

SOUTHERN AFRICAN TANTALUM MINING (PTY) LTD

MINING RIGHT APPLICATION FOR COPPER AND TUNGSTEN ON PORTION OF PORTION 13, A PORTION OF PORTION 14, AND A PORTION OF PORTION 21 OF THE FARM NABABEEP 134

NAMA KHOI LOCAL MUNICIPALITY, NAMAKA DISTRICT MUNICIPALITY, NORTHERN CAPE

DRAFT SCOPING REPORT (DSR)

DMR REF: NC 30/5/1/2/2/10150MR

Date: 1 November 2018

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.

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

NAME OF APPLICANT:	**Southern African Tantalum Mining (Pty) Ltd (SAFTA)**
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DMR REFERENCE NUMBER: NC 30/5/1/2/2/10150MR

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 considered any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

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

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

OBJECTIVE OF THE SCOPING PROCESS

1) The objective of the scoping process is to, through a consultative process—

a) identify the relevant policies and legislation relevant to the activity;
b) motivate 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 and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
e) identify the key issues to be addressed in the assessment phase;
f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Statement of Independence

Green Direction Sustainability Consulting (Pty) Ltd (GDSC) has no interest in the outcome of this Report, nor does this company have any interest that could be reasonably regarded as being capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to GDSC by the Applicant. GDSC has exercised all due care in reviewing the supplied information, with conclusions from the review being reliant on the accuracy and completeness of the supplied data.

GDSC does not accept responsibility for any errors or omissions in the information provided and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

Professional environmental opinions presented in this report apply to the site conditions and features as they existed at the time of GDSC's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which GDSC had no prior knowledge nor had the opportunity to evaluate.

DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –
i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017). These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Consultation - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Environment - The surroundings within which humans exist and that are made up of
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Municipality –

(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
    (i) The district municipality, or
    (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BPEO	Best Practicable Environmental Option
mbgl	Metres below ground level
CBA	Critical Biodiversity Area
Cu	Copper
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EStA	Early Stone Age
FME	Flat Mine East
FMN	Flat Mine North
FMS	Flat Mine South
FoT	"Free on Truck" means there is no processing and that it's a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km^2	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m^3	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State

RoM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
W	Tungsten
WMA	Water Management Area
WML	Waste Management License
WUL	Water Use License

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1 CONTACT PERSON & CORRESPONDENCE ADDRESS

1.1 Details of the EAP

Name of The Practitioner: Jennifer Barnard (Green Direction Sustainability Consulting (Pty) Ltd)
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Fax No. : N/A
e-mail address: jenny@greendirection.co.za

1.2 Expertise of the EAP

The qualifications of the Environmental Assessment Practioner (EAP)

- Masters in Environmental Science: University of KwaZulu-Natal, Durban
- SACNASP: Pr. Nat. Sci. (Professional Natural Scientist)
- EAPASA: Registered with Interim Certification Board of Assessment Practioners in South Africa

Refer to **Appendix A** for CV of EAP.

2 LOCATION OF THE ACTIVITY

Table 1: Location Information

Farm Name:	1. Portion of Portion 3 of the Farm Nababeep No. 134 2. Portion of Portion 13 of the Farm Nababeep No. 134 3. Portion of Portion 14 of the Farm Nababeep No. 134 4. Portion of Portion 21 of the Farm Nababeep No. 134
Application area (Ha)	1214 Ha
Magisterial district:	Namakwaland
Distance and direction from nearest town	Nababeep is located approximately 5km in a south-easterly direction
21-digit Surveyor General Code for each farm portion	1. C05300000000013400003 2. C05300000000013400013 3. C05300000000013400014 4. C05300000000013400021

2.1 Location

Springbok is located approximately 550km north of Cape Town in the Northern Cape Province, and is one of the major towns in the region. Springbok is also located approximately 350km west of Upington. The Flat Mine deposits are located approximately 5km north of Nababeep at 29° 33’ S and 17° 48’ E, approximately 17km by road northwest of the town of Springbok.

Refer to the locality plan attached at **Diagram 1.**

Diagram 2 shows the properties and co-ordinates as detailed in Table 1 above.

Diagram 1: Locality Plan of Project Site

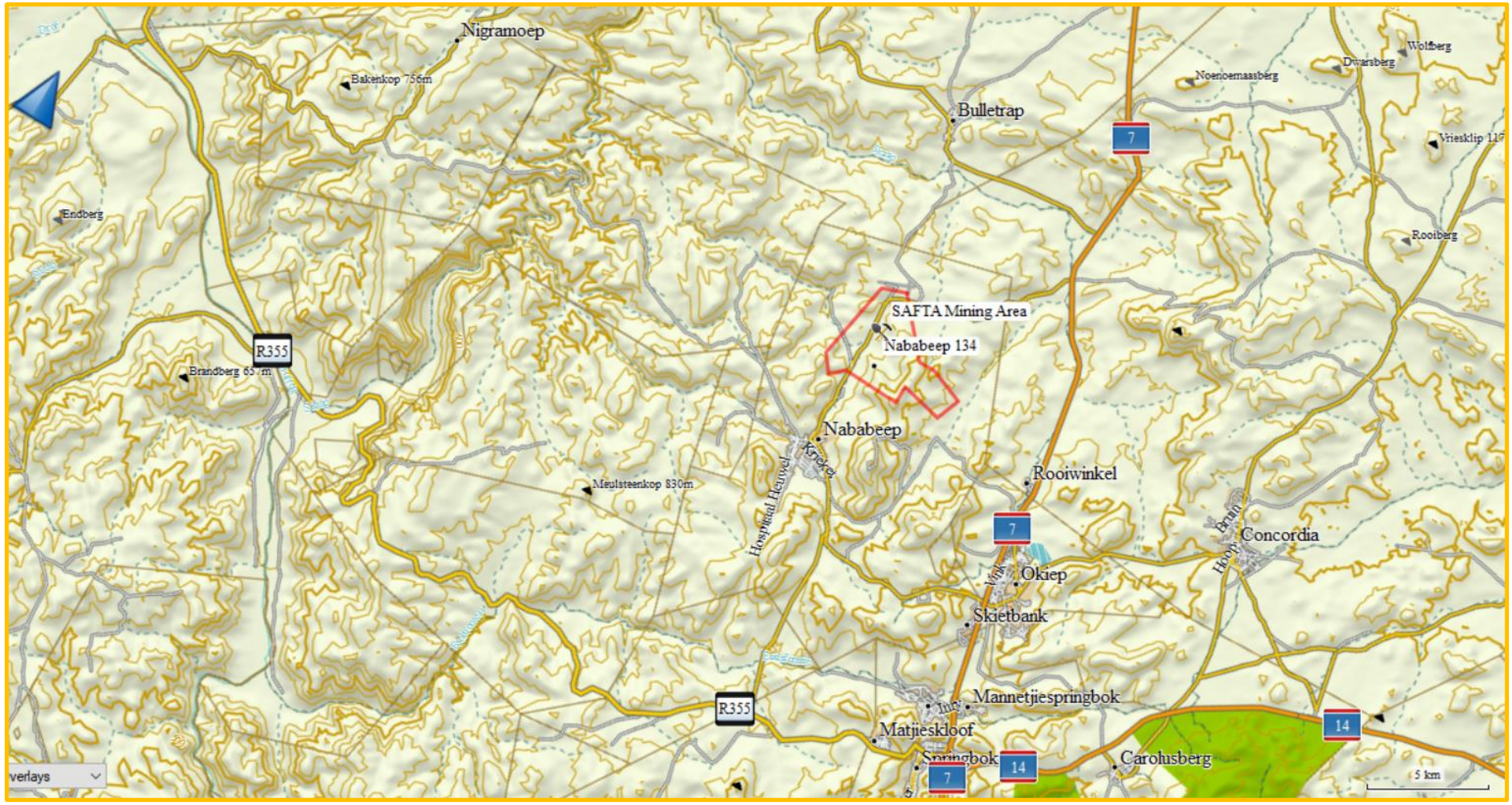
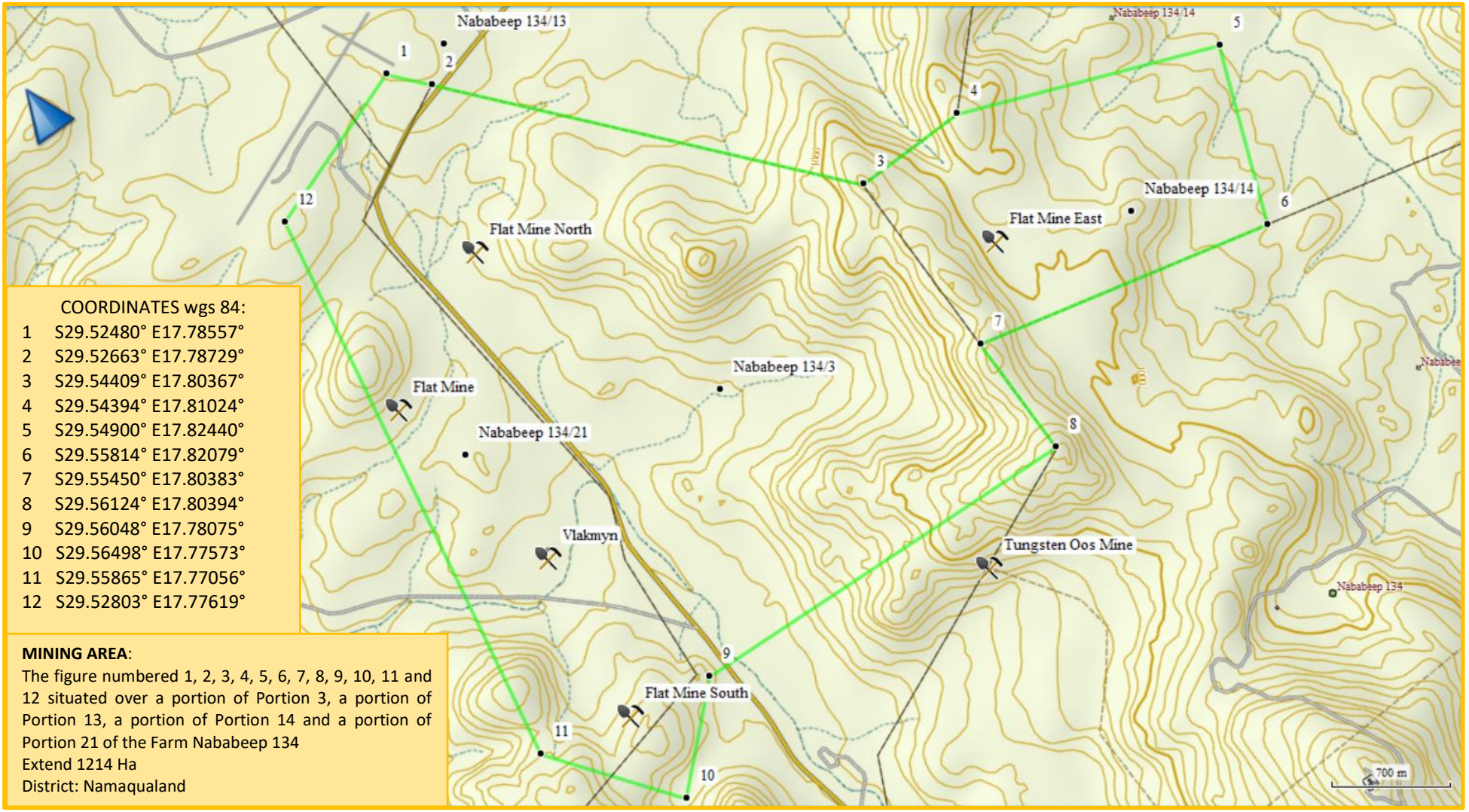


Diagram 2: Locality Plan of Project Site showing Farm Boundaries and Co-ordinates



COORDINATES wgs 84:

1	S29.52480° E17.78557°
2	S29.52663° E17.78729°
3	S29.54409° E17.80367°
4	S29.54394° E17.81024°
5	S29.54900° E17.82440°
6	S29.55814° E17.82079°
7	S29.55450° E17.80383°
8	S29.56124° E17.80394°
9	S29.56048° E17.78075°
10	S29.56498° E17.77573°
11	S29.55865° E17.77056°
12	S29.52803° E17.77619°

MINING AREA:
The figure numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 situated over a portion of Portion 3, a portion of Portion 13, a portion of Portion 14 and a portion of Portion 21 of the Farm Nababeep 134
Extend 1214 Ha
District: Namaqualand

3 DESCRIPTION OF THE PROPOSED ACTIVITIES

3.1 Introduction and Background

The Applicant, Southern African Tantalum Mining (Pty) Ltd has undertaken extensive prospecting since 12 February 2014 under cover of Prospecting Right NC30/5/1/1/2/10114 PR for Copper ore and Tungsten ore. The prospecting right covered a certain portion of Portion 3, Portion 13, Portion 14, Portion 21 and a portion of Portion 15 of the farm Nababeep No. 134 situated in the Magisterial/Administrative District of Namaqualand and measuring 5265.1741 hectares in extent. According to clause 7.2 of the Prospecting Right issued under Protocol 1454/2014 prospecting operations in the prospecting area must be conducted in accordance with the Prospecting Work Programme (PWP) and the approved Environmental Management Plan (EMP) and any amendment thereof.

An application for the Ministers approval in terms of section 102 was lodged in 2015 under application ID 409 to amend the PWP and EA together with an application in terms of section 20 to remove minerals. The amended PWP together with a local EMP addressed the bulk sampling to be implemented at the existing Wheal Flat Mine. This application for the Ministers approval in terms of section 102 was also to include additional base metals Lead, Silver, Zinc, Bismuth, Cadmium, Cobalt, Mag component, Gold and Uranium. As part of the local EMP to deal with the bulk sampling financial provision required in terms of the NEMA Financial regulations 2015 was furnished to DMR.

An application for the renewal of the prospecting right was submitted under file reference NC30/5/1/1/2/11893 PR. The Minister granted the renewal of the prospecting right including the PWP that included the amendments referred to in the previous paragraph. The renewal was executed on the 12th day of February in the year 2014, under Protocol 1454/2014, registered at the Mineral and Petroleum Titles Registration Office under 39/2014 (PR). The prospecting right was renewed for a further period of three (3) years, commencing on 16th October 2017 and, unless cancelled or suspended in terms of section 47 of the Act, it will end on 15th October 2020.

With regard to the resource statement the information supplied in terms of regulation 11(1)(d) was sourced and is supported by the exploration results obtained during the extensive exploration program.

The Mining Right area is situated 5km north of the town of Nababeep. Copper operations in this district date back over 150 years and hence the general geology is known as is the general style and form of the copper mineralization.

3.2 The Scope of the Proposed Activities

3.2.1 Mineral Resource particulars

Generally copper ore in this district is contained in a series of steep structures. Potentially economic concentrations of ores occur in clusters of pods as grade distribution is erratic and irregular. Only a small percentage of each structure carries reasonable grade ore and the rest is normally low grade. Hence the resources are a function of the cut-off grade and the current costs of mining and extraction. Refer to the section on the geology of the area in Section 8.1.3.

Table 2: Details of the Mineral Resources

ITEM	DETAIL
Type of mineral	Copper (Cu) and Tungsten (W)
Extent of application area	1214 Ha
Extent of the area required for mining	Mining takes place underground and portals included in infrastructure areas (Refer Diagram 5). ±2.8Ha surface are required for Waste Rock Dump and ±25.5Ha for Fine Residue Dam (Refer Diagram 5d)
Extent of the area required for infrastructure, roads, servitudes, etc.	±113Ha including mining portals and ROM stockpiles (Refer Diagram 5a, 5b and 5c)
Depth of the mineral below surface	The Flat Mine North (FMN) orebody extends between 24m and 240m below surface. The Flat Mine South (FMS) and Flat Mine East (FME) orebodies both extend approximately from surface to 800 m below surface.
Geological formation	The Project is located in the Okiep Copper District which occurs in the Proterozoic Namaqualand Metamorphic Complex. The dip of the Flat Mine North zones ranges from horizontal to 16°. The dip of the Flat Mine South orebody dips at 74° to the north. Flat Mine East dips at approximately 60° to the north west.

	The Okiep orebody complex consists of numerous individuals, steeply dipping, high grade copper sulphide ore bodies. The Flat mine area covers a N-S trending valley with the Flat Mine fault running approximately along the centre of the valley. A broad anticlinal structure is displaced by the Flat Mine fault. The anticlinal axis trends NNE, and coincides with the general strike of the felspathic quartzite outcrops in the SW corner of the area. The downthrown side of the Flat Mine fault is on the western side and a displacement of more than 300m. The ore-bearing phase is a diorite and contains disseminated bornite, chalcopyrite and subordinate chalcocite. The diorite has intruded the hinge of an open (limbs dip some 15º) east-west trending anticline that plunges slightly to the west. The major Flat Mine Shear strikes northwards some 500m to the west of the orebody. Several smaller faults also run through the area, striking northwest-southeast The FMN orebody is a pipe-like structure 180m long and 40m wide varying from 15 to 50m in vertical thickness. It strikes N 25° W and plunges steeply (45º) for the first 60m from surface and then flattens out to become horizontal for the remaining 120m, attaining a maximum depth of 100m.

3.2.2 Mineral Resource Map

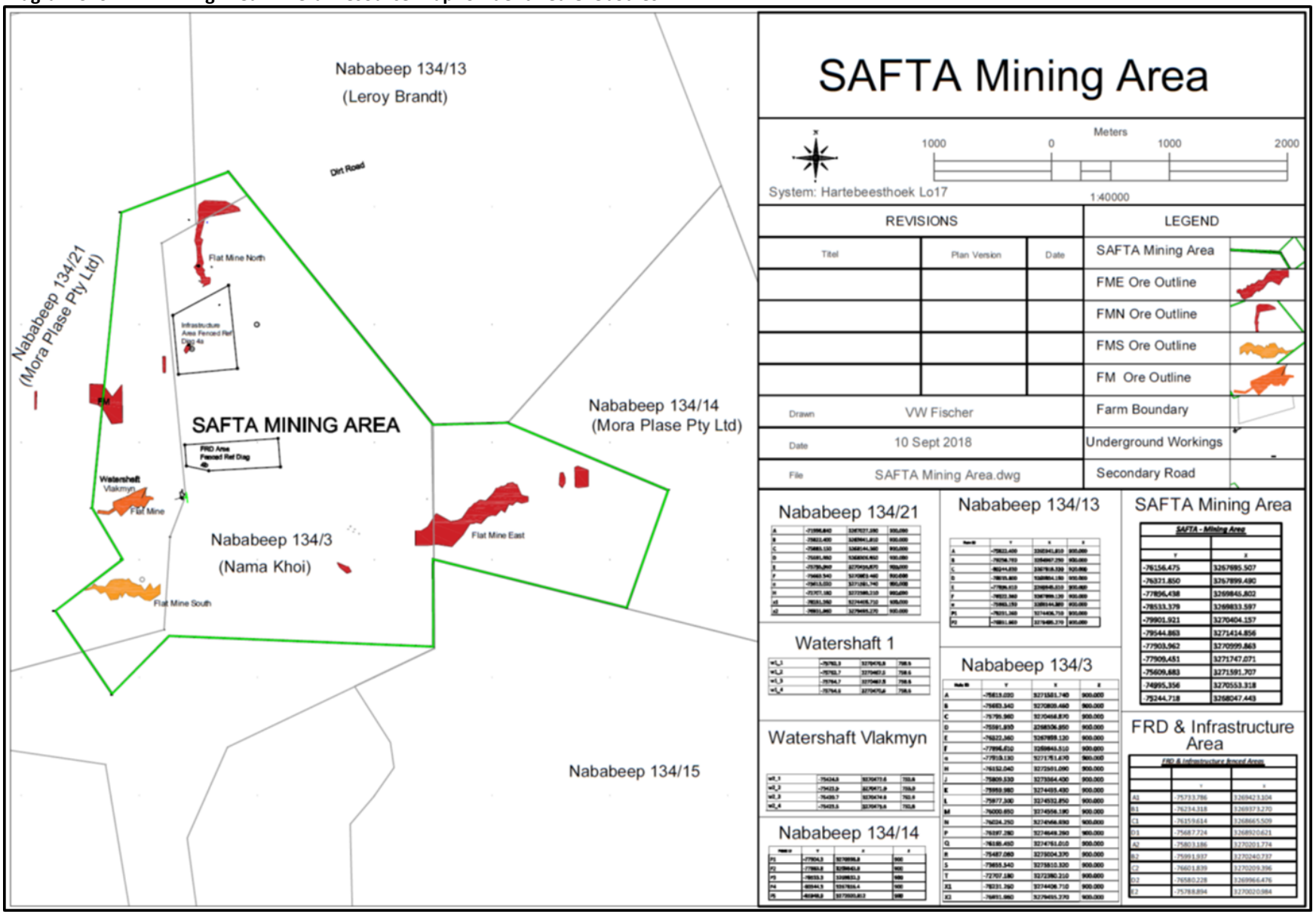
The mineral resource map for the identified orebodies is provided in **Diagram 4** below.

The drilling data and the 3D geological models received from OCC were compiled into a single database and a series of work items were completed to understand mineralization controls and the associated Copper (Cu) grade distributions. Using the 0.7% Cu cut-off orebody for the Flat Mine North (FMN) and Flat Mine South (FMS) the following aspects were examined amongst others:

- The relationship between grade and rock type to determine any preferential mineralization in association with rock type.
- A boundary analysis was done to determine whether mineralization is associated with specific geological entities such as rock type, shear zones, faults, intrusions etc. or whether the grade is distributed throughout the host rock as is typical of a Cu porphyry deposit.
- By constructing 3D models from point cloud data of the underground development as well as the stope, the associated models were depleted by the volume and tonnage attributed to these
- Finally, using the outcomes of the above and independent mineral resource estimate was completed using Ordinary Kriging.

The test results indicated that a 25% copper concentrate can be produced with a mass pull of 10% and copper recovery of 90%. The product specification is a 25% Cu concentrate at a moisture content of 8% to 10%. The intention is to secure an off-take agreement with a copper smelter who will purchase the copper concentrate at the mine gate (ex-works) as included in Section 5.2 below.

Diagram 3: SAFTA Mining Area Mineral Resource Map for Identified Orebodies



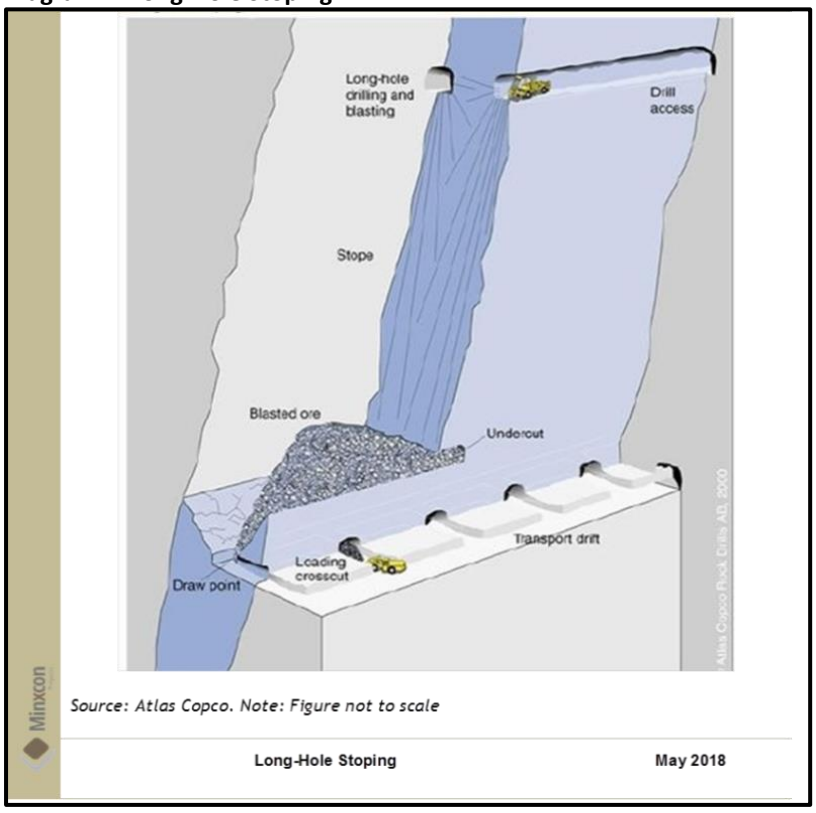
3.2.3 Basic overview of the Mining Method

The long-hole stoping method is a bulk mining method that provides good ore recovery and minimal dilution. It is an overhand, vertical stoping, utilising long-hole drilling (LHD) and blasting carried out from sublevels to break the ore. Although the stopes are supported by long anchors, pillars are usually left between stopes and occasionally within stopes. The ore flows through the stope by gravity. Ore will then be extracted from the stope via the lower extraction drift using LHDs. The LHDs will then move the rock to either an orepass tipping point or into a re-muck bay and re-handle the material into a truck when one is available. The trucks will transport the ore to surface via the decline.

Long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Typically, production drilling is carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs. These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations.

In the long-hole open stoping method access onto a level, from the decline, will be via an access cross cut. From the access cross cut ore access drives will be developed into the orebody from the footwall to the hangingwall. The mining block will be split into stopes with a horizontal span of 20 m and a vertical span of 30 m. The strike will be the length of the orebody width from the hangingwall to the footwall. Diagram 3 shows a schematic of the proposed mining method. Only one level will be in production at a time.

Diagram 4: Long-Hole Stoping



3.2.4 Timeframes and Life of Mine

Production at Nababeep can only commence after the completion of all required surface and underground infrastructure. Minimal development will be required to access the first orebody, FMN. As such the new plant will be constructed within 63 weeks at which point production can commence.

Mining operations will start at FMN at 150 ktpa building up to 420 ktpa at full production. FME commences production at 330 ktpa in year 5 building up to 840 ktpa at full production. Once FME has been depleted, FMS commences production at 550 ktpa building up to 840 ktpa at full production.

Table 3: Life of Mine Forecast

Life of Mine Year	Total Production	FMN		FME		FMS	
		Mined	Reserve	Mined	Reserve	Mined	Reserve
			1 548 000		4 750 000		3 890 000
1	-	-	1 548 000	-	4 750 000	-	3 890 000
2	150 000	150 000	1 398 000	-	4 750 000	-	3 890 000
3	420 000	420 000	978 000	-	4 750 000	-	3 890 000
4	420 000	420 000	558 000	-	4 750 000	-	3 890 000
5	700 000	370 000	188 000	330 000	4 420 000	-	3 890 000
6	840 000		188 000	840 000	3 580 000	-	3 890 000
7	840 000		188 000	840 000	2 740 000	-	3 890 000
8	840 000		188 000	840 000	1 900 000	-	3 890 000
9	840 000		188 000	840 000	1 060 000	-	3 890 000
10	840 000		188 000	840 000	220 000	-	3 890 000
11	770 000		188 000	220 000	-	550 000	3 340 000
12	840 000		188 000		-	840 000	2 500 000
13	840 000		188 000		-	840 000	1 660 000
14	840 000		188 000		-	840 000	820 000
15	820 000		188 000		-	820 000	-

3.3 Project Description

The Mine Layout showing all the development areas and services is included at Diagram 5.
Site Plans overlaid on Google Earth™ are provided for:

- Diagram 5a: Flat Mine North
- Diagram 5b: Flat Mine South
- Diagram 5c: Flat Mine East
- Diagram 5d: Centralised Fine Residue Dam

Plans and process flow diagrams are provided for the mine logistics, processing and associated infrastructure where relevant:

- Diagram 6: Electricity Supply
- Diagram 7: Mining Infrastructure located at FMN
- Diagram 8: Sewage Treatment Plant
- Diagram 9: Perimeter Fencing
- Diagram 10: Access Control
- Diagram 11: Explosives Delivery Bay
- Diagram 12: Mine Logistics
- Diagram 13: Crushing and Screening
- Diagram 14: Milling Circuit
- Diagram 15: Reagent Make-Up and Conditioning
- Diagram 16: Flotation Circuit
- Diagram 17: Product Handling
- Diagram 18: Water Supply
- Diagram 19: Services

The Mine Process Flow Diagram is included as Diagram 20.

3.3.1 Access, Roads and Routes

The Project Area will be accessed by a 3.42Km gravel road leading from the town of Nababeep in a northern direction and this road is will have to be upgraded to accommodate heavy equipment (Diagram 5). A portion of the road will from time to time be carrying loaded haul trucks and, for this reason, the road should be constructed to accommodate two-way traffic. The portion of the access road from FMS will be upgraded to serve as main surface haul road (2.81Km).

This haul road will be constructed to minimize travel of locals into the mining area and inadvertent contact with large earth moving vehicles. The access/haul road length will be 6.23km long with an 8.9 m width to accommodate two-way traffic should allow for a trench and berm on each side of the road. Construction will be conducted by clearing, topsoil removal, scraping and compacting of the area adjacent to the existing road. Compaction should be to 98% Modified American Association of State Highway and Transportation Officials with California Bearing Ration of 15% ("98% MOD AASHTO with CBR of 15%").
A new haul road will be constructed between the waste rock dump and the main surface haul road (0.5Km) and another from between FME and the main surface haul road (1.54Km).

3.3.2 Security and access control

A site perimeter fence around the development area and haul road will be required for safety and security purposes. The fence should be able to restrict access of life stock and other animals as well as perturb persons from any unauthorised access. The fence should have a total height of 2.4m. The fully galvanised wire mesh fence should be 2.1 m high with a razor mesh topping of 0.3 m and spacing between stay and intermediate posts of 3 m. The total perimeter fence length has been measured at 5.21 km.
Access to the area will be gained through two dedicated sliding vehicle gates and a single pedestrian gate. A security house will be located at the main entrance to the mining site area. Access to the complex by outside service providers will be strictly controlled, and where possible, limited to delivery at the main stores located at the plant.

3.3.3 Power supply

Currently no power supply exists to the Project Area. In order to establish power to the project site a number of off-site installations will be required, which will include:

- Construction of 1 x 66(132) kV line bay at Nababeep Town (132KV) Substation (refer to Diagram 6); and,
- Construction of a 1 x 5.6 km 11 kV squirrel line from Nababeep Town Substation (110/66KV) to SAFTA Project Intake Yard.

Substation ancillary services, control room building, protection equipment, metering equipment, and power network control and communication systems for the substations will be required.
In addition, back-up generators will be required.
The off-site power supply infrastructure designs have been prepared on a maximum demand of 4.54 MVA to the Project Area during the 35 ktpm option, which will increased to 6.4 MVA once production increases to 70 ktpm as determined by a load summary.

The load summary is listed in Table 4 and Table 5 respectively and indicated in Diagram 5.

Table 4: Project Power Supply Load Summary for 35 ktpm option

Area Description	Unit	Maximum Demand
Process Plant	kVA	3,033
Tailings Storage Facility	kVA	66
Mine Site	kVA	1,436
Total	**kVA**	**4,536**

Table 5: Project Power Supply Load Summary for 70 ktpm option

Area Description	Unit	Maximum Demand
Process Plant	kVA	4,334
Tailings Storage Facility	kVA	132
Mine Site	kVA	1,956
Total	**kVA**	**6,422**

3.3.4 Water Supply

Water supply is an essential service as various steps in the mining and particularly the processing processes are heavily reliant on the usage of water. Apart from the mining and process requirements, water will also be required for use as potable water.
The water sources on the Project Area will be supplied by a vent raise 1.6 km from the decline near Flat Mine South. Water will be pumped from the vent to a reservoir using a total of 8.9 km of piping. Major infrastructure will include all pipes and pumps to transport water from the raise to the reservoir. Water columns, with a total

length of 10.1 km as well as 8 Lorentz ps4000 pumps, will be required in FMN and FMS for dewatering and fire suppression purposes.
A total water allowance of 150 l/person/day has been made. The various unit conversions for potable water supply to be utilised to determine pumping, storage and treatment capacities include: -

- Potable water 200 employees x 150 l/person/day = 30,000 l/day
- Process water for mine site and dust suppression – 603 m^3/month for 35 ktpm option
- Process for mine site and dust suppression – 1206 m^3/month for 70 ktpm option
- Process water for processing plant the 35 ktpm option - 17,000 m3/m
- Process water for processing plant the 70 ktpm option - 35,000 m3/m

Refer to the Baseline Water Report attached at **Appendix D**, and referenced in Section 8.1.8. The specialist assessments required during the EIA Phase include a Geo-Hydrological Assessment (to inform the Water Use Licence) as listed in Section 10.3 below.

3.3.5 Water Management

As Africa is a water scarce continent and mining activities often pose significant water pollution risk, it is of utmost importance to properly manage water usage and disposal on a mining operation. For this reason, all dirty rainfall run-off, process plant discharge, treated sewage and grey water will be collected, stored, treated and recycled as far as possible. Should an excess of water exist on the operation, all effluent from the site will be suitably treated and tested to ensure compliance to acceptable standards before being released into the environment. All clean rainfall run-off should be diverted from dirty and contaminated areas to minimise the risk of environmental and water pollution. Trenches will be constructed to divert clean run-off, collect dirty run-off and route dirty water to suitable storage dams. A surface collection dam will be constructed to store all dirty water from the mining area and a series of dams will also be constructed within the plant to store run-off and discharged process water.

3.3.6 Mine logistics

The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. The site will cover an area of 20,800 m^2 (130 m x 160 m) (Refer to Diagram 5 and Photograph Compilation 1. The mine site will be enclosed by a security fence. Access to the site will be controlled by security personnel posted at the access gates to the site.
The mine site will include offices, change houses, control room, first aid station, stores, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. This area will be mainly constructed and established by the appointed mining contractor but services like water supply, power supply, water management and other services will be constructed by contractors appointed for the construction of the balance of infrastructure areas. Sewage treatment will be managed on site via a Biozone-type Purifier as shown in Diagram 8 below, and will require management of the filters and additives.

3.3.7 Processing plant site

The processing plant site will include the processing plant, a metallurgical and assay laboratory, offices, reagent storage facility and a workshop. The site will be 130 m x 200 m and will be located adjacent to the Mine site.
Refer to Diagram 5, Photograph Compilation 1 and Figures 13 – 18 for Process Flow Diagrams of each component, and Figure 20 for the project summary Process Flow Diagram (Plant Flowsheet).

Photograph Compilation 1: View north-east towards FMN on the left and the area earmarked for the processing plant, mine logistics, water reservoir, settling dam and RoM stockpile as shown on Diagram 5a.

3.3.7.1 Basic plant design

The Plant Flowsheet (Diagram 20) incorporates a conventional two stage crushing circuit with a primary jaw crusher followed by a secondary cone crusher in closed circuit with a vibrating screen. The primary mill discharge is pumped through a cyclone with the underflow passing through a flash flotation cell before gravitating to the secondary milling circuit. The cyclone overflow streams from the primary and secondary milling circuits form the feed to the flotation circuit. The flotation circuit comprises rougher, cleaner and re-cleaner tank flotation cells. The rougher concentrate is pumped to the cleaner cells with that concentrate progressing to the re-cleaner stage. The tailings from each stage are returned to the previous stage with the rougher tailings passing through a scavenger stage. The re-cleaner concentrate is the final concentrate which is filtered to and stored prior to export. The scavenger tailings will be thickened to 60% solids before being pumped to the tailings dam. The concentrate, equating to 10% of the original plant feed mass, will be sold at the mine gate.

For the 35,000 t/m operation the feed to the plant will be a nominal 54t/h with a 1:1 water requirement, i.e. 1m³ of water required per tonne of ore treated. Roughly 50% of the water requirement will be provided by reticulated water within the plant.

The design philosophy was that the processing plant would initially be designed to treat 35,000 t/m. This will be known as Phase 1. At the beginning of Year 4, a parallel stream (Phase 2), treating a further 35kt/m will be commissioned bringing the total design throughput to 70kt/m. The life of the project, based on the current resource, would be 14 years. The plant should have a 90% availability and operate on a 24 hour/day basis with 3 operational shifts and a relief shift. The plant will not be fully automated but there will be sufficient instrumentation to ensure a stable operation and allow for reliable metallurgical accounting.

3.3.7.2 Efficiency of the process

The copper will be upgraded by means of flotation with the final flotation concentrate representing 10% of the original mass of the plant feed. 90% of the copper will be contained in this fraction. This will be the final product. It will be filtered (dewatered), bagged, and sold at the mine gate. The reclaimed water will be returned to the process water circuit.

The remaining 90% of the original plant feed will be discarded as flotation tailings. This product, grading at 75% passing 106 microns, will be pumped to the tailings disposal facility (TSF), which will be a contained area 1.5 km from the processing plant. The TSF will be self-raising with the height of the initial wall being 17 m. The final height will be 35 m and the total end area will be around 0.5 km2. The tailings will be pumped at 60% solids and allowed to settle on the TFS. Water will be recovered and returned to the plant for re-use, thereby reducing the raw water requirement.

3.3.8 Stockpiles

The RoM stockpile will be sized to ensure sufficient supply to the plant for a minimum of 1 month. With a 35 ktpm production profile this will amount to 1.52 kt per day. The stockpile thus needs to be a minimum size of 35,000 t as shown in Table 6 below.

During the second phase of the project production will be increased to 70 ktpm requiring the stockpile size to double as shown in Table 7 below.

The stockpiles will have the following dimensions:

Table 6: RoM Stockpile – 35 ktpm Design Parameters

Description	Unit	Value
Height	m	5
Length	m	85
Width	m	50
Wall Gradient	h:v (x:1)	1.33
Stockpile Volume	m^3	12,996
Footprint Area	m^2	4,250
RoM stockpile tonnage	**t**	**35,000**

Table 7: RoM Stockpile – 70 ktpm Design Parameters

Description	Unit	Value
Height	m	6
Length	m	120
Width	m	60
Wall Gradient	h:v (x:1)	1.33
Stockpile Volume	m^3	26,422
Footprint Area	m^2	7,200
RoM stockpile tonnage	**t**	**71,336**

3.3.9 Mine Residue Disposal Facility

Refer to the Pre-Feasibility Report of the Mine Residue Disposal Facility (MRDF) (attached at **Appendix E)**, which is to be capable of containing the tailings stream for the Life of Mine (LoM).

The MRDF will consist of:

- A Tailings Storage Facility (TSF) with sufficient storage capacity to contain 4.5 million dry tonnes of tailings over a 10-year LoM;
- A Return Water Dam (RWD); and a Storm Water Dam (SWD);
- The associated infrastructure for the MRDF (i.e. perimeter slurry deposition pipeline, storm water diversion trenches, perimeter access road etc.)

A formal site selection was not undertaken for this phase of the project. During a site investigation with representatives from Uhuru and Epoch a single site was identified as a potential suitable location based on the following:

- Location overlies an existing environmentally disturbed location as shown in the Photograph (Compilation) 1;
- The site is positioned over a wide valley in which it is possible to establish a large depositional basin reducing the volume requirement for a starter embankment; and
- The location does not encroach on nearby settlements.
- It is centrally located within the mining right area, approximately 1.5 km south-east of the processing plant.

Photograph Compilation 2: View north-east of the disturbed area earmarked for the Residue Disposal Facility

A volumetric analysis was conducted of the selected site to confirm that the tailings stream could be contained within the available footprint. Diagram 5d provides an illustration of the selected site location with the LoM tailings footprint area.

In order to optimise the capacity of the selected site a conventional upstream self-raised facility was chosen based on the restricted available footprint area and anticipated lack of available in-situ borrow material and/or waste rock.

MRDF Design:

The **Tailings Storage Facility (TSF)** will have the following features:

- The starter embankment will be constructed to elevation 777 mamsl to correlate with the safe Rate of Rise of <2.5m/annum and provide the required minimum freeboard;
- Deposition will comprise of tailings deposited behind the starter embankment until the Rate of Rise decreases to <2.5 m/annum and then self-raised to a final elevation of 792 mamsl with a terminal Rate of Rise of 1.64 m/annum;
- The TSF has a total footprint area of 32.81 Ha, with a maximum height of 32 m;
- A slurry spigot pipeline along the crest of the TSF starter embankment;
- An elevated and a natural ground level (NGL) toe drain and associated drain outlets;
- A blanket drain and associated outlets;
- A solution trench;
- Run-off catchment paddocks;
- A penstock decant system with an intermediate intake and a final intake;
- An energy dissipator and a dual chamber silt trap with associated outfall trench;
- An access road;
- A perimeter fence; and
- Storm water diversion trenches and berms.

The **Return Water Dam (RWD)** will have the following features:

- A compacted earth containment wall raised to elevation 762 mamsl;
- A lined basin with 1.5 mm HDPE with an associated geofabric protection layer;
- A return water collection manhole;
- A storage capacity of 6 000 m³ providing approximately 5 days of slurry water; and
- A spillway at elevation 761 mamsl.

The **Storm Water Dam (SWD)** will have the following features:

- A compacted earth containment wall raised to elevation 762 mamsl;
- A lined basin with 1.5 mm HDPE with an associated geofabric protection layer;
- A return water collection manhole;
- A storage capacity of 41 000 m³ providing adequate storage to prevent spillage of dirty water more than once in a 50-year period;
- An emergency spillway at elevation 761.2 mamsl; and
- A spillway diversion trench and berm.

Water Balance:

- The average monthly water balance has been determined for a lined and an unlined facility. A water balance for a lined facility would expect greater water returns as the seepage from the supernatant pond into the in-situ soils is nil, provided the liner remains fully operational. The available water for return as a percentage of the slurry water are expected to be:
  - Between 20% - 40% for an unlined facility; and
  - Between 40% - 60% return for a lined facility.

A detailed investigation is required to address the following components for inclusion in the EIA phase:

- A full geotechnical investigation must be conducted to determine the suitability of the available in-situ materials for use as construction materials, depth to bedrock/refusal, depth of in-situ materials, foundation indicators of the in-situ soils, shear strength parameters of the in-situ soils; permeability/hydraulic

conductivity of the in-situ soils; identification of any natural fault lines; and the volumes of material available and where borrow pits may be instated;
- The sizing of the SWD is to be confirmed by a detailed water balance, which includes accurate rainfall and evaporation data and confirmation of the design flood depths;
- A seepage assessment and slope stability analysis must be conducted to confirm the geometry and drainage requirement of the TSF, RWD, and SWD;
- The Zone of Influence should be determined to establish the potential hazard posed to nearby water resources, settlements, and sensitive flora and fauna; and,
- An extension to the existing topographical survey would be required.

The geochemical properties of a representative sample of the tailings must be determined by an accredited laboratory to determine the Waste Classification according to NEMWA and the corresponding Liner requirements, and the geotechnical parameters of the sample tested to determine strength and seepage parameters.

3.3.10 Project Services

Owing to the remote nature of the Project Area a number of services will have to be supplied by personnel and infrastructure on site. These services will include the treatment of potable water, the treatment of sewage, basic medical and firefighting services, and waste handling and removal as well as information and communication services.

A potable water treatment plant will be installed to treat water abstracted from the water raise to ensure it is suitable for human consumption. Sewage will be collected in septic tanks across the operation and fed to a sewage treatment plant for treatment. Water from this plant will be recycled and utilised as service and process make up water.

A first aid station will be available at the mine site for first response to any medical emergency on the mine. This facility will be equipped for the treatment of minor to medium severity medical emergency and will serve as a first response / stabilisation facility from major medical emergencies. Patients will be transported from here to the nearest hospital for further treatment should it be required.

A firefighting truck will form part of the project services vehicles and will be utilised to respond to fires on the Project Area. A waste handling and dispatch facility will also from part of the mine site and will allow for the collection of all types of waste generated by the operation and transported to suitable disposal facilities in the area.

Lastly, Information Technology (IT) and communication infrastructure will be installed at the mine site to allow for the effective capture and management of relevant information and ensure clear and effective communication across the Project site and externally off-site.

3.3.11 Rehabilitation, decommissioning and Mine Closure

The final Rehabilitation, Decommissioning and Closure Plan to be developed in the EIA Phase, will address the following measures:

- Removal of all structures and infrastructure not to be retained by the landowner in terms of section 44 of the MPRDA.
- All fixed assets that can be profitably removed will be removed for salvage or resale.
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold and the remaining treated as waste and removed from site.
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level.
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
- A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility.
- All services related to the mining operation, water supply lines and storage on site will be demolished.
- Existing tracks will be used and no new roads will be developed.
- The MRDF and development areas will not exceed the planned footprint. Recommendations for the decommissioning, closure and rehabilitation of the residue stockpile are to be provided in the Specialist Report to be prepared in accordance with the “Regulations regarding the planning and management of

residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation" in GNR 632 of 24 July 2015 (in GG No. 39020)

- It is assumed that the post-mining pit stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
- Diversion of drainage channels due to historic waste dumps or agricultural practices will not be reinstated but mitigation to prevent damming of water will be implemented as part of annual rehabilitation.

Diagram 5: Mine Layout showing development areas and services

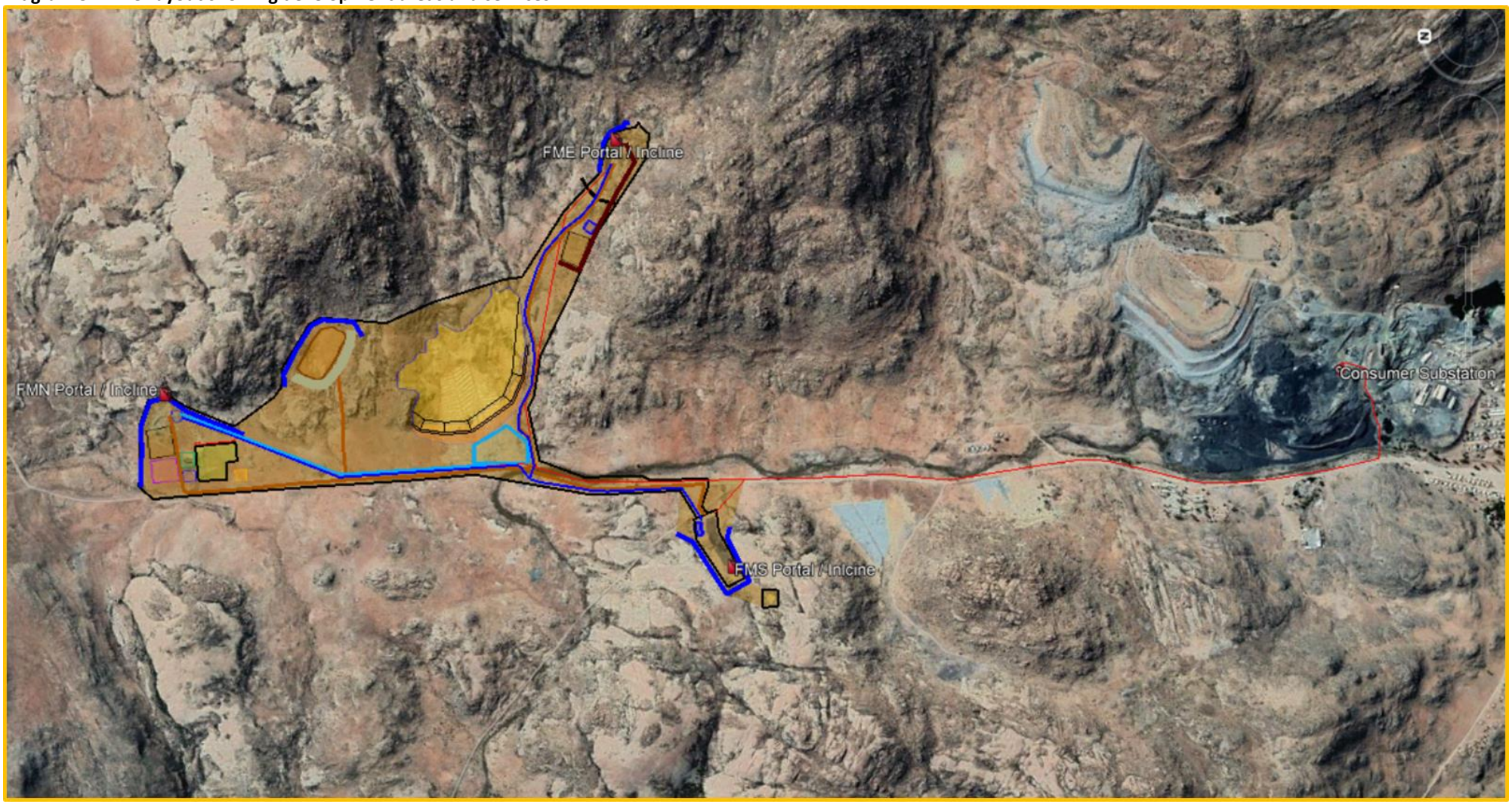


Diagram 5a: Site Plan Flat Mine North (FMN)

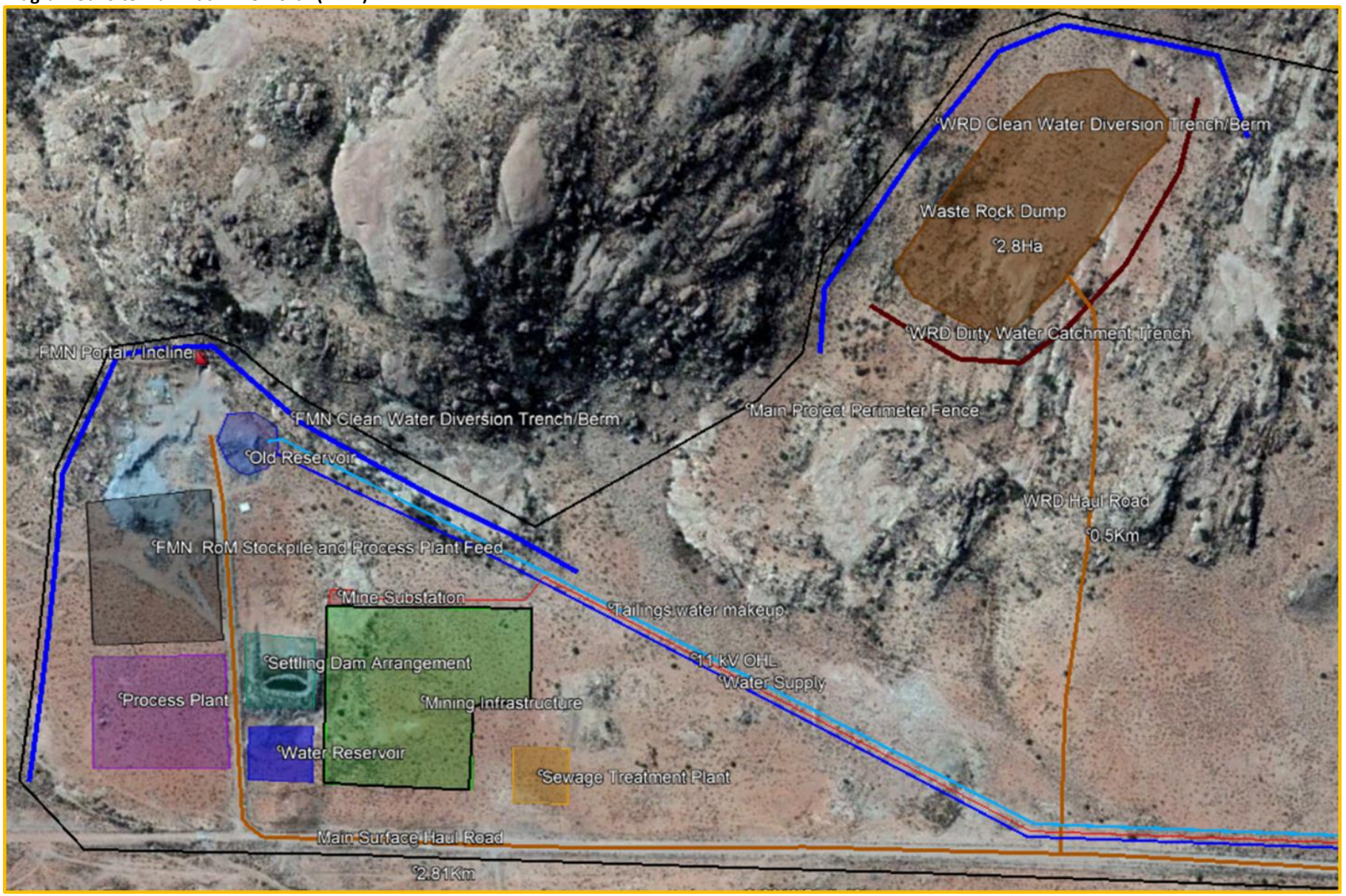


Diagram 5b: Site Plan Flat Mine South (FMS)

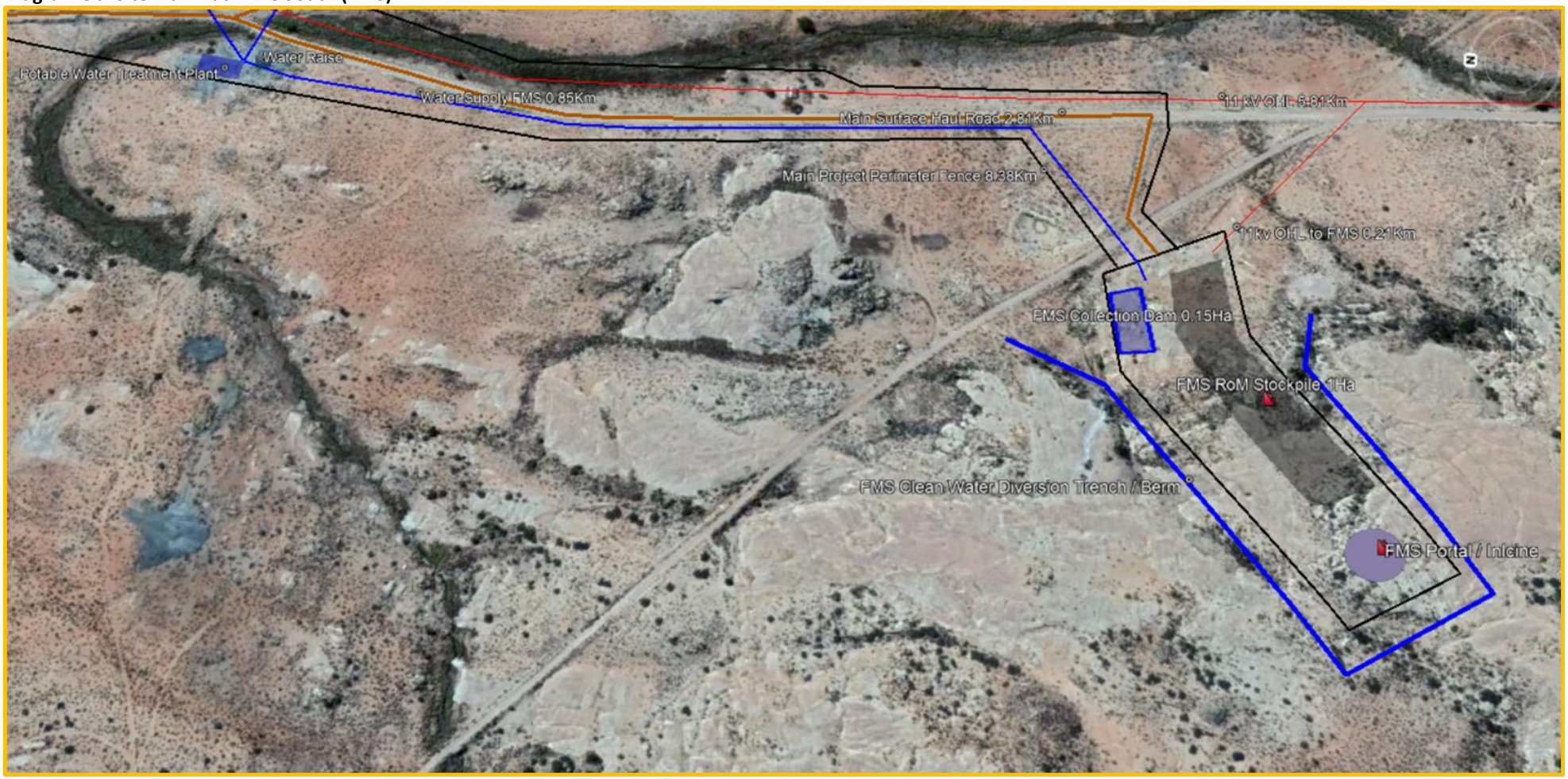


Diagram 5c: Site Plan Flat Mine East (FME)

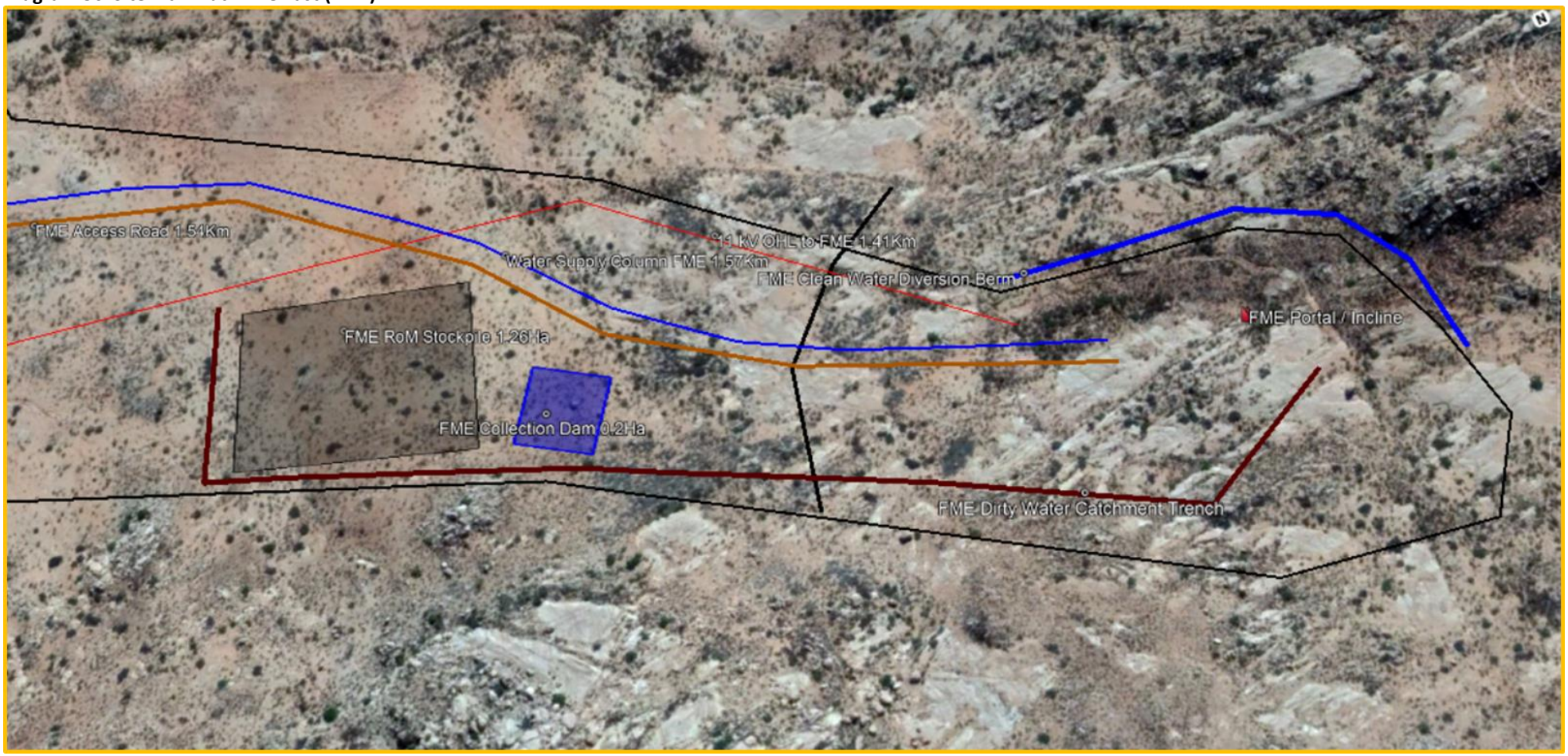


Diagram 5d: Site Plan Centralised Fine Residue Dam

Diagram 6: Electricity Supply

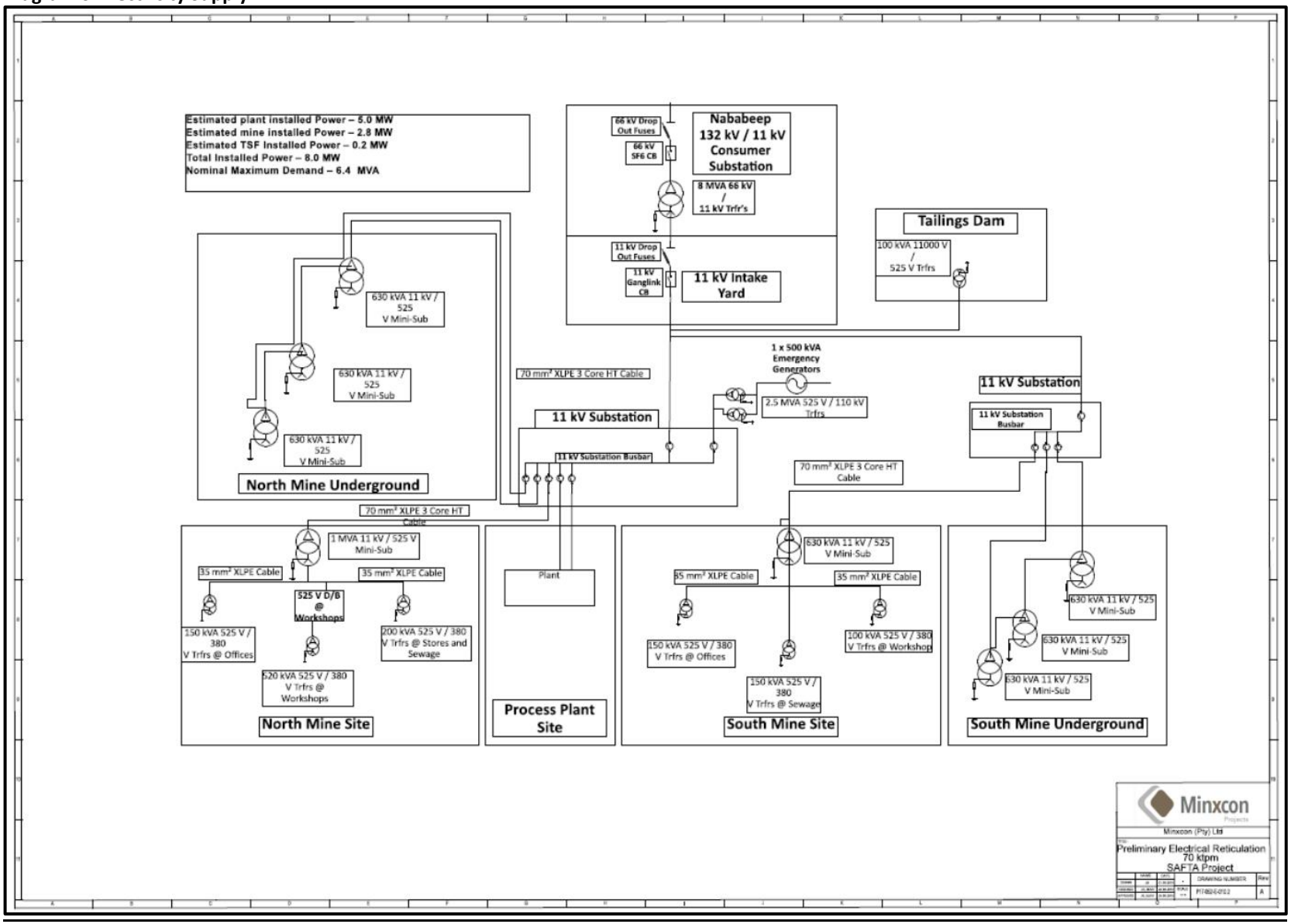


Diagram 7: Mining Infrastructure located at FMN

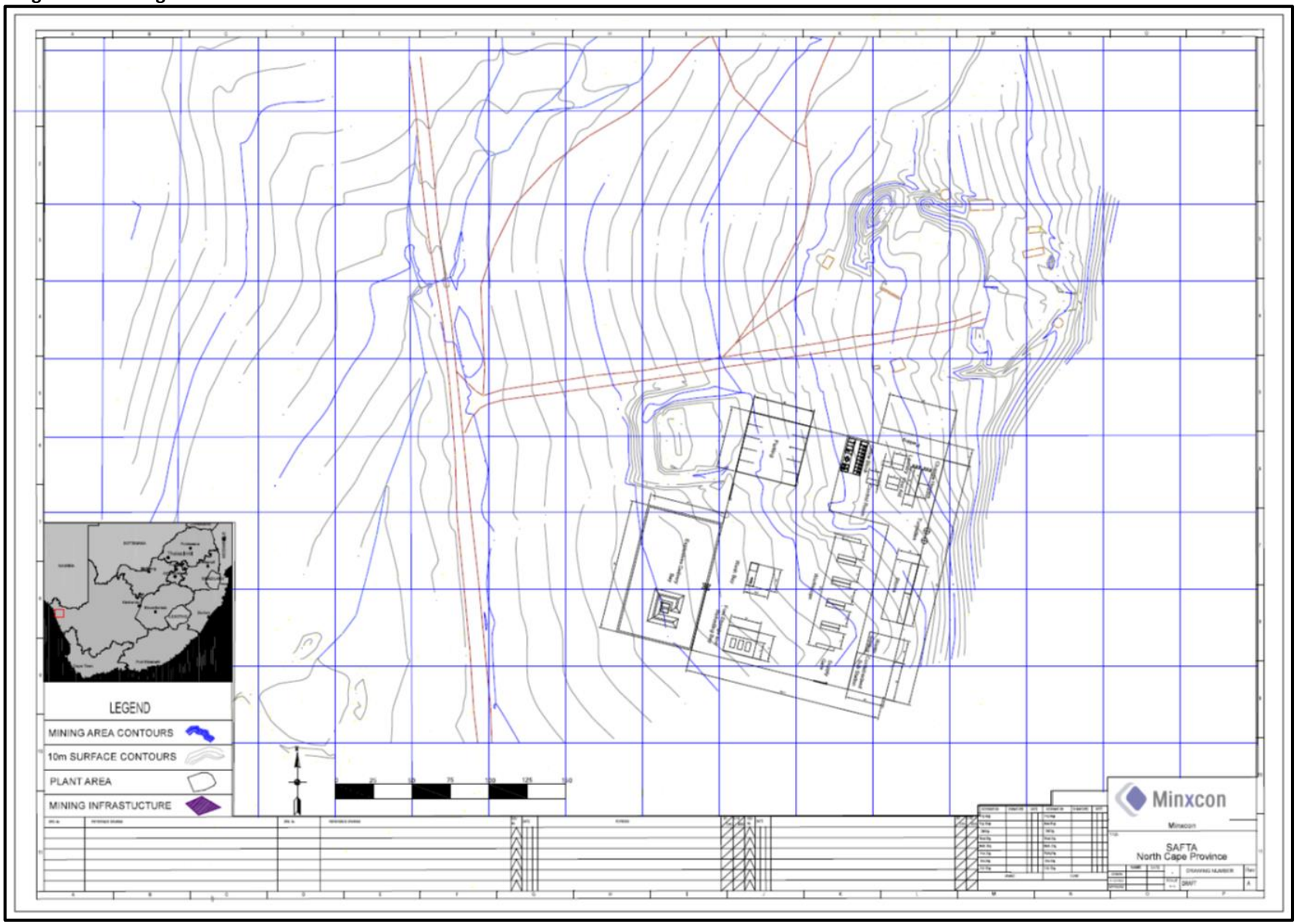


Diagram 8: Sewage Treatment Plant

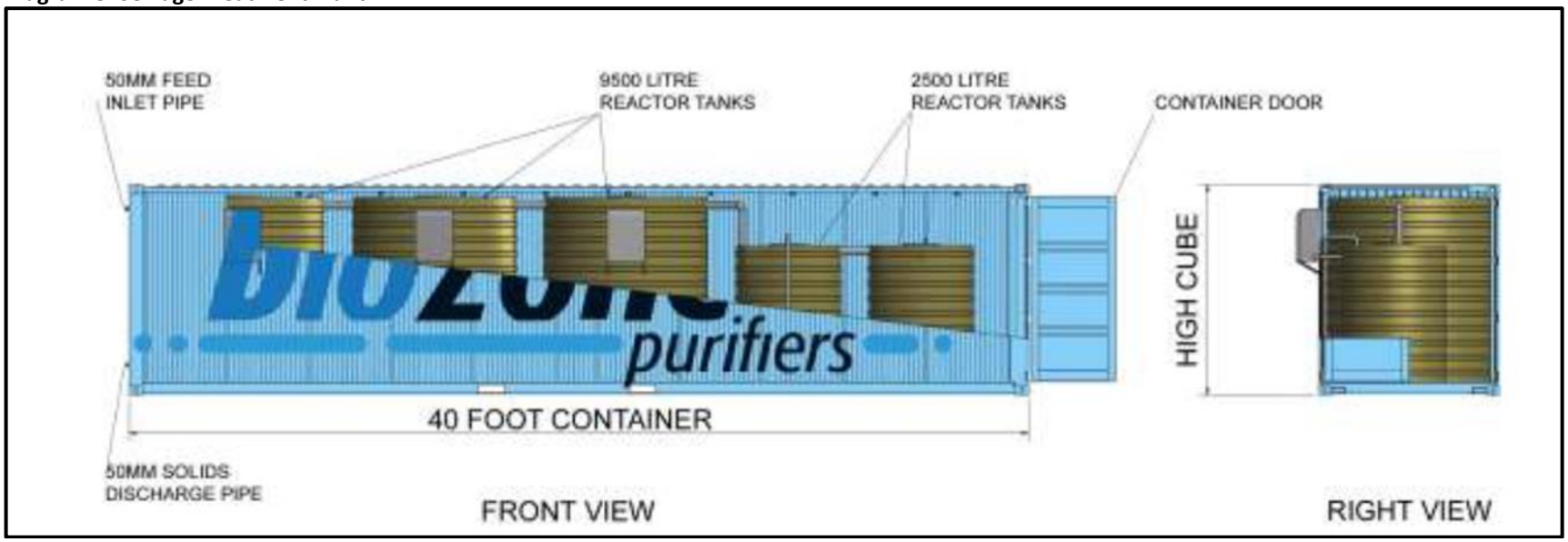


Diagram 9: Perimeter Fencing

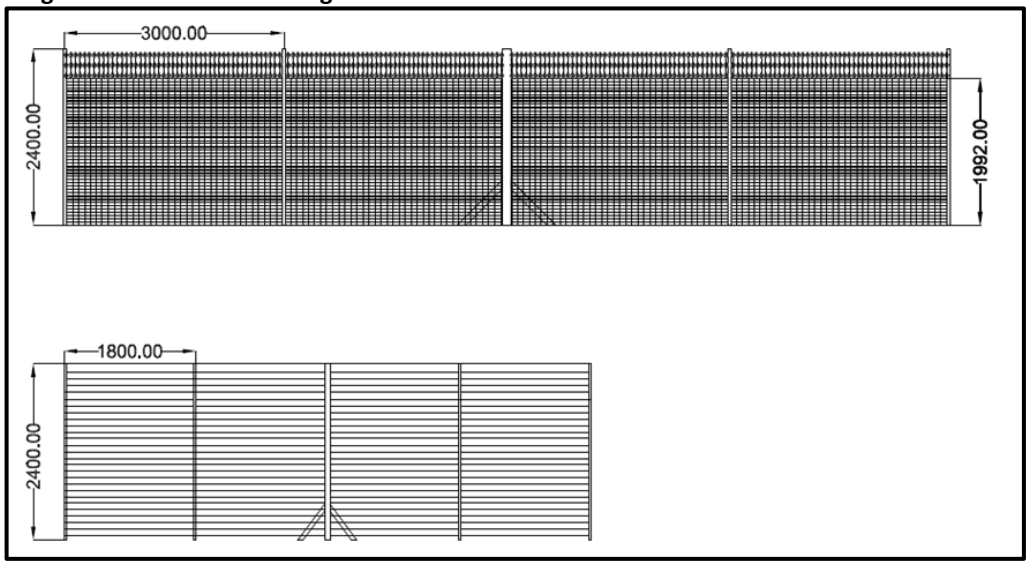


Diagram 10: Access Control

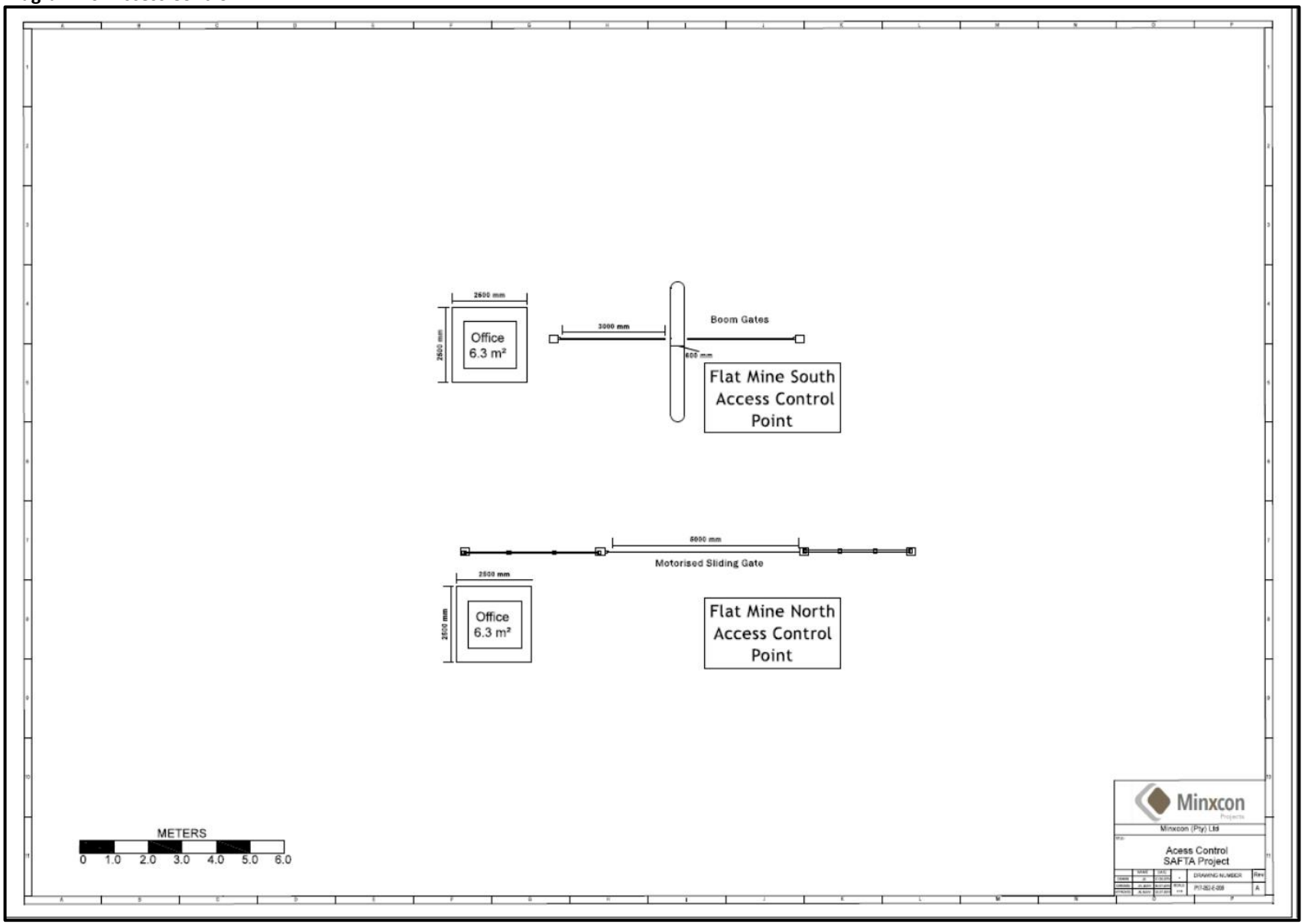


Diagram 11: Explosives Delivery Bay

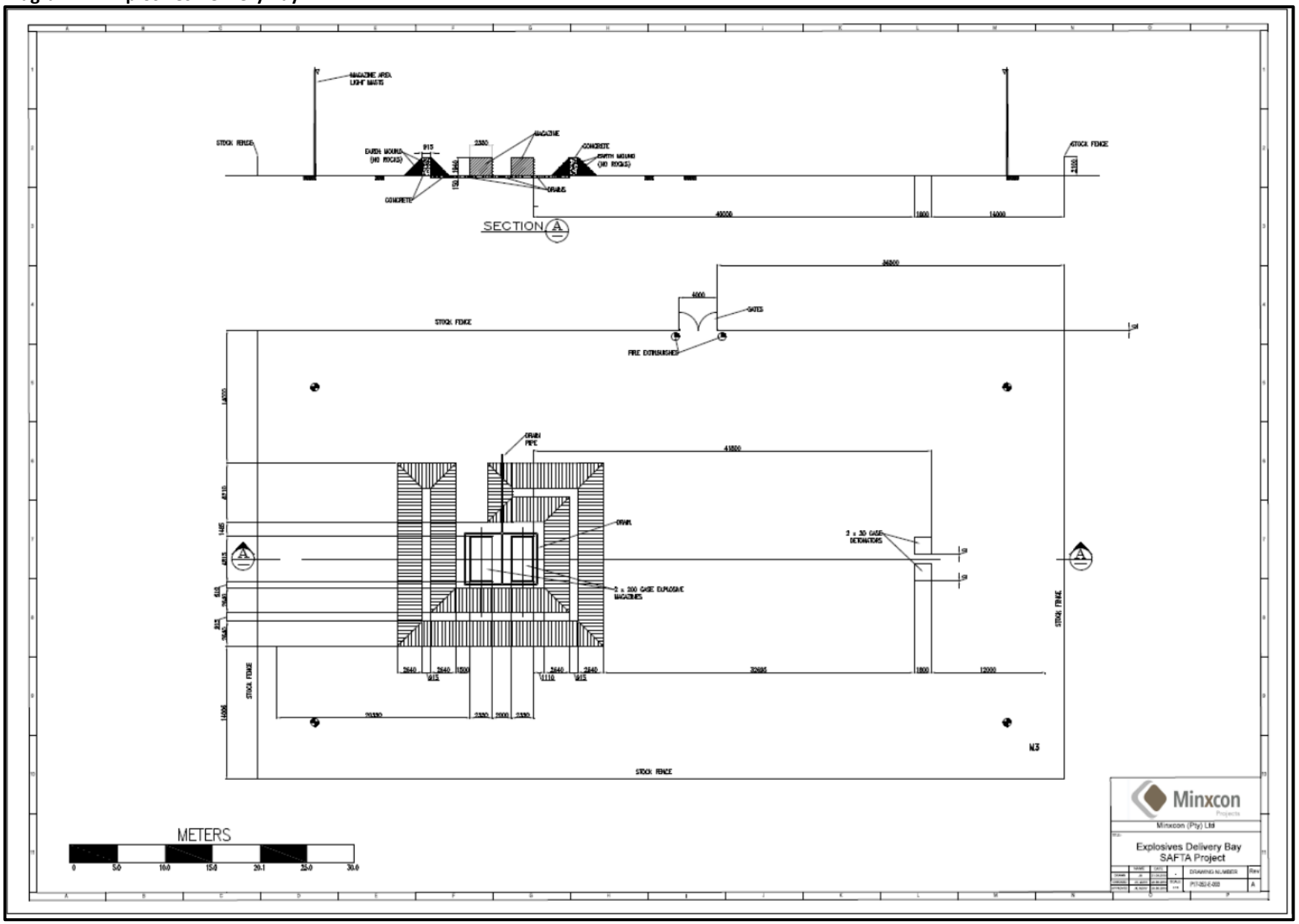


Diagram 12: Mine Logistics

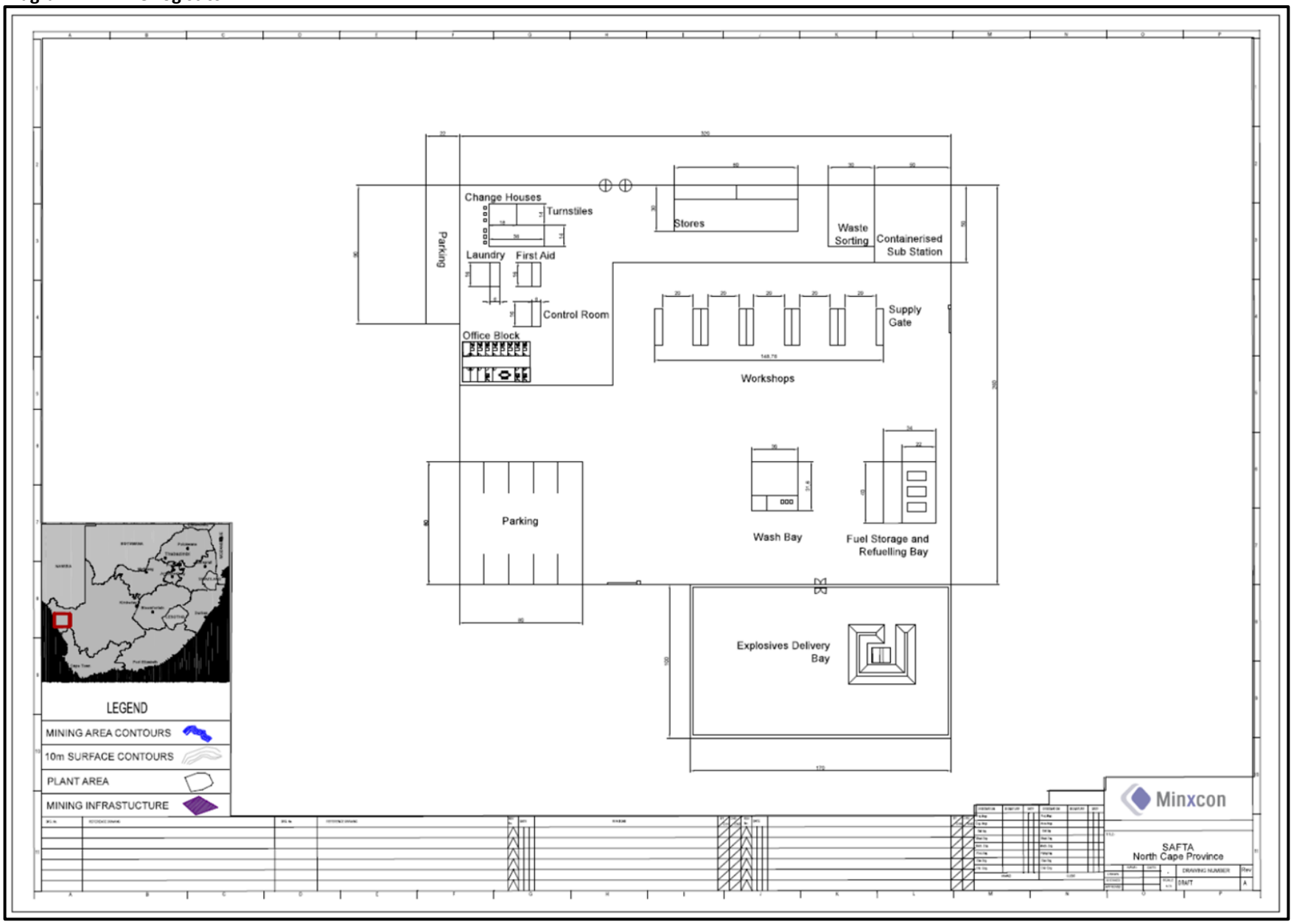


Diagram 13: Crushing and Screening

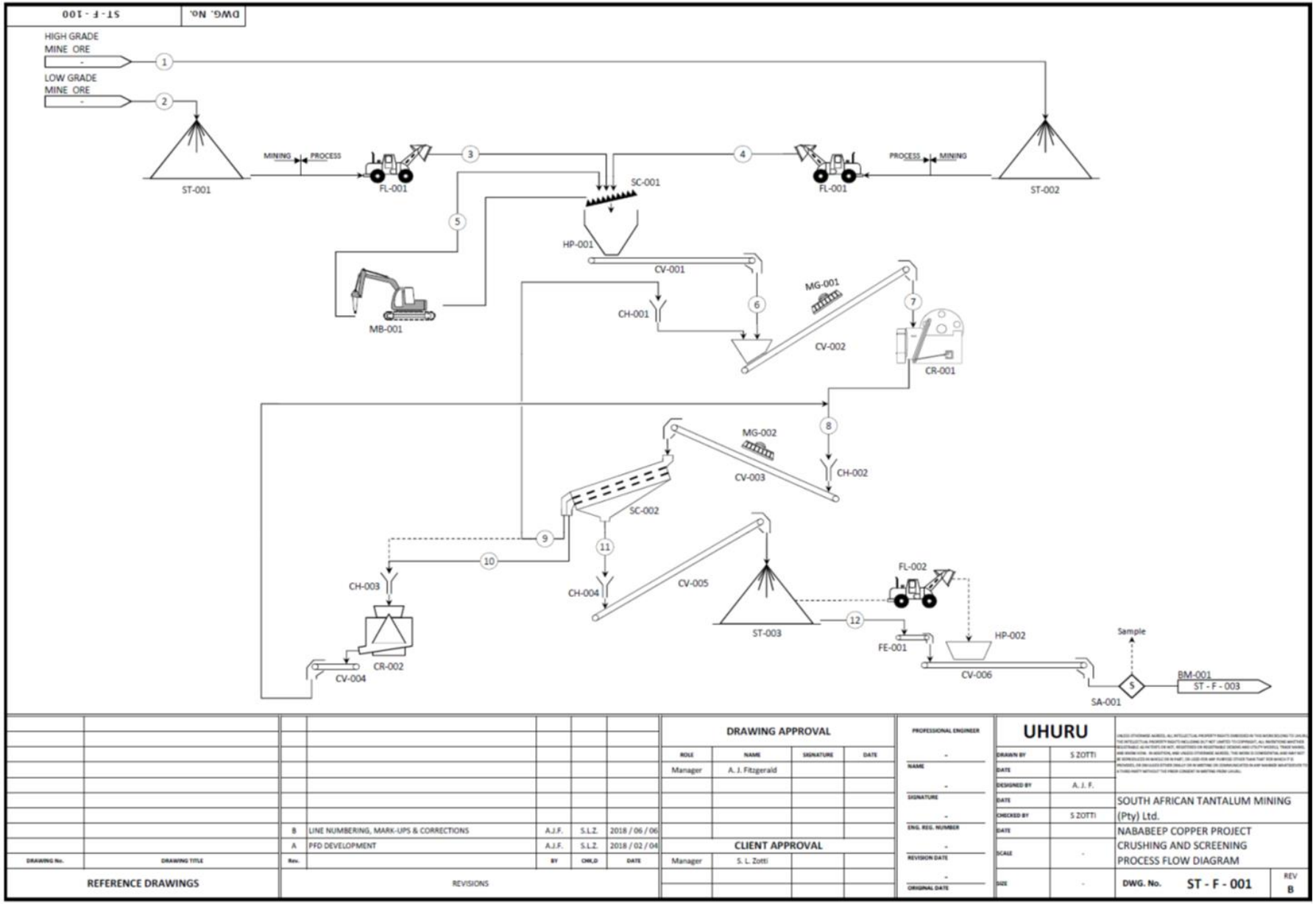


Diagram 14: Milling Circuit

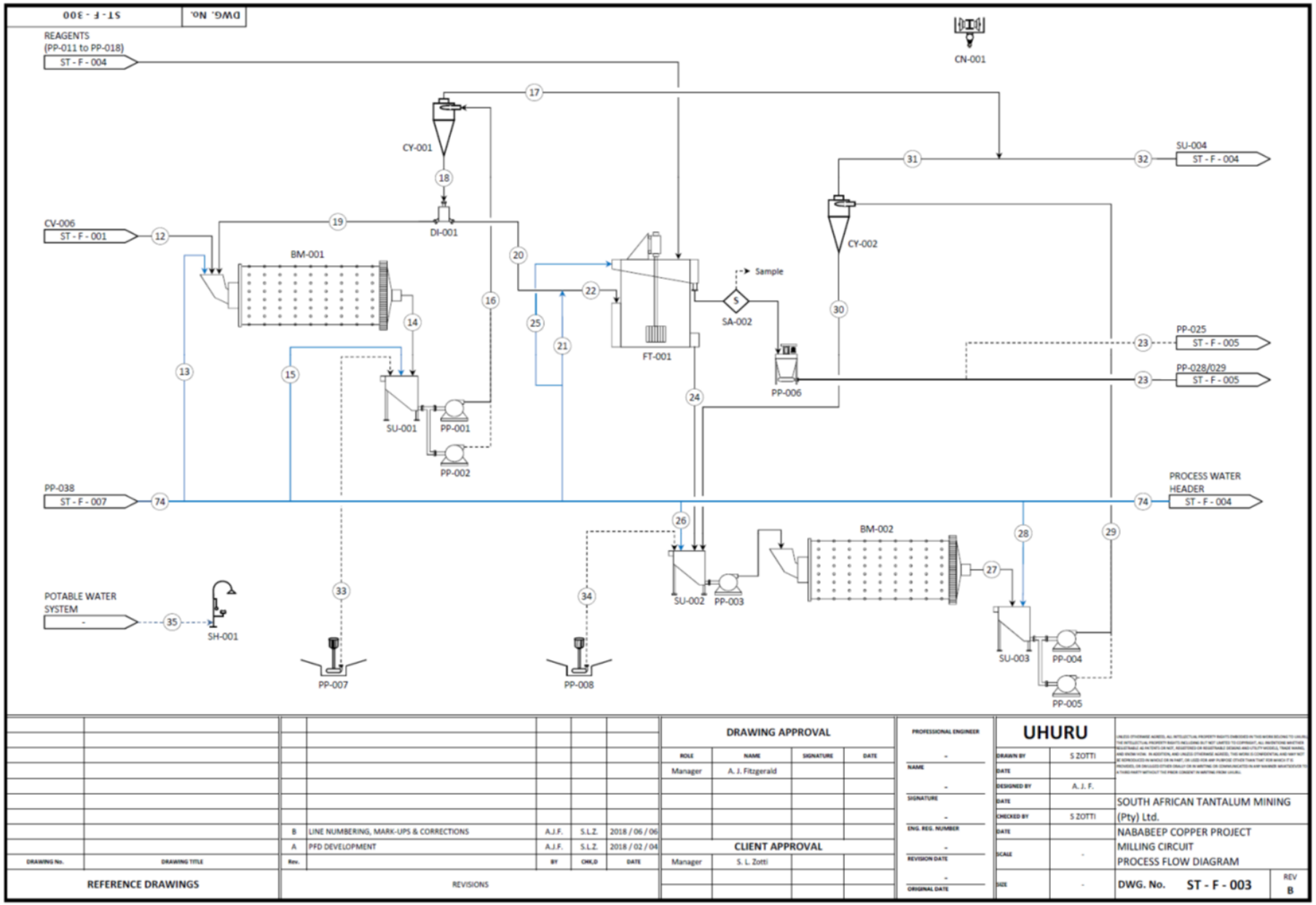


Diagram 15: Reagent Make-Up and Conditioning

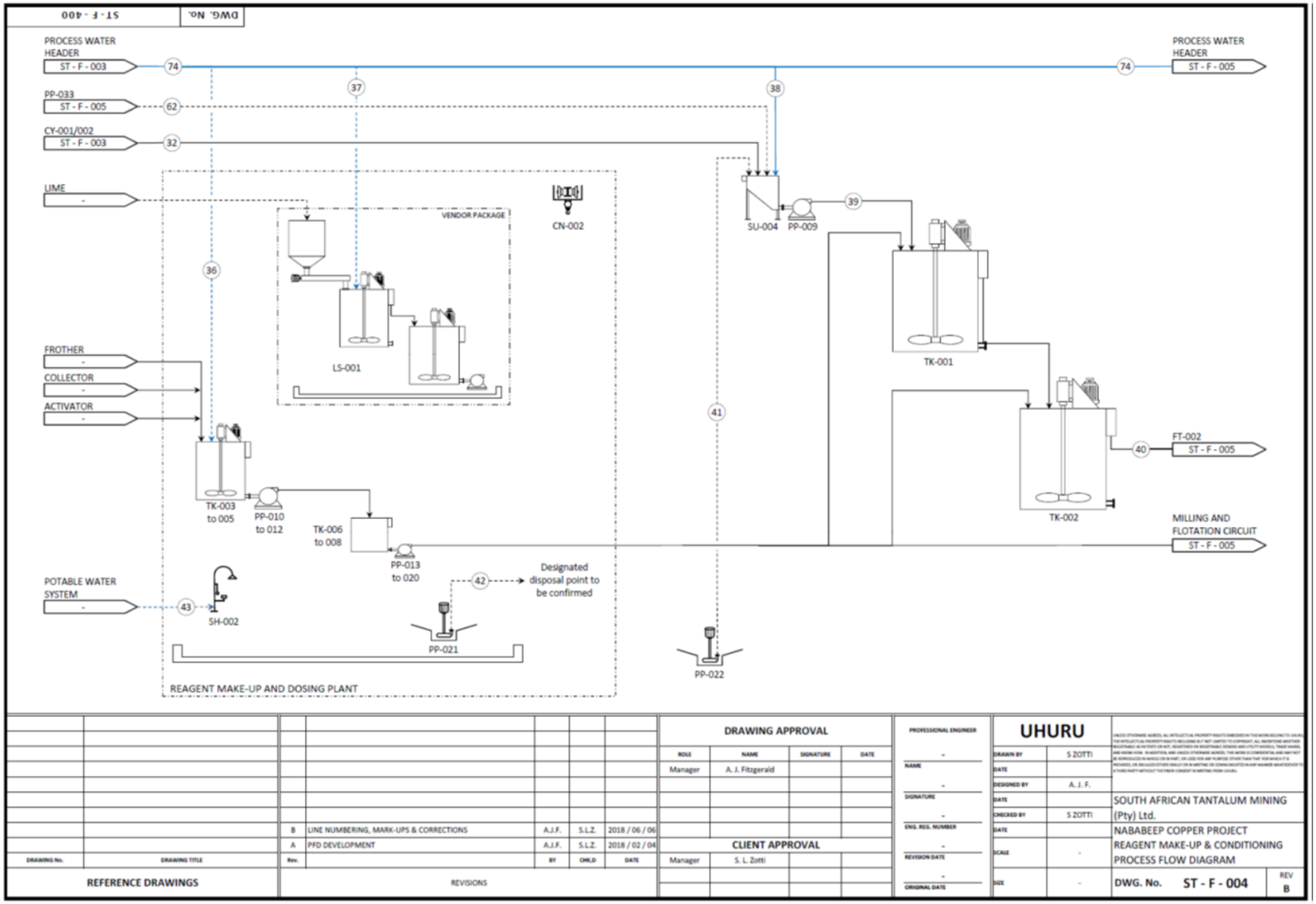


Diagram 16: Flotation Circuit

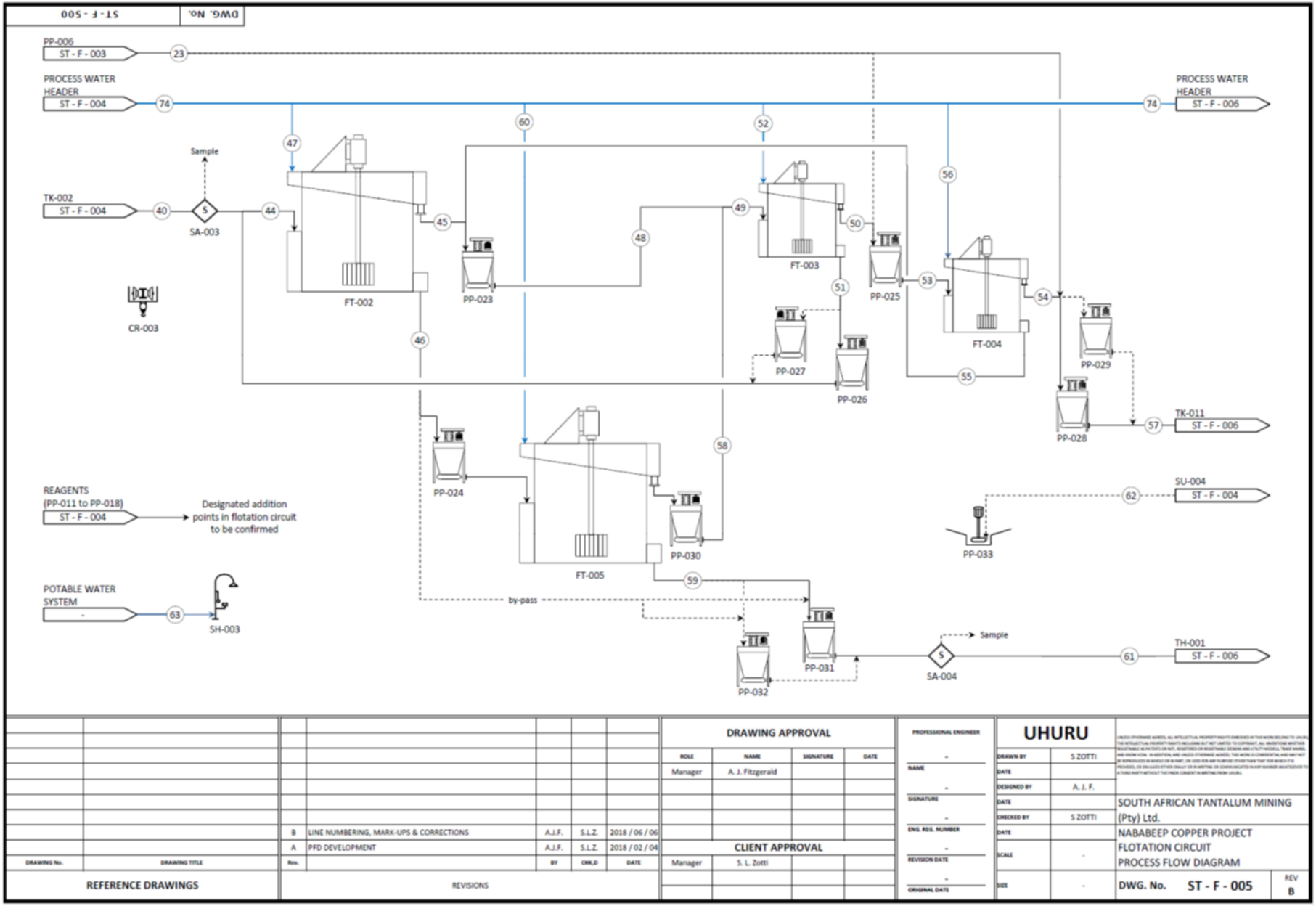


Diagram 17: Product Handling

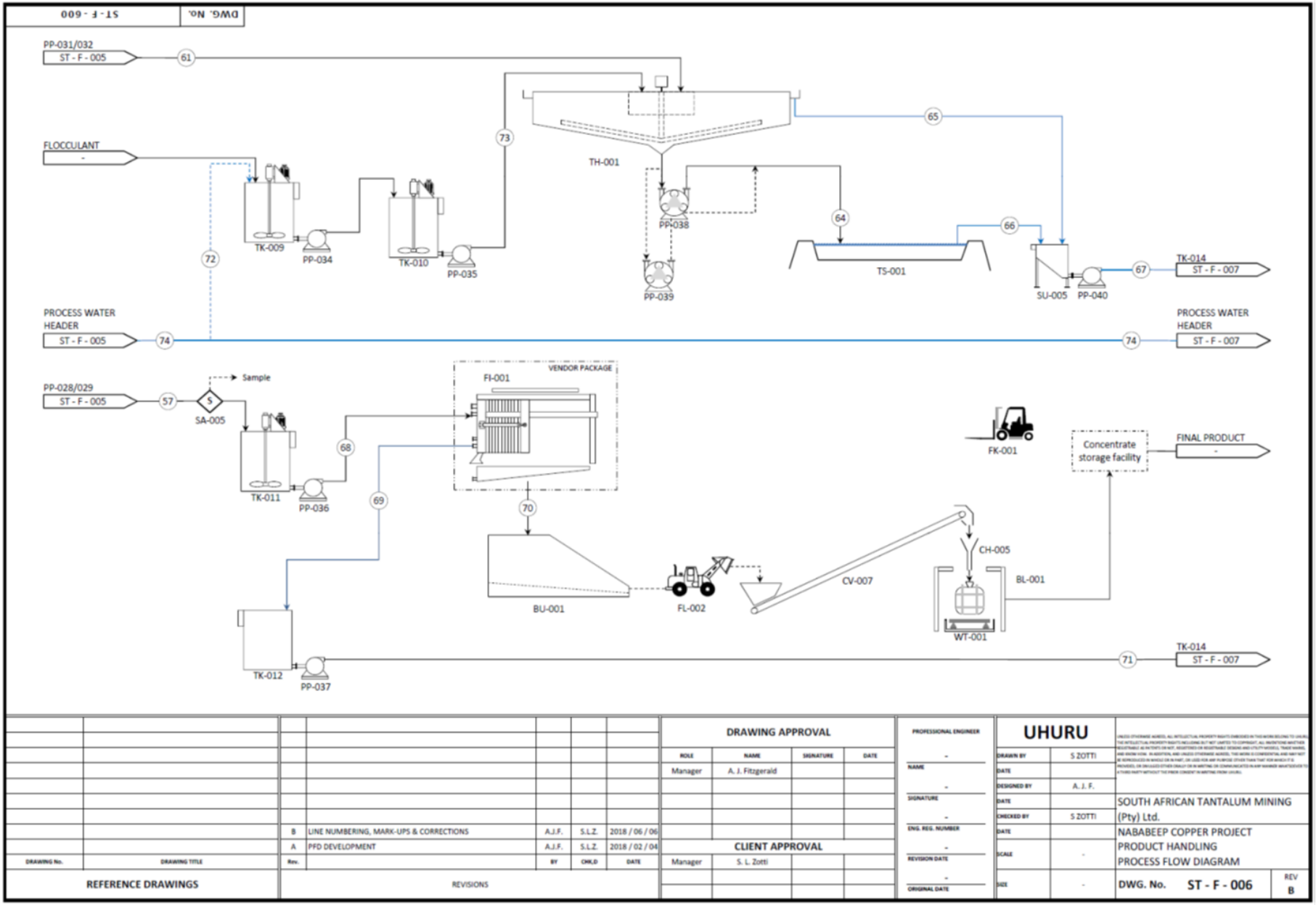


Diagram 18: Water Supply

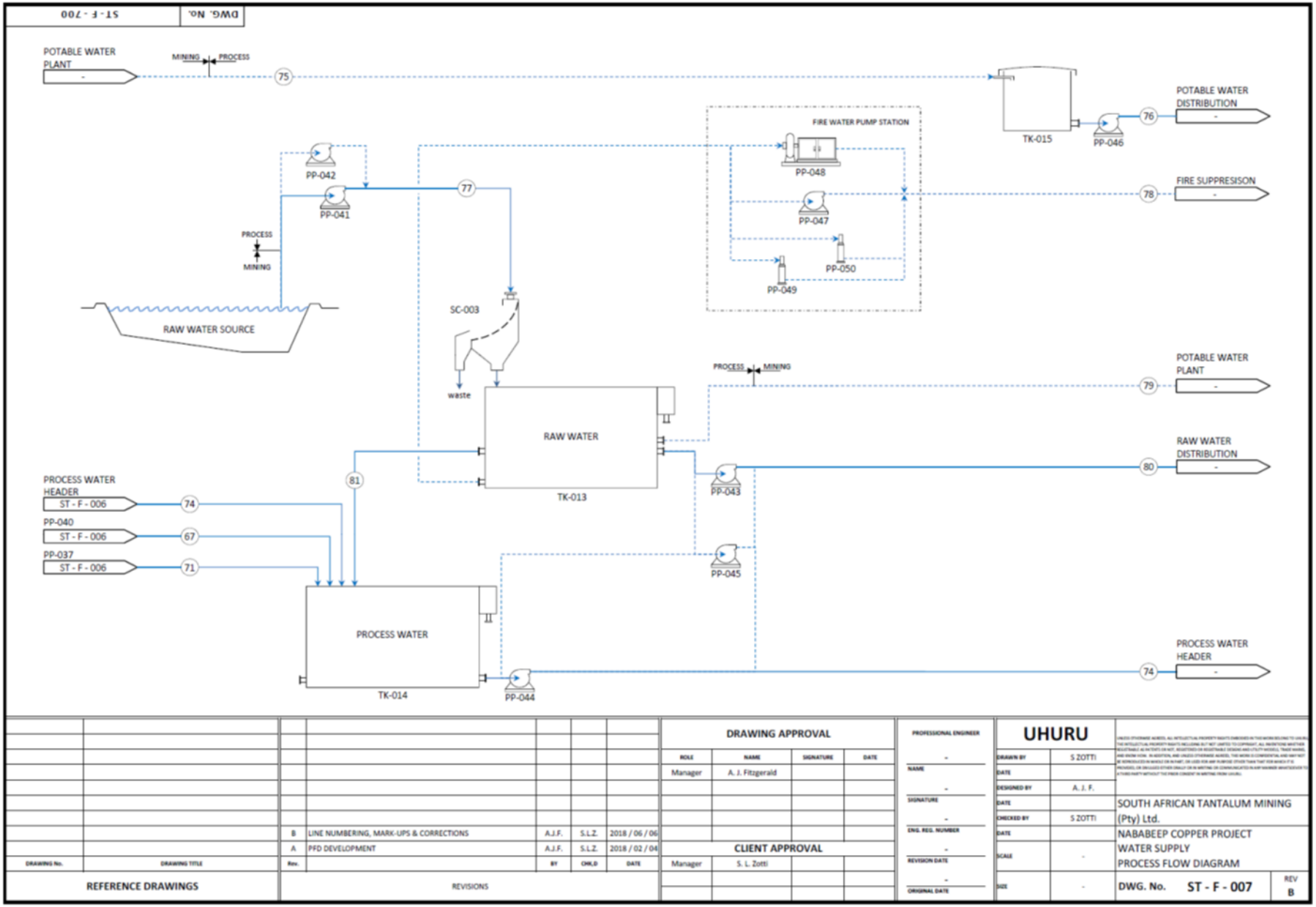


Diagram 19: Services

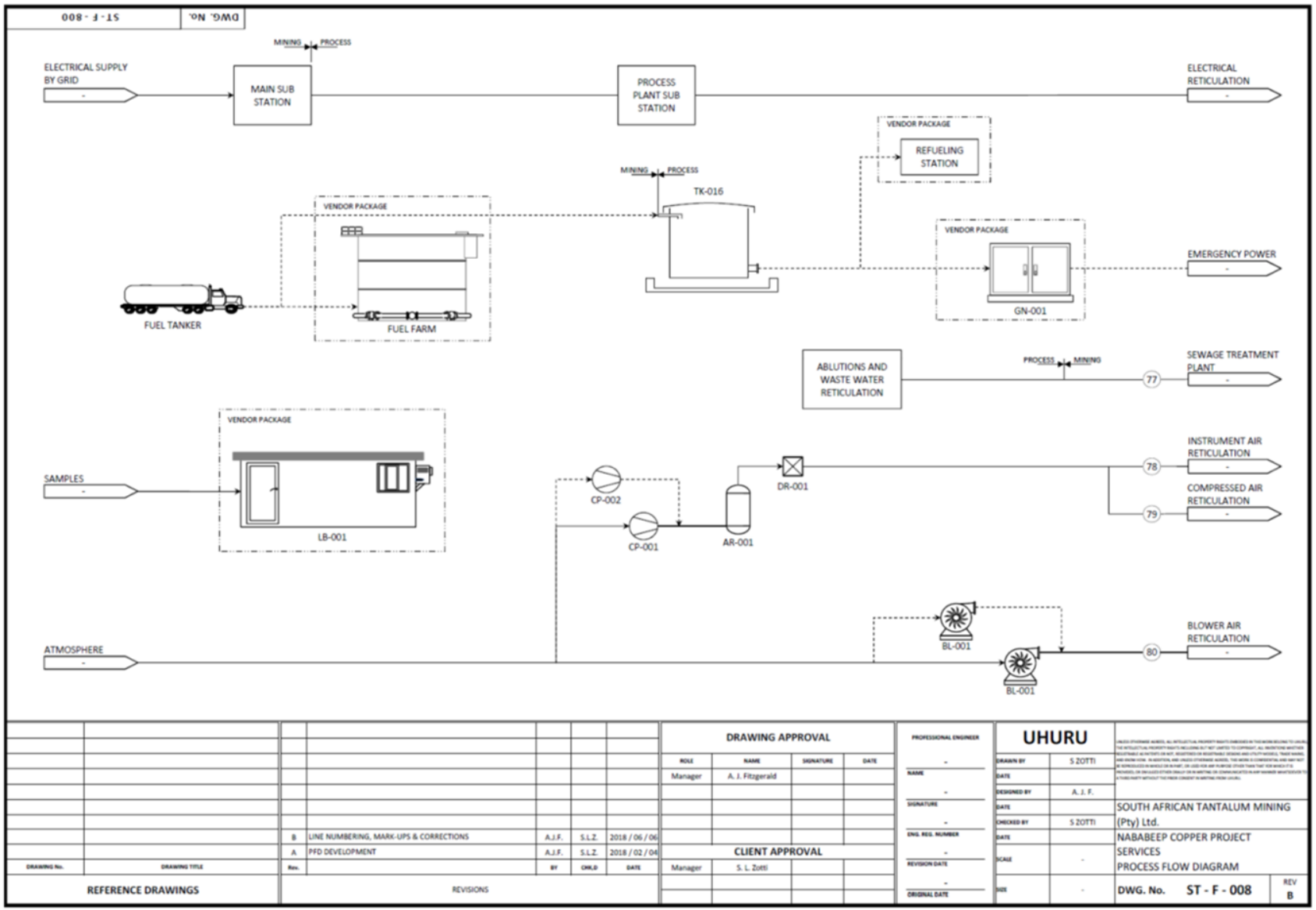
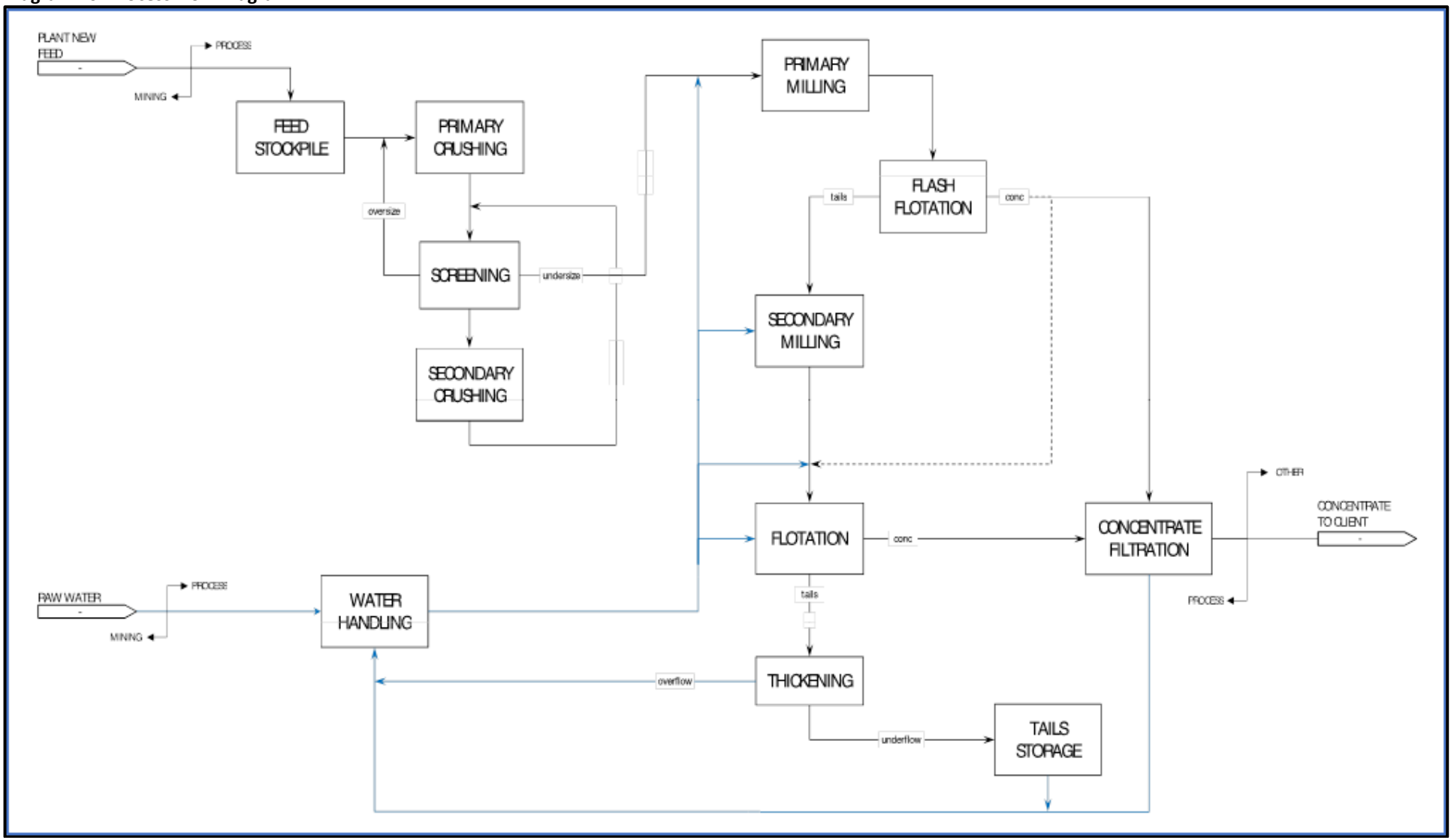


Diagram 20: Process Flow Diagram

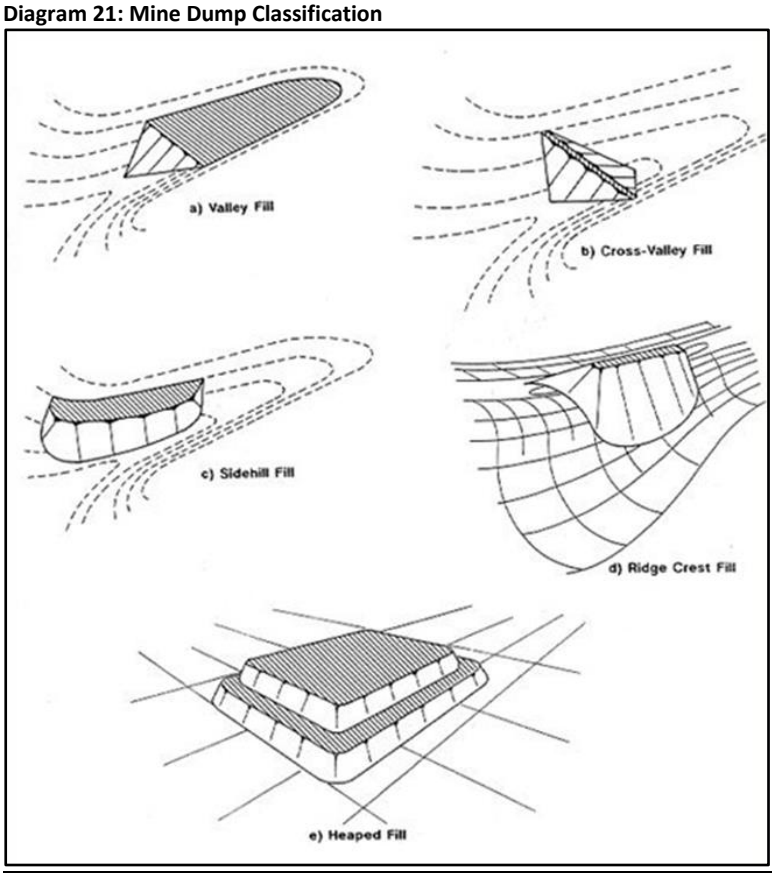


3.3.12 Waste Rock Dumps

Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff. Examples of waste dump classifications are provided in Diagram 21 below.
In mountainous terrain consisting of natural depressions along the slope and with the limited topsoil available, the best option for waste dumps is filling and levelling the top of these natural depressions "valley fill".
Waste dumps on the sides of kopjes "sidehill fill", which have large slopes will be terraced once the dump has reached its final profile at the top level, by dumping additional material along the sides at progressively lower levels, and developing these terraces at differing angles.
In the case of waste dumps in valleys "heaped fill" excavations are used with the final designed perimeter of the dump created to obtain cover material for the top of the dumps and profiling the slope of dumps. Dumping will proceed above surface on the top of this buried dump at successive tiers with an appropriate height of around 6 to 10m, leaving terraces of 6m wide and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump.

A waste rock dump is incuded in the project design as shown on Diagram 5a above, and will be designed and managed as "valley fill" in the natural valley depression near Flat Mine North.

Diagram 21: Mine Dump Classification



3.4 Description of the activities to be undertaken

The project is divided into three phases as listed below:

- Construction: including the construction of infrastructure, mine or pit footprint, access ramps and haul roads, waste rock dump, residue and product stockpiles, handling areas, water storage and reticulation, stormwater management structures, and electrical connections to the existing substation in Nababeep with an 11kV line to the project site, detailed further in Section 3.4.1 below
- Operation: Mining below ground, processing activities, operation of the logistics, and all mining infrastructure detailed further in Section 3.4.2 below.

- Decommissioning and Closure: As detailed further in Section 3.4.3 below. This phase addresses the scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of the rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance.

The methodology and technology to be employed in each phase is described in detail in Section 3.3 above and summarised below:

3.4.1 Construction Phase: Development of infrastructure and logistics

The construction phase entails the development of the infrastructure and logistics, including the removal of vegetation and topsoil in preparation of development footprints:

- Erect **perimeter fences** for safety and security purposes, and to demarcate the project site. The total perimeter fence length has been measured at 5.21 km. The fence should have a total height of 2.4 m. The fully galvanised wire mesh fence should be 2.1m high with a razor mesh topping of 0.3m and spacing between stay and intermediate posts of 3m.

- Upgrade existing **access roads and develop new access roads**, with removal of vegetation and topsoil prior to construction. This will include upgrading of the existing gravel road for length 3.4km leading from the town of Nababeep in a northern direction to accommodate heavy equipment and two-way traffic. The portion of the access road from Flat Mine South will be upgraded to serve as main surface haul road (2.81km). The access/haul road length will be 6.23km long with an 8.9 m width to accommodate two-way traffic should allow for a trench and berm on each side of the road. A new haul road will be constructed between the waste rock dump and the main surface haul road (0.5Km) and another from between FME and the main surface haul road (1.54km). The widening of the road could impact on the adjacent watercourse which flows parallel to the road before crossing below the road and flowing in a westerly direction.

- Provide **electrical supply** to Project Area as there is currently no power supply to the Project Area. In order to establish power to the project site a number of off-site installations will be required.
  This will include: -
  - Construction of 1 x 66 (132) kV line bay at Nababeep Town (132KV) Substation (Refer to Diagram 5);
  - Construction of a 1 x 5.6 km 11kV squirrel line from Nababeep Town Substation (110/66KV) to SAFTA Project Intake Yard; and,
  - Substation ancillary services, control room building, protection equipment, metering equipment, and power network control and communication systems for the substations.

- Development of **water supply and water management infrastructure** to Project Area for all activities requiring water for processing and consumption; diverting stormwater and recycling. Water supply is an essential service as various steps in the mining and particularly the processing processes are heavily reliant on the usage of water. Refer to Diagrams 5, 5a. 5b, 5c and 5d.
  - Apart from the mining and process requirements, water will also be required for use as potable water.
  - The water sources on the Project Area will be supplied by a vent raise 1.6 km from the decline near Flat Mine South.
  - Water will be pumped from the vent to a reservoir using a total of 8.9 km of piping.
  - Major infrastructure will include all pipes and pumps to transport water from the raise to the reservoir.
  - Water columns, with a total length of 10.1km as well as 8 Lorentz ps4000 pumps, will be required in FMN and FMS for dewatering and fire suppression purposes.
  - The storage of water in the project area will be less than 50 000m³.
  - All dirty rainfall run-off, process plant discharge, treated sewage and grey water will be collected, stored, treated and recycled as far as possible.
  - Should an excess of water exist on the operation, all effluent from the site will be suitably treated. All clean rainfall run-off should be diverted from dirty and contaminated areas.
  - Trenches will be constructed to divert clean run-off, collect dirty run-off and route dirty water to suitable storage dams.
  - A surface collection dam will be constructed to store all dirty water from the mining area and a series of dams will also be constructed within the plant to store run-off and discharged process water.

- FMS Collection dam is 0.15Ha.
- FME Collection Dam is 0.2Ha.
- Process water reservoir is 5600m²
- Potable water reservoir is 5250m².
- Settling dam at FMN is 6000m².
- Temporary storage for stormwater control is 12500m²

- Development of **mine logistics**. The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. The site will cover an area of 20 800 m². The mine site will be enclosed by a security fence. Access to the site will be controlled by security personnel posted at the access gates to the site. The mine site will include offices, change houses, control room, first aid station, stores, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. This area will be mainly constructed and established by the appointed mining contractor but services like water supply, power supply, water management and other services will be constructed by contractors appointed for the construction of the balance of infrastructure areas. The construction of the hydrocarbon storage area, explosives bay and storage room for hazardous chemicals will take place within the logistics footprint, comprising of:
  - Fuel storage area comprised of 2 tanks x 45m³ is 90m³.
  - Volume of hazardous chemicals with 3-month stock stored on site will not exceed 80m³:
    - Xanthate storage of 24.072m³;
    - Dow Frother is storage of 27.582m³.
  - Explosives capacity not provided but a 7-day supply is the normal volume for storage.

- Establishment of **Processing Plant Site** that will include the processing plant, a metallurgical and assay laboratory, offices, reagent storage facility and a workshop, located adjacent to the mine site with a development footprint of 26ha or 26000m² as shown on Diagram 5a.

- Establishment of areas for **RoM stockpiles** (FMN; FME & FMS) and process plant feed at FMN, and mining portals as shown on Diagrams 5a, 5b and 5c.

- Establishment of area for **Waste Rock Dump**, near FMN with a footprint of approximately 2.8ha as shown on Diagram 5a.

- Construction of Tailings Storage Facility (TSF) or Fine Residue Dam (FRD) as shown in Diagram 5d and detailed further in **Appendix E**. The Fine Residue Dam is approximately 25.5ha and the FRD Collection Pond is approximately 2.97ha.

3.4.2 Operational Phase

As detailed in Section 3.2.3 above, the **underground mining method** will be the "long-hole stoping method" which is a bulk mining method that provides good ore recovery and minimal dilution. It is an overhand, vertical stoping, utilising long-hole drilling and blasting carried out from sublevels to break the ore. Although the stopes are supported by long anchors, pillars are usually left between stopes and occasionally within stopes. The ore flows through the stope by gravity. Ore will then be extracted from the stope via the lower extraction drift using LHDs. The LHDs will then move the rock to either an orepass tipping point or into a re-muck bay and re-handle the material into a truck when one is available. The trucks will transport the ore to surface via the decline.

Long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Typically, production drilling is carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs.

These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations.

In the long-hole open stoping method access onto a level, from the decline, will be via an access cross cut. From the access cross cut ore access drives will be developed into the orebody from the footwall to the hangingwall. The mining block will be split into stopes with a horizontal span of 20 m and a vertical span of 30 m. The strike will be the length of the orebody width from the hangingwall to the footwall. Only one level will be in production at a time.

The **primary processing activities** include:

- Crushing and screening;
- Milling Circuit
- Reagent Make-up and conditioning
- Flotation circuit; and,
- Product Handling

As detailed in Section 3.3.7 above the Processing Plant is illustrated in the Plant Flowsheet (Diagram 20) and incorporates a conventional two stage crushing circuit with a primary jaw crusher followed by a secondary cone crusher in closed circuit with a vibrating screen. The primary mill discharge is pumped through a cyclone with the underflow passing through a flash flotation cell before gravitating to the secondary milling circuit. The cyclone overflow streams from the primary and secondary milling circuits form the feed to the flotation circuit. The flotation circuit comprises rougher, cleaner and re-cleaner tank flotation cells. The rougher concentrate is pumped to the cleaner cells with that concentrate progressing to the re-cleaner stage. The tailings from each stage are returned to the previous stage with the rougher tailings passing through a scavenger stage. The re-cleaner concentrate is the final concentrate which is filtered to and stored prior to export. The scavenger tailings will be thickened to 60% solids before being pumped to the tailings dam. The concentrate, equating to 10% of the original plant feed mass, will be sold at the mine gate.

For the 35,000 t/m operation the feed to the plant will be a nominal 54t/h with a 1:1 water requirement, i.e. 1m³ of water required per tonne of ore treated. Roughly 50% of the water requirement will be provided by reticulated water within the plant.

The design philosophy is that the processing plant would initially be designed to treat 35,000 t/m. This will be known as Phase 1. At the beginning of Year 4, a parallel stream (Phase 2), treating a further 35kt/m will be commissioned bringing the total design throughput to 70kt/m. The life of the project, based on the current resource, would be 14 years. The plant should have a 90% availability and operate on a 24 hour/day basis with 3 operational shifts and a relief shift. The plant will not be fully automated but there will be sufficient instrumentation to ensure a stable operation and allow for reliable metallurgical accounting.

Other operational activities include:

- Transporting waste rock to the waste rock dump site, and managing the profiling of the slope angle.
- Operating the RoM stockpiles, which will have an expected footprint of :
  - Phase 1 FMN RoM Stockpile is 4,250m².
  - Phase 2 FMN RoM Stockpile is 7,200m².
  - FMS RoM stockpile is 1Ha
  - FME RoM Stockpile is 1.26Ha
- Usage of all facilities and amenities associated with the mine logistics.

3.4.3 Decommissioning Phase

Planning for closure and restoration from the beginning of an operation makes the process easier; waste can be removed as it is created, excavation can be planned so that topography restoration is less complicated, and topsoil soil can be re-used at shorter intervals. Site rehabilitation can make the land more valuable and attractive for resale. Additionally, establishing a closure strategy (and communicating that activity to the public) can help enhance the company's reputation as a socially-responsible operation. The decommissioning and closure phase at the end of the life of the mine will consist of implementing the final rehabilitation, decommissioning and closure plan, which will be included in the EIA Phase of the project.

As included in Section 3.3.11 above, activities undertaken during this final project phase include:

- Removal of all structures and infrastructure not to be retained by the landowner in terms of section 44 of the MPRDA.
- All fixed assets that can be profitably removed will be removed for salvage or resale.
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold and the remaining treated as waste and removed from site.
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level.
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place

- A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility.
- All services related to the mining operation, water supply lines and storage on site will be demolished.
- Existing tracks will be used and no new roads will be developed.
- The FRD and development areas will not exceed the planned footprint. Recommendations for the decommissioning, closure and rehabilitation of the residue stockpile are to be provided in the Specialist Report to be prepared in accordance with the "Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation" in GNR 632 of 24 July 2015 (in GG No. 39020)
- It is assumed that the post-mining pit stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
- Diversion of drainage channels due to historic waste dumps or agricultural practices will not be reinstated but mitigation to prevent damming of water will be implemented as part of annual rehabilitation.

4 POLICY AND LEGISLATIVE CONTEXT

4.1 Table of Applicable Legislation and Guidelines

Table 8: Applicable Legislation and Guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents 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.	Mining Right activities	The mining right activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Resources Development Act (No 28 of 2002) [MPRDA] Section 24 (as amended) **MPRDA Regulations as amended by GNR349 of 18 April 2011.**	Application to the DMR for a mining right in terms of Section 22.	The conditions and requirements attached to the granting of the Mining Right will apply to the mining activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2017 EIA Regulations. Refer to Table 1.	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The listed activities in Table 1 that are triggered determine the Environmental Authorisation (EA) application process to be followed. The appropriate EA will be obtained before proceeding with any mining activities in terms of the mining right application. The compilation of this Scoping Report and the Public Participation Process is required in terms of NEMA.

National Environmental Management: Waste Act, (Act 59 of 2008) [NEMWA] (as amended) **Waste listed activities in GNR 921 (dated 29/11/ 2013)** **Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.** **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits**	Refer to Table 9 for the listed waste activities. Refer to Appendix E for the Pre-Feasibility Report on the FRD.	The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The Application for Environmental Authorization has included these waste listed activities as shown in Table 9 below. Generic mitigation measures are included in Table 14, and will be included in the EMPr in the EIA Phase.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)	Section 8.1.8 & 8.1.9. Figures 2, 3 & 4.	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The site is located within in an Ecological Support Area (ESA) and not within a River FEPA sub-catchment.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)	Section 8.1.6	Alien invasive vegetation management will be included in the EMPr.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013	Section 8.1.10	Dust control measures are to be included in the EMPr
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 8.1.12	A Heritage Impact Assessment and a Palaeontological Report has been prepared and is attached at **Appendix C1** and **Appendix C2** respectively. These will be submitted to SAHRA for comment. Any additional mitigation measures will be included in the EMPr in the EIA.
National Water Act, 36 (Act 36 of 1998)	Section 8.1.8 for description of water resources in local area, and Figures 3.1 and 3.2. The Baseline Water Report prepared to inform the prospecting phase is attached at **Appendix D.**	A site visit with DWS will confirm the listed activities requiring a Water Use License. In terms of the National Water Act, the following water uses are likely to be identified: (a) Taking water from a water resource; (b) Storing water; (c) Impeding or diverting the flow of water in a watercourse; (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; (g) Disposing of waste in a manner which may detrimentally impact on a water resource; (h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process; (i) Altering the bed, banks, course or characteristics of a watercourse; (j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people. The proposed mining activities require a water use license for a number of listed water uses. An Integrated Water Use License Application (IWULA) will be applied for.

Hazardous Substances Act (Act No. 15 of 1973)	Storage and control of hazardous substances to be included in EMPr.	The objective of the Act is to provide for the control of substances which may cause injury or ill health to or death of human beings due to their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure. 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. The reagent chemicals to be used in the mineral processing plant, as well as chemicals typically found in petroleum products (for example) benzene, are regulated in terms of this Act. The processing plant, chemical storage area, proposed fuel storage facility and refueling bay, with all appropriate controls in place, will not conflict with the Act. The EMPr will provide details in this regard.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA)	Safety precautions to be taken into account by Project Team in design of Mine.	The objective of the Act is to cover all aspects relating to health and safety of employees and other persons on the mine property. The Act places the responsibility on the mine owner for ensuring that the mine is designed, constructed and equipped in a manner which allows for a safe and healthy working environment.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that "Everyone has the right to administrative action that is lawful, reasonable and procedurally fair". All administrative actions must be based on the relevant considerations
Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)	Comments required from the Nama Khoi Local Municipality.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Municipal Plans and Policies		
Nama Khoi Local Municipality Integrated Development Plan (Draft IDP 2018-2019)	Section 5.3	The Need & Desirability of the project is referenced in terms of the Nama Khoi Local Municipality IDP, specifically relating to enhancing the mining potential of the local municipality, employment creation, rehabilitation of mining areas, and adaption to climate change and sustainable resource utilisation. Relevant mitigation measures will be included in the EMPr.
Namakwa District Municipality (Draft IDP 2017 2018)	Section 5.4	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which will be included in the EMPr
Northern Cape Provincial Spatial Development Framework (NCPSDF)	Section 5.5	Sustainable development is a key consideration as addressed in this impact assessment report.

Northern Cape Provincial Growth and Development Strategy 2004-2014 (NCPGDS)	Section 5.6	Sustainable development is a key consideration as addressed in this impact assessment report.
Standards, Guidelines and Spatial Tools		
Mining and Biodiversity Guideline: 2013 Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5.1 & 8.1.9 & Figure 5	The mitigation measures to address and mitigate the potential impacts of the mining will be included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.9	Refer to Section 5.9
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7, Table 8 & **Appendix B**.	Refer to Section 7 & Table 13 and **Appendix B.**
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	To be included in the EIR phase.
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	To be included in the EIR phase.
SANBI BGIS databases (www.bgis.sanbi.org)	Baseline environmental description and Figures 1 to 5	Used during desktop research to identify sensitive environments within the mining permit area.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants	Management and monitoring measures	Standard for dust fallout. Dust mitigation measures are to be included in the EMPr.

4.2 Listed Activities

Table 9: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Application for Mining Right	1214 Ha	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 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.	**X** **See below for specific activities.**
1. POST-APPROVAL ACTIVITIES				
1.1. Demarcate mining areas as defined in Mine Plan and EMPr.	Refer to 2.2 below	**NA**	**NA**	**NA**
2. ESTABLISHMENT / CONSTRUCTION ACTIVITIES				
2.1. Conduct Environmental Induction training to staff	All staff members	**NA**	**NA**	**NA**
2.2 Safety & Security	Using fences as demarcation system. The total perimeter fence length has been measured at 5.21 km. The fence should have a total height of 2.4 m. The fully galvanised wire mesh fence should be 2.1 m high with a razor mesh topping of 0.3 m and spacing between stay and intermediate posts of 3m. • Footprint of fence posts included in calculation of total area of mine infrastructure (113Ha), including areas of vegetation to be cleared and topsoil to be stockpiled.	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[1]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	

[1] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.3 Upgrade existing access roads and develop new access roads, with removal of vegetation and topsoil prior to construction.	Upgrading of existing gravel road for length 3.4km leading from the town of Nababeep in a northern direction to accommodate heavy equipment and two-way traffic. The portion of the access road from Flat Mine South will be upgraded to serve as main surface haul road (2.81km). The access/haul road length will be 6.23km long with an 8.9 m width to accommodate two-way traffic should allow for a trench and berm on each side of the road. A new haul road will be constructed between the waste rock dump and the main surface haul road (0.5Km) and another from between FME and the main surface haul road (1.54km).	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 12:** The development of (ii) infrastructure or structures with a physical footprint of 100m² or more (a) within a watercourse (c) within 32 metres of a watercourse measured from the edge of the watercourse • Applicable to the upgrading of the existing gravel road and river crossing within a watercourse and within 32 m of a watercourse outside an urban area where no road reserve exists. **GNR 983 (dated 8/12/2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal or moving of soil, sand or rock of 10m³ or more from a watercourse. • Applicable to the upgrading of the existing gravel road and river crossing within a watercourse. **GNR 983 (dated 8/12/2014) LN1 Activity 24, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 24:** The development of a road (ii) where no reserve exists is wider than 8 metres and longer than 1km outside an urban area. • Applicable to the section of new haul road **GNR 983 (dated 8/12/2014) LN1 Activity 48, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 48:** The expansion of (i) infrastructure where the physical footprint is expanded by 100m² or more where such expansion occurs - (a) within a watercourse; and (c) within 32 metres of a watercourse. • Applicable to the upgrading of the existing road and creation of trench and berm on each side that will be constructed adjacent to the existing road and not inside a road reserve outside an urban area, within a watercourse and within 32m of a watercourse. **GNR 985 (dated 8/12/2014) LN3 Activity 18, as amended by GNR 324 (dated 7/04/2017), LN3 Activity 18:** The widening of a road by more than 4 metres (g) Northern Cape ii. Outside urban areas (ii) within a watercourse or within 100 metres from the edge of a watercourse • Applicable to the upgrading of the existing road and creation of a trench and berm on each side that will be constructed adjacent to the existing road	**No**

2.4 Provide electrical supply to Project Area, with removal of vegetation and topsoil prior to construction where relevant.	Currently no power supply exists to the Project Area. In order to establish power to the project site a number of off-site installations will be required. This will include: - Construction of 1 x 66 (132) kV line bay at Nababeep Town (132KV) Substation; Construction of a 1 x 5.6 km 11kV squirrel line from Nababeep Town Substation (110/66KV) to SAFTA Project Intake Yard; and Substation ancillary services, control room building, protection equipment, metering equipment, and power network control and communication systems for the substations. **The electrical supply infrastructure is included in the mine logistics component described in section 2.5 below, which has a total footprint of 20,800 m².** The off-site power supply infrastructure designs will be done on a maximum demand of 4.54 MVA to the Project Area during the 35 ktpm first phase, which will be increased to 6.4 MVA once production increases to 70 ktpm as determined by a load summary.	X	**GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. • Applicable to the footprint of the SAFTA intake yard, which is included in the total area of 20 hectares or more of vegetation that will need to be cleared for the Mining Right Application.	**NA**

2.5 Development of water supply and water management infrastructure to Project Area for all activities requiring water for processing and consumption; diverting stormwater and recycling, including removal of vegetation and topsoil prior to construction where relevant. .	Water supply is an essential service as various steps in the mining and particularly the **processing processes** are heavily reliant on the usage of water. Apart from the mining and process requirements, water will also be required for use as **potable water**. The water sources on the Project Area will be **supplied by a vent raise 1.6 km from the decline near Flat Mine South**. Water will be pumped from the vent to a **reservoir** using a total of 8.9 km of piping. **Major infrastructure will include all pipes and pumps to transport water from the raise to the reservoir.** Water columns, with a total length of 10.1km as well as 8 Lorentz ps4000 pumps, will be required in FMN and FMS for **dewatering and fire suppression purposes**. The **storage of water** in the project area will be less than 50 000m³. All dirty rainfall run-off, process plant discharge, treated sewage and grey water will be **collected, stored, treated and recycled** as far as possible. Should an excess of water exist on the operation, all **effluent** from the site will be suitably treated. All **clean rainfall run-off should be diverted** from dirty and contaminated areas. **Trenches** will be constructed to divert clean run-off, collect dirty run-off and route dirty water to suitable storage dams. A **surface collection dam** will be constructed to store all dirty water from the mining area and a series of dams will also be constructed within the plant to store run-off and discharged process water. • FMS Collection dam is 0.15Ha. • FME Collection Dam is 0.2Ha. • Process water reservoir is 5600m² • Potable water reservoir is 5250m². • Settling dam at FMN is 6000m². • Temporary storage for stormwater control is 12500m²	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 12:** The development of – (ii) Infrastructure with a physical footprint of 100m² or more (a) within a watercourse; (c) or, if no development setback exits, within 32m of a watercourse, measured from the edge of the watercourse – excluding located in an urban area or in road reserve. • Pipeline infrastructure crosses the watercourse and is located within 32m of the watercourse. • The stormwater diversion berm near FMN is located within a watercourse and within 32m of watercourse. • The access road upgrading will take place within 32 m of a watercourse adjacent to the road where no road reserve exists. • All infrastructure is outside an urban area. **GNR 983 (dated 8/12/ 2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal of soil, sand or rock of more than 10m³ from a watercourse • The diversion berm near FMN is located within watercourse and 32m of a watercourse. Some sections of road upgrade are within 32m of a water course. • Pipeline infrastructure crosses the watercourse and is located within 32m of the watercourse. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. • The combined water infrastructure footprint contributes to the total area to be developed being greater than 1 hectare.	

2.5 Development of water supply and water management infrastructure to Project Area for all activities requiring water for processing and consumption; diverting stormwater and recycling, including removal of vegetation and topsoil prior to construction where relevant (continued).			**GNR 983 (dated 8/12/ 2014) LN1 Activity 48, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 48:** The expansion of (i) infrastructure where the physical footprint is expanded by 100m² or more where such expansion occurs (a) within a watercourse; (c) if no setback exists, within 32 metres of a watercourse. • The upgrading of the existing road and creation of trenches and berms for stormwater management on each side will occur adjacent to the existing road and not inside a road reserve outside an urban area, within a watercourse and within 32m of a watercourse. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. • The footprint of all the water and waste water infrastructure is included in the total area of 20 hectares or more of vegetation that will need to be cleared. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv. [2]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning. • The combined footprint of the water and waste water infrastructure exceeds 300m².	

[2] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.6 Development of mine logistics, including removal of vegetation and topsoil prior to construction where relevant.	The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. **The site will cover an area of 20 800 m²**. The mine site will be enclosed by a security fence. Access to the site will be controlled by security personnel posted at the access gates to the site. The mine site will include offices, change houses, control room, first aid station, stores, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. This area will be mainly constructed and established by the appointed mining contractor but services like water supply, power supply, water management and other services will be constructed by contractors appointed for the construction of the balance of infrastructure areas. • Fuel storage area comprised of 2 tanks x 45m³ is 90m³. • Volume of hazardous chemicals with 3 month stock stored on site will not exceed 80m³: Xanthate storage of 24.072m³; Dow Frother is storage of 27.582m³. • Explosives capacity not provided but a 7 day supply is the normal volume for storage.	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 14, as amended by GNR 327 (dated 7/04/2017) LN1 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. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[3]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**NA**
2.7 Construction of Hydrocarbon storage area, explosives bay and storage room for hazardous chemicals within logistics footprint, including removal of vegetation and topsoil prior to construction where relevant. (See 2.6 above).	• Fuel storage area comprised of 2 tanks x 45m³ is 90m³. • Volume of hazardous chemicals with 3 month stock stored on site will not exceed 80m³: Xanthate storage of 24.072m³; Dow Frother is storage of 27.582m³. • Explosives capacity not provided but a 7 day supply is the normal volume for storage.	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 14, as amended by GNR 327 (dated 7/04/2017) LN1 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.	**NA**

[3] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.8 Establishment of Processing Plant Site including removal of vegetation and topsoil prior to construction where relevant. The processing plant site will include the processing plant, a metallurgical and assay laboratory, offices, reagent storage facility and a workshop.	The Processing Plant Site will be 130 m x 200 m and will be located adjacent to the Mine site. Footprint is 26ha or 26000m².	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[4]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**NA**
2.9 Establishment of areas for RoM stockpiles (FMN; FME & FMS) and process plant feed at FMN, and mining portals, including removal of vegetation and topsoil prior to construction where relevant.	• Phase 1 FMN RoM Stockpile is 4,250m². • Phase 2 FMN RoM Stockpile is 7,200m². • FMS RoM stockpile is 1Ha • FME RoM Stockpile is 1.26Ha		**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[5]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**NA**

[4] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.
[5] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.10 Establishment of area for Waste Rock Dump including removal of vegetation and topsoil prior to construction where relevant.	• The footprint of the waste rock dump is approximately 2.8Ha	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. • The total footprint of the area required for infrastructure, etc. is 113Ha **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[6]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**X** **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (8) The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 tons. *General waste includes insert waste, as defined in the NEM:WA; Act 59 of 2008, as amended.* **GNR 921 (dated 29/11/ 2013) Category B: 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 authorized by or under other legislation. *Inert waste as defined in the NEM:WA; Act 59 of 2008, as amended.*

[6] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.11 Construction of Tailings Storage Facility (TSF) or Fine Residue Dam (FRD), including removal of vegetation and topsoil prior to construction where relevant.	• The Fine Residue Dam is Approx. 25.5 Ha. • The FRD Collection Pond is 2.97Ha.	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 12:** The development of – (ii) Infrastructure with a physical footprint of 100m² or more (a) within a watercourse; (c) or, if no development setback exits, within 32m of a watercourse, measured from the edge of the watercourse – excluding located in an urban area or in road reserve. • The Fine Residue Dam (FRD) and FRD Collection Pond of 2.97 Ha are located within drainage lines and within 32 m of watercourses. **GNR 983 (dated 8/12/ 2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal of soil, sand or rock of more than 10m³ from a watercourse • The Fine Residue Dam (22.8ha of which 12.8 ha is undisturbed) is located within drainage lines and the FRD Collection Pond 2.97Ha in size is located within 32m of the watercourse. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. • The footprint of all the water and waste water infrastructure is included in the total area of 20 hectares or more of vegetation that will need to be cleared. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[7]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**X** **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (7) the disposal of any quantity of hazardous waste to land **GNR 921 (dated 29/11/ 2013) Category B: Construction of facilities and associated structures and infrastructure** (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity). **GNR 632 (dated 24/07/2015): Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation** • The Fine Residue Dam has a footprint of 22.8 Hectares. **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits** (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MRPDA (28 of 2002) • The Fine Residue Dam has a footprint of 22.8 Hectares.

[7] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.11 Construction of Tailings Storage Facility (TSF) or Fine Residue Dam (FRD), including removal of vegetation and topsoil prior to construction where relevant.	• The Fine Residue Dam is Approx. 25.5 Ha. • The FRD Collection Pond is 2.97Ha.	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 12:** The development of – (ii) Infrastructure with a physical footprint of 100m² or more (a) within a watercourse; (c) or, if no development setback exits, within 32m of a watercourse, measured from the edge of the watercourse – excluding located in an urban area or in road reserve. • The Fine Residue Dam (FRD) and FRD Collection Pond of 2.97 Ha are located within drainage lines and within 32 m of watercourses. **GNR 983 (dated 8/12/ 2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal of soil, sand or rock of more than 10m³ from a watercourse • The Fine Residue Dam (22.8ha of which 12.8 ha is undisturbed) is located within drainage lines and the FRD Collection Pond 2.97Ha in size is located within 32m of the watercourse. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 ha or more indigenous vegetation, excluding for linear activity. • The footprint of all the water and waste water infrastructure is included in the total area of 20 hectares or more of vegetation that will need to be cleared. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[8]:** The clearance of an area of 300 square metres or more of indigenous vegetation (g) in the Northern Cape iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**X** **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (7) the disposal of any quantity of hazardous waste to land **GNR 921 (dated 29/11/ 2013) Category B: Construction of facilities and associated structures and infrastructure** (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity). **GNR 632 (dated 24/07/2015): Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation** • The Fine Residue Dam has a footprint of 22.8 Hectares. **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits** (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MRPDA (28 of 2002) • The Fine Residue Dam has a

[8] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

3. OPERATIONAL PHASE ACTIVITIES				
3.1 Mining activities	**Mining takes place underground** Basic overview of the mining method (Ref: MWP) The long-hole stoping method is a bulk mining method that provides good ore recovery and minimal dilution. It is an overhand, vertical stoping, utilising long-hole drilling and blasting carried out from sublevels to break the ore. Although the stopes are supported by long anchors, pillars are usually left between stopes and occasionally within stopes. The ore flows through the stope by gravity. Ore will then be extracted from the stope via the lower extraction drift using LHDs. The LHDs will then move the rock to either an orepass tipping point or into a re-muck bay and re-handle the material into a truck when one is available. The trucks will transport the ore to surface via the decline. Long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Typically production drilling is carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs. These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations. In the long-hole open stoping method access onto a level, from the decline, will be via an access cross cut. From the access cross cut ore access drives will be developed into the orebody from the footwall to the hangingwall. The mining block will be split into stopes with a horizontal span of 20 m and a vertical span of 30 m. The strike will be the length of the orebody width from the hangingwall to the footwall. Only one level will be in production at a time.	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 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.	**X** **As listed where relevant.**

3.2. Processing activities: 3.2.1 Crushing and screening 3.2.2 Milling Circuit 3.2.3 Reagent Make-up and conditioning 3.2.4 Flotation circuit 3.2.5 Product Handling	• The Processing Plant Site has a footprint of 26Ha.	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 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.	**NA**
3.3 Transport waste rock to waste rock dump	NA	NA	NA	NA
3.4 Operation of RoM Stockpiles	• Phase 1 FMN RoM Stockpile is 4,250m². • Phase 2 FMN RoM Stockpile is 7,200m². • FMS RoM stockpile is 1Ha • FME RoM Stockpile is 1.26Ha	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 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.	**NA**

3.5 Operation of Waste Rock Dump	Waste rock dump has a footprint of 2.8Ha.	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 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.	**GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (8) The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 tons. *General waste includes insert waste, as defined in the NEM:WA; Act 59 of 2008, as amended.* **GNR 921 (dated 29/11/ 2013) Category B: 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 authorized by or under other legislation. *Inert waste as defined in the NEM:WA; Act 59 of 2008, as amended.*
3.6 Use of all facilities and amenities associated with mine logistics	NA	NA	NA	NA
4. DECOMMISSIONING PHASE ACTIVITIES				
4.1. Cover waste rock dump leading edge with topsoil removed prior to establishment.	Leading edge	NA	NA	NA
4.2. Secure mine shafts & fence off access securely	Included in total of 113Ha (extent of area required for infrastructure)	NA	NA	NA
4.3. Remove all structures, foundations and footings not required by landowner/s	Approx. 113Ha	NA	NA	NA
4.4. Rip all hardened areas and allow to revegetate naturally	Approx. 113Ha	NA	NA	NA
4.5 Decommissioning of waste management facility – Waste rock dumps and FRD	Final footprint of waste rock dump is approx. is 2.8Ha and FRD is approx. 25.5Ha	NA	NA	**GNR 921 (dated 29/11/ 2013) Category A: Decommissioning of facilities and associated structures and infrastructure** (14) The decommissioning of a facility for a waste management activity listed in Category A or B of this schedule.

5. AFTERCARE PERIOD				
5.1. Remove alien vegetation, if present	Unknown	NA	NA	NA
5.2. Monitor revegetation success and continue	Unknown	NA	NA	NA
5.3. Conduct final environmental audit	NA	NA	NA	NA
5.4. Lodge closure Application	1214 Ha	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 22, as amended by GNR 327 (dated 7/04/2017) Activity 22:** The decommissioning of any activity requiring – (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Only applies at time of final closure.	**NA**

5 NEED & DESIRABILITY OF THE PROPOSED ACTIVITIES

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)[9] state that: "Sustainable development is enshrined in South Africa's Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act), and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa".

DMR, as custodian of South Africa's mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"[10].

The primary environmental objective of the MPRDA is to give effect to the "environmental right"[11] contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa's mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Core Area 1 are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and "Category D: Moderate Biodiversity Importance" – moderate risk for mining.
The latest conservation mapping (refer to **Figure 4**) indicates that only Category B is applicable to this project site.
These categories basically require an environmental impact assessment process to address the issues of sustainability. Refer to Section 8.1.9 and **Figure 5**.

5.2 Copper and Tungsten Mineral Resources Supply and Employment Benefits

The intention to secure an off-take agreement with a copper smelter who will purchase the copper concentrate at the mine gate (ex-works). Negotiations with potential consumers have commenced. The product specification is a 25% Cu concentrate at a moisture content of 8% to 10%.
In terms of **new employment opportunities**, there will be 7 posts for senior-management; 20 posts for professional qualified staff; 127 posts for skilled technical staff; 44 posts for semi-skilled staff; and 26 posts for unskilled staff; providing a total of 224 employment opportunities.
Services that will outsourced and that will provide **job security** will be environmental monitoring services and compliance officer, training, security, consultant geologist, main workshop and auditing/tax/accounting services.
In addition, it is expected that there will be 53 sub-contractor employees from Year 1 to 5.

5.3 Nama Khoi Local Municipality IDP (Draft IDP 2018/2019)

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under "section 152. (1) The objects of local government are-
(a) to provide democratic and accountable government for local communities;
(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;

[9] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.
[10] Constitution of the Republic of South Africa (No. 108 of 1996).
[11] Section 24 of the Constitution states that "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: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

(d) to promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government".
The vision of the Nama Khoi Municipality is:
"To proudly deliver sustainable local economic development and climate resilient quality services to the Nama Khoi Municipality"
The development and implementation of the Nama Khoi Local Economic Development (LED) strategy aims at ensuring the alignment to the economic sectors and also assist the SMME's in co-operation with other stakeholders:

- To initiate, lead and sustain an environment for job creation in the Nama Khoi Municipal Area.
- To leverage municipal assets and the municipal procurement process with the view to stimulate redistribution and growth.

The Macro Strategic Development concept provides a broad spatial development framework for the total municipal area and contains spatial planning proposals based on the following concepts (only those of relevance referenced here):

SPATIAL OBJECTIVE 3: To develop sustainable and diverse local economies by the utilisation of opportunities in the different spatial categories.
MINING

- There is a concentration of minerals around the Springbok area, as well as in a broad band along the south of the Orange River.
- Although many of these sources have been depleted, there are still plenty occurrences that can be exploited and this should be considered for small scale mining.
- The Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.
- To solve the disputes and issues related to mining rights and to investigate the possibility for local communities to gain access and limited mining rights in areas to be identified for this.

SPATIAL OBJECTIVE 4: To protect the pristine and unique natural environment with its four distinct bio-geographical regions by means of effective management and managed use.
CORE & BUFFER AREAS

- To protect and manage the following environmentally important areas in line with the objectives and targets of the NBSAP:
  - The western part of the local municipality from the coast to the east of the N7, which has been identified as a SANBI priority area; and
  - The western mountain ranges including the Kamiesberg and the Hantam which has been identified as a SANBI Escarpment.
- To protect the natural spaces affected by the Terrestrial and Aquatic Critical Biodiversity areas against development and overgrazing, due to its vital role in maintaining biodiversity.
- To support the Critical Biodiversity Corridor Linkages towards the surrounding municipalities.
- To expand the three statutory protected conservation areas in the municipal area, i.e. Goegap Provincial Nature Reserve, Namaqua National Park and Nature Reserve.
- To rehabilitate all mining areas and damaged areas in the region and to remove and terminate unwanted activities and undesirable structures in and around protected areas.
- To investigate and eradicate the invasive Prosopis tree which poses a significant threat to biodiversity and ecosystem services in the Northern Cape Province of South Africa.

OTHER

- To ensure that future planning in the region consider the mitigation of climate change, including the curbing of greenhouse emissions associated with transport and electricity use. A Climate-Neutral Strategy is to be developed for the Northern Cape. The implementation of this strategy into land use management regulations would be mandatory on all municipalities and the private sector.
- To improve the urban areas' natural character through landscaping, tree planting, the development of natural parks and the protection of natural areas and (flowers) in the neighbourhoods, e.g. Nababeep area.
- To rehabilitate the old mining areas to improve the environmental character of the area.
- To develop additional environmental awareness campaigns and environmental education programmes for the communities and visitors.

Broad development framework per settlement area: Nababeep
The area to the north of the settlement is subject to mining activities and could possibly provide opportunities and small scale mining beneficiation for local residents, which should be investigated.

5.4 Namakwa District Municipality Draft IDP 2017 2018

The vision of the Namaqua District Municipality IDP is: "Namakwa District Municipality, a centre of excellence!"
The Mission Statement is:

- A government institution legislatively mandated to stimulate economic and social transformation within the jurisdiction of the Namakwa District Municipality;
- By fostering partnership with relevant institutions to ensure sustainable development;
- Proactively supporting and capacitating B-municipalities;
- Be a transparent and accountable centre of excellence; and,
- Provide local leadership on environmental sustainability and climate change response.

The Strategic Objectives are

- Ensuring the delivery of basic services which include water, sanitation, electricity and waste management
- Creation of a thousand job opportunities through the community public works programme, as part of 4,5 million EPWP jobs.
- Transformation of administrative and financial systems of NDM and relevant B-Municipalities, which includes supply chain management
- Ensure the filling of six critical posts (Municipal Manager, Chief Financial Officer (CFO), Town Planner, Town Engineer, Human Resource Manager, Communication Manager) in all municipalities in the District
- Clean audits for all Municipalities.
- Building municipal capacity to enable municipalities to collect their revenue.
- Ensure sustainable economic and social transformation in the District.
- A society with a renewed sense of identity and confident in their skills and knowledge.
- Bridging the digital divide.
- Ensure the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, across all sectors.

The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.
The effects of climate change, such as flood events, on the proposed mining project will be mitigated as per the measures to be contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the mining activities will be addressed in the EMPr and Closure and Rehabilitation Plan.

5.5 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: "Cape is not one of South Africa's richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state". The NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.
The NCPSDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned."
The potential for job security, employment and skills transfer are identified as positive environmental impacts in this DSR. The potential negative environmental impacts can be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

5.6 Northern Cape Provincial Growth and Development Strategy 2004 – 2014 (NCPGDS)

The NCPGDS has the following vision for the Province: "Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development." The strategy for the growth and development of the Province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;

- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

5.7 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines "evaluation" as "the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision." In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, "need and desirability" must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering "need and desirability", it must also be informed by the sum of all the impacts considered holistically. In this regard "need and desirability" also becomes the impact summary with regard to the proposed activity. The impact summary will be included in the EIR.

These Guidelines state that: "In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved".

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this scoping environmental assessment and will be applied in the EIR, EMPr and Closure Report, as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process will be undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and Interested and Affected Parties. I.e. Public participation will be undertaken to obtain the issues / concerns / comments of the affected people for input into the process.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted has been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures were proposed to ensure that the impact is mitigated. i.e. this report along with the EMPr (to be included in the EIA Phase) proposes mitigation measures which will minimise the negative impacts of the proposal on the environment.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site is located within in an Ecological Support Area (ESA). The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. Rehabilitation back to the natural state is a key component, and will be undertaken in a phased manner as the mining activities progress. This report together with the EMPr and Closure Plan proposes mitigation measures which will minimise the impacts of the proposal on the environment.
- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations to be detailed in the EIR and Environmental Management Programme Report (EMPr), and Closure Plan will ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted has been considered and investigated at a scoping level to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be detailed in the EIR, EMPr and Closure Plan to ensure that the impact is mitigated. For example, landscape disturbance impacts associated with the development such as the Mine Residue Disposal Facility (MRDF), waste rock

dump sites, erosion and dust have been identified and detailed mitigation measures will be included in the EMPr to minimise the impacts.

- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into the operational component of the project, and mitigation measures included in the EMPr.
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport. Solar panels do however, provide power to borehole pumps.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures will be detailed to minimise the impact of the proposal on the environment.
- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). The DSR is being made available to all identified I&APs to obtain comments on the proposed development.
- **Access of information** – Potential Interested and Affected Parties will be notified of the proposal and the availability of the Draft Scoping Report (DSR). They will also be notified of having the opportunity to register as an I&AP and they will be kept informed during the course of the EIA process.
- **Promotion of community well-being and empowerment** – This process will be undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Any mitigation measures from SAHRA will be included. Adequate and appropriate opportunity will be provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

6 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PREFFERED SITE, ACTIVITY & ALTERNATIVE

6.1 Process to Reach the Proposed Preferred Alternative

With reference to the Mine Site Plan provided as **Diagram 5** and the location of the individual activities on site, details are provided of the alternatives considered with respect to the:

(a) Property on which or location where it is proposed to undertake the activity;
(b) Type of activity to be undertaken;
(c) Design or layout of the activity;
(d) Technology to be used in the activity;
(e) Operational aspects of the activity; and
(f) Option of not implementing the activity.

Appendix 2 Section 2 (h)(i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe feasible and reasonable alternatives. Alternatives considered during the screening phases of the project are described below.

6.2 Location or Site Alternatives

- The N7 national road to Springbok provides excellent access to Nababeep and the mining operation. Nababeep is 17km north-west of Springbok.
- The design or layout of the mining is determined by the shape, position and orientation of the mineral resource as explained in Section 3.2.2 above and illustrated in Diagram 3.
- The location of the mine logistics, processing components and rock dump site has been based on the existing disturbed footprint of the previous mining activity at FMN (previously referred to as Wheal Flat), the topography of the site and distance to the main mine shaft (FMN) to minimise transport costs for ore removal, processing and waste rock dumping.

- The processed copper is to be sold at the gate, and therefore ease of access off the road leading past the mine area is required.
- The availability of water resources such as the groundwater in the existing mine shaft at FMN and the existing boreholes are described in **Appendix D**.
- The location of the Tailings Storage Facility (TSF) is earmarked for the existing disturbed footprint as described in **Appendix E**, shown on Diagram 5d and in Photograph Compilation 2, where a single site was identified as a potential suitable location based on the following:
  - Location overlies an existing environmentally disturbed location;
  - The site is positioned over a wide valley in which it is possible to establish a large depositional basin reducing the volume requirement for a starter embankment; and
  - The location does not encroach on nearby settlements.
  - It is centrally located within the mining right area, approximately 1.5 km south-east of the processing plant.
- In addition, the linear type infrastructure as the electricity supply follows the existing lines of development that being the existing access road to the north of Nababeep.
- Other linear infrastructure, such as pipelines follow the topography and lie of the land in a direct path wherever possible to minimise cost of materials and to maximise gravity feed where relevant, this reducing costs of electricity for pumping.

6.3 Type of Activity

The Applicant is not the land owner, so it would not be realistic for this company to propose another type of activity as their core business is mining. Although the proposed mining activity takes place over a long time period, the best post-mining land use alternative is to return the site to its natural state. The holder of a mining right is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use.

Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine copper and tungsten from the identified deposits with the Mining Right application area as shown in Diagram 3. The only other activity required to be assessed in terms of NEMA is the "do-nothing" alternative, as detailed further in section 6.7 below.

6.4 Design or Layout of Activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource.

The layout of the Mine as shown in the Mine Site Plan in Diagram 5 is based on the location of the mineral resources as shown in Diagram 3; the position of the existing FMN shaft; utilising the existing disturbed footprints from the previous mining at FMN, and at the area earmarked for the Mine Residue Disposal Facility (MRDF) detailed in Section 3 above. The location of the waste rock dump is positioned in a valley-fill location which has the least visual impact, and does not require disposal off site. The associated infrastructure servicing the Mine has been positioned according to the topography and existing infrastructure such as the access road to minimise the area of disturbance.

Best practice dictates that it is best to mine and rehabilitate the area sequentially, as this minimises the disturbance to the mining areas once they have been rehabilitated. The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar.

There are no reasonable or feasible design or layout alternatives for further consideration.

6.5 Technology Alternatives

The technology used in a mining project is determined by the type, shape, position and orientation of the mineral resource. The technology applied in each major component of the mine is considered to be the only reasonable and feasible alternative as described below:

- **Underground mining technology**: Long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Typically production drilling is carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs. These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations. Refer to Section 3.2.3 above.

- **Processing Plant technology**: as detailed in Section 3.3.7.1 above and illustrated in the Plant Flowsheet (Diagram 20) the processing incorporates a conventional two stage crushing circuit with a primary jaw crusher followed by a secondary cone crusher in closed circuit with a vibrating screen. The primary mill discharge is pumped through a cyclone with the underflow passing through a flash flotation cell before gravitating to the secondary milling circuit. The cyclone overflow streams from the primary and secondary milling circuits form the feed to the flotation circuit. The flotation circuit comprises rougher, cleaner and re-cleaner tank flotation cells. The rougher concentrate is pumped to the cleaner cells with that concentrate progressing to the re-cleaner stage. The tailings from each stage are returned to the previous stage with the rougher tailings passing through a scavenger stage. The re-cleaner concentrate is the final concentrate which is filtered to and stored prior to export. The scavenger tailings will be thickened to 60% solids before being pumped to the tailings dam. The concentrate, equating to 10% of the original plant feed mass, will be sold at the mine gate.

  For the 35,000 t/m operation the feed to the plant will be a nominal 54t/h with a 1:1 water requirement, i.e. 1m³ of water required per tonne of ore treated. Roughly 50% of the water requirement will be provided by reticulated water within the plant.

  The design philosophy was that the processing plant would initially be designed to treat 35,000 t/m. This will be known as Phase 1. At the beginning of Year 4, a parallel stream (Phase 2), treating a further 35kt/m will be commissioned bringing the total design throughput to 70kt/m. The life of the project, based on the current resource, would be 14 years. The plant should have a 90% availability and operate on a 24 hour/day basis with 3 operational shifts and a relief shift. The plant will not be fully automated but there will be sufficient instrumentation to ensure a stable operation and allow for reliable metallurgical accounting.
- **Mine Residue Disposal Facility**: As detailed in Section 3.3.9 above, the technology to inform the design of the MRDF will follow best practice based on the information required and identified for detailed investigation in the EIA Phase, as included in Section 10.3 below.
- **Water management:** The existing underground water resources will need to be utilised for the provision of water for the mining processing and activities, and further investigations will be carried out in the EIA Phase, including a Geo-Hydrological assessment, which will inform best practice for the sustainable usage of the groundwater resource.
- **Use of electricity**: The use of alternative sources of energy has not been included in the design of the mine due to costs. Back-up generators will be provided to ensure a continuous source of power.

There are no reasonable or feasible technology alternatives for further consideration.

6.6 Operational alternatives

As described in the operational phase (Section 3.4.2 above) long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Typically production drilling is carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs.

These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations.

The primary processing activities include of crushing and screening; Milling Circuit; Reagent Make-up and conditioning; Flotation circuit; and, Product Handling are specific operational activities required to process copper bearing ore.

The Plant Flowsheet (Diagram 20) illustrates best practice for efficient and effective primary processing of the ore. The design philosophy is based on the phasing of the processing plant to initially treat 35,000 t/m in Phase 1. At the beginning of Year 4, a parallel stream (Phase 2), treating a further 35kt/m will be commissioned bringing the total design throughput to 70kt/m. The life of the project, based on the current resource, would be 14 years. The plant should have a 90% availability and operate on a 24 hour/day basis with 3 operational shifts and a relief shift. The plant will not be fully automated but there will be sufficient instrumentation to ensure a stable operation and allow for reliable metallurgical accounting.

There are no reasonable or feasible operational alternatives for further consideration.

6.7 The No-go Alternative

The No-Go Alternative will mean that the existing copper and tungsten prospecting right will not be realised into a Mining Right. There will be no supply of copper and tungsten for the local and international market, and no generation of much needed employment opportunities. The town of Nababeep has a high unemployment rate, as does most of the local municipality with the decline in mining a decade ago resulting in existing mines being closed. The opportunity provided by the increase in the price of copper has led to the revitalisation of interest

in copper mining of the existing deposits north of Nababeep as detailed in this report. The inflow of revenue and employment opportunities will have a very positive spin-off locally and regionally.

6.8 Summary of Alternatives

The assessment of alternatives must at all times include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative will therefore be further assessed together with the preferred and only alternative in the impact rating component of the EIA Phase.
The project site has been selected based on the results from prospecting. The layout and technology of each mine shaft and associated infrastructure has been determined by the shape, position and orientation of the mineral resource, Refer to the Overall Site Plan included as Diagram 5. The existing infrastructure and access roads will be utilised, and existing dump sites expanded where indicated. The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.
In summary therefore:

- The Preferred and Only Alternative is the Mining and Primary Processing of copper and tungsten on the Mining Right area demarcated in Diagram 2 and Diagram 5.
  - The preferred and only **location** alternative of the mining activity is on the earmarked sites shown on the Mine Site Plan as per Diagram 5. The location of the mining logistics, processing components and associated infrastructure have been positioned in relation to the location of the mineral resource below ground, the existing mine shaft at FMN, the existing disturbed footprints in close proximity to FMN, and the suitable topography of these sites for these structures. In addition, the linear type infrastructure such as the electricity supply follows the existing lines of development, such as the existing access road to the north of Nababeep.
  - The preferred and only **activity** alternative is the mining of copper and tungsten based on the mineral resources investigated during prospecting.
  - The preferred and only **technology** alternative for the underground mining, extraction, processing, waste and water management, and use of electricity are those described in Section 6.5.above.
  - The preferred and only **operational** alternative is the highly mechanised underground mining method of long-hole open stoping, and the above-ground primary processing activities (crushing and screening; Milling Circuit; Reagent Make-up and conditioning; Flotation circuit; and, Product Handling) as illustrated in the Plant Flowsheet (Diagram 20).

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

7 PUBLIC PARTICIPATION PROCESS

7.1 Introduction

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended). Full details of the public participation process conducted including copies of all supporting documents (e.g. the information provided to Interested & Affected Parties (I&APs) and the comments received) will be included in **Appendix B** in the Final Scoping Report

7.2 Comment period on Draft Scoping Report

The Draft Scoping Report will be distributed with the project notification via email to relevant Government Departments, and included with the Registered Letter to landowners and adjacent neighbours. Refer to **Appendix B** for a copy of the Registered Letter with Registration Form.

The commenting period of 30 days on this Draft Scoping Report is from 2nd November 2018 to 2nd December 2018.

Comments received will be included in the Final Scoping Report submitted to DMR for consideration.
All public consultation documents, such as a copy of the advertisement placed in a local newspaper; site notices placed on site; registered letters; and proof of project notification, will be included in the Final Scoping Report.
Registered I&APs will be notified of the commencement of the EIA Phase.
Refer to Table 13 in the Plan of Study for EIA (Sections 10.6 and 10.7).

7.3 Summary of Issues Raised by I&APs

This table will be completed following comments received on the Draft Scoping Report.

Table 10: Summary of Issues Raised by I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner/s	**X**				
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	**X**				
Municipal Councillor	**X**				
Municipality	**X**				
Organs of state (Responsible for infrastructure that may be affected Roads Department,					

Eskom, Telkom, DWA)					
Communities					
Dept. Land Affairs					
Traditional Leaders					
N/A					
Dept. Environmental Affairs & Nature Conservation	**X**				
Other Competent Authorities affected	**X**				
Dept. Water & Sanitation					
Dept. Agric., Land Reform & Rural Development					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

8 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT SITE

8.1 Type of Environment Affected by the Proposed Activity

8.1.1 Regional Setting

Namaqualand is a unique and diverse environment owing in large part to the presence of four distinct biogeographically regions within its boundaries. The Orange River valley lies to the north and is characterized by very dry desert conditions. In the west the area is composed of coastal plains, which transition into granite hills that straddle the escarpment, before transforming into low lying Bushmanland plains to the East of Springbok.

8.1.2 Landscape and Land Use

Mucina and Rutherford (2006) describe the landscape as being a dramatic landscape of huge granite and gneiss domes, smooth glacis and disintegrated boulder kopies supporting open shrubland up to 1m tall dominated by shrubs of dwarf to medium stature and with ericoid or succulent leaves.

Refer to **Figure 1** which shows the land-use as per the SANBI BGIS map viewer database dated 2009. The red patches at the project site represent the existing mined areas devoid of vegetation, and the pink represents mines (semi-bare areas). The white areas are either eroded areas or areas devoid of vegetation. The green patches indicate low shrubs; the light purple low shrub land; and, the brown patches are indicated as grassland. Therefore the land use of the project site as observed on site comprises areas previously disturbed by past mining practices at FMN.

8.1.3 Geology and Soils

The soils in a regional context are reddish, moderately shallow, sandy, and often overlay layers of calcrete of varying depths and thickness. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gulley erosion in areas where storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production and the only area where intensive crop cultivation is feasible is along the Orange River where irrigation is possible therefore the land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8Ha/SSU.

The project area has been classified into the following classes of land capability:

- Arable land: 0%
- Grazing land: 80%
- Wetland: 0%
- Wilderness land: 0%
- Urban and mining: 20%

The mining area lies close to the old mines at OKiep and Nababeep. Copper operations in this district date back over 150 years and hence the general geology is known as is the general style and form of the copper mineralization.

Within the mining area several rock types occur, however, the surface geology is dominated by two major intrusive lithologies; in the South the Nababeep granite-gneiss (Klein Namaqualand Suite) and in the North the Concordia Granite (Spektakel Suite). The former is a quartz – microcline – biotite granite gneiss with plagioclase and the latter a quartz – microcline granite with oligoclase. The granite-gneiss pre-dates the granite.

The Nababeep granite-gneiss' greatest development is centred on Nababeep where it can obtain a thickness of several hundred meters. It is well foliated and with a pronounced lineation. The formation is also augen rich (up to 7cm) but xenoliths are largely absent.

Strike and dips in the foliation are widely variable and although dip directions are usually North to West, the angle of dip is from near horizontal to sub-vertical. The Concordia granite occurs as an intrusive sheet becoming coarser grained towards the top of the unit where it grades into the overlying Rietberg Granite. The entire formation is dipping variously at some 30 – 40 degrees away from the Springbok dome. This unit shows conspicuous lineation but indistinct foliation. Orientation of lineations is far more consistent with East-West strikes generally plunging 10-25 degrees to the North in the prospecting area

There are several rock types present with a lesser surface expression, namely:

- The meta – volcano sedimentary quartzites of the Khurisberg Subgroup (O'Kiep Group) hosted within the Concordia Granite.
- Rietberg granites.

- Pegmatite clusters and aplite veins which because of their small size cannot be marked on the map. The pegmatites occur in all the major rock types. These are irregular, lensoidal shaped bodies of more leucocratic material formed locally.
- But most importantly, the intrusive anorthosites, diorite and norite of the Koperberg Suite are described in more detail below as these are the hosts of the copper mineralisation.

Structurally the whole area is complex having undergone extensive high-grade polyphase metamorphism and deformation. The grade of metamorphism is highest around Nababeep and reaches granulite facies and is characterized by minerals consistent with temperatures of 800 -1000°C.

The area is intersected by numerous shear faults and breccia faults, including a major shear fault in the center trending directly North from Nababeep. The main contact between the granite-gneiss and the Concordia granite is also believed to be a faulted contact. Although fold patterns appear relatively simple, there is evidence of several deformation and F3 folding. Numerous steeply inclined structures locally referred to as 'steep structures' occur within the area and post-date the F3 folding.

It is these structures and their associated megabreccias that have greatly controlled the emplacement and distribution of the Koperberg Suite and hence the copper ores. The Koperberg Suite is essentially basic intrusives that form narrow, dyke-like bodies typically associated with older fold structures termed steep structures and also with the breccias. They transgress all other rock units in the region and in the licence area. These structures are commonly 500 – 1000m horizontal extent and have a strongly aligned orientation dipping to the East. They also tend to exhibit a sharply antiformal structure with a vertical to sub-vertical core which extends to considerable depth. Mining in the area has exceeded 2000m but the structure extends unchanged below any known drilling.

The Nababeep district and the mining area in particular is rich in both steep structures and the Koperberg Suite – more so than any other part of the whole copper district. A large portion of the mining area holds as much as 2 – 5% of the outcrops as Koperberg Suite, whereas the regional average would be < 1%. Since this is by far the main mineralised unit in the entire district.

Since none of the deposits in this specific area have much of a surface expression the oxide assemblage is of little significance and sulphides dominate the economic geology. Ore minerals are present either as blebs or disseminations or more rarely as sulphide pockets of some size. Minerals present are primary chalcopyrite, bornite and some chalcocite.

Generally copper ore in this district is contained in a series of steep structures. Potentially economic concentrations of ores occur in clusters of pods as grade distribution is erratic and irregular. Only a small percentage of each structure carries reasonable grade ore and the rest is normally low grade. Hence the resources are a function of the cut-off grade and the current costs of mining and extraction.

8.1.4 Slope

Refer to **Figure 1** which shows the contours at 20 metre intervals. Refer to Diagram 5 and 5a-d of the Google Earth™ images base layer with the Mine Site Plan overlaid on areas that are suitable for the particular component, such as the location of the processing plan and logistics on the flatter area near FMN and the rock waste dump in a valley fill position.

8.1.5 Climate

The project site is located within the Succulent Karoo Biome where the climate has epizodic drought periods (well below 100mm per year) of one or two years in succession. The area experiences hot summers with mean maximum and minimum daily temperatures of 30°C and 5°C for January and July respectively. Given the variability of semi-arid rainfall, the mean annual runoff (MAR) is very low given the low rainfall which is less than 200mm per year occurring mainly in the winter months with high evaporation rates.

Refer to the climate diagram included as Diagram 22 below.

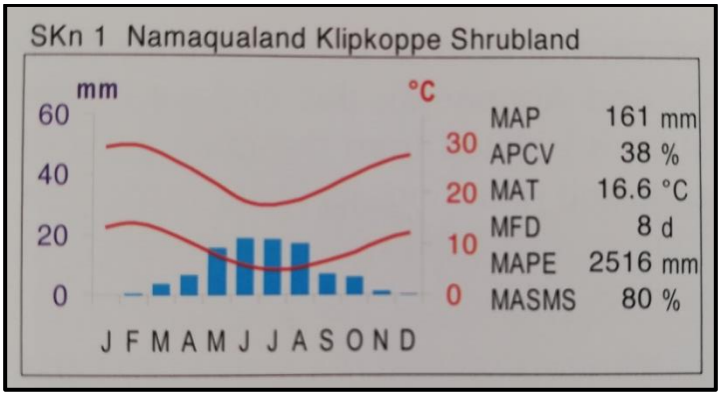
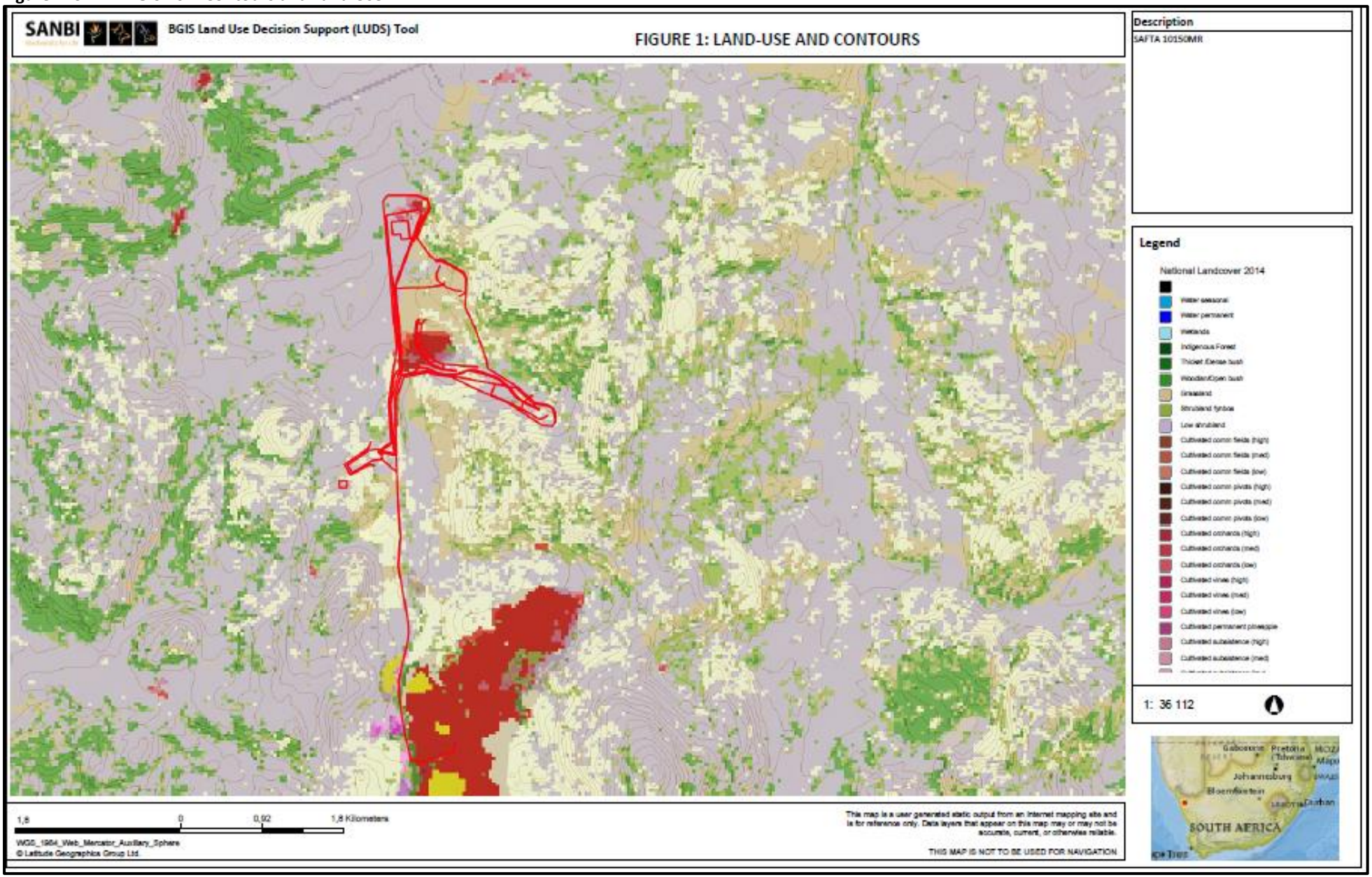


Diagram 22: Climatic data for vegetation type on site

[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature.]

Figure 1: SANBI BGIS 20m Contours and Land Use



8.1.6 Vegetation

The Nama Khoi local municipality contains 37 of the 93 vegetation types found in Namaqualand. Of these, 23 are endemic a remarkably high number that demonstrates the high levels of diversity in the area.

Refer to Figure 2 mapped from the SANBI BIS National Vegetation Map, which shows the location of the project site within the Skn1 Namaqualand Klipkoppe Shrubland.

The Namaqualand Klipkoppe Shrubland of which the mining right area forms part has 15 endemic plant species. The Namaqualand Klipkoppe Shrubland (SKn 1) and the Kamiesberg Mountain Shrubland vegetation types are structurally very similar, and also share many species. Typically Kamiesberg Mountain Shrubland occurs at higher elevations (900–1300m) than Namaqualand Klipkoppe Shrubland (<600 – 1300m), or in moister situations, such as on south and east facing slopes or in the western part of the Kamiesberg. A significant number (>15) of endemic species occur primarily or wholly within these two vegetation types, but as noted, this may be partly a function of insufficient habitat or locality information, and also partly a function of the physical extent of these two vegetation types, which cover very large areas in Namaqualand. Namaqualand Klipkoppe Shrubland fades into various forms of Succulent Karoo at lower elevations, and on the dry eastern fringes of the Kamiesberg (at the relatively high altitude of 1000m) changes into Platbakkies Succulent Shrubland (and Blomveld).

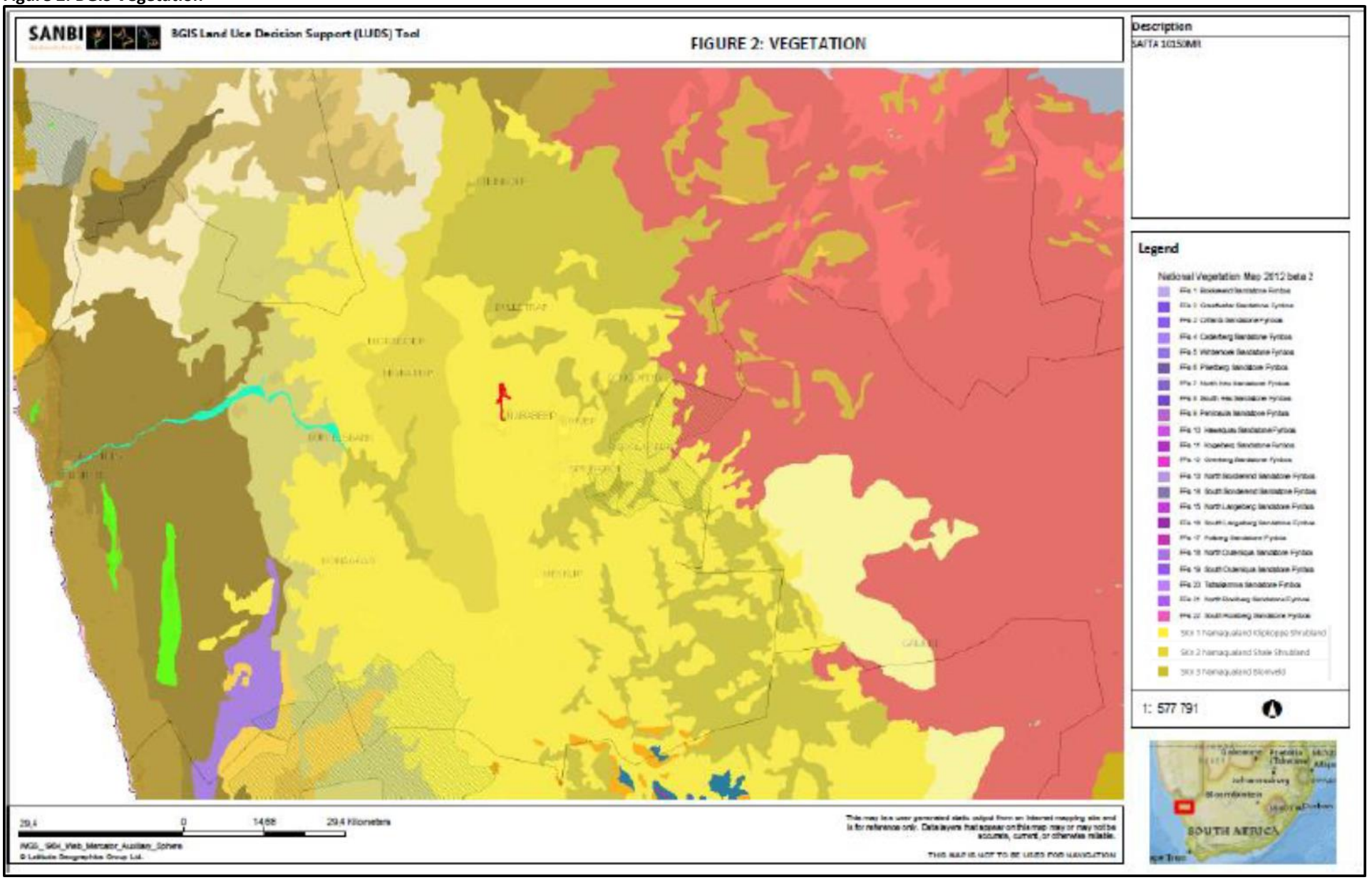
There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site, as confirmed by checking the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011).

Photograph 1: Typical vegetation found at Flat Mine North Shaft taken during the January 2018 drought.

8.1.7 Fauna

Endemism rates for invertebrates are high, and many unique and remarkable adaptive insects can be found in this region, including the scorpion – of which 22 are already known to be endemic to the Namakwa District Municipality. Likewise, there is an abundance of reptiles and snakes in the region, many of which are near endemic (including the Namaqua dwarf adder, which is the smallest of Africa's adders, measuring between 20-25 cm), as well as a few unique frogs such as the endemic rain frog, the marbled rubber frog and the paradise toad. Larger herbivores are absent due to the altered habitat and competitive land uses.

Figure 2: BGIS Vegetation



8.1.8 Water Resources

The project site is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14), and in Quaternary Catchment F30E. Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in very low given the low rainfall average occurring in the winter months, with high evaporation rates. Refer to the Climatic Diagram 22 above.

Refer to **Figure 3.1 and 3.2** that shows the location of the project site in relation to the watercourse, which is not a Freshwater Ecosystem Priority Area (FEPA)[12]. There are no wetlands within the project site as shown in **Figure 3.1**. According to the SANBI BGIS database the section of the watercourse highlight in Figure 3.2 is classified as a Category C watercourse which means it is moderately modified.

A Geo-Hydrological Assessment to be conducted in the EIA Phase will address the need to abstract groundwater from existing boreholes on the project site, including dewatering of the mine shafts.

Refer to the Baseline Assessment of the Nababeep Shaft Water Quality dated January 2014 (attached as **Appendix D**) which was prepared during the prospecting investigations as shaft water was hindering exploration of the mineral resource in FMN, and further information was required on the existing boreholes in the vicinity, and the surface water in the nearby watercourse. The report describes the shaft water quality as being comparable to the baseline groundwater conditions and significantly better quality than the local surface water. The water from the shaft would add a significant dilution (during the prospecting phase) capacity to the impacted drainage channel thereby providing a measure of mitigation for the deleteriously impacted drainage channel (upstream pollution evident from perceived lack of sewage management in the town of Nababeep).

Clarity will be sought from the Department of Water and Sanitation during the site visit planned for November 2018, regarding the water use registration and licensing requirements in terms of:

- Section 21(a): Taking water from a resource.
- Section 21(b): Storing water.
- Section 21(c): Impeding or diverting the follow in a watercourse.
- Section 21(f): Discharging waste or water containing waste into a water resource though a pipe, canal or other conduit.
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on water resource.
- Section 21(i): Altering the beds, banks, course or characteristics of a watercourse.
- Section 21(j): Removing, discharging or disposing of water found underground.

8.1.9 Critical Biodiversity Areas

Refer to **Figure 4** which shows that the project site is located within an Ecological Support Area (ESA). The Conservation Status database referenced for Figure 4 was sourced from the Department of Environment and Nature Conservation (DENC) in November 2017. It has not been gazetted and approved by the Minister, only approved by the MEC.

An ESA is described as an area that is not essential for meeting biodiversity targets, but that plays an important role in supporting the functioning of Protected Areas or Critical Biodiversity Areas, and are required for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to climate change. They include features such as regional climate adaptation corridors, water source and recharge areas, riparian habitat surrounding rivers or wetlands, and endangered vegetation. ESAs need to be maintained in at least a functional state, in order to support the purpose for which they were identified, but some limited habitat loss may be acceptable. A greater range of land uses over wider areas is appropriate, subject to an authorization process that ensures the underlying biodiversity objectives and ecological functioning are not compromised. Cumulative impacts should also be considered.

Refer to **Figure 5** below that shows that the project site has sections demarcated as Category B, C and D in terms as the "Mining and Biodiversity Guidelines" categories referenced from the SANBI BGIS map viewer from 2013.

[12] FEPAs are strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for conserving ecosystems and associated biodiversity of rivers, wetlands and estuaries. FEPA maps are suitable to use at a desktop level for planning and decision-making processes at the national or water management area level. In general, confidence in the FEPA maps at a national level is high but decreases at more local levels of planning.

Figure 3.1: BGIS National Wetlands & NFEPA Map

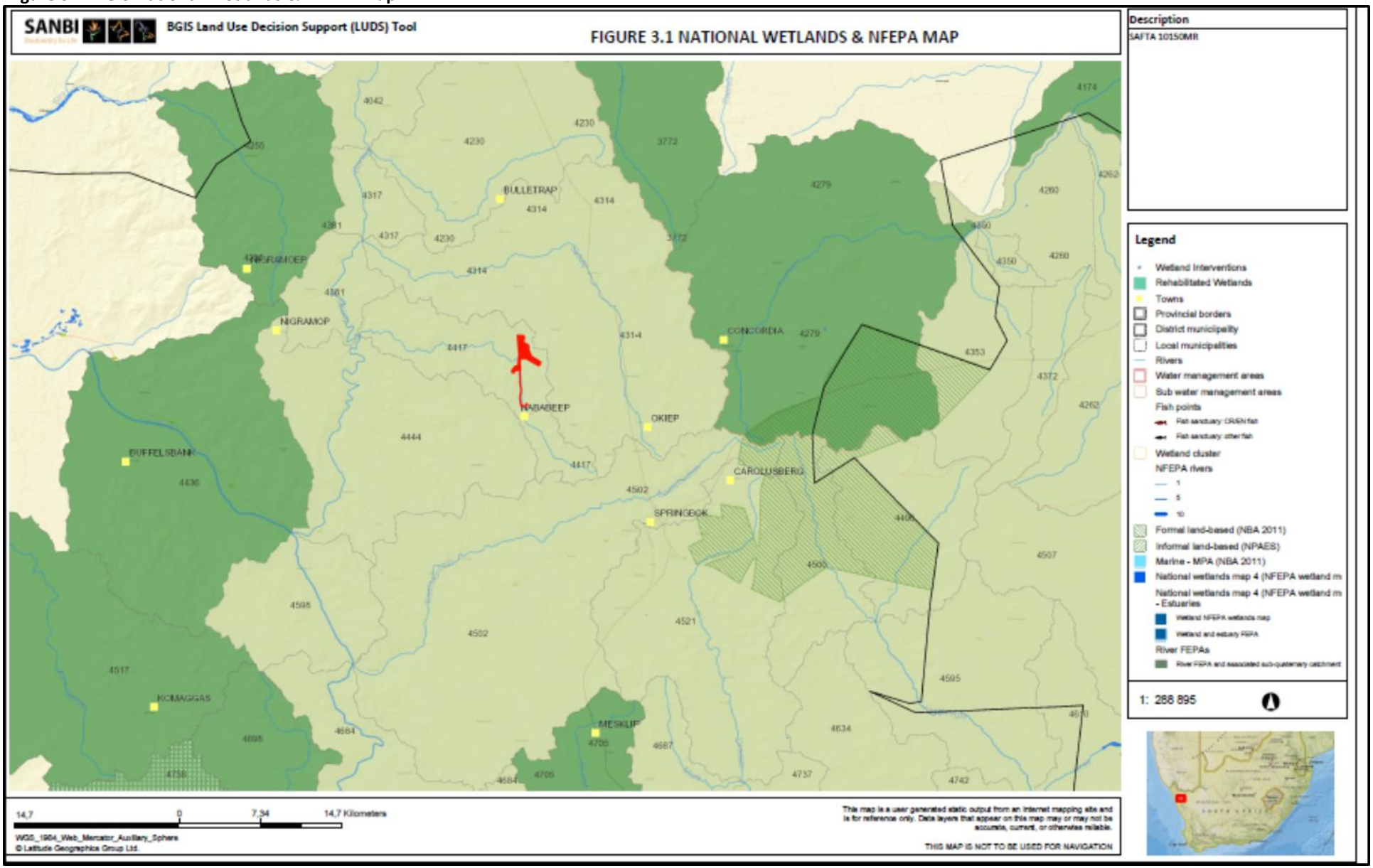


Figure 3.1: BGIS National Wetlands & NFEPA Map

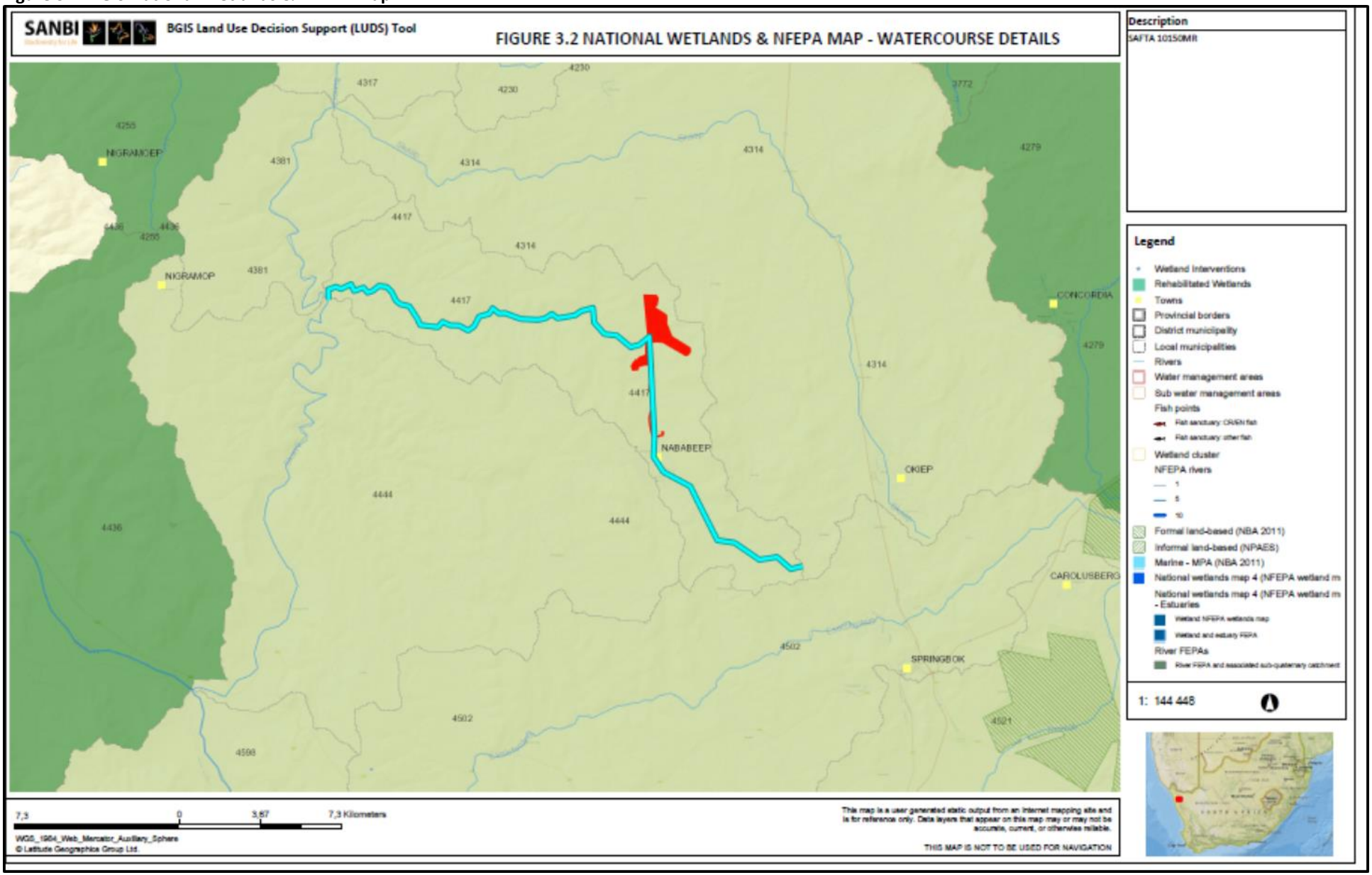


Figure 4: Biodiversity Map

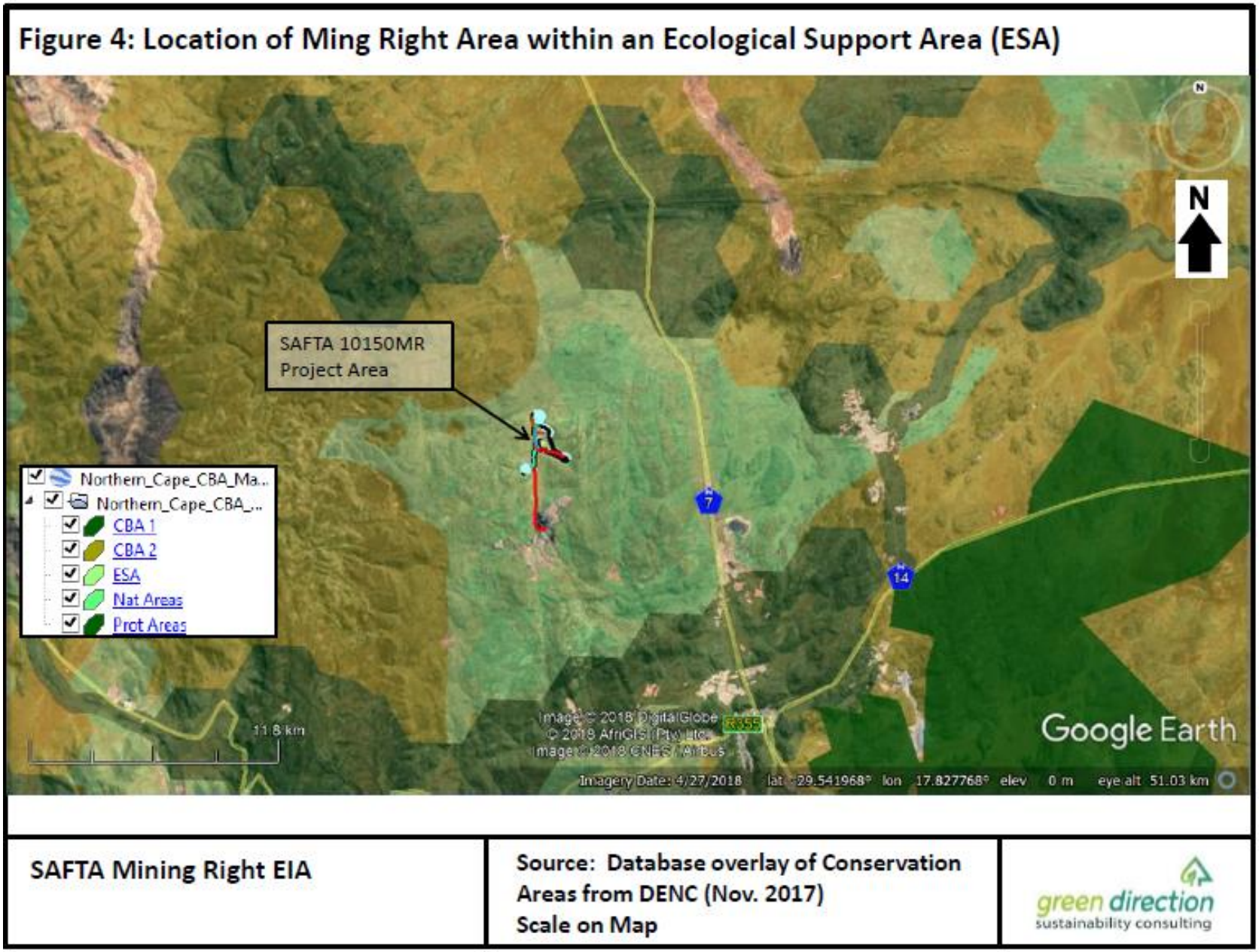
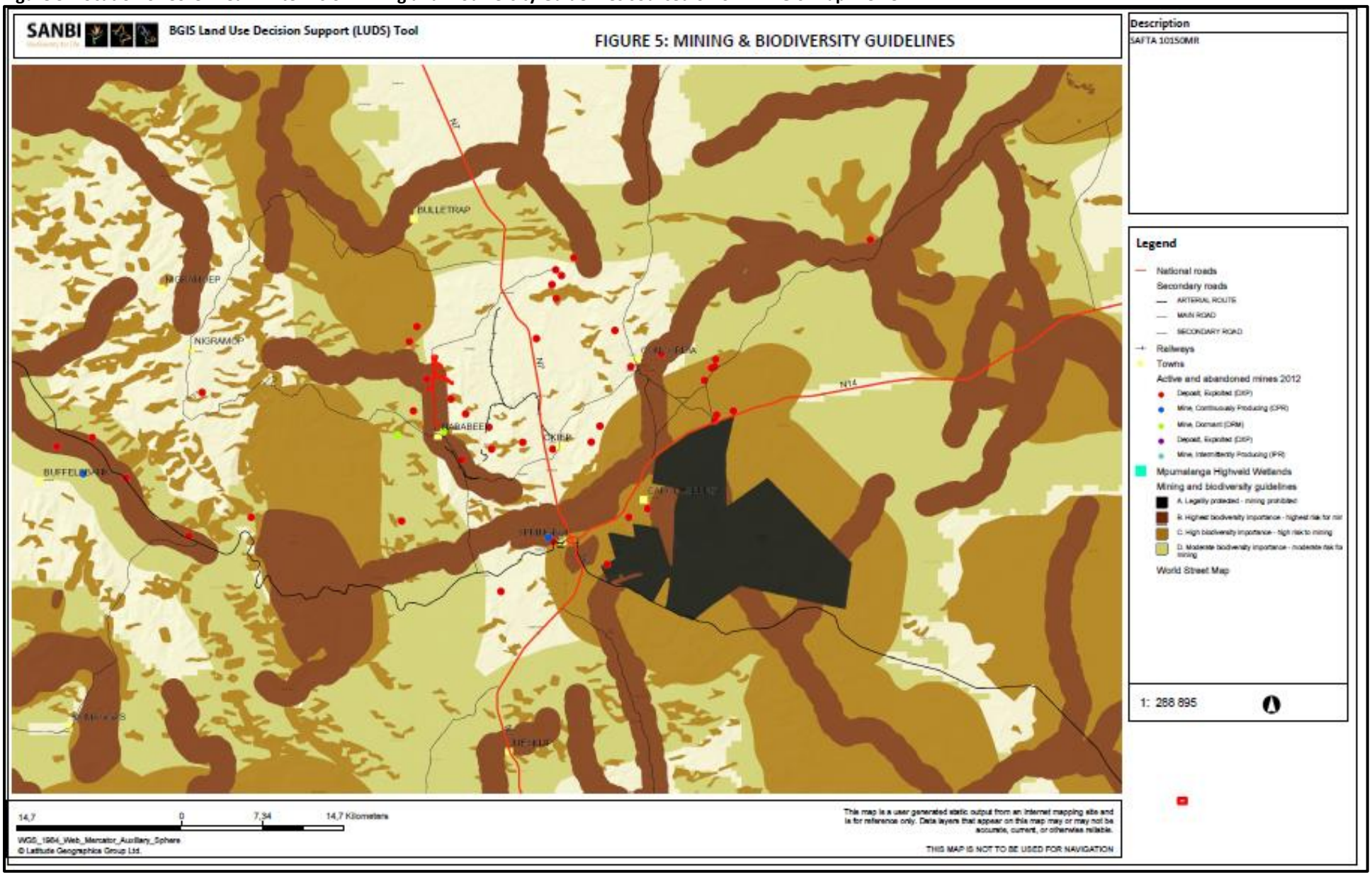


Figure 5: Location of Core Area 1 in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer



8.1.10 Emissions

Air Quality

Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of the semi-desert environment, dust generation will occur under windy conditions. Dust is generated off un-surfaced roadways when vehicles transport materials on site and in off-loading materials to the rock waste dump and RoM stockpiles.

Dust will be generated underground during blasting, and will be controlled in terms of the Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM:AQA. Air ventilation shafts are included in the mine site plan. Mining activities take place in a remote area 6km from the town of Nababeep and dust generation will be limited to a small radius at each site of activity.

Noise and vibration

- Noise and vibration will be generated during blasting below ground.
- Mine related traffic and operational activities will generate noise within the Mine area.
- The remote locality of the Mine has few receptors in close proximity.

Light Pollution

- The Mine will operate for 24 hours a day, with the need to have lighting for operational and security purposes.
- The remote locality of the Mine has few receptors in close proximity.

8.1.11 Socio-economic characteristics

Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and urban development. Tourism is a seasonal but rapidly growing feature with visitors to the region arriving almost exclusively between July and October in order take in the world renowned yearly flower display. Urban development is not a major feature of the landscape, and is not expected to increase much in the coming years.

The project site falls within the Namakwa District Municipality, and the Local Municipality of Nama Khoi. The socio-economic profiles are referenced from the IDPs and included below.

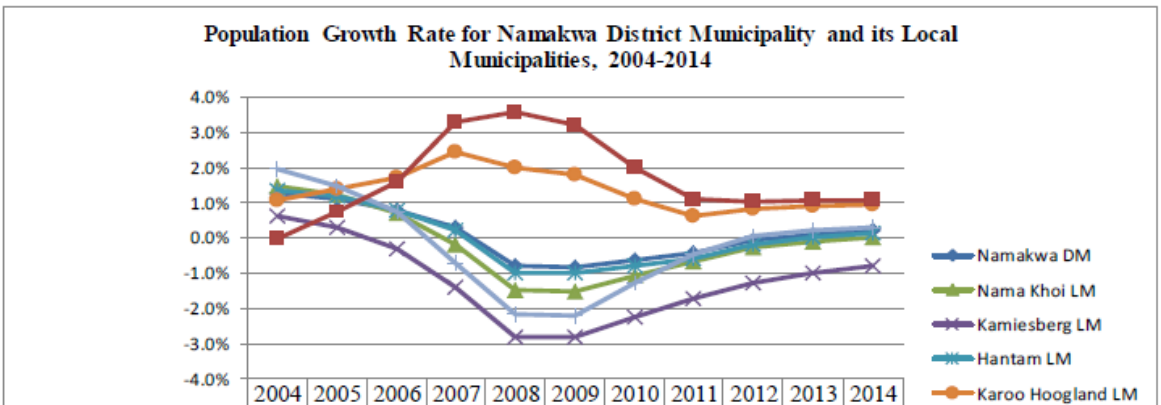
The **Namakwa District Municipality** is sparsely populated, with a population of 115 842 and is the least populated district in the Northern Cape Province (and Country, although geographically the largest) with a population comprising 10.11% of the Province's total population.

- The average growth rate for GGP in the area from 1996-2011 was 5.4 % and in 2007-2011 this slowed down slightly to an average growth rate of 4.8%.
- The largest contributing sector to employment in the local economy (21.12% of total employment in the formal sector) is the retail, catering and accommodation sectors.

The population growth rate of the **Nama Khoi Local Municipality** located within the Namakwa District is shown as improving from a negative growth rate to 0%, as illustrated in **Figure 6** below (sourced from the Nama Khoi Draft IDP 2018 2019).

Figure 6: Population growth rate in the Namaqua District Municipality (Source: Nama Khoi Draft IDP 2018 2019)

Population growth rate in Namaqua District Municipality

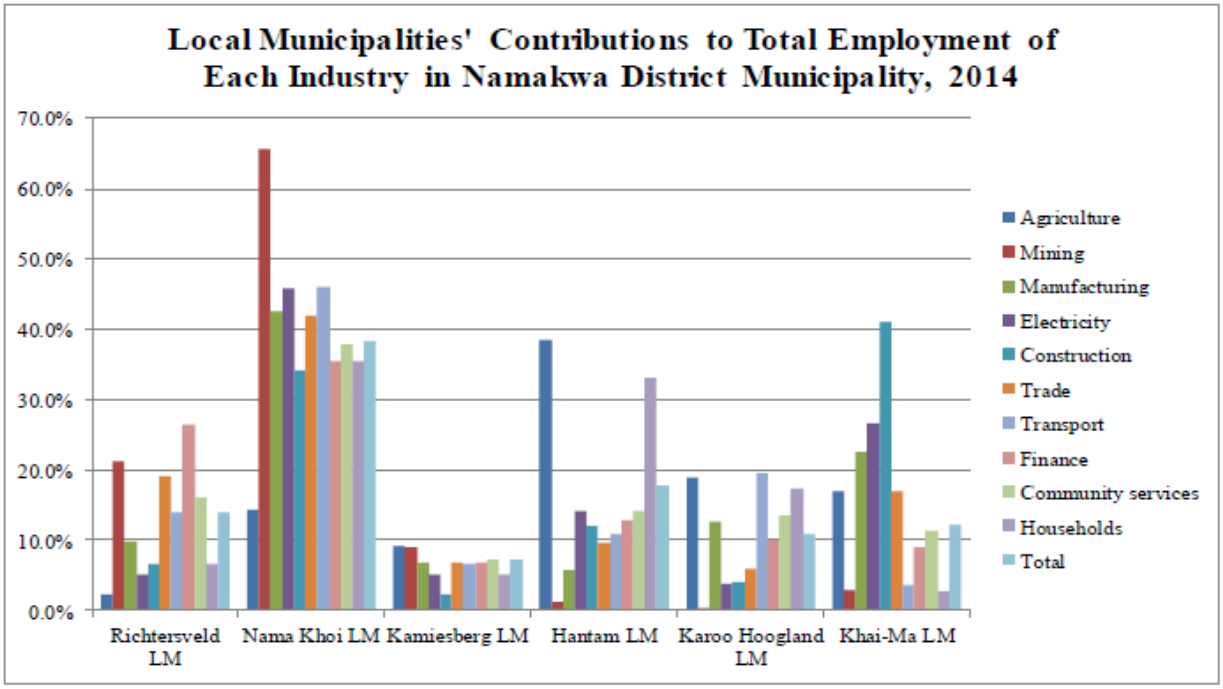


	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Namakwa DM	1.2%	1.1%	0.8%	0.3%	-0.8%	-0.8%	-0.6%	-0.4%	-0.1%	0.1%	0.2%
Nama Khoi LM	1.5%	1.2%	0.7%	-0.2%	-1.5%	-1.5%	-1.1%	-0.7%	-0.3%	-0.1%	0.0%
Kamiesberg LM	0.6%	0.3%	-0.3%	-1.4%	-2.8%	-2.8%	-2.2%	-1.7%	-1.3%	-1.0%	-0.8%
Hantam LM	1.3%	1.2%	0.8%	0.2%	-1.0%	-1.0%	-0.8%	-0.6%	-0.2%	0.0%	0.1%
Karoo Hoogland LM	1.1%	1.4%	1.7%	2.4%	2.0%	1.8%	1.1%	0.6%	0.8%	0.9%	0.9%
Khai-Ma LM	2.0%	1.4%	0.7%	-0.7%	-2.2%	-2.2%	-1.3%	-0.5%	0.0%	0.2%	0.3%
Richtersveld LM	0.0%	0.7%	1.6%	3.3%	3.6%	3.2%	2.0%	1.1%	1.0%	1.1%	1.1%

Nama Khoi had the largest number of people employed, unemployed, economically active and not economically active in 2004 and 2014. In 2014 Nama Khoi made the largest contribution to employment in the following industries (**Figure 7**): mining (65.6%), manufacturing (42.6%), electricity (45.7%), trade (42.0%), transport (46.0%), finance (35.4%), community services (37.9%) and households (35.3%). This municipality also employed the largest proportion of people in the district, accounting for 38.2 per cent of the people in formal employment.

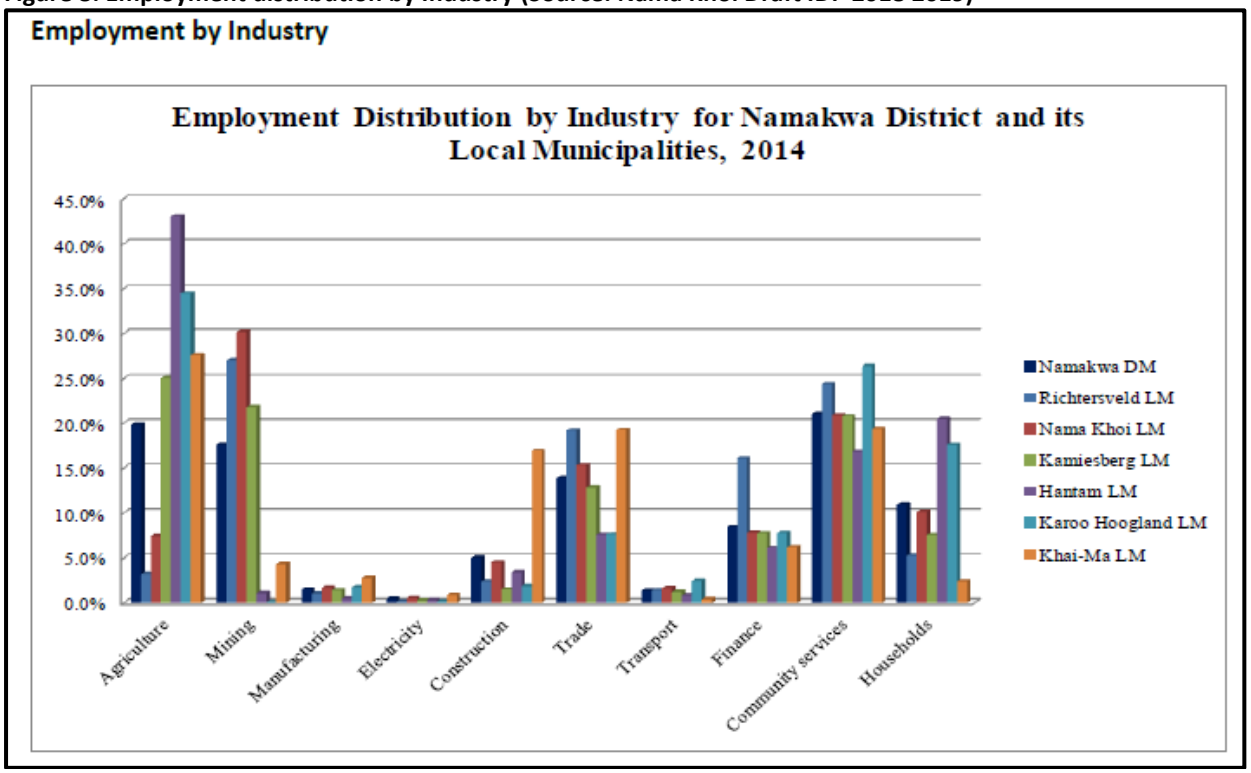
Figure 7: Employment Contributions by Local Municipality (Source: Nama Khoi Draft IDP 2018 2019)

Employment Contributions by LM



Mining was the largest employing industry in 2014 in Richtersveld and Nama Khoi as illustrated in **Figure 8** Below.

Figure 8: Employment distribution by Industry (Source: Nama Khoi Draft IDP 2018 2019)



8.1.12 Cultural, Heritage and Palaeontological Resources

8.1.12.1 Heritage Impact Assessment

A Heritage Impact Assessment was prepared by David Morris and Abenicia Henderson, dated June 2018 (McGregor Museum, Kimberley (attached as **Appendix C1**) and will be submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period.

As referenced from the HIA (on page 9): "Copper was discovered by Dutch colonials in 1685 in the Northern Cape province of South Africa during an expedition led by Simon van der Stel.
The beginning of commercial mining in the area only commenced once The South African Mining Company started mining operations in 1846 (Smalberger, 1975). In 1852, a company called Phillips and King purchased the farm upon which the town of Springbok is located today. Phillips and King owned the Spektakel, Nababeep and Okiep mines which were later taken over by the Cape Copper Company. Another company called Namaqua Copper Company had mining operations at Concordia, an area north east of Okiep. In 1919, the Cape Copper Company ceased their operations in the area due to the post First World War economic slump. Most of the mines today are inactive with only remnants of past usage.
Historically, both Okiep and Nababeep are important towns in the history of copper mining in Namaqualand (Smallberger 1995). Okiep was for many years the centre of the Namaqualand copper fields and was known at the turn of the 20th century as the richest copper mining area in the world. The mining town of Nababeep developed shortly after Okiep."

Most of the area traversed during the survey was found to have low occurrences of colonial and archaeological traces. The areas of immediate impact were the focus of the assessment and were as follows (**Appendix C1**; pages 13 and 14):
"On Portion 3 of the farm Nababeep 134: Fine Residue dam
In light of this area many surface scatters in terms of archaeology and pre-colonial traces were found. Three ovens- "bak oonde" were found in isolated areas across the terrain (co-ordinates indicated in Table 3); in close proximity to this were marked and unmarked porcelain, glass and ceramic sherds. From what could be identified

from one marked piece was the Royal Staffordshire Pottery: Wilkinson LTD England dinnerware symbol which was in use during the early 19th century. Finding ceramic pieces in close proximity to the burnt oven is indicative of occupation during that time.
Stonewalling structures which might have been used as a dwelling or kraal have also been found near the ovens as well as a 20th century homestead foundation. Surface scatters of lithics occur across the terrain in sparse isolated frequencies.
Upslope on the hilly area an MSA quartzite handaxe was found near what is perceived as the quartz source with no flaked nodules. Water slopes running downhill indicate that the surface scatters found in the plateau might have been washed down, from this possible platform of habitation. No rock art sites were found during a search of any of the rocky overhangs and shelters
Further north from the dam the landscape changes exposing a sandier area, which indicates that the area has been disturbed; it is also seen by the Mica piles (mining dumps) and demolished infrastructure that used to be there.

On portion 3 of the farm Nababeep 134 Wheat Flat Incline
No significant archaeological observations were made in this area. Isolated Stone Age and sparse scatters were recorded throughout the study area. The raw material used consists mostly of quartzite and quartz. Previous studies have mentioned similar landscapes to be either bereft of Stone Age traces or to have a very low frequency of occurrences (Kaplan 2010; Janeker & Mosajee 2010). From the small and isolated sample, it is difficult to comment definitively on typology but the material ranges from Pleistocene to Holocene.
This area has been previously disturbed and is indicated by the prospecting drill holes, bore hole, ventilation shaft and copper pegs- past remnants of mining activities which have already taken place.
Artefact densities were generally low and sporadic and therefore recorded as occurrences of low to very low archaeological significance. Quartz clusters in isolated areas could contain possible lithics but it is difficult to tell by the way quartz naturally brakes. It is therefore maintained that the proposed development will not have an impact of great significance on archaeological remains."
The sites listed in Table 3 of the AIA (on page 15) all have low significance are the co-ordinates are provided and mapped on page 16.
The report concluded that Precolonial/Stone Age material noted and investigated on farm Nababeep 134 was found to be of generally low significance.

- On archaeological grounds, the Stone Age occurrences, generally sparse, can be said to be of mainly low significance.
- For colonial era context, the site has a low to medium significance of occurrences in terms of physical heritage traces.

The report states that no mitigation is required, other than the need for monitoring during construction as artifacts could occur sub-surface.

The recommended mitigation measures for monitoring will be included in the EMPr, which is a component of the EIA Report.

8.1.12.2 Palaeontological Assessment
A desktop Palaeontological Assessment (attached as **Appendix C2**) was prepared by Professor Marion Bamford, Director of the WITS Evolutionary Studies Institute for ACO Associates. Professor Bamford stated that based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the gneisses, schists, granites, amphibolites and sands are typical for the country and do not contain any microfossils, fossil plant, insect, invertebrate and vertebrate material, and made the following recommendation:
"Based on the ancient volcanic rocks and the lack of any previously recorded fossils from the area, it is extremely unlikely any fossils would be identified in the proposed site. No further palaeontological assessment is required. As far as the palaeontology is concerned the project may continue."

8.2 Description of the current land uses

There are existing mining sites in the project area, as detailed in Section 3 above. The existing Mine Shaft known as Flat Mine North has been closed for a number of years. There are existing disturbed development footprints associated with the operation of the mine at that time in close proximity to FMN, such as a rock waste dump, and collection dam, and there is an old slimes dam further south (as shown on Diagram 5d) that has been identified as the best location for the MRDF.

Refer to **Figure 1** and Section 8.1.2 above, and **Figure 5** that shows the status of mines in the local area (the red dots represent deposits exploited, and the green dot is a dormant mine located in Nababeep).

8.3 Description of specific environmental features and infrastructure on the site

Refer to the Mine Site Plans (Diagram 5 and 5a to 5d) that provide an overview of the project site and the existing and proposed infrastructure of each mine site.

Figures 1 to 5 and the corresponding paragraphs in Section 8.1, provide a description of the environmental features on site.

8.4 Environmental and current land use map

Refer to **Figures 1 to 5** in Section 8.1 provided as part of the specific attributes of the proposed project site.

9 IMPACTS IDENTIFIED

The potential risks arising from the mining operation discussed in Section 3 above are applicable to the proposed mining right application as listed below.

9.1 Potential Risks/Impacts

9.1.1 Potential Risks with regard to mining underground

- Safety of personnel mining underground.
- Use of explosives.
- Management of dust, noise and vibration associated with blasting of ore.
- Ventilation required.
- Dewatering of groundwater required.
- Potential contamination of groundwater.
- Potentially dangerous areas like deep mine shaft or equipment left behind and uncontrolled access to a potentially unsafe post-mining area.

9.1.2 Potential risk of environmental impacts

- Waste classes not kept in separate streams and incomplete removal of waste.
- Large volumes of waste rock that requires a large waste rock dump site.
- Creation of waste rock residue deposits or stockpiles with infiltration of leachate due to inadequate basal sealing or leakage from sealed pollution control facilities.
- Stockpiles and leftover product left behind.
- Loss of indigenous vegetation.
- Increased erosion, dust generation and potential chemical contaminants reduce surface water quality or result in discharge that exceeds the maximum concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Oil fuel leaks onto virgin soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment in the field.
- Inadequate capping or sealing of the boreholes can lead to infiltration of potentially contaminated surface water leading to chemical or biological contamination of groundwater.
- Pumping of process water can discharge poor quality water exceeding minimum standards.
- Post mining landscape that increases the requirement for long term monitoring and management.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.

- Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations and power supply and water installations including pumps and pipelines.
- Equipment and other items used during the mining operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Post mining topography not compatible with original landform.

9.1.3 Potential risks with regard to viable and sustainable land

- Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure, resulting in loss of land with agricultural potential. Uncontrolled development of roads where existing farm roads are not used for mining operations and redundant internal roads are left behind. Duel used roads still needed by the landowner and fences not maintained or repaired.
- Post mining landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-mining conditions
- Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.
- Disturbance of agricultural potential and subdivision of high potential arable land into uneconomic farming units. Inadequate planning or loose development can subdivide high potential land or habitats into un-viable small areas.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas. Inadequate control of alien species can result in establishment of populations or seed sources that threaten adjacent areas.

9.1.4 Potential Risks with regard to stable, free draining post mining landform

- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope form which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from infrastructure areas is erosive, causing sheet, rill and donga erosion features.

9.1.5 Potential Risks with regard to benefits for the social environment

- No positive and transparent relationships with stakeholders and not maintaining communication channels by not providing stakeholders including government authorities with relevant information as per legislative requirements.
- Not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management system.
- Disturbance to sensitive environments such as land with historical or conservation value, urban areas, watercourses, high potential agricultural land, transport infrastructure, power transmission lines. Slow continuous damage to habitat e.g. wood collection are typical impacts on adjacent areas.
- Staff losing their jobs - mine closure can have devastating effects on communities that are reliant on mine-based income. Job losses of secondary industries, businesses and contractors. Contractual agreements with service providers surpassing mine closure date.
- Closure standards not accepted and/or are changing. Mine closure being jeopardised by other land uses.
- Poorly defined transition from mining to farming activities within different legislation.
- Mine closure stalled due to non-compliance with South African legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

9.1.6 Potential Risks with regard to aesthetic impact

Terrain morphology plays a critical role in defining the visual envelope of mining developments and can either reduce or enhance visual impact. Apart from visual intrusion there is also the risk of reduced sense of place. The visual intrusion impact of mining activity would be on nearby roads, homesteads, settlements and tourist sites.

- Visual disturbance from the public road views – excavations or overburden dumps blocking views. Large buildings, colour contrast of disturbed areas against adjacent veld or dust emission plumes.
- Nuisance effects of air emissions (dust) no implementation and maintenance of dust monitoring programs accompanied by dust suppression activities if required.
- Dust generated on haul roads reduces visibility, representing a safety hazard. Dust can retard vegetation growth and reduce the palatability of vegetation.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels.
- Noise disturbance and light pollution as a result of night-time activities.

9.1.7 Potential Risks with regard to archaeological sites, cultural heritage sites or graves

- Disturbance of unknown sub-surface archaeological sites if monitoring is not implemented as per mitigating measures in AIA (Appendix C1).
- Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

9.2 Potential Impacts and Risks associated with the Preferred Alternative

Refer to Section 6 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the reasoned deduction for the preferred and only alternative, that of the SAFTA Mining Right as per the Mine Plan shown in Diagram 5.0. The potential impacts and risks associated with this preferred and only alternative are listed in Table 11 below.

Table 11: Preferred Alternative: Potential Impacts and Risks per Phase per Activity

Phase	Activities	Potential Impacts & Risks	Significance (before mitigation)	Probability	Duration
CONSTRUCTION PHASE	Access & Haul Roads	Dust generation from vehicles using existing access and haul roads	Medium (-)	Definite	Short-term
		Soil compaction from repeated use of existing access and haul roads	Medium (-)	Definite	Short-term
	Construction of Site Establishment Activities for : • Processing plant and associated infrastructure • Water and wastewater infrastructure • Electricity infrastructure • Waste management • Stormwater control • Access roads	Topsoil stripping and stockpiling, soil erosion and soil compaction (land capability)	High (-)	Definite	Short-term
		Water resource pollution	High (-)	Possible	Short-term
		Biodiversity (wildlife and vegetation) disturbance from activities and vehicles	Low (-)	Definite	Short-term
		Soil contamination and waste management	Medium (-)	Possible	Short-Term
		Visual impact	Medium-High (-)	Definite	Short-term
		Emissions (Dust, vehicles, noise, light) causing nuisance from top soil stripping, site establishment activities and vehicles	Medium(-)	Definite	Short-term
		Socio-economic impact on job security, employment creation and economic spin-offs	High (-)	Definite	Short-term
		Impact on heritage artefacts, heritage sites or grave yards	Very Low (-)	Unlikely	Long-term
OPERATIONAL PHASE	Services and associated infrastructure Primary Processing operation Water and wastewater management Waste generation and management Fine Residue Deposit Waste rock dumps Access roads	Change in topography	High (-)	Definite	Long-term
		Erosion control or runoff diversion structures and soil compaction (land capability)	High (-)	Definite	Long-term
		Water resources: process and potable water obtained from boreholes and recycled during operation; WULA for abstraction for full production volumes to be applied for; watercourse impacted on by activities; dewatering of mine shafts; potential for groundwater pollution from hydrocarbons.	High (-)	Definite (use of groundwater) Possible (water pollution)	Long-term
		Biodiversity (wildlife and vegetation) disturbance from activities	Low (-)	Definite	Long-term
		Soil contamination and waste management	High (-)	Possible	Short-Term
		Visibility of mining operations	Medium-High (-)	Definite	Long-term
		Dust, vehicle, noise and light emissions from site activities	Medium (-)	Definite	Long-term
		Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)	High (-)	Definite	Long-term
		Impact on heritage artefacts, heritage sites and grave yards	Very Low (-)	Unlikely	Long-term

DECOMMISSIONING PHASE	Rehabilitation of the mining right area: shaping landscape profile; landscape the waste rock dumps; scarifying compacted areas and vehicle tracks; & replacing topsoil, etc..	Rehabilitation: Visibility of the rehabilitated mining operations; Biodiversity (wildlife and vegetation) disturbance from vehicles; Dust and vehicle emissions from rehabilitation activities; Erosion control or run-off diversion structures	Medium (-)	Definite	Long-term
		Socio-economic impacts: employment during rehabilitation and decommissioning activities followed by end of employment contracts once Mining Right has expired.	Medium (-)	Definite	Short-term

9.3 Potential Impacts and Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The No-Go Alternative implies that the Applicant would forgo an opportunity to provide employment opportunities in an area and sector identified for opportunities for job provision and economic growth. There is a renewed demand for copper due to advances in technology, resulting in the potential for re-investment in an existing copper mine. This potential would not be reached with the "no-go" option.

9.4 Methodology used in determining significance of potential impacts

Refer to Table 12 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed mining activity for the Preferred and Only Alternative. Each impact is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation.

Table 12: Impact Assessment Criteria

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
High	The impact would result in significant cumulative effects
Medium	The impact would result in moderate cumulative effects
Low	The impact would result in minor cumulative effects
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
High	The impact could be significantly avoided/managed/mitigated.
Medium	The impact could be fairly avoided/managed/mitigated.
Low	The impact could be avoided/managed/mitigated to a limited degree.
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact from occurring.

9.5 The positive and negative impacts that the proposed activity and alternatives will have

Positive impacts

- Creation of employment and job security with economic spin-offs.
- Provision of copper and tungsten for international markets.
- Income generation for landowners.
- Access road upgrading.

Negative impacts

The key potential negative impacts associated with the mining activity include the following:

- Site access:
  - Disturbance of onsite fauna and flora
  - Soil compaction from repeated use of access tracks
- Site Establishment Activities (including: topsoil stripping and stockpiling, placement of logistics, waste generation and management)
  - Visual intrusion.
  - Emissions (dust, vehicle and noise) from top soil stripping; vehicle and machinery.
  - Wildlife and vegetation disturbance from site preparation.
  - Contamination and disturbance of topsoil and soil from compaction and soil disturbance due to topsoil stockpiling
  - Waste generation.
  - Water use from boreholes
  - Dewatering of the mine shafts
- Mining of copper and tungsten and processing activities:
  - Noise caused by the machinery and vehicles on site, and by vehicles going to and from the mining site
  - Blasting noise and vibration
  - Visibility of the mining operations
  - Dust emissions from general site activities (vehicle entrained dust)
  - Disturbance of biodiversity from vehicles
  - Water use from boreholes
  - Dewatering of mine shafts
  - Contamination from hydrocarbon spills and compaction on access tracks
  - Use of hazardous chemicals in processing
  - Disposal of fine residue deposits
  - Disposal of sewage from logistics, and waste water form mining operations
  - The specialist heritage resources scoping report is attached at **Appendix C1** and recommendations included under section 8.1.12 above, and will be submitted to the South African Heritage Resources Agency (SAHRA) during the 30 day public participation comment period. Any additional recommendations and/or mitigation measures stipulated by SAHRA will be included in the EIA Report.
- Rehabilitation of the mining area, scarifying compacted areas and vehicle tracks
  - Mine shaft stability and slope stability
  - Dust emission from decommissioning activities (vehicle entrained dust)
  - Soil erosion of topsoil

9.6 The possible mitigation measures that could be applied

Refer to Table 14 for the potential mitigation measures included under each impact.

9.7 The outcome of the Site Selection Matrix & Final Site Layout Plan

Refer to Diagram 5 for the overall mining right site plan and Diagrams 5a to 5c for the site plan for each component, which is presented as part of the Scoping Phase stakeholder engagement process.

9.8 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives will not be considered in the Impact Assessment Phase, reasons have been provided in Section 6 above.

9.9 Statement Motivating the Preferred Sites

Refer to Section 6 above. The project site has been selected based on the results from prospecting. The layout and technology of each mine shaft and associated infrastructure has been determined by the shape, position and orientation of the mineral resource, Refer to the Overall Site Plan included as Diagram 5. The existing

infrastructure and access roads will be utilised, and existing dump sites expanded where indicated. The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.

In summary therefore:

- The Preferred and Only Alternative is the Mining and Primary Processing of copper and tungsten on the Mining Right area demarcated in Diagram 2 and Diagram 5.
  - The preferred and only **location** alternative of the mining activity is on the earmarked sites shown on the Mine Site Plan as per Diagram 5. The location of the mining logistics, processing components and associated infrastructure have been positioned in relation to the location of the mineral resource below ground, the existing mine shaft at FMN, the existing disturbed footprints in close proximity to FMN, and the suitable topography of these sites for these structures. In addition, the linear type infrastructure such as the electricity supply follows the existing lines of development, such as the existing access road to the north of Nababeep.
  - The preferred and only **activity** alternative is the mining of copper and tungsten based on the mineral resources investigated during prospecting.
  - The preferred and only **technology** alternative for the underground mining, extraction, processing, waste and water management, and use of electricity are those described in Section 6.5.above.
  - The preferred and only **operational** alternative is the highly mechanised underground mining method of long-hole open stoping, and the above-ground primary processing activities (crushing and screening; Milling Circuit; Reagent Make-up and conditioning; Flotation circuit; and, Product Handling) as illustrated in the Plant Flowsheet (Diagram 20).

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

10 PLAN OF STUDY OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

10.1 Description of alternatives to be considered including the option of not going ahead with the activity

Refer to Section 6 and Section 9.9 above.

10.2 Description of the aspects to be assessed as part of the environmental impact assessment process

The aspects to be assessed are listed in Table 14.

10.3 Description of aspects to be assessed by specialists

The following specialist assessments have been identified for further assessment and inclusion in the EIA Report:

1. Mine Residue Disposal Facility (MRDF):

Requiring compliance with NEMWA GNR632 (dated 24 July 2015), and GNR634 pertinent to the waste classification of the tailings stream, and the requirement for lining the MRDF.

A detailed investigation is required to address the following areas for inclusion in the EIA phase:

- A full geotechnical investigation must be conducted to determine the suitability of the available in-situ materials for use as construction materials, depth to bedrock/refusal, depth of in-situ materials, foundation indicators of the in-situ soils, shear strength parameters of the in-situ soils; permeability/hydraulic conductivity of the in-situ soils; identification of any natural fault lines; and the volumes of material available and where borrow pits may be instated;
- The sizing of the SWD is to be confirmed by a detailed water balance, which includes accurate rainfall and evaporation data and confirmation of the design flood depths;
- A seepage assessment and slope stability analysis must be conducted to confirm the geometry and drainage requirement of the TSF, RWD, and SWD;
- The Zone of Influence should be determined to establish the potential hazard posed to nearby water resources, settlements, and sensitive flora and fauna; and,
- An extension to the existing topographical survey would be required.

The geochemical properties of a representative sample of the tailings must be determined by an accredited laboratory to determine the Waste Classification according to NEMWA and the corresponding Liner requirements, and the geotechnical parameters of the sample tested to determine strength and seepage parameters.

2. **Geo-hydrological Impact Assessment** to inform Water Use Licence Application (WULA).
3. **Stormwater Management Plan** required as component of the WULA.
4. **Water Use License Application, with Integrated Water and Wastewater Management Plan (IWWMP)**.

Any additional detailed specialist studies required in the EIA phase will be identified following comment on the Draft Scoping Report.

10.4 Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

The impact assessment methodology that Green Direction will use in the EIA Phase is described in Section 9.4 above and is included in Table 12.

10.5 The proposed method of assessing duration significance

Refer to Section 9.4 above and Table 12.

10.6 The stages at which the competent authority will be consulted

The competent authority (Northern Cape Department of Mineral Resources) will be consulted in each phase of the EIA process. This includes:

- Pre-application;
- Scoping Phase; and
- Impact Assessment Phase.

10.7 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

10.7.1 Steps to be taken to notify interested and affected parties

The stakeholder engagement process initiated during the Scoping Phase (see Section 7) will continue in the Impact Assessment Phase of the EIA.

The key activities planned during the Impact Assessment Phase are outlined in Table 13 below.

Table 13: I&AP engagement activities planned during the Impact Assessment Phase

Task	Objectives	Timeframe
Update I&AP database	To register additional, I&APs throughout the Scoping & EIA Report (S&EIR) process	Throughout S&EIR process
Compile and release EIA Report for public comment	To assess the impacts of the project and formulate mitigation measures and management plans	Impact Assessment Phase
Public comment period	To provide I&APs with the opportunity to review and comment on the results of the Impact Assessment Phase	Impact Assessment Phase
Finalise EIA Report	To present the findings of the EIA process and incorporate I&AP comment in the final report which provides DMR with information for decision-making	Impact Assessment Phase

10.7.2 Details of the engagement process to be followed

Refer to Table 13 above.

10.7.3 Description of the information to be provided to Interested and Affected Parties

Refer to Table 13 above.

10.8 Description of the tasks that will be undertaken during the environmental impact assessment process

The Impact Assessment Phase can be divided into key steps and outlined further below:

- Consultation with relevant authorities
- Detailed specialist studies
- Completion of the EIA Report and an EMPr, including a Closure, Decommissioning and Rehabilitation Plan;
- Stakeholder engagement; and,
- Submission of the Final EIA Report, EMPr and Closure, Decommissioning and Rehabilitation Plan to the competent authority, DMR.

Consultation with the Relevant Authorities

Consultation will be conducted with DMR and other relevant authorities to clarify their requirements for the Impact Assessment Phase of the proposed development, other permit and license applications for the project and to ensure that comments from the key authorities can be received in time to allow for them to be addressed in the EIA. The authorities (and other organs of state) that will be consulted include:

- DMR
- DWS
- DENC
- SAHRA
- Namakwa District Municipality
- Nama Khoi Local Authority

Specialist Studies

Detailed specialist assessments will be undertaken to investigate in detail any key potential environmental issues and impacts initially identified during Scoping that require further detailed investigation, and following comment from the DMR.

Compilation of the Environmental Impact Assessment Report

The compilation of the EIA Report and EMPr will include the following tasks:

- Assimilation of any detailed specialist studies / input into the EIA Report and EMPr;
- Identification and assessment of environmental impacts based on the results of any specialist studies / input and professional judgment of the EIA team. This will entail an assessment of the duration, extent, probability and intensity of the impacts to determine their significance; Identification of mitigation measures and recommendations for the management of the proposed project to avoid and minimise environmental impacts and maximise benefits; and,
- Collation of the above information into an EIA Report and EMPr for the design, construction and operational phases of the project.
- Preparation of a Closure, Decommissioning and Rehabilitation Plan.

Stakeholder Engagement

The key stakeholder engagement activities planned during the Impact Assessment Phase are outlined in Table 13.

Submission of the Final EIA Report and EMPr to DMR

All comments received will be incorporated into the Issues and Responses Summary. The Final EIA Report, including the EMPr and Closure, Decommissioning and Rehabilitation Plan, will then be submitted to DMR to inform their decision regarding environmental authorisation of the proposed development.

11 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

The impacts and mitigation measures included in Table 14 are preliminary and will be re-visited in the EIA Phase, with further details included in the EMPr.

Table 14: Potential Residual Risk Pre-& Post-Mitigation for the Preferred & Only Alternative

NAME OF ACTIVITY	PHASE In which impact is anticipated	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
POST APPROVAL ACTIVITIES						
Negotiate access with landowner – roads to be used and open or close status of gates to be used	Planning and design	• Loss of vegetation and associated biodiversity • Loss of livestock (gates left open)	• Biodiversity • Landowner's assets	Low (-)	• Unnecessary destruction of vegetation avoided by ensuring that traffic and personnel movement is restricted to demarcated areas. No traffic should be allowed on the rehabilitated areas. • Ensure all gates are kept closed and locked as required by the landowner.	• Low (-)
Demarcate mining area as defined in MWP and EMPr		• Non-compliance	Legal compliance	High (-)	• Ensure that mining activities are contained within approved boundaries.	• Low (-)
SITE ACCESS & SITE ESTABLISHMENT ACTIVITIES						
Conduct Environmental Induction training of staff	Construction	• Poor management of environmental impacts	General environmental management	• Medium (-)	• Hydrocarbon and waste management • Dust control • Traffic safety	• Low (-)
Upgrading of existing access roads	Construction	• Soil compaction • Traffic safety • Stormwater control • Surface water pollution • Material stockpiling	• Land capability • Water resources	• Low (-) • Medium (-)	• Water resource management • Hydrocarbon and waste management • Dust reduction • Traffic safety • Scarify compacted areas during rehabilitation	• Low (-)

Constructing new access roads	Construction	• Soil Erosion • Loss of biodiversity • Emissions (dust, vehicles & noise) • Topsoil removal and stockpiling • Stormwater run-off • Traffic safety • Hydrocarbon & waste management • Material stockpiling • Mobile ablution facilities	• Land capability • Biodiversity • Water quality • Air quality • Visual landscape • Socio-economic spin-offs (+)	• High (-) • Low (-) • High (-) • Medium (-) • Medium-High (-) • High (-) [no jobs & no local spinoffs]	• Topsoil management • Demarcate areas for development footprints • Dust reduction • Hydrocarbon and waste management • Mobile ablutions facilities • Job creation (+) & local economic spin-offs (+)	• Low (-) • Very Low (-) • Low (-) • Low (-) • Medium-Low (-) • High (+)
Constructing electrical supply	Construction					
Constructing water and waste water infrastructure	Construction					
Prepare areas for development footprints as per Diagram 5: mine logistics; processing plant; RoM stockpile areas; waste rock dump site; Mine Residue Disposal Facility (MRDF); Hydrocarbon storage	Construction					
Resurrect boreholes and upgrade if required	Construction	Water availability	Groundwater resources	• High (-)	• Groundwater extraction within limits set by DWS for Quaternary Catchment (WUL to be applied for) • Prevent contamination of borehole.	• Medium (-)
OPERATIONAL PHASE ACTIVITIES						
Underground Mining	Operational	• Noise and vibration during blasting • Hazardous materials storage and usage • Dust generation • Pollution of groundwater resources • Water use • Waste management • Effluent/sewage control • Power supply	• Groundwater resources • Waste generation • Energy supply • Community safety (blasting & vibrations)	• High (-) • High (-) • Low (-)	• Dust control • Traffic safety below ground associated with heavy machines • Hydrocarbon management • Material management • Mobile ablution facilities • Waste management. • Groundwater management (dewatering) and pollution prevention • Back-up generators • Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA.	• Medium (-) • Low (-) • Low (-)

Processing activities	Operational	• Management of emissions (dust & noise) • Water use • Light Pollution • Water pollution • Waste management • Visual impact • Light pollution • Hazardous materials storage and usage	• Land capability • Emissions • Water resources • Waste generation • Air quality • Visual landscape	• Medium (-) • High (-) • High (-)	• Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA. • Water management:-Integrated Water and Wastewater Management Plan (IWWMP) Action Plan (component of WULA) • DWS Best Practice Guidelines for Stormwater Management • Hydrocarbon and waste management • Screening where possible	• Low (-) • Medium (-) • Medium (-)
Transporting hard rock materials (RoM ore to RoM stockpiles and waste rock to waste rock dump site)	Operational	• Management of emissions (dust, and noise) • Waste generation • Access roads compaction and erosion	• Air quality • Waste management • Soil erosion and stormwater control	• Medium (-) • Medium (-) • Medium (-)	• Dust and emissions control • RoM management • Waste rock dump management • DWS Best Practice Guidelines for Stormwater Management (G1) • Traffic safety	• Low (-) • Low (-) • Low (-)
Use of all facilities and amenities associated with mine logistics	Operational	• Management of emissions (dust, noise & light) • Water usage and pollution • Waste and effluent generation • Access roads compaction and erosion	• Air quality • Visual landscape • Waste management • Soil erosion and stormwater control	• Medium (-) • Medium (-) • Medium (-)		

DECOMMISSIONING PHASE ACTIVITIES						
Secure mine shafts and fence off access securely	Decommissioning Rehabilitation	• Security	• Land capability	High (-)	Decommissioning and Closure Plan to be included in EIA Phase	Low (-)
Cover waste rock dump leading edge with sand removed prior to extension.	Decommissioning Rehabilitation	• Topography • Visual	• Land capability • Landscape • Biodiversity	Medium (-)	Waste rock dumping management and rehabilitation	Very low (-)
Rip all hardened areas	Decommissioning Rehabilitation				Allow to revegetate naturally	Very low (-)
Remove all structures, foundations & footings not required by landowner	Decommissioning Rehabilitation				Rehabilitation according to Rehabilitation, Decommissioning and Closure Plan to be included in EIA Phase	Very Low (-)

12 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

12.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998)

The EIA report must include the: -

(1) Impact on the socio-economic conditions of any directly affected person
Potential socio-economic impacts will be addressed by the specialists who will prepare the Social and Labour Plan which will be completed after the EIA process due to the nature of the process involved. High level socio-economic impacts and mitigation measures are included in Table 14.

A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected and interested persons with the opportunity to raise any potential concerns. Concerns raised will be captured and addressed within the public participation section of this report (attached as **Appendix B**) to inform the decision-making process.

2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
A Heritage Impact Assessment (attached at **Appendix C1**) and a Palaeontological Impact Assessment (**Appendix C2**) has been prepared and is submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. Recommendations in this report are included in Section 8.1.12 above, and any additional measures stipulated by SAHRA will be included in the EIA Report and EMPr.

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

Section 2 of NEMA sets out a number of principles (see section 5.9 above) that are relevant to the:

- EIA process, such as:
  - Adopt a risk-averse and cautious approach;
  - Anticipate and prevent or minimise negative impacts;
  - Pursue integrated environmental management;
  - Involve stakeholders in the process; and
  - Consider the social, economic and environmental impacts of activities; and
- Project such as:
  - Place people and their needs at the forefront of concern and serve their needs equitably;
  - Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
  - Assume responsibility for project impacts throughout its life cycle; and
  - Polluter bears remediation costs.

This EIA process complies with the principles set out in section 2 of NEMA through its adherence to the EIA Regulations, 2014, and associated guidelines, which set out clear requirements for, inter alia, impact assessment and stakeholder involvement, and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

- The Preferred and Only Alternative will be considered in the Impact Assessment Phase (see Section 6).
- The potential social and environmental impacts of the project will be identified, assessed and evaluated using Green Direction's impact assessment methodology (Section 9.4) to understand the significance of each positive and negative impact.
- An EMPr will be compiled to ensure that potential environmental impacts are prevented or minimised.
- Mitigation measures will be recommended in the Impact Assessment Phase to allow for unavoidable impacts on the environment and people's environmental rights to be minimized and remedied.
- Opportunities for public participation are allowed for in the EIA process.
- The needs and interests of I&APs will be taken into account.
- All relevant information will be made available for public comment before submission to DMR, as part of the public participation process.
- Comments made by the relevant government departments will inform the decisions taken by DMR regarding Environmental Authorisation of the project.

13 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, **Jennifer Anne Barnard** herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

TO BE SIGNED FOLLOWING PUBLIC CONSULTATION ON THE DRAFT SCOPING REPORT

_____

Signature of the EAP

DATE

14 UNDERTAKING REGARDING LEVEL OF AGREEMENT

TO BE COMPLETED FOLLOWING THE PUBLIC CONSULTATION PROCESS

I _____herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

_____

Signature of the EAP

DATE:

15 REFERENCES

Heritage Impact Assessment Report for the proposed mining extensions on farm Nababeep 134, Namaqualand, Northern Cape. June 2018. Prepared by David Morris and Abenicia Henderson, of the McGregor Museum, KImberley

Nama Khoi Draft Integrated Development Plan (IDP) 2018 2019.

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SAFTA Copper Project Pre-Feasibility Study Report for the Mine Residue Disposal Facility. May 2018. Prepared by epoch mine residue and environmental engineering consultants.

SMS Nababeep Shaft Water Quality: Geochemical Baseline Assessment, Technical Report AS-R-2014-01-23 prepared by AGES. January 2014

16 APPENDIXES

16.1 Appendix A: CV OF EAP

Summary of the Environmental Assessment Practioner's Experience

Jennifer Barnard has been registered with the South African Council for Natural Scientific Professions since 2009, and was awarded certification as an Environmental Assessment Practioner (EAP) by the Interim Certification Board of South Africa in 2010. She has worked on numerous Environmental Impact Assessments, both in South Africa and the United Kingdom and has considerable experience in the preparation and compilation of Environmental Impact Reports, Environmental Management Programmes, Environmental Audits, and Environmental Management Frameworks, including construction monitoring where required. She has been working in the environmental consultancy field for 20 years, and prior to that in the KwaZulu-Natal Provincial Local Government and Development Planning (Environmental Planning and Policy Division) for 5 years.

Specific examples of private consultancy EAP experience include:

- Project Manager for numerous Basic Assessments for Eskom Distribution and CapeNature in the Western Cape.
- Project Manager and Lead EAP of the Eskom Transnet Coal Link Suite of Projects (in terms of the NEC2 Contract with EIA project value of R6 million), spanning both Mpumalanga and KwaZulu-Natal.
- Project Manager and Lead EAP of two SANRAL Road Upgrades on the N7, that included Borrow Pits.
- EAP for various Basic Assessments and EIAs in the Northern Cape for agricultural activities, and related Water Use General Authorisation Risk Matrices.
- Water Use General Authorisation for a sand mining outside Pella, Northern Cape.
- EAP for Basic Assesment and Water Use General Authorisation for a Sand Mining Application in the Hartbees River, Kakamas, Northern Cape.
- EAP for Basic Assessment for Kaoline Mining outside Garies in the Northern Cape.
- EAP for three Granite Mining Right Applications located to the north-east of Pofadder, including the Water Use License Application, and Integrated Water and Wastewater Management Plan.

16.2 Appendix B: Public Participation Process Report

Registered Letter with Registration Form

16.3 Appendix C1: Archeological/Heritage Impact assessment scoping report

16.4 Appendix C2: Paleontological Impact assessment

16.5 Appendix D: Water Quality Baseline Report

16.6 Appendix E: Mine Residue Disposal Facility Pre-Feasibility Report