Reg. Nr BK 2004/077075/23
MILNEX CC
ENVIRONMENTAL CONSULTANTS

053 963 1081
018 011 1925
072 998 6008

087 231 7021
info@milnex-sa.co.za

Botha Street 4
SCHWEIZER-RENEKE

Waterberry Street,
Waterberry Square,
1st floor, Office 7
POTCHEFSTROOM

C/o Welgevonden &
Memorial Street,
Roylglen Office Park
KIMBERLEY

www.milnex-sa.co.za

ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR:

The Environmental Impact Assessment for the proposed Mining Right combined with a Waste Licence application to mine for Copper, Zinc, Sulphur, Iron and associated minerals within the ore body near Upington portion 2 and the remaining extent on the farm Areachap 426, Registration Division, Gordonia, in the Northern Cape Province.

NAME OF APPLICANT:	**Synchroplex (Pty) Ltd**
PREPARED BY:	**Milnex CC**
TEL NO:	(018) 011 1925
FAX NO:	087 231 7021
POSTAL ADDRESS:	P.O. Box 1086, Schweizer-Reneke, 2780
PHYSICAL ADDRESS:	4 Botha Street, Schweizer-Reneke, 2780
REFERENCE NUMBER:	**NC30/5/1/2/2/10218MR**

Table of Contents

PROJECT INFORMATION

Project Name:	The Environmental Impact Assessment for the proposed Mining Right combined with a Waste Licence application to mine for Copper, Zinc, Sulphur, Iron and associated minerals within the ore body near Upington portion 2 and the remaining extent on the farm Areachap 426, Registration Division, Gordonia, in the Northern Cape Province.
DMRE ref:	NC30/5/1/2/2/10218MR
Report Title:	EIA & EMPr
Prepared By:	Milnex CC
Date:	12 June 2023

QUALITY CONTROL:

	Report Author:	**Report Reviewer:**
Name:	Deshney Mapoko National Diploma in Environmental Science Reg EAP (EAPASA) Member of IAIAsa	Christiaan Baron Master's Degree in Environmental Management Registered EAP (EAPASA)
Signature:		

DISCLAIMER:

Copyright Milnex CC: All Rights Reserved.

This document contains information proprietary to Milnex CC and as such should be treated as confidential unless specifically identified as a public document by law. Milnex CC owns all copyright and all other intellectual property rights in this report. The document may not be copied, reproduced in whole or in part, or used for any manner without prior written consent from Milnex CC. Copyright is specifically reserved in terms of the Copyright Act 98 of 1987 including amendments thereto. By viewing this disclaimer and by accepting this document, you acknowledge that you have read and accepted these Terms of Use and undertake to keep the information contained herein confidential and not to do any act or allow any act which is in breach of these Terms of Use.

The DFFE screening tool was used in compiling this document.

The Public Participation Process (PPP) must follow Regulation 41 of NEMA EIA Regulations; thus, the process needs to be transparent. However, due to the Protection of Personal Information Act (POPI Act) which commenced on 01 July 2021, Stakeholders, Landowners, surrounding landowners and registered I&AP' addresses, contact details and comments will not be included in any draft report to be circulated. All this information will form part of the final report to be submitted to the Competent Authority only.

Should you be identified as a Stakeholder, Landowner, Surrounding landowner and you do not wish to receive any further communique from Milnex CC regarding the application in question, you may request in writing that your details be removed from the Milnex CC database for this application.

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 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.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

(1) The environmental impact assessment process must be undertaken in line with the approved plan of study for environmental impact assessment.
(2) The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity must be set out in the environmental impact assessment report.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

SCOPE OF ASSESSMENT AND CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

i. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of:

i) The EAP who prepared the report

ii) Expertise of the EAP

Name of Practitioner	Qualifications	Contact details
Deshney Mapoko	National Diploma in Environmental Sciences Reg EAP (EAPSA) **(**Refer to **Appendix 1)**	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: deshney@milnex-sa.co.za
Christiaan Baron	Master's Degree in Environmental Management Reg EAP (EAPSA) **(**Refer to **Appendix 1)**	Tel No.: (018) 011 1925 Fax No. : (053) 963 2009 e-mail address: christiaan@milnex-sa.co.za

Summary of the EAP's past experience. (Attach the EAP's curriculum vitae as **Appendix 2**)

Milnex CC was contracted by **Synchroplex (Pty) Ltd** as the independent environmental consultant to undertake the Scoping and EIA process for the proposed Mining Right combined with a Waste Licence application to mine for Zinc, Copper, Iron, sulphur and associated minerals within the orebody near Upington on portion 2 and the remaining extent of the farm Areachap 426, Registration Division Gordonia in the Northern Cape Province.

Milnex CC does not have any interest in secondary developments that may arise out of the authorisation of the proposed project.

Milnex CC is a specialist environmental consultancy with extensive experience in the mining industry which provides a holistic environmental management service, including environmental assessment and planning to ensure compliance with relevant environmental legislation. Milnex CC benefits from the pooled resources, diverse skills and experience in the environmental and mining field held by its team that has been actively involved in undertaking environmental studies for a wide variety of mining related projects throughout South Africa. The Milnex CC team has considerable experience in environmental impact assessment and environmental management, especially in the mining industry.

Milnex CC have experience consulting in the environmental field. Their key focus is on environmental assessment, advice and management and ensuring compliance to legislation and guidelines. They are currently involved in undertaking EIAs for several projects across the country (refer to **Appendix 2** for CV).

ii. DESCRIPTION OF THE PROPERTY

Application area	**FARM NAME**	**REGISTRATION DIVISION**
	1) Portion 2 of the farm Areachap 426 2) Remaining Extent of the farm Areachap 426	Gordonia
Extent of the area required for mining	512 Hectares	
Extent of the area required for infrastructure, roads, servitudes etc	50 Hectares	
Depth of the mineral below surface	From the surface extending to ~ 900m below surface	
Distance and direction from nearest town	The project is situated 25km northwest from the town of Upington in the Northern Cape Province	
21-digit Surveyor General Code for each farm portion	1) C02800000000042600000 2) C02800000000042600002	
Minerals applied for	1. Copper 2. Zinc 3. Sulphur 4. Iron and 5. Associated minerals within the orebody	

i. . Farm co-ordinates

FARMS		LONGITUDE	LATITUDE
1. Remaining Extent of the Farm Areachap 426 2. Portion 2 of the Farm Areachap 426	0	S28.28205	E21.04412
	1	S28.29909	E21.06089
	2	S28.31126	E21.04308
	3	S28.28206	E21.02834

iii. LOCALITY MAP

(show nearest town, scale not smaller than 1:250000 attached as **Appendix 3).**

A Locality map is attached in **Appendix 3** and on figure 1 below.

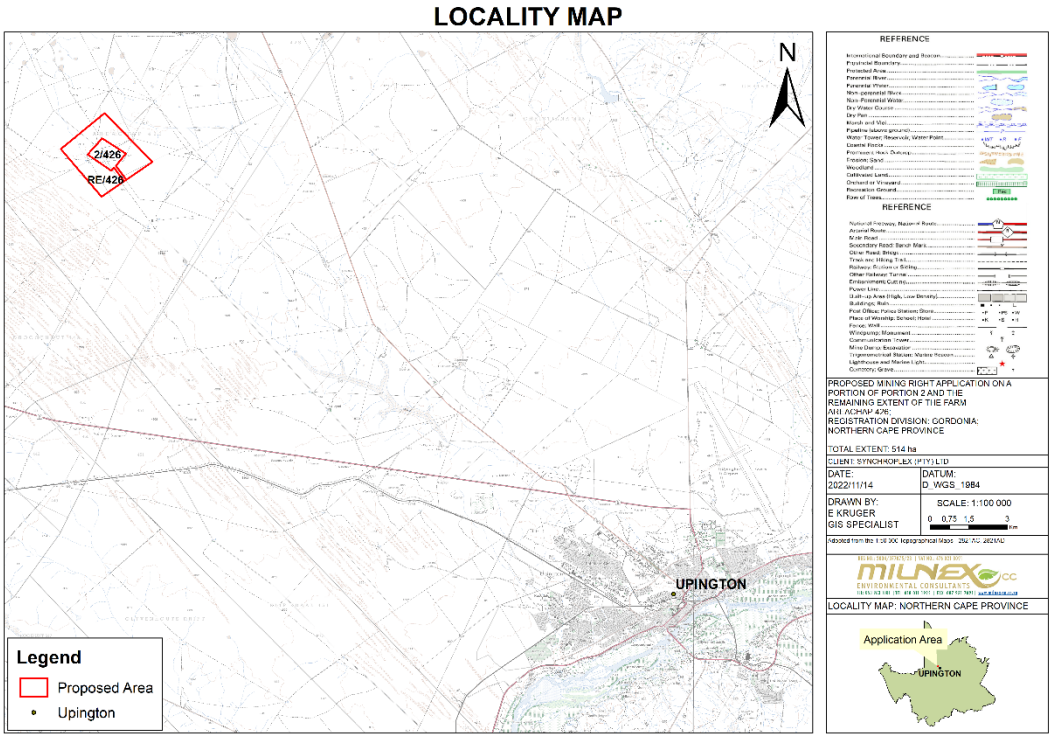


Figure 1: Locality Map

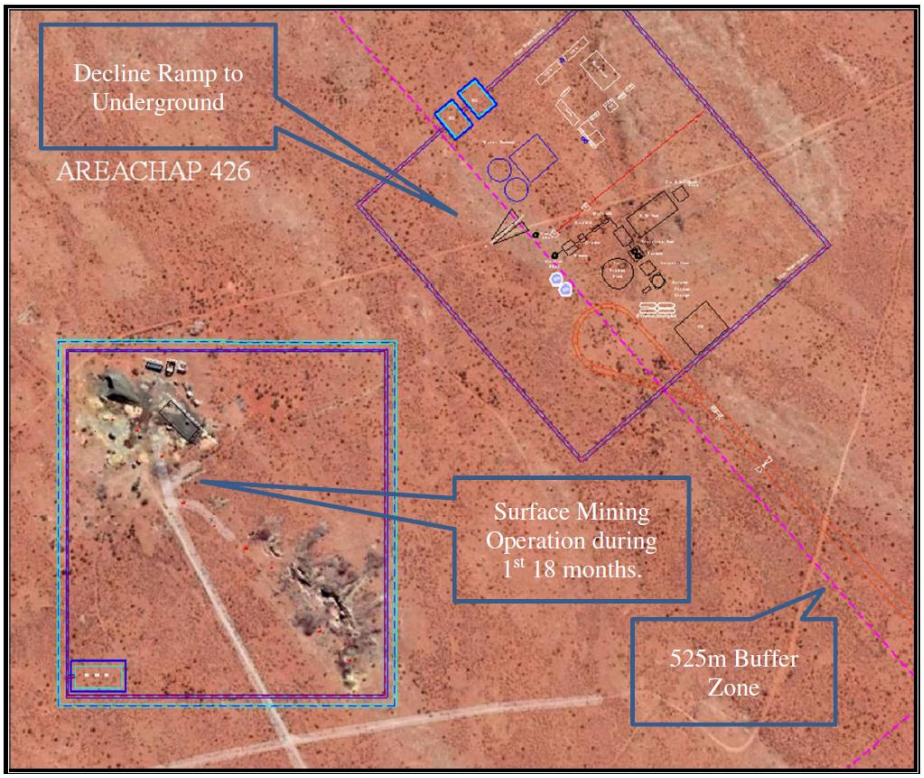


Figure 2: Site Plan

3.5 **Mineral resource map)**

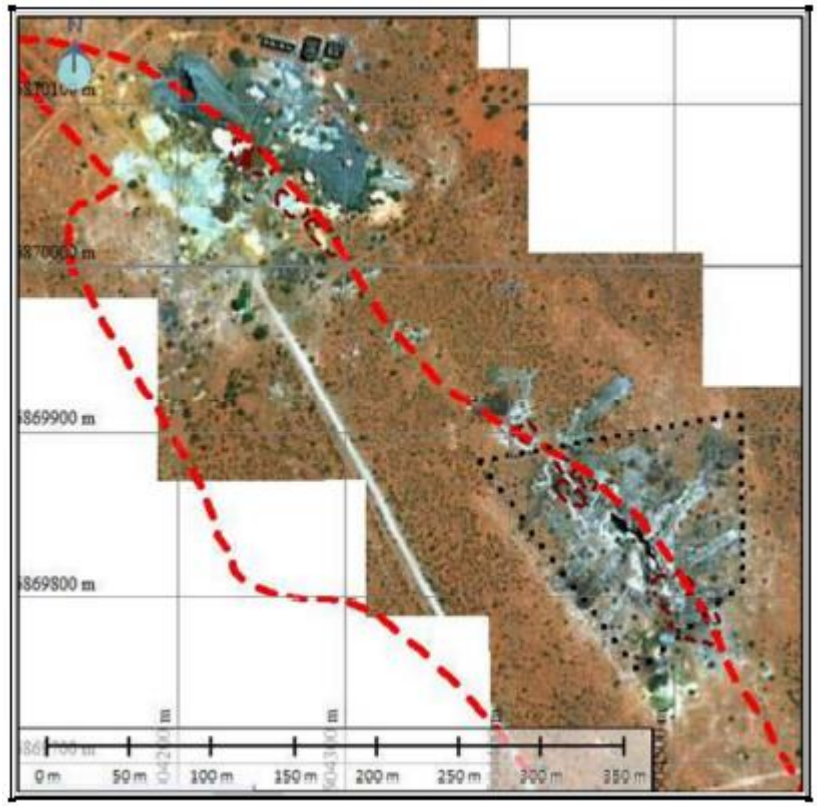


Figure 3: Mineral resource map sourced from the MWP (**Appendix 9**)

iv. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

i. LISTED AND SPECIFIED ACTIVITIES

Description of the overall activity. **(Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, technical co-operation permit, Additional listed activity)**	**Listing Notice 1 (GNR 327), Activity 9:** *The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—* *(i) with an internal diameter of 0,36 meters or more; or* *(ii) with a peak throughput of 120 liters per second or more;* **Listing Notice 1 (GNR 327), Activity 10:** *The development and related operation of infrastructure exceeding 1 000 meters in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes –* *(i) with an internal diameter of 0,36 meters or more; or* *(ii) with a peak throughput of 120 litres per second or more;* **Listing Notice 1 (GNR 327), Activity 19:** *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.* **Listing Notice 1 (GNR 327), Activity 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters. **Listing Notice 1 (GNR 327), Activity 24:** The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters. **Listing Notice 2 (GNR 325), Activity 6:** The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, **Listing Notice 2 (GNR 325), Activity 15:"**The clearance of an area of 20 hectares or more, of indigenous vegetation."

	Listing Notice 2 (GNR 325), Activity 17 (Amended GNR 517: 2021): "*Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right."* **Listing Notice 2 (GNR 325), Activity 19 (Amended GNR 517: 2021):** *"The removal and disposal of minerals which requires permission contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002, as well as any other applicable activity as contained in this Listing Notice, Listing Notice 1 of 2014 or in Listing Notice 3 of 2014, required to exercise the permission".* ***Listing Notice 3 (GNR 324), Activity 10:*** *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* ***(g) Northern Cape, (ii)*** *Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland,* Mining right for the mining of Copper, Zinc, Iron and associated minerals within the ore body & including associated infrastructure, structure and earthworks. **NEM: WA 59 of 2008** <u>Storage of hazardous waste</u> **1.** Category B: (1) The storage of general waste in lagoons. <u>Treatment of waste</u> **2.** Category B: (5) The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage. <u>Disposal of waste on land:</u> **3.** Category B: (7) The disposal of any quantity of hazardous waste to land. **4.** Category B: (8) The disposal of general waste to land covering an area in excess of 200m^2 and with a total capacity exceeding 25 000 tons. **5.** Category B: (9) The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation. <u>Construction of facilities and associated structures & infrastructure:</u> Category B: (10) The construction of a facility for a waste management activity listed in Category B of this Schedule

NAME OF ACTIVITY **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. for mining**, - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** (Mark with an **X** where applicable or affected).	**APPLICABLE LISTING NOTICE** **(*GNR 324, GNR 325 or GNR 326)***	**WASTE MANAGEMENT AUTHORISATION** (Indicate whether an authorisation is required in terms of the Waste Management Act) **(**Mark with an **X)**
The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more **Pipelines will be established for the mine infrastructure.**			**Listing Notice GNR 327, Activity 9**	
The development and related operation of infrastructure exceeding 1 000 meters in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes. **Pipelines will be established for the mine infrastructure, including for the pumping and transportation of sewage, tailings, and process water.**			**Listing Notice GNR 327, Activity 10**	
The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. **This includes explosives, diesel etc**			**Listing Notice GNR 327, Activity 14:**	
The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;			**Listing Notice 1 (GNR 327), Activity 19:**	
The development of a road— (i) for which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or			**Listing Notice GNR 327, Activity 24:**	

(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters; **These will include access & haul roads**				
The development of facilities or infrastructure for any process or activity which requires a permit or license or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding — (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic meters or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic meters per day. **The mining operation will require a water use licence as per the NWA.**			**Listing Notice GNR 325, Activity 6**	
Clearance of indigenous vegetation: "The clearance of an area of 20 hectares or more, of indigenous vegetation." – Random indigenous vegetation clearance. **Approximately 512ha of indigenous vegetation is planned to be removed for the development of the mine.**	Extent of the area required for Mining: Approximately 512ha Application area: 514.09 hectares	X	**Listing Notice GNR 325, Activity 15**	**-**
"Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including — (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies."			**Listing Notice GNR 325, Activity 17**	

Mining right for the mining of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body				
The removal and disposal of minerals which requires permission contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002, as well as any other applicable activity as contained in this Listing Notice, Listing Notice 1 of 2014 or in Listing Notice 3 of 2014, required to exercise the permission.			**Listing Notice 2 (GNR 325), Activity 19 (Amended GNR 517: 2021):**	
The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (g) Northern Cape, (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland, **This includes explosives, diesel etc that is stored within 100m of any water course or wetland**			**Listing Notice 3 (GNR 324), Activity 10:**	
Storage of hazardous waste: The storage of general waste in lagoons. Tailings storage facility.			**NEM: WA 59 of 2008 (Category B: (1))**	**X**
Treatment of waste Category B: (5) The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.			**NEM: WA 59 of 2008 (Category B (5))**	
Disposal of waste on land: (7) The disposal of any quantity of hazardous waste to land.			**NEM: WA 59 of 2008 (Category B: (7))**	
Disposal of waste on land: (8) The disposal of general waste to land covering an area in excess of 200m^2 and with a total capacity exceeding 25 000 tons.			**NEM: WA 59 of 2008 (Category B: (8))**	
Disposal of waste on land: (9) The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.			**NEM: WA 59 of 2008 (Category B: (9))**	
Construction of facilities and associated structures and infrastructure: The construction of a facility for a waste management activity listed in Category B of this Schedule			**NEM: WA 59 of 2008 (Category B: (10))**	

ii. DESCRIPTION OF THE ASSOCIATED STRUCTURES AND INFRASTRUCTURE RELATED TO THE DEVELOPMENT

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

According to the Mine Work Programme (MWP):
There is an existing Prospecting Right area of approximately 20 000 ha owned by Synchroplex (Pty) Ltd, permitting for the exploration of zinc, Copper, Iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

MINE DESIGN

Open pit mining

The surface mining operation will be conducted by surface mining methods with a truck and shovel operation by an outsourced mining contractor, specifically due to the short duration of this operation. **The mining method entails the following process:**

1. The historic surface area where historic mining activities and infra-structure occurred will be cleaned properly be removing sufficient material to expose stable and safe geological conditions.
2. As a result of the limited size of the orebody it is imperative to remove as little as possible waste from a cost perspective.
3. It is therefore intended to remove the waste material and orebody in the upper oxidized zone by means of strip-mining methodology with drilling and blasting to 70 meters in depth maximum.
4. An 8o decline ramp will provide access to the orebody but ensuring that as little as possible waste be mined during this process. This same ramp system will continue into the underground operation and will be used as well.
5. A benching operation will ensure safety benches are intact for strata protection purposes, developed and planned according to rock engineering practitioner specifications.
6. Once the desired depth is reached, preparation for the underground access will be developed a surface blasting operation with roll-over mining technology.

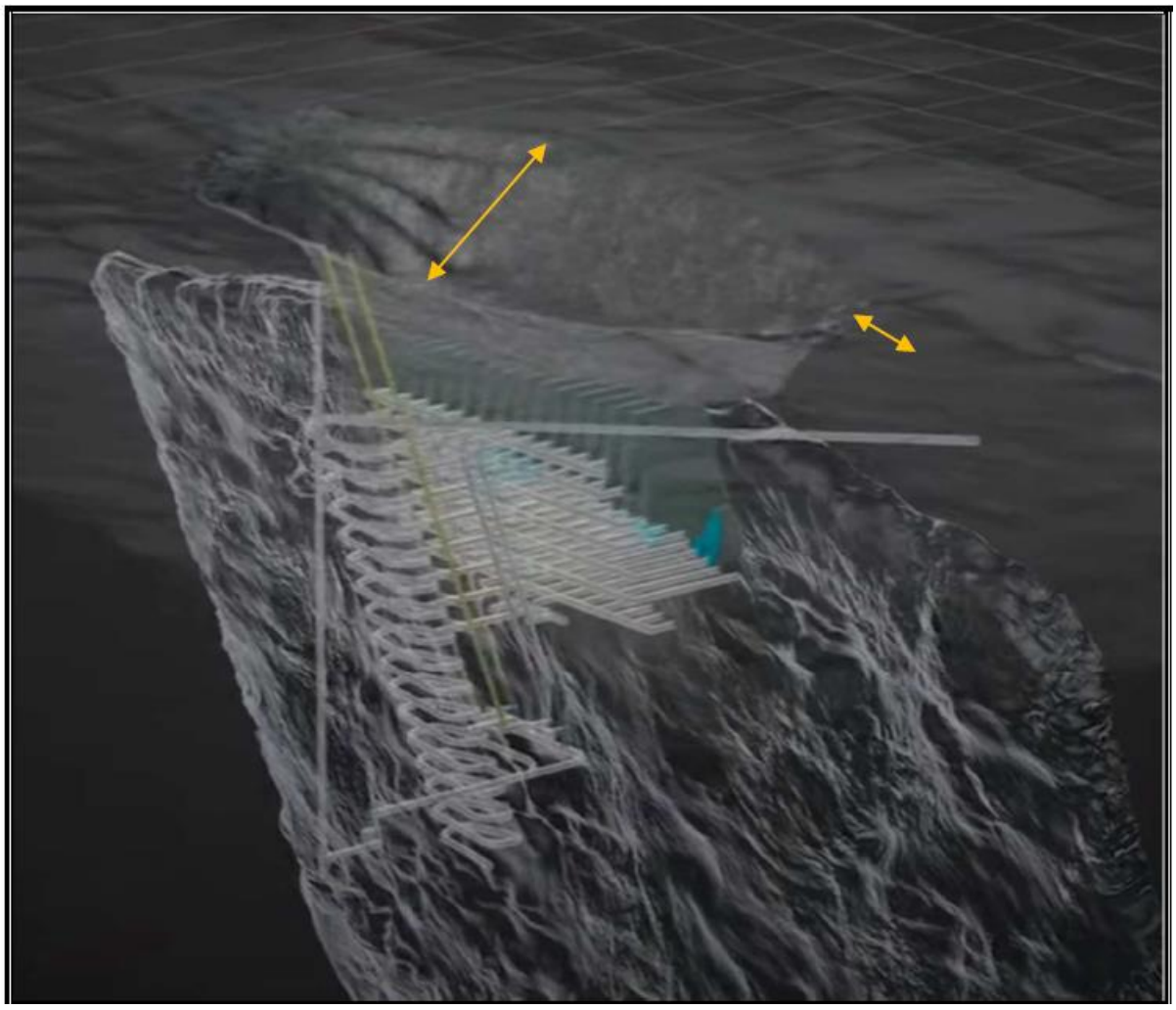
Underground Mining

The underground mining operation will be conducted by mine-own mining personnel with underground mechanized mining equipment and technology as well as drilling and blasting equipment. **The mining method to be used for the underground exploitation process is a total block-caving mining technique which encompasses the following process:**

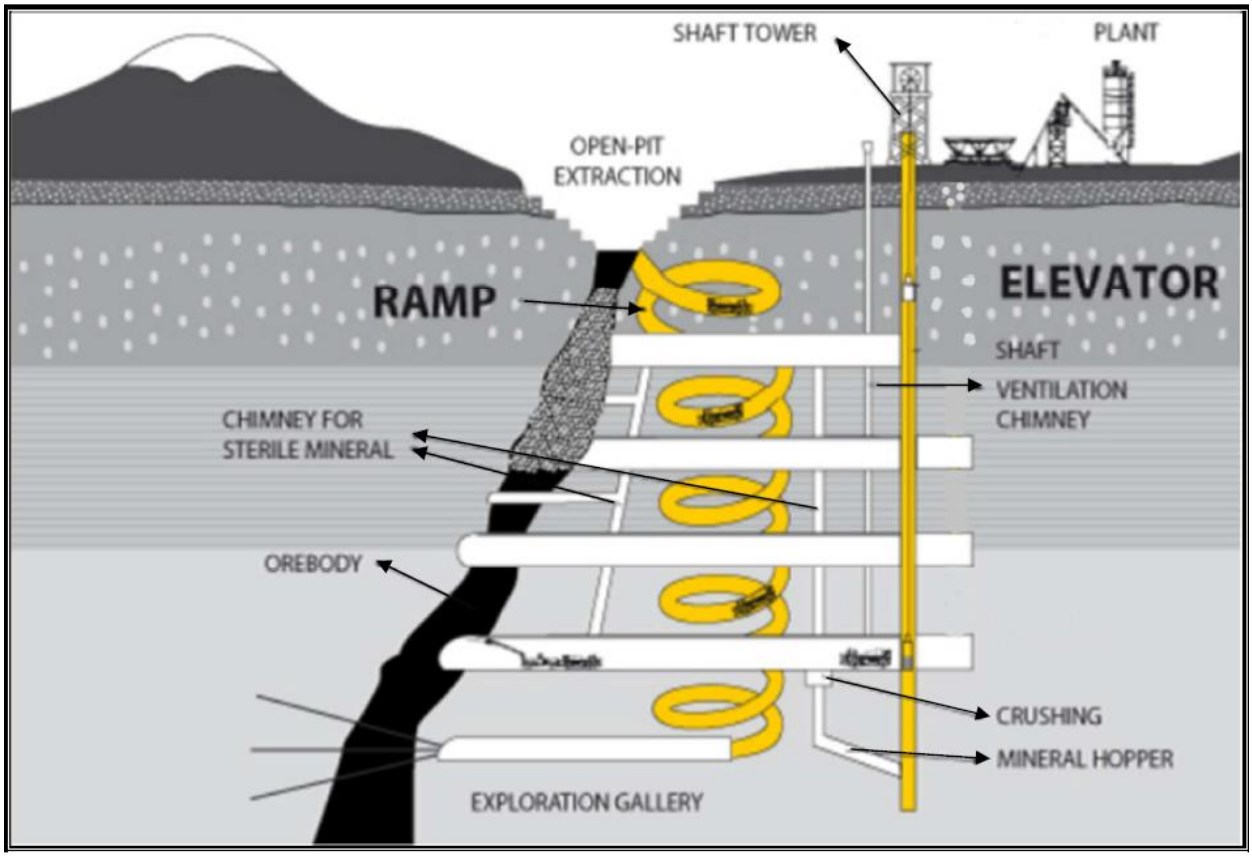
1. An 8o decline spiral ramp system will provide access to close proximity to the +85o dipping orebody at 15-meter vertical intervals, which will form each consecutive production level.
2. Each production level will thus consist of 15 meters of ore between levels.
3. Crosscuts, developed in waste, will be blasted towards the orebody out of the decline ramp system for production level access purposes.
4. Once the orebody is intersected, a development drive along the full strike of the orebody, in the ore (on-reef to explain it more simplistically), towards the full width of the orebody, some 400 meters away.
5. **The size of the development drive is planned at 3 meters wide x 3 meters in height and will be supported.**
6. Once the main development along the complete strike of the orebody is developed and supported, crosscuts, 16 in total will be developed into the width of the orebody (6m to 15m in width). The size of the orebody crosscuts will be 5 meters wide by 5 meters high.
7. These crosscuts will encompass the main production panels.
8. From the main development and each on-ore crosscut, draw-bells, 10 meters in length will be blasted into the orebody in a vertical direction upwards to surface only.
9. Once the draw-bells are blasted, starting from the end of the strike of the orebody in a retreat fashion, it will be loaded out.
10. It is required to follow a retreat-mining process due to the caving of the overburden into the void draw-bells once blasted. Once each draw-bell is loaded out, no more access into the development drive or on-ore crosscut will be possible from a rock engineering risk perspective.
    a) The caving of the overburden, al the way to surface will continue at a calculated angle of ~70o towards surface. The implication of this is that a radius of ~ 326m, established from the perimeter of the orebody (15m thick x 400m in width), will eventually cave if a mining depth of 900m is reached.

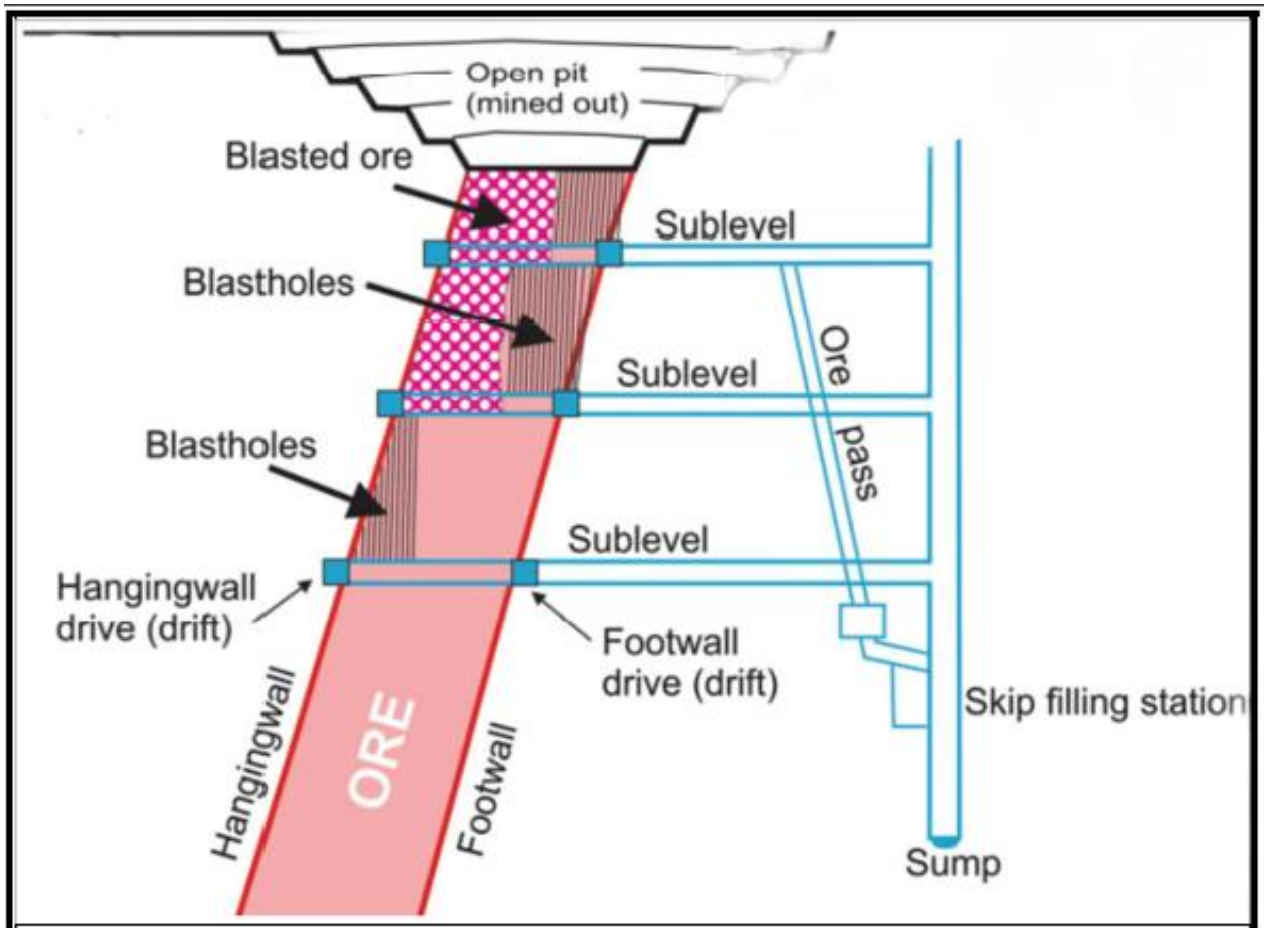
b) It is therefore required that along the 400m strike length of the orebody, a 652m buffer-zone be left open on surface for overburden caving purposes. In addition, a minimum of 200m safety standoff no-construction distance is provided for (long yellow arrow indicated in picture below). Surface infra-structure can only be constructed from this point onwards.

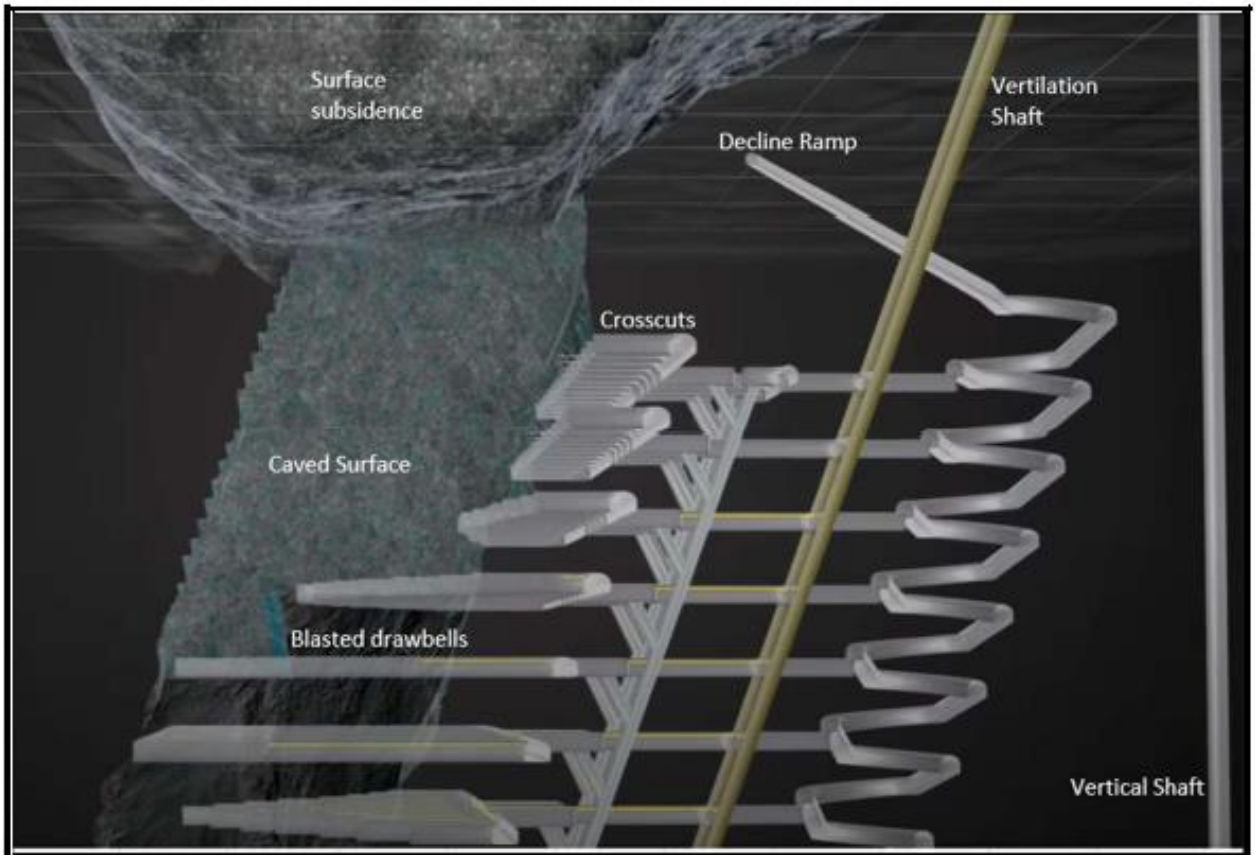
c) The two flanks at the edges of the orebody limit will only contain a 326m buffer-zone plus the 200m safety standoff distance (short yellow arrow indicated in picture below)



11. Each loaded draw-bell will allow caving of waste material above all the way towards the surface of the mine.
12. All material loaded out (ore only), will be transported via the original decline ramp crosscuts and dumped into a pre-blasted inter-level ore-pass at selective positions.
13. The ore-passes will feed blasted material into sublevel inline-crushers at certain inter-level positions.
14. The crushed ore will be drawn into blasted ore storage bins, specifically developed for ore extraction. Hoisting skips will load the crushed ore from these stockpile bins and hoist the material to surface via the main vertical ore-shaft.
15. During the mining and extraction of each upper level, sub-level development drives and crosscuts will be developed at lower levels for production continuance purposes.
16. It is imperative form a rock engineering perspective that the main development of the lower levels will lead the current blasting positions of the upper-level draw-bells at any time.
17. The development of the decline ramp system will always be at least levels lower that active mining levels in order to ensure sufficient timelines for shaft equipping and development purposes.
18. The development of the 6-meter diameter main vertical ore-and-service shaft as well as the 3-meter diameter ventilation shaft, will always lead the sequence of the rest of the mining operation quite significantly.


SHAFT TOWER
PLANT
OPEN-PIT
EXTRACTION
RAMP
ELEVATOR
SHAFT
VENTILATION
CHIMNEY
CHIMNEY FOR
STERILE MINERAL
OREBODY
CRUSHING
MINERAL HOPPER
EXPLORATION GALLERY


Open pit
(mined out)
Blasted ore
Sublevel
Blastholes
Ore
pass
Sublevel
Blastholes
Sublevel
Hangingwall
drive (drift)
Footwall
drive (drift)
Skip filling station
Hangingwall
ORE
Footwall
Sump



Water uses:

According to the Mining Work Programme, see the below information regarding water use:
Processing and beneficiation of this type of process requires a significant amount of water consumption and as such, but no major challenges are foreseen in this respect. The current available water supply in the area as well as water to be sourced from local boreholes on the property, will be sufficient and adequate for the envisaged operational requirements.

Underground and surface dust suppression will be conducted by utilizing water obtained during the water-make of the mining operations during underground cutting and exposure. The historic shaft system is fully flooded and it is therefore accepted that a substantial amount of water-make will be produced during the underground operation once the water table is compromised.

An integrated water purification plant will be needed for the purification of contaminated underground water as well as for the recycling and winning of water used in the processing and tailings plant. The standard of purification for this water needs to be at an industry acceptable level. Once the mine is no more operational, this facility will be used for AMD control and proper water purification.

A surface reservoir will be constructed at the underground portal for water distribution to the underground sections as well as for the processing facility, this will mainly consist of recirculated treated water. Apart from potable water (to be sourced from boreholes) used in mainly the administration area, this water will also be used for dust suppression, usage for the change houses and ablution facilities.

Water uses under section 21 a-k of the NWA may be triggered; thus a Water Use Licence Application (WULA) will need in cases there will be encroachment. When needed WULA will be lodged with the department of Water & Sanitation (DWS).

It should also be noted that borehole testing will need to be conducted by a qualified Geohydrologist to help in monitoring the water quality and quantity.

It is envisaged according to the scope of works and mining work programme that the following water uses will be applied for:

Section 21(a)	*Taking water from a water resource*
Section 21(b)	*Storing water*
Section 21(g)	*Disposing of waste in a manner which may detrimentally impact on a water resource*
Section 21(j)	*Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people*

Ablution

Chemical toilets shall be used, no French drains and pits shall be permitted.

Storage of dangerous goods

The following activity was applied for:

Listing Notice 1 GNR 327, Activity 14: *The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.*

During the mining activities, limited quantities of diesel and fuel, oil and lubricants will be stored on site. These goods should be placed in a bunded area one and a half times the volume of the total amount of goods to be stored. The amount of dangerous goods stored on site will not exceed 500m3. Any hazardous goods will need to be handled in a way that they do not pose any health impact on people, livestock as well as crops.

Summary of infrastructure requirements such as roads, rail, electricity and water

According to the Mining Work Programme, see the below information regarding what type of equipment will be needed for the envisaged mining activities:

1	Surface Infrastructure
1	Vertical Shaft sinking~ 900m
2	Headgear Structure
3	Material Skip
4	Winch House
5	Hoisting Rope
6	Hoisting Gear
7	Cages, material and personnel
8	Hopper Rail tracks
9	Ventilation shaft ~900m
10	Ventilation fan
11	Tipper Trucks
12	Front End Loaders
13	Skit steer
14	MPV with High-up
15	40 Ton Crane
16	Water Purification Plant
17	Water Storage Tanks
18	Water evaporations ponds
19	Various Hard Material Dumps
20	Mine access roads

2	Decline shaft to inter-level development
1	Ventilation ducting
2	Ore-passes multi-level
3	Underground crushers every 3rd level
4	Decline ramp
5	Walkway railing

3	Processing Facility
1	Froth Flotation Plants
2	Roasting Plant with Furnace
3	Leaching Plant with dams
4	Pressurized Leching Vessels
5	Neutralisation Plant
6	Electrowinning Plant
7	Electrowinning Tank-house
8	Ball Mill
9	Rod Mill
10	Filter Press
11	Dry Tailings Storage Facility (TFS)
12	Crushing & Screening Plant
13	Acid Storage facility
14	Neutralization agent storage facility
15	Water storage tanks
16	Material Handling facility
17	Product storage facility Cu & Zn
18	Product stockpiles Iron ore and Sulphur
19	Conveyor structure
20	Laboratory Complete

4	General
1	Diesel bay and storage tanks
2	Workshops
3	Service Bay
4	Washbay
5	Main offices
6	Changehouse
7	Ablution facility complete
8	Weighbridge Control
9	Security Access control gates
10	Electrical Reticulation 10 MVA Requirement
11	Transformers
12	Rectifiers
13	Power lines
14	Gates and Fences
15	PCD Dams
16	Water trenches: clean and dirty water
17	Hoisting and material handling gear
18	Lamproom
19	Battery charging center
20	Explosive magazine
21	Accessory and parts Stores

5	Mining Equipment
1	LHDs Production
2	Roofbolters
3	Support accessories
4	Long hole drilling rigs
5	Drilling accessories
6	Rock Loaders
7	Temporary support
8	Mechanical props
9	Timber props
10	Compressors & Accessories
11	Jack Hammers
12	Water columns clean & dirty
13	Ventilation ducting
14	Tractor & Trailor
15	Man carriages
16	Service vehicles (LDVs)
17	Dewatering pumps and pipes
18	Pumping accessories

Access road

The area is reasonably well accessed through a local, regional and national network of roads. Roads will need to be built for access to the plant area and haul roads will have to be developed from the cast area to the plant.

The following activity was applied for:

Listing Notice 1 (GNR 327), Activity 24(ii): *"The development of a road with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres."*

Mining activities and phases

Please find the Mining Work Programme attached as **Appendix 9**.

v. POLICY AND LEGISLATIVE CONTEXT

(a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;)

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act No. 107 of 1998 as amended.	Department of Environmental Affairs	27 November 1998
Constitution of South Africa Act 108 of 1996	National	18 December 1996
The National Heritage Resources Act (Act No. 25 of 1999)	SAHRA	1999
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Department of Mineral Resources & Energy (DMRE)	2002
National Infrastructure Plan	National	
National Environmental Management: Biodiversity Act No. 10 of 2004	Department of Environmental Affairs	7 June 2004
National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)	National & Provincial	1 July 2009
EIA regulations under NEMA	Department of Environmental Affairs	14 December 2014
Conservation of Agricultural Resources Act,1983 (Act No. 43 of 1983)	Department of Agriculture Forestry and Fisheries	1 June 1984
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004).	National and Provincial	11 September 2004
National Water Act, 1998 (Act No. 36 of 1998).	National	20 August 1998
ZF Mgcawu District Municipality Integrated Development Plan (IDP)	Municipal	
Khara Hais Local Municipality Integrated Development Plan (IDP)	Municipal	

National Forest Act (Act 84 of 1998) (NFA)	National	30 October 1998
National Veld & Forest Fires Act (Act 101 of 1998)	National	27 November 1998

A. Policy and Legislative Context

Title of legislation, policy or guideline:	Reference where applied	How does this development comply with and respond to the legislation and policy context.
Constitution of South Africa Act 108 of 1996	Section 24	The Constitution is the supreme law of the Republic and all law and conduct must be consistent with the Constitution. The Chapter on the Bill of Rights contains a number of provisions, which are relevant to securing the protection of the environment. Section 24 of the Constitution of the Republic of South Africa (Act 108 of 1996) states the following: *"Everyone has the right –* *(a) to an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –* *i) prevent pollution and ecological degradation;* *ii) promote conservation; and* iii) *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."* The Constitution therefore, compels government to give effect to the people's environmental right and places government under a legal duty to act as a responsible custodian of the countries environment. It compels government to pass legislation and use other measures to protect the environment, to prevent pollution and ecological degradation, promote conservation and secure sustainable development.
National Environmental Management Act No. 107 of 1998 as amended.	S24(1) of NEMA S28(1) of NEMA	NEMA provides for co-operative governance by establishing principles and procedures for decision-makers on matters affecting the environment. An important function of the Act is to serve as an enabling Act for the promulgation of legislation to effectively address integrated environmental management. Some of the principles in the Act are accountability; affordability; cradle to grave management; equity; integration; open information; polluter pays; subsidiary; waste avoidance and minimisation; co-operative governance; sustainable development; and environmental protection and justice. The mandate for EIA lays with the National Environmental Management Act (107 of 1998) and the EIA Regulations No. 326, 327, 325, and 324 promulgated in terms of Section 24 of NEMA. The EIA Regulations determine that an Environmental Authorisation is required for certain listed activities, which might have a detrimental effect on the environment.

EIA regulations as amended under NEMA	Listing notice 1 Listing notice 2 Listing Notice 3	The National Environmental Management Act107 of 1998 (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment. These activities are detailed in Listing Notice 1 (as amended by GNR 327 of 7 April 2017), Listing Notice 2 (as amended by GNR325 of 7 April 2017) and Listing Notice 3 (as amended by GNR324 of 7 April 2017). Undertaking activities specified in the Listing Notices are only allowed once Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation will only be considered once there has been compliance with the EIA Regulations, 2014. The Environmental Authorisation which may be granted subject to conditions.
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 10, 16, 22, 27 and 48	The Minerals and Petroleum Resources Development Act identifies the state as the official custodian of South Africa's Mineral and Petroleum Resources. Therefore, all activities relating to the reconnaissance, prospecting rights, mining rights, mining permits and retention permits are regulated by the State. One of the objectives of the Act is to 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.
Mineral and Petroleum Resources Development Regulations, 2014.	Regulations 3, 5, 10 and 14	MPRDA Regulations prescribe how an application for a permit or right must be lodged.
The National Heritage Resources Act (Act No. 25 of 1999)	Section 35 Section 38	The National Heritage Resources Act (Act No 25 of 1999, Section 35) protects South Africa's unique and non-renewable archaeological and palaeontological heritage sites. These sites may not be disturbed without a permit from the relevant heritage resources authority. Section 38 of the NHRA provides guidelines for Cultural Resources Management and proposed developments:
National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)	Category A Category B Category C	Section 24S of NEMA deals with the management of residue stockpiles and residue deposits and provides that Residue stockpiles and residue deposits must be deposited and managed in accordance with the provisions of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), on any site demarcated for that purpose in the environmental management plan or environmental management programme in question. The management of residue stockpiles and residue deposits must be done in accordance with any conditions set out and any identified measures in the environmental authorisation issued in terms of NEMA, an environmental management programme and a waste management licence issued in terms of NEMA (Regulation 3(2)). The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) regulates waste management in all aspects and created a list of waste management activities that have, or are likely to have, a detrimental effect on the environment, which requires an impact assessment and licensing process. Activities listed in Category A require a Basic Assessment process, activities listed in Category B require a Scoping and EIA process and activities under Category C must comply with the relevant requirements or standards, in order for competent authorities to consider an application in terms of NEM:WA.

National Environmental Management: Biodiversity Act No. 10 of 2004	Chapter 4 Chapter 5	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA. The Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant protection; 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 (SANBI). Chapter 4 of NEMBA deals with threatened and protected ecosystems and species to ensure the maintenance of their ecological integrity, their survival in the wild, the utilisation of biodiversity is managed in an ecologically sustainable way and to regulate international trade in specimens of endangered species. Chapter 5 of NEMA deals with species and organisms posing potential threats to biodiversity. The purpose of this chapter is to prevent the introduction and spread of alien species and invasive species, also to manage, control and eradicate alien species and invasive species
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004).	Section 21	The object of this Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in the Republic; the prevention of air pollution and ecological degradation; and securing ecologically sustainable development while promoting justifiable economic and social development. Regulations No. R248 (of 31 March 2010) promulgated in terms of Section 21(1) (a) of the National Environmental Management Act: Air Quality Act (39 of 2004) determine that an Atmospheric Emission License (AEL) is required for certain listed activities, which result in atmospheric emissions which have or may have a detrimental effect on the environment. The Regulation also sets out the minimum emission standards for the listed activities. It is not envisaged that an Atmospheric Emission License will be required for the proposed development.
National Water Act, 1998 (Act No. 36 of 1998).	Section 21	Sustainability and equity are identified as central guiding principles in the protection, use, development, conservation, management and control of water resources. The intention of the Act is to promote the equitable access to water and the sustainable use of water, redress past racial and gender discrimination, and facilitate economic and social development. The Act provides the rights of access to basic water supply and sanitation, and environmentally, it provides for the protection of aquatic and associated ecosystems, the reduction and prevention of pollution and degradation of water resources. As this Act is founded on the principle that National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, a person can only be entitled to use water if the use is permissible under the Act. Chapter 4 of the Act lays the basis for regulating water use.

National Forest Act (Act 84 of 1998) (NFA)	Regulation 7	The protection, sustainable management and use of forests and trees within South Africa are provided for under the National Forests Act (Act 84 of 1998). Regulation 7 from the Act states the following: **Prohibition on destruction of trees in natural forests.** (1) No person may - (a) cut, disturb, damage or destroy any indigenous tree in a natural forest; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from a tree contemplated in paragraph (a), except in terms of- (i) a licence issued under subsection (4) or section 23; or (ii) an exemption from the provisions of this subsection published by the Minister in the Gazette on the advice of the Council.
National Veld & Forest Fires Act (Act 101 of 1998)	Regulation 13 Chapter 5	The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout the Republic and provides for a variety of institutions, methods and practices for achieving the purpose. Regulations 13 provides the requirement for firebreaks. Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires.
Conservation of Agricultural Resources Act (Act No. 85 of 1983)		The purpose of the Act is to provide for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.

National Infrastructure Plan		The National Government adopted a National Infrastructure Plan in 2012. With the plan they aim to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. Government will over the three years from 2013/14 invest R827 billion in building and upgrading existing infrastructure. These investments will improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. On the other hand, investments in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to faster economic growth. This mining activity will indirectly contribute to the growing of the South African economy by supplying SANRAL with material to build and upgrade road infrastructure.
District Municipality Integrated Development Plan (IDP)		The IDP and SDFs of the relevant municipalities was examined and relevant information was included in the EIA report.
Local Municipality Integrated Development Plan (IDP)		The IDP and SDFs of the relevant municipalities was examined and relevant information was included in the EIA report.
National Environmental Management: Protected Areas Act 57 of 2003		This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.
National Environmental Management: Waste Act, 2008 (Act No. 59 Of 2008) Regulations regarding the Planning & Management of Residue Stockpiles & Residue Deposits from a Prospecting, Mining, Exploration or Production Operation		The purpose of these Regulations is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation.
Hazardous Substances Act (No. 15 of 1979)		The object of the Act is inter alia to 'provide for the control of substances which may cause injury or ill health to, or death of, human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in

		certain circumstances; for the control of electronic products; for the division of such substances or products into groups in relation to the degree of danger; for the prohibition and control of such substances.' In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.
Subdivision of Agricultural Land Act (No. 70 of 1970)		This Act regulates the subdivision of agricultural land and its use for purposes other than agriculture. The Directorate of Resource Conservation is responsible for the enforcement thereof. Investigations are done by the Provincial Department in support of the execution of the Act. The Act also deals with aspects associated with rezoning land.
Occupational Health and Safety Act (No. 85 of 1993)		The Occupational Health and Safety Act (No. 85 of 1993) (OHSA) provides a legislative framework for the provision of reasonably healthy and safe conditions in the workplace. It also places extensive legal duties on employees and users of machinery and makes major inroads on employers' and employees' common law rights. The OHSA is applicable and states that any person involved with construction, upgrades or developments for use at work or on any premises shall ensure as far as reasonably practicable that nothing about the manner in which it is installed, erected or constructed makes it unsafe or creates a risk to health when properly used.
Mine Health and Safety Act (No. 29 of 1996)		The Mine Health and Safety Act (No. 29 of 1996) (MHSA) aims to protect and promote the health and safety of employees and persons that may be affected by the activities at a mine and outlines both the rights and responsibilities of an employer, as well as the obligations of employees working thereat. The following principles are considered applicable to the Proposed Project and are detailed below: • The primary responsibility for ensuring a health and safe working environment in the mining site is placed on the mine owner. The Act sets out in detail the steps that employers must take to identify, assess records and control health and safety hazards in the mine; • The right of workers to participate in health and safety decisions, the right to receive health and safety information, the right to training and the right to withdraw from the workplace in face of danger; • The Act requires the establishment of institutions to promote a culture of health and safety and develop policy, legislation and regulations; and • The responsibility for enforcing MHSA lies with the Mine Health and Safety Inspectorate. The Inspectorate's powers are recast and include the power to impose administrative fines upon employers who contravene the MHSA. The Act also contains innovative approaches to the investigation of accidents, diseases and other occurrences that threaten health and safety.

Government Notice Regulation 704 of 1999		GNR.704 of 1999 under the NWA provides regulations on the use of water for mining and related activities aimed at the protection of water resources (requirements for clean and dirty water separation). GNR.704 requires inter alia the following: • Separation of clean (unpolluted) water from dirty water; • Collection and confinement of the water arising within any dirty area into a dirty water system; • Design, construction, maintenance and operation of the clean water and dirty water management systems so that it is not likely for either system to spill into the other more than once in 50 years; • Design, construction, maintenance and operation of any dam that forms part of a dirty water system to have a minimum freeboard of 0.8m above full supply level, unless otherwise specified in terms of Chapter 12 of the Act; and • Design, construction, and maintenance of all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years. <u>GNR.704 also stipulates that no person in control of a mine or activity may:</u> Locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood line or within a horizontal distance of 100 m from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked; Place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or Use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood line of any watercourse or estuary.

vi. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

(A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred [location] development footprint within the approved site as contemplated in the accepted scoping report;).

Mining has played a vital role in the economy of South Africa for over 100 years. In 2015 the mining industry contributed R286 billion towards South African Gross Domestic Product (GDP) representing 7.1% of overall GDP. Mining is a significant contributor to employment in the nation, with 457 698 individuals directly employed by the sector in 2015. This represents just over 3% of all employed nationally. (Chamber of Mines, South Africa, 17:2016)

Copper

Copper is the most prevalent of the base metals. It is a ductile and malleable metal which has excellent electrical conductivity properties. Copper is frequently used as an alloy and is highly suitable for use as electrical wire. Copper is also extensively used in construction, transportation, technology, monetary and defence industries. In addition, copper is an essential trace mineral essential for the survival of body tissues and the maintenance of the immune and nervous systems.

Copper is essential for modern living. It delivers electricity and clean water into our homes and cities and makes an important contribution to sustainable development. More than that, it is essential for life itself. The primary applications of copper are in electrical wiring, roofing, plumbing, and industrial machinery. For most of these applications, copper is used in its pure form. However, it can be alloyed with other metals when increased levels of hardness are required.

Zinc

Zinc is currently the fourth most widely consumed metal after iron, aluminium and copper. Its strong anticorrosive properties and ability to bond well with other metals make its primary use to galvanise other metals to prevent rusting, with approximately 50% of zinc mined used for this purpose. Zinc is also used to form alloys such as brass or bronze, in die-casting, and in the rubber, chemical, paint, and agricultural industries. From a health perspective, zinc is a vital element for growth and human development and is the second most common trace metal found in the human body, after iron. It is ordinarily associated with lead and other metals, including, but not limited to copper, gold and silver.

Currently the primarily use for zinc is as an anti-corrosion agent, accounting for approximately 50% of demand. With China accounting for almost 50% of zinc demand, and industrial activity in that country being a big driver of zinc for galvanising, the Chinese economy will be a big driver behind the demand for zinc in the future. Zinc has been estimated to have the tightest supply of all metals. If steel demand remains robust, then zinc demand will certainly follow suit. A future use for zinc could be in the agriculture sector (McLeod, 2017).

The primary use of zinc is in the galvanizing process, which protects iron and steel from rusting. Zinc can also be alloyed with other metals and used for die-casting into shapes such as door handles, alloyed with copper to make brass, and alloyed with copper and tin to make bronze. Zinc can also be added to fertilizers to increase crop yields, made into zinc oxide (an ingredient in skin cream), and used in tire manufacturing.

Sulphur

Sulphur is a non-metallic element widely used in industry both as elemental sulphur (brims tone) and as sulphuric acid. Sulphur production is from three sources: combined sulphur, recovered sulphur, and formed sulphur. Combined sulphur occurs in natural compounds such as iron pyrite, copper sulfides, and gypsum. Recovered sulphur is produced as a by-product of other processes such as oil re fining or air pollution control. Formed sulphur

is elemental sulphur cast or pressed into particular shapes to enhance handling and to suppress dust generation and moisture retention.

Iron

Iron ore is the source of primary iron for the world's iron and steel industries. It is therefore essential for the production of steel, which in turn is essential to maintain a strong industrial base. Almost all (98%) iron ore is used in steelmaking. Iron ore is mined in about 50 countries.

In 2021, South Africa's production of iron ore amounted to an estimated 61 million metric tons. South Africa is one of the world's largest producers of iron ore. As of 2021, South Africa was the ninth-largest iron ore producing country in the world.

vii. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT

(-within the approved site as contemplated in the accepted scoping report;)
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.

Location of the site

The location of the site is preferred due to the presence of Copper, Zinc, Sulfur, Iron and associated minerals within the orebody.

There is currently a 20 000 Hectare area is under Prospecting Right owned by Synchroplex (Pty) Ltd, permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

Based on outcomes of previous studies in the vicinity of the proposed site, the possibility to encounter high volumes of for Copper, Zinc, Sulfur, Iron and associated minerals within the orebody, on Portion 2 & the Remaining Extent of the Farm Areachap 426, Registration Division Gordonia, near Upington in the Northern Cape Province were anticipated.

Preferred activity

In terms of the technologies proposed, these have been chosen based on long term success in terms of their mining history. The mining activities proposed in the Mining Work Programme is dependent on the preceding phase, therefore no alternatives are indicated, but rather a phased approach of trusted mining techniques.

viii. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT

(-within the approved site as contemplated in the accepted scoping report, including:)

i. Details of the development footprint alternatives considered;

- **Consideration of alternatives**

The DEAT 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives namely, the no-go, site, activity, and technology alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer, the EAP and Interested and affected parties, which in some instances culminates in a single preferred project proposal. The following sections explore each type of alternative in relation to the proposed activity.

- **Location alternatives**

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. No other properties have been identified by Synchroplex (Pty) Ltd near Gordonia area to potentially mine the applied minerals.
There is currently a 20 000 Hectare area is under Prospecting Right owned by the applicant, permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

The land use map and landcover map of the proposed area illustrate the proposed area is monthly covered in natural areas. The site and surrounds have a land capability classification, on the 8-category scale, of Class 7 (VII).

- **Activity alternatives**

The environmental impact assessment process also needs to consider if the development of a mine to mine for Copper, Zinc, Sulphur, Iron and Associated minerals within the ore body would be the most appropriate land use for the particular site. As mentioned in the MWP that the applicant already has a prospecting right over the area permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization.

Mining of other commodities –from the surface and desktop assessment indicates that there are no indications that there are other commodities to be mined on the site, except the Copper, Zinc, Sulphur, Iron and Associated minerals within the ore body.

- **Design and layout alternatives**

Design alternatives were considered throughout the planning and design phase (i.e. where is the diamond bearing gravel located?). The layout follows the limitations of the site and aspects such as, roads, site offices and workshop area.
The area is mostly dominated by low shrubland and some water bodies within the site area as on the wetland areas map as well as a graveyard as confirmed by the HIA and some structures. Where applicable a Water Use License Application will be launched for conducting mining operations. All infrastructure will be temporary and/or mobile.

The following water uses are relevant for the proposed application:

Section 21(a)	*Taking water from a water resource*
Section 21(b)	*Storing water*
Section 21(g)	*Disposing of waste in a manner which may detrimentally impact on a water resource*

Section 21(j)	*Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people*

- **Operational alternatives**

Due to the nature of the mining activities, no permanent services in terms of water supply, electricity, or sewerage services are required.

No feasible alternatives to the pitting and trenching method currently exists. Impacts associated with the mining operations will be managed through the implementation of a management plan, developed as part of the application for authorisation.

- **No-go alternative**

This alternative considers the option of 'do nothing' and maintaining the status quo. The description provided in section H of this report could be considered the baseline conditions (status quo) to persist should the no-go alternative be preferred.

There is currently a 20 000 Hectare area is under Prospecting Right owned by the applicant, permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

Technology alternatives

In terms of the technologies proposed, these have been chosen based on the long-term success of their mining history. The mining activities proposed in the Mining Works Programme (**Appendix 9**) is dependent on the preceding phase as previously discussed, therefore no alternatives are indicated, but rather a phased approach of trusted mining techniques.

The preferred technology for the proposed mining activity, will be to remove the Copper, Zinc, Sulfur, Iron and associated minerals within the orebody.

The ore removed will be processed on site. Please find the Mining Work Programme attached as **Appendix 9.**

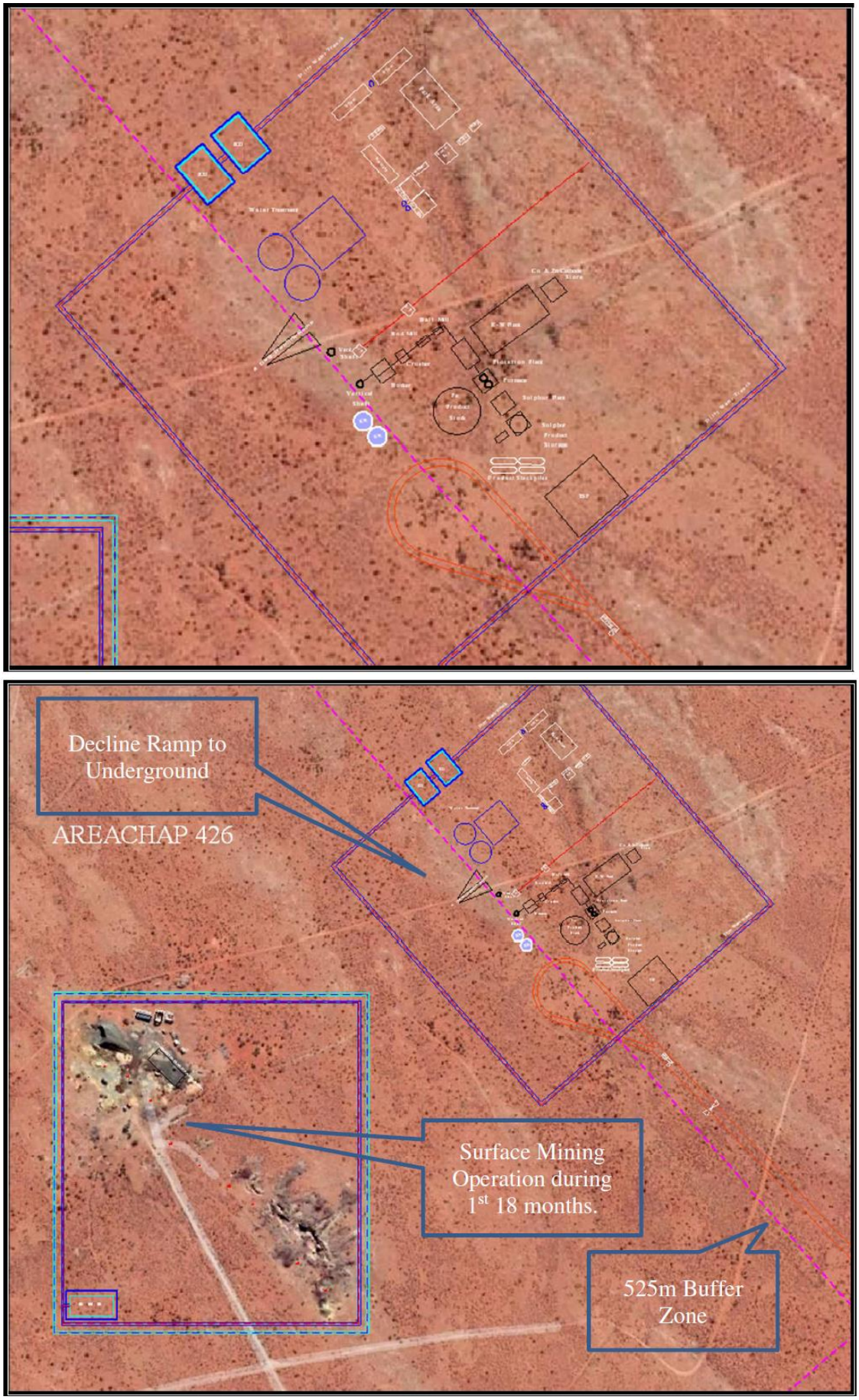


Figure 4: Mine design maps

Dust Suppression

When it comes to dust suppression two main methods were considered, namely molasses stillage and the wetting (water) of roads. The table below provides a short summary of the advantages and disadvantages of each.

Water	Molasses stillage
More cost effective	Much more expensive
Could lead to the depleting of water resources	Requires less water
No damage (only if used excessively)	The product may be toxic to aquatic organisms. (As this product could have physical effects on aquatic organisms for e.g. floating, osmotic damage)
No harm to humans or animals (Only a high quantity will have harm to humans or animals)	Not Hazardous or toxic. Could cause irritation to eyes, skin or when ingested and inhaled.
Non-flammable	Non-flammable
Eye-wash fountains not needed	Eye-wash fountains in the work place are strongly recommended
	Working procedures should be designed to minimize worker exposure to this product.
Basic storing methods	Storing methods are a bit more complicated. Should be stored in a plastic, plastic lined or stainless steel, tight closed containers between 5 and 40 degrees Centigrade.

Underground and surface dust suppression will be conducted by utilizing water obtained during the water-make of the mining operations during underground cutting and exposure. The historic shaft system is fully flooded and it is therefore accepted that a substantial amount of water-make will be produced during the underground operation once the water table is compromised.

Vehicles and earthmoving equipment may cause a dust cloud if not effectively managed which may affect the surrounding areas.

ii. 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.

Disclaimer:

The Public Participation Process (PPP) must follow Regulation 41 of NEMA EIA Regulations; thus, the process needs to be transparent. However, due to the Protection of Personal Information Act (POPI Act) which commenced on 01 July 2021, Stakeholders, Landowners, surrounding landowners and registered I&AP' addresses, contact details and comments will not be included in any draft report to be circulated. All this information will form part of the final report to be submitted to the Competent Authority only.

Should you be identified as a Stakeholder, Landowner, Surrounding landowner and you do not wish to receive any further communique from Milnex CC regarding the application in question, you may request in writing that your details be removed from the Milnex CC database for this application.

Advertisement and Notices

An advertisement was placed in English in the local newspaper **(Noordkaap Bulletin)** notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Milnex CC. I&APs were given the opportunity to raise comments within 30 days of the advertisement (see **Appendix 6**).

Site notices

Site notices were placed (as anticipated on the coordinates below) on site in English to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs will be given the opportunity to raise comments. Photographic evidence of the site notices will be included in **Appendix 6**. Below are the coordinates where the site notices were placed.

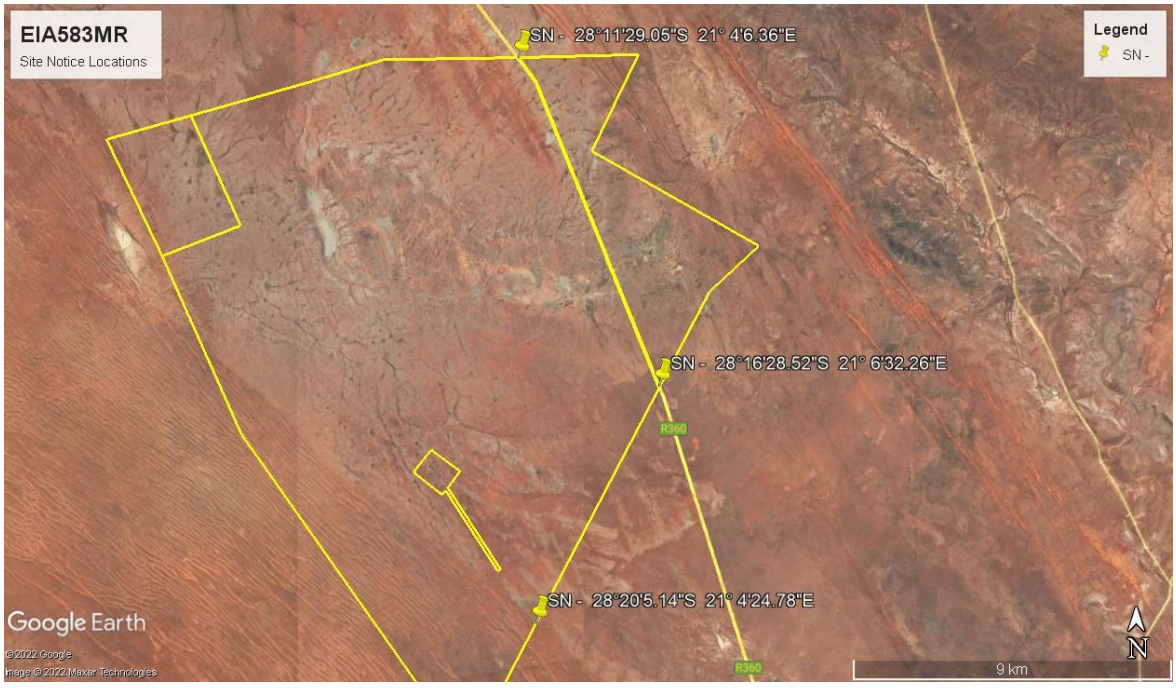


Figure 5: Site notice locations

Direct notification and circulation of Scoping Report to identified I&APs, landowners, and occupiers.

Identified I&APs, including key stakeholders representing various sectors, were directly informed of the proposed development and the availability of the Scoping Report via registered post on **14 October 2022** and were requested to submit comments by **13 December 2022.** A copy of the report is also available at the Milnex offices in Schweizer-Reneke, 4 Botha Street, Schweizer-Reneke and Potchefstroom (Waterberry Street, Waterberry Square, 1st floor, Office 5B, Potchefstroom), between 7:30AM and 5PM, Monday to Friday.

Table 1: List of Stakeholders, Landowners, & surrounding landowners

Stakeholders	Land owners	Surrounding Land owner
DMR Department of Mineral Resources & Energy (DMRE), Northern Cape Province	Areachap Plase (Pty) Ltd	Jan Petrus van der Merwe & Petronella Johanna Jacoba van der Merwe
	De Villiers Barnard Jeanine Barnard	
	Cullinan Refactories Ltd	
	Casper van den Berg	
Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR)	ISCOR LTD (Arcelormittal South Africa)	Ben van Den Heever Familie Trust

Stakeholders	Land owners	Surrounding Land owner
Department of Economic Development and Tourism (DEDAT)	Neville Francis Nicolau Lungile Constance Cele Noluthando Orimrose Gosa Katebe Monica Mutuna Musonda Gert Stephanus Gouws Hendrik Jacobus Verster Raman Karol Bradley Lloyd Davey Dawn Earp Bonang Francis Mohale Abram Makwadi Thebyane	Jacob Casper Kruger de Witt & Joey de Witt
Department of Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA)		Ghams Boerdery & Beleggings (Pty) Ltd
Department of Roads and Public Works (DR&PW)		Petronella Johanna Liebenberg Cobi Hilton Spangenberg Maria Christina Spangenberg
Department of Transport, Safety and Liaison (DTSL)		Vreede Communal Property Association
		LRA 1812 (Pty) Ltd
		Arno Petrus Bakkes & Christiaan Luther Bakkes
		Khara Hais Municipality
Department of Social Development (DSD)		Blue Dot Properties 567 (Pty) Ltd
Northern Cape Tourism Authority		Petrus Abraham Karsten
Northern Cape Heritage Resources Authority (NCHRA)		Areachap Plase (Pty) Ltd
Department of Water and Sanitation (DWS)		De Villiers Barnard Jeanine Barnard
Commission on Restitution of Land Rights.		
WESSA		
ZF Mgcawu District Municipality		
Khara Hais Local Municipality (Municipal Manger & Ward 11 Councillor)		

Direct notification and circulation of Draft EIR & EMPr to identified I&APs, landowners and occupiers.

Identified I&APs, including key stakeholders representing various sectors, are directly informed of the proposed development and the availability of the Draft EIR & EMPr via registered post on **25 April 2023** and were requested to submit comments by **06 June 2023.** A copy of the report is also available at the Milnex offices in Schweizer-Reneke, 4 Botha Street, Schweizer-Reneke and Potchefstroom (Waterberry Street, Waterberry Square, 1st floor, Office 5B, Potchefstroom), between 7:30AM and 5PM, Monday to Friday. For a complete list of stakeholder details and for proof of registered post see **Appendix 6**.

Issues Raised by Interested and Affected Parties

Comments received during this period are attached as comment & response report as well as populated in the table of summary of issues raised below as well as **Appendix 6.**

Public meeting:

A public meeting was scheduled to be held on the **15th of May 2023** with all Interested and/or Affected Parties at the **Top Speelman Community Hall, Upington at 09:00 am.** All Interested and Affected parties were invited to the said meeting through published newspapers and invitations via registered posts. Although the meeting was advertised, and all I&APs were invited to attend the meeting. The invited community and all relevant stakeholders did not attend the meeting; therefore, no issues were raised by the community regarding the proposed application.

iii. Summary of Issues Raised by I&APs

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

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.**		**Issues Raised**	**EAPS Response to Issues As Mandated By The Applicant**	**Section And Paragraph Reference In This Report Where The Issue And Or Response Where Incorporated**
Organization	**Contact Person**			
LANDOWNER				
Areachap 0(RE)/426	**Areachap Plase (Pty) Ltd** De Villiers Barnard Jeanine Barnard	No Comments Received Yet		
Areachap 2/426	**Cullinan Refactories Ltd** Casper van den Berg	No Comments Received Yet		
	ISCOR LTD (Arcelormittal South Africa) Neville Francis Nicolau Lungile Constance Cele Noluthando Orimrose Gosa Katebe Monica Mutuna Musonda Gert Stephanus Gouws Hendrik Jacobus Verster Raman Karol Bradley Lloyd Davey Dawn Earp Bonang Francis Mohale Abram Makwadi Thebyane	Email received 07/12/2022 Good day Thank you for the e-mail. We will get back to you in this regard as soon as possible. Kind Regards Liandra	Email sent 06/12/2022 Dear Liandra Hope you are well. We refer to the abovementioned matter, telephone conversation with ArcelorMittal's offices and attached letter dated 14 October 2022. During aforementioned conversation, we were advised to contact you via email as your number could not befound.	

			We hereby inform you of the mining right application of Synchroplex (Pty) Ltd on the farm known as Areachap RE/426 and 2/426, which was accepted by the DMRE on 4 October 2022. We have been appointed as the independent environmental consultant, to apply for an environmental authorisation for the mining of iron ore, copper ore, sulphate ore, zinc and silver. Arcelormittal SA, previously ISCOR, has been identified as a key stakeholder and landowner of portion 2 of Areachap 426; subsequently, we would like to provide Arcelormittal SA the opportunity to provide written comment on the application (see attachment). Please refer to the Dropbox-link below, to view the relevant draft scoping report for the application: - https://www.dropbox.com/sh/a4j2u44kw6bd304/AAC12e2uSdruXNUvY82rKa_-a?dl=0 Please feel free to contact us at any time. Kind regards	
		No correspondence received.	Email sent 30/01/2023 Good day Liandra We refer to your email below with regard to the matter above.	

			We would like to follow up with you regarding comments on the abovementioned application for a mining right by Synchroplex (Pty) Ltd on the farm Areachap 426. Kind regards	
		No correspondence received.	Email sent 26/04/2023 Dear Liandra, We refer to our email below dated 6 December 2023. We would like to follow up with you regarding comments on the abovementioned application for a mining right by Synchroplex (Pty) Ltd on the farm Areachap 426. Kind regards/ Vriendelike groete	
SURROUNDING LANDOWNERS				
Areachap 1/426	No info	No Comments Received Yet		
Steenkampsputs 2/365	Jan Petrus van der Merwe & Petronella Johanna Jacoba van der Merwe	No Comments Received Yet		
Rooiputs 6&7/366	Ben van Den Heever Familie Trust	No Comments Received Yet		
Gams 6/367	Jacob Casper Kruger de Witt & Joey de Witt	No Comments Received Yet		
Gams 7/367	Ghams Boerdery & Beleggings (Pty) Ltd Petronella Johanna Liebenberg	No Comments Received Yet		

Vreede 0(RE)/368	Vreede Communal Property Association	No Comments Received Yet		
Christiana 0(RE)/425	LRA 1812 (Pty) Ltd Arno Petrus Bakkes & Christiaan Luther Bakkes	No Comments Received Yet		
Droogehout 0(RE)/442 Klip Kraal 0/451	Khara Hais Municipality	No Comments Received Yet		
Farm 0(RE)/450	Blue Dot Properties 567 (Pty) Ltd	No Comments Received Yet		
Loerkop 3&4/427	Areachap Please (Pty) Ltd De Villiers Barnard Jeanine Barnard	No Comments Received Yet		
THE MUNICIPALITY IN WHICH JURISDICTION THE DEVELOPMENT IS LOCATED				
Khara Hais Local Municipality	**Municipal Manager:** Mr Martin Fillis (Acting)	No comments received yet		
MUNICIPAL COUNCILOR OF THE WARD IN WHICH THE SITE IS LOCATED				
Khara Hais Local Municipality	Ward 11 Councillor	No comments received yet		
ORGANS OF STATE HAVING JURISDICTION				
Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR)	**Head of Department:** Mr. Lerato Wa Modise	No comments received yet		
	Elsabe Swart			
	Jacoline Mans			
	Samantha De La Fontaine	Email received on 21/10/22 Dear Christiaan I've received the attachment from my colleague in the DFFE, Ms Jacoline Mans. Kindly register me as an I&AP for the said development. Groete / Regards		
		Email received on 03/11/22	Email sent on 16/11/22	

		Dear Chriistiaan Please send me the DSR and supporting documents in order for me to provide the necessary comments and recommendations. The Dropbox folder is empty. Groete / Regards	Dear Samantha, thank you for your email. Please note that you have been registered as an I&AP Apologies for the late response. We have been struggling with our emails lately. Please see the link below with the draft scoping report for your convenience: I have also re -uploaded the document https://www.dropbox.com/sh/a4j2u44kw6bd304/AAC12e2uSdruXNUvY82rKa_-a?dl=0 You are welcome to provide comments in due course. You will also receive the Draft Environmental Impact Report once it is readily available. Kindest Regards	
Department of Economic Development and Tourism (DEDAT)	**Head of Department:** Mr T Mabija	No comments received yet		
Department of Mineral Resources and Energy (DMRE)	**Regional Manager:** Mr Ndlelenhle Zindela **Secretary:** Ms Ntombi Mayekiso	No comments received		
	Jeanette Moabi	Letter from DMRE signed on 04/10/22	Comments have been well noted.	Scoping Report and EIAr & EMPr

		- This is to inform you that your application for a mining right in terms of section 22 of the MPRDA, 2002 (Act 28 of 2002) as amended and the Environmental Authorization in line with NEMA Regulations to mine Copper Ore, Iron Ore, Silver, Sulphur Ore and Zinc has been accepted. - In terms of section 18 (e) of the Act, you are directed to comply with the following instructions - Notify and consult with the landowners, lawful occupiers and any other I&AP as required in terms of regulation 41(2) read with section 24J of the NEMA as amended. - Lodge a notice of intent to apply for a WUL in terms of Water Use licence Act with DWS with immediate effect and confirm that with the Regional Manager. - In order to give effect to the objects of section 2(d) of the Act, a new mining right must have a minimum of 30% BEE shareholding, which shall include economic interest plus corresponding percentage of voting rights per mining right or in the mining company which holds a mining right. - In order to comply with section 2(d) you are thus directed to submit the following documents within 60 days from date of this letter. Duly signed shareholders agreements with your empowerment partner in which provisions shall be made for entrepreneurs, local community and employees, Share certificates		

		Details relating to the equity by the BBE shareholders Any other agreement relating to the BEE shareholding including the voting pool agreement where applicable Memorandum of Incorporation - Further note that the acceptance of your application does not grant you the right to commence with mining activities. It only signifies that your application will be processed, evaluated and that the Minister or his delegates will make a decision within 30 days from the acceptance of your application.		
	Kgaudi shapo	Letter from DMRE signed on 13/12/22 The Department has evaluated the submitted FSR and plan of study for Environmental Impact Assessment and is satisfied that the documents comply with the minimum requirements of Appendix 2(2) of NEMA (as amended), EIA regulations 2017. The FSR is hereby accepted by the Department in terms of regulation 22(a) of the NEMA EIA Regulations, 2017. It has been noted with concern that your Draft SR was not provided to the surrounding communities and to the Competent Authority for review and comments. You may proceed with EIA process in accordance with the tasks contemplated in the plan of study for EIA as required in terms of NEMA EIA Regulations, 2017. In addition, the following must be done: - Submit 2 copies manually and 1 electronic copy through SAMRAD of EIA inclusive of specialist	Comments have been well noted and incorporated into the EIR & EMPr.	EIAR & EMPr

		reports and an EMPr which have been subject to the public participation process of atleast 30 days incorporating the comments received. - Use environmental screening tool to determine the environmental sensitivity, significant, extent, consequences, duration and probability of potential environmental impacts and risks. - Comments from DAEARDLR. - Final recommendation from SAHRA (Upload Online). - Proper project description and prospecting methods and alternative methods. - Detail motivation for the preferred development footprint - Full public participation proves in terms of chapter 6 of EIA regulations, 2017. - Geo -Hydrological Impact assessment study. - Wetland study - Proposed rehabilitation plan and closure objectives - Emergency Preparedness plan. - Details of the future land use for the site and infrastructure after decommissioning. - Should a Water Use License be required, proof of application for a license needs to be submitted. - Possible impacts and effects of the Socio-economic impact, surface water impact, geology impact, soil impact, biodiversity impact, air quality impact, aquatic environmental impact, climate impact, cumulative impact, heritage impact, cultural impact and traffic impact must be assessed. - Information on services required on site, e.g., sewage, refuse removal water and electricity. Who will supply these services and has an agreement and confirmation of capacity been obtained?		

		- A construction and operational phase EMP to include mitigation and monitoring measures. - Summary of potential environmental Impact associated with the proposed activities on the property. Please ensure that the surrounding communities are given the opportunity to participate on the public participation process and the Draft EIAR is provided to the community representative for commenting purpose. In case where you will use proof of correspondence of the registered postage, please include the results of the postage which shows when and who collected the mail. Applicant is hereby reminded to comply with the requirements of regulation 3 of NEMA EIA Regulations, 2017. Please ensure that the EIAr includes A3 size locality maps of the area and illustrates the exact location of the proposed development. Further, it must be reiterated that, should an application for EA be subjected to any permits or authorizations in terms of the provisions of any specific Environmental Management Acts (SEMAs), proof of such application will be required. Refer to S24N (2) of NEMA,1998, as amended and Appendix 2, 4, and 6 of the EIA Regulations for the minimum requirements set for the reports. Note that acceptance of your scoping report application does not grant you a right to commence with the listed activities applied for.		

		You should also note that commencement with a listed activity without an EA contravenes the provisions of S24F (1) of NEMA,1998, as amended and constitutes an offence in terms of Section 49 A(1)(a) of NEMA. Note that in terms of regulation 45 of the EIA Regulations, your failure to submit the documents or meet any timeframes prescribed in terms of the said Regulations will result in your application deemed to have lapsed. Your attention is brought to S24 F of the NEMA which stipulates that "no activity may commence prior to an Environmental Authorization being granted by the competent authority".		
Department of Co-operative Governance, Human Settlements and Traditional Affairs (COGHSTA)	**Head of Department:** Mr Bafedile Lenkoe	No comments received yet		
Department of Roads and Public Works (DR&PW)	**Deputy Information Officer:** **Head of Department:** Dr. Johnny Mac Kay	No comments received yet		
Department of Transport, Safety and Liaison (DTSL)	**Head of Department** Mr. M. Dichaba	No comments received yet		
Department of Social Development (DSD)	**Head of Department** To whom it may concern	No comments received yet		
Northern Cape Tourism Authority	**Chairperson:** To whom it may concern	No comments received yet		
Northern Cape Heritage Resources Authority (NCHRA)	Mr Ratha Andrew Timothy and Mrs Rose Kelebogile	No comments received yet		
Department of Water and Sanitation (DWS)	Mr Khutjo Kwena Sekwaila (WUL Manager) Mudau Mashudu	No comments received yet		
Commission on Restitution of Land Rights.	**Chief Director:** Ms. M. Du Toit	No comments received yet		
OTHER–				

ZF Mgcawu District Municipality	Municipal Manager: Mr Gilbert Lategan	No comments received yet		
WESSA (National Office)	Graham Avery	No comments received yet		
Upington Community		No issues were raised by the community regarding the proposed application.		

iv. The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

1. Baseline Environment

The baseline environment is described with specific reference to geotechnical conditions, ecological habitat and landscape features, Soil, land capability and agricultural potential, climate and the visual landscape.

(a) Type of environment affected by the proposed activity.
(Its current geographical, physical, biological, socio- economic, and cultural character).

Results of the environmental sensitivity of the proposed area (Screening tool)

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification.

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No	EIA Reference No	Classification	Status of application	Distance from proposed area (km)
1	12/12/20/2230	Solar PV	Approved	25.5
2	14/12/16/3/3/1/2208	Solar PV	Approved	25.5
3	14/12/16/3/3/2/1107	Solar PV	Approved	7.3
4	14/12/16/3/3/1/2209	Solar PV	Approved	25.5
5	14/12/16/3/3/2/656	Solar CSP	Approved	22.3
6	14/12/16/3/3/3/82	Solar CSP	Approved	9.4
7	14/12/16/3/3/2/1108	Solar PV	Approved	7.3
8	12/12/20/1831/2	Solar CSP	Approved	22.3
9	14/12/16/3/3/1/2206	Solar PV	Approved	25.5
10	14/12/16/3/3/1/2210	Solar PV	Approved	25.5
11	14/12/16/3/3/1/2207	Solar PV	Approved	25.5
12	12/12/20/1831	Solar CSP	Approved	22.3
13	12/12/20/1831/3	Solar PV	Approved	22.3
14	12/12/20/2146	Solar PV	Approved	9.9
15	14/12/16/3/3/1/2205	Solar PV	Approved	25.5
16	14/12/16/3/3/2/657	Solar CSP	Approved	22.3
17	14/12/16/3/3/2/1106	Solar PV	Approved	7.3
18	14/12/16/3/3/2/816	Solar PV	Approved	23
19	14/12/16/3/3/2/815	Solar PV	Approved	23
20	14/12/16/3/3/1/2231	Solar PV	Approved	17
21	14/12/16/3/3/2/1105	Solar PV	Approved	7.3
22	12/12/20/1831/1	Solar CSP	Approved	22.3
23	12/12/20/777	Solar CSP	Approved	20.1
24	14/12/16/3/3/1/2111	Solar PV	Approved	21.7
25	14/12/16/3/3/1/2075	Solar PV	Approved	28.6

Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme			X	
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme				X
Defence Theme			X	
Paleontology Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme				X

Existing Prospecting Right

According to the Mine Work Programme (MWP):
There is an existing Prospecting Right area of approximately 20 000 ha owned by Synchroplex (Pty) Ltd, permitting for the exploration of zinc, Copper, Iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

Geology and Soils

Cenozoic Kalahari Group sands and small patches also on calcrete outcrops and screes on scarps of intermittent rivers (mekgacha). In places Dwyka Group tillites outcrop. The soils are deep (>300 mm), red yellow, apedal, freely drained, with a high base status, typical of Ae land type.

The Areachap Copper-Zinc deposits occur within the Namaqua portion of the Namaqua-Natal Metamorphic Belt, see map below:

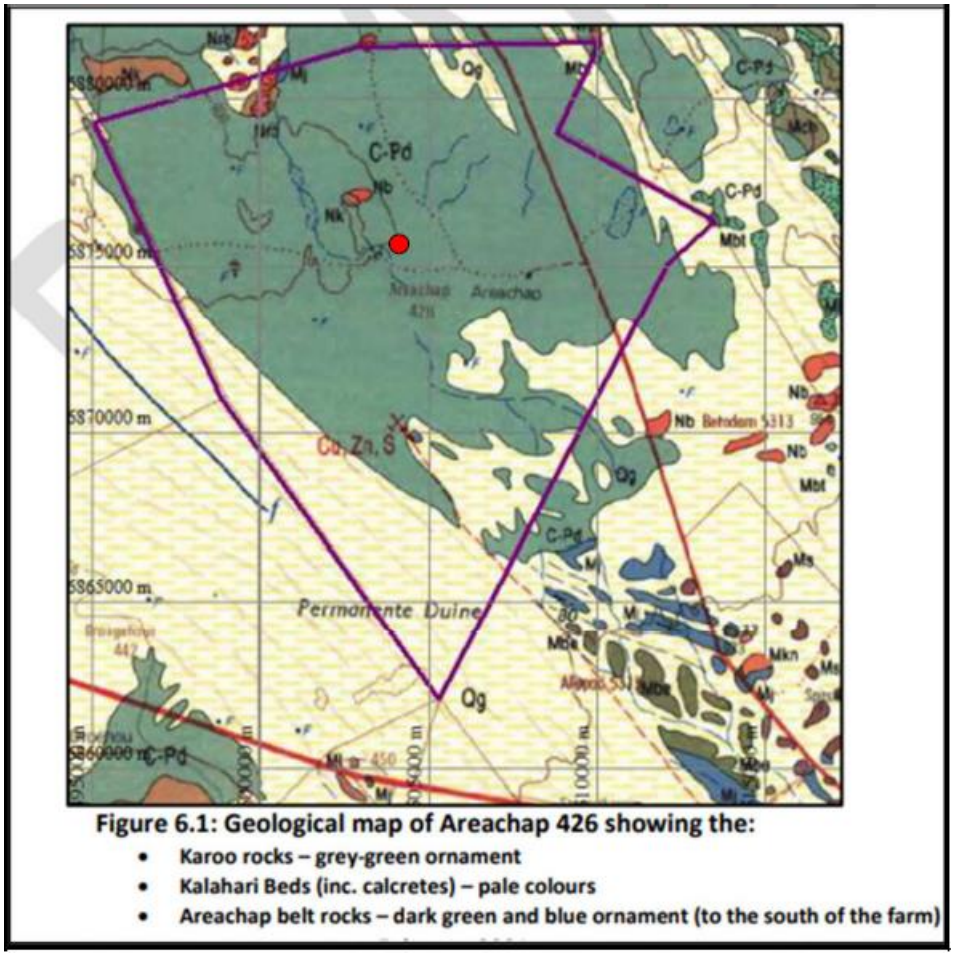


Figure 6.1: Geological map of Areachap 426 showing the:

- **Karoo rocks – grey-green ornament**
- **Kalahari Beds (inc. calcretes) – pale colours**
- **Areachap belt rocks – dark green and blue ornament (to the south of the farm)**

According to the project's MWP, the Areachap project deposit is mainly comprised of an iron-oxide gossan underlain by massive sulphide deposits. Historical Exploration at Areachap and further work on the Copper / Zinc potential of the massive sulphides was carried out by various companies over the 1960s and 1970s. Notably, Cape Asbestos and latterly by Anglo American in the 1970s. This work was aimed at delineating the Copper-Zinc sulphide resource below the zone of leaching. In this they were successful, but the resource was deemed too small to be economic in the conditions prevailing at that time. As noted above, no, or very little, exploration work has been carried out since the 1970s when Anglo American concluded their work. The current due diligence study is aimed at validating the Anglo-American ore inventory and the results of this study are presented in the relevant sections of this report. 5.3 Historical Resource estimates Over the years, various "resource statements" have been issued by the companies investigating the massive sulphides at Areachap.

The first recorded attempt appears to have been by ISCOR in the 1960s when they were investigating the potential of the massive pyrite for sulphuric acid production. Their drilling "indicated reserves of approximately 1.6 million tonnes of massive sulphides to a depth of between 200 and 300 meters. Of this, some 0.5 million tonnes grading 0.6% copper, 2.3% zinc and 42% sulphur was considered mineable". On the basis of these reserves, a shaft (still in existence) was sunk to 200 meters. In 1971-1973, Cape Asbestos in joint venture with Anglo American, carried out a 40-hole diamond drilling programme which indicated 8.9 million tonnes of sulphide ore grading 0.47% Copper and 2.24% Zinc to 750 meters depth. Cape Asbestos then ceded the rights to Anglo American in 1974. Anglo American appear to have compiled and collated all the previous work that was available to them and then instituted a work programme - including another 32 boreholes - aimed at locating additional resources but in this, they were unsuccessful.

However, their work did include defining and delineating the sulphide ore resource. As previously noted, it is probably better termed an "ore inventory" as, while it served Anglo 13 American's purpose in 1975, it cannot be considered to be exchange compliant under the rules pertaining in 2021. It should be noted that if the work had been undertaken in the immediate past with the same results, the resource would probably be classified as at least "inferred" and quite likely partly as "indicated". The main reason that it is not classifiable in these terms today is that the data are now over

45 years old and are thus "historical" in nature. As a result of the work carried out by Anglo American (see above for summary), they were able to arrive at a fairly comprehensive resource statement summarised below: The inclusiveness of these figures is an indication of the quality of work carried out by Anglo American and that it is likely that the numbers can be trusted as being as accurate as was possible at that time.
It is these figures that are being addressed in this due diligence study. Various metallurgical testwork has also been carried out over the years and this is summarised below: The result of the Anglo American work allowed for the conclusion that the orebody was too small and too low-grade for Anglo to consider as a viable project at that time. Given that Anglo American were (and are) one of the largest mining companies in the world, that is no doubt a reasonable conclusion. However, given the change in circumstances, e.g. the much increased commodity prices, it is a definite attractive proposition under present circumstances for any smaller company.

Results of the environmental sensitivity of the proposed area (Screening tool)

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification.

Ecological habitat and landscape features

The vegetation information of the proposed area has been investigated and discussed in the Terrestrial biodiversity and watercourse impact assessment report developed by Milnex CC also attached as **Appendix 11.**

The proposed site for mining overlaps within the Nama-Karoo Biome (Mucina & Rutherford, 2006). Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. The study site overlaps with the Nama Karoo Bioregion. The Kalahari Karroid Shrubland (NKb5) is the vegetation type that is associated with the project area. The conservation status of this vegetation type is considered as the least threatened vegetation type with 21% target and is minimally transformed as well as conserved statutorily. See vegetation map below on **figure 7**.

Ecoregion characteristics

The study site falls within the Southern Kalahari Ecoregion according to Kleynhans *et al* (2005), A level 1 River Ecoregion classification System for South Africa, Lesotho and Swaziland. Ecological regions (Ecoregions) are regions within which there is relative similarity in the mosaic of ecosystems and ecosystem components (biotic and abiotic, aquatic and terrestrial) (Kleynhans *et al*. 2005). The topography of the Southern Kalahari Ecoregion is represented by plains with low to moderate relief in the east, and open hills, lowlands and mountains with moderate to high relief in the west. The western part of the region consists of dune hills. The lower part of the Vaal River flows through the region, while others such as the Harts, Molopo, Kuruman and Nosob are seasonal. Attributes of the Southern Kalahari Ecoregion are summarised in Table 1 below.

Table 1: Attributes of the Southern Kalahari (29) Ecoregion (Kleynhans *et al.,* 2005)

Ecoregion Characteristics	
Dominant primary terrain morphology	**Plains; Low Relief** Plains Moderate Relief. Lowlands; Hills and Mountains; Moderate and High Relief (limited) **Open Hills, Lowlands; Mountains; Moderate to High Relief.** Closed Hills; Mountains; Moderate and High Relief
Dominant primary vegetation types	Orange River Nama Karoo (limited); Karroid Kalahari Bushveld; **Shrubby Kalahari Dune Bushveld;** Thorny Kalahari Dune Bushveld (limited); Kalahari Mountain Bushveld; **Kalahari Plains Thorn Bushveld;**

	Kalahari Plateau Bushveld; **Kimberley Thorn Bushveld**
Altitude (m a.m.s.l)	500-1700; 1700-1900 limited
MAP (mm)	0 to 500
Coefficient of Variation (% of MAP)	30 to >40
Rainfall concentration index	50 to >65
Rainfall seasonality	Mid to very late summer
Mean annual temp. (°C)	14 to 22
Winter temperature (July)	-2 to 22
Summer temperature (Feb)	14 to >32
Median annual simulated runoff	<5 to 60

Vegetation & Landscape Features: Low karroid shrubland on flat, gravel plains. Karoo-related elements (shrubs) meet here with northern floristic elements, indicating a transition to the Kalahari region and sandy soils.

Geology & Soils Cenozoic Kalahari Group sands and small patches also on calcrete outcrops and screes on scarps of intermittent rivers (mekgacha). In places Dwyka Group tillites outcrop. The soils are deep (>300 mm), red-yellow, apedal, freely drained, with a high base status, typical of Ae land type.

Important Taxa Small Trees: *Acacia mellifera* subsp. *detinens* (d), *Parkinsonia africana* (d), *Boscia foetida* subsp. *foetida*. Tall Shrub: *Rhigozum trichotomum* (d). Epiphytic Semiparasitic Shrub: *Tapinanthus oleifolius*. Low Shrubs: *Hermannia spinosa* (d), *Limeum aethiopicum* (d), *Phaeoptilum spinosum* (d), *Aizoon schellenbergii*, *Aptosimum albomarginatum*, *A. lineare*, *A. marlothii*, *A. spinescens*, *Barleria rigida*, *Hermannia modesta*, *Indigofera heterotricha*, *Leucosphaera bainesii*, *Monechma genistifolium* subsp. *genistifolium*, *Phyllanthus maderaspatensis*, *Polygala seminuda*, *Ptycholobium biflorum* subsp. *biflorum*, *Sericocoma avolans*, *Solanum capense*, *Tephrosia dregeana*. Herbs: *Dicoma capensis* (d), *Chamaesyce inaequilatera* (d), *Amaranthus praetermissus*, *Barleria lichtensteiniana*, *Chamaesyce glanduligera*. *Chascanum garipense*, *Cleome angustifolia* subsp. *diandra*, *Cucumis africanus*, *Geigeria ornativa*, *Hermannia abrotanoides*, *Indigastrum argyraeum*, *Indigofera alternans*, *I. auricoma*, *Kohautia cynanchica*, *Limeum argute-carinatum*, *Mollugo cerviana*, *Monsonia umbellata*, *Sesamum capense*, *Tribulus cristatus*, *T. pterophorus*, *T. terrestris*. Succulent Herbs: *Gisekia africana*, *G. pharnacioides*, *Trianthema parvifolia*. Graminoids: *Aristida adscensionis* (d), *Enneapogon desvauxii* (d), *E. scaber* (d), *Stipagrostis obtusa* (d), *Aristida congesta*, *Enneapogon cenchroides*, *Eragrostis annulata*, *E. homomalla*, *E. porosa*, *Schmidtia kalahariensis*, *Stipagrostis anomala*, *S. ciliata*, *S. hochstetteriana*, *S. uniplumis*, *Tragus berteronianus*, *T. racemosus.*

Biogeographically Important Taxon (Southwestern distribution limit) Graminoid: *Dinebra retroflexa*.

Conservation Least threatened. Target 21%. Very little statutorily conserved in Augrabies Falls National Park. Although only a small area has been transformed many of the belts of this type were preferred routes for early roads, thus promoting the introduction of alien plants (about a quarter of the unit has scattered *Prosopis* species). Erosion is very low (94%).

Remarks Vegetation of this mapping unit shows transitional features between the Kalahari proper (Savanna Biome) and the northern Nama-Karoo.

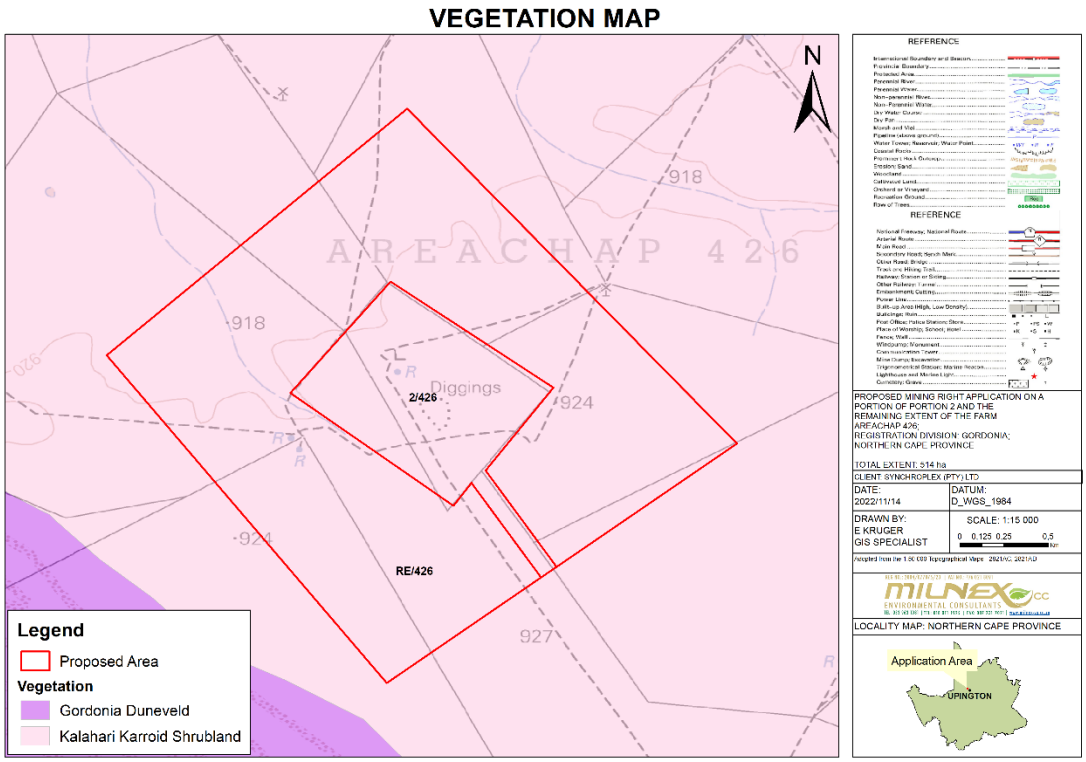


Figure 7: Vegetation Unit Map

According to the DEA Screening report the Plant Species theme sensitivity of the proposed area falls in Low sensitivity. Please see **figure 8** and **Appendix 7** for the colour map.

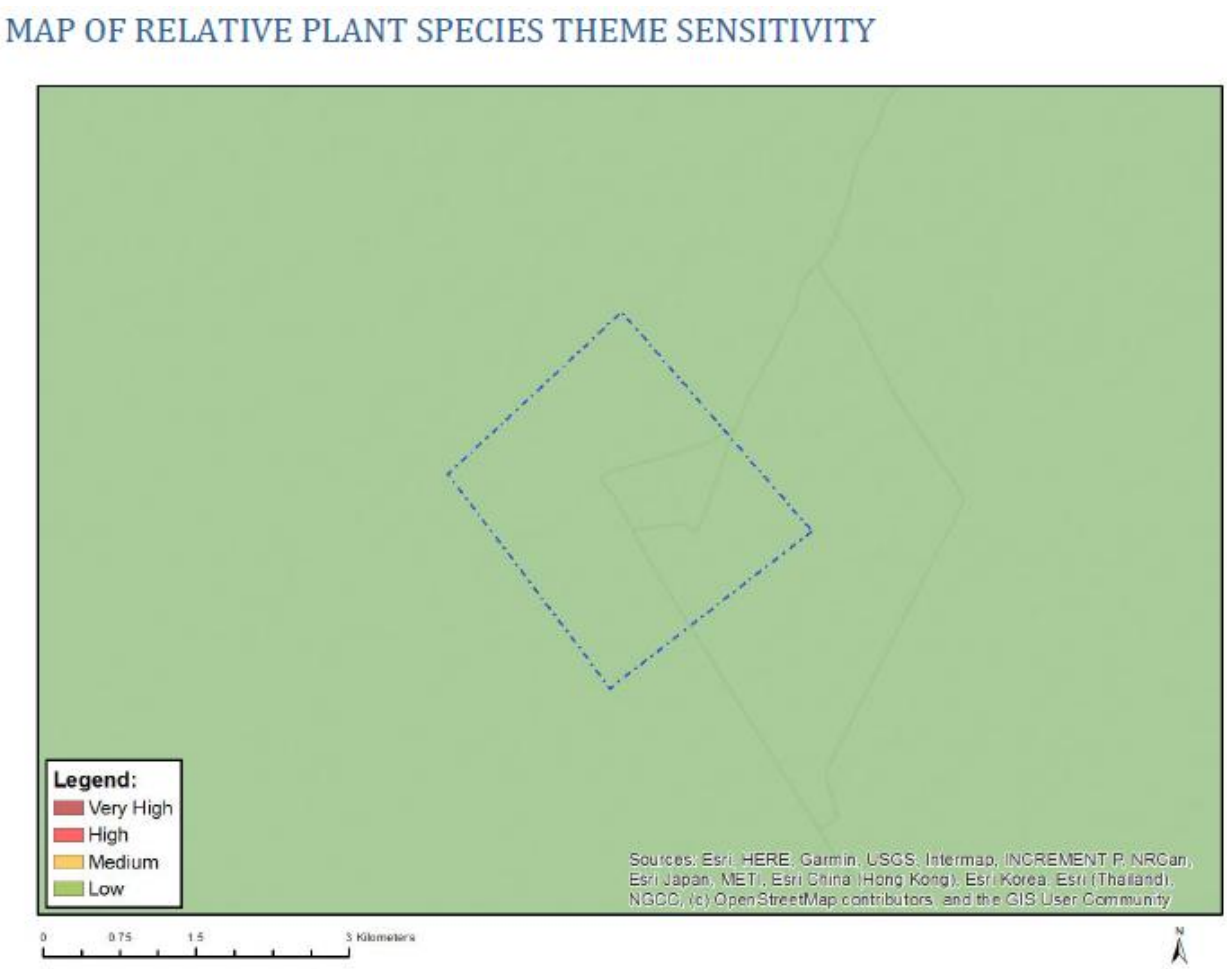


Figure 8: Plant Species Combined Sensitivity

An Ecological and Wetland Impact Assessment Report was compiled and conducted by Khume Mtshweni. The report states the following:

- *The list of flora species observed on site was compiled and their protection status was also indicated where relevant.*
- *If a species is a known Alien and Invasive Species, this was also indicated.*

Table 2: *Dominant plant species observed on the study site.*

Plant species list			
Trees and Shrubs			
Scientific Name	**Common Name**	**Status**	**Invader category (NEMBA 2020)**
Asparagus sp	Wild asparagus	Least concern	
[P]Boscia foetida	Stink Sheperd's tree	Least concern	
Ehretia alba	White Puzzle bush	Least concern	
Lycium arenicola	Sand Honey-thorn	Least concern	
Parkinsonia africana	Greenhair-tree	Least concern	
**Prosopis grandulosa*	Honey mesquite	Exotic, declared invader	2
Rhigozum trichotomum	Three thorn	Least concern	
Senegalia mellifera	Black thorn	Least concern	

[P]***Vachelia erioloba***	Camel thorn	Least concern	
Vachelia karoo	Sweet thorn tree	Least concern	
Graminoids			
Aristida adscensionis	Sixweek Three-awn	Least concern	
Aristida congesta	Spreading Three-awn	Least concern	
Enneapogon cenchroides	Furgrass	Least concern	
Eragrostis spp	Lovegrass	Least concern	
Stipagrostis ciliata	Bushman grass	Least concern	
Stipagrostis obtusa	Small bushman grass	Least concern	
Hemiparasite			
Tapinanthus oleifolius	Mistletoe	Least concern	
Forbs and Succulents			
**Bidens pilosa*	Blackjack	Exotic	
**Datura stramonium*	Downy Thorn Apple	Exotic, declared invader	1b
[#]*Erigeron canadensis*	Asthmaweed	Naturalised Invader weed	

[P] - ***Protected Species***

* - *Alien and Invasive Species*

[#] - Naturalized exotic weeds (Not assessed for National Red List)

Species of Conservation Concern

No plant species was listed in the screening tool as a Species of Conservation Concern (SCC) in the study area.

Protected trees

One provincially protected tree (*Boscia foetida*) was also recorded. If any of these trees are to be removed, a flora permit will have to be obtained.

Land capability and agricultural potential

According to an article on the Grain SA website by Garry Paterson from ARC-Institute for Soil, Climate and Water on the Grain SA website, agriculture rests on three pillars where natural resources are concerned. These are the soil (comprising the growth medium for the plant), the climate conditions (which supply the plant with sufficient water and heat) and the terrain (enabling the crop to be physically planted, to grow and to be harvested sustainably).

The concept of land capability combines the three natural resource elements or factors listed above (soil, climate and terrain) and uses set parameters to determine a specific class for a given area. The basis of the land capability assessment in South Africa is the well-known Land Type Survey, which is a country-wide inventory of natural resources, i.e. soil pattern, macroclimate and terrain type, carried out between 1972 and 2002 by the ARC-Institute for Soil, Climate and Water.

Each unique land type is allocated to one of eight land capability classes. These classes are based on the original USDA land capability system, whereby Classes I and II comprise areas with little or no limitations to rainfed agriculture, Classes III and IV comprise those areas which are still considered arable, but with moderate to severe restrictions. Classes V to VIII comprise non-arable land with increasingly serious restrictions, either in terms of restricted soil, steep terrain, rockiness and/or an unfavourable climatic regime. (Garry Paterson, ARC-Institute for Soil, Climate and Water, November 2014.)

According to the data obtained the area falls within class 7.

Refer to Land capability map attached as Appendix 5 & figure 6 below.

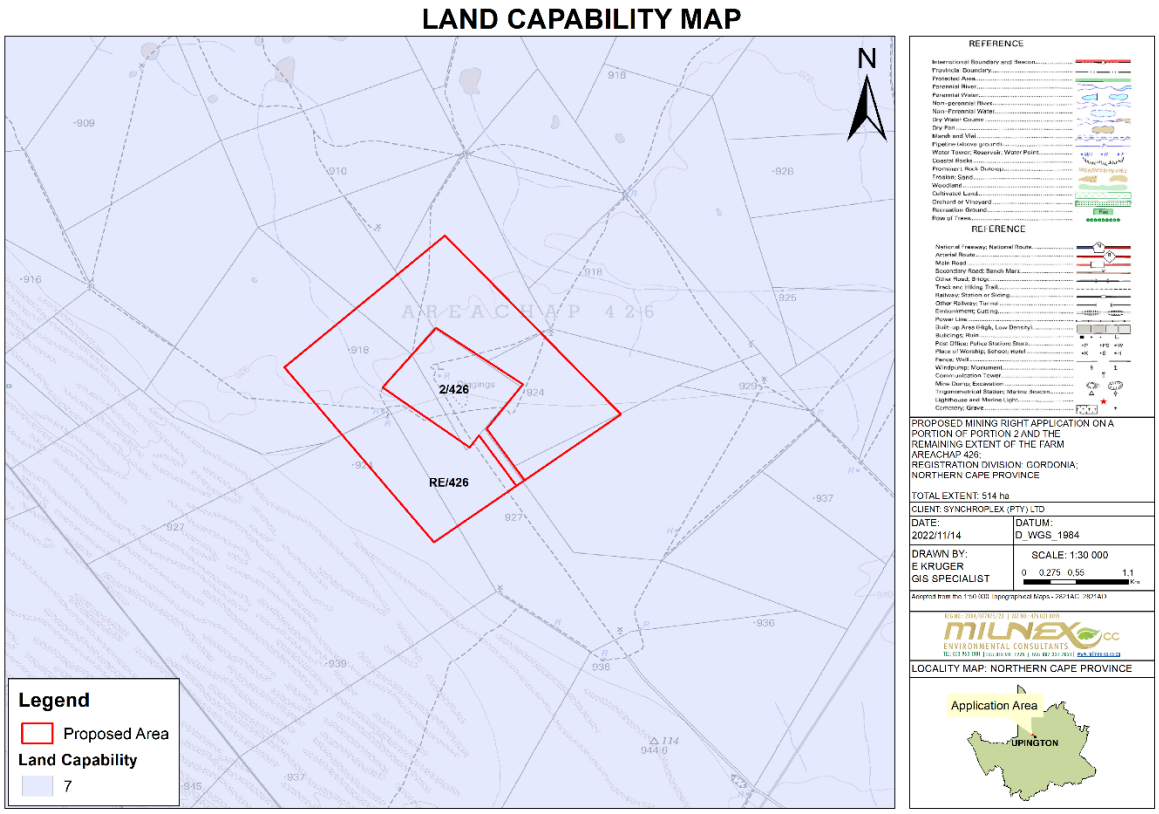


Figure 9: Land capability

According to the DEA Screening Report the Agriculture Theme Sensitivity is mostly low with some area that fall within medium sensitivity. Please see **Appendix 7** for the colour map.

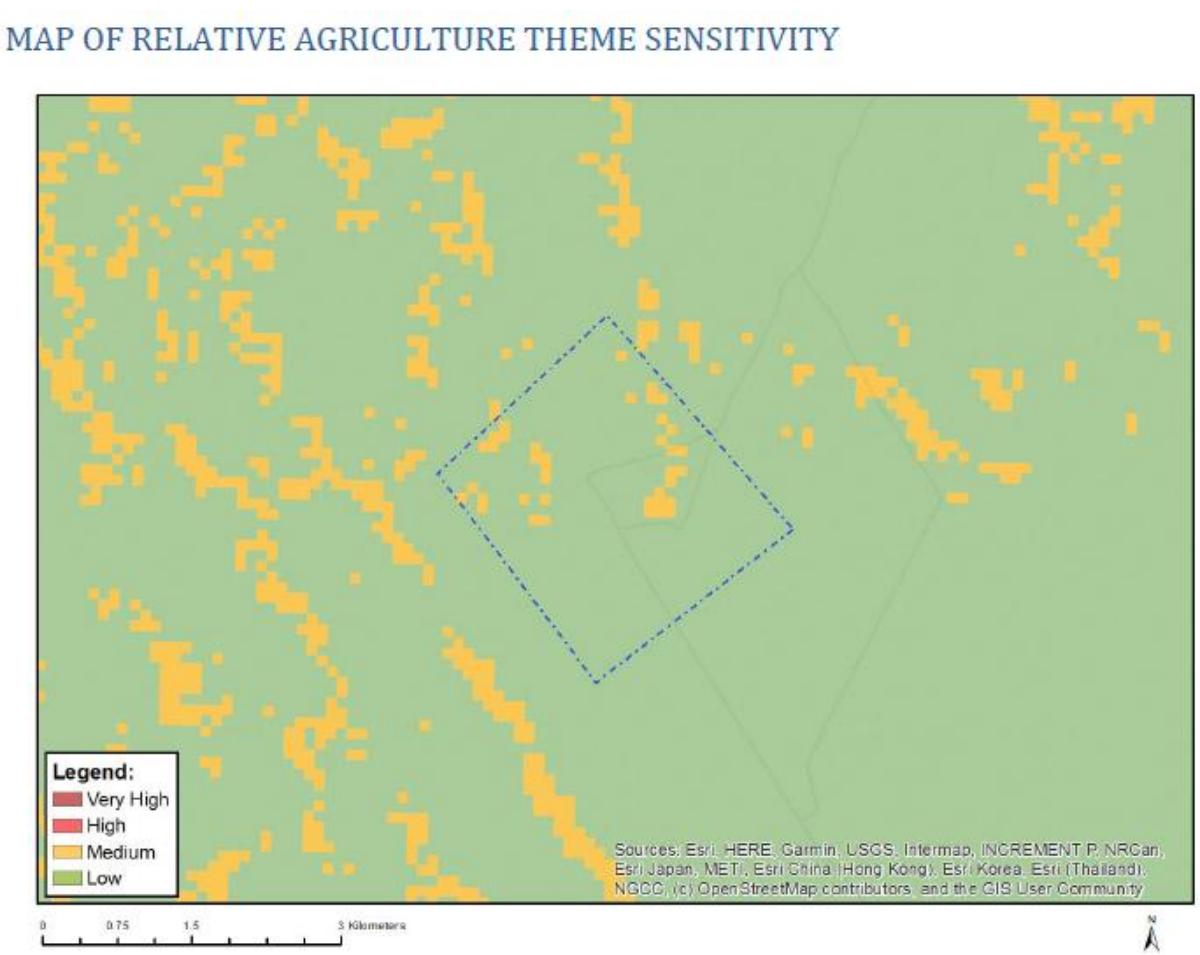


Figure 10: Agriculture Combined Sensitivity

Threatened Ecosystems

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver *et al*. 2011). Datasets have been developed by SANBI (2016) in order to outline threatened ecosystems, with the primary objective of limiting the rate of ecosystem extinctions. Four established categories group these ecosystems namely: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Protected.

Protected Areas

Formally protected areas are protected either by national or provincial legislation. Based on the SANBI (2010) Protected Areas Map (**Figure 11**), and the Northern Cape Critical Biodiversity Areas and map (2016), the study site does not overlap with any formally Protected Area. Therefore, the location of the study site is not expected to have an impact on any formally protected areas. According to data sourced from South African National Biodiversity Institute (SANBI), the proposed sites are not located within any Endangered area.

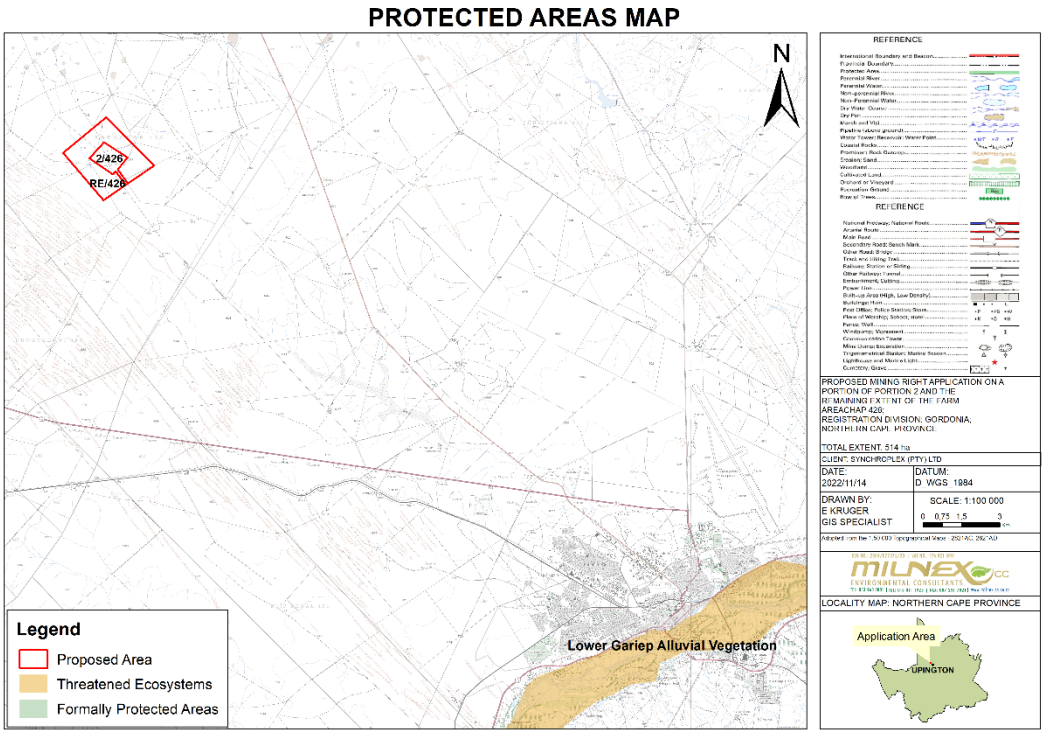


Figure 11: Protected Areas Map

An Ecological and Wetland Impact Assessment Report (**Appendix 11)** was compiled and conducted by Khume Mtshweni. The report confirms the above findings. Pease see below:

Critical Biodiversity Area

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of high biodiversity value that need to be conserved and maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services (MTPA, 2014). According to the National Environmental Management Act (NEMA) (Act no. 107 of 1998) certain activities have strict guidelines or are prohibited within CBAs and ESAs. Refer to the listed activities under the NEMA: Environmental Impact Assessment Regulations of 2014 (GNR 982) as promulgated in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) [as amended] for a comprehensive breakdown. The following terms are used to categorise the various land used types according to their biodiversity and environmental importance:

- Critical Biodiversity Area One (CBA1);
- Critical Biodiversity Area Two (CBA2);
- Ecological Support Area (ESA);
- Other Natural Areas (ONA); and
- Protected Area (PA).

An Ecological and Wetland Impact Assessment Report was compiled and conducted by Khume Mtshweni. The report confirmed the above-mentioned findings;

Based on the desktop information (Figure 12), the study site does not overlap with any CBA. This area was mostly covered with natural vegetation and was flagged in the screening report as an area possessing low terrestrial biodiversity sensitivity (Figure 13). The study site is classed as Other Natural Areas. Due to the nature and methodology of the proposed activity, the land use zones are assessed for surface and underground mining. Therefore, according to the matrix of recommended land use zones and associated activities in relation to the CBA map categories (DENC,

2008), underground mining is permitted, and actively encouraged in ONAs, while surface mining being restricted to compulsory, site specific conditions and controls. When these conditions are unavoidable, surface mining is usually not permitted in ONAs.

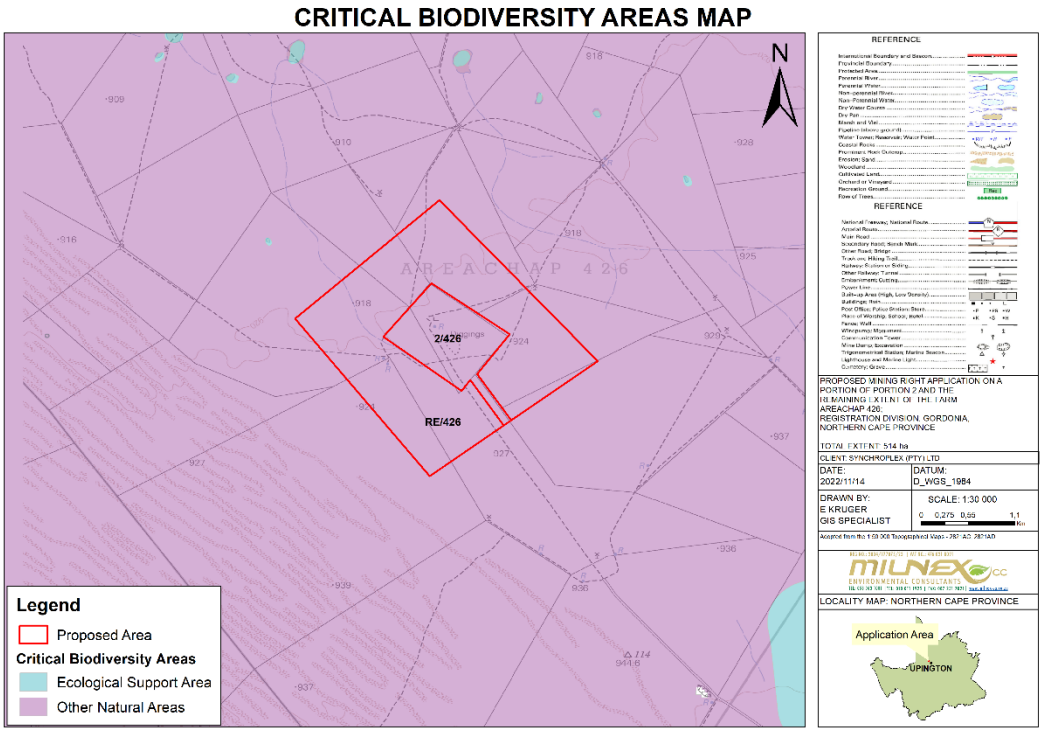


Figure 12: Critical Biodiversity Areas Map.

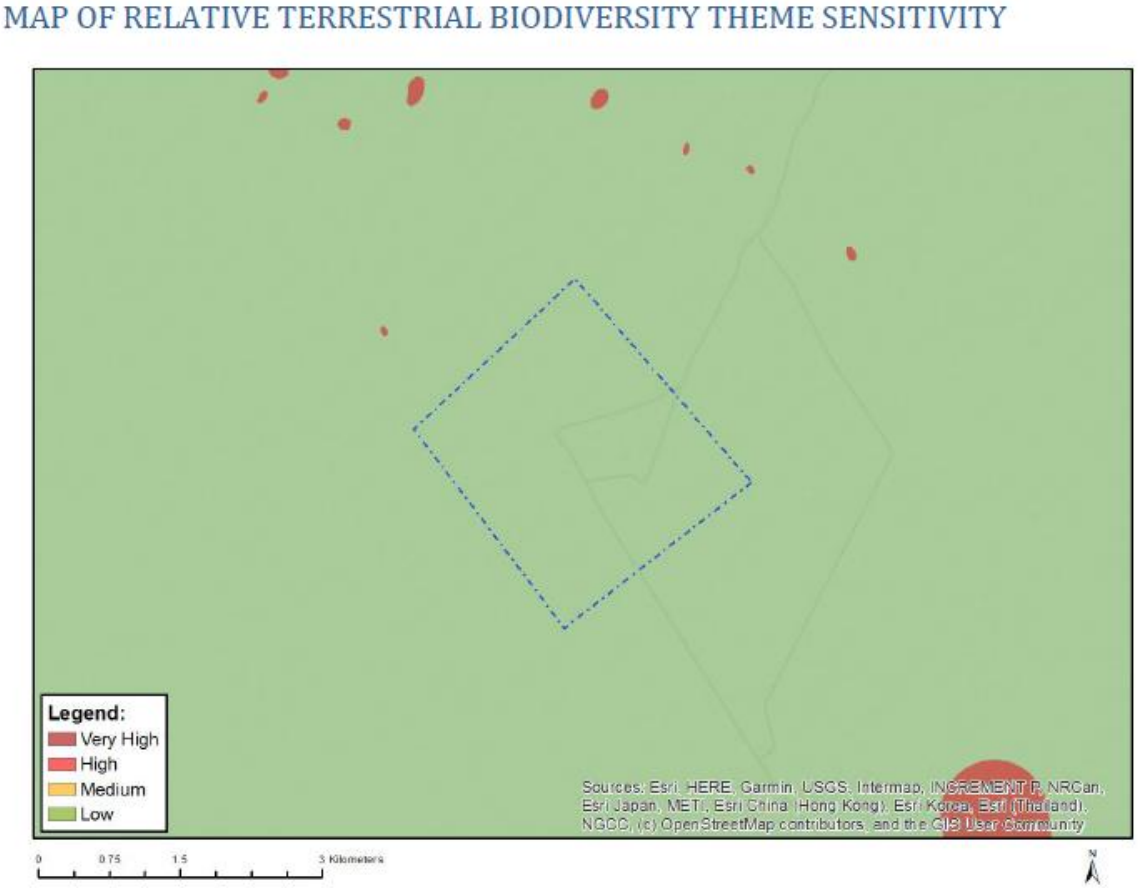


Figure 13: Terrestrial Biodiversity Map

According to the DEA Screening Report the Aquatic Biodiversity Theme Sensitivity is covered by low sensitivity. Please see **Appendix 7** for the colour map.

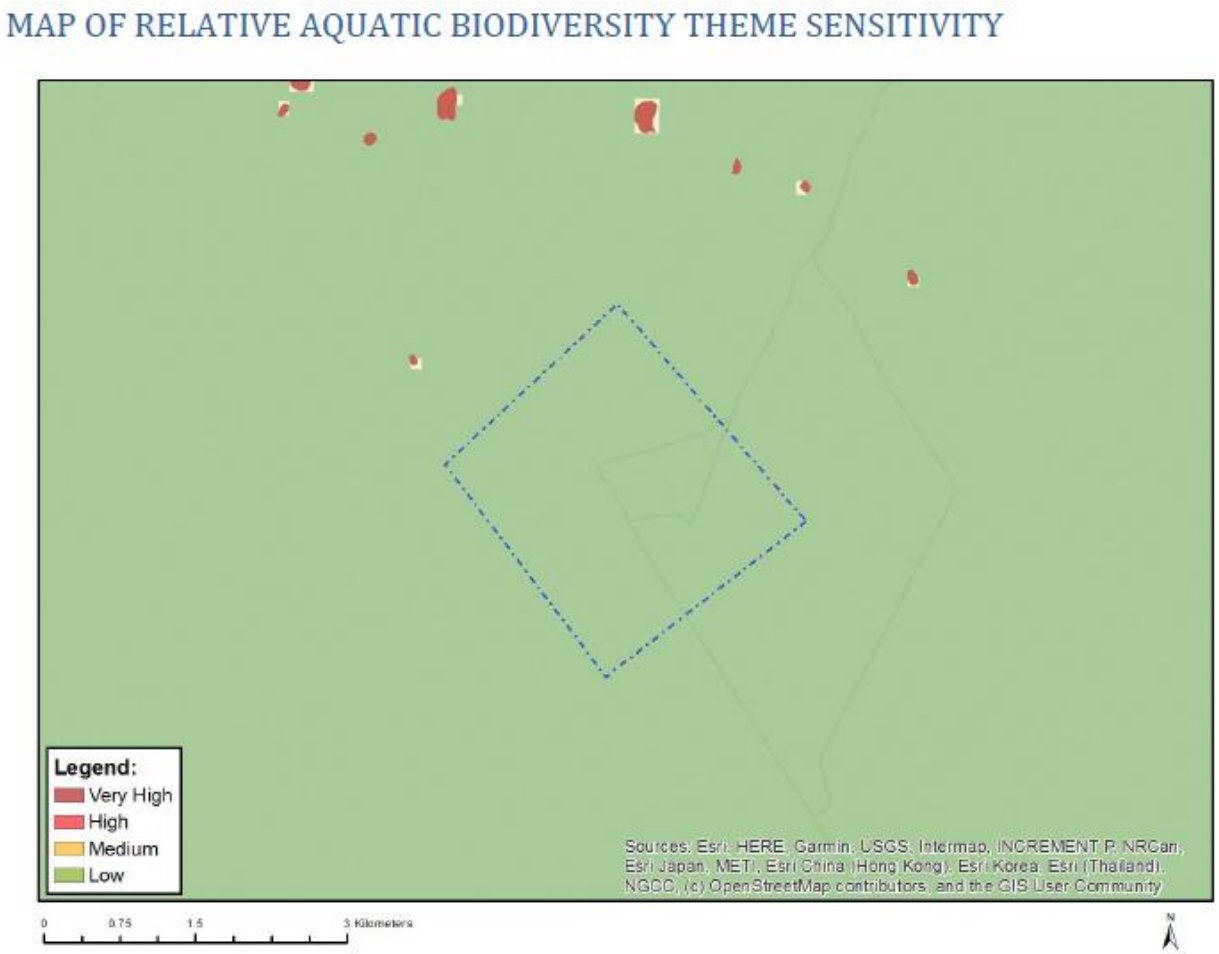
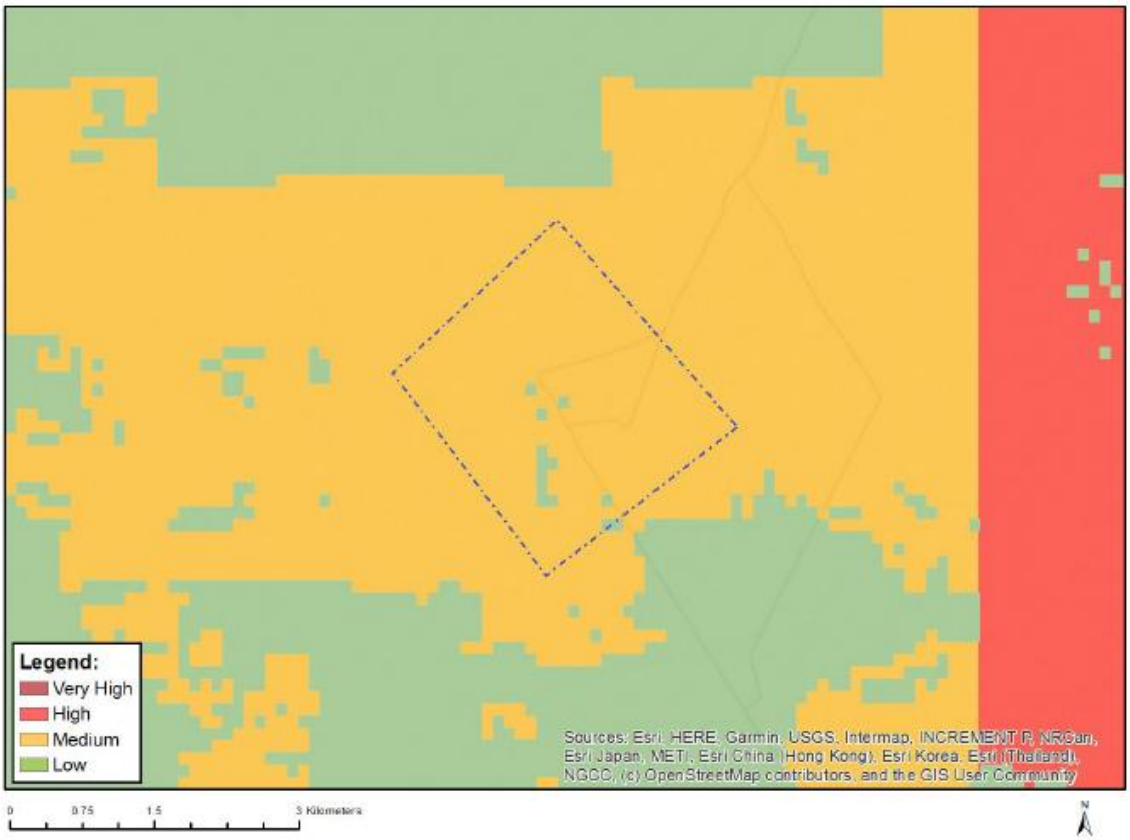


Figure 14: Aquatic Biodiversity Theme Sensitivity

According to the DEA Screening Report the Animal Species theme sensitivity is mostly medium with small patches of low sensitivity. Please see **Appendix 7** for the colour map

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Subject to confirmation
Medium	Aves-Neotis ludwigii

Figure 15: Animal Species theme sensitivity

Biodiversity Priority Areas for Mining

The Mining and Biodiversity Guideline was developed in 2013 for the purpose of mainstreaming biodiversity management practices into the mining sector (DEA, DMR, Chamber of Mines, SAMBF & SANBI 2013). This Guideline provides explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining. The Guideline distinguishes between four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service perspective as well as the implications for mining in these areas (**Table 2**).

Table 2: Four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining.

Category	Biodiversity Priority Areas	Risks for Mining	Implications for Mining
A. Legally Protected	• Protected areas (including National Parks, Nature Reserves, World Heritage Sites, Protected Environments, Nature Reserves) • Areas declared under Section 49 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002)	**Mining Prohibited**	Mining projects cannot commence as mining is legally prohibited. Although mining is prohibited in Protected Areas, it may be allowed in Protected Environments if both the Minister of Mineral Resources and Minister of Environmental Affairs approve it. In cases where mining activities were conducted lawfully in protected areas before Section 48 of the Protected Areas Act (No. 57 of 2003) came into effect, the Minister of Environmental Affairs may, after consulting with the Minister of Mineral Resources, allow such mining activities to continue, subject to prescribed conditions that reduce environmental impacts.
B. Highest Biodiversity Importance	• Critically endangered and endangered ecosystems • Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans • River and wetland Freshwater Ecosystem Priority Areas (FEPAs) and a 1km buffer around these FEPAs • Ramsar Sites	**Highest Risk for Mining**	Environmental screening, environmental impact assessment (EIA) and their associated biodiversity specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences, and environmental authorisations. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. An EIA should include the strategic assessment of optimum, sustainable land use for an area and will determine the significance of the impact on biodiversity. This assessment should fully consider the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country. Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts and may specify biodiversity

			offsets that would be written into licence agreements and/or authorisations.
C. High Biodiversity Importance	• Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves) • Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas) • Other identified priorities from provincial spatial biodiversity plans • High water yield areas • Coastal Protection Zone • Estuarine functional zone *Note that the status of buffer areas of World Heritage Sites is subject to a current intra-governmental process	**High Risk for Mining**	These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, and for maintaining important ecosystem services for communities or the country. An EIA should include an assessment of optimum, sustainable land use for an area and will determine the significance of the impact on biodiversity. Mining options may be limited in these areas, and limitations for mining projects are possible. Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.
D. Moderate Biodiversity Importance	• Ecological support areas • Vulnerable ecosystems • Focus areas for protected area expansion (land-based and offshore protection)	**Moderate Risk for Mining**	These areas are of moderate biodiversity value. EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened (land-based and offshore protection) species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.

Based on **Figure 16**, the area does not overlap with any area of biodiversity importance.

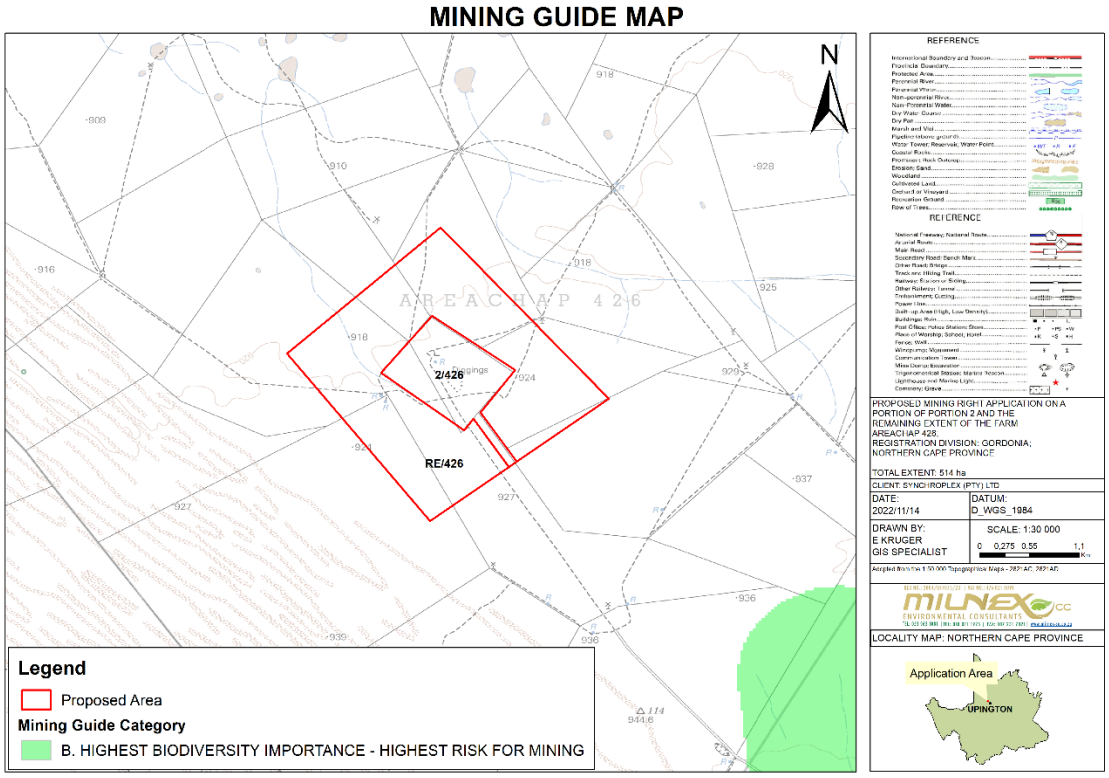


Figure 16: Biodiversity priority areas, in accordance with the Mining of Biodiversity Guidelines, associated with the study site.

Wetland Areas

In terms of Section 1 of the National Water Act (No. 36 of 1998) (NWA), wetlands are legally defined 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*" (NWA 1998).

Wetlands are defined by the presence of unique soils and vegetation that do not occur in terrestrial and purely aquatic environments (Edwards *et al.* 2018). Wetland soils are referred to as hydric soils that develop under anaerobic conditions (condition where oxygen is virtually absent from the soil). Wetlands are also typically characterized by relatively large and dense stands of plants sticking out of shallow water or wet soil. Plants adapted to such waterlogged conditions are referred to as hydrophytes. Wetlands are distinct from true aquatic ecosystems like river ecosystems, which are characterized by fast flowing water within channels, and lake ecosystems, that are flooded to great depth; both of which are not primarily characterized by the occurrence of hydric soils and hydrophytes.

A wide variety of wetland types are present in South Africa, and can be classified into six broad types, namely floodplain wetlands, unchannelled valley bottom wetlands, channelled valley bottom wetlands, seeps, depressions and wetland flats. Owing to the large variations in climate and topography across South Africa, vegetation and habitat associated with these wetland types vary tremendously from subtropical reed beds and tall swamp forests to arid salt pans, which all support unique and varied animal life.

Figure 17 illustrates all wetland types associated with the study site. A depression exists within 500m from the proposed site area. The wetland vegetation types forms part of the Nama Karoo Bushmanland (**Figure 18**).

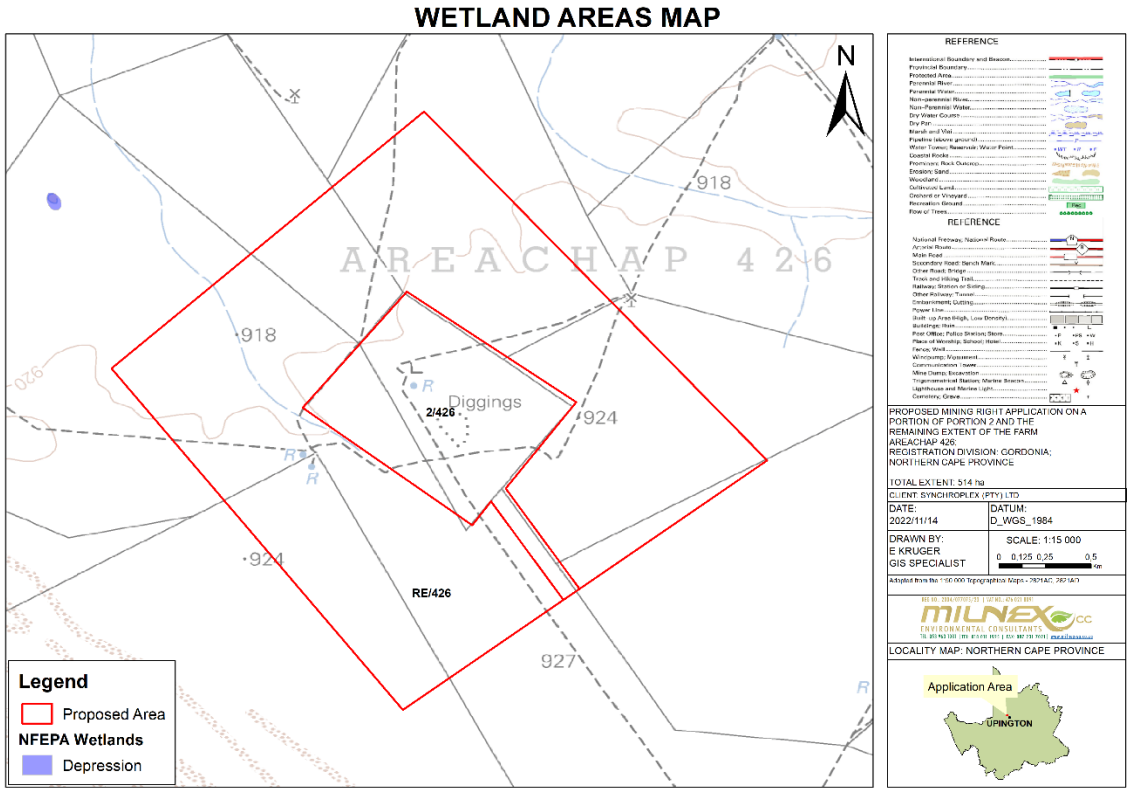


Figure 17: Wetland types present on site

An Ecological and Wetland Impact Assessment Report (**Appendix 11**) was compiled and conducted by Khume Mtshweni. The report confirmed the above-mentioned findings, please see below:

From the desktop assessment, no wetlands were expected to occur within 500m of the study area. A site visit was conducted to confirm the desktop findings which are discussed below:

One (1) watercourse was identified during the site visit. The site visit confirmed the assessed watercourse to be a drainage line which is defined as "a natural channel in which water flows regularly or intermittently", therefore deeming the systems not to be true wetlands. The rational for this was that these systems did not present any of the following indicators:

- *Wetland (hydromorphic) soils that display characteristics resulting from prolonged saturation such as grey horizons, mottling streaks, hard pans, organic matter depositions, iron and manganese concretion resulting from prolonged saturation;*
- *The presence of water loving plants (hydrophytes); (e.g. Sedges)*
- *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.*

Due to the watercourse not being a true wetland, the PES, EIS, REC and Scientific buffers could not be determined. Furthermore, the study is located in a low rainfall zone, outside of any SWSA, outside of the Orange River catchment area, and the drainage line did not present any recent alluvial deposits. With that being noted, the drainage line presented little to no aquatic significance.

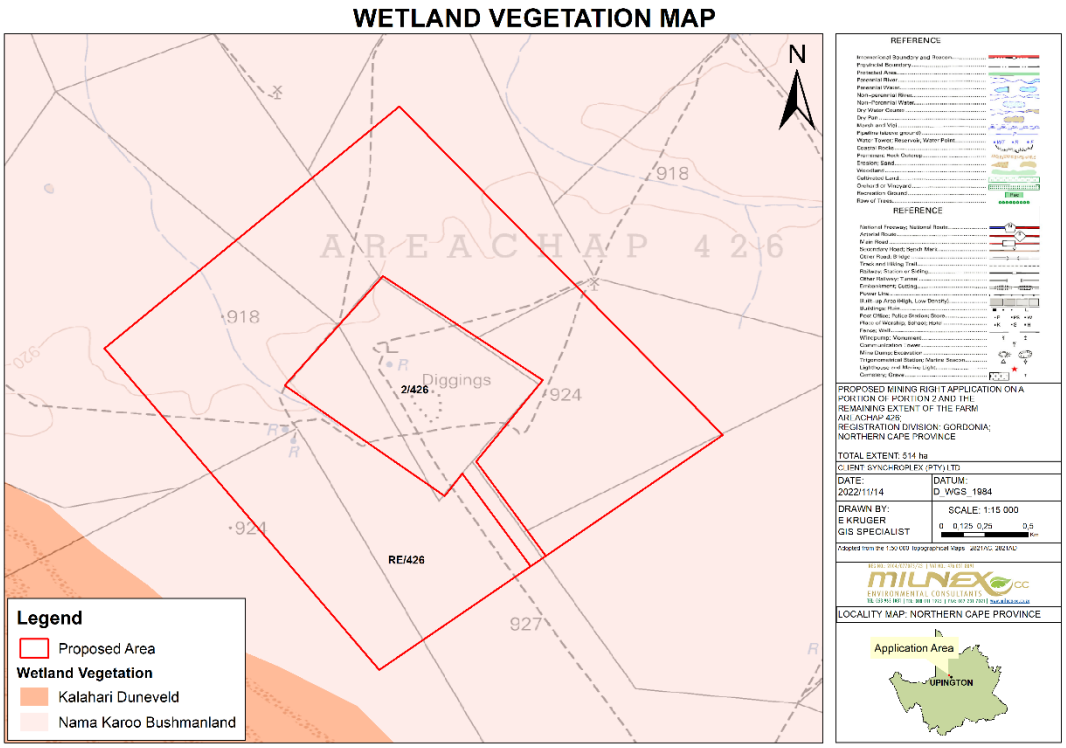


Figure 18: Wetland vegetation type

River Ecosystem Status

According to **Figure 20**, the status of the river is classed Moderately Modified (Class C).

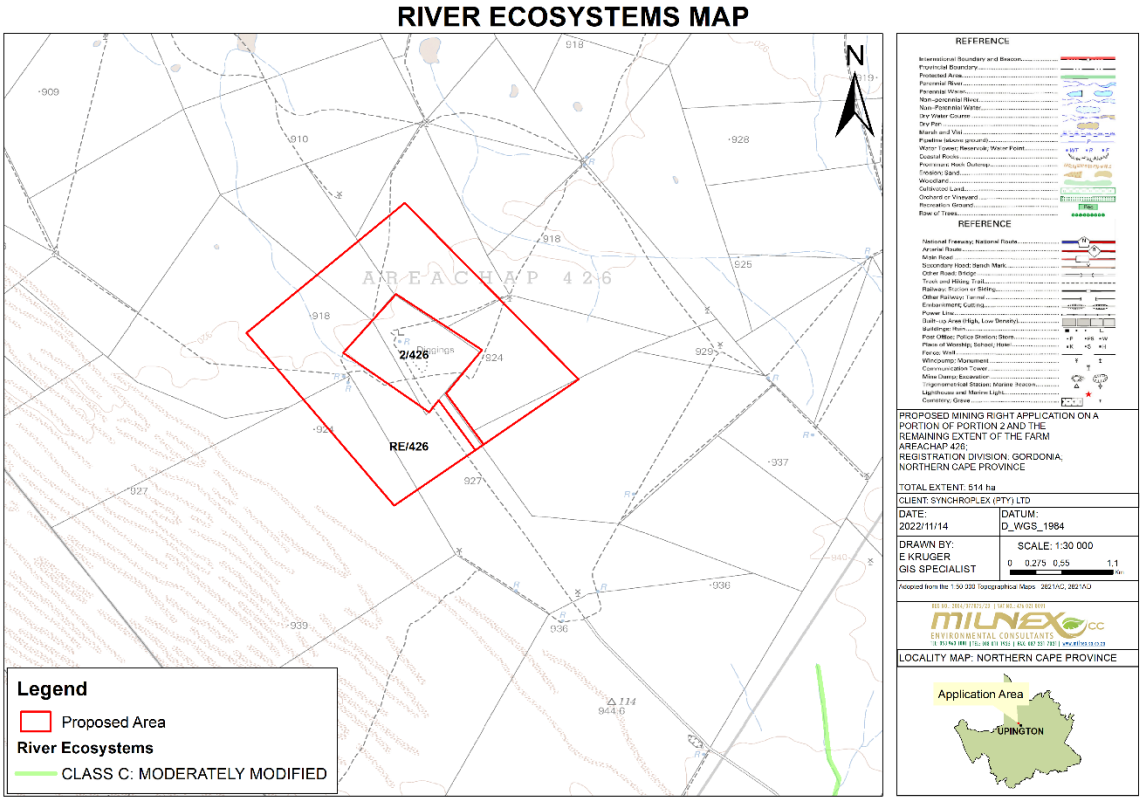


Figure 20: Ecosystem status of the rivers occurring in close proximity to the study site.

Quaternary Catchments and Associated Watercourses

The study site falls within the D42E Quaternary Catchments and forms part of the Lower Orange Water Management Area (WMA) (DWS, 2016). The Lower Orange WMA covers a total catchment area of 252 182 km2, with its major rivers being the Ongers, Hartebees, and the Orange Letaba.

Strategic Water Source Areas

Water source areas are those areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. Strategic water sources areas are those that supply substantial downstream economies and urban centers. These water source areas are vital to the national economy (Nel *et al*., 2013). The study area is not found in a strategic water source area.

Important Bird and Biodiversity Areas

Important Bird and Biodiversity Areas (IBAs) are a network of sites that are significant for the long-term viability of naturally occurring bird populations (Birdlife 2019). Many sites are also important for other forms of biodiversity; therefore, the conservation of Important Bird & Biodiversity Areas ensures the survival of a correspondingly large number of other animals and plants.

No IBAs were identified within the vicinity of the study site (**Figure 19**).

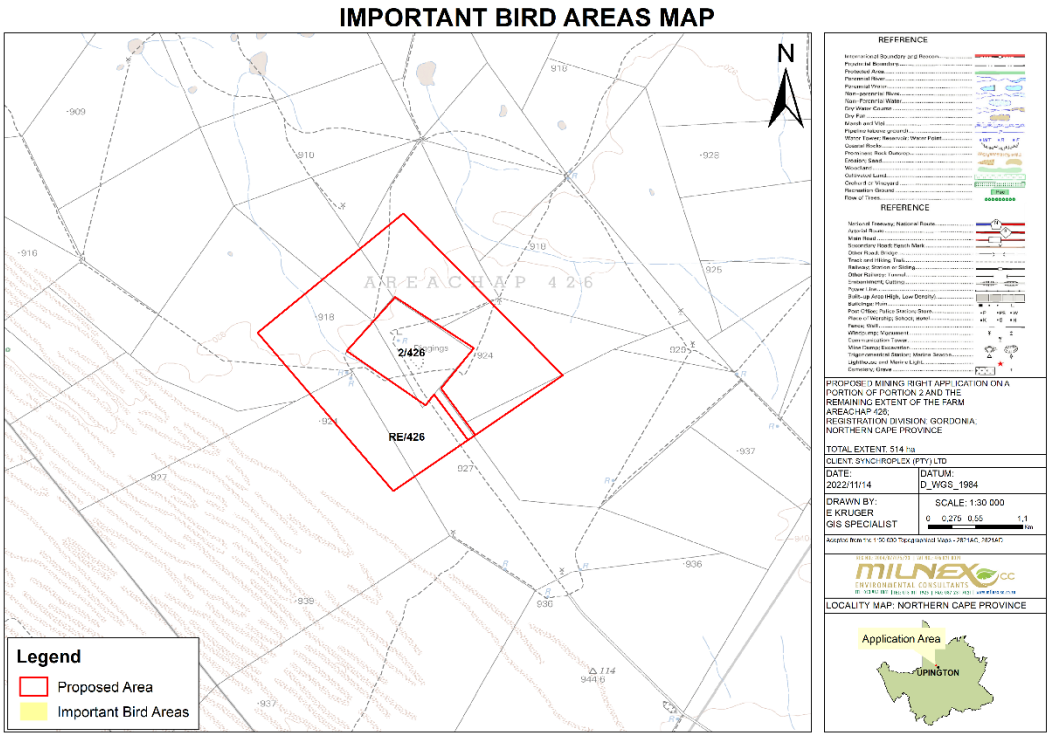


Figure 19: Important Bird and Biodiversity Areas associated with the study site.

An Ecological and Wetland Impact Assessment Report was compiled and conducted by Khume Mtshweni. The report states the following:

> *4.2.1. Avifauna*
> *Many avifaunal species are adaptable as they are habitat generalists and can therefore accommodate a certain degree of habitat degradation and transformation (Harrison et al., 1997). Other species are extremely habitat specific and have to rely on certain habitat units for breeding, hunting or foraging and roosting. It is the survival of these species that become threatened as they cannot adapt to habitat changes. Habitat-specific species are sensitive to*

environmental change, with destruction of habitat being the leading cause of species decline worldwide (Barnes, 2000).

It is widely accepted that vegetation structure, rather than the actual plant species, influences bird species' distribution and abundance (Harrison et al., 1997). Therefore, the vegetation description used in the Bird Atlas does not focus on lists of plant species, but rather on factors which are relevant to bird distribution. After generating a screening report of the study site, it was observed that the Near threatened Neotis ludwigii (Ludwig's Bustard) is expected to occur within the region.

Ludwig's Bustards are adapted to flat, open, semi-arid shrublands of the succulent Karoo, Nama karoo and Namib. Depending on rainfall, these birds can be found in cultivated fields and pastures. Suitable breeding and feeding habitats influencing distribution were observed on site and described in Section 4.1.2 as grass and shrubland (Taylor et al., 2015).

*According to the Southern African Bird Atlas Project 2 (SABAP2) bird map, 211 bird species are expected to occur within this region (Brooks and Ryan, 2023), with only 13 species enjoying conservation status in the IUCN Red List. Species of concern are presented in **Table 9** below. No species of conservation concern was observed during the site visit, but based on anecdotal evidence and habitat structure, their likelihood of occurrence is listed in the table below. Species in bold are protected under NEMBA.*

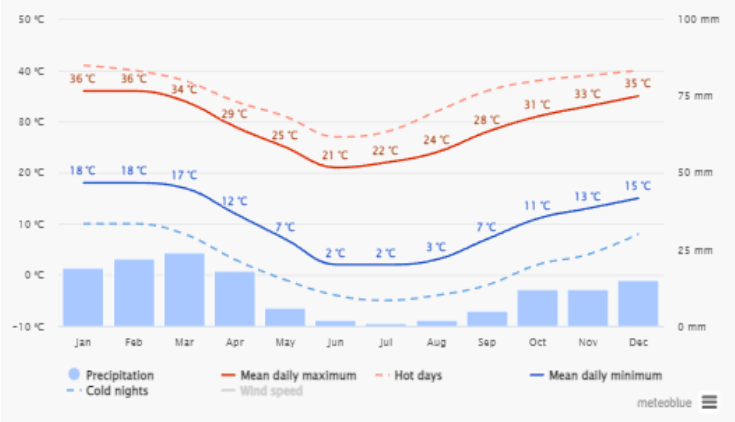
***Table 9**: List of Birds Possibly Occurring on Site (IUCN, 2021)*

Scientific Name	Common Name	Red Data List Category	Likelihood of Occurrence	ToPS
Sagittarius serpentarius	**Secretary bird**	**EN**	High	**Protected**
Circus maurus	Black Harrier	**EN**	High	
Neotis Ludwigii	**Ludwig's Bustard**	**EN**	**Medium**	**Protected**
Gyps africanus	**White-backed Vulture**	**CR**	**Low**	**Protected**
Torgos tracheliotos	**Lappet-faced Vulture**	**EN**	**Low**	**Protected**
Gyps coprotheres	**Cape Vulture**	**EN**	**Low**	**Protected**
Polemaetus bellicosus	**Martial Eagle**	**EN**	**Medium**	**Protected**
Aquila rapax	**Tawny Eagle**	**VU**	**Low**	**Protected**
Calidris ferruginea	Curlew Sandpiper	**NT**	High	
Falco vespertinus	Red-footed Falcon	**NT**	High	
Falco biarmicus	**Lanner Falcon**	**Vulnerable**	**High**	**Protected**
Anthus crenatus	Yellow-tufted Pipit	**NT**	Medium	
Ardeotis kori	**Kori Bustard**	**NT**	**Medium**	**Protected**
Spizocorys sclateri	Sclater's Lark	**NT**	High	

Climate

The meteoblue climate diagrams are based on 30 years of hourly weather model simulations and available for every place on Earth. They give good indications of typical climate patterns and expected conditions (temperature, precipitation, sunshine and wind). The simulated weather data have a spatial resolution of approximately 30 km and may not reproduce all local weather effects, such as thunderstorms, local winds, or tornadoes, and local differences as they occur in urban, mountainous, or coastal areas.

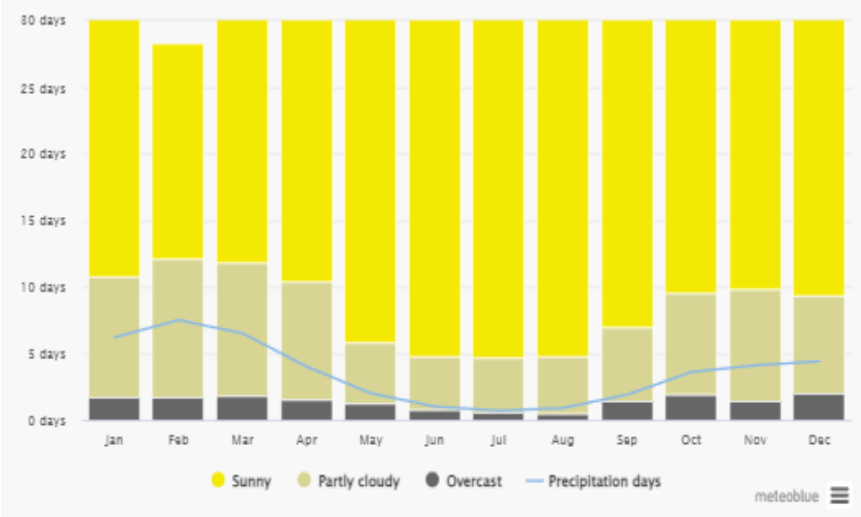
Average temperatures and precipitation



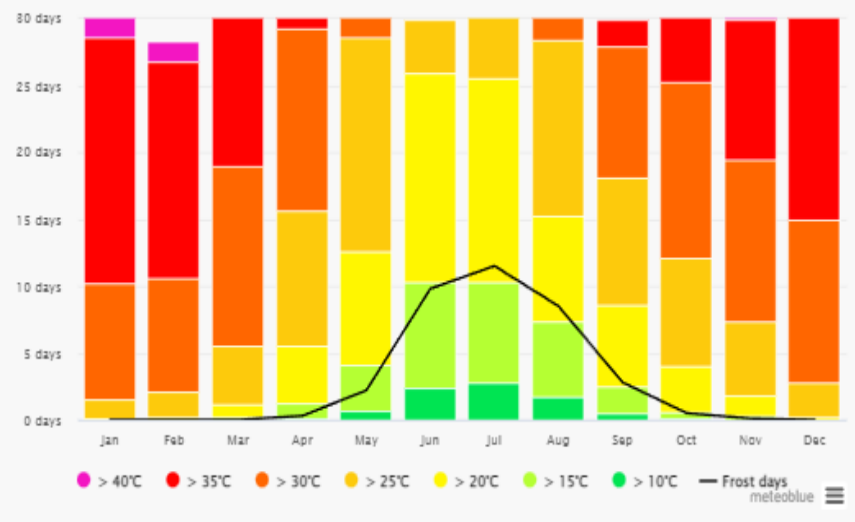
The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Upington. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. From the graph it can be deduced that Upington experience highest temperatures during the summer seasons which begins at the end of January and ends in December (i.e. December, January, February and March).

Cloudy, sunny, and precipitation days

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Upington receives the lowest rainfall in the month July and the highest in February and March.



Maximum temperatures



The maximum temperature diagram for Upington displays how many days per month reach certain temperatures. January is shown to be the warmest month and July the coldest month.

Description of the socio-economic environment

- Socio-economic conditions

Khara Hais Local Municipality (Now known as Dawid Kruiper Local Municipality).

The proposed project area falls within the Dawid Kruiper Municipality. This local municipality is a Category B municipality that forms part of the ZF Mgcawu District Municipality in the Northern Cape Province. It borders with the Kgalagadi Transfrontier Park in the north, Botswana in the north-east, and Namibia in the west. It is the largest of five municipalities in the district, making up almost half its geographical area. It was established by the amalgamation of the Mier and //Khara Hais Local Municipalities in August 2016. It consists of small towns and the !Khomani San community within its jurisdiction. Rietfontein, which is one of the main towns, is situated approximately 280km north-west from the nearest big town of Upington.

Upington is situated 400km west of Kimberley and has an airport and a landing strip. Natural boundaries provide a unique aspect to the town – one is the Kalahari Desert, and another is the Orange River, South Africa's largest river, which it straddles. The municipality is the acknowledged commercial, educational, military, agricultural, medical, transport and tourism centre of the area.

Population growth

According to the draft Integrated development Plan (2022/2027) Dawid Kruiper Local Municipality is considered as the most populous municipality in ZF Mcgawu District. There is currently 6 879 people within the Mier area which in terms of the demographic spread are scattered compared to the 100 282 within the former Khara Hais / Upington area, which brings the total population to 107 162 within the Dawid Kruiper jurisdiction. The coloured population is in the majority, followed by whites and then the Black African population and Indian/Asian. The most commonly spoken language is Afrikaans, spoken by 85% of the residents.

Unemployment rate and education

The unemployment rate fell drastically, from 34% in 2001 to 22.1% in 2011. The young unemployment rate also fell dramatically, from 42.3% in 2001 to 29% in 2011, however it remains quite high in relation to the municipality's total unemployment rate. Despite the fact that 44.7% of the Dawid Kruiper population is between the ages of 14 and 35, youngsters remain disenfranchised. People over the age of twenty in Dawid Kruiper finished the 12th grade at a rate

of 5.1% (20.9% in 2001 to 26% in 2011), but there was a considerable reduction of 6.5% (13.6 in 2001 to 7.1% in 2011) in those who had no schooling at all. Higher education has increased from 20.9% to 21.9% in 2001 to 26% in 2011.

Key Statistics summary:

Demographic Information

	2016	2011
Population	107 161	100 498
Age Structure		
Population under 15	28.6%	30.0%
Population 15 to 64	65.8%	64.4%
Population over 65	5.6%	5.7%
Dependency Ratio		
Per 100 (15-64)	52.1	55.3
Sex Ratio		
Males per 100 females	97.2	97.6
Population Growth		
Per annum	1.46%	n/a
Labour Market		
Unemployment rate (official)	n/a	n/a
Youth unemployment rate (official) 15-34	n/a	n/a
Education (aged 20 +)		
No schooling	4.5%	7.1%
Matric	31.8%	24.9%
Higher education	6.4%	7.3%
Household Dynamics		
Households	28 704	25 028
Average household size	3.7	3.8
Female headed households	40.2%	39.7%
Formal dwellings	69.7%	76.3%
Housing owned	73.7%	54.3%
Household Services		
Flush toilet connected to sewerage	64.5%	66.3%
Weekly refuse removal	80.9%	84.6%
Piped water inside dwelling	50.4%	54.4%
Electricity for lighting	88.0%	89.9%

Main Economic Sectors:

Agriculture, business services, game farming, tourism and hospitality, manufacturing, transport, community services, social and personal services.

According to the draft IPD, 2021-2027; the following economic sectors have been observed and evaluated:

Transport and logistics: Road, Rail and Air Network

The Transport sector has a number of economic linkages with the agricultural, manufacturing, mining and finance and business services sector: • Transport of raw materials and value adding products • Storage of the raw materials and value adding products before transporting to markets (needs to be further exploited in the district) • Businesses in the area need to market their products (requiring communication services) which need to be further exploited in the district • Research and development of products also require communication services (internet, etc) Upington is seen as the hub for all the Transport services, with the location of the airport and Upington being the centre of large transport corridors. The majority of the infrastructure development is taking place in and around Upington.

Manufacturing

The manufacturing sector is focused on value adding of agricultural products, mining products, construction and renewable energy products. As indicated the Dawid Kruiper Municipality has a very well-established agricultural sector within livestock and high value produce as well as very rich mineral deposits within the area. Manufacturing activities are dispersed throughout the ZF Mgcawu District Municipality with the highest concentration of manufacturing activities located within the Dawid Kruiper Local Municipality in Upington. The three most prominent manufacturing firms in the Upington area in terms of agriculture are SAD Vine Fruit (Pty) Ltd and Orange River Wine Cellars Co-Op and in terms of the renewable industry and construction are MEAPSA.

Agriculture and Agro-Processing

Agriculture is the base of developing economies and is still regarded as an important sector in South Africa as it is the sector that most people depend on for survival. Furthermore, it is the sector that offers the best potential for poverty and inequality reduction, as it provides sources of productivity from which the most disadvantaged people working in the sector can benefit. A healthy agricultural industry is also central to a country's gross domestic product (GDP), food security, social welfare, job creation and ecotourism, while adding value to raw materials.

Construction

Construction is the process of constructing a building or infrastructure. Building construction is the process of adding structure to real property or construction of buildings. The South African construction industry is a strategic sector that supports the government's National Development Plan (NDP) and has reiterated its commitment to infrastructure development. The Construction sector around the Dawid Kruiper Municipality area comprises of the following: Production of building materials, Production of renewable energy plants equipment, Assemblinh of steel pipes, Welding of storage equipment. Increased demand for housing in urban areas, construction of shopping malls and industrial space both within and beyond the municipality. Dawid Kruiper Municipality is responsible for nearly half of all construction related activities in the ZF Mgcawu District.

Tourism

The tourism industry is a major growth sector in terms of investment, employment and the diversification of services. Less directly, tourism stimulates the property market – especially prime residential and cluster projects – and strengthens business contacts, often are the forerunners of trade, joint ventures and immigration plans. The tourism industry also has strong linkages with the major routes (routes between Johannesburg and Upington, leading to Namibia) as well as with other countries such as Namibia and Botswana.

Mining

The mining and quarrying sector is small economic sector in the Dawid Kruiper Municipality. The industry is mostly around the production of raw salt, gravel minerals and semi-precious tones. It is important that beneficiation take place in the Dawid Kruiper Municipality in order to promote job creation within the sector as well as to increase the benefits (mostly financial) of these products.

Renewable Energy

Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat. Upington falls within the Northern Cape Solar Corridor and one of South Africa's Renewable Energy Development Zones (REDZs). The town experiences an ideal level of solar irradiation (power per unit area received from the sun in the form of electromagnetic radiation) for solar energy production. Renewable energy sources, other than biomass, are currently being optimally exploited in South Africa, especially in the Northern Cape.

- Cultural and heritage aspects

According to the DEA Screening Report the Archaeological and Cultural Heritage Theme Sensitivity is dominated by low sensitivity with patches of high environmental sensitivity as the project area is within 50m of a grade IIIc Heritage Site. Please see colour map under **Appendix 7.** The South African Heritage Research Agency (SAHRA) has been consulted on the online SAHRIS system. The HIA as well as PIA relevant for the proposed application have been uploaded on the SAHRA online system.

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

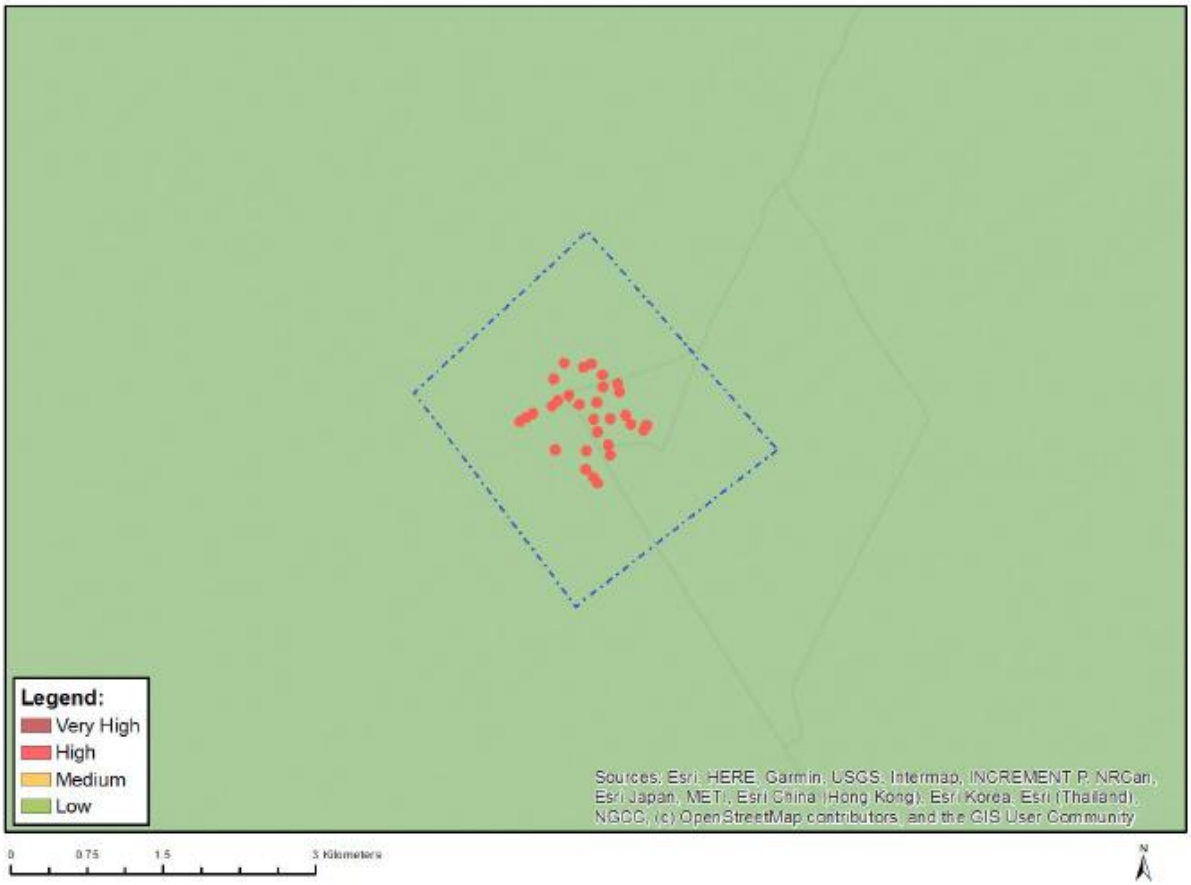


Figure 21: Archaeological and Cultural Heritage Combined Sensitivity

A Phase 1 investigation – Cultural Heritage Impact Assessment study was conducted by Francois P Coetzee (a Heritage consultant) for the proposed project and the results are discussed below and also attached as **Appendix 11** to this report.

Isolated occurrences

Isolated occurrences are artefacts or small features recorded on the surface with no contextual information. No other associated material culture (in the form of structures or deposits) was noted that might provide any further context. This can be the result of various impacts and environmental factors such as erosion and modern developments. By contrast archaeological sites are often complex sites with evidence of archaeological deposit and various interrelated features such as complex deposits, stone walls and middens. However, these isolated occurrences are seen as remains of erstwhile complex or larger sites and they therefore provide a broad indication of possible types of sites or structures that might be expected to occur or have occurred in the survey footprint.

Throughout the survey area several isolated occurrences were recorded usually associated with the Middle Stone Age. These surface finds were recorded near open areas in the southern section of the survey area. As such a general A°/m² index for the survey footprint is 0 – 5 artefacts per m2 which is low.

As discussed above, please note that widespread surface 'background scatter' of Middle Stone Age artefacts throughout the survey footprint. This phenomenon has also been defined and clearly characterised by Orton (2016).

Figure 27: Middel Stone Age (MSA) flakes and cores recorded on the surface

Heritage sites

A total of one site was recorded during the survey, which include one graveyard (Site 1) The graveyard is probably associated with the early mining activities on the farm and probably dates to the early 20th century.

No historical, Stone Age or Iron Age settlements, structures, features or assemblages were recorded during the survey.

Locations and Evaluation of Sites

Site No	Coordinates	Site Type	Field Rating of Significance	Impact	Proposed Mitigation
1	28.302055°S 21.041148°E	Graveyard	Generally protected A: High significance	Low	• Maintain a buffer zone of 50 metres during mining operations

Table 8: Location and evaluation of the site

Observations:

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible.
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken.

- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological, or paleontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

Palaeontology

According to the map of relative Palaeontology Theme Sensitivity in the DEA Screening Report, the proposed area falls within medium sensitivity. Please see map colour map under **Appendix 7**. The South African Heritage Research Agency (SAHRA) has been consulted on the online SAHRIS system. The HIA as well as PIA relevant for the proposed application have been uploaded on the SAHRA online system.

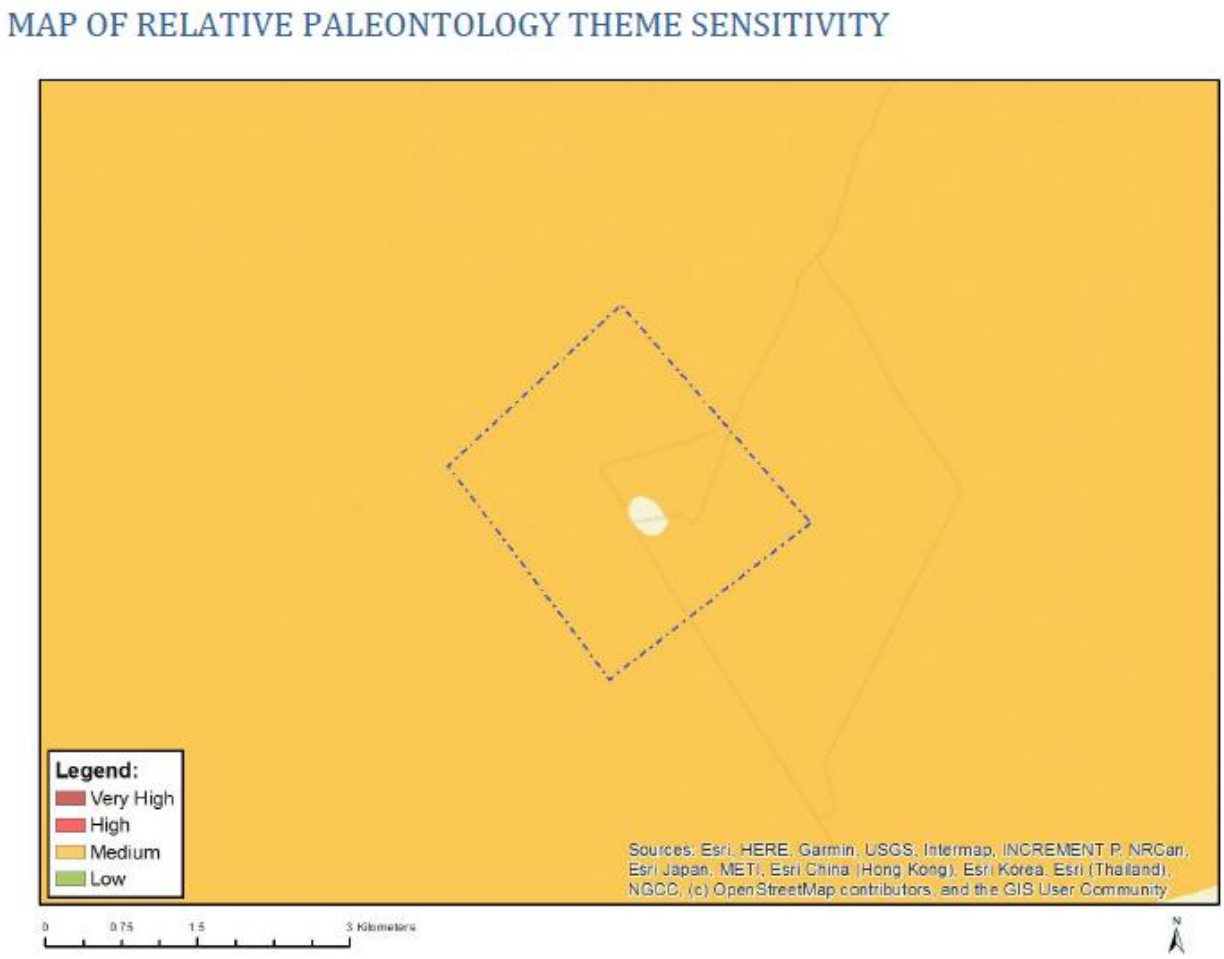


Figure 22: Relative Palaeontology Theme Sensitivity

The Palaeontological desktop study was prepared by Banzai Environmental for the proposed project. The findings are as follows and the report is available under **Appendix 11**.

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**".

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

A fossil is the naturally preserved remains (or traces thereof) of plants or animals embedded in rock. These organisms lived millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine environmental conditions that existed in a specific geographical area, millions of years ago.

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when construction activities accidentally uncover fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

(b) Description of the current land uses.

The desktop information revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of low shrubland and to a lesser extent bare non vegetated due to prospecting that was done in the area. See figure 23 Land use map below.

The land cover map also shows that the proposed project area is overlain by natural area.

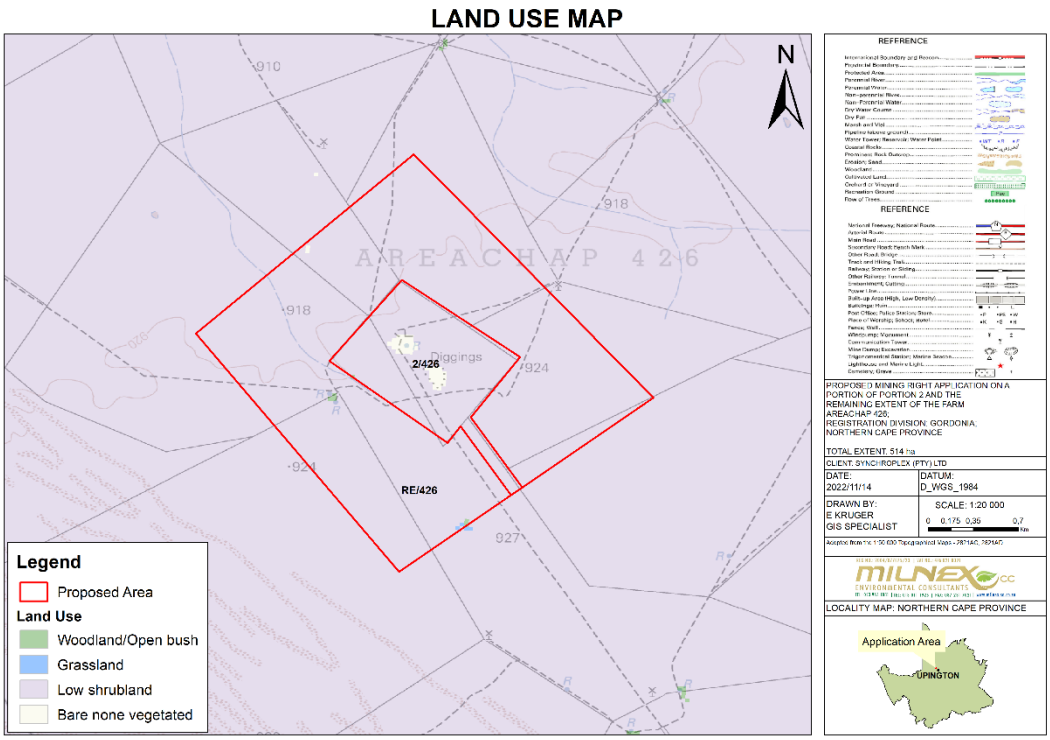


Figure 23: Land use map

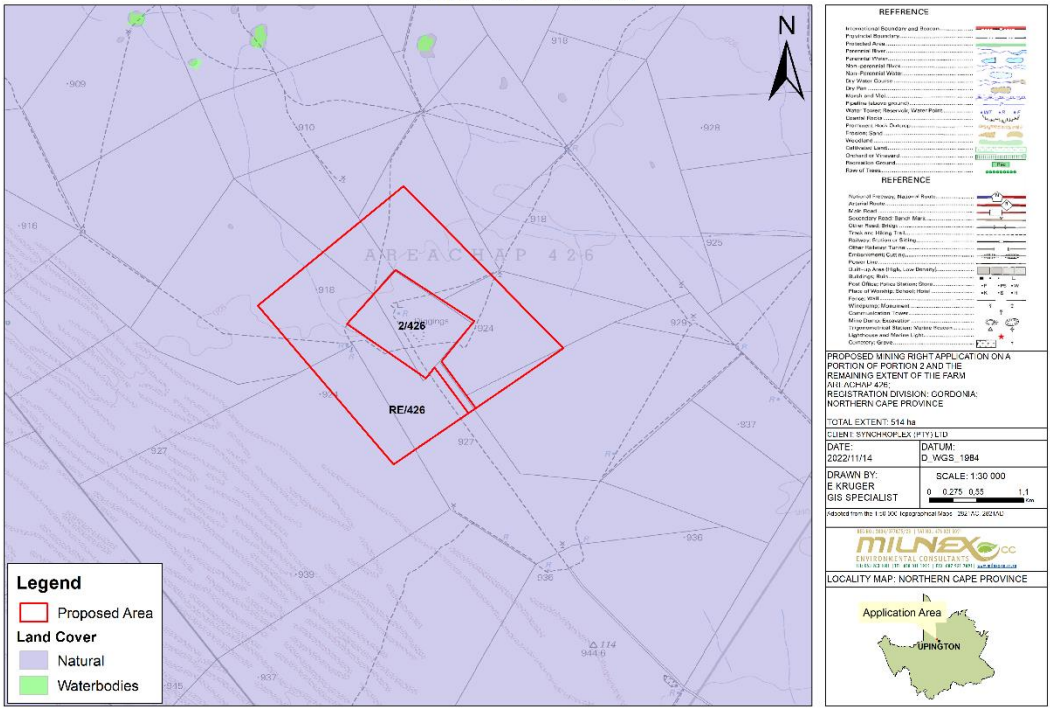


Figure 24: Landcover map

v. The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts—

(aa) can be reversed;
(bb) may cause irreplaceable loss of resources; and
(cc) can be avoided, managed or mitigated;

Please see heading J) for the impacts identified and their assessment.

vi. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

Method of environmental assessment

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed development. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the Table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction
- Operation
- Decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied

to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table: *The rating system*

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.

2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		

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

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

vii. Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

- Increased ambient noise levels resulting from geophysics surveys site fly-overs and increased traffic movement during all mining phases.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on environmental resources utilized by communities, landowners and other stakeholders.
- Potential water and soil pollution impacts resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning.
- Increased vehicle activity within the area resulting in the possible destruction and disturbance of fauna and flora.
- Poor access control to farms which may impact on cattle movement, breeding and grazing practices.
- Access control to portion which may impact on cattle movement, breeding and grazing practices of the surrounding community.
- Influx of persons (job seekers) to site as a result of increased activity and the possible resultant increase in opportunistic crime.
- Potential visual impacts caused by mining activities.
- mining will be undertaken by specialist sub - contractors and it is not anticipated that employment opportunities for local and / or regional communities will result from the mining activities.
- Negative impacts on the groundwater resources.
- Long-term loss of indigenous vegetation.
- Air pollution due to dust to the surrounding community and hospital.
- Impact on tourism.

viii. The possible mitigation measures that could be applied and level of residual 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).

Adverse environmental associated with the mining activity have been identified through the Scoping & EIR process. Mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B must be implemented in order to minimise any potential impacts.

All comments received during the review period of the Scoping and EIR report, as well as response provided is captured and recorded within the Comments and Response Report and will be attached in the final EIR.

ix. If no alternative development [location] footprints for the activity were investigated, the motivation for not considering such; and

As discussed in the previous section, based on outcomes of previous studies conducted in the vicinity of the proposed site, it is expected that high volumes of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body near Upington, on portion 2 and the remaining extent of the farm Areachap 426, Registration Division Gordonia in the Northern Cape Province are anticipated.

The location of the activities is depicted by figure 2, **Appendix 4** and referred to in the Mining Work Programme (see **Appendix 9** for the Programme). The proposed area consists mostly of low schrubland and disturbed areas as a result of prospecting.

x. A concluding statement indicating the location of the preferred alternative development [location] footprint within the approved site as contemplated in the accepted scoping report;

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

Design alternatives were considered throughout the planning and design phase (i.e. where is the rock bed located?). In this regard discussions on the design were held between the EAP and the developer. The layout follows the limitations of the site and aspects such as, roads, site offices and workshop area as well as fencing.

ix. A FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS THE ACTIVITY AND ASSOCIATED STRUCTURES AND INFRASTRUCTURE WILL IMPOSE ON THE PREFERRED [LOCATION] DEVELOPMENT FOOTPRINT ON THE APPROVED SITE

(As contemplated in the accepted scoping report through the life of the activity, including—.)

i. A description of all environmental issues and risks that are identified during the environmental impact assessment process.

Process for the identification of key issues

The methodology for the identification of key issues aims, as far as possible, to provide a user-friendly analysis of information to allow for easy interpretation.

- Checklist: The checklist consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts.

- Matrix: The matrix analysis provides a holistic indication of the relationship and interaction between the various activities, development phases and the impact thereof on the environment. The method aims at providing a first order cause and effect relationship between the environment and the proposed activity. The matrix is designed to indicate the relationship between the different stressors and receptors which leads to specific impacts. The matrix also indicates the specialist studies, which will be submitted as part of the Environmental Impact Report in order to address the potentially most significant impacts.

Checklist analysis

The site visit was conducted to ensure a proper analysis of the site-specific characteristics of the study area. The table below provides a checklist, which is designed to stimulate thought regarding possible consequences of specific actions and so assist scoping of key issues. It consists of a list of structured questions related to the environmental parameters and specific human actions. They assist in ordering thinking, data collection, presentation and alert against the omission of possible impacts. The table highlights certain issues, which are further analysed in matrix format.

Table: Environmental checklist

QUESTION	YES	NO	Un-sure	Description
1. Are any of the following located on the site earmarked for the development?				
I. A river, stream, dam or wetland	✕			According to the Watercourse Delineation and Ecological Impact Assessment Report, no rovers were observed within the study area, but a depression and a drainage line.
II. A conservation or open space area		✕		None
III. An area that is of cultural importance	✕			From the Heritage Impact Assessment, a single graveyard was recorded within the site, possibly associated with the early mining activities on the farm and probably dates to the early 20th century. No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. According to the Cultural Heritage Sensitive areas map the area falls within a low and high archaeological & cultural heritage theme which is within a 5m radius of a Grade IIIc Heritage site.
IV. Site of geological significance			✕	
V. Areas of outstanding natural beauty		✕		
VI. Highly productive agricultural land		✕		The proposed area falls within land capability Class 7. According to the screening tool, the application area falls within a low to medium sensitive area
VII. Floodplain		✕		None.

VIII. Indigenous Forest			✕	The desktop information revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of low shrubland and to a lesser extent bare non vegetated due to prospecting that was done in the area.
IX. Grass land			✕	The proposed area falls within vegetation unit NKb 5, which is known as the Kalahari Karroid Shrubland. The desktop information revealed that land uses on and in the immediate vicinity of the proposed development are essentially comprised of low shrubland and to a lesser extent bare non vegetated due to prospecting that was done in the area.
X. Bird nesting sites			✕	According to the Important Bird Area map, as attached in Appendix 7, the area does not fall within the Important Bird Areas Map.
XI. Red data species			✕	According to the screening tool attached as Appendix 7, the animal sensitivity is classified as medium. An Ecological Assessment will however be conducted to in fact confirm the desktop data.
XII. Tourist resort		✕		None.
2. Will the project potentially result in potential?				
I. Removal of people			✕	
II. Visual Impacts	✕			The visual impact will be managed.
III. Noise pollution	✕			The noise impact will be managed.
IV. Construction of an access road			✕	Access will be obtained from a gravel road off the N10. Upington Water Board's water supply line to the north to Askham, traverses next to the R360 regional road northwards. It might be required to obtain access to the main reservoir, approximately 7.3 Km due east of the project and reroute or replace a portion of this pipeline to service the mining requirements at Areachap project
V. Risk to human or valuable ecosystems due to explosion/fire/ discharge of waste into water or air.			✕	
VI. Accumulation of large workforce (>50 manual workers) into the site.	✕			According to the Mining Work Programme a workforce of 63 employees is envisaged. It is also indicates the possibility of sub-contracting works, should sub-contracting be utilized, 151 employees can be employed.

VII. Utilisation of significant volumes of local raw materials such as water, wood etc.			X	The Areachap mining project will require between 180 000 m3 to 420 000 m3 of water during peak production period monthly. This equates to a daily requirement of 6 700 m3 of water per day minimum.
VIII. Job creation			X	According to the Mining Work Programme a workforce of 63 employees is envisaged. It is also indicates the possibility of sub contracting works, should subcontracting be utilized, 151 employees can be employed
IX. Traffic generation			X	Little to none
X. Soil erosion			X	Only areas earmarked for mining will be cleared. The mining will be phased and the topsoil stockpiled separately.
XI. Installation of additional bulk telecommunication transmission lines or facilities	X			
3. Is the proposed project located near the following?				
I. A river, stream, dam or wetland	X			According to the Watercourse Delineation and Ecological Impact Assessment Report, no rovers were observed within the study area, but a depression and a drainage line. It is evident that some water bodies are present to the north of the proposed site
II. A conservation or open space area			X	
III. An area that is of cultural importance	X			From the Heritage Impact Assessment, a single graveyard was recorded within the site, possibly associated with the early mining activities on the farm and probably dates to the early 20th century. No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint. According to the Cultural Heritage Sensitive areas map the area falls within a low and high archaeological & cultural heritage theme which is within a 5m radius of a Grade IIIc Heritage site.
IV. A site of geological significance			X	
V. An area of outstanding natural beauty		X		None
VI. Highly productive agricultural land			X	The proposed area falls within land capability Class 7. According to the screening tool, the application area falls near a low to medium sensitive area
VII. A tourist resort		X		
VIII. A formal or informal settlement			X	

Matrix analysis

The matrix describes the relevant listed activities, the aspects of the development that will apply to the specific listed activity, a description of the environmental issues and potential impacts, the significance and magnitude of the potential impacts, and the mitigation of the potential impacts. The matrix also highlights areas of particular concern, which requires more in depth assessment. Each cell is evaluated individually in terms of the nature of the impact, duration and its significance – should no mitigation measures be applied. This is important since many impacts would not be considered insignificant if proper mitigation measures were implemented. The matrix also provides an indication if mitigation measures are available.

In order to conceptualise the different impacts, the matrix specify the following:

- **Stressor**: Indicates the aspect of the proposed activity, which initiates and cause impacts on elements of the environment.
- **Receptor**: Highlights the recipient and most important components of the environment affected by the stressor.
- **Impacts**: Indicates the net result of the cause-effect between the stressor and receptor.
- **Mitigation**: Impacts need to be mitigated to minimise the effect on the environment.

x. 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.

LISTED ACTIVITY (The Stressor)	ASPECTS OF THE DEVELOPMENT /ACTIVITY	POTENTIAL IMPACTS			SIGNIFICANCE AND MAGNITUDE OF POTENTIAL IMPACTS			MITIGATION OF POTENTIAL IMPACTS	SPECIALIST STUDIES / INFORMATION
		Receptors		Impact description	Minor	Major	Duration	Possible Mitigation	
CONSTRUCTION PHASE									
Listing Notice 1 (GNR 327), Activity 9: The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more. **Listing Notice 1 (GNR 327), Activity 10:** The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; **Listing Notice 1 (GNR 327), Activity 24:** The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; **Listing Notice GNR 325, Activity 15:"***The clearance of an area of 20 hectares or more, of indigenous vegetation."*	<u>Site clearing and preparation.</u> Areas earmarked for mining will need to be cleared, topsoil will be stockpiled separately.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Loss or fragmentation of indigenous natural vegetation. • Loss of sensitive species. • Loss or fragmentation of habitats.	-		M	Yes	-
			Air	• Air pollution due to the increase of traffic of construction vehicles.	-		M	Yes	-
			Soil	• Soil degradation, including erosion. • Loss of topsoil. • Disturbance of soils and existing land use (soil compaction).		-	M	Yes	-
			Geology	• It is not foreseen that the removal of indigenous vegetation will impact on the geology or vice versa.	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	• Generation of waste that need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the local sewage plant.	-		S	Yes	-
			Ground water	• Pollution due to construction vehicles. • Pollution due to the construction of underground equipment	-	-	S	Yes	-
			Surface water	• Increase in storm water run-off. • Pollution of water sources due to soil erosion. • Destruction of watercourses (pans/dams/streams).	-		S	Yes	-
		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. • Business opportunities. • Skills development.		+	S	Yes	-
			Visual landscape	• Potential visual impact on residents of farmsteads, settlements and motorists in close proximity to proposed facility.	-		L	Yes	-
			Traffic volumes	• Increase in construction vehicles.	-		S	Yes	-
			Health & Safety	• Air/dust pollution. • Road safety. • Increased risk of veld fires.		-	S	Yes	-
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery such as drills, excavators, rotary pans, dumper trucks and people working on the site.		-	L	Yes	-

			Tourism industry	• Since there is no tourism facility in close proximity to the site, the construction activity will have no impact on tourism in the area.	N/A	N/A	N/A	N/A	-
			Heritage resources	• Removal or destruction of archaeological and/or paleontological sites. • Removal or destruction of buildings, structures, places and equipment of cultural significance.	-		S	Yes	-
OPERATIONAL PHASE									
Listing Notice 2 (GNR 325), Activity 17 (Amended GNR 517: 2021): "Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right." **Listing Notice 2 (GNR 325), Activity 17 (Amended GNR 517: 2021):** "Any activity including the operation of that activity which requires a mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right." **Listing Notice GNR 325, Activity 19**: "The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—	The key components of the proposed project are described below: <u>Infrastructure:</u> -Roads -Electricity - Water -Processing	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Fragmentation of habitats. • Establishment and spread of declared weeds and alien invader plants (operations).		-	L	Yes	-
			Air quality	• Air pollution due to the mining activity, screening & crusher plant, transport of the gravel to the designated areas and possible blasting.		-	M	Yes	-
			Soil	• Soil degradation, including erosion. • Disturbance of soils and existing land use (soil compaction). • Loss of agricultural potential (low significance).		-	L	Yes	-
			Geology	• Collapsible soil. • Seepage (shallow water table). • Active soil (high soil heave). • Erodible soil. • The presence of undermined ground. • Instability due to soluble rock. • Steep slopes or areas of unstable natural slopes. • Areas subject to seismic activity. • Areas subject to flooding. • Blasting		-	L	Yes	-
			Existing services infrastructure	• Generation of waste that need to be accommodated at a licensed landfill site. • Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. • Increased consumption of water.		-	L	Yes	-
			Ground water	• Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies. • Pollution due to blasting • Pollution due to underground works			L	Yes	-
			Surface water	• Increase in storm water runoff. The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion. • Destruction of watercourses (pans/dams/streams). • Leakage of hazardous materials. The machinery on site require oils and fuel to function. Leakage of these oils and fuels can contaminate water supplies.		-	L	Yes	-

Listing Notice 3 (GNR 324), Activity 10: The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. **(g) Northern Cape, (ii)** Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland,		SOCIAL/ECONOMIC ENVIRONMENT	Local unemployment rate	• Job creation. Security guards will be required for 24 hours every day of the week and general laborers will also be required for the cleaning of the panels. • Skills development.		+	L	Yes	-
			Visual landscape	• The mine will have a visual impact	-		L	Yes	-
			Traffic volumes	• Increase in vehicles.	-		S	Yes	-
			Health & Safety	• Air/dust pollution. • Road safety. • Overall mine health and safety		-	S	Yes	-
			Noise levels	• The proposed development will result in noise pollution during the operational phase.	-	-	L	Yes	-
			Tourism industry	• Since there is no tourism facility in close proximity to the site, the operational activities will have no impact on tourism in the area.	N/A	N/A	N/A	N/A	-
			Heritage resources	• Removal or destruction of archaeological and/or paleontological sites. • Removal or destruction of buildings, structures, places and equipment of cultural significance.	-		S	Yes	-
DECOMMISSIONING PHASE									
-	<u>Mine closure</u> During the mine closure the Mine and its associated infrastructure will be dismantled. <u>Rehabilitation of biophysical environment</u> The biophysical environment will be rehabilitated.	BIOPHYSICAL ENVIRONMENT	Fauna & Flora	• Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.		+	L	Yes	-
			Air quality	• Air pollution due to the increase of traffic of construction vehicles.	-		S	Yes	-
			Soil	• Backfilling of all voids • Placing of topsoil on backfill • Underground closure and rehabilitation		+	L	Yes	-
			Geology	• It is not foreseen that the decommissioning phase will impact on the geology of the site or vice versa.	N/A	N/A	N/A	N/A	-
			Existing services infrastructure	• Generation of waste that need to be accommodated at the local landfill site. • Generation of sewage that need to be accommodated by the municipal sewerage system and the local sewage plant. • Increase in construction vehicles.	-		S	Yes	-
			Ground water	• Pollution due to construction vehicles.	-		S	Yes	-
			Surface water	• Increase in storm water run-off. • Pollution of water sources due to soil erosion. • Destruction of watercourses (pans/dams/streams).	-		S	Yes	-
		SOCIAL/ECONOMIC	Local unemployment rate	• Loss of employment.		-	L	Yes	-
			Visual landscape	• Potential visual impact on visual receptors in close proximity to proposed facility.	-		S	Yes	-

			Traffic volumes	• Increase in construction vehicles.	-		S	Yes	-
			Health & Safety	• Air/dust pollution. • Road safety. • Increased crime levels. The presence of mine workers on the site may increase security risks associated with an increase in crime levels as a result of influx of people in the area.	-			Yes	-
			Noise levels	• The generation of noise as a result of construction vehicles, the use of machinery and people working on the site.	-		S	Yes	-
			Tourism industry	• Since there is no tourism facility in close proximity to the site, the decommissioning activities not have an impact on tourism in the area.	N/A	N/A	N/A	N/A	-
			Heritage resources	• It is not foreseen that the decommissioning phase will impact on any heritage resources.	N/A	N/A	N/A	N/A	-

(N/A) No impact (+) Positive Impact (-) Negative Impact (S) Short Term (M) Medium Term (L) Long Term

i. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK, INCLUDING—

(i) cumulative impacts;
(ii) the nature, significance and consequences of the impact and risk;
(iii) the extent and duration of the impact and risk;
(iv) the probability of the impact and risk occurring;
(v) the degree to which the impact and risk can be reversed;
(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
(vii) the degree to which the impact and risk can be mitigated;

Significance of potential impacts

The following sections present the outcome of the significance rating exercise. The results suggest that almost none of the key issues identified as part of the EIR process had a negative high environmental significance. Instead the overall score indicate a low environmental significance score.

INITIAL CLEARANCE AND SITE PREPARATION PHASE

Direct impacts: During this phase minor negative impacts are foreseen over the short term. The latter refers to a period of weeks. The site preparation may result in the loss or fragmentation of indigenous natural fauna and flora, loss or fragmentation of habitats, soil erosion, hydrology, and temporary noise disturbance, generation of waste, visual intrusions, increase in heavy vehicle traffic, and risk to safety, livestock and farm infrastructure, and increased risk of veld fires. The abovementioned impacts are discussed in more detail below:

- Loss, destruction or fragmentation of indigenous natural fauna and flora:

According to Mucina & Rutherford (2006), the study area overlaps with the Kalahari Karroid Shrubland vegetation type (NKb5). The screening report also did not record any plant species as a Species of Conservation Concern (SCC). One provincially protected tree (*Boscia foetida*) was also recorded. If any of these trees are to be removed, a flora permit will have to be obtained. Flora species expected to occur according to Mucina and Rutherford (2006) and Dominant plant species observed on the study site were identified and discussed in the Watercourse Delineation and Ecological Impact Assessment Report attached as **Appendix 11.**

According to the Watercourse Delineation and Ecological Impact Assessment Report, it was observed that the Near threatened Neotis ludwigii (Ludwig's Bustard) is expected to occur within the region. These species are adapted to flat, open, semi-arid shrublands of the succulent Karoo, Nama karoo and Namib. Depending on rainfall, these birds can be found in cultivated fields and pastures. Suitable breeding and feeding habitats influencing distribution were observed on site and described in Section 4.1.2 as grass and shrubland (Taylor *et al*., 2015). No species of conservation concern was observed during the site visit, but based on anecdotal evidence and habitat structure, their likelihood of occurrence is expected, see table 9 of the list of birds possibly occurring on site in the study report attached as **Appendix 11**.

A desktop study revealed that Mammal species that are protected under NEMBA could potentially occur within the project area as well as those species in the South African Red list of Mammals (2012) and the Threatened or Protected Species (ToPS) List (NEMBA, 10 of 2004). The DFFE screening tool report did not flag any SCC that may potentially occur on site. The study area can be classified as a hot temperate desert presenting deep red soils and open grasslands essential for grazing and fossorial animals. Evidence of occurrence was noted in the form of spoors, droppings, burrows, bones and carcasses.

The specialist study also mentions that the study area was observed to present low terrestrial biodiversity but high faunal abundance due to limited habitat diversity and minimal anthropogenic disturbances. Diversity in habitat types was only observed in the form of vegetation structure, therefore limiting the area to organisms adaptable to the assessed area (habitat specialists). Due to low biodiversity, but vast range of the study area and its surrounding. Impacts on organisms in this area are expected to be low. The study area and surrounding farms were observed to present low fences which do not impede on the migratory nature of most large mammals sporadically seen in the region. Herpetofauna, avifauna and small mammals are expected to be widely distributed within the region and not confined to the study area.

Loss or fragmentation of indigenous natural fauna and flora	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	**Negative medium (32)**	**Negative low (13)**
Can impacts be mitigated?	If the development is approved, contractors must ensure that no mammalian species are disturbed, trapped, hunted or killed. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for the development and have the least possible edge effects on the surrounding area. The EMPr also provides numerous mitigation measures – refer to section (D) of the EMPr. The potential impacts associated with damage to, and loss of farmland should be effectively mitigated. The aspects that should be covered include: • The site should be fenced off prior to commencement of construction activities; • The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible; • An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase; • All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase; • The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr – section (D) of the EMPr. • The implementation of the Rehabilitation Programme should be monitored by the ECO.	

- Loss destruction or fragmentation of habitats – It is noted that the proposed mining site is mostly covered in natural vegetation. Faunal species will primarily be affected by the overall loss of habitat. However, it is expected to be low to medium since there were prospecting activities that occurred over the area in the past which already disturbed the area.

Loss or fragmentation of habitats	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	**Negative medium (48)**	**Negative low (26)**
Can impacts be mitigated?	Exotic and invasive plant species should not be allowed to establish, if the development is approved. Where exotic and invasive plant species are found at the site continuous eradication should take place. If the development is approved, every effort should be made to confine the footprint to the blocks allocated for development – section (D) of the EMPr also provides numerous mitigation measures related to fauna and flora. Mitigation measures • Do not disturb nests, breeding sites or young ones. Do not attempt to kill or capture snakes unless directly threatening the safety of employees. • Dogs or other pets are not allowed to the worksite as they are threats to the natural wild animal • A low speed limit should be enforced on site to reduce wild animal-vehicle collisions • No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. • Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal species. • Hunting weapons are prohibited on site. • Contract employees must be educated about the value of wild animals and the importance of their conservation. • The ECO must conduct regular site inspections of removing any snares or traps that have been erected. • Employees and contractors should be made aware of the presence of, and rules regarding, flora and fauna through suitable induction training and on-site signage. • Ensure that the colours used to paint the buildings including the roof are blending to the environment	

- Loss of topsoil –Topsoil may be lost due to poor topsoil management (burial, erosion, etc.). The effect will be the loss of soil fertility on disturbed areas after rehabilitation.

Loss of topsoil	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Medium term (2)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	**Negative medium (45)**	**Negative low (20)**
Can impacts be mitigated?	The following mitigation or management measures are provided: • If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation. • Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them. • Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. • Erosion must be controlled where necessary on top soiled areas. Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports and should include all the records below. • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation of constructional (or operational) activities at the particular site. • Photograph the area on cessation of constructional activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time. Section (D) of the EMPr also provide mitigation measures related to topsoil management.	

- Soil erosion – Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, and vegetation removal. Erosion will cause loss and deterioration of soil resources. The erosion risk is low due to the low slope gradients.

Soil erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant (3)	Marginal (2)
Cumulative impact	Medium cumulative impacts (3)	
Significance	**Negative medium (30)**	**Negative low (22)**
Can impacts be mitigated?	The following mitigation or management measures are provided: Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence any erosion on site or downstream – refer to section (D) of the EMPr.	

- Temporary noise disturbance - Preparation activities will result in the generation of noise over a period of months. Sources of noise are likely to include vehicles, the use of machinery such as back actors and people working on the site. The noise impact is unlikely to be significant, there is an existing prospecting right on the proposed area and working hours are limited to 12hours a day in the Mine Work Programme.

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	
Significance	**Negative low (20)**	**Negative low (20)**
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (D) of the EMPr.	

- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc If any). The applicant will need to ensure that general and construction waste is appropriately disposed of i.e., taken to the nearest licensed landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts if services become unstable or unavailable, which in turn would negatively impact on the local community.	
Significance	**Negative low (23)**	**Negative low (13)**
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in section (D) of the EMPr are implemented.	

- Impacts on heritage objects –

According to the DEA Screening Report the Archaeological and Cultural Heritage Theme Sensitivity is low with some parts of high sensitivity as it is within 50m of a grade IIIc Heritage site. The screening report also reveals that the Palaeontology Theme Sensitivity falls withing medium sensitivity.

A Heritage Impact Assessment and Paleontological desktop assessment were conducted for this application. The findings are as follows and the report is available under **Appendix 11.**

Impacts on heritage objects	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Unlikely (1)
Duration	Permanent (4)	Permanent (4)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2). Should these impacts occur, there may be a cumulative impact on the preservation of heritage objects in the area.	
Significance	**Negative medium (30)**	**Negative low (13)**
Can impacts be mitigated?	If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Also refer to section (D) of the EMPr.	

Indirect impacts: The nuisance aspects generally associated with the installation of infrastructure or ground preparation will also be applicable to this development, which relates primarily to the increase in vehicle traffic associated with mining practices, the influx of job seekers to the area, risk to safety, livestock and farm infrastructure, and increased risk of veld fires.

- Increase in vehicle traffic – The movement of heavy vehicles have the potential to damage local farm roads and create dust and safety impacts for other road users in the area. Access to the project area will be obtained from a gravel road off the N10.While the volume of traffic along the gravel roads are low, the movement of heavy vehicles along this road is likely to damage the road surface and impact on other road users.

Increase in vehicle traffic	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Low cumulative impact (2). If damage to roads is not repaired, then this will affect the farming and other mining activities in the area and result in higher maintenance costs for vehicles of local farmers, miners / contractors and other road users. The costs will be borne by road users who were no responsible for the damage.	
Significance	**Negative low (26)**	**Negative low (10)**
Can impacts be mitigated?	The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include: • The contractor must ensure that damage caused by construction on the gravel road is repaired. The costs associated with the repair must be borne by the contractor; • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. Also refer section (D) of the EMPr. For mitigation measures related to traffic.	

- Risk to safety, livestock and farm infrastructure – No livestock has been observed to reside within the project area. Therefore, the risk to the safety of livestock is minimal to none.

Risk to safety, livestock and farm infrastructure	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Completely reversible (1)

Irreplaceable loss of resources	Marginal loss of resource (2)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	**Negative low (12)**	**Negative low (9)**
Can impacts be mitigated?	Key mitigation measures include: • **Synchroplex (Pty) Ltd** should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences; • The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area; • Contractors appointed by **Synchroplex (Pty) Ltd** should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties; • **Synchroplex (Pty) Ltd** should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below); • The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested; • Contractors appointed **Synchroplex (Pty) Ltd** must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. • Contractors appointed by **Synchroplex (Pty) Ltd** must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation; • The housing of construction workers on the site should be strictly limited to security personnel (if any).	

- Increased risk of veld fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife, farmsteads and the communities in the area. In the process, infrastructure may also be damaged or destroyed and human lives threatened. The potential risk of grass fires was heightened by the windy conditions in the area, especially during the dry, windy winter months. Fire-fighting equipment should be provided on site during the construction phase.

Increased risk of veld fires	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Very high (4)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	**Negative high (68)**	**Negative low (24)**
Can impacts be mitigated?	The mitigation measures include: • A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase; • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. • Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months; • Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle; • Contractor to provide fire-fighting training to selected construction staff; • No construction staff, with the exception of security staff, to be accommodated on site over night; • As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.	

OPERATIONAL PHASE

Direct impacts: During the operational phase the study area will serve as a mining area and the impacts are generally associated with soil erosion, change in land use, impacts associated with the, increase in storm water runoff, increased consumption of water, visual intrusion, the generation of general waste, leakage of hazardous

materials, and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities and facilitating a positive economic growth. The abovementioned impacts are discussed in more detail below:

- Soil erosion – The largest risk factor for soil erosion will be during the operational phase when the mining activity ensues, and soil is left bare until rehabilitation is initiated. Erosion will be localised within the site. This will ultimately lead to the irretrievable commitment of this resource. The measurable effect of reducing erosion by utilizing mitigation measures may reduce possible erosion significantly.

Soil erosion	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Probable (3)	Unlikely (1)
Duration	Long term (3)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Completely reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3). Should these impacts occur, there will be a cumulative impact on the air and water resources in the study area in terms of pollution.	
Significance	**Negative medium (32)**	**Negative Low (10)**
Can impacts be mitigated?	Yes, to avoid soil erosion it will be a good practice to not remove all the vegetation at once but to only clear the area as it becomes necessary and to implement concurrent rehabilitation. Also refer to section (D) of the EMPr.	

- Change in land-use – The use of the area for the operation of the mining activity will result in the area not being suitable for any agricultural used during the LoM. The area is currently predominantly used for grazing.

Change in land use	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Probable (3)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Negligible cumulative impacts (1).	
Significance	**Positive low (22)**	**Positive low (11)**
Can impacts be mitigated?	The proponent should establish a Rehabilitation Fund to be used to rehabilitate the area once the proposed facility has been decommissioned. The fund should be funded by revenue generated during the operational phase of the project. The motivation for the establishment of a Rehabilitation Fund is based on the experience in the mining sector where many mines on closure have not set aside sufficient funds for closure and decommissioning.	

	Also refer to section (D) of the EMPr.

- Increase in storm water runoff – The development will potentially result in an increase in storm water run-off that needs to be managed to prevent soil erosion, especially where vegetation will be cleared. Not all the vegetation should be removed at once. Only the specific trench being excavated at the specific time should be cleared.

Increase in storm water runoff	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3) - Should these impacts occur, there will be a cumulative impact on the wider area.	
Significance	**Negative medium (30)**	**Negative low (13)**
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in section (D) of the EMPr are implemented to ensure that these impacts do not occur	

- Increased consumption of water –

Water uses:

According to the Mining Work Programme, see the below information regarding water use:

Processing and beneficiation of this type of process requires a significant amount of water consumption and as such, but no major challenges are foreseen in this respect. The current available water supply in the area as well as water to be sourced from local boreholes on the property, will be sufficient and adequate for the envisaged operational requirements.

Underground and surface dust suppression will be conducted by utilizing water obtained during the water-make of the mining operations during underground cutting and exposure. The historic shaft system is fully flooded, and it is therefore accepted that a substantial amount of water-make will be produced during the underground operation once the water table is compromised.

An integrated water purification plant will be needed for the purification of contaminated underground water as well as for the recycling and winning of water used in the processing and tailings plant. The standard of purification for this water needs to be at an industry acceptable level. Once the mine is no more operational, this facility will be used for AMD control and proper water purification.

A surface reservoir will be constructed at the underground portal for water distribution to the underground sections as well as for the processing facility, this will mainly consist of recirculated treated water. Apart from potable water (to be sourced from boreholes) used in mainly the administration area, this water will also be used for dust suppression, usage for the change houses and ablution facilities.

Water uses under section 21 a-k of the NWA may be triggered; thus a Water Use Licence Application (WULA) will need in cases there will be encroachment. When needed, WULA will be lodged with the department of Water & Sanitation (DWS).

It should also be noted that borehole testing will need to be conducted by a qualified Geohydrologist to help in monitoring the water quality and quantity.

It is envisaged according to the scope of works and mining work programme that the following water uses will be applied for:

Section 21(a)	*Taking water from a water resource*
Section 21(b)	*Storing water*
Section 21(g)	*Disposing of waste in a manner which may detrimentally impact on a water resource*
Section 21(j)	*Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people*

Increased consumption of water	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Region (3)	Region (3)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Significant loss of resources (3)	Marginal loss of resources (2)
Cumulative impact	High cumulative impacts (4) - An additional demand on water sources could result in a significant cumulative impact with regards to the availability of water.	
Significance	**Negative medium (42)**	**Negative medium (40)**
Can impacts be mitigated?	Yes, management actions and mitigation measures related to the use of water are included in section (D) of the EMPr.	

- Generation of waste –Workers will be present on site, sources of general waste will be waste food, packaging, paper, etc. General waste will be stored on the site and removed on a weekly basis.

Generation of waste	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Medium term (2)	Medium term (2)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3) - An additional demand for landfill space could result in significant cumulative impacts with regards to the availability of landfill space. If general waste is left on site livestock could mistakenly eat it, which might in turn harm or kill them.	

Significance	**Negative low (28)**	**Negative low (14)**
Can impacts be mitigated?	Yes, management actions related to waste management are included in section (D) of the EMPr.	

- Leakage of hazardous materials - The proposed mining activity will make use of machinery that use fuel and oil. Leakage of these oils and fuel can contaminate water supplies and must be prevented by constructing oil and diesel permeable bunds to ensure that any spills are suitably attenuated and not released into the environment. Drip trays must always be placed under any vehicle including trucks when stationary.

Leakage of hazardous materials	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	Significant loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	Medium cumulative impact (3)	
Significance	**Negative medium (48)**	**Negative low (22)**
Can impacts be mitigated?	Yes. It is therefore important that all management actions and mitigation measures included in the section (D) of EMPr are implemented to ensure that these impacts do not occur.	

- Noise disturbance - Mining activities will result in the generation of noise over a period of ± 22 years. Sources of noise are likely to include vehicles, the use of machinery such as back actors, rotary pans and people working on the site. The noise impact is unlikely to be significant as the closest homestead is more than 1km from the site.

Temporary noise disturbance	**Pre-mitigation impact rating**	**Post mitigation impact rating**
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	
Significance	**Negative low (22)**	**Negative low (10)**
Can impacts be mitigated?	Yes, management actions related to noise pollution are included in section (D) of the EMPr.	

Indirect impacts: The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Potential impact on tourism – There are no tourist facilities in close proximity to the proposed area.

Potential impacts on tourism	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Unlikely (1)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	N/A	
Significance	**Negative low (7)**	**Negative low (7)**
Can impacts be mitigated?	No mitigation required	

DECOMMISIONING PHASE (MINE CLOSURE AND REHABILITATION)

Direct impacts: Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live. If infrastructures are removed after a 3/5 year period, the site will be returned to its natural state. Therefore, the physical environment will benefit from the closure of the mining area.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the mining area. There is a slight chance to restore the site to its natural state, however rehabilitation will be done concurrently.

Rehabilitation of the physical environment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Definite (4)	Definite (4)
Duration	Permanent (4)	Permanent (4)
Magnitude	Very High (4	Very High (4)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	**Positive medium (36)**	**Positive medium (36)**
Can impacts be mitigated?	No mitigation measures required.	

- Loss of employment - The decommissioning of the facility has the potential to have a negative social impact on the local community.

Loss of employment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Permanent (4)	Permanent (4)

Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Medium cumulative impact (3)	
Significance	**Negative low (28)**	**Negative low (28)**
Can impacts be mitigated?	The following mitigation measures are recommended: • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. • **Synchroplex (Pty) Ltd** should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas.	

Indirect impacts: No indirect impacts are anticipated from the decommissioning phase of the proposed development.

xi. SUMMARY OF THE FINDINGS AND RECOMMENDATIONS OF ANY SPECIALIST REPORT

(where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)
Palaeontological desktop assessment conducted by Elize Butler from Banzai Environmental (Pty) Ltd on the 03rd of March 2023	The findings are as follows and the report is available under **Appendix 11**. **Findings and recommendations** The development footprint is underlain by the Superficial sediments of the Gordonia Formation (Kalahari Group) as well as the Dwyka Group of the Karoo Supergroup. However, the minerals will be mined from deep below the earth's surface. At depth the study site is underlain by ancient Precambrian basement rocks that belongs to the Namaqua-Natal Province of Mid Proterozoic (Mokolian) age and comprises of largely high-grade metamorphic rocks (e.g., metapelites, gneisses) and intrusive granitoids. These rocks are about two to one billion years old and are entirely unfossiliferous. Updated geology corresponds with that of the 1998 Geological. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Dwyka Group is moderate. A low Palaeontological Significance has thus been allocated to the proposed development. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. If fossil remains are discovered during any phase of construction, either on the surface or below, the ECO in charge of these developments must be alerted immediately. These discoveries should be protected (if possible, in situ) and the ECO must report to SAHRA so that appropriate mitigation can be carry out by a professional paleontologist. SAHRA Contact details: South African Heritage Resources Agency, 111 Harrington Street, PO Box 4637, Cape Town 8000, South Africa. Email: Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509 Web: www.sahra.org.za)	X

<table>
<tr><td></td><td>Preceding any collection of fossil material, the specialist would need to apply for collection permit from SAHRA. Fossil material must be housed in an approved collection (museum or university) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.</td><td></td></tr>
<tr><td>Cultural Heritage Impact Assessment conducted and prepared by Francois P Coetzee, a Heritage Consultant in February 2023.</td><td>The findings are as follows and the report is available under Appendix 11.

Conclusion and recommendations
A single graveyard was recorded during the survey (Site 1). The graveyard is possibly associated with the early mining activities on the farm and probably dates to the early 20th century.
No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint.

<table>
<tr><td colspan="3">Nature: Graveyard (Site 1)</td></tr>
<tr><td></td><td>Without mitigation</td><td>With mitigation</td></tr>
<tr><td>Prospecting Phase</td><td></td><td></td></tr>
<tr><td>Probability</td><td>Definite (5)</td><td>Very Improbable (1)</td></tr>
<tr><td>Duration</td><td>Permanent (5)</td><td>Short term (2)</td></tr>
<tr><td>Extent</td><td>Limited to the site (1)</td><td>Limited to the site (1)</td></tr>
<tr><td>Magnitude</td><td>Very High (10)</td><td>Minor (2)</td></tr>
<tr><td>Significance of Impact</td><td>80 (High)</td><td>5 (Low)</td></tr>
<tr><td>Status (positive or negative)</td><td>Negative</td><td>Positive</td></tr>
<tr><td>Reversibility</td><td>Low</td><td>Low</td></tr>
<tr><td>Irreplaceable loss of resources?</td><td>Yes</td><td>None</td></tr>
<tr><td>Cumulative impacts and indirect impacts</td><td colspan="2">Mining and blasting activities could cause excessive vibrations.</td></tr>
<tr><td>Can impacts be mitigated?</td><td colspan="2">Yes, buffer zones (50 metres) should be maintained during mining.</td></tr>
</table>
Table 9: Significance of the impact
It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed, taking into account the mitigation measures.
Also, please note:
If the exhumation and reburial of the graveyards are envisaged it will entail social consultation and permit application. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions,</td><td>X</td></tr>
</table>

	laws and by-laws that may be in place. Note that unmarked graves are by default regarded as older than 60 years and therefore falls under the NHRA (Act No. 25 of 1999, Section 36). Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf.* NHRA (Act No. 25 of 1999)**, Section 36 (6)).	
Ecological and Wetland Impact Assessment Report conducted by Khume Mtshweni from Milnex CC, March 2023	The findings are as follows and the report is available under **Appendix 11**. *Conclusion:* According to the DFFE screening tool report in terms of National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), the site has the following sensitivities: Animal Species Theme: Medium Sensitivity Aquatic Biodiversity Theme: Low Sensitivity Plant Species Theme: Low Sensitivity Terrestrial Biodiversity Theme: Low Sensitivity A post-screening site visit was therefore conducted to determine the accuracy of the generated information, and if the studies recommended should be conducted. After the site visit the following was concluded: The site presented a Medium Sensitivity for the Animal Species Theme due to the vastness of faunal habitat and the abundance of species observed on site. Species diversity was low due to the area presenting habitat for specialists. Species of conservation concern were not noted but have a high probability of occurrence due to the lack of human disturbance on most of the study area. The site presented a Low Sensitivity for the Aquatic Species Theme due to the study are not presenting the presence of wetlands. The site presented a Low Plant Species Sensitivity Theme. The Vegetation on site is mostly undisturbed with a few declared invader plant species, which mainly occur at the disturbed footprints around the old mining operations. No plant species of conservation concern was recorded. The site has a Medium sensitivity from a terrestrial biodiversity perspective because the area is mostly undisturbed and presents habitat conditions suitable for a narrow range of faunal species. The information below concludes the Desktop findings supported by field verifications. According to the National Threatened Ecosystem database (2011), no threatened ecosystems overlap with the study site. According to the Northern Cape Critical biodiversity Areas and map (2016), the study area was observed to overlap Other Natural Areas (ONAs).	X

<table>
<tr><td></td><td>According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), one (1) HGM unit was expected on site. A site visit confirmed the presence of no true wetlands
The study area is not found in a Strategic Water Source Area (SWSA).
The provincially protected plant species Boscia foetida was recorded on site. A Provincial flora permit will have to be obtained if any of these trees are to be removed
Exotic and Invasive Vegetation Species were recorded on site.
For Avifaunal species potentially occurring on site, and that enjoy conservation status in the Eskom Red Data Book, kindly refer to Section 4.3.1(Table 9) for a species list.
Based on the Reptile Atlas of Africa, the Frog Atlas of South Africa (ADU, 2019) and the DFFE Screening tool, no Herpetofauna SCC are expected to occur on site.

<table><tr><td>NEMA Impact assessment</td><td>Most of the impacts associated with the mining activities range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Medium-Low to Very-Low</td></tr><tr><td>Mitigation Measures</td><td>Refer to Section 6.5</td></tr></table>
It is imperative that an effective management plan is implemented to ensure that all mitigation measures discussed in the report are adhered to. Therefore, the proposed mining operations can be considered from an ecological conservation point of view. During the construction, operational and decommissioning phases all recommendations made and concerns raised in this document should be taken into consideration. A good closure and rehabilitation plan should be in place to rehabilitate the habitat for faunal and floral species and active alien and invasive vegetation removal and monitoring should take place in accordance with an Alien Invasive Vegetation Management Plan.</td><td></td></tr>
<tr><td>Hydrogeological Investigation</td><td>The findings are as follows and the report is available under Appendix 11.

The waste analyses were not available during the writing of this report. It is important that the waste classification along with a numerical model and geochemical characterization be set in place to ensure that aquifer destruction does not take place. A risk assessment is therefore required and can only be completed with the use of the aforementioned data. Waste sampling and waste classification as well as a numerical model will assist in identifying the leachability and potential for groundwater contamination from waste storage facilities. The waste classification will ensure that the correct liners are recommended.</td><td>X</td></tr>
</table>

	Monitoring boreholes are to be included as part of the groundwater monitoring system. Groundwater monitoring will ensure that aquifer contamination does not take place.	

Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme			X	
Animal Species Theme			X	
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme				X
Defence Theme			X	
Paleontology Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme				X

Specialist assessments needed according to the DEA Screening Report:	Response
Agricultural Impact Assessment	The study is not needed since there is an exciting 20 000 Ha area under t Prospecting Right owned by the applicant permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes. Also, the proposed area falls withing Land capability Class 7. The mining activities will be conducted in conjunction with livestock grazing activities on the proposed area.
Landscape/Visual Impact Assessment	The study is not needed since there are exciting Prospecting activities by the applicant on the proposed area

Archaeological and Cultural Heritage Impact Assessment	A Heritage Impact Assessment and Palaeontological desktop study was conducted for the proposed application and results discussed in this report and attached in **Appendix 11.**
Palaeontology Impact Assessment	
Terrestrial Biodiversity Impact Assessment	Ecological and Wetland Impact Assessment was conducted for the proposed mining right application. The report is available under **Appendix 11**.
Aquatic Biodiversity Impact Assessment	
Plant Species Assessment	
Animal Species Assessment	
Hydrology Assessment	Hydrogeology Assessment study was conducted for the said application and attached as **Appendix 11.**
Noise Impact Assessment	The study is not needed since there are exciting Prospecting activities by the applicant on the proposed area.
Radioactivity Impact Assessment	This study is not necessary since the process of mining of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body does not have any radioactive effects.
Traffic Impact Assessment	This study is not necessary.
Geotechnical Assessment	Hydrogeology Assessment study was conducted for the said application and attached as **Appendix 11.**
Climate Impact Assessment	Not applicable
Health Impact Assessment	Not applicable
Socio-Economic Assessment	This study is not necessary
Ambient Air Quality Impact Assessment	The study will only be conducted if complaints are received and unacceptable levels of dust fallout was determined by implementing dust management by monitoring compliance with the requirements of the National Dust Control Regulations for the proposed activities, in terms of nuisance or disturbance.
Seismicity Assessment	Not applicable.

xii. AN ENVIRONMENTAL IMPACT STATEMENT WHICH CONTAINS—

i. Summary of the key findings of the environmental impact assessment:

This section provides a summary of the assessment and conclusions drawn from the proposed mining area. In doing so, it draws on the information gathered as part of the environmental impact assessment process and the knowledge gained by the environmental consultant during the course of the process and presents an informed opinion on the environmental impacts associated with the proposed project. The following conclusions can be drawn for the proposed mining activity:

- Potential impacts on biodiversity: The terrestrial biodiversity over the proposed project area has low environmental sensitivity.

<u>According to the DEA Screening report the sensitivity of the proposed area is as follow:</u>

- **Plant Species theme sensitivity**: Low
- **Agriculture Theme Sensitivity:** Mostly low with some area that fall within medium sensitivity
- **Aquatic Biodiversity Theme Sensitivity:** Low
- **Terrestrial Biodiversity Theme Sensitivity:** Low
- **Animal Species Theme Sensitivity:** Mostly medium with small patches of low sensitivity

An Ecological and Wetland Impact Assessment Report (**Appendix 11**) was conducted, and the following finding was made and statement by the specialist:

The proposed Mining activities are only supported if all suggestions and mitigation measures provided in this report as well as general good practice, are strictly adhered to.

According to the DFFE screening tool report in terms of National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), the site has the following sensitivities:

- Animal Species Theme: Medium Sensitivity
- Aquatic Biodiversity Theme: Low Sensitivity
- Plant Species Theme: Low Sensitivity
- Terrestrial Biodiversity Theme: Low Sensitivity

A post-screening site visit was therefore conducted to determine the accuracy of the generated information, and if the studies recommended should be conducted. After the site visit the following was concluded:

- The site presented a Medium Sensitivity for the Animal Species Theme due to the vastness of faunal habitat and the abundance of species observed on site. Species diversity was low due to the area presenting habitat for specialists. Species of conservation concern were not noted but have a high probability of occurrence due to the lack of human disturbance on most of the study area.
- The site presented a Low Sensitivity for the Aquatic Species Theme due to the study is not presenting the presence of wetlands.

- The site presented a Low Plant Species Sensitivity Theme. The Vegetation on site is mostly undisturbed with a few declared invader plant species, which mainly occur at the disturbed footprints around the old mining operations. No plant species of conservation concern was recorded.

- The site has a medium sensitivity from a terrestrial biodiversity perspective because the area is mostly undisturbed and presents habitat conditions suitable for a narrow range of faunal species.

The information below concludes the Desktop findings supported by field verifications.

- According to the National Threatened Ecosystem database (2011), no threatened ecosystems overlap with the study site.

- According to the Northern Cape Critical biodiversity Areas and map (2016), the study area was observed to overlap Other Natural Areas (ONAs).

- According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), one (1) HGM unit was expected on site. A site visit confirmed the presence of no true wetlands.

- The study area is not found in a Strategic Water Source Area (SWSA).

- The provincially protected plant species *Boscia foetida* was recorded on site. A Provincial flora permit will have to be obtained if any of these trees are to be removed.

- Exotic and Invasive Vegetation Species were recorded on site.

- For Avifaunal species potentially occurring on site, and that enjoy conservation status in the Eskom Red Data Book, kindly refer to Section 4.3.1(**Table 9**) for a species list.

- Based on the Reptile Atlas of Africa, the Frog Atlas of South Africa (ADU, 2019) and the DFFE Screening tool, no Herpetofauna SCC are expected to occur on site.

NEMA Impact assessment	Most of the impacts associated with the mining activities range from High to Medium-Low prior to mitigation taking place. With mitigation fully implemented, the significance of most impacts can be reduced to Medium-Low to Very-Low
Mitigation Measures	Refer to Section 6.5

It is imperative that an effective management plan is implemented to ensure that all mitigation measures discussed in the report are adhered to. Therefore, the proposed mining operations can be considered from an ecological conservation point of view. During the construction, operational and decommissioning phases all recommendations made, and concerns raised in this document should be taken into consideration. A good closure and rehabilitation plan should be in place to rehabilitate the habitat for faunal and floral species and active alien and invasive vegetation removal and monitoring should take place in accordance with an Alien Invasive Vegetation Management Plan.

- Potential impact on Heritage and Palaeontological resources: According to the DEA Screening Report the Archaeological and Cultural Heritage Theme Sensitivity mostly low with some area that fall within high sensitivity and the Palaeontology Theme Sensitivity fall within medium sensitivity.

  The Palaeontological desktop study was prepared, and the findings are as follows and the report is available under **Appendix 11**.

Findings and recommendations:

The development footprint is underlain by the Superficial sediments of the Gordonia Formation (Kalahari Group) as well as the Dwyka Group of the Karoo Supergroup. However, the minerals will be mined from deep below the earth's surface. At depth the study site is underlain by ancient Precambrian basement rocks that belongs to the Namaqua-Natal Province of Mid Proterozoic (Mokolian) age and comprises of largely high-grade metamorphic rocks (e.g. metapelites, gneisses) and intrusive granitoids. These rocks are about two to one billion years old and are entirely ***unfossiliferous****. Updated geology corresponds with that of the 1998 Geological. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Dwyka Group is moderate. A low Palaeontological Significance has thus been allocated to the proposed development. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development will not lead to detrimental impacts on the palaeontological resources of the area.*

If fossil remains are discovered during any phase of construction, either on the surface or below, the ECO in charge of these developments must be alerted immediately. These discoveries should be protected (if possible, in situ) and the ECO must report to SAHRA so that appropriate mitigation can be carry out by a professional paleontologist. SAHRA Contact details: South African Heritage Resources Agency, 111 Harrington Street, PO Box 4637, Cape Town 8000, South Africa. Email: Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509 Web: www.sahra.org.za) Preceding any collection of fossil material, the specialist would need to apply for collection permit from SAHRA. Fossil material must be housed in an approved collection (museum or university) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

The Heritage Impact Assessment was prepared and the findings are as follows and the report is available under **Appendix 11.**

Conclusion and recommendations

A single graveyard was recorded during the survey (Site 1). The graveyard is possibly associated with the early mining activities on the farm and probably dates to the early 20th century.

No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint.

Nature: Graveyard (Site 1)		
	Without mitigation	**With mitigation**
Prospecting Phase		
Probability	Definite (5)	Very Improbable (1)
Duration	Permanent (5)	Short term (2)
Extent	Limited to the site (1)	Limited to the site (1)
Magnitude	Very High (10)	Minor (2)
Significance of Impact	**80 (High)**	**5 (Low)**
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	None
Cumulative impacts and indirect impacts	Mining and blasting activities could cause excessive vibrations.	
Can impacts be mitigated?	Yes, buffer zones (50 metres) should be maintained during mining.	

Table 9: Significance of the impact

It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed, taking into account the mitigation measures.

Also, please note:

If the exhumation and reburial of the graveyards are envisaged, it will entail social consultation and permit application. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance

(Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place. Note that unmarked graves are by default regarded as older than 60 years and therefore falls under the NHRA (Act No. 25 of 1999, Section 36).
Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(cf. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

- Potential social impacts: The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.

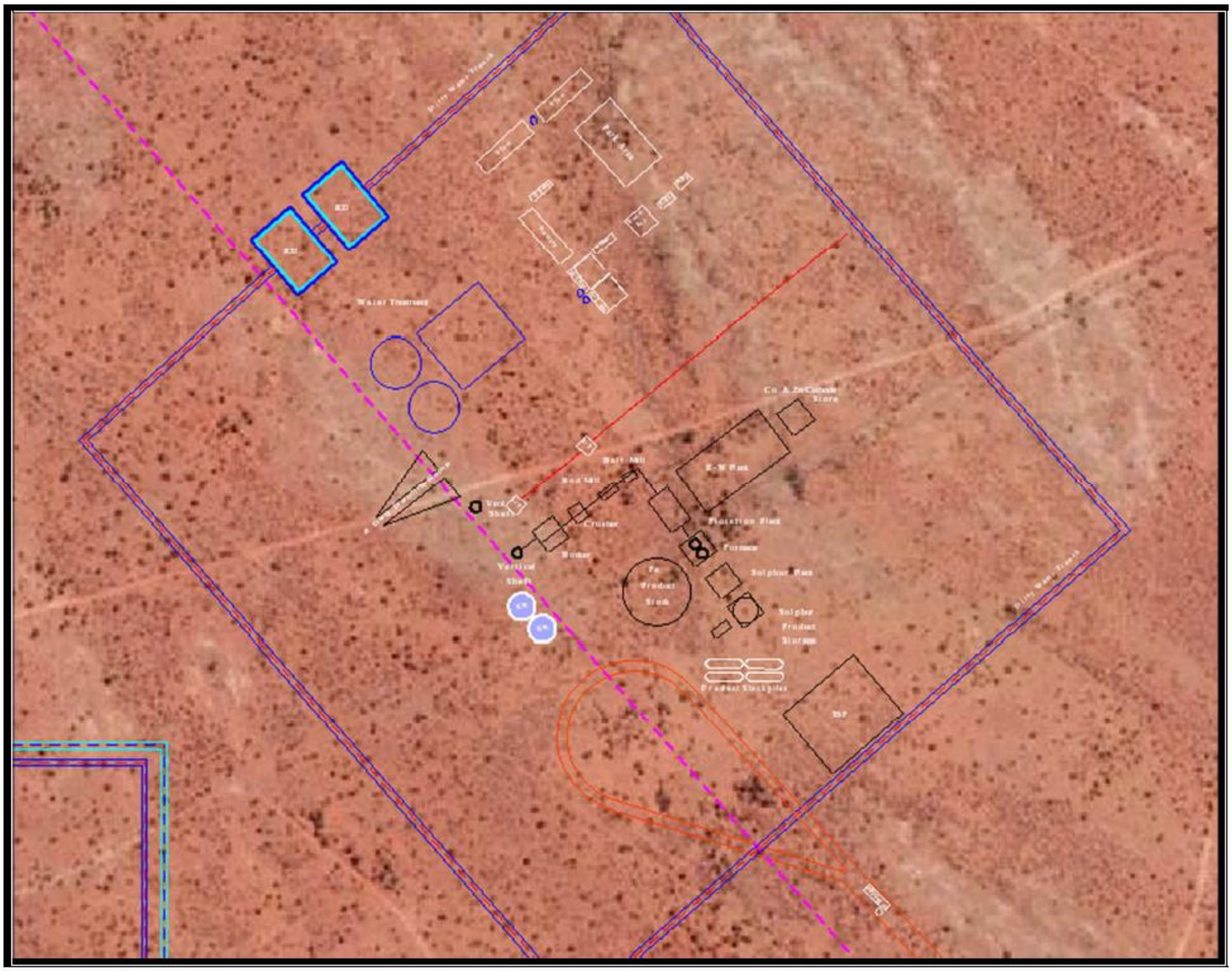
- Potential negative impacts: (noise, dust, soil degradation, storm water, traffic, health and safety) associated with the operation of the facility are expected to be of low-high impact, of medium terms and site specific. These can be mitigated or negated through the implementation of practical and appropriate mitigation measures.

- Positive impacts: The mining of the applied minerals, may result in socio-economic benefits to the area.

All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the migratory measures as set out in the Environmental Management Programme (EMPr) attached in Part B.

(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred [site] development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and

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.


Ball Mill
Rod Mill
Crusher
Vertical
Shaft
Flotation Plant
Furnace
Product Stockpiles

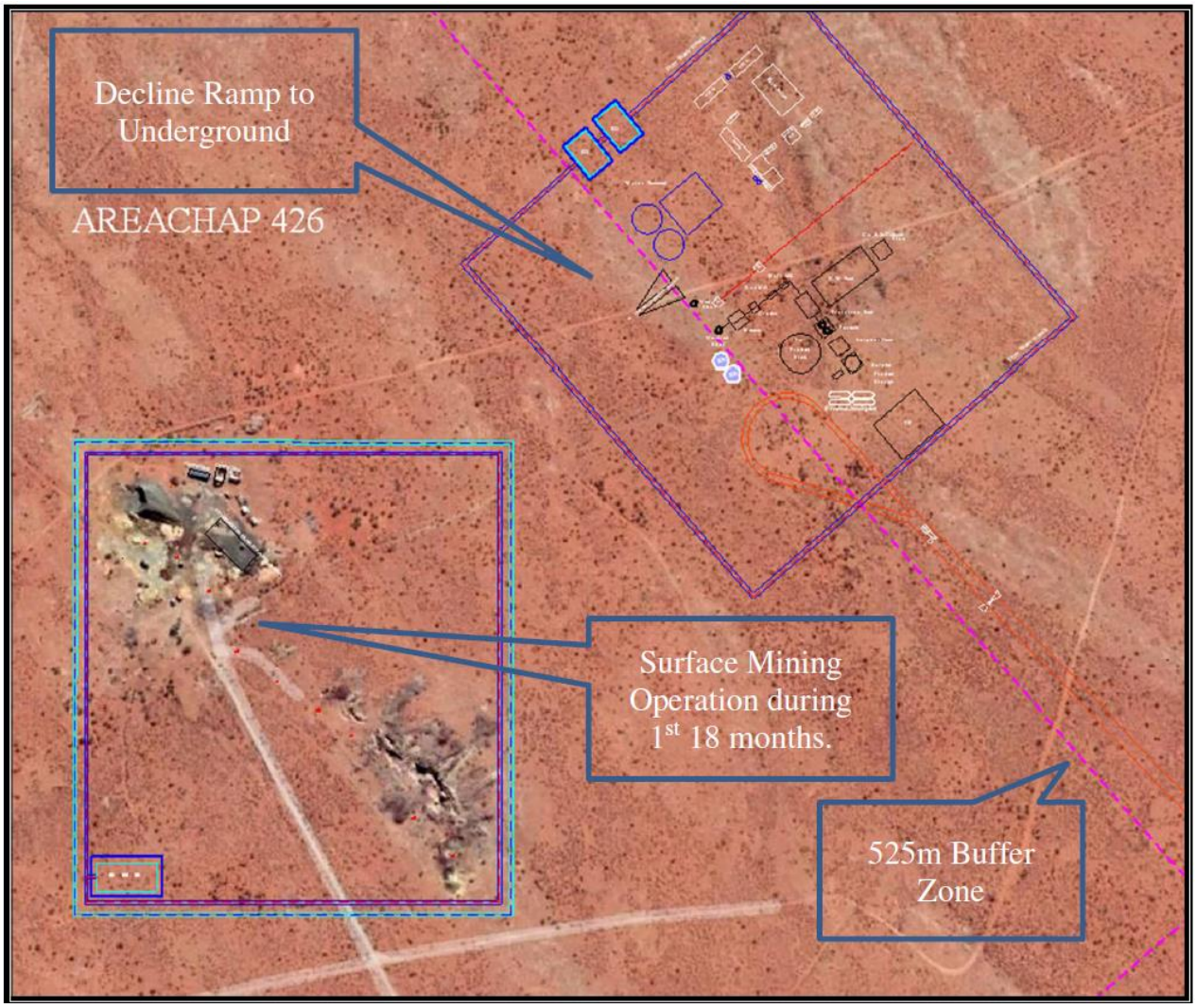


Figure 25: Layout plans for the applied mining activities

Refer to Site layout Map attached in **Appendix 4**.

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

There are regional socio-economic benefits due to the alluvial diamonds being prospected in the Northern Cape Province and greater knowledge is gained on the mineralogy of South Africa. All possible negative impacts and risks that have been identified in this report can be effectively mitigated and managed by implementing the mitigation measures as set out in the Environmental Management Programme (EMPr) attached in Part B. Significant adverse social environmental impacts are anticipated.

xiii. 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.

Management objectives include:

- Ensure that the mining activity does not cause pollution to the environment or harm to persons.

- Minimise production of waste.
- All mining activities must be conducted in a manner that minimises noise impact, litter, environmental degradation, and health hazards i.e., injuries.
- The mine must be kept neat and tidy during waste handling to prevent unsightliness and accidents.

Expected outcomes include:

- Minimum impacts on the environment as a result of alluvial diamond mining.
- Compliance with legislative requirements.
- Mine is neat and tidy and well managed.

i. FINAL PROPOSED ALTERNATIVES.

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

This alternative asks the question, if there is not, from an environmental perspective, a more suitable location for the proposed activity. Portion 2 & the Remaining Extent of the Farm Areachap 426, Registration Division Gordonia, near Upington in the Northern Cape Province is preferred due to the sites underlying the Copper-Zinc deposits which occur within the Namaqua portion of the Namaqua-Natal Metamorphic Belt, therefore there will be no other alternative (i.e. to facilitate the movement of machinery, equipment, infrastructure).

xiv. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.

(Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;)

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMPr should be always made available onsite.
- Implementation of the proposed mitigation measures set out in the EMPr.

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

(Which relate to the assessment and mitigation measures proposed)

The uncertainties in results are mostly related to the availability of information, time available to gather the relevant information as well as the sometimes-subjective nature of the assessment methodology. In terms of addressing the key issues the EAP is satisfied that there are no major gaps in knowledge and that the report provides sufficient information to conduct the significance rating and provide the environmental authority with sufficient information to make an informed decision.

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

(If the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;)

i. Reasons why the activity should be authorized or not.

Based on the outcomes of the prospecting activities, the possibility to encounter further Resource Reserves were identified.

Currently a 20 000 Hectare area is under Prospecting Right owned by Synchroplex (Pty) Ltd, permitting for the exploration of Zinc, Copper, iron oxides and Sulphur mineralization. The existing prospecting right makes provision for the removal of 160 000 tonnes of ore for testing and evaluation purposes.

It is planned to sign long-term supply contracts with various international commodity traders and end-users for the supply of constant takeoff and price for various commodities. The fact that various commodities will be produced from the Areachap Mine will greatly assist in the hedging of market and commodity risk and as such will allow great flexibility and versatility to the project.

In addition, products can be supplied to the international as well as the domestic markets but with the benefit of a linked or hedged market price. Product prices will be directly influenced by international market trends as well as international exchange rates.

The option of not approving the activities will result in a significant loss of valuable information regarding the mineral status present on these properties. Also, the investment made in the current mining right will also go to waste.

ii. Conditions that must be included in the authorisation.

- The operational activities and relevant rehabilitation of disturbed areas should be monitored against the improved EMPr and all other relevant environmental legislation.
- A copy of the EMP should be made available onsite at all times.
- Implementation of the proposed mitigation measures set out in the EMPr.

The EMPr should be binding on all managers and contractors operating/utilizing the site. The applicant shall familiarize himself with the content of this document and the attached specialist studies and the requirements/conditions thereof.

xvii. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.

The environmental authorisation is required for a minimum 20 years & maximum period of 30 years.

xviii. AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO:

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

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

I, **Deshney Mapoko,** 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. the acceptability of the project in relation to the finding of the assessment and level of mitigation propose☒

Signature of the environmental assessment practitioner:

Milnex CC

Name of company:

12/06/2023

Date:

xix. FINANCIAL PROVISION

(Where applicable, details of any financial provision[s] for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;)

CALCULATION OF THE QUANTUM

Applicant: Synchroplex (Pty) Ltd
Evaluators: Milnex CC
Ref No.: NC30/5/1/2/2/10218MR
Date: May-23

No.	Description	Unit	A Quantity	B Master Rate	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)	m3	6972	19	1	1	132468
2 (A)	Demolition of steel buildings and structures	m2	864	171	1	1	147744
2(B)	Demolition of reinforced concrete buildings and structures	m2	816	400	1	1	326400
3	Rehabilitation of access roads	m2	23790	49	1	1	1165710
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0
5	Demolition of housing and/or administration facilities	m2	1830	542	1	1	991860
6	Opencast rehabilitation including final voids and ramps	ha	14.85	284292	0.52	1	2195302.824
7	Sealing of shafts adits and inclines	m3	90	146	1	1	13140
8 (A)	Rehabilitation of overburden and spoils	ha	8.5	189518	1	1	1610903
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	4.3	236054	1	1	1015032.2
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	1.2	685512	1	1	822614.4
9	Rehabilitation of subsided areas	ha	0	158701	1	1	0
10	General surface rehabilitation	ha	70.23	150138	1	1	10544191.74
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	1257	171	1	1	214947
13	Water management	ha	40.53	57087	1	1	2313736.11
14	2 to 3 years of maintenance and aftercare	ha	80.13	19930	1	1	1596990.9
15 (A)	Specialist study	Sum	1			1	0
15 (B)	Specialist study	Sum	0			1	0
					Sub Total 1		23091040.17

1	Preliminary and General	2770924.821	weighting factor 2 1.05	2909471.062
2	Contingencies	2309104.017		2309104.017
			Subtotal 2	28309615.25
			VAT (15%)	4246442.29
			Grand Total	**32556058**

i. Explain how the aforesaid amount was derived.

The closure cost estimate provided above is aligned with the Guideline Document for the Evaluation of Quantum of Closure related Financial Provision Provided by a Mine, by the DMRE (January, 2005). The amount was calculated by Milnex CC.

ii. 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 Mine Work Programme as the case may be).

Financial Guarantee

The financial guarantee for the rehabilitation for land disturbed by **Synchroplex (Pty) Ltd** will be submitted.

Rehabilitation Fund

Synchroplex (Pty) Ltd will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

xx. DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY.

i. Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and

None of the methodologies approved for the scoping report were deviated

ii. Motivation for the deviation.

Not applicable

xxi. ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY; AND

i. COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

Read with Section 24 (3) (A) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA Report must include the:

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 mining on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The mining of the Copper, Zinc, Sulphur, Iron and associated minerals within the ore body will not impact directly on any socio-economic aspects. Indirect socio-economic benefits are expected to be associated with the creation of employment.

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

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

According to the DEA Screening Report the Archaeological and Cultural Heritage Theme Sensitivity is low with some parts of high sensitivity, and the Palaeontology Theme Sensitivity fall withing medium sensitivity. A Heritage impact Assessment study was conducted for the proposed project and a single graveyard was identified within the project area. The graveyard is possibly associated with the early mining activities on the farm and probably dates to the early 20th century. It is therefore recommended, from a cultural heritage perspective that the proposed mining activities may proceed, taking into account the mitigation measures. The HIA report has been attached as **Appendix 11.**

The Palaeontological desktop study was also prepared for the proposed project. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Dwyka Group is moderate. A low Palaeontological Significance has thus been allocated to the proposed development. It is consequently recommended that no further paleontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The report is available under **Appendix 11**.

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

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

From a local perspective on Portion 2 & the Remaining Extent of the Farm Areachap 426, Registration Division Gordonia, near Upington in the Northern Cape Province is preferred due to the site's mineral resources. The specific site has been chosen for its mineral resources thus making an alternative site selection null and void. No mining should commence without the necessary permits and the impacts on the surrounding area, the possible livestock grazing, and land uses should be kept to the minimum.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

A. An EMPr must comply with section 24N of the Act and include—

i. DETAILS OF–

(i) the EAP who prepared the EMPr; and
(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;

Name of Practitioner	Qualifications	Contact details
Deshney Mapoko	National Diploma in Environmental Science (refer to **Appendix 1**)	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: deshney@milnex-sa.co.za
Mr. Christiaan Baron	Master's Degree in Environmental Management (refer to **Appendix 1**)	Tel No.: (018) 011 1925 Fax No.: (053) 963 2009 e-mail address: christiaan@milnex-sa.co.za

It is hereby confirmed that the requirements for the provision of the details and expertise of the EAP are contained in Part A, section 1(a) as required. The Curriculum Vitae for the responsible EAP is contained in **Appendix 1 and 2**.

ii. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;)

It is hereby confirmed that the requirements to describe the aspects of the activity that are required by the EMP is already included in Part A, section 1(h).

iii. COMPOSITE MAP

(A map 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 Locality Map, attached as in **Appendix 4**.

iv. A DESCRIPTION OF THE IMPACT MANAGEMENT [OBJECTIVES] OUTCOMES, INCLUDING MANAGEMENT STATEMENTS, IDENTIFYING THE IMPACTS AND RISKS THAT NEED TO BE AVOIDED, MANAGED AND MITIGATED AS IDENTIFIED THROUGH THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR ALL PHASES OF THE DEVELOPMENT INCLUDING—

1. Determination of closure objectives. (Ensure that the closure objectives are informed by the type of environment described in 2.4 herein).

Closure objectives for the Copper, Zinc, Sulphur, and Iron mine will aim to ensure that the residual post-closure impacts be minimized and be acceptable to relevant parties. To achieve these closure objectives, the following will be implemented:

- All mining related infrastructure, foundations and concrete areas will be decommissioned, removed from the site and appropriately disposed of. Reclaimable structures such as metal, electrical installations or equipment will be sold for re-use or as scrap.

- All disturbed areas within the site not already vegetated will be re-vegetated with appropriate indigenous, ecologically adapted species appropriate to the area and the final land use as soon as possible after operation ceases. Progress of vegetation growth/establishment, stability and drainage/erosion will be monitored and, in the event of adverse trends being identified, corrective measures will be implemented.

- Vegetation monitoring will consider, inter alia, the establishment of perennial ground cover and infestation by alien invasive plant species. The encroachment of indigenous vegetation into the area will be used as an indication of a stable, self-sustaining vegetation cover with little risk of retrogressing to a situation where are and water pollution may occur.

- Final landforms must be resilient to perturbation and also be self-sustaining to obviate/limit further/ongoing interventions and maintenance by **Synchroplex (Pty) Ltd**. The remaining impacts be of an acceptable nature with minimal deterioration over time.
- The final outcome of the mine site rehabilitation would be productive systems, where required sustaining either cattle or wildlife.
- Environmental and human quality of life, including health and safety requirements in general, would not be compromised; and
- Closure is achieved in an efficient and cost-effective manner as possible and with minimum socioeconomic changes.

2. A DESCRIPTION AND IDENTIFICATION OF IMPACT MANAGEMENT OUTCOMES REQUIRED FOR THE ASPECTS CONTEMPLATED IN PARAGRAPH (D);]

The above goal is underpinned by more specific objectives listed below.

a) Upfront planning/development

To provide overall guidance and direction to closure planning and/or the implementation of progressive closure measures over the remaining over the mining life.

b) Physical stability

To ensure that surface infrastructure and mining residue and/or disturbances that are present at processing plant decommissioning will be removed and/or stabilised in a manner that these will not compromise post-closure land use and be sustainable long-term landforms.

- Closure, removal and disposal of all surface infrastructure that has no beneficial post-closure use.
- Shaping and vegetating the remaining earth embankments, trenches, etc. to stabilise slopes and integrate with surrounding topography.

c) Environmental quality

To ensure that local environmental quality is not adversely affected by possible physical effects arising from mining operations and the mining site after closure. This will be achieved by:

- Avoiding and/or limiting the following during mining operations which could result in adverse effects that could not be readily addressed and/or mitigated at mine closure.
  - Dust fall-out areas surrounding the mining site.
  - Wash-off and/or mobilisation of chemically contaminated soils and sediments from the mining site that could have long term adverse effects on local aquatic health and/or other water uses.
  - Possible shallow groundwater contamination adversely affecting the quality of the local water resource and its beneficial use.
- Limiting the potential for dust generation on the rehabilitated mining site that could cause nuisance and/or health effects to surrounding landowners;
- Limiting the possible adverse water quality and quantity effects arising from the rehabilitated mining site to ensure that long term beneficial use of local resources is not compromised;
- Conducting soil clean-up/remediation to ensure that the planned land use could be implemented and maintained;

d) Health and safety

To limit the possible health and safety treats due to terrain hazards to humans and animals utilizing the rehabilitated mining site after closure by:

- Demonstrating through upfront soil testing that any resultant inorganic and organic pollution present on the site is acceptable;
- Removal of potential contaminants such as hydrocarbons and chemicals off site;
- Shaping of embankments and trenches to safe slopes and reintegrating of these into surrounding topography.
- Ensuring that the environmental quality as reflected above is achieved.

e) Land capability / land use

To ensure that the required land capability to achieve and support the planned land use can be achieved over the mining site by:

- Clean-up and reclamation of contaminated soil areas in order not to compromise the above land use planning earmarked for implementation;
- To ensure that the overall rehabilitated mining site is free draining
- Transferring mining related surface infrastructure to third parties for beneficial use after closure.

f) Aesthetic quality

To ensure that the rehabilitated mining site will display, at a minimum, an acceptable aesthetic appearance that would not compromise the planned land use by leaving behind:

- A mining area that is properly cleared-up with no fugitive/scattered waste piles
- Rehabilitated mining area that is free draining and disturbed areas that are suitably vegetated.
- Rehabilitated mining residues that are suitably landscaped, blending with the surrounding environment as far as possible.
- Shaped and rehabilitated terrace and hard stand areas, roughly emulating the local natural surface topography.

g) Landscape viability

To create a landscape that is self-sustaining and over time will evolve/converge to the desired ecosystem structure, function and composition by:

- Conducing surface profiling, with associated material movement optimisation, to obtain a landscape resembling the natural landscapes to support the succession trajectory towards a climax ecological system.
- Establishing woody patches and create “rough and loose” areas for pioneer specie establishment around the respective patches.

- Establishing pioneer species as follows:
- Collected and prepared seeds for broad casting;
- Seedlings grown on on-site nursery;
- Cuttings collected from surrounding veld areas;
- Conducting rehabilitation monitoring and corrective action as required.

h) Biodiversity

To encourage, where appropriate, the re-establishment of native vegetation on the rehabilitated mine site such the terrestrial biodiversity is largely re-instated over time, by:

- Stabilising disturbed areas to prevent erosion in the short- to medium term until a suitable vegetation cover has established; and
- Establishing viable self-sustaining vegetation communities of local fauna, as far as possible.

B. DESCRIPTION OF PROPOSED IMPACT MANAGEMENT ACTIONS, IDENTIFYING THE MANNER IN WHICH THE IMPACT MANAGEMENT [OBJECTIVES AND] OUTCOMES CONTEMPLATED IN PARAGRAPH (D) [AND (E)] WILL BE ACHIEVED, AND MUST, WHERE APPLICABLE, INCLUDE ACTIONS TO —

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

The Rehabilitation & Closure Plan is attached as **Appendix 10.**

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

CALCULATION OF THE QUANTUM

Applicant: Synchroplex (Pty) Ltd — **Ref No.:** NC30/5/1/2/2/10218MR
Evaluators: Milnex CC — **Date:** May-23

No.	Description	Unit	A Quantity	B Master Rate	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)	m3	6972	19	1	1	132468
2 (A)	Demolition of steel buildings and structures	m2	864	171	1	1	147744
2(B)	Demolition of reinforced concrete buildings and structures	m2	816	400	1	1	326400
3	Rehabilitation of access roads	m2	23790	49	1	1	1165710
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	471	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	257	1	1	0
5	Demolition of housing and/or administration facilities	m2	1830	542	1	1	991860
6	Opencast rehabilitation including final voids and ramps	ha	14.85	284292	0.52	1	2195302.824
7	Sealing of shafts adits and inclines	m3	90	146	1	1	13140
8 (A)	Rehabilitation of overburden and spoils	ha	8.5	189518	1	1	1610903
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	4.3	236054	1	1	1015032.2
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	1.2	685512	1	1	822614.4
9	Rehabilitation of subsided areas	ha	0	158701	1	1	0
10	General surface rehabilitation	ha	70.23	150138	1	1	10544191.74
11	River diversions	ha	0	150138	1	1	0
12	Fencing	m	1257	171	1	1	214947
13	Water management	ha	40.53	57087	1	1	2313736.11
14	2 to 3 years of maintenance and aftercare	ha	80.13	19930	1	1	1596990.9
15 (A)	Specialist study	Sum	1			1	0
15 (B)	Specialist study	Sum	0			1	0
					Sub Total 1		23091040.17

1	Preliminary and General	2770924.821	weighting factor 2 1.05	2909471.062
2	Contingencies	2309104.017		2309104.017
			Subtotal 2	28309615.25
			VAT (15%)	4246442.29
			Grand Total	**32556058**

a. Confirm that the financial provision will be provided as determined.

Financial Guarantee

The financial guarantee for the rehabilitation for land disturbed **Synchroplex (Pty) Ltd** will be submitted.

Rehabilitation Fund

Synchroplex (Pty) Ltd will also make provision for rehabilitation during closure by establishing a rehabilitation trust.

C. IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

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

ACTIVITIES **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. For mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**PHASE** (Of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure).	**SIZE AND SCALE of disturbance** (Volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (Describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity Or. Upon the cessation of mining, bulk sampling or prospecting as the case may be.
Clearance of vegetation	Pitting and trenching phase- (construction and operation phase)	Mining right covers an area of 514 Ha. Only the areas where mining takes place, will be cleared. Concurrent backfilling will take place in order to rehabilitate.	1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be prospected on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site.	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.		
Construction of roads	Pitting and trenching phase- (construction and operation phase)	± 23790m^2	1. Planning of access routes to the site for construction/ mining purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a “NO ENTRY for mining vehicles" sign. 2. Construction routes and required access roads must be clearly defined. 3. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 4. Soils compacted by construction/ mining activities shall be deep ripped to loosen compacted layers and re-graded to even running levels. 5. The contractor must ensure that damage caused by related traffic to the gravel access road off the R360 is repaired continuously. The costs associated with the repair must be borne by the contractor; 6. Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport the gravel are fitted with tarpaulins or covers; 7. All vehicles must be road-worthy and drivers must be qualified and made aware of the	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining activities.

			potential road safety issues and need for strict speed limits.		
Mining of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body– Soils and geology	Pitting and trenching phase- (construction and operation phase)	Mining right covers an area of 514 Ha. Only the areas where mining takes place, will be cleared. Concurrent backfilling will take place in order to rehabilitate.	1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil (If topsoil exists) and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. 2. Care must be taken not to mix topsoil and subsoil during stripping. 3. The topsoil must be conserved on site in and around the pit/trench area. 4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order. 5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms, trenches or low brick walls around their bases. 6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mine

			spillage/leakage occurs should be attained and given to the project manager. 8. The impact on the geology will be permanent. There is no mitigation measure.		
Mining of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body – excavations	Pitting and trenching phase- (construction and operation phase)	Mining right covers an area of 514 Ha. Only the areas where mining takes place, will be cleared. Concurrent backfilling will take place in order to rehabilitate.	1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Mine, pans, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed into the system. 3. Truck traffic should be routed away from noise sensitive areas, where possible. 4. Noise levels must be kept within acceptable limits. 5. Noisy operations should be combined so that they occur where possible at the same time. 6. Mine workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated hours. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed	Compliance with Duty of Care as detailed within NEMA	Duration of operations on the mining area

			to remove the offending vehicle or machinery from the site. 10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport. 11. Implementation of enclosure and cladding of processing plants. 12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.		

D. IMPACT MANAGEMENT OUTCOMES

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

ACTIVITY (whether listed or not listed). **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(Modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation.**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**

Clearance of vegetation	Loss or fragmentation of habitats	Fauna & flora	Pitting and trenching phase- (construction and operation phase)	**Existing vegetation** 1. Vegetation removal must be limited to the mining area. 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 3. No vegetation to be used for firewood. 4. Exotic and invasive plant species should not be allowed to establish, if the development is approved. 5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance. 6. In case Camel Thorn or Shepherd's trees are found permits must be obtained from DAFF to remove these individuals. The contractor must apply for these permits in a phased manner as mining proceeds. **Rehabilitation** 7. All damaged areas shall be rehabilitated upon completion of the contract. 8. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 9. All natural areas impacted during construction/ mining must be rehabilitated with locally	Minimisation of impacts to acceptable limits

				indigenous grasses typical of the representative botanical unit. 10. Rehabilitation must take place in a phased approach as soon as possible. 11. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 12. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 13. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. **Demarcation of mining area** 14. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan. 15. The mining area must be well demarcated and no construction/mining activities must be allowed outside of this demarcated footprint. 16. Vegetation removal must be phased in order to reduce impact of construction/ mining. 17. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 18. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas. 19. Soils must be kept free of petrochemical solutions that may be kept on site during construction/ mining Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.	

				Utilisation of resources 20. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO. **Exotic vegetation** 21. Alien vegetation on the site will need to be controlled. 22. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. 23. The spread of exotic species occurring throughout the site should be controlled. **Herbicides** 24. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 25. The use of pesticides and herbicides on the site must be discouraged as this impact on important pollinator species of indigenous vegetation. **Fauna**	

				26. Rehabilitation to be undertaken as soon as possible after the mining activities have been completed. 27. No trapping or snaring to fauna on the construction/ mining site should be allowed. 28. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development. 29. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer. 30. All construction vehicles should adhere to a low-speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises. 31. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.	
Mining Copper, Zinc, Sulphur, Iron and associated minerals within the ore body – excavations	Loss of topsoil	Soil	Pitting and trenching phase - (construction and operation phase)	1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. 2. Care must be taken not to mix topsoil and subsoil during stripping.	Minimisation of impacts to acceptable limits

				3. The topsoil must be conserved on site in and around the pit/trench area. 4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order. 5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. 6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager. Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports, and should include all the records below. • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled. • Record the date of cessation mining activities at the particular site.	

				• Photograph the area on cessation of mining activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.	
	Erosion	Soil Air Water	Pitting and trenching phase-(construction and operation phase)	1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream. 3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly 5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 6. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.	Minimisation of impacts to acceptable limits

				7. Other erosion control measures that can be implemented are as follows: o Brush packing with cleared vegetation o Mulch or chip packing o Planting of vegetation o Hydroseeding/hand sowing 8. Sensitive areas need to be identified prior to construction/ mining so that the necessary precautions can be implemented. 9. All erosion control mechanisms need to be regularly maintained. 10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 11. Retention of vegetation where possible to avoid soil erosion. 12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses. 14. No impediment to the natural water flow other than approved erosion control works is permitted. 15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly. 16. Stockpiles not used in three (3) months after stripping must be seeded or backfilled to prevent dust and erosion.	
	Air Pollution	Air	Pitting and trenching phase -	**Dust control**	Minimisation of impacts to acceptable limits

			(construction and operation phase)	1. Wheel washing and damping down of un-surfaced and un-vegetated areas. 2. Retention of vegetation where possible will reduce dust travel. 3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust. 5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities. 6. A speed limit of 30km/h must not be exceeded on site. 7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. 8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled. **Odour control** 9. Regular servicing of vehicles in order to limit gaseous emissions. 10. Regular servicing of onsite toilets to avoid potential odours. **Rehabilitation** 11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.	

				Fire prevention 12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires. 13. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.	
	Noise		Pitting and trenching phase- (construction and operation phase)	1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Mine, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed into the system. 3. Truck traffic should be routed away from noise sensitive areas, where possible. 4. Noise levels must be kept within acceptable limits. 5. Noisy operations should be combined so that they occur where possible at the same time. 6. Mine workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated hours. 8. Noise from labourers must be controlled.	Minimisation of impacts to acceptable limits

				9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site. 10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport. 11. Implementation of enclosure and cladding of processing plants. 12. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.	
	Impact on potential cultural and heritage artefacts	Heritage	Pitting and trenching phase - (construction and operation phase)	1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA. 2. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts/ fossils are uncovered in the affected area. 3. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds	Minimisation of impacts to acceptable limits

				to the ECO so that appropriate action can be taken. 4. Known sites should be clearly marked in order that they can be avoided. The work force should also be informed that fenced-off areas are no-go areas. 5. The ECO must also survey for heritage and palaeontological artefacts during groundbreaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a palaeontologist should be appointed during the digging and excavation phase of the development. 6. All digging, excavating, drilling or blasting activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to determine proper management, mitigation, excavation and/or collecting measures. 7. Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered. 8. Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set	

				out in the NHRA (Act No. 25 of 1999), Section 51. (1). 9. Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**". If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop. If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies: • NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA.	

				Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.	

				Chance Find Procedure • If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.	

				Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary. • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area. <u>Palaeontological desktop study</u> The specialist report is available under **Appendix 11**. <u>Heritage Impact Assessment</u> The specialist report is available under **Appendix 11**. The following recommendations area made: • From a cultural heritage perspective that the proposed mining activities may proceed, taking into account the mitigation measures.	

				• If the exhumation and reburial of the graveyards are envisaged it will entail social consultation and permit application. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place. Note that unmarked graves are by default regarded as older than 60 years and therefore falls under the NHRA (Act No. 25 of 1999, Section 36). • Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf.* NHRA (Act No. 25 of 1999)**, Section 36 (6)).	
Waste management		Pollution	Pitting and trenching phase-(construction and operation phase)	**Litter management** 1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.	Minimisation of impacts to acceptable limits

				3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction site. 4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. 6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 8. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. 9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. 10. Under no circumstances may solid waste be burnt on site. 11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. **Hazardous waste** 12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed	

				of offsite at a licensed landfill site, where practical. Incineration may be used where relevant. 13. Contaminants to be stored safely to avoid spillage. 14. Machinery must be properly maintained to keep oil leaks in check. 15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated. **Sanitation** 16. The Contractor shall install mobile chemical toilets on the site. 17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. 18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly. 19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer. 20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 21. The construction of "Long Drop" toilets is forbidden, but rather toilets connected to the sewage treatment plant. 22. Potable water must be provided for all construction staff. **Remedial actions**	

				23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. 27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment and stored in adequate containers until appropriate disposal.	
Water Use and Quality	Water pollution	Water	Pitting and trenching phase-(construction and operation phase)	**Water Use** 1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users. 2. Water must be reused, recycled or treated where possible. **Water Quality**	

				3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines. 4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone. 5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. **Stormwater** 6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 7. Silt fences should be used to prevent any soil entering the stormwater drains. 8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 9. Promote a water saving mind set with construction/ mining workers in order to Contractor ensure less water wastage. 10. Hazardous substances must be stored at least 40m from any water bodies on site to avoid pollution. 11. The installation of the stormwater system must take place as soon as possible to attenuate	

				stormwater from the construction phase as well as the operation phase. 12. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers. 13. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 14. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas. **Groundwater resource protection** 15. Process solution storage ponds and other impoundments designed to hold non fresh water or non-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality. **Sanitation** 16. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers). 17. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. **Concrete mixing**	

				18. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth. **Public areas** 19. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis. 20. The Contractor should take steps to ensure that littering by construction/mining workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines. 21. No washing or servicing of vehicles on site.	

Ecological and Wetland Impact Assessment Report (Appendix 11) mitigation measures:

Impact	Source of Impact	Recommended Mitigation Measures
Loss of terrestrial habitat	**Construction:** • Clearing of vegetation – vegetation loss **Operational:** • Clearing of vegetation during mining operations **Decommissioning:** • Damage to vegetated areas • Ineffective rehabilitation measures	• Areas that are stripped during construction and operation should be re-vegetated with indigenous vegetation. • It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon (including fencing off the defined project area) and preventing movement of workers into natural areas. • The duration of the mining should be minimised to as short term as possible, in order to reduce the period of disturbance on fauna and flora. • Areas of indigenous vegetation should under no circumstances be fragmented or disturbed or used as an area for dumping of waste.

		• As far as possible the existing road network should be utilised, minimising the need to develop new access routes resulting in an increased impact on the local environment. • All staff and visitors to the site must undergo an induction process and must be made aware of the sensitive nature of the environment and floral species which occur there. • The area must be re-vegetated with plant and grass species which are indigenous to the exact vegetation types. • Rehabilitation measures that are implemented must be continually monitored to ensure that proper succession has occurred and that there is no erosion occurring. • An alien invasive vegetation management plan should be developed and implemented. • Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat.
Loss of Terrestrial Fauna	**<u>Construction and Operational:</u>** • Vegetation loss and disturbance – clearing of vegetation. • Excessive noise disturbances • Illegal hunting • Habitat fragmentation destruction • Vehicles driving through natural vegetated areas.	• Site clearing to take place in a phased manner (where possible) to allow for any faunal species present to move away from the study site to the surrounding open space areas. • Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery. • Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals. • Fencing should be erected around the project area to prevent workers and members of the public from entering the surrounding environments. This fence should have small openings to allow wildlife to pass through. • Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. • Should any sensitive or Red Data animal or bird species be encountered during the construction, operation and decommissioning activities, these should be relocated to natural areas in the vicinity. Any sensitive fauna that

		are inadvertently killed during earthmoving operations should be preserved as museum voucher specimens. • No hunting, trapping or killing of fauna are allowed. • Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. • General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. • Trenches and deep excavations should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.
Loss of Terrestrial Flora	**Construction and Operational:** • Vegetation clearance • Vehicles driving through natural vegetated areas • Habitat fragmentation and destruction	• Areas that are stripped during construction and operation should be re-vegetated with indigenous vegetation as soon as possible. This will also reduce the likelihood of encroachment by alien invasive plant species. • Protected trees and plants shall not be removed or damaged without prior approval, permits or licenses from the relevant authority.
Introduction and spread of alien vegetation	**Construction:** • Clearing of vegetation **Operational:** • Clearing of vegetation during mining operations **Decommissioning:** • Damage to vegetated areas • Ineffective rehabilitation measures	• Proliferation of alien and invasive species is expected within any disturbed areas particularly as there are some alien and invasive species present within the study site. These species should be eradicated and controlled to prevent further spread beyond. • An alien invasive vegetation management plan should be developed and implemented. • Alien and invasive vegetation control should take place throughout all phases to prevent loss of floral habitat. • Footprint areas should be kept as small as possible when removing alien plant species. • Monitoring and eradication of invasive plant species should be continued five years after decommissioning.

IMPACT MANAGEMENT ACTIONS

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

ACTIVITY Whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation.**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Clearance of vegetation	Loss or fragmentation of habitats.	**Existing vegetation** 1. Vegetation removal must be limited to the mining site. 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 3. No vegetation to be used for firewood.	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		4. Exotic and invasive plant species should not be allowed to establish, if the development is approved. 5. There should be a preconstruction walk-through of the development footprint/project site in order to locate individuals of plant species of conservation concern. A search and rescue exercise must be done to locate and relocate any protected species to a suitable and similar habitat where these plants can grow without any disturbance; 6. In case Camel Thorn or Shepherd's trees are found permits must be obtained from DAFF to remove these individuals. The contractor must apply for these permits in a phased manner as mining proceeds. **Rehabilitation** 7. All damaged areas shall be rehabilitated upon completion of the contract. 8. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 9. All natural areas impacted during construction/mining must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. 10. Rehabilitation must take place in a phased approach as soon as possible. 11. Rehabilitation process must make use of species indigenous to the area. Seeds from		

		surrounding seed banks can be used for re-seeding. 12. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 13. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. **Demarcation of mining area** 14. All plants not interfering with mining operations shall be left undisturbed clearly marked and indicated on the site plan. 15. The mining area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint. 16. Vegetation removal must be phased in order to reduce impact of construction mining. 17. Site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 18. Strict and regular auditing of the mining process to ensure containment of the mining and laydown areas. 19. Soils must be kept free of petrochemical solutions that may be kept on site during construction/ mining. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. **Utilisation of resources** 20. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas		

		adjacent to the site is prohibited unless with prior approval of the ECO. **Exotic vegetation** 21. Alien vegetation on the site will need to be controlled. 22. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. 23. The spread of exotic species occurring throughout the site should be controlled. 24. Weed control measures must be applied to eradicate any noxious weeds (category 1a &1b species) on disturbed areas. **Herbicides** 25. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 26. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation. **Fauna**		

		27. Rehabilitation to be undertaken as soon as possible after mining has been completed. 28. No trapping or snaring to fauna on the construction/mining site should be allowed. 29. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development. 30. Any fauna threatened by the construction and operation activities should be removed to safety by the ECO or appropriately qualified environmental officer. 31. All construction vehicles should adhere to a low-speed limit (<30km/h) to avoid collisions with susceptible species such as snakes and tortoises. 32. If trenches need to be dug for electrical cabling or other purposes, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are exposed should contain soil ramps allowing fauna to escape the trench.		
Mining of Copper, Zinc, Sulphur, Iron and associated minerals within the ore body – excavations	Loss of topsoil	1. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction/mining and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		2. Care must be taken not to mix topsoil and subsoil or any other material, during stripping. 3. The topsoil must be conserved on site in and around the pit/trench area. 4. Subsoil and overburden in the mining area should be stockpiled separately to be returned for backfilling in the correct soil horizon order. 5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. 6. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 7. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager. Establish an effective record keeping system for each area where soil is disturbed for mining purposes. These records should be included in environmental performance reports and should include all the records below. • Record the GPS coordinates of each area. • Record the date of topsoil stripping. • Record the GPS coordinates of where the topsoil is stockpiled.		

		• Record the date of cessation mining activities at the particular site. • Photograph the area on cessation of mining activities. • Record date and depth of re-spreading of topsoil. • Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.		
	Erosion	1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream. 3. Implement an effective system of run-off control, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. 4. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		5. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 6. The use of silt fences and sandbags must be implemented in areas that are susceptible to erosion. 7. Other erosion control measures that can be implemented are as follows: o Brush packing with cleared vegetation o Mulch or chip packing o Planting of vegetation o Hydroseeding/hand sowing 8. Sensitive areas need to be identified prior to construction/mining so that the necessary precautions can be implemented. 9. All erosion control mechanisms need to be regularly maintained. 10. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 11. Retention of vegetation where possible to avoid soil erosion. 12. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 13. Re-vegetation of disturbed surfaces should occur immediately after construction/mining activities are completed. This should be done through seeding with indigenous grasses. 14. No impediment to the natural water flow other than approved erosion control works is permitted.		

		15. To prevent stormwater damage, the increase in stormwater run-off resulting from construction/mining activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings. 16. Stockpiles not used in three (3) months after stripping must be seeded/backfilled to prevent dust and erosion.		
	Air Pollution	**Dust control** 1. Wheel washing and damping down of un-surfaced and un-vegetated areas. 2. Retention of vegetation where possible will reduce dust travel. 3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust. 5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities. 6. A speed limit of 30km/h must not be exceeded on site. 7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled. **Odour control** 9. Regular servicing of vehicles in order to limit gaseous emissions. 10. Regular servicing of onsite toilets to avoid potential odours. **Rehabilitation** 11. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks. **Fire prevention** 12. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires. 13. The Contractor shall always have operational fire-fighting equipment available on site. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.		
	Noise	1. The mining activities must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Pans, power plants, crushers, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Once	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed into the system. 3. Truck traffic should be routed away from noise sensitive areas, where possible. 4. Noise levels must be kept within acceptable limits. 5. Noisy operations should be combined so that they occur where possible at the same time. 6. Mine workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated hours. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all equipment. Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from the site. 10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport. 11. Implementation of enclosure and cladding of processing plants. 12. Applying regular and thorough maintenance schedules to equipment and processes. An		

		increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.		
	Impact on potential cultural and heritage artefacts	2. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA. 2) Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts/ fossils are uncovered in the affected area. 3) The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical, archaeological or palaeontological finds to the ECO so that appropriate action can be taken. 4) Known sites should be clearly marked in order that they can be avoided. The workforce should also be informed that fenced-off areas are no-go areas. 5) The ECO must also survey for heritage and palaeontological artefacts during groundbreaking and digging or drilling. He/she should familiarise themselves with formations and its fossils or a palaeontologist should be appointed during the digging and excavation phase of the development. 6) All digging, excavating, drilling or blasting activities must be stopped if heritage and/or palaeontological artefacts are uncovered and a specialist should be called in to determine proper management, mitigation, excavation and/or collecting measures.	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		7) Any discovered artefacts or fossils shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained, and the site has been mapped and noted. Permits shall be obtained from SAHRA should the proposed site affect any world heritage/palaeontology sites or if any heritage/palaeontology sites are to be destroyed or altered. 8) Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1). 9) Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources include **"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**". If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact		

		assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop. If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies: • NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; • NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending		

		on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist. **Chance Find Procedure** • If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African		

		Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary. • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.		

		• In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area. <u>Palaeontological desktop study</u> The specialist report is available under **Appendix 11**. • If fossil remains are discovered during any phase of construction, either on the surface or below, the ECO in charge of these developments must be alerted immediately. These discoveries should be protected (if possible, *in situ*) and the ECO must report to SAHRA so that appropriate mitigation can be carry out by a professional paleontologist. SAHRA Contact details: South African Heritage Resources Agency, 111 Harrington Street, PO Box 4637, Cape Town 8000, South Africa. Email: Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509 Web: www.sahra.org.za) <u>Heritage Impact Assessment</u> The specialist report is available under **Appendix 11**. the following recommendations area made:		

		• From a cultural heritage perspective, it is recommended that the proposed mining activities may proceed, taking into account the mitigation measures • If the exhumation and reburial of the graveyards are envisaged it will entail social consultation and permit application. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place. Note that unmarked graves are by default regarded as older than 60 years and therefore falls under the NHRA (Act No. 25 of 1999, Section 36). • Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf.* NHRA (Act No. 25 of 1999)**, Section 36 (6)).		
Waste Management		**Litter management** 1. Refuse bins must be placed at strategic positions to ensure that litter does not	Duration of operation	The implementation of the recommended mitigation measures will result in the minimisation of impacts to

		accumulate within the construction/ mining site. 2. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 3. Good housekeeping practices should be implemented to regularly maintain the litter and rubble situation on the construction/ mining site. 4. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 5. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. 6. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 7. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 8. Where a registered waste site is not available close to the construction/ mining site, the Contractor shall provide a method statement with regard to waste management. 9. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.		acceptable standards, thereby ensuring compliance with NEMA and Duty of Care as prescribed by NEMA.

		10. Under no circumstances may solid waste be burnt on site. 11. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. **Hazardous waste** 12. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant. 13. Contaminants to be stored safely to avoid spillage. 14. Machinery must be properly maintained to keep oil leaks in check. 15. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction/ mining and any spills shall immediately be cleaned up and all affected areas rehabilitated. **Sanitation** 16. The Contractor shall install mobile chemical toilets on the site. 17. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. 18. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.		

		19. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer. 20. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 21. The construction of "Long Drop" toilets is forbidden, but rather toilets connected to the sewage treatment plant. 22. Potable water must be provided for all construction staff. **Remedial actions** 23. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. 24. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 25. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 26. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.		

		27. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 28. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 29. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.		
Water Use and Quality	Water pollution	**Water Use** 1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users. 2. Water must be reused, recycled or treated where possible. **Water Quality** 3. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines. 4. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone. 5. Efficient oil and grease traps or sumps should be installed and maintained at refueling facilities, workshops, fuel storage depots, and		

		containment areas and spill kits should be available with emergency response plans. **Stormwater** 6. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 7. Silt fences should be used to prevent any soil entering the stormwater drains. 8. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 9. Promote a water saving mind set with construction/ mining workers in order to Contractor ensure less water wastage. 10. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency. 11. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution. 12. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase. 13. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.		

		14. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 15. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas. **Groundwater resource protection** 16. Process solution storage ponds and other impoundments designed to hold non fresh water or un-treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality. **Sanitation** 17. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers). 18. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. **Concrete mixing** 19. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth. **Public areas**		

		20. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis. 21. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines. 22. No washing or servicing of vehicles on site.		

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

B. MONITORING OF IMPACT MANAGEMENT ACTIONS

C. MONITORING AND REPORTING FREQUENCY

D. RESPONSIBLE PERSONS

E. TIME PERIOD FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Clearance of vegetation	Loss or fragmentation of habitats	• Conduct regular internal audits • Conduct regular external audits	• Environmental Manager • Suitable qualified environmental auditor	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Mining of Diamonds (Alluvial) and Diamonds (General) – excavations	Loss of topsoil Erosion Air Pollution Noise Impact on potential cultural and heritage artefacts	• Conduct regular internal audits • Conduct regular external audits	• Environmental Manager • Suitable qualified environmental auditor	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Waste management	Pollution	• Conduct regular internal audits • Conduct regular external audits	• Environmental Manager • Suitable qualified environmental auditor	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6 months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.
Water Use and Quality	Water pollution	• Conduct regular internal audits	• Environmental Manager	Monitoring should be undertaken for duration of operations. Internal audits should be undertaken at least every 6

		• Conduct regular external audits	• Suitable qualified environmental auditor	months. External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the competent authority if required.

E. A PROGRAM FOR REPORTING ON COMPLIANCE, TAKING INTO ACCOUNT THE REQUIREMENTS AS BY THE REGULATIONS;

External audits should be undertaken by a suitably qualified auditor on an annual basis. Reports should be made available to the Competent Authority if required.

F. AN ENVIRONMENTAL AWARENESS PLAN DESCRIBING THE MANNER IN WHICH—

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

Synchroplex (Pty) Ltd will implement an Environmental Awareness Plan which will include various mechanisms for informing employees of environmental risks resulting from their work, including:

- Induction training for full –time staff and contractors;
- In-house training sessions to be held with relevant employees;
- On the job training regarding environmental issues
- Training and skills development

The above measures will be implemented through an Environmental Communication Strategy to be implemented.

See the attached **Appendix 10** for the Awareness plan

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

Synchroplex (Pty) Ltd will implement an incident reporting and reporting procedure in order to identify risks timeously and implement actions to avoid or minimise environmental impacts.

G. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

No specific information requirements have been detailed by the Competent Authority.

H. AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO:

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

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

I, **Deshney Mapoko,** herewith confirm;

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. the acceptability of the project in relation to the finding of the assessment and level of mitigation propose☒

Signature of the environmental assessment practitioner:

Milnex CC

Name of company:

12/06/2023

Date:

************END OF THE REPORT************