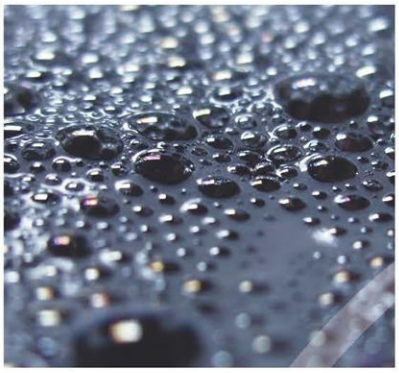




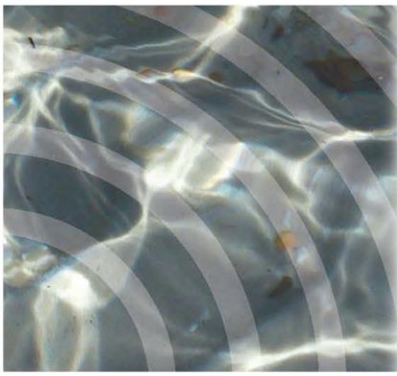
DRAFT REVISED AND UPDATED ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Tendele Coal Mining (Pty) Ltd

May 2024











M²ENCO

Tel: 012 004 0362 | Fax: 086 621 0292 | Web: www.menco.co.za | PO Box 2047, Garsfontein East, 0060

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT REVISED AND UPDATED

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED, BY TENDELE MINING (PTY) LTD ("TENDELE") FOR PURPOSES OF THE PENDING APPEAL BEFORE THE MINISTER OF MINERAL RESOURCES AND ENERGY IN ACCORDANCE WITH THE ORDER OF THE PRETORIA HIGH COURT OF 4 MAY 2022

Name of Applicant	Tendele Mining (Pty) Ltd
Tel No	011 706 1644
Fax No	Not applicable
Postal Address	PO Box 6070, Rivonia, 2128
Physical Address	37 Peter Place, Lyme Park, Bryanston, 2021
File Reference Number SAMRAD	KZN30/5/1/2/2/10041MR

This draft revised and updated EIA/EMPr documentation has been prepared by M2 Environmental Connections (Pty) Ltd

Report Type:	Draft revised and updated EIA and EMP Report
Project:	Somkhele Extension Project
Project Reference No:	KZN30/5/1/2/2/10041MR
Report Number:	TEN/EIA/04/2024/V2.5

Document Control

Name	Responsibility	Signature	Date
Johan Maré	Report Compiler		15 May 2024
Dr Michelle Thompson	Reviewer		
Deon Esterhuizen	EAP Reviewer		
Pierre Louw	Client Approval		

IMPORTANT NOTICE AND BACKGROUND INFORMATION

This document constitutes a draft revised Environmental Impact Assessment and Environmental Management Program ("**EIA/EMPr**"), (hereinafter referred to as the Draft 2024 EIA/EMP), and updates the 2014 **EIA/EMPr** previously submitted by Tendele to the Department of Mineral Resources and Energy ("**DMRE**") in June 2014.

Lomqulu uhlanganisa uhlaka lwe Environmental Impact Assessment and Environmental Management Program (EIA/EMPr) olubuyekeziwe, (lapha ezobizwa ngokuthi yi-Draft 2024 EIA/EMP), uphinde ubuyekeze i-2014 EIA/EMPr eyathunyelwa ngaphambilini yiTendele eMnyangweni wezimbiwa phansi (DMRE) ngo Juni 2014.

The 2014 EIA/EMPr was submitted in support of an application submitted by Tendele for a Mining Right for an area known as Areas 4 and 5 situated to the north and west of the existing Somkhele Mine located on Reserve No. 3, in the Magisterial District of Mtubatuba, KwaZulu Natal Province.

i-EIA/EMPr yango-2014 yathunyelwa ngokweseka isicelo seLungelo Lokumayina esasithunyelwe yi-Tendele sendawo eyaziwa ngokuthu ngu Area 4 and 5 esenyakatho nentshonalanga yeSomkhele Mine etholakala ku Reserve No. 3, eMtubatuba, esifundazweni sa-KwaZulu Natali.

In November 2018, the Mfolozi Community Environmental Justice Organisation ("**MCEJO**") launched judicial review proceedings to set aside –

NgoNovemba 2018, iMfolozi Community Environmental Justice Organisation (MCEJO) yathula isicelo sokubuyekezwa esebeka eceleni -

1. the decision of the Director-General of the DMRE ("**DG**") of May 2016 to grant a Mining Right to Tendele in respect of Areas 4 and 5 ("**Areas 4 and 5 MR**");

   isinqumo sikamqondisi jikelele wase-DMRE (DG) sango Meyi 2016 sokunikeza iTendele iLungelo Lokumayina lezindawo ezizwa ngikuthi uArea 4 no 5.

2. the decision of the Regional Manager, KZN Region of the DMRE ("**RM**") of October 2016 to approve the aforesaid EIA/EMPr; and

   isinqumo semenenja yesifunda, esofundeni sase-KZN se-DMRE (RM) sango Okthoba 2016 sokugunyaza i-EIA/EMPr eshiwo ngenhla; kanye

3. the decision of the Minister of June 2018 to dismiss MCEJO's appeal against the two aforesaid decisions.

Nesinqumo sikangqongqoshe sango Juni 2018 sikuchitha isikhalazo so-MCEJO sokumelana nalezi zinqumo ezimbili ezishiwo ngenhla.

The Area 4 and 5 MR was initially granted over a vast area encompassing 10 locations of potential mineable reserves identified during prospecting operations undertaken in Areas 4 and 5. During the course of the review proceedings, Tendele abandoned 92% of the area comprising the Area 4 and 5 Mining Right and retained only those areas which it requires in order to keep the Mine operating in the short to medium term. These are the Emalahleni, Ophondweni and Mahujini areas, which will ensure the continuation of the Somkhele Mine ("**the Mine**") for approximately 10 years.

Ekuqaleni iLungelo Lokumayina lezindawo Area 4 no 5 lalifaka indawo enkulu eyengamelwe zigodi ezingu-10 ezatholakala ngesikhathi kuhlonzwa ilahle ezindaweni iArea 4 no5. Ngesikhathi kuqhubeka uphenyo, iTendele ibe isidedela ingxenye elinganiselwa ku 92% wezindawo zelungelo lokumayina ezingaphansi kuka Area 4 no 5 bagcina kuphela lezo zindawo abazidingayo ukuthi imayini iqhubeke isebenze isikhashana. Lezi zindawo yisEmalahleni, Ophondweni kanye naseMahujini, okuzoqinisekisa ukuthi iSomkhele Mine (the Mine) izoqhubeka iminyaka elinganiselwa kwengu 10.

Judgment in the judicial review proceedings was handed down by Bam J in the Pretoria High Court on 4 May 2022. Although Bam J declared both the DG's decision to grant the Areas 4 and 5 MR to Tendele and the RM's decision to approve the EMPr invalid, neither decision was set aside by Bam J. Instead, Bam J remitted MCEJO's appeal back to the Minister for reconsideration together with any new information placed before him by Tendele, MCEJO or any other Interested and Affected Party ("**I&AP**"), which new information must be subjected to a comprehensive public participation process. Tendele is of the reason that in deciding not to set aside the Areas 4 and 5 MR, Bam J recognised the importance of the Somkhele Mine.

Isinqumo sokuqulwa kwecala sakhishwa uBam J Enkantolo Ephakeme yasePitoli ngomhlaka 4 Meyi 2022. Nakuba uBam J ephakamise zombili izinqumo, esika DG sokunikeza iTendele ilungelo lokumayina kuAreas 4 no 5 kanye Nesika RM sokugunyaza i-EMPr njengezingekho emthethweni, asikho isinqumo esabekwa eceleni ngu Bam J. kunalokho uBam J wabuyisela isicelo soMCEJO kungqongqoshe ukuze sicutshungulwe kabusha kanye nanoma yiluphi ulwazi olusha olulethwe phambi kwakhe, yiTendele, uMCEJO noma iyiphi enye inhlangano enentshisekelo nethintekayo (I&AP), okuwukuthi ulwazi olusha kumele lube ngaphansi kwenqubo ebanzi yokubamba iqhaza komphakathi. ITendele ikholelwa ekutheni isizathu sokuthi uBam J akhethe ukungalibeki eceleni ilungelo

lokumayina (MR) ka Areas 4 no 5, yingoba uBam J wakubona ukubaluleka kweSomkhele Mine.

The Tendele legal position at present therefore is that the Area 4 and 5 MR and its associated EMPr remain in place and Tendele as decided to commence miming on this basis, although both of the documents are subject to the pending Appeal before the Minister.

Ngokomthetho ilungelo lokumayina (MR) lezindawo Areas 4 no 5 kanye ne EMPr ehambisana nalo kusasemthethweni futhi ngalokhu iTendele isinqume ukuqala ukumayina, yize imibhalo yomibili ingaphansi kwesilhalazo esisalinde ngaphambi kukaNgqongqoshe.

Following the order of Bam J, Tendele proceeded with the following–

Ngokulandela umyalelo ka Bam J, iTendele yaqhubeka nalokhu okulandelayo –

1. Tendele notified interested and affected parties ("**I&APs**") of the order of Bam J and invited I&APs to participate in the Appeal proceedings;
   ITendele yazisa abathintekayo nabanentshisekelo (I&Aps) ngomyalelo ka Bam J futhi yamema ama I&Aps ukuthi abambe iqhaza kulenqubo yokubuyekezwa kwesicelo;
2. Tendele appointed suitably qualified experts and specialists, including suitable Environmental Assessment Practitioner ("EAP") to facilitate and run the appeal proceedings;
   Itendele yaqoka ochwepheshe abaqeqeshwe ngokufanele kanye nongoti, okufaka Phakathi noMhloli weZemvelo (EAP) ukuba bahole baphinde baqhube inqubo yokubuyekezwa kwesicelo;
3. Tendele appointed M2 Environmental Connections (Pty) Ltd ("MENCO") as Independent consultants to prepared a 2024 Scoping Report, which was subjected to public participation in accordance with the provisions of the Environmental Impact Assessment Regulations, 2014 ("**EIA Regulations**") read with the Public Participation Guideline and the final 2024 Scoping Report was submitted to the DMRE and other stakeholders on 11 March 2024;
   ITendele iqpke iM2 Environmental Connections (Pty) Ltd (MENCO) njengongomxhumanisi ozimele ukuze ilungise iScoping Report sika 2024 owabe wenziwe nggaphansi kwenqubo yokubamba iqhaza komphakathi ngokuhambisana ngezinhlinzeko zemithethonqubo yokuhlolwa kwemithelela kwezemvelo ka 2014 (EIA regulations 2014, efundwa ngokuhlanganiswa nomhlahlandlela wokubamba

iqhaza komphakathi. I-Final Scoping Report yathunyelwa kwa-DMRE nakwabanye ababambiqhaza ngomhlaka 11 Mashi 2024.

4. MENCO appointed specialists undertook specialist studies which informed the preparation of the draft reviewed 2024 EIA/EMP; and
   I-MENCO yaqoka ochwepheshe abazokwenza ucwanongo oluzosetshenziswa ekulungisweni kombiko we 2024 EIA/EMP; futhi
5. MENCO prepared this draft reviewed 2024 EIA/EMP, which was subjected to public participation in terms of the EIA Regulations read with the Public Participation Guideline.
   iMenco ilungise umbiko obuyekeziwe i-2024 EIA/EMP eyenziwa ngaphansi kwenqubo yokubamba iqhaza komphakathi ngokwemithethonqubo ye EIA ifundwa ngokuhlanganyela nomhlahlandlela wokubamba iqhaza komphakathi.

In addition to the above, Tendele reported that they have obtained consent from the communities in Emalahleni and Ophondweni in terms of the provisions of IPILRA and has prepared a revised Mining Work Programme to align with the 2024 EIA/EMP. The IPILRA process was excluded from the MENCO brief.

Ukwengeza kulokhu okungenhla, iTendele yabika ukuthi yathola imvume emiphakathini yasOphondweni nasEmalahleni ngokwezihlinzeko ze-IPILRA futhi isilungise neMining Work Programme ebuyekeziwe ukuze ihambelane ne 2024 EIA/EMP. Inqubo ye-IPILRA ayifakwanga emibhalweni yeMENCO.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Since 2007, Tendele Mining (Pty) Ltd ("**Tendele**") has been operating the Somkhele Mine, located in Mpukunyoni. Tendele applied for a Mining Right (MR) in 2014 and the MR was subsequently issued in October 2016 (reference number: KZN30/5/1/2/2/10041MR). The granting of the MR and the approval of its associated environmental management programme (EMPr) were challenged through an appeal process in terms of section 96 of the Mineral and Petroleum Resources Development Act, 28 of 2002 (MPRDA) and through subsequent court proceedings. On 4 May 2022, the Pretoria High Court handed down a judgment (Court Order) relating to the MR and the EMPr held by Tendele; Court Case No: 82865/2018. Judge Bam called for "pragmatism" and the MR and its EMPr were not set aside by the Court but the appeal was sent back to the Minister of Mineral Resources and Energy for reconsideration. In reconsidering the appeal, the Judge has directed the Minister to consider:

ITendele Mining (Pty) Ltd (Tendele) yaqala ukusebenza eSomkhele Mine etholakala kwaMpukunyoni ngo 2007. ITendele yafaka isicelo selungelo lokumayina (MR) ngo 2014 eyabe isilithola ngo Okthoba 2016 (inombolo yereferensi: KZN30/5/1/2/2/10041MR). ukutholwa kwelungelo lokumayina kwathola ukuphikiswa ngokwesigaba 96 somthetho we-Mineral and Petroleum Resources Development Act 28 ka 2002 (MPRDA) nokulandela izinqubo zenkantolo. Kwathi ngomhlaka-4 Meyi 2022 iNkantolo eNkulu yasePitoli yakhipha isinqumo esiphathelene neMR kanye nohlelo Lokuphathwa Kwemvelo (EMPr) oluhambisana nayo kwe-Tendele (Icala Lenkantolo No: 82865/2018). Ilungelo Lokumayina kanye ne-EMPr ehambisana nalo, akuzange kubekelwe eceleni yiNkantolo kodwa kunalokho kwabuyiselwa kuNgqongqoshe Wezimbiwa Namandla (i-DMRE) ukuze kucutshungulwe kabusha. Ekucubungeni isikhalazo, iJaji liyalele uNgqongqoshe ukuthi acabangele:

- any information that the Mine wishes to place before him as well as
  nanoma yiluphi ulwazi imayini efisa ukululetha phambi kwakhe kanye
- any information and comments from Interested and Affected Parties (I&APs).
  Nanoma iluphi ulwazi nokuphawula okuvela kulabo abanentshisekelo nabathintekayo.

In light of this Tendele opted to follow the industry standard NEMA EIA regulations to ensure that where applicable the public participation process complies with the

requirements of the Public Participation Guidelines GN R.326 and Environmental Impact Assessment (EIA) Regulations. By following these guidelines all specialist studies will be reassessed to ensure that the 2024 EIA/EMPr reflects the most recent and relevant findings associated with the Mining Right area. By following the objectives outlined above and below, the Draft 2024 EIA/EMP will meet with new NEMA EIA regulatory requirements.

Ngenxa yalokhu iTendele ikhethe ukulandela izimiso zemithethonqubo ye NEMA EIA ukuqinisekisa ukuthu inqubo yokubamba iqhaza komphakathi iyathobelana nemfuno zemihlahlandlela yokubamba iqhaza komphakathi GN R.326 kanye nemithethonqubo ye EIA. Ngokulandela lemihlahlandlela lonke ucwaningo lochwepheshe luzobuyekezwa ukuze kuqinisekiswe ukuthi i-2024 EIA/EMPr ikhombisa konke okutholakalile mayelana nendawo yelungelo lokumayina. Ngokulandela lokhu okuchazwe ngenhla nangezansi, iDraft 2024 EIA/EMP izothobelana nezimfuno zemithethonqubo emisha ye NEMA EIA.

In light of the above, the objective of the environmental impact assessment process conducted for the Somkhele Extension Project is to, through a consultative public participation process: -

Ngalokhu okungenhla, inhloso yenqubo yokuhlolwa kwemithelela kwezemvelo eyenziwe yeProjekthi yokunwetshwa kweSomkhele ngokusebenzisa inqubo yokubamba iqhaza komphakathi: -

- determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
  Ukunquma inqubomgomo kanye negqikithi yomthetho lapho umsebenzi utholakala khona bese ubhalaphansi ukuthi umsebenzi ohlongozwayo uyahambisana/uyathobelana nenqubomgomo kanye nengqikithi yomthetho;
- describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
  Chaza isidingo somsebenzi ohlongozwayo, okuhlanganisa isidingo nokufiseleka komsebenzi esimweni sendawo ekhethiweyo;
- identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
  Khomba futhi kuqinisekiswe indawo ekhethwayo, ngenqubo yokukhetha indawo enemininingwane eminingi, ehlanganisa inqubo yokuhlola umthelela kanye

nobungozi ehlanganisa imithelela enqwabelene kanye nenqubo yokukala amazinga kuzo zonke ezinye izinto ezihlonziwe ezigxile endaweni, kwimvelo, ezenhlalo, ezomnotho, kanye namasiko;

- determine the / thola: -
    - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
      umsuka, ukubaluleka, imiphumela, ubude besikhathi kanye namathuba okuba khona kwemithelela eyenzakalayo ukuze kube lula ukwazi ezinye izindlela ezingakhetha; kanye
    - degree to which these impacts / izinga lokuthi lemithelela: -
        - can be reversed;/ ingabuyiselwa emumva
        - may cause irreplaceable loss of resources, and / ingadala ukulahleka kwezinsiza okungenakubuyiselwa emumva, kanye
        - can be avoided, managed or mitigated./ Ingagwemeka, kulawulwe noma kuncishiswe
- identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
  ukutholwa kwendawo ewufanele umsebenzi kulendawo ekhethiwe ngokusekelwe amazinga aphansi okuzwela kwemvelo okutholakale ngezikhathi sokuhlolwa.
- identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
  ukuthola, ukuhlola, kanye nokulinganiswa kwemithelela yomsebenzi kulendawo ekhethiwe kuze kuyobe uyaphela umsebenzi.
- identify suitable measures to manage, avoid or mitigate identified impacts; and
  ukuthetha izindlela ezifanele zokwengamela, ukugwema noma ukunciphisa imithelela etholakele; kanye
- identify residual risks that need to be managed and monitored.
  Ukukhomba ubungozi besikhathi eside obudinga ukulawulwa nokuqashwa.

EXECUTIVE SUMMARY

Introduction:

M2 Environmental Connections (Pty) Ltd (trading as MENCO) was appointed by Tendele Mining (Pty) Ltd (Tendele) to review and update the 2014 Environmental Impact Assessment Report (EIAR) and 2014 Environmental Management Program Report (EMPr) as submitted by Tendele to the Department of Mineral Resources and Energy ("**DMRE**"). for the Somkhele Anthracite Mine Project (Somkhele) located 23 km northwest of the town of Mtubatuba in the KwaZulu-Natal Province.

I- M2 Environmental Connections (Pty) Ltd (trading as MENCO) yaqokwa yiTendele Mining (Pty) Ltd (Tendele) ukuthi ibuyekeze umbiko we EIA wango 2014 kanye ne EMPr yango 2014 yokwandiswa kwe Somkhele Anthricite Mine etholakala endaweni engu 23km enyakatho-ntshonalanga yedolobha laseMtubatuba esifundazweni saKwaZulu natali njengoba kwathunyelwa yiTendele kwa DMRE.

Tendele commenced mining operations in 2007 at Somkhele for which Tendele owns and holds various Mining Rights (MRs). Tendele has been issued with MRs and associated EMPs for each mining area, these being:

Itendele yaqala imisebenzi yokumayina ngo 2007 eSomkhele lapho iTendele ingumnikazi wamalungelo okumayina ahlukene (MRs). iTendele yanikezwa amaMR ahambisana nam-EMPs endawo ngayinye:

- Area 1 - KZN30/5/1/2/2/135MR,
- Area 2 - KZN 30/5/1/2/2/216MR, and
- Areas 4 and 5 - KZN30/5/1/2/2/10041MR issued on 26 October 2016 to Tendele.

The issued mining authorisation for areas 4 and 5 include Emalahleni, Ophondweni and Mahujini. The MR for these areas (4 and 5) originally covered 212 km², and Tendele subsequently abandoned 92% of the area comprising the Area 4 and 5 Mining Right and elected to retain only those areas which it requires in order to keep the Mine operating in the short to medium term, totalling 27km^2 of mining areas.

Igunya lokumayina ezindaweni Areas 4 and 5 ifaka indawo yasEmalahleni, Ophondweni, kanye naseMahujini. Ekuqaleni I-MR yalezindawo (4 no 5)yayifaka indawo engu 212km2 , iTendele yabe isidedela u-92% walezi zindawo yakhetha ukugcina kuphela lezi zindawo edinga ukumayina kuzo ukuze igcine imayini isebenza okwesikhashana, ezilinganiselwa ku 27km2.

Applicant:

The contact details for the Tendele are contained in the Table below.

Imininingwane yokuxhumana neTendele iqukethwe kuleliTable elingezansi.

Company Name:	Tendele Mining (Pty) Ltd
Mine Manager:	Pierre Louw
Contact Person:	Nathi Kunene
Designation:	Head: Environmental and Business Development
Physical Address:	37 Peter Place, Lyme Park, Bryanston, 2021
Telephone:	082 444 3814 / 078 815 5309
E-mail:	pierrel@somkhele.co.za Nathi@somkhele.co.za

Environmental Assessment Practitioner and Environmental Consultancy:

Contact details for M2 Environmental Connections (Pty) Ltd ("MENCO", Tendele's appointed Environmental Assessment Practitioner) involved with the Project are given in the Table below.

Imininingwane yokuxhumana neMENCO okuyi EAP eqokwe iTendele ukuba ihole lenqubo iqukethwe ngezansi

Company Name:	M2 Environmental Connections (Pty) Ltd
Contact Person:	Johan Maré
Designation:	Managing Director
Physical Address:	726 Wiedrigh Street, Moreleta Park, Pretoria
Telephone:	012 004 0362
E-mail:	johan@menco.co.za
EAP Company Name:	MDT Environmental Consultants (Pty) Ltd
Contact Person:	Deon Esterhuizen
Designation:	Environmental Assessment Practitioner (EAP)
Physical Address:	673 Glossoti Street, Garsfontein, Pretoria
Telephone:	082 575 3690
E-mail:	deon@mdte.co.za

Approach and Methodology for the Public Participation Process (PPP):

Public participation is an essential and regulatory requirement for an environmental authorisation process, and must be undertaken in terms of Regulations 39 to 44 of the Environmental Impact Assessment (EIA) Regulations GN R.326. Public participation is a process that is intended to lead to a joint effort by stakeholders, technical specialists, the authorities and the proponent/developer who work together to produce better decisions than if they had acted independently. The approach followed by MENCO and WSP ensures a public participation process designed to provide sufficient and accessible information to

Interested and Affected Parties (I&APs) in an objective manner, and is comprehensively covered in the Draft 2024 EIA/EMP and in all of its annexures.

Ukubamba iqhaza komphakathi kuyinqubo ebaluleke kakhulu ekutholeni i-Environmental Authorization, futhi kumele kwenziwe ngokwemithethonqubo 39 kuya ku 44 ye mithethonqubo yeEIA GR.326. Ukubamba iqhaza komphakathi kuyinqubo okuhloswe ngayo ukwenza inhlanganyela yalabo ababambiqhaza, ochwepheshe, iziphathimandla kanye nabasunguli bomsebenzi basebenze ndawonye ukuze bathatha izinqumo ezincono kunokuba benze ngokuzimela. Indlela elandelwa yi-MENCO kanye ne WSP iqinisekisa ukuthi inqubo yokubamba iqhaza komphakathi ihlelwa ngendlela yokuthi ulwazi lufinyelela ngendlela efanele nangokwanele kuma I&APs, futhi ihlanganiswe ngokuphelele kwi Draft 2024 EIA/EMP nakuzo zonke izithasiselo zayo.

Initially, Blackrock Environmental served as the Environmental Assessment Practitioner (EAP) for Tendele Mining's expansion project, overseeing the appeal process before the DMR Minister. On July 15, 2022, the Draft Scoping Report for Tendele Mining's project, subject to the ongoing appeal, was distributed to all I&APs, who were given until August 19, 2022, to submit comments. The comment period was extended twice, with the final deadline set for October 14, 2022, due to significant feedback and the project's magnitude.

Ekuqaleni, iBlackrock Environmental iyona eyayisebenza njengomhloli wezemvelo (EAP) kulomsebenzi wokwandiswa kweTendele Mining, yengamele nenqubo yesikhalazo esabe siphambi kukaNgqongqoshe we-DMR. Ngomhlaka 15 Julayi 2022, umbiko osalungiswa wokuhlonzwa kwezimvo (Drafe Scoping Report) wanikezelwa kuma-I&Aps ukuze aphawule ngawo. Ama-I&Aps anikezwa usuku lwangomhlaka 19 Agasti 2011 njengomnqamlajuqu wokuthunyelwa kwezimvo/imibono. Isikhathi esabe sinikeziwe njengomnqamlajuqu sengezwa kwaze kwaba Kabili okwagcina sekuholela ekutheni usuku lokugcina lokuthunyelwa kwemibono/izimvo kube ngumhlaka 14 Okthoba 2022, ngenxa yokubaluleka kanye nobubanzi beprojekthi.

In light of concerns raised by certain I&APs regarding Blackrock's impartiality, OMI Solutions was appointed in October 2022 to lead the process, with Blackrock offering support due to their historical knowledge of the project.

Ngenxa yokukhathazeka okwaphakanyiswa ama-I&Aps athile mayelana neBlackrock, kwabe sekuqokwa i-OMI Solutions ngo Okthoba 2022 ukuba ihole lenqubo, iBlackrock yabe isinikeza ukweseka ngenxa yolwazi lwayo oludala mayelana neprojekthi

Additionally, WSP, an independent facilitator, was engaged in October 2022 to assist OMI in all public participation activities, including documentation preparation, meeting coordination, and feedback management.

Ukwengeza, ngo Okthoba 2022 kwaqokwa i-WSP, njengomsizi ozimele ukuba ilekelele i-OMI kuyo yonke imisebenzi yokubamba iqhaza komphakathi, okuhlanganisa ukulungiswa kwemibhalo, ukuhlela imihlangano, nokwengamela izimpendulo.

Further objections to the independence of the EAP led to the appointment of MENCO in August 2023, replacing OMI Solutions, as communicated to all I&APs by WSP on August 23, 2023.

Okunye ukungagculiseki mayelana nokuzimela kwe EAP kwaholela ekuqokweni kwe MENCO ngo Agasti 2023, esikhundleni se OMI Solutions, njengoba i-WSP yazisa ama-I&Aps ngo Agasti 2023.

The process of preparing this Draft 2024 EIA/EMP involved extensive engagements with I&APs which may be summarised as follows:

Inqubo yokulungiselela lombiko i-Draft 2024 EIA/EMP ubandakanye ukuxoxisana okunzulu nama I&Aps okungafingqwa ngalendlela elandelayo:

1. Public Participation Process Initiation (June 2022 - July 2022):
   Imihlangano yokubamba iqhaza komphakathi yaqaliswa (Juni 2022 – Julayi 2022):

   - Tendele held meetings with Mpukunyoni Traditional Council and community leaders to discuss the pending Appeal process (June 2022).
     I-Tendele yabamba imihlangano nobuholi bomdabu bakwaMpukunyoni kanye nabaholi bomphakathi ukudingida udaba lwenqubo yesikhalazo eyabe iqhubeka (Juni – 2022).

   - BlackRock drafted a public participation Plan of Study, finalized on July 12, 2022.
     iBlackrock yalungisa uhlelo lokubambiqhaza komphakathi olwaqedwa ngomhlaka 12 Julayi 2022.

   - Documentation including basic information documents, invitation letters, site notices, newspaper notifications, and draft Scoping Report prepared (June-July 2022).
     Imibhalo ebandakanya umqulu i-Basic Information Document, izincwadi zezimemo, izizinda lwazi, izikhangisi zamaphephandaba, kanye nombiko wokuhlonzwa kwezimvo (draft scoping report) kwenziwa (Juni – Julayi 2022).

- Public participation process commenced on July 1, 2022.
  Inqubo yokubambiqhaza komphakathi yaqala ngomhlaka 1 Julayi 2022.
- Initial notices distributed to community members through various means, including hand delivery, newspaper adverts, radio adverts, and SMS notifications (July 2022).
  Izimemo zadluliselwa emphakathini ngezindlela ezahlukene, okubalwa kuzo izimemo ezihanjiswa ngezandla, izikhangiso zamaphephandaba, izikhangiso zemisakazo, kanye nangemiyalezo kamakhalekhukhwini (Juayi 2022)
- Initial public meetings held in Ophondweni and Emalahleni on July 23 and 24, 2022, respectively.
  Imihlangano yomphakathi yaqalayabanjwa Ophondweni kanye nasEmalahleni ngomhlaka 23 no 24 Julayi 2022 ngokulandelana.
- Additional public meetings scheduled for Mahujini and Machibini in August 2022.
  Imihlangano yomphakathi eyengeziwe yahlelelwa imiphakathi uaseMahujini nasemachibini ngo Agasti 2022.

2. Revised Draft Scoping Report and Further Public Meetings (October 2022 - November 2023):
   Umbiko wokuhlonzwa kwezimvo osalungiswa (Draft Scoping Report) obuyekeziwe kanye nemihlangano yomphakathi eyengeziwe (Okthoba 2022 – Novemba 2023):

   - OMI appointed as the new EAP for the Appeal process and WSP appointed as the independent lead to manage the entire public participation process (October 2022).
     I-OMI yaqokwa njenge EAP entsha ezoqhuba inqubo yesicelo sokubuyekezwa wesinqumo kanti i-WSP yona yaqokwa njengomsizi ozimele ukuthi ihole futhi yengamele yonke inqubo yokubamba iqhaza komphakathi (Okthoba 2022)
   - OMI notified I&APs of the submission deadline for comments on the initial Draft Scoping Report (October 2022).
     I-OMI yazisa ama I&APs mayelana nosuku lokugcina lokuthunyelwa kwezimvo/imibono ngombiko wokuqala wokuhlonzwa kwezimvo (Okthoba 2022).
   - Further public meetings held with stakeholders and community members, including meetings with Game Rangers Association of Africa, Mahujini stakeholders, and Machibini stakeholders (October-November 2022).
     Imihlangano yomphakathi eyengeziwe yabanjwa nababambiqhaza kanye namalungu omphakathi okubalwa khona imihlangano neGame Rangers

Association of South Africa, abababiqhaza baseMahujini kanye nabaseMachibini (Okthoba - Novemba 2022).

- Tendele held focus group meetings within the community (January 2023 - March 2023).

  iTendele yabamba imihlangano emaqembuqembu emphakathini (Januwari 2023 – Mashi 2023).

- MENCO appointed as the new EAP in October 2023.

  iMENCO yaqokwa njenge EAP entsha ngo- Okthoba 2023.

- Revised Draft Scoping Report made available for public comment from October 9 to November 15, 2023.

  Umbiko wokuhlonzwa kwezimvo obuyekeziwe wathunyelwa emhakathini ukuba uphawule ngawo ksukela ngomhlaka 9 Okthoba kuya kumhlaka- 15 Okthoba 2023.

- Public meetings held in Ophondweni, Emalahleni, Mahujini, and rescheduled in Machibini due to heavy storms (October-November 2023).

  Imihlangano yomphakathi yabanjwa Ophondweni, Emalahleni, eMahujini, yahlelelwa olunye usuku eMachibini ngenxa esimo sezulu esasingesihle (Okthoba – Novemba 2023).

- Meeting held with MCEJO and legal representatives (November 2023).

  Kwabanjwa umhlangano nenhlangano uMCEJO kanye nabammeli bayo (Novemba 2023).

3. Finalization of Scoping Report and Submission (March 2024):

   Ukuqedelwa kanye nokuthunyelwa kombiko wokuhlonzwa kwezimvo (Mashi 2024).

   - Measures implemented to ensure free and fair participation in public meetings.

     Kwasetshenziswa izinyathelo ukuqinisekisa ukuthi ukubanjwa kweqhaza emihlanganweni yomphakathi kuvulelekile futhi akukhethi.

   - MENCO finalized the Scoping Report addressing comments from I&APs during the public participation process.

     i-MENCO yahlanganisa umbiko wokuhlonzwa kwezimvo owabe ufaka phakahi izimpendulo kwimbono/izimvo/ekuphawuleni eyayivela kuma-I&APs ngesikhathi senqubo yokubamba iqhaza komphakathi.

   - Final Scoping Report issued to the public and submitted to the Department of Mineral Resources and Energy (DMRE) on March 11, 2024.

     Umbiko wokugcina wokuhlonzwa kwezimvo wathunyelwa emnyangweni wezimbiwa phansi (DMRE) ngomhlaka 11 Mashi 2024.

In total 27 meetings were held as from October 2022 until February 2024. All comments and responses were captured as received during this process (refer to Comments and Response Report (CRR) and related Annextures as contained in **Appendix 2**) and included as part of the EIA process. The PPP is ongoing as an integral part of the Draft 2024 EIA/EMP that is circulated in the public domain for comment. All issues of concern will be captured and considered for inclusion in the final reviewed and updated EIA/EMP. In addition to the work done above Tendele indicated the need that specific reference must be made to the received AMICUS listed under Annexture K of the CRR in this regard.

Sekukonke kwabanjwa imihlangano engu-27 kusukela ngo Okthoba 2022 kuze kube ngu Febhuwari 2024. Konke ukuphawula nezimpendulo kwathathwa njengoba kunjalo (bheka umbiko wokuphawula nezimpendulo (CRR) kanye nezithasiselo ezihambisana nawo ku Appendix 2) futhi kwaphinde kwafakwa njengengxenye yenqubo ye-EIA. I-PPP isaqhubeka njengengxenye ebalulekile yohlaka kwe-EIA esatshalaliswe emphakathini ukuze kuphawulwe ngayo. Konke ukukhathazeka / ukuphawula kuzothathwa kuphinnde ukuze kufakwe kwi-EIA/EMP yokugcina. Ngaphezu kwalomsebenzi osuwenziwe ngenhla.

Description of Mining Operation:

The mining method to be used at the Emalahleni, Ophondweni and Mahujini areas is a conventional opencast mining method with some roll-over where and when practically and safely possible. Rehabilitation will be undertaken on an on-going basis where practically possible. The rollover method implies that some of the overburden will be stripped and placed directly inside the final void it will not be placed on the dump. Where roll-over is not possible, the overburden will be placed next to the pit on a dump designed for this purpose as close to the pit as possible to reduce the footprint of the Mine. The overburden/soils that are stripped and stockpiled for use in the final void will need to be protected against wind and water erosion (drainage), as well as any compaction. This will be done through the design and re-vegetation of the stockpiles as designed.

Indlela yokumayina ezosetshenziswa Emalahleni, Ophondweni kanye nasEmahujini, indlela ejwayelekile evulelekile eyaziwa ngokuthi yi-open cast ehambisana nendlela yokugqiba imigodi eyaziwa ngokuthi yi roll-over method kodwa kuphela uma isimo sivuma noma kuphephile ukukwenza. Ukugqitshwa kwemigodi kuzokwenziwa ngokuqhubekayo uma isimo sivuma. Indlela yokumayina efaka phakathi iroll-over method isho ukuthi imfucuza yamadwala izokhishwa kulomgodi okuyobe kusetshenzwa kuyo ifakwe ngqo emgodini okuyobe sekuqediwe ukumayina kuwo kunokuthi ibekwe ngaphandle endaweni yokugcina imfucuza yamadwala. Esimweni lapho iroll-over method ingeke yenzeke khona, imfucuza yamadwala izobekwa eceleni komgodi endaweni elungiselelwe khona ukugcina imfucuza, bude buduze nomgodi ukuze kugcinwe indawo

ezophazanyiswa ukusebenza kwemayini incane. Imfucuza yamadwala kanye nomhlabathi ozobe wenguliwe wanqwabelaniswa ndawonye ukuze isetshenziswe ekugqibeni imigodi kuyodingeka ukuba ivikeleke ekugugulweni umoya, kanye namanzi (imisele yamanzi egelezayo) kanye nanoma yikuphi ukugqishelana. Lokhu kuyokwenziwa ngendlela efanele futhi kuzotshalwa nezihlahla notshani ngengoba kuhleliwe.

Need and Desirability of the Project:

The principal use of anthracite today is metallurgical in nature, used as a reductant in the ferrochrome and ferromanganese industries. It is typically low in sulphur and volatile matter. It delivers high energy per its weight and burns cleanly with little soot, making it ideal for this purpose. Its high value makes it prohibitively expensive for power plant use in the electricity generating sector. In the metal's smelting and fabrication industries, anthracite is commonly used as a reduction agent for various applications such as briquetting charcoal, iron ore pellets, and other uses. However, the market is divided between the low-phosphorous variety needed for metallurgical use, and medium-phosphorous, used by power stations.

Ilahle i-Anthracite isetshenziswa kakhulu ezimbonini ezikhiqiza insimbi. I-anthracite yaziwa njengohlobo lwelahle olune-sulphur encane futhi olungasheshi ukusha/ukuvutha. Loluhlobo lwelahle lunamandla amakhulu futhi uma seluvutha lusha ngokuhlanzekile ngentuthu encane, okulenza likulungele kakhulu lokhu. I-Antracite Ibiza inani eliphezulu okuyenza kube nZima kakhulu ukuthi ingasetshenziswa ezikhungweni zikagesi, emikhakheni yokuphehla ugesi. I-Anthracite ibuye isetshenziswe kakhulu ezimbonini ezincibilikisa insimbi. Kodwa ke imakhethe ihlukene phakathi, kunenhlobo ene-phosphorus encane/ephansi edingeka uma kwenziwa insimbi nenhlobo eno-phosphorus ophakathi nendawo odingakala eziteshini zikagesi.

Anthracite is a type of coal with high carbon content and more energy intensity than others. Also called hard coal, anthracite makes up only about 1% of global coal reserves, with South Africa accounting for the bulk of production on the African continent. One of the main benefits of anthracite coal is its high energy content. This means that when burned, it produces more heat per unit of weight than other types of coal. This makes it an efficient and cost-effective fuel source, as it requires less coal to generate the same amount of energy.

i-Anthracite iwuhlobo lwelahle okuqukethe icarbon eningi futhi elinamandla amaningi kunamanye. Ibuye ibizwe ngokuthi ilahle eliqinile, i-anthracite yenza cishe u-1% kuphela wezinqolobane zamalahle emhlabeni wonke, kanti iNingizimu Africa ibalwa njengenomkhiqizo omingi ezwenikazi lase-Africa. Enye yezinzuzo ezo ezimqoka zelahle i-

anthracite ukuthi iqukethe Amandla amaningi. Lokhu kusho ukuthi uma ishisiwe ikhiqiza ukushisa okukhulu kunezinye izinhlobo zamalahle. Lokhu kuyenza ibe ngumthombo we-fuel osebenza kahle futhi ongabizi, njngoba udinga amalahle amancane ukuze ukhiqize Amandla afanayo.

Anthracite Benefits:

- Anthracite has a high carbon content (86-98%), producing more heat per weight compared to power station coal;
  I-Anthracite ine carbon eningi elinganiselwa ku (86-98%), ikhiqiza ukushisa okukhulu uma iqhathaniswa nelahle elisetshenziswa ezikhungweni zikagesi;
- Anthracite is a cleaner fuel because of its high carbon content and low impurity;
  I-Anthracite ingamfutha (Fuel) ahlanzekile ngenxa yokuthi ine carbon eningi nokungcola okuncane;
- Anthracite has a lower environmental impact;
  IAnthracite inomthelela omncane kwimvelo;
- It has a lower carbon footprint resulting in fewer greenhouse gas emissions per unit of energy produced;
  Ine carbon footprint encane okuyenza ikhiqize ukungcola okuncane emkhathini.
- It has a lower air pollution potential as it creates less pollutants than regular coal;
  Inomthelela omncane ekugcolisekeni komoya uma uyiqhathanisa nelahle elijwayelekile
- Anthracite has a reduced potential for sulphur dioxide ($S0_2$) and particulate matter.

Baseline Environment:

Tendele has mined and operated the Somkhele Mine since 2007. Although numerous specialist studies were conducted historically as part of the current approved 2014 EMPr, the decision was made by Tendele to proceed with the updates of all existing specialist studies prior to the finalisation of the judicial review proceedings launched by MCEJO in November 2018. MENCO reviewed these studies and commissioned additional studies and expanded the scope where appropriate. These specialist studies were undertaken during the project evaluation of this process currently underway to inform the Draft 2024 EIA/EMP, (refer to **Appendices 2 – 26)** and these include:

ITendele isebenze eSomkhele Mine kusukela ngo 2007. Yize ucwaningo lochwepheshe oluningi kwenziwa ngaphambilini njengengxenye ye-2014 EMPr egunyaziwe, iTendele ithathe isinqumo sokuthi iqhubeke nokubuyekeza lonke ucwaningo olwenziwa ngochwepheshe ngaphambi kokuthi kuze kuphume isinqumo mayelana nesikhalazo esifakwe uMCEJO ngo Novemba 2018. IMENCO ilubuyekezile lolucwaningo olwenziwa ngochwepheshe yaphinde yagunyaza ucwaningo olwengeziwe lapho kufuneka khona. Lolucwaningo lochwepheshe lwenziwe ngesikhathi sokuhlolwa kweProjekthi ukuze lufakwe kwi-Draft 2024 EIA/EMP, (Bheka Izithasiselo 2-26) futhi lokhu kubandakanya:

- Soil, Land Use and Land Capabilities Assessment;
- Surface Water Assessment;
- Geohydrological Impact Assessment;
- Air Quality Assessment;
- Fauna and Flora Assessment;
- Wetland Assessment;
- Aquatic Ecology Assessment;
- Socio-economic Impact Assessment;
- Heritage Assessment;
- Visual Impact Assessment;
- Climate Impact Assessment;
- Health Impact Assessment;
- Noise Impact Assessment;
- Blasting and Vibration Impact Assessment;
- Paleontological Impact Assessment;
- Traffic Impact Assessment and
- Rehabilitation and Closure Assessment.

A summary of the baseline environment is presented in Section 10.1 (Part A). Various environmental monitoring plans are included in Section 9 (Part B) of this report and should be implemented to measure compliance, determine if mitigation measures are effective and determine trends over the life of the project.

Okufingqiwe mayelana nocwaningo lwezemvelo kwethulwe Esigabeni 10.1 (Ingxenye A). izinhlelo ezahlukahlukene zokuqapha zifakiwe Esigabeni 9 (Ingxenye B) yalombiko futhi kuzomele zisetshenziswe ukuze kukhombise ukuthobelana nomthetho, kubhekwe ukuthi izinyathelo zokunciphisa ziyasebenza yini kuphinde kubhekwe ukuthi ngabe zisebenza kanjani ngokuqhubeka komsebenzi.

The table below provides a brief summary of the baseline environment as determined during the specialist studies.

ITafula elingezansi linikeza okufingqiwe mayelana nocwaningo lwezemvelo olweziwe ochwepheshe.

Aspect / Isici	**Baseline Summary / Okutholakele**
Agricultural / Ezolimo	Soils within the project area are of the Glenrosa, Mayo and Arcadia forms. These forms consist of an orthic, melanic or vertic A-horizon overlaying rock or lithocutanic mudrock (weathered rock). The effective depth of the soils is mainly between 0 and 30-40 cm, but the soil depths of the Arcadia soil form is 80cm with very high clay contents. The agricultural potential for dryland and irrigation conditions of the soil forms are considered low under dryland as well as irrigation conditions. Only subsistence farming is practised in the area with limited crop production. Locals utilise the area primarily for livestock grazing. Ucwaningo lukhombise ukuthi umhlabathi wendawo womile kakhulu. Izindawo zisetshenziselwa ukulimela ukuziphilisa kuphela nomkhiqizo mncane. Abahlali basebenzis lndawo kuphela ngengamadlelo.
Air Quality / Isimo Somoya	Air Dispersion Modelling (ADM) results of PM_{10} and $PM_{2,5}$ indicate significant contributions to ambient concentrations of PM_{10} and $PM_{2,5}$ limited to isolated areas within proximity to haul roads. The modelling assessment predicts that the operation of the mine under maximum operating conditions (overburden material handling volumes of approximately 8 million Bank Cubic Metres (BCM) per annum, and ROM volumes of approximately 2.76 MT per annum representing the cumulative total across 3 active pits. Although these pits will be mined in series, i.e. at most 2 out of the 3 pits will be active at any given point in time. It is nevertheless expected to likely make noticeable and significant contributions to the ambient concentrations of fugitive dust. However, these significant impacts to ambient air quality and community health, based on the future mining operations at Ophondweni, Emalahleni and Mahujini may be mitigated effectively with adequate management of dust suppression, and in particular, increased watering of haul routes in affected areas.

Aspect / Isici	Baseline Summary / Okutholakele
	Kutholakale ukuthi uma imayini isisebenza ngokuphelele endaweni okungahe kwenzeke ukuthi kuyoba khona isikhathi lapho isisebenza imigodi emibili ngesikhathi, kulindeleke ukuthi kubekhona umthelela obonakalayo ekushintsheni kwesimo somoya. Kodwa ke lemithelela ebalulekile yesimo somoya kanye nempilo yomphakathi ezodalwa ukusebenza kwemayini ezindaweni ezintsha Ophondweni, Emalahleni, kanye naseMahujini ingalawuleka uma kungasetshenziswa izindlela ezifanele zokunciphisa uthuli, ngokuchela umgwaqo lapho kuhamba khona izithuthi ezithutha umkhiqizo kulezi zindawo ezithintekayo.
Aquatic Ecology / Ezasemanzini	Mining operations at Somkhele falls within the Kwaluhlanga River catchment, a tributary of the Mfolozi River that is part of the W23G quaternary catchment of the Pongola to Mtamvuna Water Management Area. The identified major impacts on the aquatic systems included in-stream modifications, solid waste disposal and erosion of river banks. Erosion is most likely caused by the livestock trampling and damaging riparian vegetation, leaving the banks exposed and vulnerable to erosion. Imithelela emikhulu etholakele kwezamanzi ifaka phakathi ukuguqulwa kwemifula, ukulahlwa kwemfucuza eqinile kanye nokuguguleka kosebe / unqenqema lwemifula. Ukuguguleka komhlabathi ikakhulukazi kudalwa ukunyathela kwemfuyo kanye nokulimaza izihlahla/utshani ezigudle umfula, kushiyeke usebe / unqenqema lomfula lusobala lube sengozini yokuguguleka.
Biodiversity / Imvelo	The mining areas are located within close proximity to the Hluhluwe-Umfolozi Protected Area and falls within a Critical Biodiversity Area. The Emalahleni and Ophondweni area could potentially cause the most significant impacts to natural habitats and local biodiversity. Impacts to natural habitat will lead to a decrease in abundance within the region and will take an extended period of time after rehabilitation to reach the size and abundance as was evident before mining. Impacts on the faunal community as a result of habitat destruction are likely to be incurred; however, most species would be able to migrate to similar nearby natural habitat. Given that mining is proposed across all these areas, the significance of cumulative impacts on biodiversity would also be potentially high without mitigation. With careful mitigation and on-going

Aspect / Isici	Baseline Summary / Okutholakele
	management of impacts during mining, impacts at each site could potentially be reduced to low-medium levels. In this regard the mine is fully committed to cooperate with the relevant authorities to implement the required Biodiversity offsets and has signed an Off-Set agreement with Ezemvelo KZN Wildlife in this regard. Indawo yemayini isondelene kakhulu nesiqiwi (Hluhluwe-Umfolozi Protected Area). Izindawo zasEmalahleni nasOphondweni zingaba nomthelela omkhulu kakhulu kwimvelo. Okungathatha isikhathi eside kakhulu emva kokugqitshwa kwemigodi nokulungiswa kwendawo ukuthi zibuyele esimeni ezabe ziyiso ngaphambi kokuba kumayinwe. Umthelela ezilwaneni zasendle ungaholela ekutheni zilahlekelwe izindawo zokuhlala, kepha ke ezinye izilwane zingakwazi ukuhamba ziye kwezinye izindawo ezithi azifane nalezi eziphazamiseka kuzo. Ngokucophelela okukhulu nokulandela izincomo ezinikeziwe zokunciphisa umthelela, imithelela inganciphisela ize iphe sezingeni eliphansi kuya phakathi nendawo. Ngalokhu imayini izimisele kakhulu ukubambisana neziphathimandla ezifanele futhi isayin nesivumelwano se Off-set neEzemvelo KZN Wildlife ukuqinisekisa ukuthi imithelela kwimvelo iyancishiswa.
Blasting / Ukuqhumisa	The blasting and vibration study was conducted by EARES (2024). The potential impacts of ground vibration, air blast levels and fly rock risks were determined using methods provided by the USBM. The project is proposed in an area with a number of BSRs such as residential houses, cement dams, sheds and informal houses (constructed of wood and corrugated iron) and the R618 tar road. While the risks from blasting impacts are manageable, people are always concerned about the potential effects and dangers of blasting and measures are recommended for the mine to consider and implement. The blasting assessment also assumes that receptors located directly on the areas to be developed (opencast and infrastructure areas) will be relocated to outside the 500m blast zone. Similarly, all structures associated with these BSR will no longer be used. Community involvement throughout the project is of utmost importance, especially with regards to potential damage to dwellings. The mine will have to consider conducting crack surveys to establish baseline conditions. Ucwaningo lokuqhumisa lwaveza ukuthi kungaba nemithela yokuzamazama, amadwala endiza emoyeni,

Aspect / Isici	Baseline Summary / Okutholakele
	iProjekthi izokwenzeka endaweni ena BSRs amaningi okubalwa kuwo zindlu, amadamu kasimende, imikhukhu kathayela neyamaplangwe kanye nomgwaqo wetiyela uR618. Nakuba imithelela yokuqhumisa ilawuleka, abantu bahlezi benokukhathazeka ngobungozi obungase bube khona ngenxa yokuqhumisa. Kunezindlela zokunciphisa ezinconyiwe ukuba iTendele izisebenzise ukunciphisa. Ucwaningo luyakucabangela ukuthi abantu abasondele kakhulu endaweni yokumayina bazothuthwa. Nezakhiwo ezihambisana ne BSR angeke zisasetshenziswa. Ukubandakanya umphakathi kuleProjekthi kubaluleke kakhulu, ikakhulukazi mayelana nomonakalo ongase ube khona ezindlini. Imayini kuzomele icabange ukwenza ucwaningo lesimo sezindlu (crack surveys) ukuze ibe nolwazi mayelana nesimo sezindlu.
Climate Change / ukuguquguquka kwesimo sezulu	The study conducted by Rayten Engineering Solutions has calculated that the carbon footprint for the Somkhele Mine Extension project for the Life of Mine is 236,697.29 tonnes CO_{2e}. If the calculated footprint is compared to the quantity of emissions allocated under South Africa's carbon budget, Somkhele's contribution under the 1,5°C and 2°C scenarios at 0.0063% and 0.0023% respectively are considered to be a medium impact in terms of the magnitude/severity of the proposed mine's GHG emissions and climate change impacts. Ucwaningo luthole ukuthi imayini izoba nomthelela ophakathi nendawo ekuguquguqukeni kwesimo sezulu
Health / Ezempilo	Based on the results of research undertaken, and the specialist studies, it has been concluded that the mine will have a predominantly low impact on the health surrounding communities after mitigation. This can be seen from the fact that the mine was operational for the past 16 years with no predominant impact on health and safety of the surrounding communities. Ngokusekelwe emiphumeleni yocwaningo olwenziwe, kufinyelelwe esiphethweni sokuthi imayini izoba nomthelela omncane kwezempilo emphakathini ngemumva kokunciphisa. Lokhu kufakazelwa ukuthi selokhu imayini yaqala ukumayina eminyakeni engu 16 eyedlule akukaze kube nemithelela kwezempilo nezokuphepha komphakathi.
Heritage / Amagugu	The fieldwork conducted revealed numerous heritage sites which ranged from historic homesteads with associated infant burial risk to confirmed burials. The development of

Aspect / Isici	Baseline Summary / Okutholakele
	anthracite mining infrastructure within the study area will have an immediate and damaging effect on the heritage resources discussed in this report. This impact would be severe and irreversible. It is accordingly recommended that the proposed development of anthracite mining infrastructure is plausible, it is expected to result in a high heritage impact, that may only proceed under the condition of the recommended mitigation measures based on a grave relocation process. It needs to be supported by a detailed social consultation process. The mine has already since 2017 engaged with the Directly Affected Communities (DAC) and it is acknowledged that at the time of this Report the mine has concluded 139 out of 143 relocation agreements in the Emalahleni and Ophondweni area. Furthermore, voting in Emalahleni and Ophondweni in accordance with the requirements of IPILRA indicated support for the mine in excess of 90%. Ucwaningo olwenziwe lukhombise izindawo eziningi ezingamagugu, kubalwa imizi emidala ehlobene nobungozi bokungcwatshwa kwezingane ezincane emagcekeni. Ukwakhiwa wengqalasizinda yemayini kulezizindawo kuzoba nomthelela ongemuhle kumagugu endawo njengoba kuchaziwe kulombiko. Umthelela uzoba mkhulu kakhulu futhi angeke ulungiseke. Ngakho ke kunconwa ukuthi ukwakhiwa kwengqalasisinda makwenzeke ngaphansi kwezincomo zokunciphisa imithelele ezintweni/ ezindaweni ezingamagugu, kubalwa khona ukulandelwa kwenqumo yokuthuthwa kwamathuna ehambisana nokubonisana nokuvumelana nalabo abathintekayo. Imayini iyaxoxisana nabathintekayo futhi imindeni engu 139 kwengu 143 isisayinile izivumelwano zokuthutha EMalahleni nasOphondweni. Ngaphezu kwalokho kwavotwa ngokulandela izimiso zeIPILRA Emalahleni nasOphondweni imiphumela yaveza ukeseka okungaphezu kuka 90%.
Geohydrology / Amanzi angaphansi komhlaba	The Mahujini, Emalahleni and Ophondweni areas are underlain by sediments of the Emakwezeni Formation (lower Beaufort Group) of the Karoo Supergroup and numerous dolerite intrusive sills and dykes. The groundwater generally exhibits neutral pH conditions, Electrical Conductivity (EC), Total Dissolved Solids (TDS), dissolved calcium (Ca), dissolved magnesium (Mg), dissolved sodium (Na), dissolved chloride (Cl) and dissolved manganese (Mn) plots above DWAF (1996) ideal water quality ranges for potable water use. It was also reported that on average dissolved sulphate (SO_4) and

Aspect / Isici	Baseline Summary / Okutholakele
	dissolved nitrate (NO_3), which are typically associated with pollution from South African coal mines (INAP, 2018), generally plot well within DWAF (1996) ideal water quality ranges for potable water use. Detailed geochemical data revealed that: • Discard and coal are generally Potentially Acid Generating (PAG); • Tailings (slurry) is generally Not Potentially Acid Generating (non-PAG); and • Overburden lithologies are generally non-PAG. Taking the above-mentioned concerns into consideration the ongoing geohydrological investigations conducted historically for Tendele Mining has reported that the anthracite seams within the Mining Right Areas have a low potential for AMD due to the non-acid generating lithologies associated with the discard. Ucwaningo oluqhubekayo olwenziwe ngaphambilini lukhombisa kuthi iAnthracite inamathuba amancane kakhulu okwenza iAMD ngenxa yokuthi amadwala akulezizindawo awayikhiqizi i-acid.
Hydrology / Amanzi	The project area falls within the W23A quaternary drainage area of the Usutu to Mhlathuze Water Management Area with the Mfolozi, Nyalaza and Mnyaba Rivers the main water courses. The catchment has a Present Ecological Status of Class C/D implying it is moderately impaired. The mine is authorised to abstract 750,000 m^3/a raw water from the Mfolozi River. The mine has the potential to cause moderate pollution impacts on surface water sources but with mitigation measures it could be rated as low. The flood line study also revealed that only the northern footprint of the Emalahleni pit area falls within the 1:100-year flood line of the Nyalaza River. The mine complied with GN704 Regulations in this regard as per issued Water Use License. Imayini yanikezwa imvume yokudonsa amanzi Emfuleni iMfolozi. Imayini ingaba nomthelela ophakathi nendawo emanzini asemifuleni kodwa ngokusebenzisa izindlela zokunciphisa lemithelela ingagcina izimincane.
Hydropedology / Ezomhlabathi	The hydropedological study at the Somkhele Anthracite Mine was undertaken in order to provide conceptual hydrological process models for the hillslopes that were delineated across the site.

Aspect / Isici	Baseline Summary / Okutholakele
	Kwenziwe ucwaningo lomhlabathi ukuze kubonakale indlela amanzi ahamba ngayo kulendawo oklamelwe umsebenzi.
Noise / Umsindo	The construction and operational scenarios all consider noise-generating activities close to the NSR (or NSR representing the closest communities), at the same time considering worst-case scenario (all equipment generating maximum noises, all equipment operating simultaneously, the effect of stockpiles, deposits and berms minimized). It is expected that the mining activities will be clearly audible at the closest NSR, though noise impacts are not considered to be a fatal flaw as mitigation measures are available to reduce the noise levels as well as the probability of noise complaints. While complaints about noise might arise, the implementation of the recommended mitigation measures will assist in reducing annoyance with the project. It is therefore recommended that the Somkhele Expansion Project be authorized (from a noise impact perspective), subject that the applicant selects appropriate measures to reduce the noise levels. Kulindelekile ukuthi ukusebenza kwemayini kuholele ekunyukeni kwamazinga omsindo endaweni, umthelela womsindo awubulali ngoba zikhona izindlela zokunciphisa amazinga omsindo kanye namathuba okuthola izikhalazo ngomsindo. Yize noma izikhalazo mayelana nomsindo zizoba khona kodwa ukusetshenziswa kwezincomo zokunciphisa umsindo kuyolekelela kakhulu.
Socio-Economic / Ezenhlo-mnotho	The findings by Urban-Econ indicate both positive and negative socio-economic impacts associated with the mine expansion. On the positive side, the expansion is expected to generate increased taxes and royalties for Government, employment opportunities, increased household income which allows for a better standard of living, stimulate local economic growth, and infrastructure development. The mine expansion and increased employment will contribute to government revenues through taxes and an increase in the Municipal GVA. Kutholakale ukuthi leProjekthi izoba nakho kokubili, imithelela emihle nemibi kwezenhlalo-mnotho. Ngasohlangothini oluhle ukwandiswa kwemayini kulindeleke ukuthi kukhuphule izintela nezinzuzo kuHulumeni, kuvule amathuba emisebenzi, kwenzengcono impilo zemindleni eminingi, kugqugquzele ukukhula

Aspect / Isici	Baseline Summary / Okutholakele
	komnotho wendawo kanye nokuthuthukiswa kwengqalasizinda. On the negative side the project also poses challenges, including population displacement and re-settlement, population influx which may lead to increased crime and social conflicts in the area. Other negative impacts (rated as low) include noise disturbances, health risks and culture erosion. Addressing these challenges will require mitigation measures and stakeholder engagement to ensure sustainable development and minimize adverse effects on surrounding communities. Ngasohlangothini olungeluhle, leProjekthi ibuye ibe nezinselelo okubala kuzo ukususwa kwabantu kanye nokuhlaliswa kabusha, ukwanda kwabantu endaweni okungaholela ekunyukeni kwamazinga obugebengu nezingxabano emphakathini. Eminye imithelela yize noma iphansi kubalwa umsindo, ubungozi kwezempilo, nokuphazamiseka kwesiko. Ukubhekana nalezi zinselelo kuzodinga kusetshenziswe izinyathelo zokunciphisa nokubambisana nababambiqhaza ukuze kuqinisekiswe intuthuko esimeme. The overall conclusion is that the mine should be allowed to continue with their operations as the community as a whole will benefit economically in terms of job creation. Isiphetho esibalulekile ukuthi imayini kumele ivunyelwe ukuthi iqhubeke nokusebenza ngoba umphakathi wonkana uyazuza kwezomnotho nangamathuba emisebenzi.
Vegetation / Izihlahla notshani	There is only one vegetation type on the sites, either present on the sites in national vegetation mapping available from SANBI (2018), presented in the Revised National List of Threatened Ecosystems of 2022, or revealed by surveying, namely Zululand Lowveld. Some sites currently host much settlement and support numbers of goats, cattle and sheep. In addition, other parts were formerly settled or cultivated. Vegetation in these areas is degraded or secondary. Little of the Zululand Lowveld on the sites is assessed as being in excellent condition. Uhlobo lwendawo lwaziwa ngokuthi yi Zululand Lowveld vegetation, imvelo kulezizindawo iphazamiseke kakhulu ngenxa yezakhiwo kanye nemfuyo eningi. Kwezinye

Aspect / Isici	Baseline Summary / Okutholakele
	izingxenye zisetshenziswe kakhulu zilinywa. Zincane kakhulu izindawo ezingaphazamisekanga. Although little of the Zululand Lowveld vegetation on the sites is in very good condition, large numbers of protected species occur. These fall into two categories: firstly, National Forest Act protected trees, that include *Sideroxylon inerme* (White Milkwood and *Sclerocarya birrea* subsp. *caffra* (Marula). Secondly, there are a range of smaller herbaceous or succulent species protected by the KwaZulu-Natal provincial conservation ordinance. These include species in the plant families *Amaryllidaceae, Apocynaceae, Asphodelaceae, Passifloraceae, Hyacinthaceae* and *Iridaceae*. None of these protected species is threatened or identified as of conservation concern in the National Plant Red List. Some of these, such as *Aloe* and *Ledebouria* species, are very abundant and number thousands. Yize noma incane kakhulu indawo engaphazamisekanga, zona zisesimeni esihla kakhulu, kunezihlahla eziningi ezivikelekile ngokomthetho kazwelonke okubalwa kuzo uMganu noMakhwelafingqane, khona futhi nezinye ezivikelekile ngokomthetho wesifunda okubalwa kuzo icena, unyawolwendlovu, isidiya, umanhlangwane nezinye

Project Alternatives:

As the Somkhele Mine is an existing mining operation, alternatives in terms of land use practises that may be affected was not considered. Mining as a land use in comparison to Tourism, Commercial Farming and Forestry were assessed. Transport alternatives were under consideration and preferred option of upgrading the existing road network to be used for haulage of the coal was considered to be the best alternative. Infrastructure alternatives were considered and the already optimised anthracite washing and recovery plant was considered as the preferred option.

Njengoba iSomkhele Mine iyimayini evese isebenza, ezinye izindlela zokusetshenziswa komhlaba ezingase zithinteke azizange zicatshangelwe. Ukumayina njengoba kuyingxenye yokusetshenziswa komhlaba, uma ukuqhathanisa neZokuvakasha, Ezolimo, kanye Namahlali kwahlolwa. Ezinye izindlela zokuthutha zacatshangelwa, kwabe sekunqunywa ukuthi kuzolungiswa imigwaqo evele ikhona isetshenziswe ukuthutha umkhiqizo. Izindkeka ezahlukie zengqalasizinda nazo zacatshangelwa kodwa

kwabe sekunqunywa ukuthi kusethsenziswe lengqalasizinda evele ikhona ukuwasha nokucutshungulwa komkhiqizo.

Impact Assessment Summary:

The Draft 2024 EIA/EMP and associated specialist studies and the PPP has been undertaken and completed in line with the legislative requirements discussed in section 6. (Part A) of this report. A quantitative impact rating methodology was applied to determine the significance of the expected impacts pre-mitigation and post- mitigation. The table below provides a summary of the key impacts (of moderate and major significance only) expected during the various phases of the project. The detailed environmental impact assessment is contained in **Table 14-1** of the EIA Report. In addition, **Table 7-1** (Part B) of this report lists and assesses all the potential impacts, together with the associated mitigation measures.

I-Draft 2024 EIA/EMP kanye nocwaningo lochwepheshe oluhambisana nayi kanye ne PPP kwenziwe kwaphothulwa ngokulandela izimfuneko zomthetho okuxoxwe ngazo esigabeni 6 (ingxenye A) yalombiko. Kusetshenziswe indlela ebizwa ngokuthi yi-quantitative impact rating ukukala ukubaluleka kwemithelela elindelekile ngaphambi kokuba ilungise nangemumva kokuba ilungiswe. iTafula elingezansi linekeza okufingqiwe mayelana nemithelela ebalulekile elindeleke ezigabeni ezahlukene zeProjekthi. Umbiko ophelele wokuhlolwa komthelela kwezemvelo ufakwe kuTafula 14-1 lombiko we EIA. Ukwengeza, iTafula 7-1 (ingxenye B) yalombiko libala futhi lihloye yonke imithelela engahle ibekhona, kanye nezindlela zokuyinciphisa leyo mithelela.

Aspect	Site Specific Impact	Significance Without Mitigation	Significance With Mitigation
Agricultural, Soils, Land use	Ineffective soil stockpile management	Moderate (40)	Moderate (32)
	Removal of soil layers, compaction, erosion	High (65)	Moderate (44)
	Loss of land use capability	High (85)	Moderate (52)
	Loss of soil by wind erosion, rainwater runoff	High (65)	Moderate (44)
	Restoration of land capability	High 85	Moderate + (36)
Aquatic Ecology	Stream modification, erosion, sedimentation and riparian vegetation destruction	Moderate (33)	Low (16)
Blasting and Vibration	Ground vibration impacts human responses	High (85)	Low (30)
	Ground vibration structural impact – houses	High (80)	Low (28)
	Ground vibration structural impact – infrastructure	High (64)	Low (12)
	Air Blast impacts	High (85)	Low (22)
	Flyrock risks	Medium (32)	Low (16)

Aspect	Site Specific Impact	Significance Without Mitigation	Significance With Mitigation
Climate Change	Increased contribution towards Greenhouse Gasses	High (65)	Moderate (55)
Health	Increased occurrences of human health effects associated with exposure to PM2.5	Medium (42)	Low (26)
Noise	Increased levels due to construction activities at all three areas	Medium (39)	Low 22
	Night construction/operational activities	High (80)	Low (24)
	Noise stemming from daily mining activities – all mining areas	High (60)	Low (22)
Socio-Economic – Negative	Population displacement and resettlement	High (75)	High (60)
	Population influx	Medium (48)	Low (6)
	Increase in crime	Medium (33)	Low (6)
	Health related impacts (noise/air)	Low (24)	Low (20)
	Cultural erosion	Medium (45)	Low (6)
Socio-Economic – Positive	Increase in employment opportunities	High (+)	High (+)
	Increase household income	High (+)	High (+)
	Infrastructure development	High (+)	High (+)
Vegetation	Vegetation clearance during construction	High (60)	Moderate (36)
	Destruction of Zululand lowveld biome	High (75)	High (60)
	Revegetation as part of rehabilitation	High (60)	Moderate (33)
Visual	Change in visual character of area	Medium (56)	Moderate (36)
	Dust creation, impact sensitive receptors	Moderate (56)	Moderate (36)
	Impact eco-tourism (HiP)	Moderate (42)	Moderate (36)
	Light pollution	Moderate (33)	Low (27)
Air	Dust fall 24 hr	Moderate (52)	Moderate (44)
	Exceedance PM10 limits	High (60)	Moderate (44)
	Exceedance PM2,5 limits	Moderate (44)	Moderate (36)
Fauna	Loss of habitat	High (70)	Moderate (55)
	Faunal disturbance	Moderate (55)	Moderate (40)
Wetlands	Direct modification of wetland habitat	High (75)	High (60)
	Alteration geomorphological processes	High (60)	Moderate (42)
	Impact ecological connectivity	Moderate (48)	Moderate (36)
Hydrology	Stormwater runoff	Moderate (45)	Low (27)
	Poor quality water	Moderate (36)	Low (27)
	Groundwater contamination	Moderate (36)	Low (18)
Traffic	Impact road safety	Moderate (45)	Low (27)
	Stormwater accumulation on roads	Moderate (45)	Low (27)
	Dust and noise creation	High (85)	Moderate (30)
Geohydrology	Disturbing vadose zone	High (60)	Moderate (30)
	Poor quality seepage	Moderate (45)	Low (24)
	Groundwater pollution	High (65)	Moderate (39)
	Over groundwater abstraction	High (65)	Moderate (39)
Paleontological	Loss of fossil heritage	Moderate (46)	Low (30)

Conclusions and Recommendations:

A full Scoping and EIA process has been undertaken by MENCO, the independent consultant, with input from the various specialists as indicated in the approved Plan of Study. Since September 2022, WSP (an independent global environmental consulting

company) has acted as an independent entity that has chaired all public participation meetings, compiled minutes and received all comments following the meetings. All correspondence in respect of the public participation had been channelled via WSP to further enhance the independence of the project.

Inqubo ephelele yeScoping kanye ne-EIA iqhutshwa ochwepheshe abazimele i-MENCO, ngemibono evela kochwepheshe abahlukahlukene njengoba kukhonjiswe ohlelweni olugunyaziwe locwaningo. Kusukela ngo-Septhemba 2022, iWSP (inkampani yochwepheshe ezimele umhlaba wonke) isibe umsizi ozimele oy waphatha yonke imihlangano yokubamba iqhaza komphakathi, yabhala amaminithi emihlangano yaphinde yaqoqa yahlanganisa konke ukuphawula ngemumva kwemihlangano. Zonke izincwadi eziphathelene nokubamba iqhaza komphakathi zithunyelwe ku-WSP ukuze kuqinisekiswe ukuzimela kwalenqubo.

As per the approved Plan of Study, the required studies were undertaken by the appointed specialists during the EIA Phase of the Project with the objective of identifying and weighing anticipated impacts and risks associated with the activities. The findings of the impact assessment have shown that without risk mitigation factors the Project will have some major adverse impacts on the receiving environment. This mainly pertains to the loss of terrestrial habitat for the creation of the open pits, numerous concerns of the communities situated within close proximity of the mining footprint of the Somkhele Extension Project stating potential impacts on the Mfolozi River catchment due to increased sedimentation of surface water resources, as well as moderate impacts on aquatic biota, reduction in catchment yields, nuisance noise, dust and visual impacts, displacement of households located in the proposed open pits footprint. In addition, there is an irreversible impact to the land use and the overall land capability until it is rehabilitated that relates to loss of grazing potential and rural agricultural activities. However, the implementation of the mitigation and management measures recommended by the various specialists involved in the compilation of this Draft Reviewed 2024 EIA/EMPr, will aid to reduce the significance of these impacts to minor or negligible significance. Monitoring plans, which should be implemented throughout the life of the mine, have also been provided to ensure that adverse impacts are identified and mitigated throughout the mine's life.

Ngokohlelo olugunyaziwe locwaningo, ucwaningo lwenziwa ochwepheshe ababeqokiwe ngesikhathi sesigaba se-EIA seProjekthi, ngenhloso yokuhlonza kanye nokukala imithelela elindelekile kanye nobungozi obuhambisana nemisebenzi. Okutholwe ekuhlolweni kwemithelela kubonise ukuthi ngaphandle kwezici zokunciphisa ubungozi, iProjekthi izoba nemithelela emibi kakhulu endaweni. Lokhu kufaka phakathi ikakhulukazi ukulahleka kwendawo uokuhlala ngenxa yokwenziwa kwemigodi yemayini, ukukhathazeka okuningi

okuvela emiphakathini eyakhelene nendawo yokusebenza yemayini yaseSomkhele ibalula imithelela engaba khona Emfuleni IMfolozi ngenxa yokwanda komhlabathi ozobe ugugulekela emifuleni, kanye menithelela ephakathi nendawo yokuphazamiseka kwemilo yezihlahla kanye nezilwane zasemanzini, ukuncipha kwamanzi atholakala emifuleni, umsindo, uthuli, kanye nemithelela ekubukekeni kwendawo, ukuthuthwa kwemizi eyakhe lapho kuhlongozwa ukumayinwa khona. Ukwengeza, kunomthelela ongeke walungiseka ekusetshenzisweni komhlaba jikelele kuze kube yilapho kubuyiselwa indawo esimeni emva kokumayina, lokhu kufaka phakathi ukulahleka kwamadlelo, kanye nemisebenzi yezolimo yasemakhaya. Kodwa-ke, ukwenziwa/ukulandelwa kwezincomo zokunciphisa ezihlinzekwe ngochwepheshe abehlukahlukene ababeyingxenye yokuhlanganiswa kwale-Draft Reviewed 2024 EIA/EMPr, kuzosiza ekunciphiseni imithelela emikhulu ibe sezingeni eliphansi okanye iphele. Izinhlelo zokuqapha imithelela ezizolandelwa kuze kube imayini iyavala, nazo zihlinzekiwe ukuze kuqinisekiswe ukuthi imithelela emibi ibonakele futhi yancishiswa/ yalungiswa kuze kube imayini iyavalwa.

It should be noted that the IPILRA vote in Emalahleni and Ophondweni indicated that more than 90% of the Community voted in support of the Mine and at the time of writing this report, 139 out of 143 families within 500 m of the pit boundary area in Emalahleni and Ophondweni have agreed to relocate and the majority of these families have already relocated.

Kumele kuqashelwe ukuthi ukuvota kwe- IPILRA Emalahleni nasOphondweni kwaveza ukuthi aba ngaphezu kuka-90% amalungu omphakathi avota ukweseka imayini, futhi nangesikhathi sokubhalwa kwalombiko, imindeni engu 139 kwengu 143 engaphakathi kuka 500m womgcele womgodi Emalahleni nasOphondweni ivumile ukuthutha futhi imindeni eminingi kulemndeni isithuthile.

Throughout the EIA process there have been some issues with access to the Mahujini area which has meant that a number of the specialist studies were initially delayed contributing towards a delayed environmental authorisation process. Following engagement via the local respected traditional structures, (and following public meetings conducted under the leadership of the Inkosi and Induna of the area), specialists were eventually allowed access for a 30-day period (4 February – 4 March) to complete their fieldwork.

Kuyo yonke iqubo ye-EIA kube nezinkinga ezithile ngokufinyelela endaweni yaseMahujini okuye kwasho ukuthi ucwaningo oluningi lochwepheshe lubambezeleke ekuqaleni, okugcine sekuholela ekubambezelekeni kwenqubo yokugunyazwa kwezemvelo. Emva kokuxoxisana nezinhlaka zendabuko ezihlonishwayo zendawo, (kanye nokulandela imihlangano yomphakathi eyaqhutshwa ngaphansi kobuholi beNkosi kanye neNduna

yendawo), ochwepheshe bagcine bevunyelwe ukungena izinsuku ezingu-30 (4 Febhuwari – 4 Mashi) ukuze baqedele umsebenzi wabo.

Therefore, the available data that this EIA is based on is inclusive of all three mining right areas being Emalahleni, Ophondweni and Mahujini. Wherever possible, information gaps identified by MENCO, the various specialists or by I&APs have been addressed. Those that remain are listed in section 20 (Part A) of this report. The findings of the impact assessment undertaken show that there is the potential for significant impacts throughout all phases of the project. However, with the effective implementation of the Draft 2024 EIA/EMP, careful planning, successful implementation of the biodiversity offset, SLP, RAP, WUL, and ongoing engagement with all stakeholders and potentially affected parties, there is no biophysical, social or economic reason why Tendele should not proceed with mining in the Emalahleni, Ophondweni and Mahujini areas.

Ngakho ke, imininingwane etholakalayo kule EIA ihlanganisa zontathu izindawo ezingaphansi kwelungelo lokumayina okuyisEmalahleni, Ophondweni, naseMahujini. Amagebe olwazi atholwe i-MENCO, ochwepheshe abehlukene noma ama-I&Aps alungisiwe. Lawo asele afakwe esigabeni 20 (Ingxenye A) yalombiko. Okutholwe ngesikhathi sokuhlolwa komthelela kukhombisa ukuthi akhona amathuba okuba khona komthelela omkhulu kuzo zonke izigaba zeProjekthi. Kodwa ke ngokusetshenziswa ngempumelelo kwe Draft 2024 EIA/EMP, ukuhlela ngokucophelela, ukuphothulwa ngempumelelo kwe-Biodiversity offset, SLP, i-RAP, i-WUL, kanye nokubonisana okuqhubekayo nabo bonke ababambiqhaza kanye nabangase bathinteke, asikho isizathu esibonakalayo, senhlalakahle okanye sezomnotho esingaholela ekutheni iTendele ingaqhubeki nokumayina Emalahleni, Ophondweni, kanye naseMahujini.

Furthermore, a comparative assessment has been made in relation to the previous approved Environmental Authorisations (2014 – 2016) and it is evident that no new material risk factors were tabled by the various appointed specialists, and no specific suggestions were made that Tendele should not proceed with mining in the Emalahleni, Ophondweni and Mahujini areas. There is therefore, no need for the "No-Go" option to be considered.

Ngaphezu kwalokho, ukuhlola okuqhathanisayokwenziwe mayelana ne-Environmental Authorisation yangaphambilini (2014 – 2016)futhi kuyabonakala ukuthi azikho ezinye izici ezintsha ezinobungozi kulokhu okwethulwa ochwepheshe abahlukahlukene abaqokiwe, futhi azikho iziphakamiso ezithile ezethuliwe ezikhomba ukuthi iTendele ingaqhubeki nokumayina Emalahleni, Ophondweni, naseMahujini. Ngakho ke, asikho Isidingo sokuthi kucatshangelwe ukuthi ingenzeki leProjekthi (No-Go option).

The ruling by Judge Bam on 4 May 2022 instructed Tendele to redo the Public Participation Process and update the existing Environmental Authorisation approved in 2016. Tendele can now re-submit the EIA/EMPr to the Minister of Mineral Resources and Energy for reconsideration knowing that all aspects of dispute had been appropriately covered and addressed in this Report.

Isinqumo sika Judge Bam sango mhlaka 4 Meyi 2022 sayalela iTendele ukuba yenze kabusha inqubo yokubambiqhaza komphakathi iphinde futhi ibuyekeze iEnvironmental Authourization yango -2016. iTendele isingathumela futhi i-EIA/EMPR kuNgqongqoshe wezokumbiwa phansi (DMRE) ukuze icutshungulwe kabusha, inolwazi lokuthi zonke izici obekukhalazwa ngazo zenziwe ngendlela efanele kuloMbiko.

Therefore, if the proposed Project is authorised to continue, positive social and economic impacts will be realised at local, regional and national level. Nationally, the Project will contribute to the high anthracite demand in the metallurgical industry (the industry is forced to import this commodity given the insufficient local supply). This, in addition to the knock-on benefits of government tax revenue contributions, among other. At regional and local level, the Project has the potential to improve local socio-economic profiles through the creation of more or less 1600 job opportunities, development of SMMEs and skills development.

Ngakho ke, uma leProjekthi ehlongozwayo igunyazwa ukuba iqhubeke, izoba nemithelela emihle kwezenhlalakahle nezomnotho ezingeni lendawo, lesifunda kanye nelikazwelonke. iProjekthi izofaka isandla ekunikezeni ngomkhiqizo osemgangathweni embonini yensimbi (imboni iyaphoqeleka ukuthi ithole umkhiqizo emazweni angaphandle ngenxa yokwentuleka komkhiqizo). Lokhu, kanye nezinzuzo ezikhona zeminikelo yentela kahulumeni. Ezingeni lesifunda nelendawo, leProjekthi inamandla okwenza ngcono isimo senhlolo-mnotho yendawo ngokudala amathuba emisebenzi angaphezu kuka-1600, ukuthuthukiswa kwama-SMME kanye nokuthuthukiswa kwamakhono.

TABLE OF CONTENTS

1. INTRODUCTION 1
1.1. Background 1
1.2. Structure of the EIA 2
2. PROJECT APPLICANT 5
2.1. Details of the EAP 5
2.2. Expertise of the EAP 6
2.2.1. Qualifications of the EAP 6
2.2.2. Summary of EAP's past experience 6
3. DESCRIPTION OF PROPERTY 9
4. LOCALITY MAP 9
5. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY 11
5.1. Listed and Specified Activities 11
5.2. Description of the activities to be undertaken 18
5.2.1. Project Location 25
5.2.2. Surrounding Activities 26
5.2.3. Mineral Resource 27
5.2.4. Mining Method 27
5.2.5. ROM Production 28
5.2.6. Mineral Processing 28
5.2.7. Efficiency of the Process 28
5.2.8. Mine Infrastructure 29
5.2.9. Water Management 34
5.2.10. Water Consumption 35
5.2.11. Diesel Storage and Consumption 38
5.2.12. Waste Management 38
5.2.13. Sewage 39
6. POLICY AND LEGISLATIVE CONTEXT 40
6.1 Constitution of South Africa 40
6.2 Mineral Petroleum Resources Development Act 40
6.3 National Environmental Management Act 40
6.4 National Environmental Management: Waste Act 41
6.5 National Water Act 42

6.6 National Heritage Act 43
6.7 National Environmental Management: Biodiversity Act 44
6.8 National Environmental Management: Air Quality Act 44
6.9 Other Legislation 45
7. NEED AND DESIRABILITY OF PROPOSED ACTIVITIES 46
7.1. Economic Consideration 46
7.2. Social Consideration and Just Transition 47
7.3. Introduction Just Transition and Social Responsibility 48
7.4. Environmental Consideration 55
7.5. Consideration of Sustainable Development 55
8. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT 61
8.1. Details of the Development Footprint Alternatives Considered 61
8.1.1. Location Alternative 61
8.1.2. Site Layout Alternative 61
8.1.3. Processing Methods or Mining Method alternatives 61
8.1.4. No-Go Alternative 62
9. DETAILS OF PUBLIC PARTICIPATION PROCESS 65
9.1. Stakeholder Identification 65
9.1.1. Government 65
9.1.2. Directly Affected and Adjacent Farms 65
9.1.3. Communities 65
9.1.4. Non-Governmental Organisations 66
9.1.5. AMICUS 66
9.2. Consultation with Stakeholders during Impact Assessment Phase 67
9.3. Summary of PPP 67
9.4. Summary of Issues Raised by I&APs 72
10. ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES 76
10.1. Type of Environment Affected by the Proposed Activity 76
10.1.1. Climate 76
10.1.2. Geology 78
10.1.3. Soil 81
10.1.4. Air Quality 82
10.1.5. Groundwater 84
10.1.6. Hydropedology 103
10.1.7. Surface Water 108

10.1.8. Wetlands 115
10.1.9. Hydrology 117
10.1.9.1. Emalahleni drainage 120
10.1.9.2. Ophondweni drainage 120
10.1.9.3. Mahujini drainage 120
10.1.9.4. Runoff 120
10.1.9.5. Flood line assessment 121
10.1.10. Flora and Fauna 125
10.1.11. Aquatic Ecology 134
10.1.12. Noise 140
10.1.13. Blasting and Vibration 148
10.1.14. Visual 156
10.1.15. Social 157
10.1.16. Cultural Heritage 162
10.2. Description of Current Land Uses 165
10.2.1. Land Capability 165
10.2.2. Land Use 167
10.3. Description of Specific Environmental Features 168
10.3.1. Rivers and Wetlands 168
10.3.2. Terrestrial Landscape and Habitat 169
10.3.3. Cultural Heritage 171
10.3.4. Infrastructure 171
10.4. Environment and Current Land Use Map 174
10.5. Climate Change 176
10.5.1. Greenhouse Gas (GHG) Emissions 176
11. IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT DURATION AND PROBABILITY 178
11.1. Soil Impact Assessment 178
11.1.1. Construction 179
11.1.2. Operational Phase and Decommissioning Phase 179
11.2. Blasting and Vibration Impact Assessment 181
11.3. Visual Impact Assessment 182
11.3.1. Construction Phase 182
11.3.2. Operational Phase 183
11.3.3. Decommissioning Phase 185
11.4. Heritage Impact Assessment 187

11.5. Geohydrological Impact Assessment 189
11.5.1. Construction Phase 189
11.5.2. Operational Phase 191
11.5.3. Decommissioning Phase 193
11.6. Hydropedology 195
11.6.1. Construction and Operational phase 195
11.6.2. Decommissioning phase 197
11.7. Surface Water Impact Assessment 198
11.7.1. Construction Phase 198
11.7.2. Operational Phase 199
11.7.3. Decommissioning Phase 200
11.8. Air Quality Impact Assessment 201
11.8.1. Construction Phase 201
11.8.2. Operational Phase 201
11.8.3. Decommissioning Phase 202
11.9. Noise Impact Assessment 202
11.9.1 Construction Phase 202
11.9.2 Operational Phase 208
11.9.3 Decommissioning Phase 210
11.10. Flora Impact Assessment 210
11.10.1. Construction Phase 211
11.10.2. Operational Phase 211
11.10.3. Decommissioning Phase 212
11.11. Faunal Impact Assessment 213
11.12. Hydrology 216
11.12.1. Construction Phase 216
11.12.2. Operational Phase 218
11.12.3. Decommissioning Phase 219
11.13. Wetland Impact Assessment 221
11.13.1. Construction Phase 221
11.13.2. Operational Phase 222
11.13.3. Decommissioning Phase 223
11.14. Aquatic Impact Assessment 224
11.14.1. Construction Phase 224
11.14.2. Operational Phase 224
11.14.3. Decommissioning Phase 225

11.15. Social Impact Assessment 225
11.15.1. Construction 225
11.15.2. Operational and Decommissioning Phases 226
11.16. Traffic Impact Assessment 228
11.17. Health Impact Assessment 230
11.18. Climate Change 232
11.19. Cumulative Impacts 233
11.19.1. Soils 233
11.19.2. Heritage 234
11.19.3. Palaeontology 234
11.19.4. Visual 235
11.19.5. Surface Water 235
11.19.6. Social- Economic 236
11.19.7. Air Quality 237
11.19.8. Fauna and Flora 238
11.19.9. Wetlands 240
12. METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS 240
12.1. Positive and Negative Impacts that the Proposed Activity will have on the Environment and Community that may be affected 242
12.2. Possible Mitigation Measures that could be applied and the Level of Risk 244
12.3. Motivation where No Alternative Sites were considered 245
12.4. Statement Motivating the Alternative Development Location within the Overall Site 245
13. FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE THROUGH THE LIFE OF THE ACTIVITY 245
14. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK 245
15. SUMMARY OF SPECIALIST STUDIES 272
16. ENVIRONMENTAL IMPACT STATEMENT 287
16.1. Summary of the Key Findings of the Environmental Impact Assessment 287
16.2. Final Site Map 291
16.3. Summary of Positive and Negative Implications and Risks of the proposed activity and Identified Alternatives 291
17. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR 292

18. FINAL PROPOSED ALTERNATIVES 292
19. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION 301
20. DESCRIPTION OF ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE 302
20.1. EIA Assessment 302
20.2. Soil Impact Assessment 302
20.3. Heritage Impact Assessment 302
20.4. Groundwater Impact Assessment 303
20.5. Air Quality 304
20.5.1. Assumptions 304
20.5.2. Limitations 304
20.6. Noise Impact Assessment 305
20.7. Aquatic Impact Assessment 306
20.8. Socio-Economic Assessment 307
20.9. Blasting and vibration 307
20.10. Rehabilitation and Closure Assessment 308
21. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED 309
21.1. Reasons why the Activity should be authorised or not 309
21.2. Conditions that must be included in the Authorisation 311
21.2.1. Specific conditions to be included into the Compilation and Approval of the EMPr 311
21.2.2. Rehabilitation Requirements 311
22. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED 311
23. UNDERTAKING 312
24. FINANCIAL PROVISION 313
24.1. Explanation of how the aforesaid amount was derived 313
24.2. Confirmation that this amount can be provided for from Operating Expenditure 313
25. DEVIATIONS FROM APPROVED SCOPING REPORT AND PLAN OF STUDY 313
25.1. Deviations from the Methodology used in Determining the Significance of Potential Environmental Impacts and Risks 314
25.2. Motivation for the Deviation 314
26. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY 314
26.1. Impact on the Socio-Economic Conditions of any Directly Affected Person 314
26.2. Impact on any National Estate referred to in section 3(2) of the National Resources Heritage Resources Act 315

27. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT 316

PART B 1

1. Item 1(a): DETAILS OF THE EAP 2
2. Item 1(b): DESCRIPTION OF THE ASPECTS OF THE ACTIVITY 2
3. Item 1(c): COMPOSITE MAP 2
4. Item 1(d): DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS 4
   - 4.1. Item 1(d)(i): Determination of Closure Objectives 4
   - 4.2. Item 1(d)(ii): Process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a Listed Activity 4
   - 4.3. Item 1(d)(iii): Potential Risk of Acid Mine Drainage 7
     - 4.3.1. Acid Base Accounting 7
     - 4.3.2. Leachate Results 9
   - 4.4. Item 1(d)(iv): Steps taken to Investigate, Assess and Evaluate the impact of Acid Mine Drainage 10
   - 4.5. Item 1(d)(v): Engineering or Mine Design Solutions to be implemented to avoid or remedy Acid Mine Drainage 12
   - 4.6. Item 1(d)(vi): Measures that will be put in place to Remedy any residual or cumulative Impact that may result from Acid Mine Drainage 17
   - 4.7. Item 1(d)(vii): Volumes and Rate of Water Use required for the Mining, Trenching or Bulk Sampling Operation 18
   - 4.8. Item 1(d)(viii): Has a Water Use License been applied for 18
5. Item 1(d)(ix): IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES 26
6. Item 1(e): IMPACT MANAGEMENT OUTCOMES 71
7. Item 1(f): IMPACT MANAGEMENT ACTIONS 89
   - 7.1. Environmental Management Roles and Responsibilities 139
   - 7.2. Environmental Management Financing 140
8. Item 1(i): FINANCIAL PROVISION 141
   - 8.1. Item (i)(1): Determination of the amount of Financial Provision 141
     - 8.1.1. Item (i)(1)(a): Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2) as described in 2.4 herein 141
     - 8.1.2. Item (i)(1)(b): Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties 143

8.1.3. Item (i)(1)(c): Provide a Rehabilitation Plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at time of closure 143

8.1.4. Item (i)(1)(d): Explain why it can be confirmed that the rehabilitation plan is compatible with closure objectives 143

8.1.5. Item (i)(1)(e): Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline 144

8.1.6. Item (i)(1)(f): Confirm that the financial provision will be provided as determined 144

9. Item 1(g): MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT 144

9.1. Item 1(g): Monitoring of Impact Management Actions 144

9.1.1. Soil 144

9.1.2. Heritage 145

9.1.3. Surface Water 145

9.1.4. Aquatic Ecology 146

9.1.5. Hydrology 151

9.1.6. Groundwater 152

9.1.7. Air Quality 153

9.1.8. Fauna and Flora 153

9.1.9. Wetlands 153

9.1.10. Blasting and Vibration 154

9.1.11. Noise 156

9.2. Item 1(h): Monitoring and Reporting Frequency 156

9.3. Item 1(i): Responsible Persons 157

9.4. Item 1(j): Time Period for Implementing Impact Management Actions 157

9.5. Item 1(k): Mechanism for Monitoring Compliance 158

10. Item 1(l): FREQUENCY OF THE SUBMISSION OF PERFORMANCE ASSESSMENT REPORT 162

11. Item 1(m): ENVIRONMENTAL AWARENESS PLAN 162

11.1. Item 1(m)(i): Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work 162

11.1.1. Objectives 162

11.1.2. Inclusion of Open Cast Mining Areas 163

11.1.3. Induction and Training 164

11.1.4. General Environmental Awareness 165

11.1.5. Internal Communication and Awareness Campaign 165

11.1.6. External Communication and Awareness Campaign 165

11.2. Item 1(m)(ii): Manner in which risks will be dealt with in order to avoid pollution or degradation of the environment 165
12. Item 1(n): SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY 166
13. Item 2: UNDERTAKING 167
14. REFERENCES 168

LIST OF TABLES

Table 2-1: Name and Address of Mine 5
Table 2-2: Mining Right Holder detail 5
Table 2-3: EAP Details 5
Table 2-4: Academic Qualifications 6
Table 2-5: Past experience of the EAP 6
Table 3-1: Property Description 9
Table 5-1: Listing Notice 1, GNR 983 of 4 December 2014 (as amended GN517, 11 June 2021) 11
Table 5-2: Listing Notice 2 (GNR 984 of 4 December 2014 (as amended GN517, 11 June 2021) 14
Table 5-3: Listing Notice 3 (GNR 985 of 4 December 2014 (as amended GN517, 11 June 2021) 16
Table 5-4: List of Waste Management activities, Category B, GNR 921 July 2015 18
Table 5-5: Phase activities undertaken as part of the Somkhele Mining Project 19
Table 5-6: Project area in relation to surrounding activities 27
Table 5-7: Customer Specifications for the resource 27
Table 5-8: Somkhele's indicative planned production for period June 2025 – June 203328
Table 5-9: Capacities of the PCD's for the Somkhele Project 35
Table 5-10: Average annual water balance for Somkhele 36
Table 5-11: Typical General and Hazardous Waste Generated on site 38
Table 7-1: Historical number of employees from each sending area prior to the mine's closure June 2022 (full time employees) 48
Table 7-2 Action Plan to give immediate effect to Just Transition 49
Table 7-3: NEMA Principles and Sustainable Development for Somkhele Project 56
Table 9-1: Venues where DFSR was available 70
Table 9-2: Summarised issues raised by I&APs 72
Table 9-3: Community leaders in support of Tendele Project 74
Table 10-1: Rainfall and Evaporation data 76
Table 10-2: Temperature data applicable to Somkhele 77
Table 10-3: Frequency of exceedance at control buckets in Somkhele area 83
Table 10-4: Aquifer Test Results 87
Table 10-5: Hydraulic gradient calculation - Emalahleni 89
Table 10-6: Flow velocity calculation - Emalahleni 90
Table 10-7: Hydraulic gradient calculation - Ophondweni 90
Table 10-8: Flow velocity calculation - Ophondweni 90
Table 10-9: Hydraulic gradient calculation - Mahujini 90
Table 10-10: Flow velocity calculation - Mahujini 90
Table 10-11: List of hydrocencus boreholes 92
Table 10-12: Summary of groundwater quality data 2024 102
Table 10-13: Sub-catchment characteristics 104
Table 10-14: Background water quality data for Areas 4 and 5 108
Table 10-15: Relevant Water Quality Standards 109
Table 10-16: Monitoring sites used by Eco-Pulse 115
Table 10-17: Dominant vegetation species associated with the wetlands 116
Table 10-18: Ophondweni wetland delineation results 117
Table 10-19: Summary of design rainfall data used for peak flow estimation 121

Table 10-20: Protected trees in terms of National Forest Act 127
Table 10-21: Plants Protected by KZN Provincial Conservation Ordinance 128
Table 10-22: Rare and threatened mammals occurring or likely to occur within broader Project Area 129
Table 10-23: Rare and threatened reptiles 131
Table 10-24: Rare and threatened amphibians 132
Table 10-25: *In-situ* Water Quality 134
Table 10-26: Water Quality data obtained from sampled sites (February 2024) 135
Table 10-27: HIA results for an aquatic ecology summer survey at the Somkhele Project site 136
Table 10-28: Results of the SASS5 Assessment 138
Table 10-29: Fish survey data 139
Table 10-30: Summary of PES, EIS and REC for water courses assessed within study area 139
Table 10-31: Sound power emission levels used for modelling 145
Table 10-32: Potential maximum noise levels generated by construction equipment 146
Table 10-33: Potential equivalent noise levels generated by various equipment 147
Table 10-34: Summary of blasting variables from the existing Tendele Mining operations 152
Table 10-35: Human response to ground vibration 154
Table 10-36: Ground vibration limits for various structures 156
Table 10-37: Air blast levels that may result in damage or complaints 156
Table 10-38: Population Statistics 157
Table 10-39: Age distribution within primary area of impact 158
Table 10-40: Gender profile 158
Table 10-41: Education Profile 160
Table 10-42: Primary area of impact Employment by Sector 161
Table 10-43: Average annual household income for primary area of impact 161
Table 10-44: Heritage Resource Types Identified 165
Table 10-45: Distribution of Agricultural Land in the project Area 165
Table 10-46: Regional characteristics of catchment area 168
Table 10-47: Total annual GHG emissions for the Project (2024 – 2028) 177
Table 10-48: GHG Emissions rating table 177
Table 11-1: Specialist studies and associated Appendices 178
Table 12-1: Criteria used for Environmental Risk Assessment 241
Table 12-2: Significance Rating 241
Table 12-3: Mitigation Prediction Criteria 242
Table 12-4: Alternatives considered and their impacts 244
Table 14-1: Assessment of each identified impact as per activity 246
Table 15-1: Summarised Specialist Studies 274
Table 16-1: Summary of impacts – Construction Phase 287
Table 16-2: Summary of impacts – Operational Phase 288
Table 16-3: Summary of impacts – Decommissioning and Closure Phase 290
Table 18-1: Assessment of Route 1 297
Table 18-2: Assessment of Route 2 297
Table 18-3: Assessment of Route 3 298
Table 4-1: ABA and NAG screening criteria 8
Table 4-2: NAG screening methods used 9

Table 4-3: Geochemical and Hydrochemisty data for Somkhele project 10
Table 4-4: Likely decant associated with Areas 4 and 5 10
Table 4-5: Authorised Water Uses 18
Table 4-6: Water Uses relevant to Somkhele Extension Project 20
Table 5-1: Proposed mitigatory measures for Somkhele Project 26
Table 6-1: Impact management outcomes for the Somkhele project 71
Table 7-1: Management actions for the Somkhele Project 89
Table 7-2: Proposed consolidated Management Actions for Somkhele mine during all phases (C, O, D) 108
Table 8-1: Summary of Life of Mine Closure Costs 141
Table 8-2: Project Closure Objectives 142
Table 9-1: Allocated budget for monitoring 144
Table 9-2: Proposed surface water monitoring points 145
Table 9-3: Alternative surface water monitoring points 146
Table 9-4: Bio-monitoring program 146
Table 9-5: Proposed monitoring points, frequencies and sample analysis 151
Table 9-6: Groundwater Quality Limits 153
Table 9-7: Appointed Responsible persons 157
Table 9-8: Monitoring of Environmental Impacts 160

LIST OF FIGURES

Figure 1-1: Regulation 2(2) map indicating mining areas 4
Figure 4-1: Locality of the Somkhele Mining Project..... 10
Figure 5-1: Regional setting of mining right areas 26
Figure 5-2: Effect of quality variation on yield of saleable product 29
Figure 5-3: Mine layout for Emalahleni..... 30
Figure 5-4: Mine layout plan for Ophondweni..... 31
Figure 5-5: Mine layout plan for Mahujini and Machibini 32
Figure 5-6: Area 4 and 5 anthracite seams..... 33
Figure 5-7: Schematic water balance for the Somkhele Mining Project areas 34
Figure 8-1: Proposed mine layout for Emalahleni if Xcentric Rippers® are implemented. 64
Figure 9-1: Mpukunyoni Community Mining Forum structure 66
Figure 9-2: Locality of Open Day venues and public places where DFSR were placed ... 71
Figure 10-1: Wind Rose plots for the Somkhele area 78
Figure 10-2: Typical local stratigraphy at Somkhele..... 79
Figure 10-3: Regional geology of project area..... 80
Figure 10-4: Sensitive receptors identified in terms of the AQIA study 82
Figure 10-5: Conceptualisation of the aquifer zones..... 86
Figure 10-6: Emalahleni – Groundwater elevation vs. topographic elevation 89
Figure 10-7: Hydrocencus boreholes identified at Emalahleni..... 98
Figure 10-8: Hydrocencus boreholes identified at Ophondweni..... 99
Figure 10-9: Hydrocencus boreholes identified at Mahujini 100
Figure 10-10: Local hydrogeological setting..... 101
Figure 10-11: Land morphology concept 103
Figure 10-12: Soil types encountered within project area 107
Figure 10-13: Mining areas in relation to quaternary catchments 108
Figure 10-14: Stormwater management plan for Ophondweni 112
Figure 10-15: Stormwater management plan for Emalahleni..... 113
Figure 10-16: Stormwater management plan for Mahujini 114
Figure 10-17: NFEPA Rivers and wetlands in relation to the project area 115
Figure 10-18: Delineated wetlands at Ophondweni in relation to mine layout..... 116
Figure 10-19: Regional locality and drainage 119
Figure 10-20: Simulated natural (unmodified) average runoff for W32G..... 120
Figure 10-21: Simulated flood line for Emalahleni 122
Figure 10-22: Simulated flood lines for Ophondweni 123
Figure 10-23: Simulated flood lines for Mahujini..... 124
Figure 10-24: South African red list categories..... 127
Figure 10-25: Watercourse and wetland process unit labelling 137
Figure 10-26: Projected day time noise rating levels for Ophondweni..... 141
Figure 10-27: Projected night time noise rating levels for Ophondweni 141
Figure 10-28: Projected day time noise rating levels for Emalahleni..... 142
Figure 10-29: Projected night time noise rating levels for Emalahleni..... 143
Figure 10-30: Projected day time noise rating levels for Mahujini 143
Figure 10-31: Projected night time noise rating levels for Mahujini 144
Figure 10-32: Potential BSR within 2000m of blasting area for Ophondweni 148
Figure 10-33: Potential BSR within 2000m of blasting area for Emalahleni..... 149

Figure 10-34: Potential BSR within 2000m of blasting area for Mahujini 149
Figure 10-35: Flow diagram illustrating continues optimisation of blasting parameters 151
Figure 10-36: Human vibration sensitivities and potential structural damage compared to the RI 8507 limits 155
Figure 10-37: Employment status of population ages 15 - 64 within area of impact ... 160
Figure 10-38: SAHRIS Palaeo-sensitivity map 163
Figure 10-39: Fossilized leaf imprints found *in situ* in mudstone 164
Figure 10-40: Land capability map for Ophondweni 166
Figure 10-41: Land capability for Emalahleni 167
Figure 10-42: Specific environmental features in the catchment 169
Figure 10-43: Special habitats and species occur south east of Emalahleni 170
Figure 10-44: Proposed mining development in relation EKZNW CBA layer 172
Figure 10-45: Biodiversity-offset area as Option 1 173
Figure 10-46: Land use map for the Emalahleni Area 174
Figure 10-47: Land use map for the Mahujini Area 175
Figure 10-48: Land use map for the Ophondweni Area 175
Figure 18-1: Proposed Routes for the Emalahleni and Ophondweni Pits 294
Figure 18-2: Proposed intersection for the P495 access road 299
Figure 18-3: Alternative haul roads considered for the Mahujini Pit 300
Figure 18-4 Layout P235/P495 intersection type B1 301
Figure 3-1: Composite map of the Emalahleni Site 2
Figure 3-2: Composite map of the Ophondweni Site 3
Figure 3-3: Composite map of the Mahujini Site 3
Figure 4-1: Emergency Response Procedure 6
Figure 4-2: Conceptual geohydrological model for Mahujini indicating potential decant area 11
Figure 4-3: Limestone diversion well (from IMWA, 2018) 14
Figure 4-4: Flowchart for AMD Performance Assessment and Review 16
Figure 9-1: Surface water monitoring for Emalahleni 148
Figure 9-2: Surface water monitoring for Ophondweni 149
Figure 9-3: Surface water monitoring for Mahujini 150
Figure 9-4: Proposed monitoring borehole construction 152

LIST OF APPENDICES

APPENDIX 1	CV of the EAP
APPENDIX 2	Public Participation
APPENDIX 3	Agricultural, Soils and Land Use Impact Assessment
APPENDIX 4	Landscape and Visual Impact Assessment
APPENDIX 5	Archaeological and Cultural Heritage Impact Assessment
APPENDIX 6	Paleontology Impact Assessment
APPENDIX 7	Hydropedology Impact Assessment
APPENDIX 8	Wetland and Surface Water Impact Assessment
APPENDIX 9	Hydrology Assessment
APPENDIX 10	Noise Impact Assessment
APPENDIX 11	Traffic Impact Assessment
APPENDIX 12	Geohydrological Assessment
APPENDIX 13	Climate Change Impact Assessment
APPENDIX 14	Health Impact Assessment
APPENDIX 15	Socio-Economic Assessment
APPENDIX 16	Ambient Air Quality Impact Assessment
APPENDIX 17	Blasting and Vibration
APPENDIX 18	Vegetation Impact Assessment
APPENDIX 19	Biodiversity (Terrestrial) Assessment
APPENDIX 20	Geotechnical Study
APPENDIX 21	Rehabilitation and Closure Plan
APPENDIX 22	Visual and Noise Compensation
APPENDIX 23	Civil Engineering Design
APPENDIX 24	Social and Labour Plan
APPENDIX 25	Relocation Action Plan
APPENDIX 26	Biodiversity Offset

List of Abbreviations

AIS	Alien Invasive Species
AMD	Acid Mine Drainage
amsl	above mean sea level
AQIA	Air Quality Impact Assessment
BH	Borehole
BHN	Basic Human Needs
BID	Background Information Document
BPEO	Best Practical Environmental Option
BPG	Best Practice Guideline
BSR	Blast Sensitive Receptor
CBA	Critical Biodiversity Area
CRR	Comments and Response Report
CSR	Corporate Social Responsibility
CV	Curriculum Vitae
DAC	Directly Affected Community
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DOT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environment Conservation Act, 1989 (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Environmental Integrity and Sensitivity
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme Report
ENIA	Environmental Noise Impact Assessment
EO	Environmental Officer
ESA	Ecological Support Area
ESD	Enterprise Supplier Development
ESG	Environmental Social Governance
FEPA	Freshwater Ecosystem Priority Area
FRAI EC	Fish Response Assessment Index Ecological Class
GN	Government Notice
HIA	Heritage Impact Assessment
HiP	Hluhluwe iMfolozi Park
HGM	Hydro-Geomorphology
IAPP	International Association for Public Participation
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPILRA	Interim Protection of Informal Land Rights Act, 1996 (Act 31 of 1996)
ISO	International Organisation for Standardization
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
kg	Kilogram
KZN	KwaZulu Natal

l/s	Litres per second
LED	Local Economic Development
LOM	Life of Mine
m/s	meters per second
m^3/a	Cubic meters per annum
m^3/d	Cubic meters per day
m^3/s	Cubic meters per second
MAE	Mean annual evaporation
mamsl	Meters Above Mean Sea Level
MAC	Mining Area Committee
MAP	Mean Annual Precipitation
MAR	Mean annual runoff
MCEJO	Mfolozi Community Environmental Justice Organisation
MCMF	Mpukunyoni Community Mining Forum
MENCO	M^2 Environmental Connections
MJ/kg	Megajoules per kilogram
MHSA	Mine Health and Safety Act, 1996 (Act 29 of 1996)
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
MR	Mining Right
MRA	Mining Right Application
MW	Megawatt
NAPAES	National Protected Area Expansion Strategy
NDCR	National Dust Control Regulations
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEMPA	National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)
NEMWA	National Environmental Management: Waste Amendment Act, 2008 (Act 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Governmental Organisation
NHA	National Health Act, 2003 (Act 61 of 2003)
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NQF	National Qualifications Framework
NSR	Noise Sensitive Receptor
NWA	National Water Act, 1998 (Act 36 of 1998)
OHSA	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
PCC	Presidential Climate Commission
PCD	Pollution Control Dam
PES	Present Ecological Status
PPP	Public Participation Process
RAP	Relocation Action Plan
RD	Red Data
RE	Remaining Extent
ROM	Run of Mine
RQO	Resource Quality Objective
RWD	Return Water Dam
SA	South Africa
SABS	South African Bureau of Standards
SACNASP	South African Council for Natural Scientific Professions
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAIIA	South African Institute of International Affairs
SANAS	South African National Accreditation System
SANBI	South African National Biodiversity Institute

SANS	South African National Standard
SAPS	South African Police Services
SASS	South African Scoring System
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEIA	Scoping and Environmental Impact Assessment Process
SHE	Safety Health and Environment
SHEQ	Safety, Health, Environment and Quality
SIA	Social Impact Assessment
SLP	Social Labour Plan
SMME	Small, Micro and Medium Enterprise
STD	Sexual Transmitted Disease
SWMP	Stormwater Management Plan
TIA	Traffic Impact Assessment
VU	Vulnerable
WMA	Water Management Area
WUL	Water Use License

PART A:

Scope of Assessment and

Environmental Impact Assessment Report

1. INTRODUCTION

1.1. Background

Tendele Mining (Pty) Ltd, (Tendele), owns and operates an open cast anthracite mine, known as Somkhele Anthracite Mine (Somkhele) that is situated 23 km northwest of Mtubatuba Town, KwaZulu-Natal (KZN). The mine is located within the uMkhanyakude District Municipality.

Tendele commenced mining operations in 2007 at Somkhele for which the Company owns and holds various Mining Rights (MRs). Tendele has been issued with MRs and associated Environmental Management Plans (EMPs) for each mining area, these being the Area 1 MR (KZN135MR), the Area 2 MR (KZN 30/5/1/2/2/216MR), and on the 26 October 2016 Tendele was granted a MR (KZN30/5/1/2/2/10041MR) for Areas 4 and 5. This MR originally covered 222 km² although the intended mining areas were substantially smaller. The mining right areas are indicated on **Figure 1-1**.

Tendele has since abandoned 92% of the area covered by the MR. The intended mining areas are now approximately 27 km^2. The retained areas are located in Emalahleni, Ophondweni and Mahujini. These areas are also referred to as Area 4 and 5.

The Mining Right granted to Tendele was contested and, on 4 May 2022, the Pretoria High Court handed down a judgment relating to the 10041MR and an EMPr held by Tendele (Court Case No: 82865/2018). The decisions to grant the MR and approve the EMPr were declared invalid by the Judge. The MR and its EMPr were not, however, set aside by the Court but rather sent back to the Minister of Mineral Resources and Energy (DMRE) for reconsideration.

The court ordered the following:

- *"The Director General's decision of 31 May 2016, in awarding the Mining Right to Tendele, and the Regional Manager's decision of 26 October 2016, in approving Tendele's EMPr, are hereby declared invalid. The decisions are not set aside"*
- *"The Minister's decision of 15 June 2018 in dismissing the appeal against the grant of the Mining Right to Tendele and the Approval of Tendele's EMPr is hereby declared invalid and is set aside."*
- *"The appeal is remitted back to the Minister for reconsideration in accordance with the findings of this judgement."*
- *"In reconsidering the appeal, and in addition to the findings of this judgement, the Minister is directed to consider":*

  a) *any information that the Applicants and Tendele wish to place before him for that purpose.*

  b) *any information, comments, and submissions from I&APs.*

- *Tendele is directed to notify interested and affected parties of their entitlement to participate in the appeal process by publicising the contents of this widely.*

- *Tendele is to ensure that public participation process to be conducted pursuant to the Minister's determination of the appeal process, complies with the requirements of (a) Public Participation Guidelines in terms of the National Environmental Act, 1998 and (b) Chapter 6 of the Environmental Impact Assessment Regulations, 2014 as Published in Government Gazette No38282 GNR 982 of 4 December 2014.*

In reconsidering the appeal, the Judge has directed the Minister to consider any information that Tendele wishes to place before him as well as any information and comments from Interest and Affected Parties (I&APs)

In addition, the Judge has directed the Mine to notify I&APs of their entitlement to participate in the appeals process (the notification to be published widely) and the Mine must ensure that public participation is conducted in terms of the EIA Regulations, read with the public participation guidelines.

The intent is to submit all relevant documents with the Minister following Chapter 6 of the EIA Regulations.

As per the EIA Regulations, 2014, a Scoping and EIA (SEIA) process must be undertaken in such a manner that the environmental outcomes, impacts and residual risks of the activities to be undertaken are noted in the Scoping and EIA Reports and assessed accordingly by the Environmental Assessment Practitioner (EAP).

1.2. Structure of the EIA

The main purpose of this EIA/EMPr is to provide a description of the current baseline environmental conditions within the proposed project area, and to describe the identified environmental impacts and mitigation measures for the proposed activities.

This document has been structured as follows to meet the requirements of Appendix 3 of the 2014 EIA Regulations, as amended in April 2017:

Chapter 1: Introduction and overview – Introduce the project and the project proponent, provides an overview of the project, provides the details of the environmental assessment practitioner (EAP), and explains the EIA process.
Chapter 2: Project Motivation – Motivates the need for and desirability of the project.
Chapter 3: EIA Process – Summarises the process being undertaken with respect to the EIA for the project, inclusive of the methodology utilised for scoping.
Chapter 4: Description of the Proposed Project - Provides a summary of the key project components, the project location, scale, nature and design, discard production process, main inputs and outputs, schedule and activities during different phases of the project, inclusive of a description of the project location and the properties on which the project will take place.
Chapter 5: Project Alternatives – Summarises alternatives considered by the project proponent.
Chapter 6: Policy, Legal and Administrative Framework – Discusses the environmental policy, legal, and administrative framework applicable to the proposed project. This framework includes a summary of relevant South African regulations, the applicable administrative framework, and the environmental permitting process.

Chapter 7: Description of the Environment that may be affected – Describes the current pre-project biophysical, socio-economic, and cultural status of the area, key characteristics (sensitive or vulnerable areas), important heritage resources, current land use and livelihoods.
Chapter 8: Environmental Issues and Potential Impacts of the Project - Describes the identified impacts and recommended mitigation measures.
Chapter 9: Public Consultation – This section provides a summary of the public consultation activities undertaken as part of the Scoping process and to be undertaken as part of the EIA/EMPr process.
Chapter 10: Environmental Attributes – Description of the types of environments affected by the proposed project.
Chapter 11: Impacts and Risks Identified -
Chapter 12: EIA Methodology
Chapter 13: Description of Processes Undertaken
Chapter 14: Summary of Each Identified Impact
Chapter 15: Summary of Specialist Studies
Chapter 16: Environmental Impact Statement
References – Provides references to literature consulted.
Appendices – Contains the technical material supporting the EIA report, including the Curricula Vitae (CV) of the EAP, stakeholder comments and supporting information, preliminary design report, specialist reports, and document limitations.

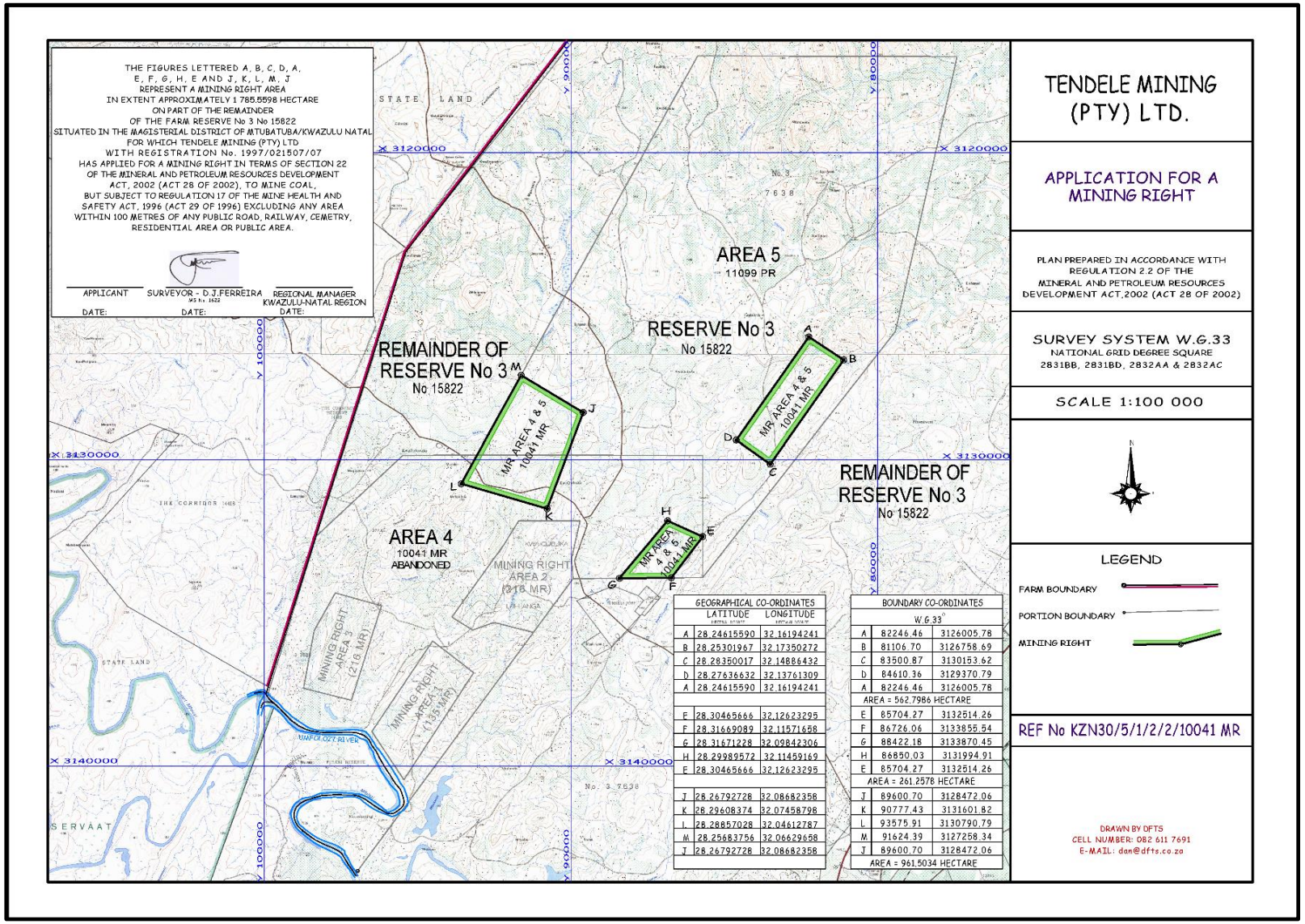


Figure 1-1: Regulation 2(2) map indicating mining areas

2. PROJECT APPLICANT

The name and address of the project applicant is contained in **Table 2-1**:.

Table 2-1: Name and Address of Mine

Name of Mine	Somkhele Anthracite Mine
Physical Address	23 km West of Mtubatuba, along the R618
Telephone	082 895 1406 x 101
Facsimile	082 895 1386

Table 2-2: below contains the detail of the Mining Right Holder.

Table 2-2: Mining Right Holder detail

Name of company:	Tendele Mining (Pty) Ltd
Physical Address:	Tendele Mining (Pty) Ltd 1st Floor 37 Peter Place Lyme Park Gauteng
Postal Address:	PO Box 6070, Rivonia, 2128
Telephone:	011 706 1644
Facsimile:	011 706 1594
Mining Right No:	KZN 30/5/1/2/2/10041MR

2.1. Details of the EAP

Please refer to **Table 2-3**: for the details of the EAP.

For the purpose of the Somkhele Project, the facilitation and compilation of documentation was conducted by MENCO. An independent EAP from MDT Environmental (Mr Deon Esterhuizen) was appointed by Tendele to ensure that the process followed is open and transparent and compliant with NEMA Regulations.

Table 2-3: EAP Details

Company Name:	M2 Environmental Connections (Pty) Ltd (trading as MENCO)
Contact Person:	Johan Maré (SACNASP 400092/91)
Designation:	Managing Director
Physical Address:	726 Wiedrigh Street, Moreleta Park, Pretoria
Telephone:	012 004 0362

E-mail:	johan@menco.co.za
EAP Company Name:	MDT Environmental Consultants (Pty) Ltd
Contact Person:	Deon Esterhuizen (SACNASP 400154/09)
Designation:	Environmental Assessment Practitioner (EAP) Registration No 2022/5762
Physical Address:	673 Glossoti Street, Garsfontein, Pretoria
Telephone:	082 575 3690
E-mail:	deon@mdte.co.za

2.2. Expertise of the EAP

2.2.1. Qualifications of the EAP

The academic qualifications of the EAP are summarised in **Table 2-4**:. Copies of the EAP's qualifications and professional registration are included in **Appendix 1**.

Table 2-4: Academic Qualifications

Specialist	Degree	Institution	Year Obtained
Deon Esterhuizen	M.Sc Environmental Ecology	University of Pretoria	2003
	B.Sc Honours	University of Jo'burg	1991
	B.Sc (Botany & Zoology)	University of Jo'burg	1990
Johan Maré	M.Sc (Microbiology)	University of Stellenbosch	1989
	B.Sc Honours (Microbiology)	North West University	1982
	B.Sc (Microbiology, Chemistry)	North West University	1981

2.2.2. Summary of EAP's past experience

A summary of the professional experience over a period of the last twenty years, in reverse chronological order is provided in **Table 2-5**:. The information is indicative of the EAP's experience in particular technical and managerial fields relevant to the project.

Table 2-5: Past experience of the EAP

Date from - To	Company / Project / Position / Relevant Technical and Management Experience
December 2020 to date	Mokolo Crocodile (West) River Water Augmentation Project Phase 2 (MCWAP-2) – the transfer of water from the Crocodile (West) River near Thabazimbi, to the Steenbokpan and Lephalale areas, including the implementation of the River Management System in the Crocodile (West) River and its tributaries.
Company/Client	Trans-Caledon Tunnel Authority
Position held	Environmental and Social Lead

Date from - To	Company / Project / Position / Relevant Technical and Management Experience
Experience	Responsible and accountable for the management of all environmental and social related tasks performed by two Environmental Monitors, two Social Monitors, and a Land Acquisition Team. This team is/ will be responsible to ensure that the Contractor executes the project within the guidelines of legislation, the environmental authorisation, the environmental management plan, and project specifications.
Project Value	> ZAR 15 Billion
December 2009 to date	Olifants River Water Resources Development Project: Sub- Phases 2B, C, D, E, & F which is a multi-purpose project incorporating both economic and social development objectives to cater for the water demands of commercial and social users.
Company/Client	Trans-Caledon Tunnel Authority
Position held	Environmental and Social Lead
Experience	Responsible and accountable for the management of all environmental and social related tasks performed by two Environmental Monitors, two Social Monitors, and a Land Acquisition Team. This team was responsible to ensure that the Contractor executes the project within the guidelines of legislation, the environmental authorisation, the environmental management plan, and project specifications.
Project Value	> ZAR 12 Billion
January 2019 to date	External Audit of Environmental Authorisations issued to Sasol Mining's various Coal Mines by the Department Mineral Resources & Energy and the Department of Water and Sanitation
Company/Client	Sasol Mining (Pty) Ltd
Position	External Auditor
Experience	The critical review of the mine's operations versus its legislated compliance requirements.
Project Value	ZAR 500,000
October 2019 to date	External Audit of Environmental Authorisations issued to Omnia by the Department of Environmental Affairs, Forestry and Fisheries
Company/Client	BME (Pty) Ltd
Experience	The critical review of the industry's operations versus its legislated compliance requirements.
Project Value	ZAR 100,000
Nov 2013 – Aug 2017	Kitwe Water and Sanitation Project Phase II in Zambia
Company/Client	Environmental Impact Assessment (EIA) for Kitwe Water and Sanitation Project Phase II in Zambia
Experience	External specialist review of Environmental Impact Assessment
Project Value	ZAR 193,730,000
March 2010 – December 2010	Design and construction of Botsabelo Complex- Lesotho blood transfusion services centre, National Reference Laboratory, student accommodation at the National Health Training College
Company/Client	The Government of the Kingdom of Lesotho
Experience	Development of an Environmental Protection Plan for implementation during construction. The development of method statements for key environmental construction activities.
Project Value	ZAR 100 million

Date from - To	Company / Project / Position / Relevant Technical and Management Experience
January 2014 – February 2015	EIA and Water Use Licence Application for the Mzimvubu Water Project for the construction of the Ntabelanga and Lalini Dam and associated infrastructure.
Company/Client	Department of Water & Sanitation
Experience	Review of Reports and team and budget management.
Project Value	ZAR 24 Billion
2012 - 2015	EIA and Waste Management Licence Application for the disposal of the gypsum and ash on the Kusile Power Station Co-Disposal Facility
Company/Client	Eskom Holdings
Experience	Waste Management Licence Application
Project Value	ZAR 168 Billion
Nov 2004 – Jan 2006	Feasibility study and EIA for the construction of the East-West highway Jamahiriya toll road
Company/Client	Government of Libya
Experience	Drafting of the feasibility report and the EIA report, project management and client liaison
Project Value	ZAR 2 Billion
January 2005 – September 2005	EIA study in respect of detailed design of Lower Shashe Dam
Company/Client	Republic of Botswana: Ministry of Minerals, Energy and Water Affairs; Department of Water Affairs
Experience	External specialist review of Environmental Impact Assessment
Project Value	ZAR 1,2 Billion
2007 - 2010	Development of a National Groundwater Strategy for the Department of Water Affairs and Forestry
Company/Client	Department of Water & Sanitation
Experience	Project team management, report review, client liaison, process management
Project Value	ZAR 13 Million
Apr – 2010 – Aug 2013	Waste Management Licence Application and Water Use Licence Application for Baviaanspoort Waste Water Treatment Works.
Company/Client	City of Tshwane
Experience	Project team management, report review, client liaison, process management
Project Value	ZAR 121 million
2010 - 2011	Development of a Water Conservation and Demand Management Strategy.
Company/Client	City of Johannesburg Metro Municipality
Experience	Project team management, report review, client liaison, process management
Project Value	ZAR 952,300
May 2007 - 2010	Environmental Impact Assessment, Integrated Water Use Licence, Waste Management Licence application for Zeekoegat Wastewater Treatment Works.
Company/Client	City of Tshwane
Experience	Project team management, report review, client liaison, process management
Project Value	ZAR 100 million

3. DESCRIPTION OF PROPERTY

The property description contained in **Table 3-1:** falls under the ambit of the Ingonyama Trust. The Ingonyama Trust is a corporate entity established to administer the land traditionally owned by the Zulu people, represented by their King, for the benefit, material welfare and social well-being of the Zulu Nation.

Table 3-1: Property Description

Farm Name	Farm Number	Portion	21-digit Surveyor General code
Reserve No 3	15822	0 (Remaining extent)	N0GV00000001582200000

4. LOCALITY MAP

Reference is made to **Figure 4-1** which indicates the Mining Right Areas (Emalahleni, Ophondweni and Mahujini) in relation to the nearest towns and regional roads. The project area spans over several community areas such as Somkhele and Myeki located within the Mtubatuba Local Municipality and the Umkhanyakude District Municipality.



Figure 4-1: Locality of the Somkhele Mining Project

5. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

5.1. Listed and Specified Activities

The Listed and Specified Activities that are linked to the Somkhele Mining Project are contained in **Table 5-1** to **Table 5-4**.

Table 5-1: Listing Notice 1, GNR 983 of 4 December 2014 (as amended GN517, 11 June 2021)

Activity	Description	Applicability
2	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where – • the electricity output is more than 10 megawatts but less than 20 megawatts; or • the output is 10 megawatts or less, but the total extent of the facility covers an area in excess of 1 hectare	The development of a transformer at the processing plant with an electricity output of more than 10 but less than 20 MW.
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	There is the potential that pipelines for the conveyance of bulk water or stormwater may be required and that the stipulated threshold will be exceeded.
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or	Somkhele Mine will likely require pipelines for the bulk conveyance of process or return water and that the stipulated threshold will be exceeded.

Activity	Description	Applicability
	(b) where such development will occur within an urban area.	
11	The development of facilities or infrastructure for the transmission and distribution of electricity— • outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or • inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — • temporarily required to allow for maintenance of existing infrastructure; • 2 kilometres or shorter in length; • within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	This will likely be applicable due to the permanent relocation of the existing overhead power lines, which is likely more than 33 kilovolts.
12	The development of— • dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or • infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— • within a watercourse; • in front of a development setback; or • if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	This activity will likely be applicable due to the proposed activities in the vicinity of the watercourse.
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.	It is likely that a bulk fuel storage facility will be required at Somkhele Mine and that the stipulated threshold will be exceeded.
19(i)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells,	This activity will likely be applicable due to the proposed access road construction activities in the watercourses.

Activity	Description	Applicability
	shell grit, pebbles or rock of more than 10 cubic metres from (i) a watercourse; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high- water mark of the sea or estuary, whichever distance is the greater	
24(ii)	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 m	It is likely that internal and haul roads will have to be constructed and that the length and width thresholds will be exceeded.
25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.	There is a potential that an effluent treatment plant will be required and that the stipulated threshold will be exceeded.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Based on the site assessment there is the potential that in excess of 1 hectares of indigenous vegetation will have to be cleared and this activity will be applicable. It is however more likely that 20 hectares will be exceeded
28(ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for	The site is currently being used for agriculture activities and is in excess of 1 hectare, as such this activity will be applicable.

Activity	Description	Applicability
	residential, mixed, retail, commercial, industrial or institutional purposes.	
31	The decommissioning of existing facilities, structures or infrastructure for— • any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; • any expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; • any phased activity or activities for development and related operation activity or expansion or related operation activities listed in this Notice or Listing Notice 3 of 2014; or • any activity regardless the time the activity was commenced with, where such activity: • is similarly listed to an activity in (i) or (ii) above; and • is still in operation or development is still in progress; excluding where— (aa) activity 22 of this notice applies; or (bb) the decommissioning is covered by part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies.	The development of the proposed Somkhele site will result in the decommissioning of existing activities taking place on-site.

Table 5-2: Listing Notice 2 (GNR 984 of 4 December 2014 (as amended GN517, 11 June 2021)

Activity	Description	Applicability
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding— (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published	The PCD's will require licensing in terms of section 21(g) of the NWA which governs the generation or release of pollution and as such this activity will trigger.

Activity	Description	Applicability
	in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.	
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Based on the site assessment there is the potential that in excess of 20 hectares of indigenous vegetation will have to be cleared and this activity will be applicable.
17	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including— (i) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (ii) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.	The Somkhele Mine required to amend and update the approved EIA/EMPr as part of the mining right to cover all environmental impacts for areas 4 and 5.
19	The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—	The Somkhele Mine will result in the removal of minerals, as such this activity will be applicable.

Activity	Description	Applicability
	(i) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or (ii) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.	

Table 5-3: Listing Notice 3 (GNR 985 of 4 December 2014 (as amended GN517, 11 June 2021)

Activity	Description	Applicability
4(iv), (vii), (xi), (xii)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. d. KwaZulu-Natal i. In an estuarine functional zone; ii. Trans- frontier protected areas managed under international conventions; iii. Community Conservation Areas; iv. Biodiversity Stewardship Programme Biodiversity Agreement areas; v. World Heritage Sites; vi. A protected area identified in terms of NEMPAA; vii. Sites or areas identified in terms of an international convention; viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ix. Core areas in biosphere reserves; x. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; xi. Sensitive areas as identified in an environmental management framework	The site is used for agricultural activities, a portion of the site is considered an ESA and the Hluhluwe iMfolozi Park is located within close proximity to the proposed sites. Therefore, the construction of the internal roads will likely trigger this activity.

Activity	Description	Applicability
	as contemplated in chapter 5 of the Act and as adopted by the competent authority; xii. Outside urban areas: (aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or (bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or	
10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. d. KwaZulu-Natal	The storage of fuel on site is likely to exceed the limits as specified.
12(iv), (ix), (x)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. d. KwaZulu-Natal	A portion of the site is considered an ESA and the HiP Nature reserve is located within close proximity to the proposed site therefore this activity will likely be applicable due to the proposed activities in the vicinity of watercourses.
14(ii), (iv), (vi), (x), (xii),	The development of— (i) canals exceeding 10 square metres in size; (ii) channels exceeding 10 square metres in size; (iii) bridges exceeding 10 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres in size; (vi) bulk storm water outlet structures exceeding 10 square metres in size; (vii) marinas exceeding 10 square metres in size; (viii) jetties exceeding 1 square metres in size; (ix) slipways exceeding 10 square metres in size; (x) buildings exceeding 10 square metres in size;	Construction of storm water control measures and pollution control dams

Activity	Description	Applicability
	(xi) boardwalks exceeding 10 square metres in size; or (xii) infrastructure or structures with a physical footprint of 10 square metres or more;] (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	

Table 5-4: List of Waste Management activities, Category B, GNR 921 July 2015

Activity	Description	Applicability
10	The construction of a facility for a waste management activity listed in Category B of this Schedule	Establishment of overburden and discard stockpile areas.
11	The establishment or reclamation of a residue stockpiles or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the MPRDA.	The Somkhele Mine will result in the establishment of overburden and discard stockpiles.

5.2. Description of the activities to be undertaken

The activities proposed by Tendele Mining (Pty) Ltd for the Somkhele Mining Project will occur in four phases:

- Pre-construction/planning phase – This phase will involve the removal of existing infrastructure situated within the mining area and development of the final plans/designs.
- Construction phase – The construction phase will take approximately 2 months to complete, which will include activities such as site establishment and the construction of all infrastructure, including the development of a box cut.
- Operational phase – All related mine operations, including anthracite (coal) removal, stockpiling, processing, water treatment and transportation as well as concurrent rehabilitation forms part of this phase.

- Decommissioning, closure and rehabilitation phase – This phase will involve the removal of all infrastructure and rehabilitation of the disturbed area. The closure period as determined during the EIA Phase based on the input from the rehabilitation specialist will commence after mining has ceased. The predicted Life of Mine (LoM) is given as 10 years.

A summarised description of the various activities to be undertaken is provided in **Table 5-5**: below.

Table 5-5: Phase activities undertaken as part of the Somkhele Mining Project

Activity	Description
Pre-construction/Planning Phase	
Finalise plans and designs	Existing Mining Works Program to be updated in terms of mining layout
Removal of existing infrastructure	Dwellings within the Mining Right Area in Ophondweni and Emalahleni to be removed in accordance with local custom and relocation agreements signed prior to the introduction the Relocation Action Plan requirements. Dwellings within the Mining Rights area in Mahujini to be removed in accordance with local custom and the Relocation Action Plan requirements
Construction Phase	
Establishment of mining site	Clearing of vegetation, levelling of areas designated for mining infrastructure (stockpile areas, pollution control facilities, etc.); commence with initial box cut
Upgrading of haul road, construction of access roads	Roads in the operational area will be constructed to facilitate on-site vehicle movement. The upgrading of existing roads will commence to act as haul roads and the establishment of the access roads will involve clearing vegetation and/or crops from the route areas. In terms of internal circulation, internal roads will be provided to allow accessibility to loading areas. All internal roads will be provided with sufficient width and turning radius to allow for movements and manoeuvring of trucks.
Soil Stripping	Stripping and stockpiling of soil in areas designated for surface infrastructure, stockpile areas, and the initial box cut. The maximum allowable soil will be removed through a truck and shovel stripping method. Stockpiling height will be limited as far as possible to reduce dust impacts during windy conditions and to preserve aerobic soil conditions.
Box cut	The initial box cut along with the access ramp will be established. This will involve

Activity	Description
	drilling and blasting activities along with the removal of the hard overburden.
ROM and product stockpiles	Vegetation will be cleared, and the initial topsoil removed and stockpiled to reuse during rehabilitation. Lining will be implemented as per DWS requirements contained in the WUL conditions
Overburden stockpiles	As above
Pollution Control Dams	Pollution control dams will be constructed to contain dirty water runoff from the mining area. The PCD's will be HDPE lined as per WUL requirement.
Storm water management	A system of grass lined clean water channels and lined dirty water channels will be constructed to separate clean and dirty water. The pollution control dams (PCDs), cut off and dirty water drains will be constructed as early as possible during the construction phase to separate clean and dirty water. Storm water culverts will be constructed on the proposed haul and access roads at the locations determined by the civil engineer.
Operational Phase	
On-going opening of box cut by means of drilling, blasting and excavation of overburden	Excavators will be utilised to remove the soft overburden. Hard overburden not excavated will be drilled and blasted prior to removal by dump trucks
Opencast mining and earth work activities	The mining method to be used at Somkhele is a conventional opencast mining method with some roll-over where and when practically and safely possible. Rehabilitation will be undertaken on an on-going basis where practically possible. The rollover method implies that some of the overburden will be stripped and placed directly inside the final void it will not be placed on the dump. Where roll-over is not possible, the overburden will be placed next to the pit on a dump designed for this purpose as close to the pit as possible to reduce the footprint of the Mine.
On-going vegetation clearance	Removal of crops and other vegetative cover within the areas earmarked for immediate opencast mining
Removal and stockpiling of available soils in the designated stockpile areas	As per the construction phase, the soils excavated will be separately pre-stripped as topsoil or subsoil and stockpiled separately in a designated area for use during rehabilitation. It is recommended that the topsoil stripping operation is carried out in line with the mine planning. This will ensure that the mining cycle will not be interrupted at any time for this

Activity	Description
	essential component to be carried out. The topsoil recovered from the cut areas is to be placed on a resource dump close to the final voids where it will be required for final closure. Subsoil stripping and stockpiling should follow a similar truck and shovel stripping procedure than the method used in the stripping of topsoil.
Dewatering of opencast pits	Dewatering is required to ensure stability of mine walls and optimise anthracite mining production. In opencast mines, a water table that is too high can destabilize mine walls, haulage roads, and slopes. Water pressure reduces the stability of mine walls and can lead to sliding and collapse of materials in the slope. Effective dewatering operations create dry conditions so that low strength aquifer sequence materials (sands, gravel, and clays) can be safely excavated, reducing drilling and blasting costs. Water from the open pits will be pumped to the PCDs.
Overburden stockpiling	Overburden material will be excavated from the pit to expose the anthracite. The overburden material is classified into: • Softs – the weathered soils between the rock or relatively un-weathered soils and the topsoil. This zone is assumed to be approximately between 2m and 25m deep. This material can be considered clean as it is unlikely to contain carbonaceous material. • Hards – the rock and relatively un-weathered soils above the anthracite and in between the anthracite seams. This material is assumed to contain carbonaceous material and should be considered dirty. The overburden stockpiles will consist of hard and soft dumps. The dumps will be between 15 and 50m high or in line with design parameters.
ROM Coal and product stockpiling	Run of Mine anthracite will initially be stockpiled at the pit area and will then be moved to the processing plant complex. The product will be stockpiled at the processing plant complex in the designated stockpile areas. The stockpiles will have a maximum height of 10m.
Processing of ROM anthracite	Tendele Mining has existing processing facilities and will use a wet anthracite beneficiation process comprising crushing,

Activity	Description
	screening, spiral concentrators and dense medium separation. Anthracite is tipped directly into a 30-ton capacity bin or reclaimed from the stockyard and tipped into the bin. Anthracite is reclaimed from the bin by a vibrating feeder and discharged onto a belt conveyor, which is fitted with a mass meter and electro-magnet, before feeding a double deck screen fitted with 90mm and 50mm aperture screen decks. The 400 x 90mm fraction feeds a short picking belt where any stone, shale and tramp will be removed. The 400 x 90mm anthracite fraction is reduced to –90mm in a primary double roll crusher. The primary crushed product re-joins the intermediate 90 x 50mm screen product on the belt conveyor feeding the secondary double roll crusher. The 90 x 50mm anthracite fraction is then reduced to –48mm in the secondary double roll crusher. The –48mm secondary crushed product will re-join the – 50mm undersize product from the double deck screen on the belt conveyor feeding the raw anthracite local stockpile. The product is stockpiled and where necessary blended with washed fines from the process plant to improve the overall quality of the anthracite dispatched to local markets.
Disposal of dirty water in the PCDs	Potentially contaminated water from the operational areas will be diverted to the PCDs.
Recycling of dirty water from the PCDs	Dirty water contained in the PCDs will be recycled and used as process water in the washing plant. The water will also be used for dust suppression on the haul roads.
Storm water management	The grass lined channels will divert all clean water runoff away from the operational area and release clean water into the surrounding drainage lines via energy dispersion erosion control type structures. All dirty water runoff from the polluted areas such as the ROM stockpiles, overburden dumps, contractor's yard will be directed to the PCDs via dirty water channels. The dirty water channels will release dirty water into the PCDs. The PCDs will be lined with the lining as advised by DWS and civil engineers to prevent seepage. The water accumulating in the PCDs will then be used for dust suppression. The PCDs will be designed to ensure a capacity that can

Activity	Description
	account for 1:50 year storm events and kept at a freeboard of 0.8m. The capacities required for the water management infrastructure will be determined during the hydrology study and civil engineers' designs.
Operation of bulk fuel storage facility	Diesel will be stored in above ground bunded storage tanks to prevent spillages from seeping into the underlying aquifer.
Disposal of discard and slurry at co disposal facility	Discard from the processing plant is transported by truck to the discard dump. Settled slime from the thickener will be pumped to a slurry pond within the confines of the discard dump in a co-disposal operation.
Maintaining of equipment at the workshop	Various mining machinery will be repaired and stored at the workshop. Oil traps and drums will be present to contain oil waste and spills.
Sewage management	Disposal and treatment of human sewage will be handled by means of portable facilities that will be maintained on site
Increased human activity through operation of site and security offices	The operational phase will involve the constant movement of contractors and mining employees in and around the area.
Transportation of ROM anthracite and anthracite product to the desired locations	The ROM anthracite from the pits will be road hauled to the stockpile area at the processing plant complex. After processing the product will be road hauled to the desired locations.
Maintaining access and haul roads	The access and haul roads will be treated with wet suppression in combination with chemical surfactants where applicable and maintained by the appointed contractor throughout the life of mine.
Water management	Water requirements for the operational phase for the mine are still being determined. In terms of operational water supply different options exist which include using underground water and water from the open pit (mine dewatering), drilling a supply borehole or obtaining water off site. In terms of domestic purposes potable water will be sourced from an on-site borehole or from the municipal source of site. The amount of operational and domestic water required will be determined as part of the water balance calculations during the WULA.
General and hazardous waste management	General and hazardous waste as defined under National Environmental Management: Waste Act will be generated at the proposed mine operation. General

Activity	Description
	waste will comprise concrete, rubble, glass, plastics and recyclable metals and hazardous waste will include used oils, oily rags, paint and chemicals containers etc. No disposal of general or hazardous waste will take place at the mine; such waste will be transported off-site for disposal at suitably licenced facilities. The different type of waste bins for the temporary storage of waste will be located at the contractor's yard.
Operational vehicle movement inside mining area	The operational phase will involve the constant movement of vehicles and machinery within the mining area.
Implementation of the Social and Labour Plan (SLP)	Tendele has prepared and submitted a Social and Labour Plan for the proposed Somkhele Mine, as required of the Mining Charter and the Mineral and Petroleum Resources Development Act 28, 2002. The objectives outlined in the SLP will be implemented during the operational phase.
Concurrent rehabilitation	Continuous rehabilitation will occur during the operational phase in terms of the requirements as contained in the approved Rehabilitation and Closure Plan. From the rehabilitation perspective, the key factors to consider during the operational phase are to minimise the area affected by the development, minimise potential future contact of toxic or polluting materials with the environment, and to maximise the recovery and effective storage of those mining profile materials that will be most useful during the rehabilitation process.
Decommissioning/Closure/Rehabilitation	
Pit closing and backfill	Overburden material will be used to backfill the final void as per approved rehabilitation designs (discard and hard overburden at the bottom and soft overburden at the top).
Rehabilitation of disturbed areas	Product and top soil stockpile areas will be re-vegetated with indigenous vegetation.
Soil replacement	Pre-stripped, topsoil will be replaced over the remaining landscaped area. Activities associated with the decommissioning phase will aim at rehabilitation of the site and associated soil to the extent that the site can revert to agricultural (grazing) use post mining.
Haul and access roads	The access roads will be ripped and reseeded with indigenous vegetation. Haul

Activity	Description
	roads will remain intact as this is existing district roads.
Water pollution control infrastructure	The PCDs along with the storm water management infrastructure will only be demolished should the area proof to be free draining with no pollution potential after rehabilitation. The areas will be cleaned, filled and landscaped during decommissioning.
Waste disposal	Large quantities of waste, including scrap metal and used oil, will be produced during the demolition of infrastructure and the operation of equipment used during decommissioning. Some disposal of general waste will take place on site although most of general and all hazardous waste will not take place on site; such waste will be transported off-site for disposal at suitably licenced facilities.

5.2.1. Project Location

Somkhele is located approximately 23 km to the west of Mtubatuba, within Mpukunyoni traditional land, within the KZN Province. The Mine falls within Reserve No. 3 (Somkhele 15822) of the Mtubatuba Administrative District and is located within the boundaries of the uMkhanyakude District Municipality (DC27) which is sub-divided into six municipalities (**Figure 5-1**).

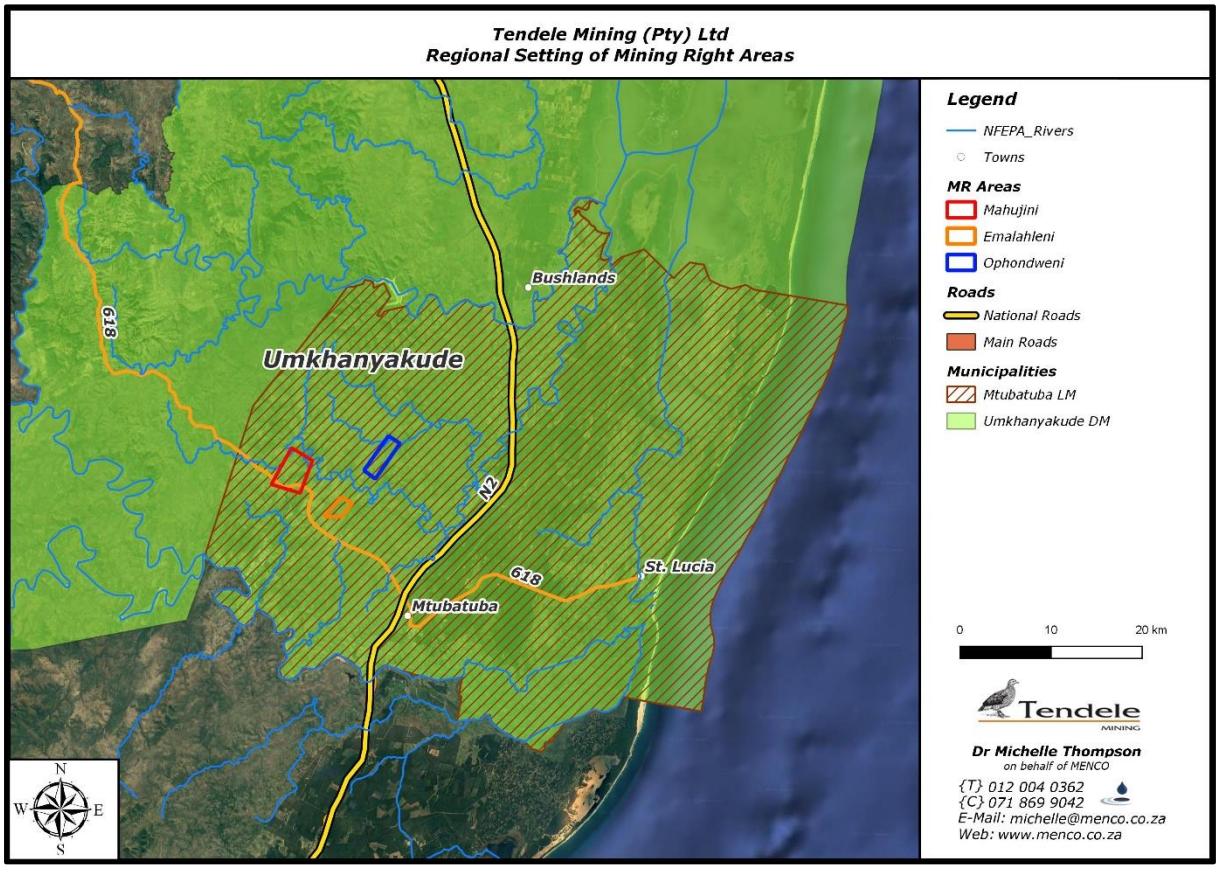


Figure 5-1: Regional setting of mining right areas

The components of the Somkhele Project affect one of the six municipalities i.e. Mtubatuba Municipality (KZN275) in which the Mine is located. At present the Mtubatuba Municipality is served by the uMkhanyakude District Municipality.

5.2.2. Surrounding Activities

There is no private land ownership in the area with only rural communal activities and informal settlements. The land is owned by the Ingonyama Trust and held in trust for the rural communities. Based on information contained in the Umkhanyakude District Municipality Spatial Development Framework (2017) as well as multiple visits to the region there is very little economic activity within the various municipalities in the area.

The Umhlatuzi Valley Sugar Company owns and run a farming operation on the Umfolozi Flats which constitute 470 hectares of sugar cane and 65 ha of Macadamia. The farms are irrigated with water from the Umfolozi River. The Umfolozi Sugar Mill also operates more than 25 km downstream of Somkhele and abstracts water from the Umfolozi River for sugar cane farming. The largest agricultural development in the region occurs on the fertile areas along the Pongola River, which forms the western boundary of the Municipal Area and not directly influenced by Tendele Mining operations. The area between the N2 from Mbazwana to Phelenda and iSimangaliso Wetland Park are characterized by local ownership and management with local employment opportunities and is strongly linked with the flourishing towns of Manguzi, Mbazwana, Mseleni and Phelendaba. Tourism development is concentrated around the iSimangaliso Wetland Park and other protected areas such as the Ezemvelo's Hluhluwe iMfolozi Park.

Major activities surrounding Somkhele is contained in **Table 5-6**.

Table 5-6: Project area in relation to surrounding activities

Sector	Activity	Distance, direction from Project Area
Eco-Tourism	Hluhluwe iMfolozi Park	11 km, W from Emalahleni; 13 km W from Ophondweni; 5 km W from Mahujini
Eco-Tourism	iSimangaliso Wetland Park	35 km east of Somkhele
Agriculture	Umfolozi Sugar Mill (USM)	17 km, SE from Emalahleni; 20 km S from Ophondweni; 21 km SE from Mahujini
Agriculture	Umhlatuzi Valley Sugar Company (Pty) Ltd (UVS)	15 km south east from Somkhele
Mining	Tendele Mining	Three (3) pit areas, 3 and 5 km West of Somkhele and 8km south-west of Somkhele

5.2.3. Mineral Resource

The mineral resource targeted by Tendele is metallurgical grade anthracite. This resource competes with bituminous anthracite, chars and cokes as carbon feedstock in the metallurgical industry. The mineral resource could by means of calcining be upgraded to a higher quality by increasing carbon and reducing volatiles. Tendele's low volatile, high-ash energy anthracite is exported to markets around the world for use in the cement and low-volatile power stations. Tendele is capable of meeting the customer specifications as contained in

Table 5-7:.

Table 5-7: Customer Specifications for the resource

Product	Ash (%) Max	VM (%) Max	FC (%) Min	CV (kcal/kg) Min	Phos (%) Max	Sulphur (%) Max	Total Moisture (Max)
Prime Duff	15.5	8.5	76.0	-	0.025	1.0	10.0
Peas	17.5	8.5	74.0	-	0.025	1.0	8.0
Small nuts	17.5	8.5	74.0	-	0.025	1.0	8.0
Large nuts	20.0	8.5	71.5	-	0.025	1.0	8.0
Fine energy	35.0	8.5	56.5	-	0.050	1.0	13.0
Coarse Energy	35.0	8.5	56.5	-	0.050	1.0	10.0
6000GAD energy	30.0	8.5	61.5	6000	0.050	1.0	12.0
18% Ash duff	18.0	8.5	73.5	-	0.025	1.0	10.0
5200 NAR energy	30.0	8.5	61.5	5200	0.050	1.0	10.0

5.2.4. Mining Method

The mining method to be used at Somkhele is a conventional opencast mining method with some roll-over where and when practically and safely possible. Rehabilitation will be undertaken on an on-going basis where practically possible. The rollover method implies that some of the overburden will be stripped and placed directly inside the final void it will not be placed on the dump. Where roll-over is not possible, the overburden will be placed

next to the pit on a dump designed for this purpose as close to the pit as possible to reduce the footprint of the Mine.

The overburden/soils that are stripped and stockpiled for use in the final void will need to be protected against wind and water erosion (drainage), as well as any compaction. This will be done through the re-vegetation of the stockpiles.

5.2.5. ROM Production

The run of mine or raw ore material (ROM) was historically at 230 000 tons per month (2 760 000 ROM per annum and 10 500 tons per day). ROM is processed by a series of three processing plants. The by-product of the anthracite screening and washing activities is:

- A fine slurry material that is approximately 12% of the ROM; and
- Course discard that consists of roof and floor sandstone and shale's and makes up approximately 44% of the ROM.

Refer to **Table 5-8** for the planned future anthracite production for the Somkhele Project.

Table 5-8: Somkhele's indicative planned production for period June 2025 – June 2033

	Jun 24	Jun 25	Jun 26	Jun 27	Jun 28	Jun 29	Jun 30	Jun 31	Jun 32	Jun 33
ROM	0	1156480	2598100	2590226	2792987	2880000	2880000	2880000	2880000	1259686
Total Sales	0	532880	1445579	1441190	1554189	1604451	1604451	1604451	1604451	811772

5.2.6. Mineral Processing

There will be no mineral processing conducted within Mining Areas 4 and 5. Beneficiation will be undertaken at the existing facilities in Area 2. Anthracite washing is required as the raw product requires to be upgraded to at least a High-grade (HG) specification. The Somkhele Plant has a drum, cyclone and spiral washing facilities. Plant 3 also located within Area 2 has the ability to process a much smaller product.

5.2.7. Efficiency of the Process

There is no process plant associated with the Somkhele Extension Project as all anthracite will be processed at the available three plants situated Area 2. These plants are already authorised and have been operational since 2007.

When reference is made to the efficiency of an anthracite preparation plant or a specific anthracite processing unit, the sharpness of separation is usually inferred. The efficiency of separation reflects the ability of a unit (dense-medium cyclone) to selectively separate anthracite and non-anthracite particles from ROM feed material based on the difference in their relative densities.

Control of the medium density is a very important factor in any dense-medium plant. Under normal conditions, a fluctuation of the density about the set-point value will occur due to the nature of the control system. The fluctuation will usually follow a sine wave pattern. In some plants, the variation of density, both below and above the set point, can be relatively large. This may be due to large tank volumes, insufficient amounts of density-control water, poor design of the density-control system or incorrect operation of the

system. Although the overall, average density of the medium is the same as the set-point value, yield is lost.

The net effect of this is that the product quality is higher than specification for half the time and below it for half of the time. The overall product is still on specification. However, the same argument above holds true and yield will be lost. The larger the variation in quality between the upper and lower limits of the range of qualities produced, the more severe will be the negative effect on the product yield. This is illustrated in **Figure 5-2** below.

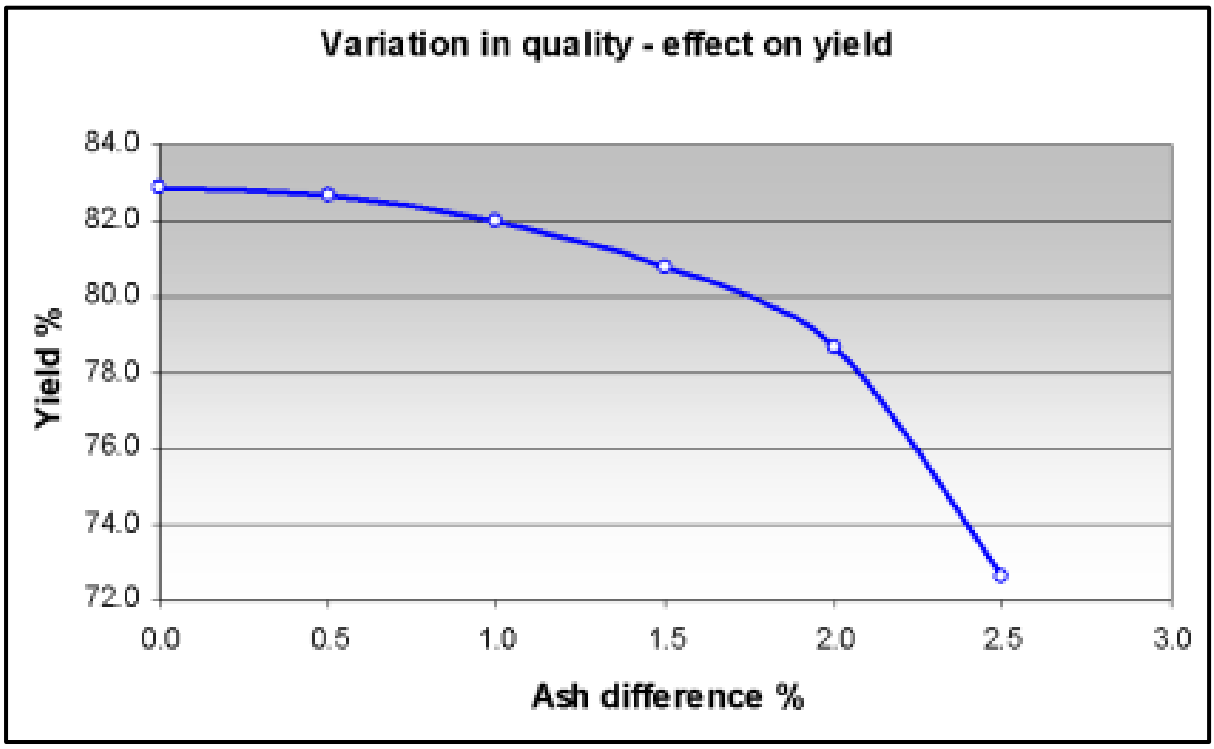


Figure 5-2: Effect of quality variation on yield of saleable product

5.2.8. Mine Infrastructure

Somkhele is an operational mine with all infrastructure required to process the raw material already in place within Area 2. **Figure 5-3** to **Figure 5-5** below provides for the preliminary layout plan of the selected mining areas (4 and 5) with the following infrastructure:

- 3 x Washing plants (Area 2);
- Workshop Complex;
- Water Storage dam;
- Pollution Control Facilities;
- Offices and Change House complex;
- Stockpile Facilities;
- Fuel Storage Facilities;
- Weighbridges;
- Haul and Access Roads;
- Generators; and
- Discard Dumps.

The anthracite seams to be mined in Areas 4 and 5 are illustrated in **Figure 5-6**.

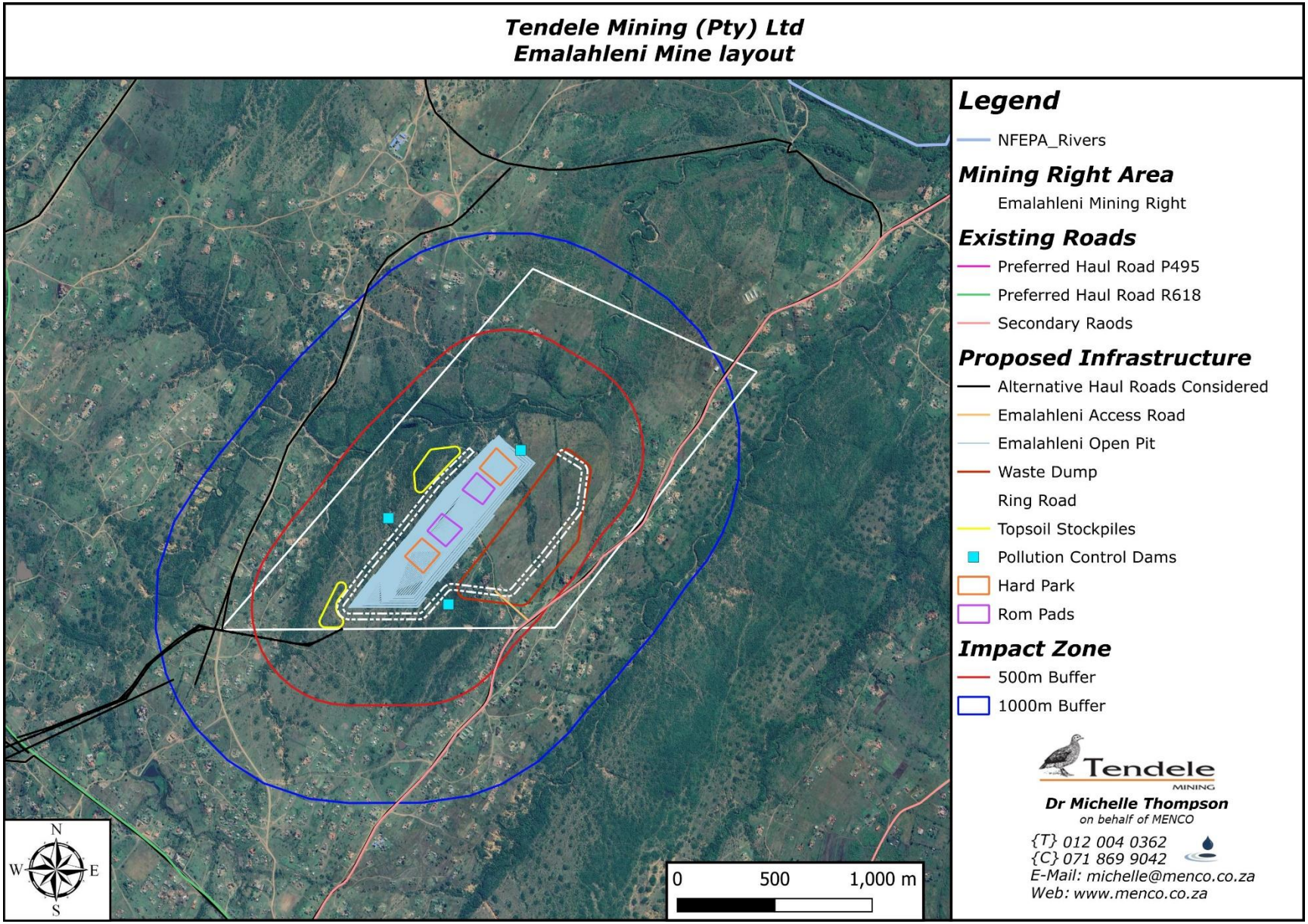


Figure 5-3: Mine layout for Emalahleni

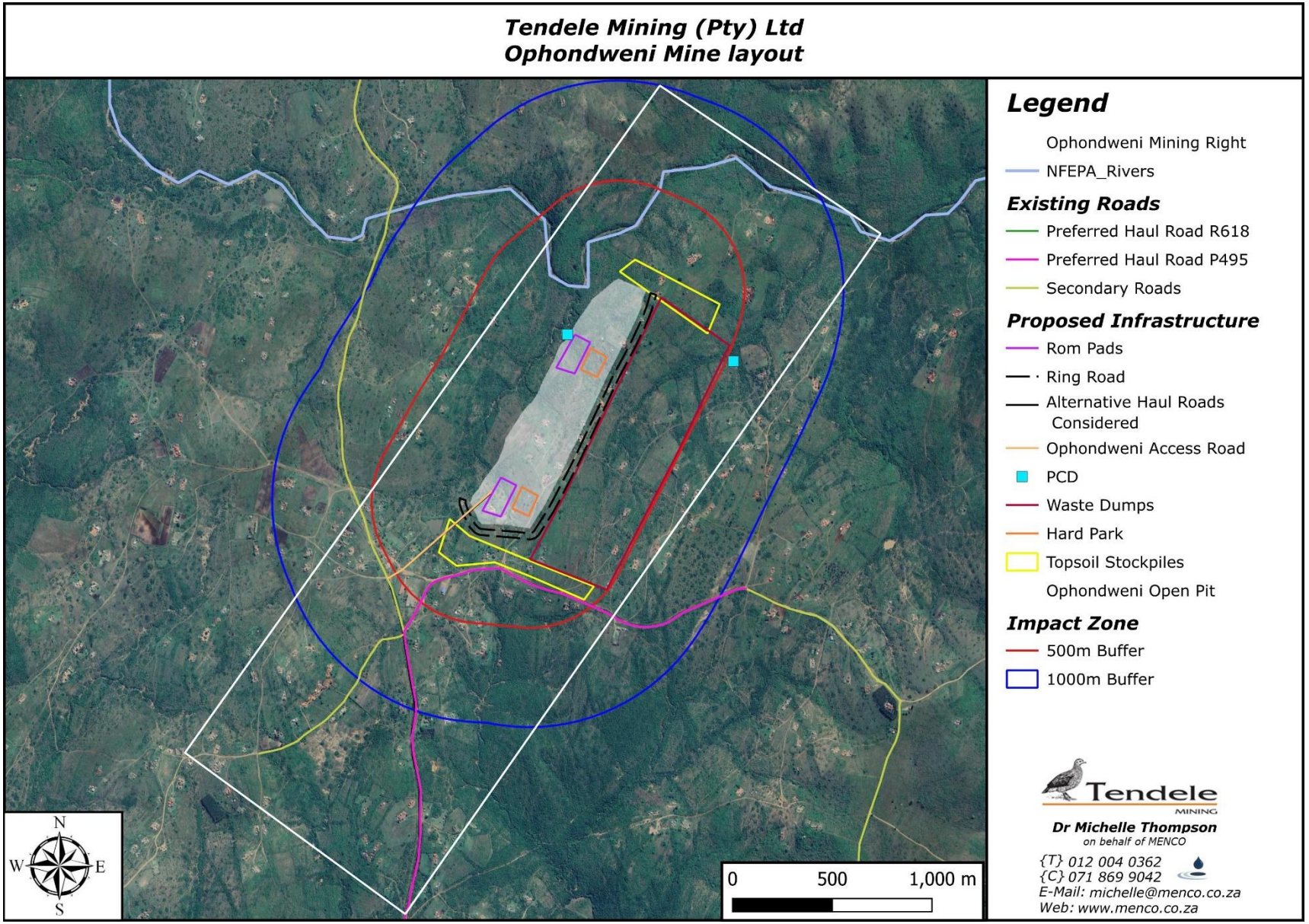


Figure 5-4: Mine layout plan for Ophondweni

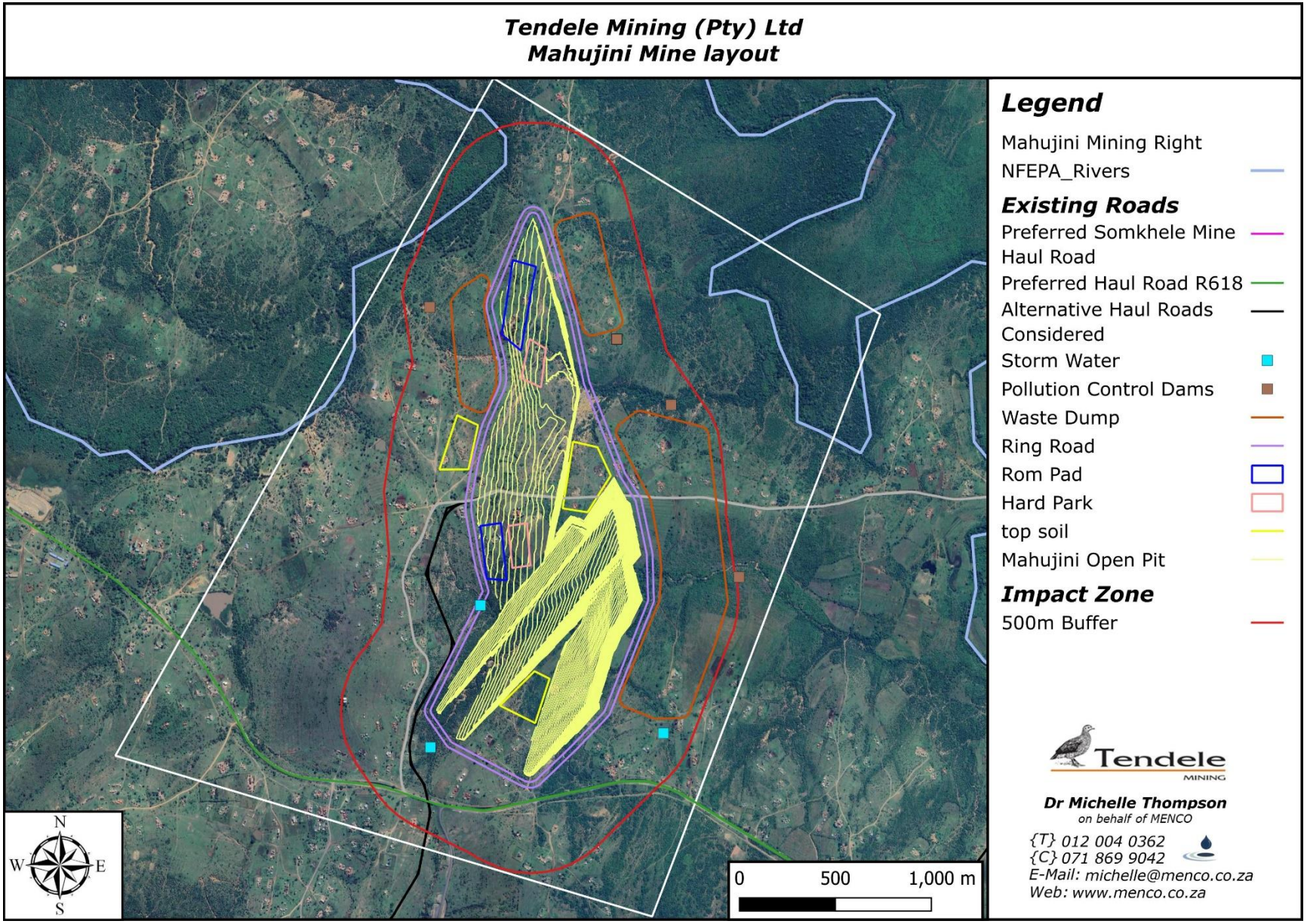


Figure 5-5: Mine layout plan for Mahujini and Machibini

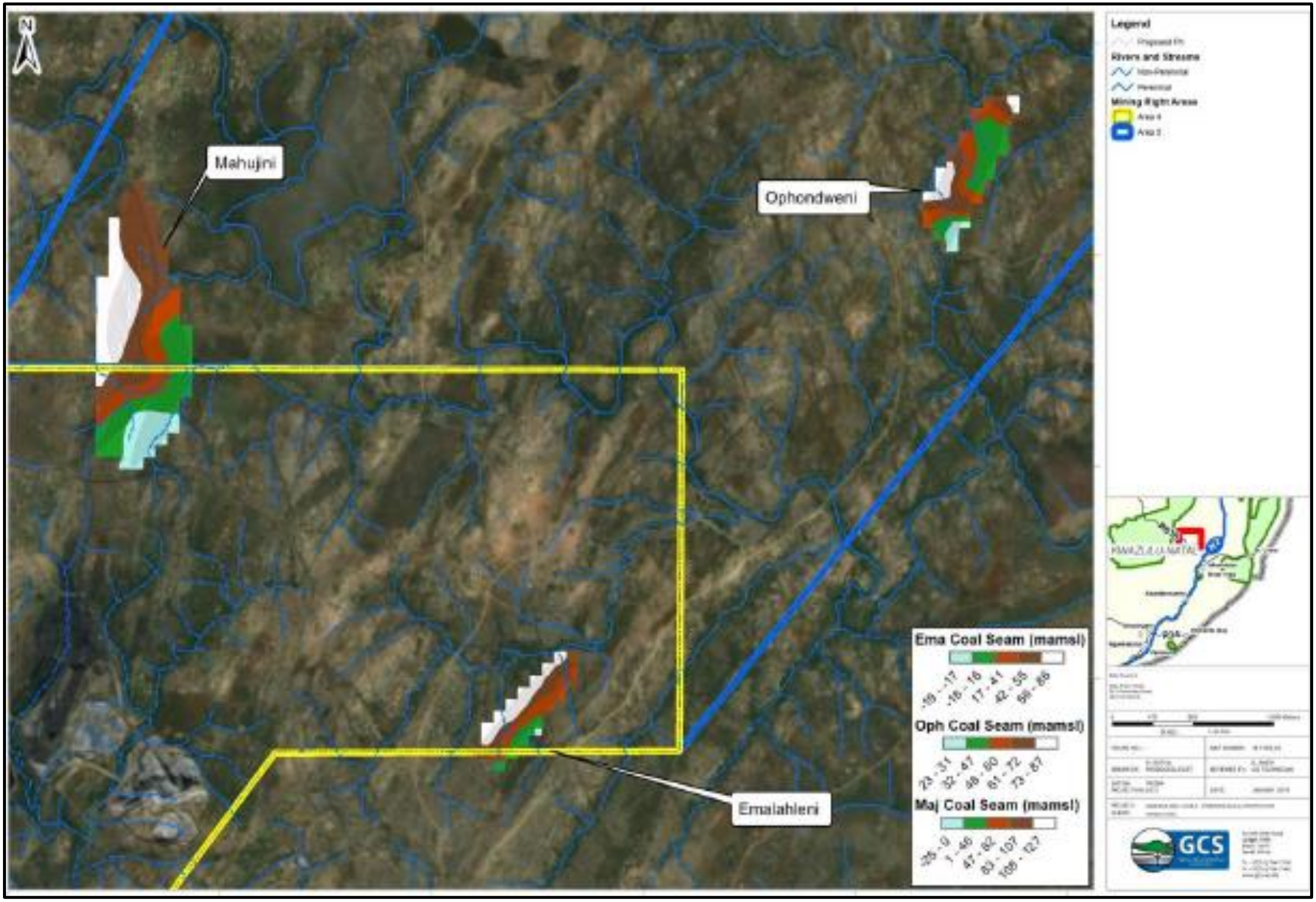


Figure 5-6: Area 4 and 5 anthracite seams

5.2.9. Water Management

The Somkhele Extension Project has been issued with a Water Use License (WUL) in which water management at the mining areas are based on the hierarchical principles of retain dirty water in PCD's for reuse and recycling with treatment prior to authorised discharge. **Figure 5-7** below provides for a schematic overview of the water management system endorsed by the mine.

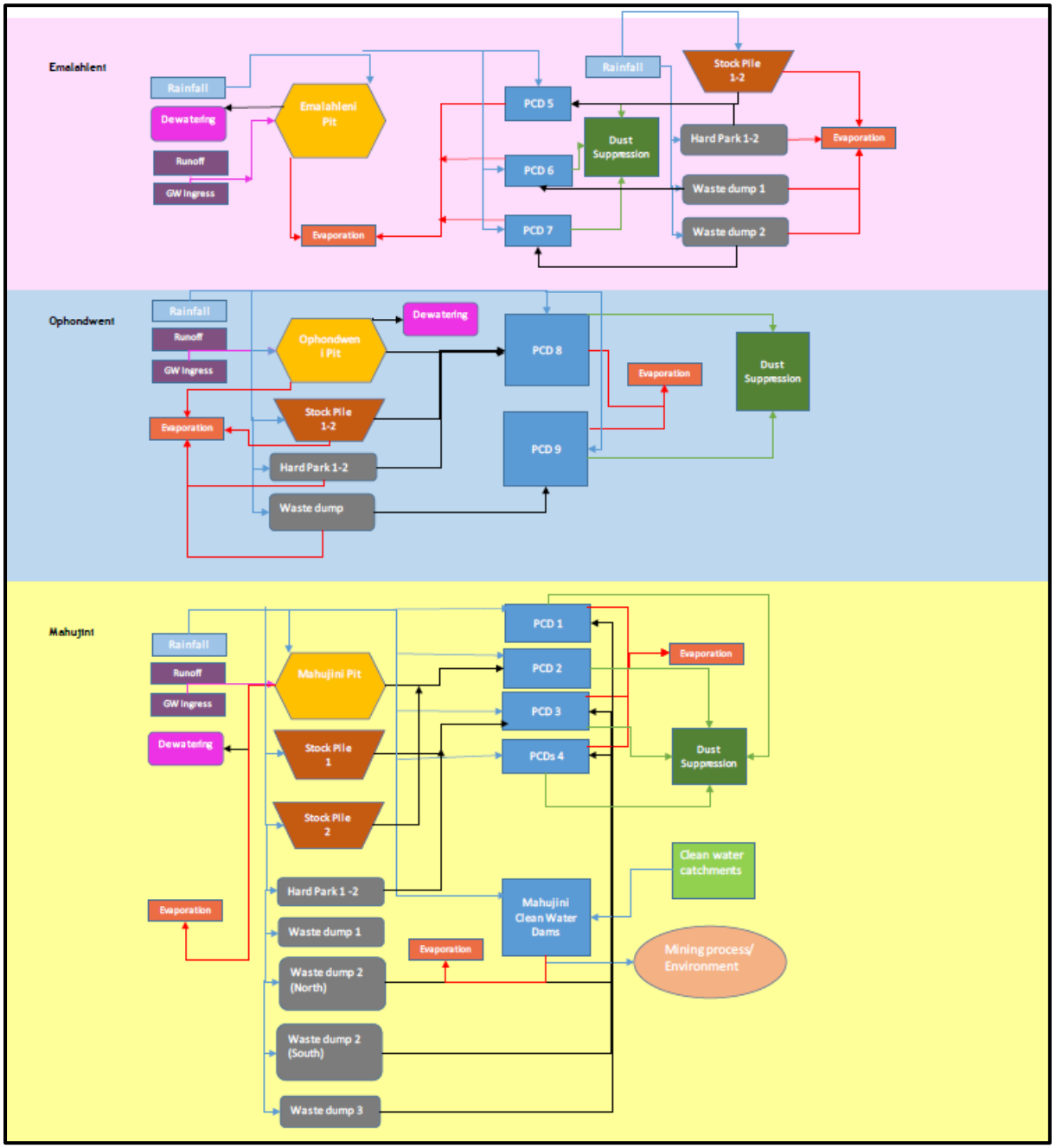


Figure 5-7: Schematic water balance for the Somkhele Mining Project areas

The proposed pit areas of Emalahleni, Ophondweni and Mahujini will generate water by means of direct rainfall into the pits, runoff and groundwater inflow. Water that will accumulate in the future operational pits will be dewatered to PCD's by means of pumping. The water is then earmarked to be used for dust suppression.

The capacities of the PCD's for the three mining areas are given in **Table 5-9**.

Table 5-9: Capacities of the PCD's for the Somkhele Project

Facility	Capacity (m^3)
Mahujini PCD 1	16 240
Mahujini PCD 2	17 360
Mahujini PCD 3	20 630
Mahujini PCD 4	45 960
Mahujini Stormwater Dam 1	15 700
Mahujini Stormwater Dam 2	5 660
Mahujini Stormwater Dam 3	3 520
Emalahleni PCD 5	13 010
Emalahleni PCD 6	17 563
Emalahleni PCD 7	15 730
Ophondweni PCD 8	15 730
Ophondweni PCD 9	45 270

From the above stated water management approach, it is evident that the mine has adopted a zero effluent discharge policy. No affected water will be discharge to the receiving environment and thereby reduce the risk of water quality deterioration in downstream surface water resources.

5.2.10. Water Consumption

GCS (2019) has developed and modelled a mine-wide water balance for the Somkhele Project that consists of multiple opencast pits, return water dams and a number of water supply dams. There is no process water required for Emalahleni, Ophondweni or Mahujini and the only consumptive water use is dust suppression.

Water consumption in terms of the water balance for the project was based on the following information:

- Pit areas were determined to be:
  - Mahujini – 804,000 m^2;
  - Emalahleni – 562,900 m^2;
  - Ophondweni – 621,000 m^2;
- Runoff towards pits assumed to be 25% MAP;
- Runoff from stock piles 10% of MAP;
- Runoff from hard park areas 30% of MAP
- Evaporation 15-20% of rainfall

The simulated water balance for the project is given in **The consumptive** water use in terms of dust suppression for the cumulative mining areas as indicated in the Table below is determined to be 162,339 m3/annum.

Table 5-10 below.

5.2.10.1. Potable Water

The Umkhanyakude District Municipality is the Water Service Provider for the area. There is a potable water reticulation system installed along the R618 from where water could be

sourced for domestic purposes. The mine's potable water supply will be sourced from this system.

Due to unreliable supply from this system, the mine has infrastructure installed to provide its own potable water. In terms of the issued WUL the mine is entitled to abstract 750,000m^3 of water from the Mfolozi River. A volume at the rate of 12m^3/hour of this water is pumped to a filtration/chlorination water treatment plant to augment the potable supply. Potable water supply to a work force of approximately 1600 employees is in the order of 80m^3/day.

5.2.10.2. Process Water

There is no process water required for the Somkhele Extension Project. However, there are consumptive water uses for the three areas which are part of the water balance as given in **The consumptive** water use in terms of dust suppression for the cumulative mining areas as indicated in the Table below is determined to be 162,339 m3/annum.

Table 5-10.

The consumptive water use in terms of dust suppression for the cumulative mining areas as indicated in the Table below is determined to be 162,339 m^3/annum.

Table 5-10: Average annual water balance for Somkhele

Facility	Source	IN (m^3/a)	Water Circuit	OUT (m^3/a)
Mahujini				
Mahujini Pit	Rainfall and runoff	147,490	Evaporation	147,268
	Groundwater ingress	16,425	Mahujini PCD 3	5,158
			Mahujini PCD 4	11,490
	Total	*163,915*	*Total*	*163,915*
PCD 1	Rainfall and runoff	5,383	Dust Suppression	15,433
	Waste Dump 1	10,857	Evaporation	807
	Total	*16,240*	*Total*	*16,240*
PCD 2	Rainfall and runoff	6,247	Dust Suppression	937
	Waste Dump 2	11,113	Evaporation	16,423
	Total	*17,360*	*Total*	*17,360*
PCD 3	Rainfall and runoff	5,158	Dust Suppression	774
	Waste Dump 3	5,158	Evaporation	19,856
	Mahujini Hard Park 1	5,158		
	Stockpile 1	5,158		
	Total	*20,630*	*Total*	*20,630*
PCD 4	Rainfall and runoff	11,490	Dust Suppression	1,724
	Waste Dump	11,490	Evaporation	44,237
	Mahujini Hard Park 2	11,490		
	Stockpile 2	11,490		
	Total	*45,960*	*Total*	*45,960*
Waste Dump 1	Rainfall and runoff	10,857	To PCD 1	10,857
Waste Dump 2	Rainfall and runoff	11,113	To PCD 2	11,113
Waste Dump 3	Rainfall and runoff	5,158	To PCD 3	5,158
Waste Dump 4	Rainfall and runoff	11,490	To PCD 4	11,490
	Total	*38,618*		*38,618*

Facility	Source	IN (m^3/a)	Water Circuit	OUT (m^3/a)
Hard Park 1	Rainfall and runoff	18,377	Evaporation	13,179
			PCD 3	5,158
Hard Park 2	Rainfall and runoff	17,474	Evaporation	5,984
			PCD 4	11,490
	Total	*35,851*	*Total*	*35,851*
Stockpile 1	Rainfall and runoff	43,286	Evaporation	38,129
			PCD 3	5,158
Stockpile 2	Rainfall and runoff	42,555	Evaporation	31,065
			PCD 4	11,490
	Total	*85,841*	*Total*	*85,841*
Emalahleni				
Emalahleni Pit	Rainfall and runoff	118,720	Evaporation	148,968
	Groundwater ingress	32,850	PCD 5	2,602
	Total	*151,570*	*Total*	*151,570*
PCD 5	Hard Park 1	2,602	Dust suppression	9,428
	Hard Park 2	2,602		
	Stockpile 1	2,602		
	Stockpile 2	2,602		
	Emalahleni Pit	2,602		
	Rainfall and Runoff	6,826		
	Total	*9,428*	*Total*	*9,428*
PCD 6	Rainfall and runoff	17,560	Dust Suppression	14,926
			Evaporation	2,634
	Total	*17,560*	*Total*	*17,560*
PCD 7	Rainfall and runoff	15,540	Dust Suppression	13,209
			Evaporation	2,331
	Total	*15,540*	*Total*	*15,540*
Hard Park 1	Rainfall and runoff	17,328	Evaporation	14,726
			PCD 5	2,602
Hard Park 2	Rainfall and runoff	16,984	Evaporation	14,382
			PCD 5	2,602
Waste Dump 1	Rainfall and runoff	262,526	Evaporation	244,966
			PCD 6	17,560
Waste Dump 2	Rainfall and runoff	135,822	Evaporation	120,092
			PCD 7	15,730
Stockpile 1	Rainfall and runoff	25,375	Evaporation	32,773
			PCD 5	2,602
Stockpile 2	Rainfall and runoff	42,214	Evaporation	39,612
			PCD 5	2,602
	Total	*500,249*	*Total*	*500,249*
Ophondweni				
PCD 8	Ophondweni Pit	3,146	Evaporation	6,332
	Rainfall and Runoff	42,214	Dust Suppression	51,612
	Stockpile 1	3,146		
	Stockpile 2	3,146		
	Hard Park 1	3,146		
	Hard Park 2	3,146		
	Total	*57,944*	*Total*	*57,944*
PCD 9	Waste Dump	45,270	Evaporation	1,593
	Rainfall and Runoff	10,619	Dust Suppression	54,296
	Total	*55,889*	*Total*	*55,889*

Facility	Source	IN (m^3/a)	Water Circuit	OUT (m^3/a)
Ophondweni Pit	Rainfall and runoff	536,544	Evaporation	566,248
	Groundwater ingress	32,850	PCD 8	3,146
Stockpile 1	Rainfall and runoff	14,320	Evaporation	11,174
			PCD 8	3,146
Stockpile 2	Rainfall and runoff	14,071	Evaporation	10,925
			PCD 8	3,146
Hard Park 1	Rainfall and runoff	8,806	Evaporation	5,660
			PCD 8	3,146
Hard Park 2	Rainfall and runoff	9,436	Evaporation	6,290
			PCD 8	3,146
	Total	*616,027*	*Total*	*616,027*

5.2.11. Diesel Storage and Consumption

Diesel storage in the excess of 80m^3 at the proposed mining areas will be stored in tanks with a bund wall around the tanks to prevent liquids from escaping in the event of a spillage or leakage. The volume of the bund surrounding the tanks will be designed to contain 100% of the volume in the storage tanks.

5.2.12. Waste Management

The proposed mining and related activities will result in the generation of anthracite discard as well as non-mineralised waste. Waste management should be done in accordance with the requirements set out in NEMWA and the Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

Non-mineralised waste in the form of general and hazardous waste will be produced from various activities associated with the Project. Table 5-11**Table 5-11** provides a preliminary list of potential wastes that may be generated at the Somkhele Project sites.

5.2.12.1. General Waste

In terms of NEMWA, Category C describes waste management activities that do not require a WML but these activities will have to comply with the prescribed requirements and standards as prescribed by the Minister, which includes the Norms and Standards for Storage of Waste, 2013. These activities include the storage of general waste at a facility with a capacity to store in excess of 100 m^3 and storage of hazardous waste in excess of 80m^3.

Table 5-11: Typical General and Hazardous Waste Generated on site

General Waste	Hazardous Waste

Scrap Metal Waste tyres and rubber Non-contaminated materials (plastic, timber, wood, food, cardboard, etc.) Cement Waste paper Grey water (from human consumption) Non-compatible waste (ash, wood, used sand, general garden refuse) Cable, wire	Fluorescent tubes, batteries, printer cartridges, acids Hydrocarbon contaminated materials Aerosols and chemical waste Asbestos Sewage waste Medical waste Contaminated PPE Poly-chlorinated biphenyl's (PCB's) Pesticides, herbicides, insecticides, fertilizer Contaminated soils

Tendele Mining (Pty) Ltd had been granted a Waste Management License (WML) under Reference Number KZN30/5/1/2/2/216MR dated 29 October 2021 to undertake the following listed activities as contemplated in the NEMWA Regulations:

Category A:

- Activity 1 – Storage of waste in lagoons (PCD's)

Category B:

- Activity 8 – Disposal of general waste (mine discard) to land;
- Activity 10 – Construction of a facility for waste management

5.2.12.2. Hazardous Waste

5.2.13. Sewage

There will be no Waste Water Treatment Works (WWTW) installed at any of the mining extension areas. The mine will utilise conservancy tanks at each of the sites. A waste contractor will be appointed to empty the conservancy tanks on a weekly basis or when needed.

The change house facilities at Mining Area 2 could also be used by the employees of Tendele.

6. POLICY AND LEGISLATIVE CONTEXT

6.1 Constitution of South Africa

The environmental right is mentioned in Chapter 2 of the Constitution of the Republic of South Africa (Act No.108 of 1996). In terms of this provision: everyone has the right to an environment that is not harmful to his or her health or wellbeing. The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. Specifically, as regards the environmental right, the Constitution states that: "*...everyone has the right 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, promotes conservation, and secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*".

The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate.

6.2 Mineral Petroleum Resources Development Act

The Minerals and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) identifies the state as the official custodian of South Africa's Mineral and Petroleum Resources. Therefore, all activities relating to the reconnaissance, prospecting rights, mining rights, mining permits and retention permits are regulated by the State. One of the objectives of the Act is to give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development. Applicable sections of the MPRDA include sections 10, 16, 21, 22, 27 and 48.

The Mineral and Petroleum Resources Development Regulations (2004) prescribe how an application process in terms of the MPRDA must be lodged. The relevant Regulations include 3, 5, 10, 11 and 13.

Other Regulations and Guidelines that are relevant include;

- Financial Provisioning Regulations;
- Residue Stockpiles and Residue deposit regulations;
- Biodiversity Guidelines for Mining;
- Resettlement Guidelines (refer GN 1939 dated 30 March 2022 entitled "Publication of Mine Community Resettlement Guidelines 2022 for Implementation").

6.3 National Environmental Management Act

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) was promulgated to serve as the general framework within which environmental management and implementation plans must be formulated. It provides guidelines on how any organ of state must exercise any function when taking any decision in terms of the Act or any statutory provision concerning the protection of the environment. NEMA sets out the principles by reference to which a conciliator appointed under the Act must make

recommendations. These principles guide the interpretation, administration and implementation of the Act, and any other specific laws concerned with the protection or management of the environment.

NEMA also advocates and promotes public participation in environmental governance. One of the objectives of NEMA is to provide for institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith, such as detailed regulations for Environmental Impact Assessment to predict the impacts of a plan, proposal or policy.

Since its promulgation on 29 January 1999, there have been several amendments to the original act, with a view to strengthening the environmental management function and the general framework of laws concerning the environment.

Regulations for EIA in South Africa were first promulgated under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). Those regulations took effect in September 1997 and several minor amendments followed in the early 2000s. Since then, two major reviews of EIA regulations have ushered in gradual reforms aimed at improving the efficiency of EIAs and resolving the administrative problems that soon became apparent with the implementation of the ECA regulations. The most recent of these regulations were promulgated in terms of Sections 24(5), 24M and 44 of NEMA, and are now referred to as the NEMA EIA Regulations, 2014 (Government Notice Nos. R982, R983, R984, R985 and R986, published in Government Gazette No. 38282 of 04 December 2014).

The Environmental Impact Assessment (EIA) for the proposed opencast anthracite mining activities at Somkhele Anthracite Mine is being undertaken by following the requirements outlined in the NEMA EIA Regulations, 2014, which came into effect on 04 December 2014, read with the now repealed sections and regulations under the MPRDA which applied to Tendele's MR application at the time of its submission and processing by the DMRE.

6.4 National Environmental Management: Waste Act

A specific environmental management act was promulgated on 10 March 2009 to govern waste management activities. This Act aims to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

The National Environmental Management Waste Act (Act No. 59 of 2008) establishes institutional arrangements and planning matters; provides for national norms and standards for regulating the management of waste by all spheres of government; makes provision for specific waste management measures; establishes the procedures for the licensing and control of waste management activities; provides for the remediation of contaminated land; provides for the establishment of the national waste information system; and provides for compliance and enforcement of waste management activities.

The proposed development, being a waste disposal site, is expected to generate significant amounts of waste. Section 16(1) of the Waste Act states that "A holder of waste must, within the holder's power, take all reasonable measures to—

a) *avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*

b) *reduce, re-use, recycle and recover waste;*

c) *where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*

d) *manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*

e) *prevent any employee or any person under his or her supervision from contravening this Act; and*

f) *prevent the waste from being used for an unauthorised purpose.*

Also, section 19(1) of the act gives the minister power to gazette certain activities as "listed waste management activities" for which either a Basic Assessment or an Environmental Impact Assessment must be carried out and an Environmental Authorisation and a Waste Management License issued, before such activities may be undertaken.

Minimum requirements for the handling, classification and disposal of hazardous waste

The minimum requirements for handling, classification and disposal of hazardous waste guideline sets out the waste classification system, in which waste is placed in two classes i.e. general or hazardous. The classification of the waste is based on their inherent toxicological properties. Hazardous waste, however, is further subdivided based on the risks the waste poses. The requirements for pre-treatment and disposal of hazardous waste are appropriately set in accordance with the waste classification and are provided for within the guideline document. Hazardous waste prevention and minimisation as well as the handling, transportation and storage are also briefly addressed. Co-disposal of sewage sludge as well as protocols for evaluating downstream uses of waste, sampling, risk-based modelling and risk assessment are included.

NEMWA: National Norms and Standards for the Storage of Waste

The National Norms and Standards for the Storage of Waste was promulgated in terms of the provision stipulated in the NEMWA, and came into effect on the 23 November 2013, GN No. 926. The National Norms and Standards for the Storage of Waste aim to regulate both the storage of general and hazardous waste. The schedule provides standards for the location, construction and design as well as the operation of waste management facilities. Furthermore, the schedule provides the minimum requirements for both above ground and underground waste storage facilities and containers.

6.5 National Water Act

The National Water Act, 1998 (Act No. 36 of 1998) aims to provide for management of the national water resources in order to achieve sustainable use of water for the benefit of all water users. This act requires that the quality of water resources is protected as well as

the integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensurethat the nation's water resources are protected, used, developed, conserved and managed in ways which take into account:

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

In pursuit of these objectives, Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) – (k)]. Watercourses and wetlands are protected in terms of this section, as both are regarded as water resources. Should there be any wetlands located within 500m of the watercourse or with the flood line, a Water Use Licence Application will be undertaken in terms of this Act.

6.6 National Heritage Act

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa are required by this Act.

Section 38(1) of this Act states that: "any person who intends to undertake a development categorised as any development or other activity which will change the character of a site-

i. *Exceeding 5 000 m^2 in extent; or*
ii. *Involving three or more existing erven or subdivisions thereof; or*
iii. *Involving three or more erven or divisions which have been consolidated within the past 5 years; or*
iv. *The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
v. *The rezoning of a site exceeding 10 000m^2 in extent; or*
vi. *Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development".*

Section 38(3) further states that the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a).

The Act stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the Act states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…"

6.7 National Environmental Management: Biodiversity Act

The object of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. The objectives of NEMBA are:

- Within the framework of the National Environmental Management Act, to provide for:
    - the management and conservation of biological diversity within the Republic and of the components of such biological diversity;
    - the use of indigenous biological resources in a sustainable manner; and
    - the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;
- To give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- To provide for co-operative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

6.8 National Environmental Management: Air Quality Act

The aim of the National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004) (NEMAQA) is to:

- Protect and enhance air quality in the Republic;
- Prevent air pollution and ecological degradation and
- Secure ecologically sustainable development, while promoting justifiable economic and social development.

The NEMAQA makes provision for the establishment of ambient air quality and emission standards at a national, provincial and local level.

The utilisation of diesel generators could trigger a listed activity and associated minimum emission standards identified in terms of section 21 of NEM: AQA with specific reference to Sub-category 1.2: Liquid fuel combustion installations. Installations with a design

capacity equal or greater than 50MW heat input, based on the lower calorific value of the fuel used will be subject to the requirements of NEM: AQA whether an Air Emission License needs to be issued.

6.9 Other Legislation

Various other laws regarding the protection of the environment that are relevant to this EIA include:

- Interim Protection of Informal Land Rights Act ("IPILRA");
- Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and Regulations,
- KwaZulu-Natal Provincial Environmental Management Framework;
- Municipal By-laws as applicable;
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- Environment Conservation Act, 1989 (Act No. 73 of 1989) (as amended);
- Hazardous Substances Act, 1973 (Act No. 15 of 1973);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Land Administration Act, 1995 (Act No. 2 of 1995);
- Water Services Act, 1997 (Act No. 108 of 1997);
- National Forests Act, 1998 (Act No. 84 of 1998); and
- Occupational Health and Safety Act, 1993 (Act 85 of 1993) (OHSA).

7. NEED AND DESIRABILITY OF PROPOSED ACTIVITIES

Tendele Mining (Pty) Ltd is an affiliated company of Petmin (Pty) Limited which is an anthracite mining company with the Somkhele Mine the current operational activity in KwaZulu-Natal. The company was South Africa's leading producer of metallurgical anthracite. The Need and Desirability section of the EIA must consider the Guidelines as published by the DFFE (2017).

7.1. Economic Consideration

Somkhele is unique among South African anthracite producers as other anthracite producers cannot produce the qualities and quantities consistently required by ferrochrome producers. If Tendele does not supply anthracite to the local Ferrochrome Industry, it is likely that local ferrochrome producers will be required to import reductants (being either anthracite or low sulphur coke breeze) in order to continue production which would significantly increase the cost of the production of ferrochrome – a crucial component in the production of stainless steel. Increased production costs for ferrochrome producers may, for example, result in retrenchments (in respect of direct and indirect employees) which will negatively affect South Africa's trade balance and have associated regional and national economic impacts. South Africa is the second largest producer of ferrochrome in the world, with China being the largest. The continued mining of anthracite at Somkhele is critical for ensuring the continuation of affordable ferrochrome production in South Africa.

Somkhele's anthracite competes with bituminous coals, chars and cokes as a carbon feedstock in the metallurgical industry. There is a distinction between the anthracite mined at the mine and the typical coal associated with polluting the environment. The mine extracts a coal known as anthracite, which is typically low in Sulphur and volatile matter. This coal is used as a reductant in the Ferrochrome and Ferromanganese industries due to its high carbon content and is generally viewed as a cleaner burning fuel when burnt. Anthracite is very different to the coal used by power stations, i.e. Eskom which is called bituminous coal. Approximately 50% of Somkhele's anthracite production is exported via Richards Bay to iron ore pelletising and sintering markets primarily in Brazil. The balance of Somkhele's anthracite production is sold to the South African ferro-alloy industry as a reductant.

The local South African ferrochrome industry remains heavily reliant on this anthracite reductant feedstock, which is currently being imported at higher costs following the lower supplies of this commodity available locally. This is leading to higher input costs associated with the higher volumes of more costly anthracite imports, thus threatening the economic viability and the corresponding thousands of jobs in the ferrochrome industry. The anthracite, as supplied by Tendele, is not easily substitutable in the same quality and quantity compared to other suppliers. Tendele supplied substantial volumes of anthracite to Glencore, who operates 22 smelting furnaces in South Africa (Lydenburg, Rustenburg, Steelpoort) producing 2.2 million tonnes of ferrochrome. Tendele was one of the most crucial and reliable suppliers of anthracite to Glencore in South Africa. Samancor is the second largest supplier of ferrochrome in South-Africa and was also a material client of Tendele having procured approximately 50% of Tendele's saleable product for local ferrochrome smelting. These facilities are faced with having to increase their reliance on

lower quality more expensive imports going forward based on lower availability of local anthracite production.

The Somkhele Project has an estimated 22 million ROM tonnes of metallurgical anthracite that can be mined and marketed to both local and export markets. The South African ferro-alloy industry is the logical choice for potential customers. Somkhele's low volatile, high-ash energy coal is exported through Richards Bay to markets around the world for primarily use in the cement and low volatile power station markets. Future potential markets include the ferromanganese industry and titanium smelters.

Somkhele's existing mining areas are depleted, and the mine is in an urgent need to continue with mining in areas 4 and 5. This would allow the mine to generate sufficient financial resources to settle debts in terms of term loans from banking institutions, shareholder loans and short-term banking facilities. Without the needed generated cash, the financial situation is as such that the majority employees from the mine have been retrenched and are currently without a job. In order for there to be a meaningful future contribution to the community around Somkhele, the mine needs to complete the relocation process in the new mining areas. Should this happen, then Somkhele will continue to have the ability to make a meaningful contribution to the local community for the next 10 years.

Matters have materially worsened in the area following COVID-19 and the retrenchments that followed. Unemployment has increased to in excess of 80% (previously we indicated 72%). Poverty has continued to be exacerbated by high illiteracy and lack of growth opportunities within uMkhanyakude. The poverty rate for the district municipality ranges between 72.1% and 88.6% of the total population. According to Patrick (2020)1, over 70% of the population in uMkhanyakude survives on less than R800 per month and over 83% of the total households live below the poverty line. The upper poverty line is R1,417 (in April 2022 prices) per person per month.

The planned labour compliment, once the mine is fully operational, is expected to be 1600 and consisting of 1100 full time employees (that includes blasting, mining, haulage, processing, clinic and lab, and some of these activities may be outsourced) and some 500 from the appointed contractors and ancillary service providers such as transport, cleaning and security, depending on available and potential skills and subject to negotiation with the Authorities Union and Community Representatives:

- A target of 80% would be drawn from the Local Mpukonyoni Areas that include Ophondweni, Emalahleni and Mahujini, as the direct sending region;
- A target of 20% would be drawn would be drawn from other sending regions in South Africa.

7.2. Social Consideration and Just Transition

The proposed mine will provide employment for locals and support services, as well as empowerment and skills transfer opportunities (refer Table 7-1). Seen in the light of the current economic environment, having an income has a high impact on the quality of life of families, creating a positive effect. This can therefore be considered a significant benefit for the surrounding communities. Somkhele plans to build skills that are recognised by the National Qualifications Framework (NQF) and are transferable outside of the workers'

current employment. Therefore, the impact here would be long term, past the life of the mine itself.

Table 7-1: Historical number of employees from each sending area prior to the mine's closure June 2022 (full time employees)

Area	Standard Employment	SLP Workplace Exposure	TOTAL
Local (Mpukunyoni)	828	89	917
Empangeni/Richards Bay	84	0	84
Other: KZN	75	2	77
Gauteng	9	1	10
Mpumalanga	4	2	6
Other	15	0	15
TOTAL	1015	94	1109
%Total	92%	8%	
%Local	83%		

Tendele has committed to support the well-being of its communities through feasible and sustainable initiatives that will be integrated into the local and district municipalities' Local Economic Integrated Development Planning processes. Tendele will consult with the local municipalities within which the project falls in order to determine how the project can be implemented in a way that will benefit the community. The Umkhanyakude District Municipality's LED project will focus on the areas of improving the quality of lives of people living in the communities together with creating sustainable job opportunities by the enhancement of existing jobs and developing potential for more jobs. Tendele aims to achieve this by means of the following the requirements as depicted in the Just Transition Framework outlined in the section below.

7.3. Introduction Just Transition and Social Responsibility

The Presidential Climate Commission (PCC) has stated that South Africa is faced with many challenges including poverty, unemployment and inequality. A balanced approach to the "just transition" movement is required to ensure both the current needs of South Africans, especially rural communities, are met while at the same time considering the long-term effects on the climate.

The "Just Transition" framework ensures that this is facilitated well and justly in an orderly manner while ensuring that no one is left behind and the framework recognizes the need to mitigate the negative impacts of mine closures on workers, their families, local entrepreneurs and the surrounding communities.

South Africa's Cabinet has approved the Just Energy Transition Implementation Plan (JET IP). The JET IP is set for a five-year period (2023-2027) and sets out several interventions and investments which are needed in South Africa for the country to transition into a low carbon and climate resilient economy. The JET for the coal mining sector is broadly outlined in **Table 7-2.**

Table 7-2 Action Plan to give immediate effect to Just Transition

WHAT ARE WE RESPONDING TO	LONG RANGE OUTCOMES	SHORT TERM DECISIONS AND ACTIONS REQUIRED	RESPONSIBILITY	RISKS
Coal mining and coal-based electricity plants continue to downsize and retire	Affected miners, small businesses and communities can shift into decent livelihoods Affected municipalities provide effective services and create sustainable jobs in partnership with all social partners to improve community livelihoods and reducing vulnerabilities	Agreement between stakeholders on: (a) the success indicators for the just transition in the coal value chain, (b) phasing of the just transition in coal (when will downsizing start? what preparations are needed before then?), and (c) core strategies to achieve the success indicators Initial needs analysis for affected communities and workforces conducted in participation with affected groups, with estimated timelines for downsizing from mid-2020s Agreement on an agency, government structures and stakeholder forums to drive the just transition in the coal value chain, with role clarity and capacity to develop viable proposals to support communities and individual workers; ensure effective and responsive measures; mobilise local support and collective action; and obtain adequate staffing and funding	PCC to work with DFFE and DMRE to convene stakeholders, including Limpopo and Mpumalanga provinces, to agree on requirements and phasing for the just transition in the coal value chain, and on the affected communities and workforces DMRE engages with relevant agencies across national, provincial, and local governments on structure to drive the just transition for coal communities DMRE and DoE&L to develop transition pathways for workers in the coal value chain	Stakeholders cannot reach agreement on timing of coal phase out, on definition of at-risk communities, on core strategies for the just transition, or on the nature of the agency to drive them Stakeholder engagement too inclusive of unrepresentative groups or else too limited in scope to be meaningful Proposals for agency do not ensure it has adequate power and resources to secure alignment across stakeholders, or make it excessively bureaucratic and complex, and therefore unable to respond to changing needs

The "Just Transition" framework, as published in July 2022 and adopted in South Africa, aims to provide impetus to the transition to a state of low carbon emission, bringing a gradual reduction in the footprint of coal mining in the country with the aim to combat climate change.

The Tendele mine subscribes to the principle that operating in a community can bring dramatic and drastic economic benefits to the area, but also brings great responsibility. As a socially responsible corporate citizen, Environmental Social Governance (ESG) principles are at the heart of our business. Tendele is committed to making a difference in the Community and assist with the transformation of the South African mining industry

which will underpin the "Just Transition" initiatives. In respect of our community, these principles include:

Corporate Social Responsibility (CSR):

Tendele's commitment to CSR within the Mpukunyoni Community focuses on various initiatives to the benefits of the local community, including:

- Being a major employer in the area, with 1 600 previously employed at the mine (benefitting some 16 000 people), with 87% of these employees residing in the local community. Since inception the mine has spent R1.74 billion in salaries to community members, and more than R2.6 billion is expected to be spent on community-based employees over the next 10 years.

- Employing the services of 70 locally based entrepreneurs (who employ some 400 people from the local community, benefitting some 4 000 people) to assist the mine with transportation of anthracite to the Richards Bay port, potable water distribution within certain areas in the Mpukunyoni community, the movement of material from the pits to the plant, the movement of finished products between the various stockpile areas; and local transport /taxi services for Somkhele employees.

- Trained more than 20 000 people since the inception of the mine.

- Relocated over 225 households, with a further 143 to be relocated from the areas at Emalahleni and Ophondweni in the next 4 years. The estimated cost to relocate all the families from Emalahleni, Ophondweni and Mahujini is R174 million. The aim of all negotiations for relocation is to leave households better off after the relocation has taken place.

- Tendele has also undertaken several community-based projects for the benefit of the local community. Some of the infrastructure projects include the following:

    - Tendele has constructed homes and infrastructure in the community, including the Siphelele Primary School which cost R7.6 million.
    - Tendele built a maternity ward within theknown Somkhele Clinic, at a cost of some R4 million. Prior to the construction of the maternity ward, pregnant women were required to travel 37 km to Hlabisa Hospital in order to receive obstetric care.
    - Tendele built an agricultural hub which served as the marketplace for local and trained farmers to meet with their customers (like supermarkets and the Umkhanyakude Development Agency (UMDA)) and Tendele trained 900 families on various farming aspects. The focus was, inter alia, on vegetable growth and water harvesting.
    - Tendele built an education centre and entered into an agreement with the Umfolozi FET to offer N-Courses to local students. At the same time, the Edu Centre offered Maths and Science to grade 12 learners to excel in their examinations and trained in excess of 5000 learners.
    - Tendele built a state-of-the-art hall at Ingaqa Primary School in Machibini to accommodate learners with disabilities and drilled a borehole for reliable water supply.

- Tendele built four community halls in Dubelenkunzi, Esiyembeni, Machibini and Kwa-Myeki for the hosting of community meetings and ceremonies;
- Tendele rolled out a two-phased Lego Project which aims at the development of sensory, motor, cognitive, social, language and emotional skills in young children. The first phase provided training and Lego material to 26 primary schools within Mpukunyoni, benefitting some 3000 children. The second phase entailed the erection of 26 mobile classrooms to benefit more than 5000 children;
- Tendele established more than 21 water points and continues to supply potable water to the benefit of more than 2 000 people of Mpukunyoni;
- A broiler project was initiated in Ophondweni benefitting six cooperatives comprising women, youth and men, benefitting 120 community members;
- Tendele purchased and supplied tractors and implements targeting 30 cooperatives in Mpukunyoni who rely on agriculture for their livelihoods;
- Three dip tanks were constructed at Machibini, Luhlanga and Dubelenkunzi in line with the Department of Agriculture's specifications to cater for local farmers' livestock;
- Tendele established roads linking Machibini, Dubelenkunzi, Luhlanga and Esiyembeni and added a bridge that connects Luhlanga and Dubelenkunzi, making it easier for learners and teachers to access schools; and
- Tendele purchased and supplied 100 desks and two green boards for Kwa-Gxaba high school in Ophondweni.

Over the next 10 years it is anticipated that some R4.7 billion will be invested in the community and will be spent on employment, procurement and social and labour plan projects will materially assist with the economic development in the Community.

Tendele is mindful that it operates in an area with unemployment in excess of 83% and the average monthly income per family is less than R 1200, and Tendele will continue to strive to provide benefits to as many community members as possible but sadly, it is impossible to assist the entire community.

Social and Labour Plans (SLPs):

Tendele's community investment strategies are meticulously outlined in the five-year social and labour plans (SLPs) of our operations. These plans adhere to the requirements set forth in Mining Charter III, municipal Integrated Development Plans (IDPs), priority community needs, the Mineral and Petroleum Resources Development Act, and related regulations. Developed in consultation with the Mtubatuba Municipality, Mpukunyoni Community, unions, our SLPs ensure greater accountability for local economic development.

Stakeholder Engagement:

As outlined elsewhere in this document, the Road Map as spearheaded by the Mine, established formal engagement structures with key stakeholders, including the Mpukunyoni Traditional Council ("MTC"), the Mpukunyoni Community Mining Forum ("MCMF") and Mining Area Committee ("MAC") to address the needs and challenges of our communities. As circumstances changes, Tendele will review its Stakeholder Engagement Plans.

The MCMF is a platform to discuss all historic and future mine/community related matters. The members include the Inkosi, representatives of the MTC, representatives of the Mtubatuba Municipality, Ward Councillors from the Mtubatuba Municipality (the Mine operates in 3 wards), the Mpukunyoni Business Association (representing more than 150 locally-based businesses in the area), full time shop stewards from representative unions, leaders representing families that historically have been relocated to enable mining (totalling 225 families), leaders of the families that still have to be relocated (143 families, of which 139 have already signed relocation agreements with the Mine).

The MAC has been elected in each Isigodi where the Mine operates and consists of the Induna, members of the Induna Council, the Municipality Councillor in the area and the committee members democratically elected in each Isigodi. The MAC meets monthly under the chairmanship of a chairman elected by the MAC and the MAC chairman and Induna represents the MAC at the MCMF meetings.

Tendele actively participates in local economic development forums and IDP sessions organized by the municipality to grasp municipal challenges and priority areas.

Enterprise Supplier Development (ESD) Programs:

Tendele have been supporting more than 70 local businesses, and will continue to support to expand their operating capacity.

Over the next 10 years, Tendele anticipates procurement opportunities to entrepreneurs and transporters of product to the Richard's Bay Port.

Human Rights:

Tendele upholds human rights principles and does not engage in activities that deliberately impact the rights of our communities. Legacy issues violating human rights are addressed by engaging with affected parties, investigating incidents through internal procedures, and implementing corrective measures. Grievance, complaint, and emergency preparedness response procedures are in place at our operation.

Tendele is mindful that the mine in the "future mining areas" is a new mine using existing infrastructure, financed by enormous amount of debt, that will operate for approximately 10 years in the community. Depending on the financial viability over time, Tendele will develop a comprehensive plan of action to address the issues outlined below.

Leveraging the Benefits of the Existing Mine:

Employment opportunities: During the next 10 years, Tendele will provide a stable source of income for employees (and it is estimated that in excess of 80% of employees will come from the local community), and these employees will attract billions of Rands in salaries that will be poured into the local economy over their operational lifespan and in the interim assist many small-scale businesses to develop and expand. This income can further be used to support career advancement for family members, creating a ripple effect of economic empowerment.

Skills development: Developing portable skills during the mines operation provides individuals with opportunities for employment, once Tendele is complete, at other mines

and or beyond the mining sector, contributing to broader economic diversification in South Africa.

Procurement opportunities: Operating mines stimulate entrepreneurship by providing procurement contracts to local businesses. Entrepreneurs can use these contracts to pay off debts, invest in equipment, and expand their businesses beyond the mining environment, creating sustainable economic growth.

Legacy initiatives: Mines can contribute to long-term community development through initiatives such as supporting education programs. For example, in the past partnerships with entities like LEGO benefited thousands of children, laying the foundation for lifelong learning and empowerment. Expanding such programs can further enhance the lives of teenagers and contribute to the overall well-being of the community.

Estimated benefit that the mine will bring to the community during the next 10 years in respect of salaries, procurement, social and labour plan and relocation is estimated to be some R 4,7 billion of economic development in our area for the next 10 years, and the will assist our community to prepare for the day that the mine does not exist anymore.

Skills Development and Training Programs:

Retraining initiatives: Establishing vocational training centers or partnering with educational institutions to offer courses in fields such as renewable energy technology or sustainable agriculture, or areas that may be identified working with community at the time.

Internship and apprenticeship programs: Providing opportunities for community members to have their first "job experience" at Tendele, that will assist them as they further their careers.

Recognition of prior learning (RPL): Assessing and accrediting the skills and experience of mine workers to facilitate their transition into related occupations.

Diversification of the Local Economy:

Indirect Investment incentives: By offering procurement opportunities, local entrepreneurs will continue to build their business that will form the basis of a business away from the mine when the mine eventually closes and may provide capital to expand into renewable energy companies or agribusiness ventures.

Infrastructure development: Tendele is investing in infrastructure projects such as upgrading P495 and this will improve the region's connectivity.

Cluster development: Tendele will collaborate and do knowledge-sharing with the community and the municipality to encouraging the development of new business to stimulate innovation and growth.

Social Support Systems:

Job placement services: Providing employment counselling, job matching, and placement services to help mine workers find new job opportunities that align with their skills and interests.

Provident fund savings: Contributions during the life span of the mine, can provide foundation for families to develop income generating business post mine closure, and assist families facing economic hardship during the transition period.

Health and wellness programs: Providing access to healthcare services, counselling, and mental health support to address the physical and emotional needs of affected individuals and communities.

Community Development Initiatives:

Small business development: Supporting entrepreneurship and small business development through assistance to access to microfinance, business training, and mentorship programs to stimulate economic activity and create local employment opportunities.

Education and training facilities: Investing in programs at schools and skills training Centre's to improve educational outcomes and enhance the employability of local residents.

Community infrastructure projects: Implementing projects to upgrade water and sanitation, improve the community Centre's previously built and rehabilitate some areas to provide community dams, and public spaces to enhance the quality of life and social cohesion in affected communities. This will definitely be in collaboration with the public entities whose responsibility it is to legally authorize and support such initiatives.

Stakeholder Engagement and Consultation:

Community forums and dialogues: Facilitating open and transparent communication channels between stakeholders to exchange information, address concerns, and build consensus on the transition process.

Partnership agreements: Establishing formal agreements or partnerships between government agencies, the municipality, traditional council, labour unions, and community organizations to coordinate efforts and share resources effectively.

Conflict resolution mechanisms: Implementing mechanisms for resolving disputes or conflicts that may arise during the transition process, such as mediation or arbitration services, to promote cooperation and collaboration among stakeholders. The Mine has at some stage initiated a peace accord which was a peace keeping initiative in the area.

Rehabilitation Program Benefits:

Community dams (pit lakes): Rehabilitation programs will ensure that pit lakes are established in the mined-out pits, buffering residents from seasonal droughts and creating opportunities for tremendous growth. Access to water is a constant issue for the community and these lakes can serve as sources of water for livestock watering and recreational activities, enhancing economic opportunities and quality of life in the area.

This is viewed in line with the prevailing and historical scarcity of water in the district hence the need for lasting solutions in collaboration with water provisioning agencies. Both at district and national levels.

Tourism potential: Some rehabilitated areas may be developed into economic hubs, attracting tourists with cultural experiences and outdoor recreational activities. This further diversifies the local economy and creates employment opportunities beyond the mining sector.

By implementing these strategies over the next 10 years whilst mining and leveraging the benefits of the mine including providing employment, funding community projects, assisting local entrepreneurs and training community members for a life after the mine, Tendele can achieve a "Just Transition" that promotes economic resilience, social equity, and sustainable development for all stakeholders involved.

7.4. Environmental Consideration

It is however necessary to highlight the sustainability of mining compared to subsistence agriculture (current land use over a large part of the application area) because the proposed Somkhele Mine is located in an area associated with rural agricultural farming activities. Mining is a weak-sustainable activity because it is restricted to the extent of the reserve and the life of mine. Agriculture on the other hand can be seen as a strong-sustainable activity if correctly practiced.

However, the agriculture activities in the area are not on a commercial scale and are practice for self-sustainability. Therefore, mining can generate more gross income over a shorter period, it is more sustainable than rural agricultural practices and will contribute significantly more towards the economy of region and the country. The development of the proposed Somkhele Mine will have a positive impact with respect to the area's socio-economic constraints. The issue of future sustainability can only be overcome, by successfully rehabilitating the disturbed area after mining in order to recover the area as close as possible to its natural state and to gain the necessary permits for closure purposes. A maintenance period (as determined by the rehabilitation specialists) must be incorporated into the closure cost, to ensure that sufficient financial provision will be available for the rehabilitation and maintenance of the disturbed area. Depending on the land and the population growth in the affected region, it could be given back as agricultural land for grazing purposes. The environmental externalities between rural crop production and opencast coal mining are significantly different and will be further assessed during the EIA Phase of this project as part of the Agricultural Potential, Land Capability and Soil Assessment which will also inform the Socio-Economic Assessment.

7.5. Consideration of Sustainable Development

The proposed Somkhele Project site is a 'brownfield' site and outcomes from biodiversity studies have indicated that the project area identified for the opencast mining activities at Emalahleni, Ophondweni and Mahujini are associated with some species of conservation concern (SCC) (Section 10.3). According to the National Protected Area Expansion Strategy (NPAES) (SANBI, 2010) spatial outputs, there are no national protected areas found within the study areas. However, it is still a requirement to consider the Ecological

Sustainable Development and Use of Natural Resources in accordance with the NEMA Principles as outlined in

Table 7-3.

Table 7-3: NEMA Principles and Sustainable Development for Somkhele Project

NEMA Principle	Relevance to Somkhele Project
(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural, and social interests equitably.	Mining has long been one of the key drivers of economic growth and employment in South Africa. The proposed Tendele Mining: Somkhele Project activities would be undertaken in accordance with the approved EMPr while ensuring that environmental management principles are implemented as far as practically possible during all phases of the project. The EIA process identifies the needs and interests of potentially affected parties and attempts to address issues and concerns raised through the course of the study.
(3) Development must be socially, environmentally and economically sustainable.	Government has set development goals aimed at reducing poverty, unemployment, and inequality. The New Growth Path identifies the mining value chain as one of the seven key economic sectors for job creation. Mining is promoted in the national, regional, and local policy and planning frameworks; thus, the proposed Somkhele Project with their approximate 1600 job opportunities would aim to find and implement acceptable environmental management strategies that promote sustainable development. Just Transition principles has been incorporated into the long-term development plans of Tendele.
(4)(a) Sustainable development requires the consideration of all relevant factors including the following: • That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; • that pollution and degradation of the environment are avoided, or, where they cannot be altogether	The update of the EIA process as per Judge Bam ruling, considers resultant biophysical, cultural and socio-economic impacts as a result of the Proposed Project. Measures to avoid, minimise and/or remedy potential pollution and/or degradation of the environment that may occur as a result of the proposed Somkhele Project are detailed in the EMPr.

NEMA Principle	Relevance to Somkhele Project
avoided, are minimised and remedied; • that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied; • that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner; • that the use and exploitation of non- renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource; • that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;	
(4)(a)(vii) that a risk-averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions;	Assumptions, uncertainties, and limitations associated with the compilation of the reports is included in Section 20. In the event that gaps exist in the data as a result of site access being restricted, the precautionary principle has been exercised
(4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.	The EIA process considers and assesses the resultant social, economic, cultural and biophysical impacts of the project. The EMPr provides the recommended management measures to mitigate the significance of identified impacts as indicated in **Table 6-1**. Where information is limited, the worst-case scenario has been assumed during the impact quantification methodology.
(4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.	The S&EIA process that has been followed recognises that all elements of the environment are linked and interrelated. DMRE, as the decision-making authority, will be responsible for taking all aspects of the environment, including whether or not the potential impacts of the project would unfairly discriminate against any person, into consideration when making a decision regarding the proposed Somkhele project.
(4)(c) Environmental justice must be pursued so that adverse environmental	With specific reference to the Reallocation Action Plan, the special needs of the

NEMA Principle	Relevance to Somkhele Project
impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.	elderly had been taken into account due to the expected stress and trauma that are associated with relocation
(4)(d) Equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human well- being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.	The proposed Somkhele Project would require the relocation of directly affected communities that currently inhabit the mining right areas. The relocation of the people of Mahujini would be undertaken in accordance with the recently promulgated Resettlement Guidelines (refer GN 1939 of 30 March 2022) as part of the Resettlement Action Plan (a separate process to the EIA process). The relocation of the people of Ophondweni and Emalahleni will consider where applicable the Resettlement Guidelines as the some 95% of all relocation agreements in this area were signed prior to the introduction of these guidelines. In addition to the relocation of communities, the relocation of associated cultural heritage and reburial of graves is a complex process and will be done in accordance with the National Heritage Resources Act (NHRA) and in consultation with the affected communities and individuals.
(4)(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.	Tendele is committed to comply with environmental health and safety obligations for the proposed Somkhele Project throughout all phases of the project.
(4)(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.	A comprehensive public participation process has been undertaken in accordance with the requirements of the EIA Regulations, 2014 (Section 9 of the EIA and Appendix 5 of the FSR).
(4)(g) Decisions must take into account the interests, needs and values of all I&APs, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.	The EIA process has taken into account the interests, needs and values of all I&APs, through the submission of comments on the proposed Somkhele Project (Appendix 5, – Comments and Responses Report). The meetings were conducted in English and translated into Zulu to ensure all participants have a proper understanding of the process. Key Focus Group meetings were held with selected I&APs in alignment with the protocols as stipulated in terms of Tribal authority protocols. Thus, the decision-

NEMA Principle	Relevance to Somkhele Project
	makers will have all the necessary information before them on which to base an informed decision.
(4)(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	The EIA and EMPr prepared for the proposed Somkhele Project have been made available to communities for review and comment on the WSP website. Upon EIA/EMP update approval, ongoing knowledge sharing/ training etc. would be a requirement as per associated SLP of the mine.
(4)(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment	The EIA process considers identified potential social, economic, biophysical impacts of the project in an integrated manner. The significance of these impacts has been assessed in Table 6.1 (Part B) – Detailed Impact Assessment.
(4)(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected	Tendele Mining is obliged to comply with the regulations as depicted in the MHSA and OHSA. An environmental awareness plan is included in the EMPr. The mine will implement induction which will inform the employees of any aspect of their work that may pose a danger.
(4)(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.	The public consultation process has been undertaken in accordance with the requirements of the EIA Regulations, 2014 (as amended). Request for privileged and confidential information was received by the NGO was requested to follow the requirements as stated in PAIA
(4)(l) There must be intergovernmental co- ordination and harmonisation of policies, legislation and actions relating to the environment.	The public participation process provides an opportunity for the Organs of State to provide comment on the proposed Somkhele Project and address any potential conflicts between policies or other developmental proposals administered by them that may be in conflict with the proposed Somkhele Project before decision- making. The relevant Regulatory Authorities were all respondents in the Appeal Court Case and was kept informed about the progress made with the judgement.
(4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.	At this stage there is no conflict of interest between Organs of state. The conflict registered in the CRR relates to NGO's that opposed the mine development in the Somkhele area.
(4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest.	DMRE, as the decision-making authority, will be responsible for taking cognisance of any international obligations that could have an influence on the project. The

NEMA Principle	Relevance to Somkhele Project
	production of anthracite as a strategic resource for export is of national interest.
(4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.	The Heritage Impact Assessment has revealed that none of the old structures (>60years) have any conservation value.
(4)(p) The costs of remedying pollution, environmental degradation, and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.	Tendele has compiled a Rehabilitation and Closure Plan taking into account the financial provisioning needed to remedy the impact of mining on the environment.
(4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted.	The SLP compiled by Tendele for the Somkhele Project has earmarked equal employment opportunities for women. The youth will be catered for in terms of the development programs as per SLP
(4)(r) Sensitive, vulnerable, highly dynamic, or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	The EIA process undertaken for the proposed Somkhele Project has identified relevant sensitive and/or vulnerable areas and assessed potential impacts as per specialist study. These areas are inclusive of the Hluhluwe iMfolozi Park as well as the iSimangaliso Wetland Park System. A Biodiversity Offset Agreement has been signed with EKZN Wildlife for the implementation of the agreed Off-Set Plan

8. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT

8.1. Details of the Development Footprint Alternatives Considered

8.1.1. Location Alternative

Location alternatives for the Somkhele Extension Project were not under consideration. The mine is already in possession of Mining Rights for the areas of Emalahleni, Ophondweni and Mahujini. The mining area is located within the Umkhanyakude District Municipality.

8.1.2. Site Layout Alternative

In terms of site layout, where haul roads and infrastructure services need to traverse ecological sensitive habitats, consideration was given to utilise existing routes or degraded areas of habitat before seeking alternative routes. As the mine is an existing operational mine, the further investigation of infrastructure alternatives was not considered practical.

8.1.3. Processing Methods or Mining Method alternatives

The mineral mined by Tendele Mining at Somkhele is a high-grade anthracite product used primarily in the metallurgical industry. Various grades are blended to create the different products as dictated by the market and the customers.

Due to the nature of the mineral and the geological characteristics of the reserve all possible alternatives were looked at, there is no other alternatives to what is presented for both processing and mining methods.

8.1.3.1. Truck and Shovel

Opencast mining is the preferred option for the reason that the resource lies close to the surface. It was also already established during the compilation of the Resource Statement as per Mining Works Program that the geology is very complex in the area rendering underground mining difficult in most areas.

8.1.3.2. Alternative to Blasting

Blasting is considered one of the major draw backs of any hard rock mining operation and in this instance Tendele is not different, however recent new technology has provided an alternative that may be the answer to the age-old blasting practise. The Xcentric Ripper® is a specialized excavator attachment designed for efficient rock excavation in various mining and construction applications. It utilizes a unique patented technology that combines the principles of vibration and impact force to break through hard materials effectively.

The Xcentric Ripper® is primarily used for selective extraction of mineral deposits, particularly in hard rock environments. This method involves the precise targeting and extraction of specific ore bodies or mineralized zones within a larger geological formation. Mining operations can achieve high productivity and cost-effectiveness while minimizing environmental impact and reducing the need for blasting. This method is commonly utilized in surface mining, quarrying, and civil engineering projects where conventional excavation techniques are not feasible or economical. Rather than using explosives to

break rock or concrete, the Xcentric Ripper® utilizes a hydraulic mechanism to apply concentrated force to the material, fracturing it along natural lines of weakness.

Key features of the technology as an alternative to blasting include:

- Non-Explosive: Unlike blasting, which involves the detonation of explosives, the Xcentric Ripper® operates without the need for explosives, making it safer and more environmentally friendly.
- Precision: The Xcentric Ripper® allows for precise control and targeting, minimizing collateral damage to surrounding structures and the environment. It can be used in sensitive areas where blasting may not be feasible.
- Versatility: The Xcentric Ripper® is versatile and can be used in various applications, including quarrying, mining, road construction, demolition, and trenching.
- Efficiency: The hydraulic action of the Xcentric Ripper® efficiently breaks down rock and concrete, reducing the need for secondary crushing and processing. This can lead to cost savings and increased productivity.
- Reduced Vibration and Noise: Compared to blasting, which generates significant vibration and noise, the Xcentric Ripper® produces less vibration and noise, making it more suitable for urban environments or areas with noise restrictions.
- Safety: The Xcentric Ripper® enhances safety on job sites by eliminating the risks associated with explosives handling and detonation, as well as reducing the potential for fly rock, air blast and other hazards.

Overall, the Xcentric Ripper® offers a safe, efficient, and environmentally friendly alternative to traditional blasting methods, providing precise control and high productivity. Should this method be implemented at the proposed Tendele operations, the possibility of a larger opencast pit can be considered due to lower safety risks. If the Geology is susceptible to this form of excavation. Preliminary provision for the proposed Mine Layout Plan associated with the alternative mining techniques are depicted in **Figure 8-1**.

8.1.3.3. Underground Mining

Underground mining was considered as an alternative but due to the complex geology of the area it was rated as unfeasible. Only when the pit is mined out do the opportunity present itself for some type of underground mining method to mine underground, this will only be possible to assess after the opencast mining is completed.

8.1.4. No-Go Alternative

The development of the Mining right Areas 4 and 5 are proven to be a catalyst in creating new job opportunities, local economic development, employment and much needed basic infrastructure for an impoverished community and should the no go option be implemented this will not occur. The negative impacts of the no go option will include:

- No establishment, development or training of new HDSAs, SMMEs and small local businesses;
- No job creation through economic spin-offs and no revenue for local businesses;

- No capacity building and portable skills development for locals to seek employment at other mines and industries.

The central purpose of the impact assessment including specialist input and the environmental management plan is to assess whether the socio-economic benefits of the proposed operation outweigh the environmental impacts and to consider the aim of sustainable development.

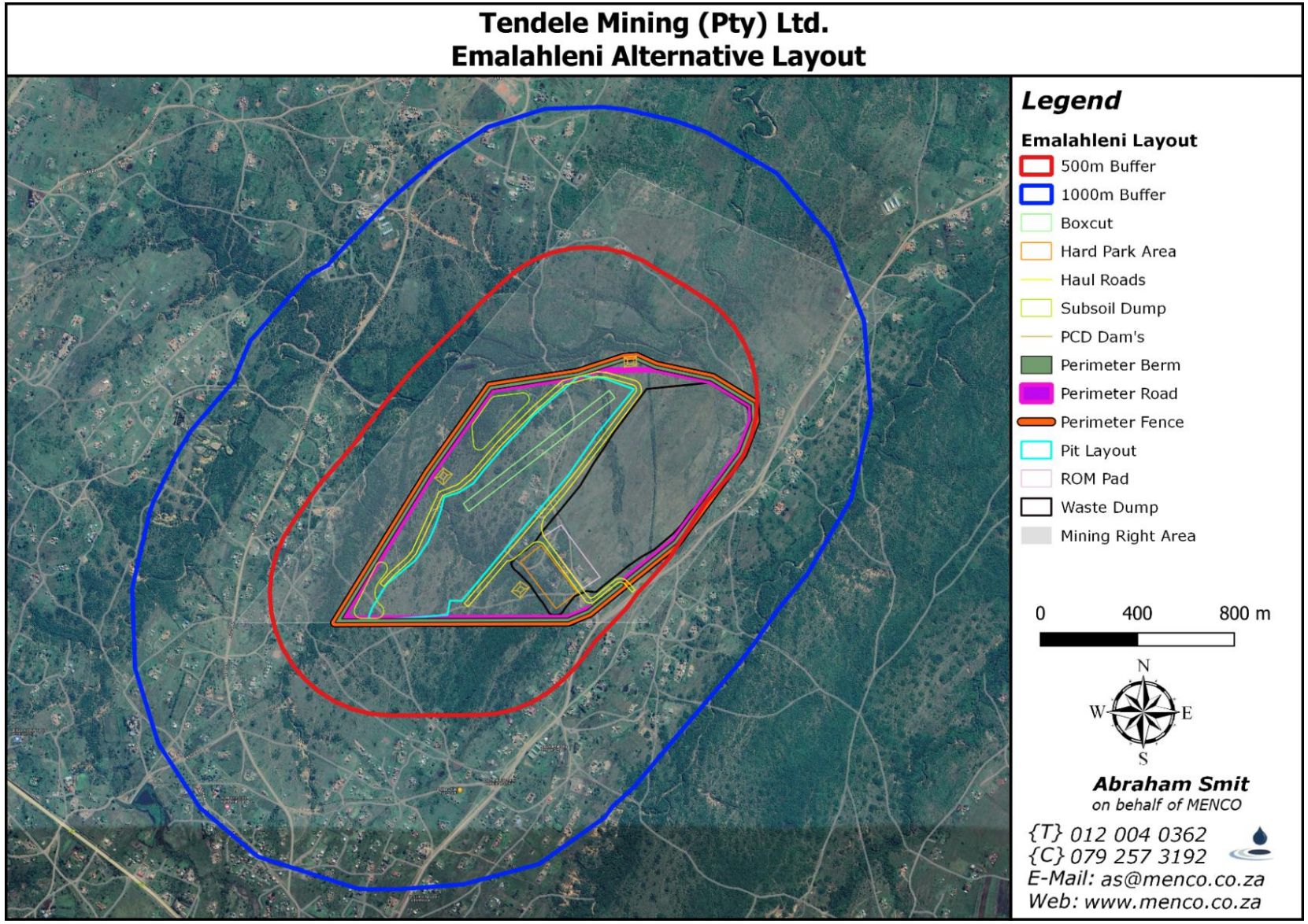


Figure 8-1: Proposed mine layout for Emalahleni if Xcentric Rippers® are implemented.

9. DETAILS OF PUBLIC PARTICIPATION PROCESS

9.1. Stakeholder Identification

As indicated in the Background Information Document (BID) regulatory authority and public involvement formed an integral part of the Scoping and EIA processes. Stakeholder identification and engagement were comprehensively captured in the FSR and contained as **Appendix 5** of the mentioned Report.

9.1.1. Government

The following government departments and organs of state have been consulted through the Appeal process and the subsequent amendment of the EIA and EMPr:

- Department of Mineral Resources and Energy;
- Department of Forestry, Fisheries and the Environment;
- Department of Water and Sanitation;
- Cooperative Governance and Traditional Affairs;
- Ezemvelo KZN Wildlife;
- uMkhanyakude District Municipality; and
- Mtubatuba Local Municipality

9.1.2. Directly Affected and Adjacent Farms

The land use adjacent to the Somkhele Extension Project is rural and communal farming with no commercial farming directly affected by the mine. The rural communities who are reliant and subsistence farming and livestock grazing who are to be impacted by the mine have been identified and have participated during the public participation process.

9.1.3. Communities

Tendele Mining has published a detailed protocol for communication with the Communities. The purpose of community communication was agreed to include the following:

- Encourage the participation of the Communities and act as their own liberators through participation and representation in the MAC and MCMF;
- Promote, in consultation with the Community, the awareness of Government Policy and laws;
- Unite and promote the relationship between the Municipality, Local, Provincial, and National Government and the Mine in creating a conducive environment for the Mine to be profitable, strong and to promote opportunities for the Community;
- Promote cooperation, peace and stability in the Communities;
- Support the Mine and assist it to operate at its full capacity because a strong mine will be in a position to provide greater opportunities to the Communities;
- Assist the Mine in developing a Social and Labour Plan and compliance with the Mining Charter to ensure long lasting benefits to the Community;
- The responsibility for oversight of the Mine's compliance with relevant legislation remains with Government;

- The MCMF to act as communication channel for the Community to raise concerns regarding the compliance of the Mine at MCMF and MAC meetings and to provide the Mine, MCMF and MAC with a fair and reasonable opportunity to address issues.

The organisational structure of the MCMF is illustrated in **Figure 9-1**.

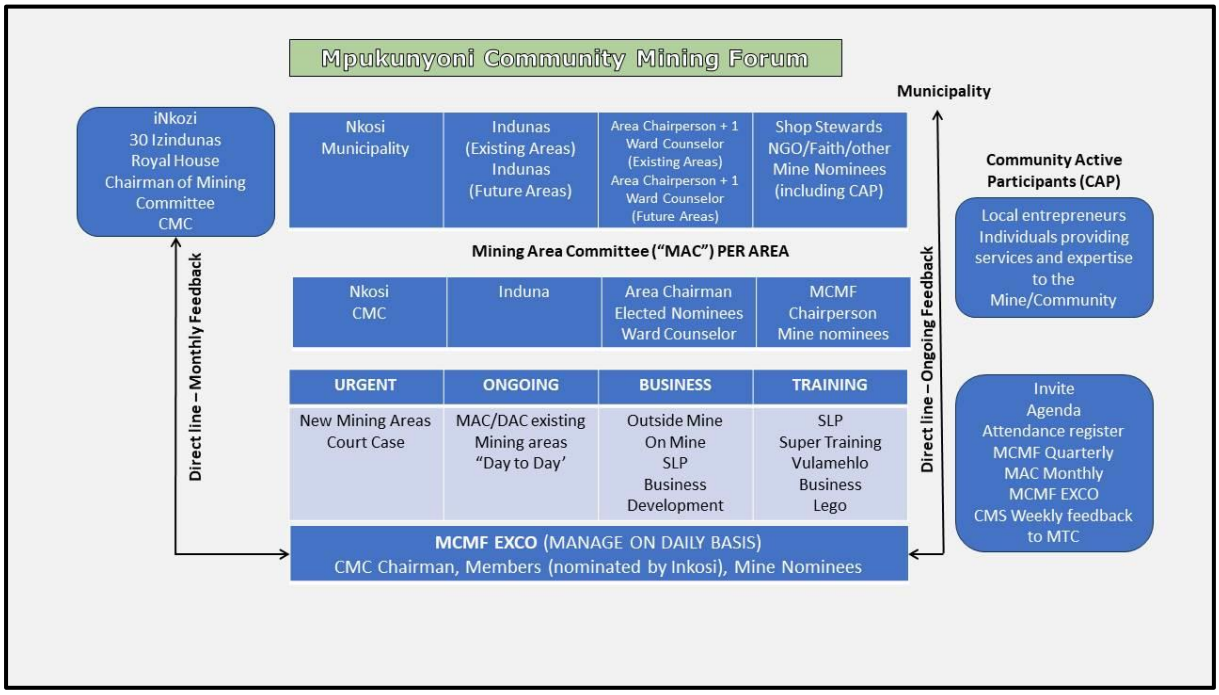


Figure 9-1: Mpukunyoni Community Mining Forum structure

9.1.4. Non-Governmental Organisations

Several Non-Governmental Organisations (NGO's) have participated and strongly objected to the Somkhele Project. Most notably was All Rise who represented the Mfolozi Community Environmental Justice Organisation (MCEJO). Other NGO's include the Global Environmental Trust (GET) who represented the following organisations:

- ActionAid;
- SANBI;
- Wilderness Action Group;
- Ian Player Magqubu Ntombela Foundation
- Wilderness Trail Guides;
- Organic Farming/Agro-ecological Movement

9.1.5. AMICUS

The Amicus included in the **CRR** as **Annexure K** under **Appendix 2** of this report includes the Mpukunyoni Traditional Council (operating as Mpukunyoni Traditional Authority) ("MTC"), Mpukunyoni Community Mining Forum ("MCMF"), National Union of Mineworkers ("NUM") and Association of Mineworkers and Construction Union ("AMCU"). The MTC is a statutory body and local council in the Mpukunyoni area which was established in terms of section 3 of Traditional Leadership and Governance Framework Act 41 of 2003. MTC is constituted by 30 Izinduna of the 30 Izigodi (communities) of the Mpukunyoni area which

represent about 220 000 community members who have vested interests in the mining operations of Tendele Coal Mining (Pty) Ltd ("Tendele").

In essence, MTC represents the entire community of Mpukunyoni area through the 30 Izinduna standing as the leaders in the respective 30 communities within Mpukunyoni greater community.

MCMF is a structure established in the Mpukunyoni community at the recommendation of DMR, KZN which structure operates as a liaison between the management of Tendele and Mpukunyoni community regarding the mining operations of Tendele.

MCMF is an inclusive democratic structure representing all members and organisations within the Mpukunyoni community (including, but not limited to, the royal family through Inkosi, traditional council, tribal authority, Izinduna from the affected mining areas operated by Tendele, local municipality, trade unions (NUM and AMCU), ordinary members of the Mpukunyoni community who wish to participate in their individual capacity or through group representatives, full time shop stewards, local entrepreneurs, local church groups, local academic institutions, local NGOs and NPOs) on the one hand and Tendele management on the other hand.

The NUM and AMCU are trade unions which represent more than 90% of the unionised workers employed by Tendele. There is a third union, Solidarity which represents about 5% percent of the unionised workers employed by Tendele.

The above entities, represent more than 90% of the community members and employees of Tendele.

Collectively, the above members are directly affected and impacted upon by the mining operations of Tendele and have vested interests in the continued mining operations of Tendele.

9.2. Consultation with Stakeholders during Impact Assessment Phase

A comprehensive database was established during the Scoping Phase by WSP Consulting as the appointed service provider to oversee the public participation process. This database was used to involve the stakeholders during the EIA Phase of the project. The entire database is included in the Comment and Response Report and its associated annextures that are included as **Appendix 2** of this Report.

9.3. Summary of PPP

Public participation with the affected communities was initiated during Tendele's Environmental Authorisation application process for areas 4 and 5 in November 2013 when the following meetings were held:

- 17 November 2013: Tholokuhle and Mahujini;
- 23 November 2013: Kwamyeki;
- 24 November 2013: Mvutshini and Ophondweni

The issued environmental authorisations based on the 2013 application for areas 4 and 5 have led to an Appeal by MCEJO. On 15 July 2022, a Draft Scoping Report relating to

Tendele Mining's expansion project with MR reference number: KZN30/5/1/2/2/10041MR and which is subject to the aforementioned appeal that is currently before the Minister of Mineral Resources and Energy was shared with all I&APs.

I&APs were requested to submit comments in respect of the Draft Scoping Report within a period of 30 days, which 30-day period ended on 19 August 2022. The comment period was extended to 1 September 2022 to allow for further comments. As outlined below, this comment period was again extended to 14 October 2022.

In addition to making the DSR available for public review, the following public meetings were held:

- 23 July 2022, Ophondweni;
- 24 July 2022, Emalahleni;
- 6 August 2022, Mahujini;
- 9 August 2022, Machibini;
- 11 August 2022, MCEJO members only, Riverview Country Club; and
- 19 August and 25 August 2022, Virtual I&AP meetings via Zoom.

During these meetings, details of the project were shared with those in attendance and questions and queries regarding the Draft Scoping Report and the project were raised and recorded considering the nature and extent of the comments received from I&APs and the scale and importance of Tendele's expansion project:

Tendele had initially appointed BlackRock Consulting ("BlackRock") as the independent Environmental Assessment Practitioner (EAP), then subsequently appointed OMI Solutions (Pty) Ltd (OMI) effective from 1 October 2022 as the EAP to continue with and lead the Scoping and Environmental Impact Assessment (S&EIA) Process inclusive of the Public Participation Process (PPP), in support of the appeal that is before the Minister. In addition, WSP was appointed as the independent entity to manage the entire communication process since October 2022. Representatives from OMI attended all of the public meetings conducted when Black Rock was the EAP and OMI was therefore well placed to lead this process.

The period for comments on the Draft Scoping Report (originally extended to 1 September 2022) came to a close on the 14th October 2022.

Further public meetings included:

- 12 Nov 2022 - Mahujini Information Sharing Meeting
- 13 Nov 2022 - Machibini Information Sharing Meeting postponed to 10 December 2022 due to inclement weather.

Further focus group meetings followed in the 1st quarter of 2023, including on 9 March 2023, when a meeting was conducted with MCEJO members only.

Although not specifically required for the EIA, it should be noted that in addition to the above, Tendele has obtained the consent of affected community members in terms of the Interim Protection of Informal Land Rights At, 31 of 1996 ("**IPILRA**") in Emalahleni and Ophondweni following the various information meetings conducted in October 2022. More than 90% of the community members in Emalahleni and Ophondweni have consented to Tendele undertaking mining and related activities in these two areas. IPILRA Information Sharing meetings and corresponding voting were also concluded as follows:

- 22 Oct 2022 - Ophondweni Information Sharing Meeting
- 23 Oct 2022 - Emalahleni Information Sharing Meeting
- 30 Oct 2022 - Ophondweni IPILRA voting Meeting (voter support exceeded 90%)
- 30 Oct 2022 - Emalahleni IPILRA voting Meeting (voter support exceeded 90%)

The voting at these meetings was independently observed by SAPS and WSP.

Subsequent to the aforementioned Public Participation conducted by the applicant, a third process was initiated due to several problems experienced that prevented the application going forward. MENCO as the appointed EAP and WSP as the appointed PPP facilitator have introduced another round of stakeholder consultation. Steps taken to notify the public of the proposed project are explained in detail below.

Site notices

Site notices were placed at strategic locations on site, at public places and in the vicinity of the site. Photographs of all the site notices are provided in **Appendix 2**. These include:

- Taxi ranks;
- Clinics;
- Offices of the Mpukunyoni Traditional Authority
- Major intersections; and
- Schools

Site notices were also placed at the following rural community halls: Emalahleni, Ophondweni, Mahujinil and Machibini. Copies of the Draft Scoping Report were also made available at these same venues.

Emails and SMS Notifications

Emails and SMS's were sent on 8 October 2023 to all previously identified I&AP's from the following data bases:

- 2014 EMPr data base (2014)
- Somkhele Waste Management Licence (2021)
- Luhlanga Box Cut Zero Project (2017)
- Somkhele Water Use Licence Application (2018)

Radio Adverts

As from 5 October 2023 adverts were played on Ukhozi FM and Rise FM, advising the public of the appeal and inviting people to register as I&APs. The adverts played as follows:

- Ukhozi FM:
  - Four times within a space of two weeks;
  - (Monday to Friday @19:00 to 20:00)
  - Sunday @ 15:00 to 17:00
- Rise FM
  - Played on daily basis for two weeks as and when they deemed fit to air

Draft Final Scoping Report

Copies of the draft Final Scoping Report (DFSR) available in English and partly in Zulu were available for public review at the following locations (refer Figure 9-2:):

- Mgeza Traditional Council offices
- Induna Justice Gumede of Emalahleni

- Mtubatuba Municipal Offices
- Induna LX Mkhwanazi of Ophondweni
- Somkhele Mine Security Offices
- Induna M.Z. Mkhwanazi at Mahujini
- Induna B.D. Mthethwa at Machibini

The DFSR was available at the following schools:

- MsiziwamaKrestu Primary School
- Gxaba High School
- Machwetshana Primary School
- Bhekumusa Primary School
- Somkhele Clinic
- Zamokwakhe Store
- Kwa-Ndlovu Tuckshop
- Gwebu Creche
- Mthulasizwe High School

Copies of the DFSR were sent to:

- Department of Forestry, Fisheries and Environment (DFFE);
- Cooperative Governance and Traditional Affairs (COGTA);
- Ezemvelo KZN Wildlife
- Mtubatuba Local Municipality;
- uMkhanyakude District Municipality;
- DWS;
- DMRE

The Notification of the I&APs regarding the Public Participation process is attached as Appendix 5 under I&AP Register and proof of email contained in the Final Scoping Report.

In terms of the Public Participation Process for the Somkhele Project, site notices were placed at the following rural community halls: Emalahleni, Ophondweni, Mahujini and Machibini. Copies of the Draft Scoping Report were also made available at these same venues.

The Scoping Report together with the Comments and Response Report were made available at the following venues (refer **Table 9-1**: and **Figure 9-2**:) for review and comment for 30 days from 6 October 2023 to 7 November 2023. On 11 March 2024 the Final Scoping Report was issued to all stakeholders and an electronic copy is available for download at the following data free website: https://www.wsp.com/en-ZA/services/public-documents

Table 9-1: Venues where DFSR was available

Location	Venue	Address	GPS Co-ordinates
Mpukunyoni Tribal Council	Mgeza TC Offices	Tribal Court, next to ARHI	28°20'14.50"S 32°6'52.80"E
Mtubatuba	Mtubatuba Library	Municipality Building	28°24'50.32"S 32°11'26.77"E
Ophondweni	Ophondweni Community Hall	Ophondweni Hall next to Machwetshana Primary School	28°16'7.80"S 32°9'3.70"E
Ophondweni	Induna LX Mkhwanazi's Residence	Ophondweni Induna Homestead	28°16'3.59"S 32°9'11.20"

Location	Venue	Address	GPS Co-ordinates
Emalahleni	Somkhele Clinic	Somkhele Next to Taxi Rank	28°19'53.30"S 32°6'2.90"E
Emalahleni	Induna JM Gumede's Residence	Residence next to Myeki Community Hall	28°17'45.27"S 32°6'22.98"E
Mahujini	Induna MZ Mkhwanazi's Residence	Induna's Homestead, Mahujini	28°17'7.50"S 32°4'41.92"E
Mahujini	Kwa-Zamokwakhe Store	Mahujini Area	28°17'33.70"S 32°5'7.20"E
Machibini	Induna BD Mthethwa's Residence	Kwa-Bhedangaye next to Mine Old Gate	28°19'16.82"S 32°6'40.88"E

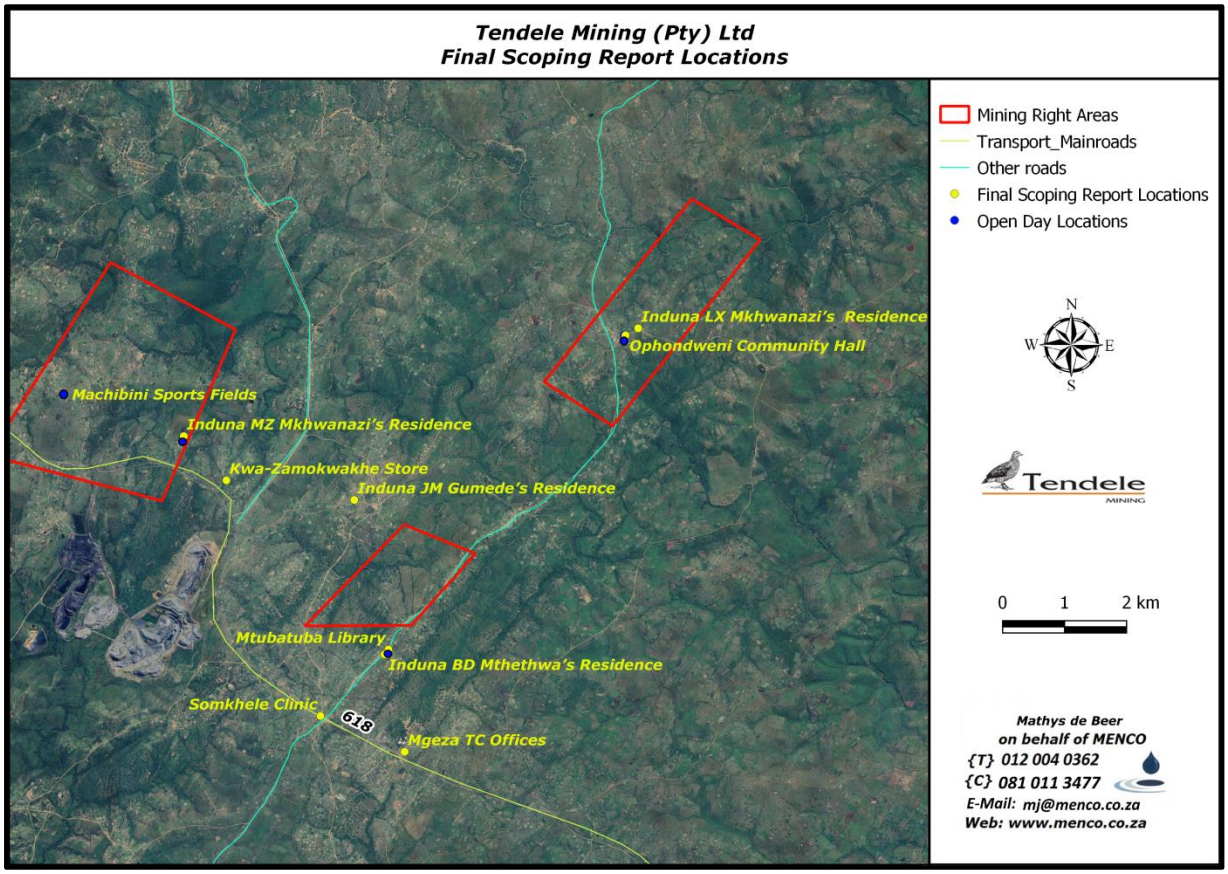


Figure 9-2: Locality of Open Day venues and public places where DFSR were placed

As required in terms of the NEMA Regulations a further stakeholder consultation process was conducted during March 2024 when the draft EIA/EMPr was circulated for a 30-day period review. The draft EIA/EMPr was presented at the following venues;

- 30 March 2024: Emalahleni Community;
- 31 March 2024: Ophondweni Community;
- 6 April 2024: Mahujini Community; and
- 7 April 2024: Focus Group Meeting with MCEJO at Meet Mekaar Resort.

9.4. Summary of Issues Raised by I&APs

Stemming from the above meetings numerous concerns were captured that had been raised by the I&APs. These community and NGO concerns fall within the field of:

- Limitations in the Public Participation Process followed;
- Continued requests for outstanding material information (such as Gap Analysis Report);
- Failure to address comments on previous submitted Scoping documents;
- Accusations that comments have been left out of the Scoping documents;
- Flawed documents and substantial flaws in the Public Participation Process followed;
- Social aspects that relate to heritage, employment, community and land as well as relocation;
- Rushed and short-cut processes followed by the appointed EAPs;
- Failure to fulfil commitments made during meetings;
- Failure to engage with communities as part of resettlement and biodiversity offset;
- Insufficient detail in the Scoping Report which prevents the I&APs from providing informed comments;
- Cumulative impacts are not identified or assessed;
- Mine planning in relation to layout and designs, alternatives considered and rehabilitation;
- Impacts stemming from the operational phase of the mine in terms of air, dust, visual, noise, blasting and pollution in general;
- Biophysical impacts on sensitive receptors in terms of vegetation, faunal, wetlands, streams and rivers;
- Resettlement process considered as an ad-hoc process that was followed without the necessary transparency and independent expertise;
- Processes that were followed have resulted or caused violence, intimidation and significant psychological trauma.

The consultative process conducted over the entire period with the I&APs as well as stakeholders have raised several concerns that could potentially negatively impact several residential areas surrounding the proposed mining area. All of these concerns are captured, and form part of the Comments and Response Report attached to this document as **Appendix 2**. The general concerns are summarized in **Table 9-2**.

Table 9-2: Summarised issues raised by I&APs

Category / Aspect	General Concern
Agricultural	Numerous concerns were raised regarding the impact of the proposed mining on the potential of agricultural activities in the area. The concerns include the loss of high potential soils, loss of land capability, loss of income and loss of grazing potential. How will the communities be compensated for the loss of grazing areas for the livestock
Air	The air quality in the area will deteriorate based on dust fall-out stemming from opencast activities. Air quality will also cause health conditions.
Biodiversity	The biodiversity of the area will be disrupted by mining. Mining areas in close proximity to HiP. Negotiations regarding a Biodiversity offset are now finelised

Category / Aspect	General Concern
Blasting and Vibration	The mining area is too close to rural areas and blasting will cause damage to the houses and dwellings. How will these impacts be avoided? Houses are already cracked due to mining activities and the Mine has not investigated the situation
Heritage	Several graves are within the mining area. Cultural aspects regarding graves and places of spiritual importance will be adversely affected
Hydrology	Several concerns were raised that deal with the impact on the surface water resources of the area. The 1:50 year flood line was questioned and considered to be outdated. Surface water and hydrological assessment considered inconsistent with missing information
Hydrogeology	The high impact on groundwater was tabled as an issue of grave concern. Groundwater is a source for many for potable use. There seems to be serious flaws in the groundwater assessment. Some households are complaining about the groundwater quality as it appears black due to the presence of coal.
Hydropedological and wetlands	The mining area transgresses wetland areas that will be impacted. Wetland functions will be negatively impacted. The biodiversity of the wetlands will be destroyed.
Infrastructure and disruption of Services	The infrastructure of the mine and the layout maps are inadequate as no detail or dimensions are provided related to access roads, haul roads and potential river crossings.
Noise	High level of noise disturbance, especially during night will impact negatively on quality of life
Pollution	Several concerns related to pollution were tabled. The water quality of the various water sources in the area will be subject to degradation. Toxic substances associated with mining will cause health related issues and contribute towards land contamination. The livestock of the communities will not be able to drink the polluted water
Socio-economic	The livelihood and quality of life of all rural communities neighboring the site will be disrupted in terms of loss of property, health issues and loss of agricultural opportunities. 139 out of 143 families at Ophondweni and Emalahleni have signed relocation agreements and have started to relocate. IRO the families to be relocated at Mahujini, the issue of compensation with regard to displacement of business, damage to houses caused by blasting and health-related matters will have to be addressed by means of the Relocation Action Plan. There are also several responses received by community members in support of the project based on the economic benefit to the area in terms of employment security, including support by the leaders of the Amicus, representing 220 000 people.
Rehabilitation	Rehabilitation not done properly. Mined out areas not sloped, not rehabilitated and fenced off, regarded as unsafe for humans as well as animals. Several losses of livestock on the un-rehabilitated areas reported to the Mine without any action taken or been compensated. It being noted that the mine provides updated rehabilitation audits to the DMRE on an annual basis.
Resettlement	Not all affected families are happy with the resettlement agreements or the criteria used to determine which families

Category / Aspect	General Concern
	are earmarked to be resettled, it being noted that 139 out of 143 families have signed relocation agreements.
Traffic	The increase in traffic into the residential area is of concern based on road conditions and the heavy traffic volume that brings a safety concern.
Visual	The eastern boundary of the Hluhluwe-iMfolozi Park will negatively impact on eco-tourism of the area due to the visibility of discard dumps and associated mining infrastructure. Coal mining in the area not seen as sustainable or feasible. Tendele has signed an Off-Set agreement and finalized an Off-Set plan as required.

The community leaders as listed in **Table 9-3** have openly spoken up for their support of the Tendele mining project. They have mentioned how the relentless attacks for the past few years have crippled the mine to the extent that it is now on the verge of "dying" and in the process numerous job losses. This has resulted in immeasurable suffering for the community as the mine cannot assist with the urgently needed economic development. It is stated that the sadness in the communities is the direct result of NGO's purporting to act in the interest of the communities, relentlessly trying to close the mine, resulting in 1,600 community members losing their jobs. This represents 87% of local community members without work, 70 local entrepreneurs without business and 20,000 people that have lost their livelihoods[1].

Table 9-3: Community leaders in support of Tendele Project

Name	Organization
Inkosi Ntokozo Mkhwanazi	Mpukunyoni Traditional Council (MTC). Chairman of the MTC and head of the Mkhwanazi Royal Family
Induna Alex Mkhwanazi	Community of Ophondweni
Induna Justice Gumede	Community of Emalahleni
Induna BD Mthethwa	Community of Machibini (Mahujini Pit crosses into Machibini)
Induna MZ Mkhwanazi	Community of Mahujini
Mayor Mxolisi Mthethwa	Mtubatuba Municipality
Mr Mandla Ngcobo	Chairman: Directly Affected Communities to be relocated in Ophondweni
Mr T Mlungwana	Chairman: Directly Affected Communities to be relocated in Emalahleni
Mr Bheki Sithole	AMCU
Mr Ivan Bhengu	NUM
Mr Ndabenhle	FALWUSA
Mr Eric Sokhulu	Chairman: Mtubatuba Business Association representing some 150 community entrepreneurs
Mr Sicelo Shandu	CEO: Mtubatuba Business Entrepreneur
Mr Sipho Mathunjwa	Mpukunyomi Business Entrepreneur

All of the above entities and its leaders from part of the Amicus as described in **Section 9.1.5** above**.**

Further statistical data presented by the supporters claimed that more than 90% of the 220,000 community members are in support of the mine while less than 2% object against

[1] Refer https://www.dailymaverick.co.za dated January 2024 last accessed 13 of March 2024

the project. Communities within the Mtubatuba Municipal area is rated as poor with about 70% that live on R800 per month implying that 83% of the households live below the poverty line. Taking this information into consideration, it is clear why there is overwhelming support for the mine.

10. ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES

10.1. Type of Environment Affected by the Proposed Activity

10.1.1. Climate

The closest main town to the Mine with weather data, is Mtubatuba which is located 23 km south-east of Somkhele. The region experiences hot, humid summers and mild winters.

10.1.1.1. Rainfall and Evaporation

Mtubatuba receives approximately 388mm of rain on average per annum with most rainfall occurring during the spring and summer period. Mtubatuba historically received the lowest rainfall between April and August and peak rainfall in November. The daily rainfall record for the rainfall station 0339352_W (Kangela) (see **Table 10-1** for details) was sourced and used in this study. The monthly rainfall distribution is illustrated in **Table 10-1**.

Table 10-1: Rainfall and Evaporation data

Month	Monthly Rainfall Distribution				Evaporation (mm/month)
	10th percentile	50th percentile	90th percentile	Average	S-Pan
October	30.5	77.9	175.2	87.52	131.4
November	37.7	86.0	180.2	102.7	145.9
December	32.0	76.9	179.4	96.03	166.9
January	29.2	93.9	209.8	111.4	177.6
February	33.6	93.6	234.1	118.9	152.9
March	29.0	82.2	225.8	103.0	144.4
April	17.5	50.5	115.7	61.17	101.5
May	5.8	19.5	100.6	40.88	80.2
June	4.1	20.8	94.2	39.19	62.7
July	4.1	18.7	76.7	31.67	66.5
August	4.0	19.6	73.7	32.31	86.9
September	10.9	39.0	114.3	53.78	108.2

10.1.1.2. Temperature

The mean monthly temperatures for Mtubatuba show limited variation and range from 25°C (January) to 17°C (June/July). During the summer months, from October to March, the mean daily maximum temperatures range between 26°C and 30°C, while the mean daily minimum temperatures for the period range between 17°C and 21°C. During the winter months, from April to September, mean daily maximum temperatures range between 23°C and 25°C while the mean daily minimum temperatures range between 12°C and 17°C (refer to **Table 10-2**).

The extreme maximum temperature range is from 33°C to 43°C. The highest maximum temperature of 43ºC was recorded in September; however, maxima for the period

September to February all exceed 40°C. Very cold temperatures are never experienced; however, extreme minima of 4.3°C to 5°C may occur during the coldest months (July and August).

Table 10-2: Temperature data applicable to Somkhele

	Month of the year											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Min	21.0	21.0	20.2	17.7	15.0	12.1	12.1	13.8	15.9	17.1	18.6	20.2
Avg	25.6	25.5	24.7	22.5	20.2	17.8	17.8	19.3	20.8	21.7	23.0	24.7
Max	30.2	30.0	29.3	27.3	25.5	23.5	23.6	24.8	25.6	26.3	27.4	29.3

10.1.1.3. Wind

The prevailing wind in the area is a northerly wind throughout the year with the wind speeds peaking in the August, September and October months to approximately 20 km/h on average. An average wind rose for Mtubatuba for the period January 2020 to December 2022 (Rayten Engineering, 2024) is depicted in

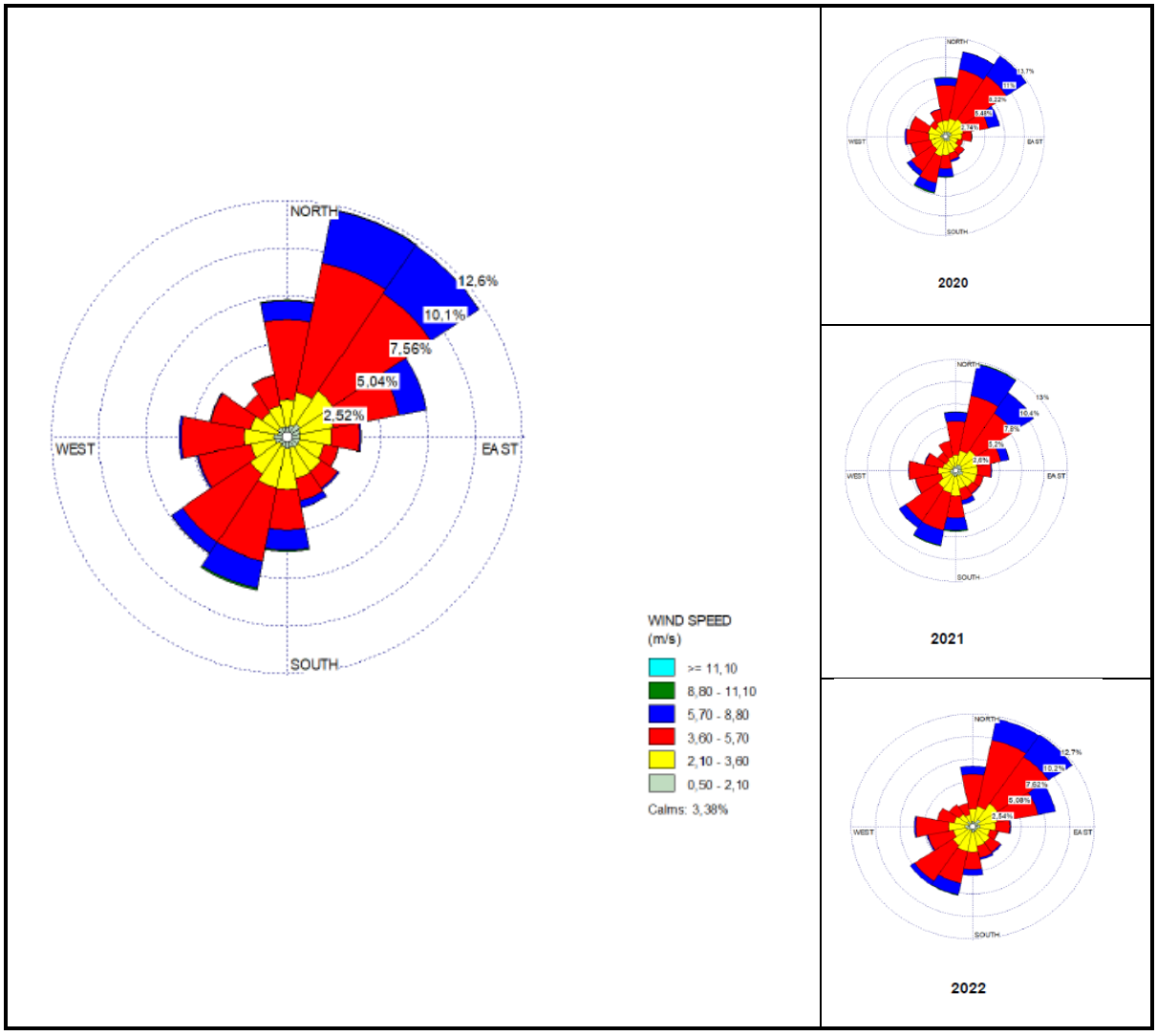


Figure 10-1 below.

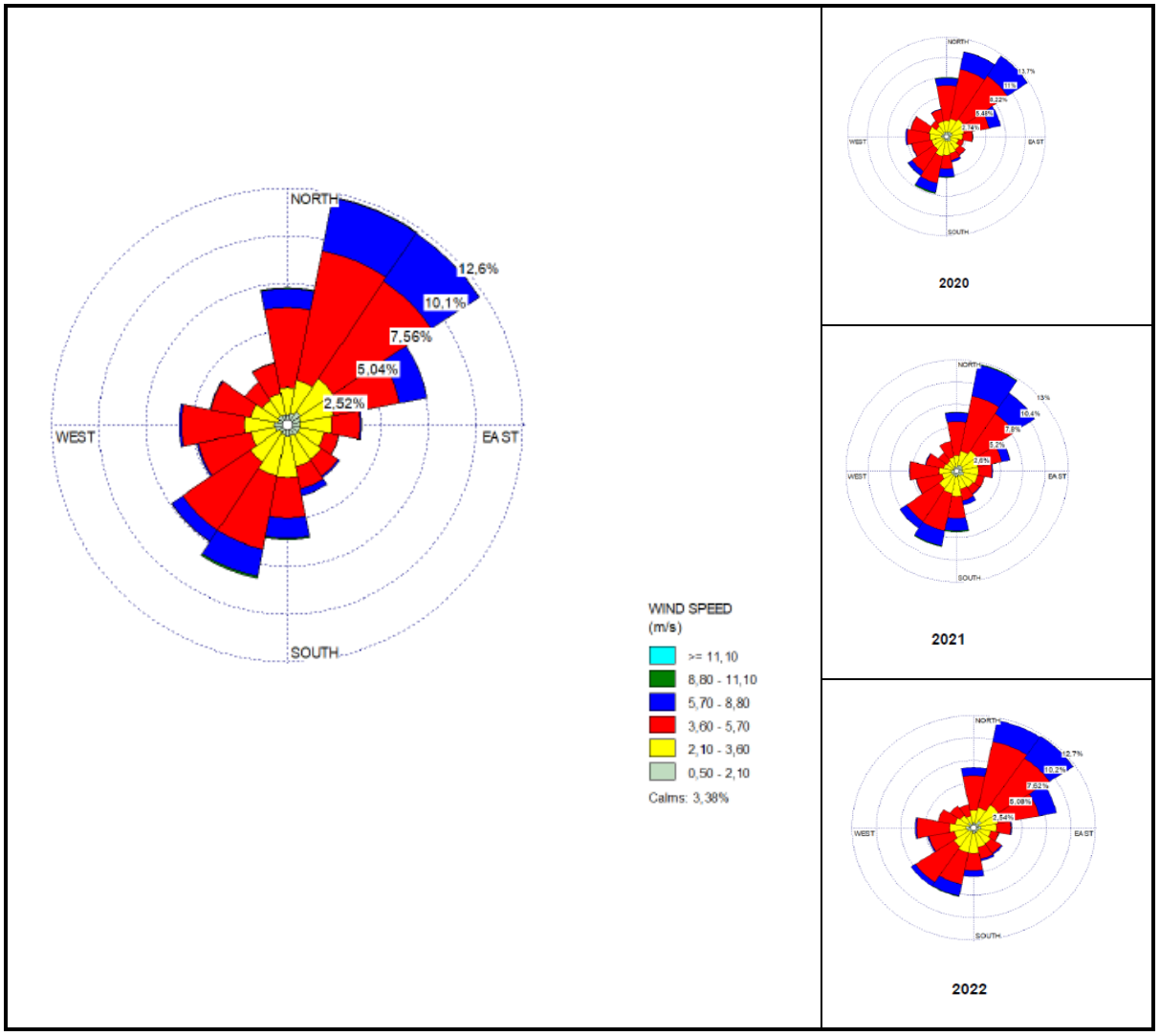


Figure 10-1: Wind Rose plots for the Somkhele area

Generally, winds in the area blow at speeds between 1.6 to 3.5 m/s (33%) and 3.6 to 5.5 m/s (29%). Stronger winds, in excess of 8 m/s, are less common (6.2%) and are mostly likely to blow during September and October.

10.1.2. Geology

The regional geological map (2732 St. Lucia - 1:250 000 Geological Map Series) indicates that most of the Mahujini, Emalahleni and Ophondweni areas are underlain by sediments of the Emakwezeni Formation (lower Beaufort Group) of the Karoo Supergroup. Dolerite sill and dyke structures, fault zones and metamorphic contact zones are known to be associated with the area.

From the drilling of boreholes in Area 4 and 5 (SAM exploration boreholes) and Area 2, 8 and 9, the local geology can be inferred. Lithology typically comprises dolerite sills, sandstone, siltstone, shale and occurrences of coal. **Figure 10-2** shows the general lithology encountered in the Somkhele region.

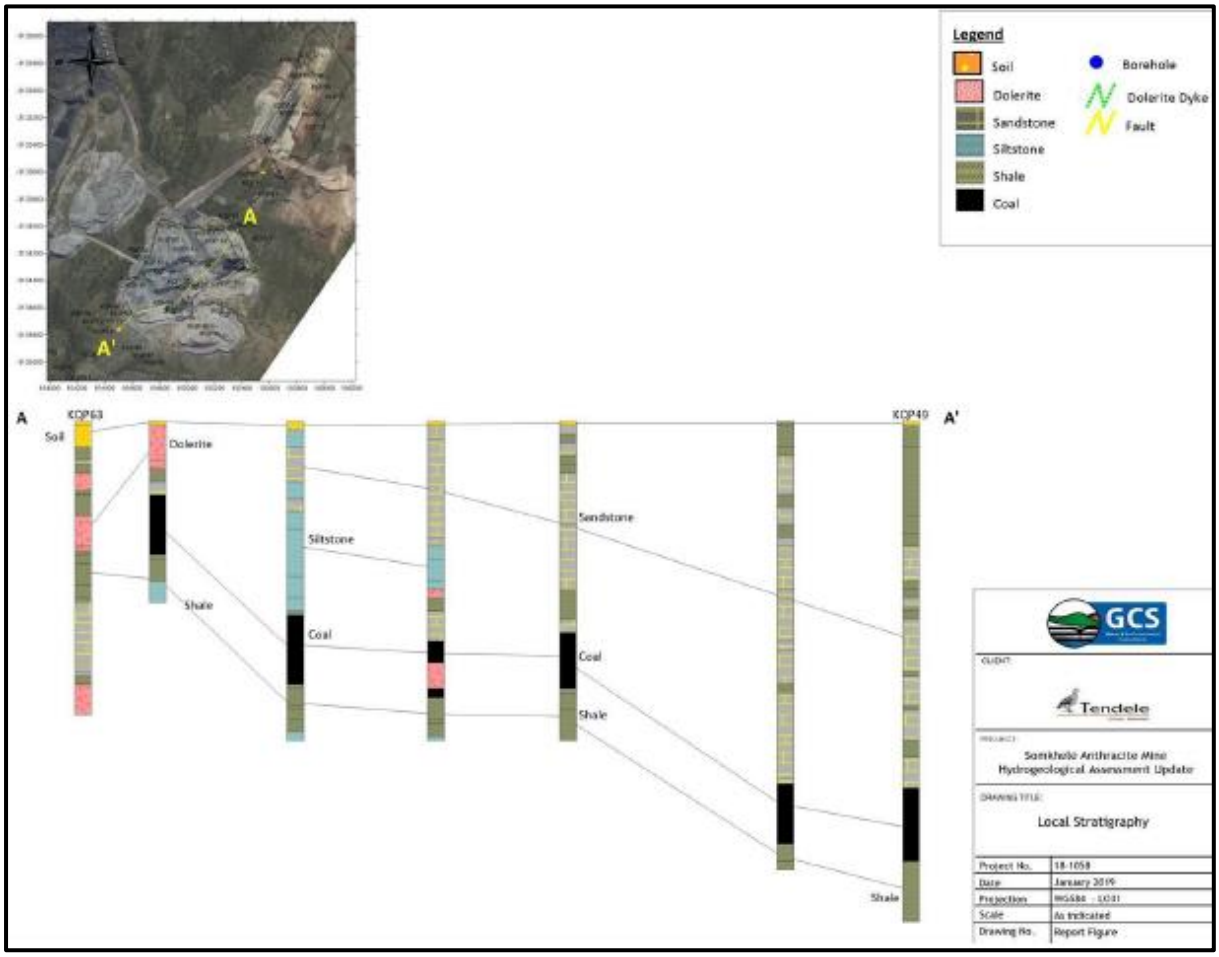


Figure 10-2: Typical local stratigraphy at Somkhele

The regional geology is illustrated in **Figure 10-3**.

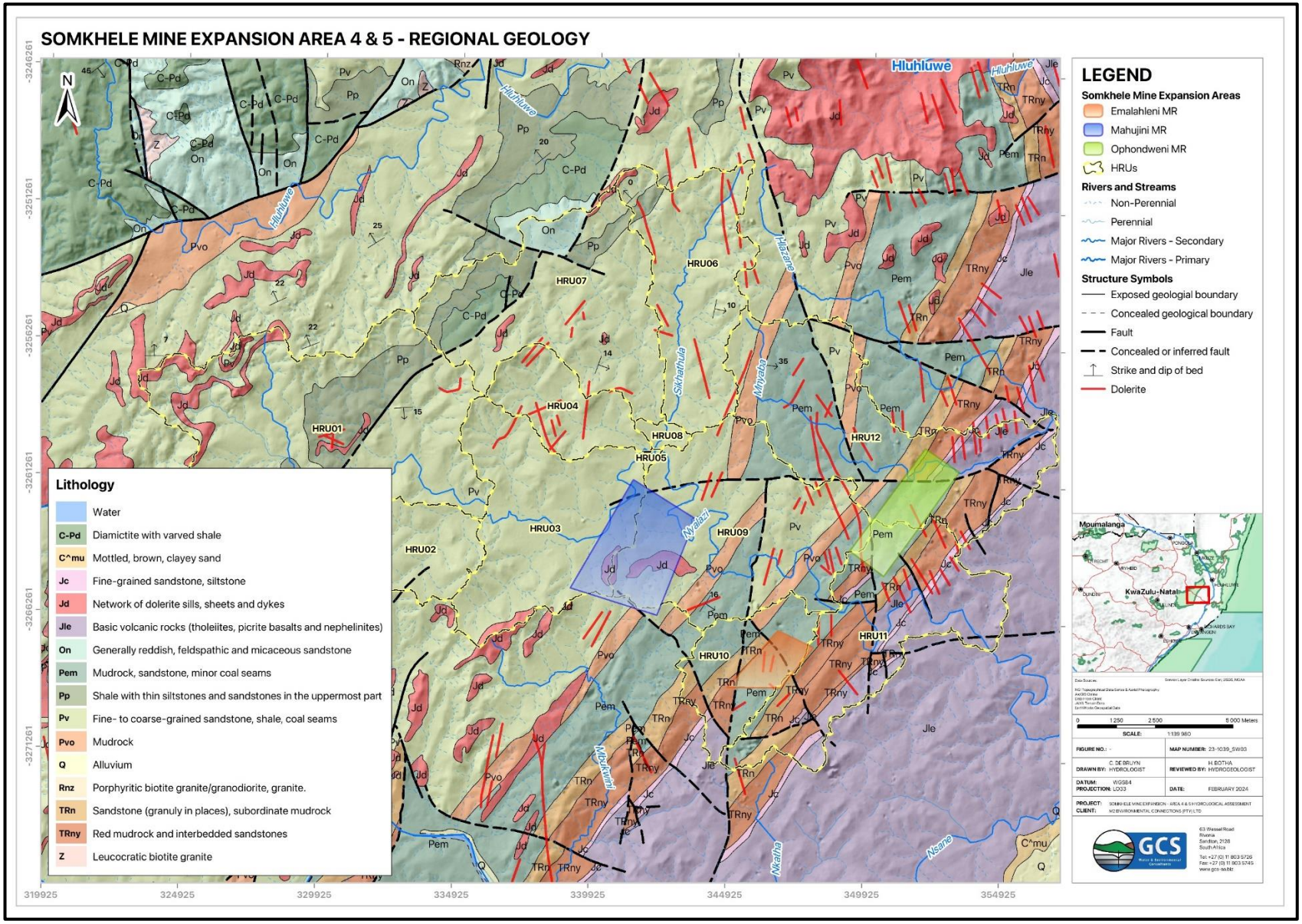


Figure 10-3: Regional geology of project area

10.1.3. Soil

The Agricultural, Land Use Capability and Soils Impact Assessment study was conducted by Eco Soils and is attached as **Appendix 3**.

The dominant soil forms found at Ophondweni and Emalahleni are Glenrosa, Mayo and Arcadia. Due to thicket bushes and community resistance, only restricted areas could be surveyed. These forms consist of an orthic, melanic or vertic A-horizon overlaying rock or lithocutanic mudrock (weathered rock). The effective depth of the soils is mainly between 0 and 30-40 cm, but the soil depths of the Arcadia soil form is 80cm with very high clay contents. The clay contents are generally between 17 and 25% in the top soil. The silt contents of the soil almost equal the clay content. The agricultural potential for dryland and irrigation conditions of the soil forms are considered low under dryland as well as irrigation conditions.

The project area has restrictions for crop production, since the soils are shallow and therefore has a very low water holding capacity. According to the soil assessment based on the Klingebiel and Montgomery (1961) classification the soils in the project area are classed as soils with no dominant class and falls in land class VII to VIII. It has very severe limitations that makes it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife.

10.1.3.1. Soil Fertility

The soils in the southern two thirds of the area are characterized by dominantly prisma cutanic and/or pedocutanic diagnostic horizons (Landtype Ea137). The B horizons are mainly not red. The average depth of the soils is 36 cm and average clay content is 33.3%. Only 5.8% of this landtype has a high potential, while 28.9% and 56.3% of the soils has moderate and low potential respectively, and 9% of the land type is covered by rock. The soils have a high natural fertility. Restrictive properties of the soils in this land type are limited effective depths. The soils have a high swell-shrink potential, are plastic and sticky and water infiltration slow. Seasonal wetness and high erodibility are possible. Theses soils can be regarded as not suitable for arable agriculture, but suitable for forestry or grazing where climate permits.

In the northern third of the area (Land type Ea137) the soils are vertic, melanic and red structured diagnostic horizons. The average depth of the soils is 40.2 cm and average clay content 19.8%. The texture contrast between the A and B-horizons soils is strong. No high potential soils are found in this land type, but 46.3% of the soils have a moderate and 51.9% low potential according to the land type survey of the ISCW. Rock covers 1.9% of this land type.

Favourable properties of the soils are the somewhat high natural fertility and relative wetness in dry periods. The soils have restricted effective depths. Additionally, the soils have slow water infiltration; high seasonal wetness and high erodibility. The soil potential according to the land type survey of the ISCW Soil potential is indicated as having no dominant class.

10.1.4. Air Quality

The Air Quality Impact Assessment (AQIA) undertaken by Rayten Engineering Solutions (2024) during the EIA Phase is attached to this report as **Appendix 16**.

The objective of the baseline air quality assessment undertaken was to determine the following:

- the prevailing meteorological conditions at the site;
- establish baseline concentrations of key air pollutants of concern;
- identify existing sources of emissions; and
- identify key sensitive receptors surrounding the project site.

Based on the prevailing wind fields for the period January 2020 to December 2022, emissions from activities at the proposed Somkhele Operations will likely be transported towards the south-west and south-southwest, depending on the season and time of day. Moderate to fresh breezes observed during all the time periods may result in effective dispersion and dilution of emissions from the proposed operations; however, higher winds speeds can also facilitate fugitive dust emissions from open exposed areas such as stockpiles, waste dumps and other mining activities.

Dustfall data for the January 2023 – September 2023 monitoring period was used to determine baseline air quality conditions at the project site (refer **Table 10-3**). The dustfall rates ranged from 22.00 – 5385.00 mg/m^2/day for the period. Out of the 261 dustfall rates recorded for the period, there were 2 exceedances of the residential limit of 600 mg/m^2/day and non-residential limit of 1 200 mg/m^2.

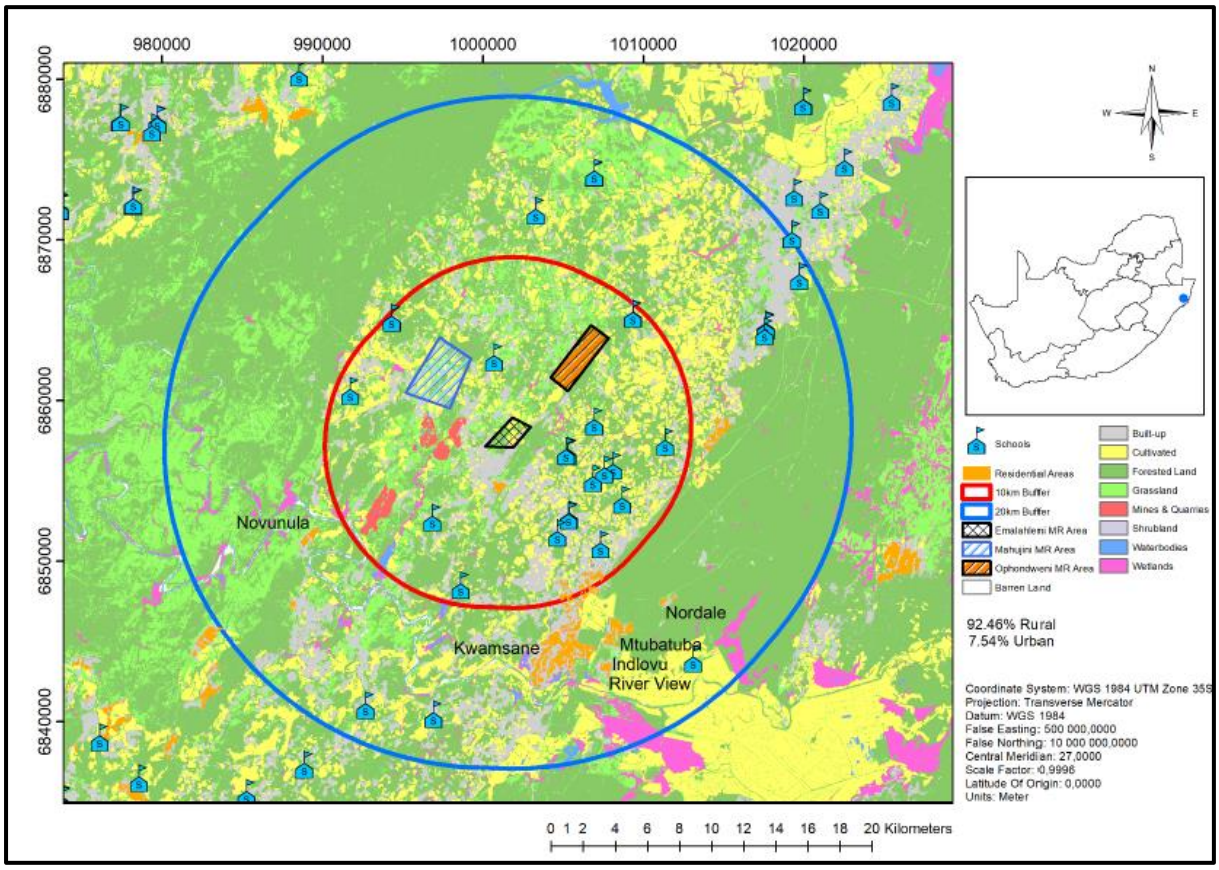


Figure 10-4: Sensitive receptors identified in terms of the AQIA study

Low concentrations of $PM_{2.5}$, annual PM_{10}, and dustfall rates are predicted at most of the discrete receptors surrounding the mine, except for the receptors situated in proximity to the proposed Emalahleni, Mahujini and Ophondweni mining areas, the proposed haul routes and the Plant at Area 2. In contrast, high daily PM_{10} concentrations are predicted at half of the identified receptors.

In terms of the cumulative assessment, overall – the proposed Somkhele Operations are anticipated to result in high cumulative impacts close to the operational areas in terms of dustfall. However, the impacts are anticipated to decrease with increasing distance from the operational areas.

Table 10-3: Frequency of exceedance at control buckets in Somkhele area

#	Description	Classification	Coordinates		Exceedance (2023)	National Standard
Sampling sites compared to non-residential standard (mg/m²/day)						
1	Magazine	Non-residential	28°19'18.00"S	32°2'52.00"E	0	1200
2	Myengi Dam 1	Non-residential	28°18'34.00"S	32°3'25.99"E	0	1200
3	Main Entrance	Non-residential	28°18'2.00"S	32°3'33.00"E	0	1200
4	Myengi Dam 2	Non-residential	28°17'54.00"S	32°3'48.00"E	0	1200
5	Workshop	Non-residential	28°18'13.09"S	32°3'52.06"E	0	1200
6	Ground Solar Panel	Non-residential	28°20'13.04"S	32°2'14.53"E	0	1200
7	Area 1 Hard Park	Non-residential	28°27'34.30"S	32°7'10.40"E	0	1200
8	Phungula	Non-residential	28°18'28.08"S	32°3'49.97"E	0	1200
9	Platform	Non-residential	28°18'5.86"S	32°3'40.82"E	1	1200
Sampling sites compared to residential standard (mg/m²/day)						
10	Goodman Site	Residential	28°18'5.86"S	32°1'16.00"E	0	600
11	T-junction School	Residential	28°19'59.00"S	32°2'17.00"E	0	600
12	Area 1 Community	Residential	28°21'4.00"S	32°3'3.99"E	0	600
13	Siyaya Site	Residential	28°20'29.00"S	32°2'25.99"E	1	600
14	Myeki	Residential	28°19'32.00"S	32°4'46.00"E	0	600
15	Mbuyazi	Residential	28°19'49.00"S	32°4'35.00"E	0	600
16	Duze	Residential	28°19'53.00"S	32°3'57.00"E	0	600
17	Sangweni Res	Residential	28°18'21.80"S	32°3'24.90"E	0	600
18	Khumalo	Residential	28°19'48.10"S	32°3'47.90"E	0	600
19	Mgeza Edu Centre	Residential	28°20'12.70"S	32°6'49.80"E	0	600
20	Mtshali/Dladla	Residential	28°19'32.20"S	32°5'11.10"E	0	600
21	Qhubeka Creche	Residential	28°17'51.20"S	32°8'55.78"E	0	600
22	Ophondweni	Residential	28°16'8.92"S	32°8'55.78"E	0	600
23	Myengi Dam 2 (N)	Residential	28°17'54.00"S	32°3'38.00"E	0	600
24	Somkhele Clinic	Residential	Unknown	Unknown	0	600
25	Msiziwamakrestu School	Residential	Unknown	Unknown	0	600
26	Gumbi Home	Residential	Unknown	Unknown	0	600
27	Buhlebemfundo Creche	Residential	Unknown	Unknown	0	600
28	Gumede Induna	Residential	Unknown	Unknown	0	600
29	Myengeni new Hall	Residential	Unknown	Unknown	0	600
30	Dladla Luhlanga	Residential	28°18'34.63"S	32°4'8.86"E	0	600
31	Ncube	Residential	28°19'12.97"S	32°4'53.05"E	0	600

10.1.5. Groundwater

A geohydrological investigation for the proposed Ophondweni, Emalahleni and Mahujini mining operations was conducted by GCS Water and Environmental Consultants and is included as **Appendix 12** of the EIA Report.

10.1.5.1. Hydrocencus and Borehole Survey

GCS undertook a field hydrocensus in 2013 (GCS, 2014) and January 2019 (GCS, 2019). As part of this investigation, a third attempt was made to identify existing groundwater users within a 2.5 km radius of the proposed opencast operations.

89 boreholes were identified within the combined Mahujini, Emalahleni and Ophondweni areas. The majority of the boreholes discovered are exploration boreholes drilled by SAM; the remainder are boreholes fitted with hand pumps. From the hydrocensus conducted, water for human consumption and agricultural purposes within the proposed mining areas is either obtained from some of the ephemeral streams or other water supply systems (i.e. hand pumps or municipal water trucks).

Table 10-11 lists the field boreholes discovered in the project area. The spatial distribution of the borehole area is shown in **Figure 10-7** to **Figure 10-9**.

10.1.5.2. Aquifer Characteristic

Based on available data, the aquifer occurring in the area can be divided into two (2) distinct zones:

1. *Weathered to semi-confined aquifer zone*:

a. The sedimentary rocks of the Emakwezini formation (part of the Beaufort Group) form the secondary water-bearing strata in the region. In the Emakwezini formation, multi-layered aquifers and aquitards are common. It is, however, conceptualised as a single unit with interconnectivity between layers, as a worst-case scenario.

b. On average the saturated thickness of the weathered to semi-confined aquifer zone, determined by boreholes drilled at the site, varies from 10 - 24 m. However, on a catchment scale, the average weathered thickness is estimated to be in the order of 14 - 30 m (King et al., 1998)

2. *Confined fractured aquifer zone*:

a. The Ecca and Dwyka Formation, which underlies the Emakwezini Formation, normally has a very low permeability due to its secondary aquifer characteristics. The aquifer can be referred to as being primarily fractured and acts as an aquitard. Preferential groundwater flow is known to be associated with fault or intrusive rock contact zones.

b. The saturated fractured aquifer thickness for the general area is estimated to be in the order of 90 - 100 m (King et al., 1998; Lourens, 2013).

In general, the aquifer in the study area can be referred to as being predominantly intergranular and fractured. These aquifer types generally have very low to medium primary hydraulic conductivity and medium to low porosity values due to the secondary nature of the aquifer (King et al., 1998). A hydrogeology map is available in **Figure 10-10**.

10.1.5.3. Aquifer Parameters

A conceptual drawing of the typical aquifer zones in the study area is presented in **Figure 10-5**.

The aquifer parameters used in the groundwater modelling is based on a rainfall recharge range between 0,5% and 2,5% of the MAP for the area given as 808 mm/a for the Karoo Rock Aquifers. The Transmissivity values were calculated from aquifer tests performed on monitoring boreholes in the existing Mining areas and it ranged from 9 to 0,06 m^2/day. The geometric mean transmissivity, for the tested boreholes in the Karoo rock is 0,6m2/day and was considered representative of the fractured aquifers of the area. It was further assumed that the transmissivity values of the weathered aquifers would be in the same range.

If a 10m aquifer zone is considered, hydraulic conductivity values can be assumed to be between 0,9 and 0,006 m/day. If an aquifer thickness of 40m is considered, the hydraulic conductivity is 0,0015m/day.

Typical hydraulic conductivity values for the sediments are highly variable and values range from 1 – 20 m/day. The storativity values range $5X10^{-3}$ to $5X10^{-4}$ for Karoo Rock Aquifers.

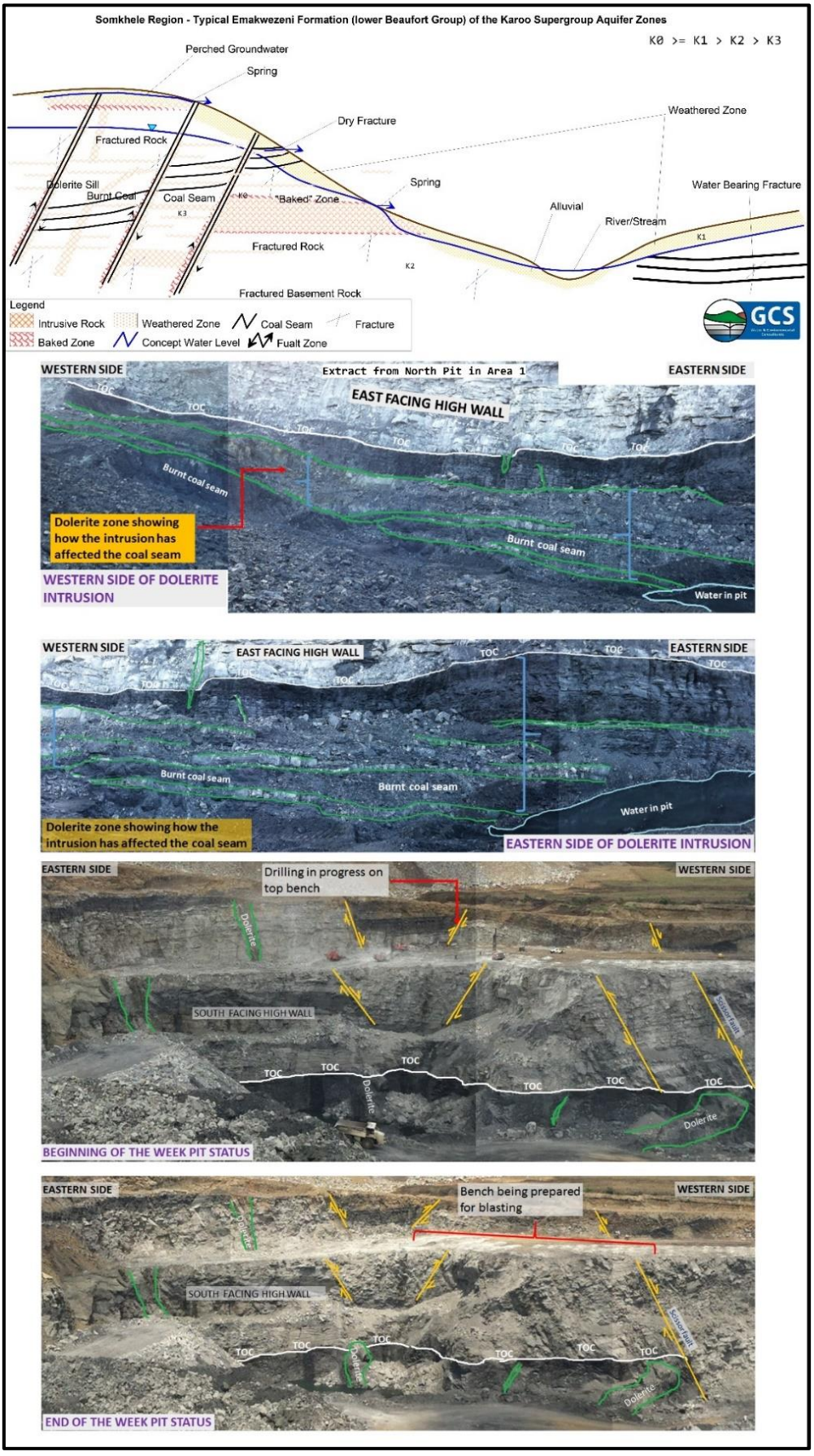


Figure 10-5: Conceptualisation of the aquifer zones

10.1.5.4. Aquifer Testing

Constant rate pump tests and slug tests have been performed on several boreholes situated in the study area. Available hydraulic conductivity data for the SAM area are listed in **Table 10-4**.

Table 10-4: Aquifer Test Results

BH	Test Type	T-value (m²/d)	BH Depth (m)	Predominate Geology	K 10m Aquifer Zone (m/d)
GC-BH1	CRT	0.17	50.00	Dolerite	0.017
GC-BH3	CRT	0.24	50.00	Dolerite	0.024
SM8	CRT	0.25	40.00	Dolerite	0.025
SM9	CRT	2.70	40.00	Mudstone	0.270
SM6	CRT	4.00	60.00	Sandstone	0.400
SBH3	CRT	0.27	62.00	Sandstone	0.027
SBH5	CRT	3.92	80.00	Sandstone	0.392
GC-BH2	CRT	0.15	50.00	Sandstone	0.015
SM1	CRT	0.25	60.00	Sandstone and Shale	0.025
SM4	CRT	0.70	60.00	Sandstone and Shale	0.070
SM7	CRT	0.10	60.00	Sandstone and Shale	0.010
SBH1	CRT	7.76	61.00	Sandstone and Shale	0.776
SBH2	CRT	0.65	41.00	Sandstone and Shale	0.065
SBH4	CRT	0.23	40.00	Sandstone and Shale	0.023
GWP011	CRT	0.35	56.73	Sandstone and Shale	0.035
GWP055	CRT	0.55	52.44	Sandstone and Shale	0.055
GWP028	CRT	9.17	19.21	Sandstone and Shale	0.917
GWP023	CRT	0.49	44.65	Sandstone and Shale	0.049
OPP013	CRT	0.46	32.00	Sandstone and Shale	0.046
OPP005	CRT	0.05	42.53	Sandstone and Shale	0.005
QNP016	CRT	1.51	23.47	Dolerite	0.151
SPX143	CRT	0.81	22.22	Sandstone and Shale	0.081
SM2	CRT	0.35	60.00	Shale	0.035
SM3	CRT	0.20	60.00	Shale	0.020
A9.BH2	CRT	0.19	60.00	Sandstone and Shale	0.019
A9.BH3	CRT	0.23	60.00	Sandstone and Shale	0.023
SMS008	CRT	2.80	50.00	Sandstone and Shale	0.280

BH	Test Type	T-value (m²/d)	BH Depth (m)	Predominate Geology	K 10m Aquifer Zone (m/d)
MMP036	CRT	1.70	50.00	Sandstone and Shale	0.170
MMP28	CRT	1.32	50.00	Sandstone and Shale	0.132
SWX3	CRT	0.28	80.00	Shale	0.028
SWX4	CRT	0.87	44.00	Dolerite	0.087
A9.BH5	CRT	0.97	37.00	Dolerite	0.097
A9.BH8	CRT	1.28	38.00	Mudstone, Shale, and Dolerite	0.128
A9.BH9	CRT	2.88	38.00	Shale	0.288
SBH6a	Slug Test	0.31	56.00	Sandstone and Coal	0.031
SBH8C	Slug Test	0.61	55.00	Sandstone	0.061
A9.BH6	Slug Test	0.91	85.00	Dolerite and Shale	0.091
A9.BH7	Slug Test	1.37	80.00	Shale	0.137
Min		0.05			0.01
Max		9.17			0.92
Avg		1.35			0.13

The aquifer has small T-values (ranging from 0.1 to 9 m²/day, geometric average of 0.5 m²/day). Hence, groundwater flow throughout the saturated aquifer zones is slow. It is noted that T-values are greater along highly weathered dolerite dykes and subsequent contact zones.

10.1.5.5. Groundwater levels

Several groundwater levels have previously been recorded at hydrocensus boreholes identified in the area (GCS, 2014; GCS, 2018) and more recently as part of this study (2023 and 2024). The groundwater levels observed are summarised as follows:

- Mahujini: ranges from 10 to 26 mbgl.
- Emalahleni: ranges from 11 to 32 mbgl; and
- Ophondweni: ranges from 17 to 25 mbgl.

Figure 10-6 plots the groundwater elevation vs. topographic elevation for hydrocensus boreholes situated within the Emalahleni, Ophondweni and Mahujini areas. A good linear relationship (R ≈0.87) between topographic and groundwater elevations is observed.

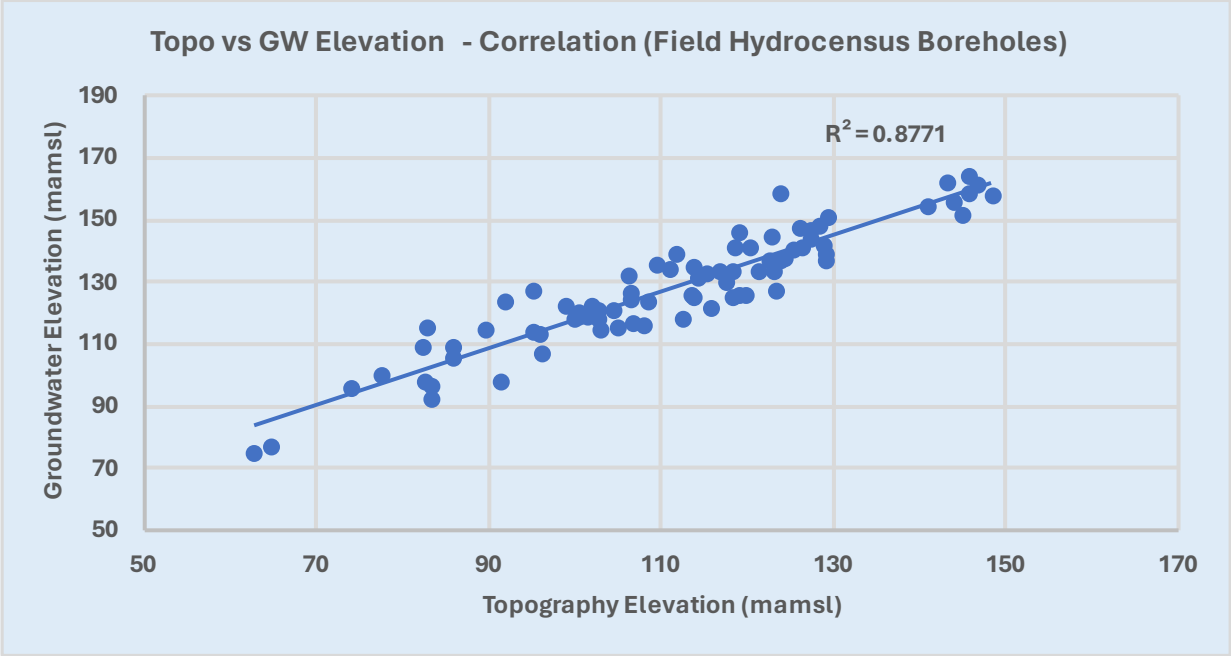


Figure 10-6: Emalahleni – Groundwater elevation vs. topographic elevation

10.1.5.6. Groundwater Flow

The calculation of the groundwater flow rate is important when determining the rate at which a pollutant will migrate in an aquifer. The average flow velocity can be calculated, using Darcy's Flow Velocity equation, as given below in Equation 1.

$$v = \frac{Ki}{\theta} \quad \text{.....Equation 1}$$

Where: *v=flow velocity*

K=hydraulic conductivity

θ=porosity (a standard porosity of 20% for sandstones will be used)

i =probable average hydraulic gradient (Equation 2)

$$i = \frac{h1-h2}{l} \quad \text{..... Equation 2}$$

The hydraulic gradient is calculated in **Table 10-5**. **Table 10-6** shows the results of the flow velocity equation, which indicates that groundwater will flow through the weathered aquifer at an approximate average rate of 0.0105 m/day or 3.81 m/year. This flow rate is considered slow. However, the flow rate will increase in areas adjacent to dykes, which act as preferential pathways. A porosity of 25% was applied, based on the typical porosity for shale and sandstone from literature (Freeze and Cherry, 1979).

Table 10-5: Hydraulic gradient calculation - Emalahleni

Parm	Ema BH2 to Ema BH1
h1 (mamsl)	106.923
h2 (mamsl)	68.067
h1-h2 (m)	38.856

Parm	Ema BH2 to Ema BH1
L (m)	966
i	0.040
K (m/day)	0.113
n	0.2

Table 10-6: Flow velocity calculation - Emalahleni

Parm	Ema BH2 to Ema BH1
m/day	0.0227
m/year	8.2951

Table 10-7: Hydraulic gradient calculation - Ophondweni

Parm	Oph BH1 to Oph BH2	Oph BH1 to Oph BH3	Oph BH3 to Oph BH2
h1 (mamsl)	129.002	129.002	111.158
h2 (mamsl)	103.526	111.158	103.526
h1-h2 (m)	25.476	17.844	7.632
L (m)	247	516	476
I	0.103	0.035	0.016
K (m/day)	0.113	0.113	0.113
N	0.2	0.2	0.2

Table 10-8: Flow velocity calculation - Ophondweni

Parm	Oph BH1 to Oph BH2	Oph BH1 to Oph BH3	Oph BH3 to Oph BH2	Average
m/day	0.0583	0.0195	0.0091	0.0290
m/year	21.2704	7.1315	3.3065	3.2610

Table 10-9: Hydraulic gradient calculation - Mahujini

Parm	Mah-HBH2 to MAH-HBH1	MAH-HB1 to MAH-BH1
h1 (mamsl)	113.96	110.77
h2 (mamsl)	110.77	103.298
h1-h2 (m)	3.19	7.472
L (m)	1189	667
i	0.003	0.011
K (m/day)	0.113	0.113
n	0.2	0.2

Table 10-10: Flow velocity calculation - Mahujini

Parm	Mah-HBH2 to MAH-HBH1	MAH-HB1 to MAH-BH1	Average
m/day	0.0015	0.0063	0.0039
m/year	0.5533	2.3102	3.2610

Groundwater flow generally follows the topographical characteristics of the area and local streams, and rivers act as groundwater boundaries for the shallow weathered aquifer. The site is bound by the Nyalazi River, which can be regarded as the local weathered aquifer's boundary for the immediate area.

10.1.5.7. Aquifer Classification

The weathered/fractured aquifer that underlies the site may be classified as a minor aquifer (Parsons, 1995) due to the general yields of less than 2.0 l/s. The Minor Aquifer System is defined as "fractured or potentially fractured rocks which do not have high primary permeability or other formations of variable permeability. Aquifer extent may be limited and water quality variables. Although these aquifers seldom produce large quantities of water, they are important both for local supplies and in supplying base flow to rivers."

10.1.5.8. Groundwater Quality

Thirteen (13) groundwater samples were obtained during the hydrocensus and drilling program. The sample results are summarised in **Table 10-11** and laboratory certificates are available in **Appendix D**. The sample results are compared to DWAF's (1996) Target Water Quality Values (TWQV) for potable water use to contextualise the results.

It is important to note that no mining has taken place in the area. Therefore, the water quality data obtained forms the baseline for the proposed mining areas and forms the Closure Water Quality Objectives (CWQO). The proposed CWQO are listed in Table 4-15 of the specialist geohydrological assessment. Fe, Al, pH and SO_4 will likely be used to track any pollution during the mining phase as the groundwater and surface water resources in the area have a high natural salt content.

The following is noted from the hydrochemistry data obtained:

- All samples are pH-neutral.
- The electrical conductance (EC) of all samples is high compared to DWAF TWQV.
    - As a result of the high EC, several dissolved salts are also observed to be high. Very high total dissolved solids (TDS) are noted.
    - Na is constantly high for all groundwater sites, followed by chloride at OPH BH3 and EMA BH3 compared to DWAF TWQV.
    - F is high for several boreholes, as well as Ca and Mg.
    - SO_4 is observed to be presented in the groundwater, at some boreholes the concentrations are > 150 mg/l and a very high concentration is observed at EMA BH1 above DWAF TWQV.

Table 10-11: List of hydrocencus boreholes

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2014	OP1-GW	-28.26210004	32.15974003	117.889			Community water supply
2014	OPP35(34)	-28.26614835	32.15312678	138.15	0.3	14.23	Exploration BH
2014	OPP005	-28.26517706	32.15413552	126.228	0.2	6.75	Exploration BH
2014	OPP002	-28.2630706	32.15610552	133.816	0.3	12.74	Exploration BH
2014	OPP013	-28.25980924	32.157907	116.396	0.26	8.7	Exploration BH
2014	SPX072	-28.24192357	32.15223926	146.155	0.4	27.58	Exploration BH
2014	GWP053	-28.22958462	32.16190771	105.92	0.32	20.31	Exploration BH
2014	GWP011	-28.2442591	32.15323998	141.456	0	15.08	Exploration BH
2014	GWP049	-28.23916186	32.15856671	144.305	0.32	17.4	Exploration BH
2014	GWPO55	-28.24253956	32.15342001	141.331	0	22.79	Exploration BH
2014	GWP023	-28.23591893	32.16132575	134	0.3	16	Exploration BH
2014	GWP028	-28.23044815	32.16276752	113.581	0.22	17.9	Exploration BH
2014	GW3-GW	-28.2232909	32.15923001	112.635	0.9		Community
2014	SMP32	-28.30823336	32.11474804	92.566	0.39	9.6	Exploration BH
2014	EMBH1/SMP1	-28.31702179	32.10577661	125.92	0.4	7.24	Exploration BH
2014	SPX1	-28.3093517	32.11343065	96.417	0.4	13.61	Exploration BH
2014	SMP058	-28.31194562	32.11529497	107.286	0.41	11.53	Exploration BH
2014	MEP0014	-28.2253007	32.14172	151.84	0.3	7.2	Exploration BH
2014	MEP0011	-28.22641945	32.13812003	158.935	0.3	13.44	Exploration BH

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2014	MEP-001	-28.22884045	32.13686001	162.069	0.44	19.22	Exploration BH
2014	SPX110	-28.22985074	32.13538996	159.099	0.33	35.66	Exploration BH
2014	MEP002	-28.22946914	32.13783001	164.389	0.19	18.78	Exploration BH
2014	CBH	-28.23245924	32.14197998	162.249	0.9		Community
2014	CBH-PUMP	-28.23513073	32.14022997	155.649	0.23		Community
2014	SPX119	-28.23838109	32.12562996	125.038	0.15	7	Exploration BH
2014	MEP020	-28.24250081	32.12617999	136.836	0.32	13.29	Exploration BH
2014	SPX125	-28.24323985	32.132	118.493	0.36	6.38	Exploration BH
2014	THD005	-28.25075914	32.12868999	126.233	0.25	13	Exploration BH
2014	SPX093	-28.25029117	32.12774999	121.973	0.58	6.81	Exploration BH
2014	THP008	-28.25321028	32.12215003	148.528	0.47	20.7	Exploration BH
2014	THP009	-28.25271011	32.12154003	151.171	0.3	22.21	Exploration BH
2014	SPX146	-28.25230076	32.12312995	139.044	0.24	10.25	Exploration BH
2014	SPX092	-28.2543096	32.12093997	158.213	0	9.82	Exploration BH
2014	THP044	-28.25478098	32.11945999	161.908	0.28	15.5	Exploration BH
2014	THP016	-28.25956043	32.11626002	156.243	0.26	12.58	Exploration BH
2014	THP0018	-28.25910006	32.11553003	154.563	0.27	14	Exploration BH
2014	MMP011	-28.27659059	32.07106998	142.291	0.24	13.82	exploration BH
2014	MMP025	-28.27914023	32.07078	131.937	0.32	26	exploration BH

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2014	MMP007	-28.27689008	32.07199	134.685	0	23.72	exploration BH
2014	MMP028	-28.27983906	32.07178002	121.325	0	17	exploration BH
2014	QNP016	-28.29737972	32.09663952	130.187	0.25	12.82	Exploration BH
2014	SPX143	-28.30527649	32.08931225	136.904	0.3	8.07	Exploration BH
2023	SOM-BH001	-28.291816	32.126794	79.053			The hand pump is dysfunctional
2023	SOM-SPX008	-28.297877	32.136239	75.151		12.41	This borehole has been intended for use by the community for water supply. The borehole has collapsed.
2023	SOM-HBH002	-28.30503	32.12399	118.283		15.68	The borehole is not equipped. The submersible pump previously installed in the borehole has been removed.
2023	SOM-HBH003	-28.309926	32.113813	98.157		6.85	Exploration BH
2023	SOM-HBH004	-28.31052	32.11004	108.97		26.61	Exploration BH
2023	SOM-HBH005	-28.316679	32.104839	122.786		20.76	The borehole is blocked.
2023	SOM-HBH006	-28.316327	32.104593	119.294		19	Exploration BH
2023	SOM-HBH007	-28.317997	32.105535	131.238			Blocked
2023	SOM-HBH008	-28.330728	32.104491	149			The hand pump is dysfunctional
2023	SOM-HBH009	-28.300261	32.123265	96.075		22.1	Exploration BH
2023	SOM-HBH010	-28.308836	32.112033	97.931		15.32	Exploration BH
2023	SOM-HBH011	-28.312691	32.111712	122.481		23.5	Exploration BH

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2019	MMP36	-28.27468	32.0752	113.842	0.21	18.92	Clear sample with no smell. Rusty collar. The borehole is not equipped and is unused. Slug tested.
2019	HCBH1	-28.27649	32.07217	135.889	0.32	26.63	Clear sample with no smell. Rusty collar. The borehole is not equipped and is unused.
2019	HCBH2	-28.28287	32.07341	115.677	0.76	11.38	No comment.
2019	HCBH3	-28.28488	32.06266	147.762	0	21.78	No comment.
2019	HCBH4	-28.27618	32.07129	140.534	0.31	15.57	No comment.
2019	HCBH5	-28.27242	32.0877	109.116	0.22	23.5	No comment.
2019	MMP28	-28.27942	32.07199	121.104	0.25	18.69	Water has a strong sulphur smell and suspends fine coal particles. Slug tested.
2019	SPX148	-28.32	32.10267	125.05	0.4	11.7	Clear sample with no smell. Rusty collar. The borehole is not equipped and is unused.
2019	SMS008	-28.31592	32.10477	119.593	0.29	18.32	A sample has a blackish colour with no smell. Slug tested.
2019	SPX138	-28.31604	32.10365	114.709	0.31	12.1	No comment.
2019	SMS009	-28.31511	32.10547	118.875	0.3	17.73	No comment.
2019	SPX142	-28.31553	32.1059	120.715	0.38	20.6	Clear sample with no smell. Rusty collar. The borehole is not equipped and is unused.

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2019	EMBH2	-28.31381	32.11156	127.115	0.32	32.34	Clear sample with no smell. Rusty collar. The borehole was not equipped and was unused.
2019	SMD044	-28.31292	32.11089	123.637	0.44	32.22	No comment.
2019	SMP077	-28.31122	32.11156	115.58	0.22	33.05	No comment.
2019	EMBH3	-28.30916	32.11242	100.442	0.38	23.24	No comment.
2019	SPX86	-28.29745	32.13643	76.931	0.57	12.91	No comment.
2019	OPBH1	-28.26793	32.15159	137.223	0.21	14.84	No comment.
2019	OPP21	-28.25301	32.16602	114.837	0.19	25.42	No comment.
2019	OPBH2	-28.26215	32.15977	117.797			Hand pump
2019	SP002	-28.26266	32.15631	131.365	0.31	17.37	No comment.
2019	SP001	-28.26337	32.15678	133.362	0.23	16.72	No comment.
2019	SPX071	-28.24736	32.14846	138.991	0.32	27.58	No comment.
2019	GWP053	-28.23977	32.15523	145.005	0.35	22.59	No comment.
2019	GWP070	-28.23951	32.15476	141.556	0.38	21.54	No comment.
2019	GWP023	-28.2355	32.16156	133.152	0.3	18.1	No comment.
2019	GWP049	-28.23873	32.15878	146.891	0.39	20.07	No comment.
2019	OPP010	-28.27161	32.14958	135	0.27	21.45	Good borehole yield and great-tasting water
2024	OP- HC 01	-28.26194	32.154878	126.448	0.4	20.53	Exploration BH
2024	OP- HC 02	-28.262532	32.154191	124.774	0.26	18.5	Exploration BH

Date	ID	Latitude	Longitude	Z (mamsl)	Collar (m)	WL (mbgl)	Comment
2024	OP- HC 03	-28.263627	32.153487	117.181	0.17	10.59	Exploration BH
2024	OP- HC 04	-28.264435	32.153085	123.776	0.2	15.44	Exploration BH
2024	OP- HC 05	-28.265246	32.154405	127.666	0.37	4.67	Exploration BH
2024	OP- HC 06	-28.263069	32.156109	133.782	0.29	11	Exploration BH
2024	OP- HC 07	-28.261196	32.15511	118.122	0.31	18.56	Exploration BH

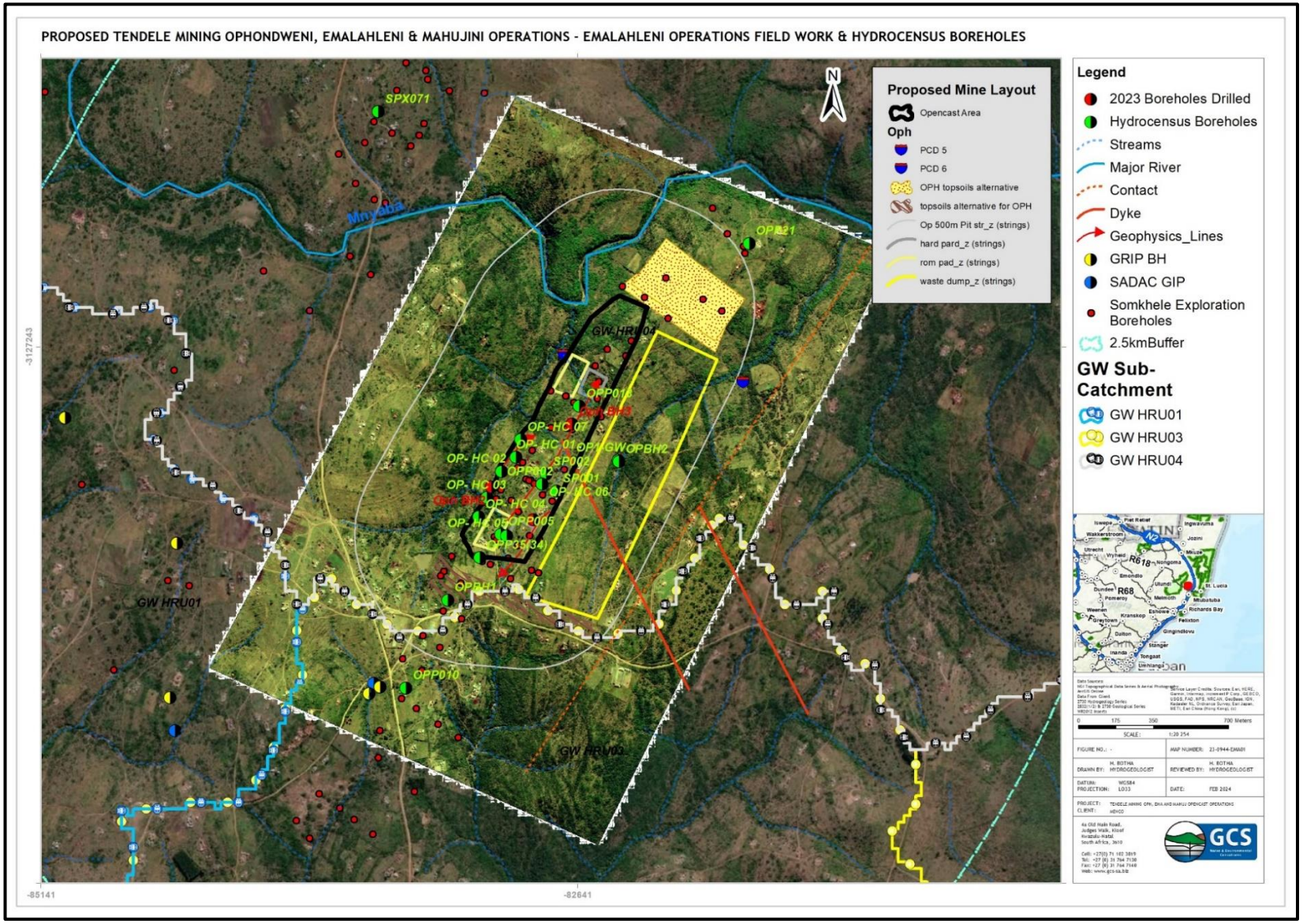


Figure 10-7: Hydrocencus boreholes identified at Emalahleni

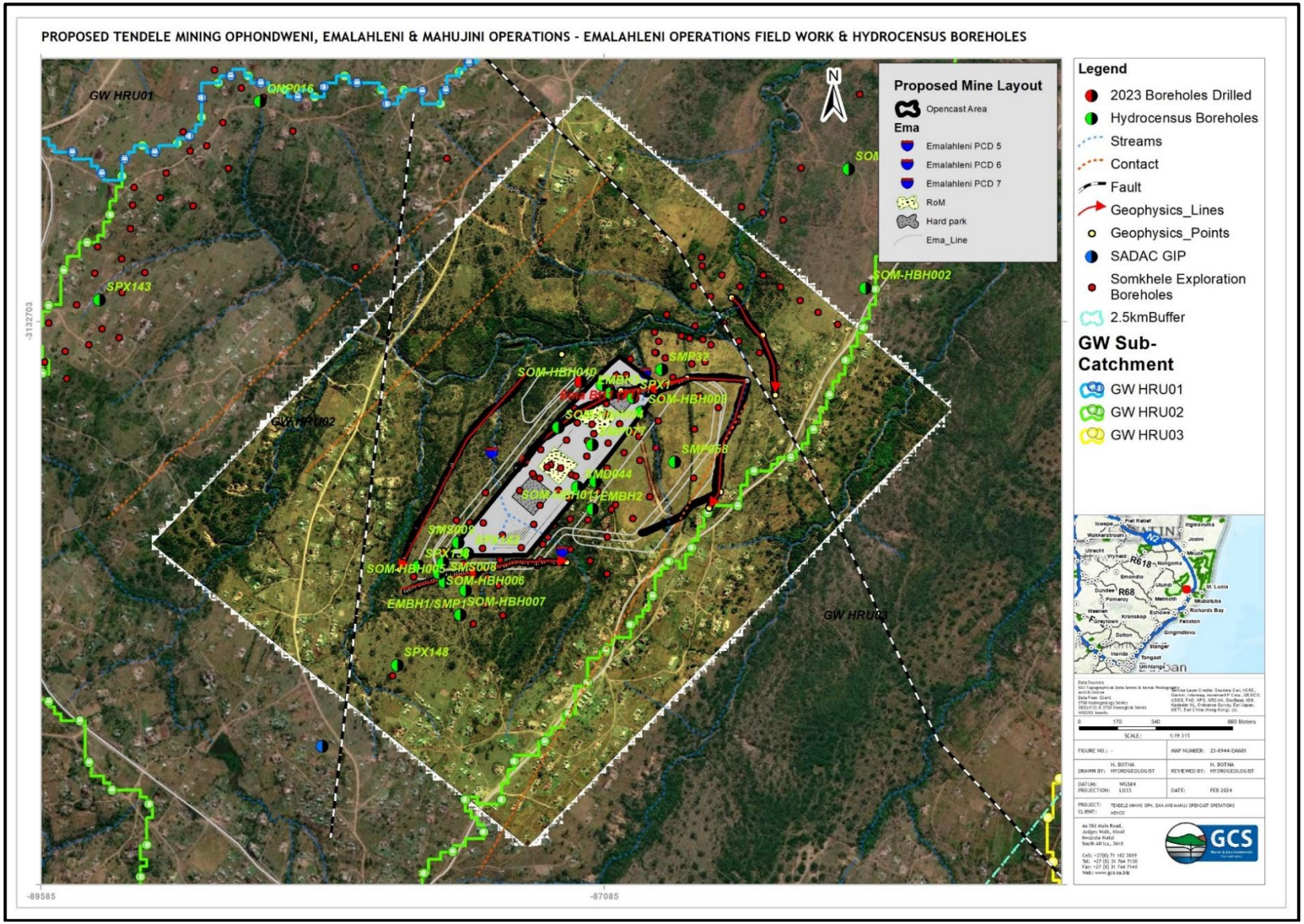


Figure 10-8: Hydrocencus boreholes identified at Ophondweni

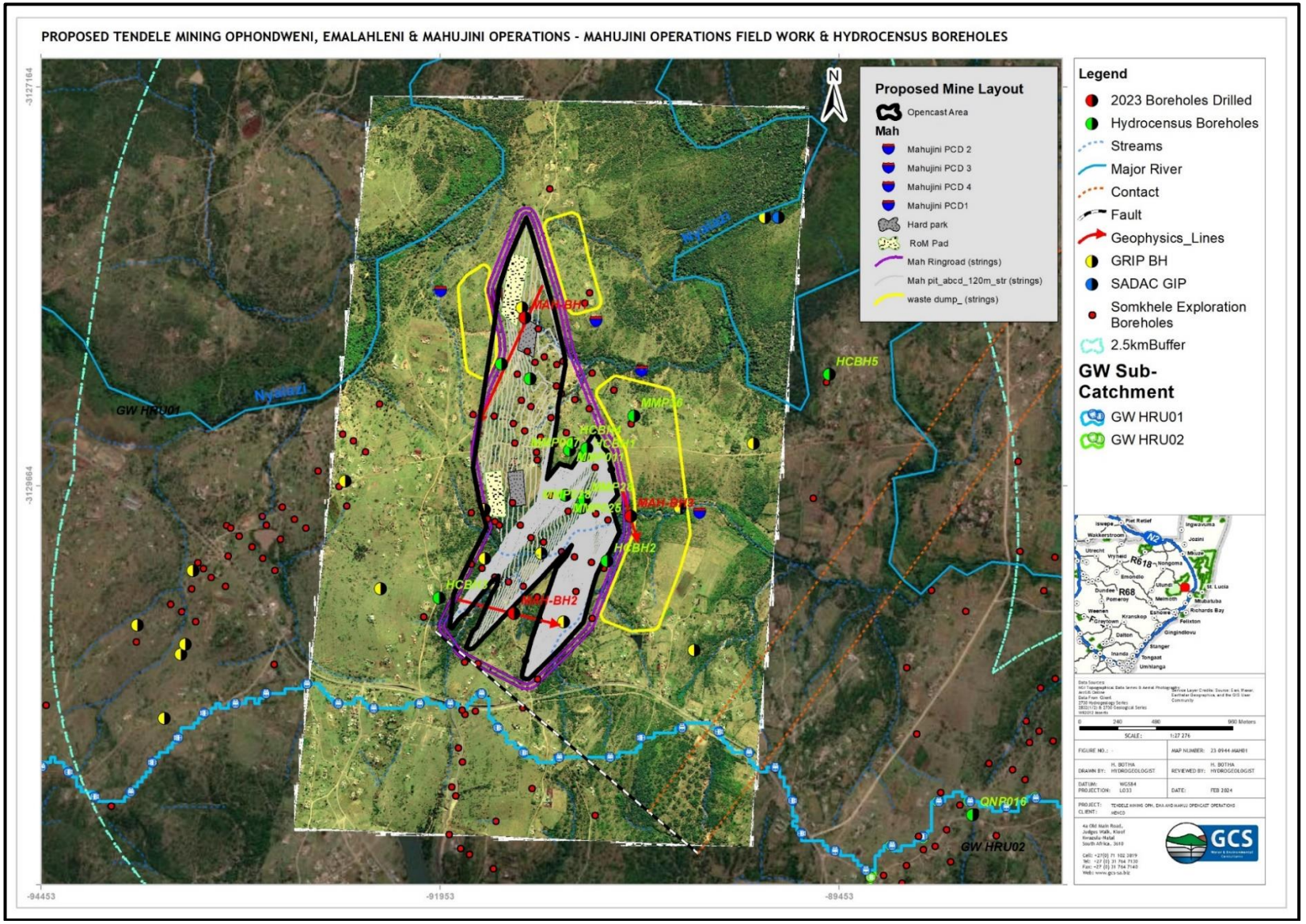


Figure 10-9: Hydrocencus boreholes identified at Mahujini

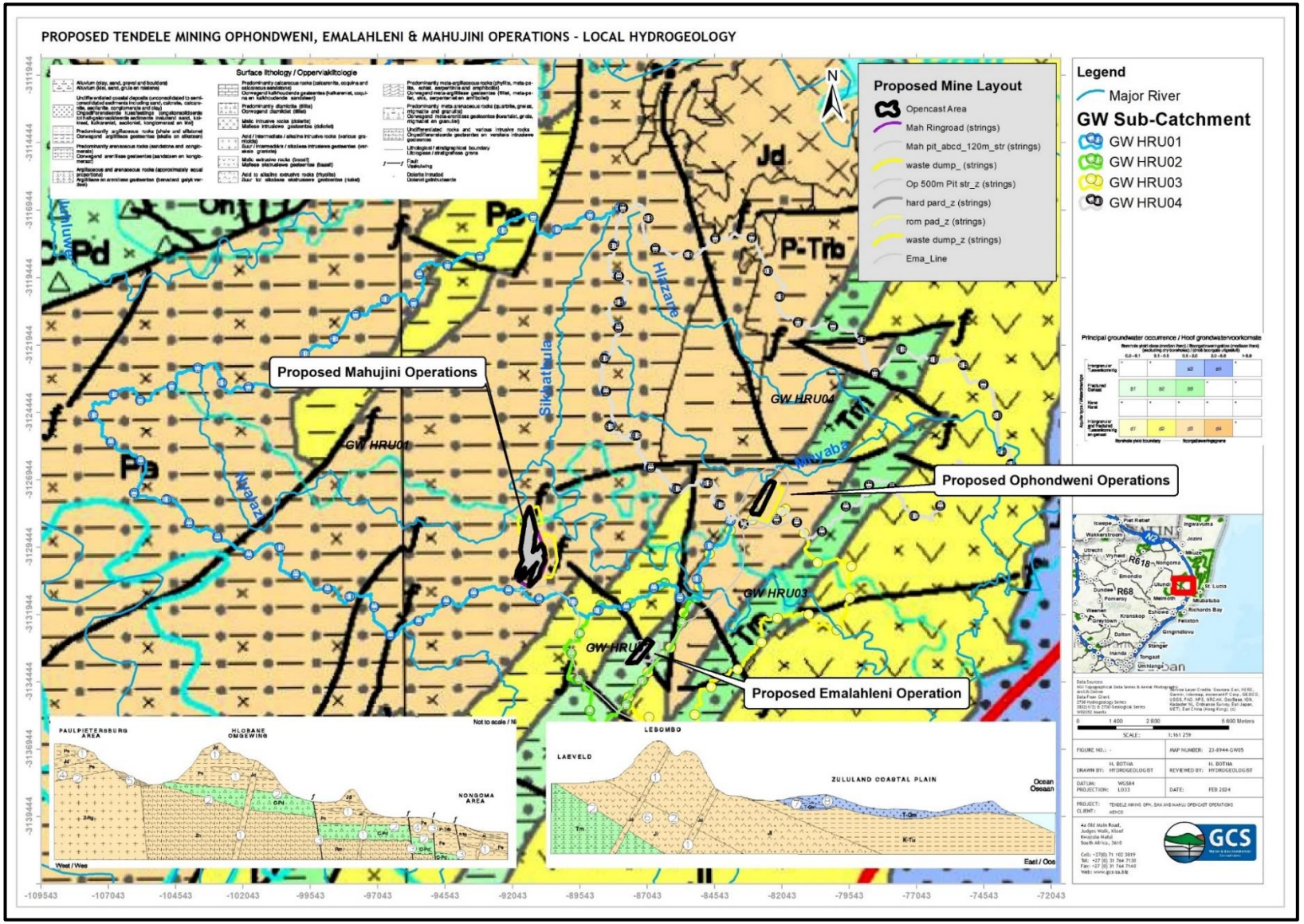


Figure 10-10: Local hydrogeological setting

Table 10-12: Summary of groundwater quality data 2024

Constituent	Unit	SOMKHELE: OPH -BH1 07/12/2023	SOMKHELE: OPH -BH2 07/12/2024	SOMKHELE: OPH -BH3 07/12/2025	SOMKHELE: OPH -HC07 07/12/2026	SOM SPX008	SOM-HBH003	SOM-HBH004	SOM-HBH002	SOM-HBH005	SOM-HBH011	SOMKHELE : EMA - T1 07/12/2027	SOMKHELE: EMA - T2 07/12/2028	SOMKHELE: EMA - T3 07/12/2029	DWAF 1996 Domestic Use - TWQR
pH in water at 25°C	-	7.4	6.8	6.8	6.8	6.7	6.6	6	6.9	6.3	6.8	6.9	6.8	6.9	4 - 9
Conductivity in mS/m @ 25°C	mS/m	193	252	895	218	434	650	814	176	986	330	308	1214	982	<70
TDS	mg/l	1376	1564	5194	1522	3176	4494	5640	1074	7968	1958	2110	8784	6250	<450
Suspended Solids	mg/l	438	638	412	96							194	808	196	
Bicarbonate Alkalinity as CaCO3	mg/l	469	571	629	433	173	746	502	676	662	708	589	317	610	ns
Total Alkalinity as CaCO3	mg/l	469	571	629	433	173	746	502	676	662	708	589	317	610	ns
Calcium	mg/l	17	24	126	44	87	125	123	55	567	90	27	228	154	<32
Magnesium	mg/l	21	30	190	47	49	152	156	52	431	89	29	265	216	<30
Potassium	mg/l	2	2.09	28	1.3	7.03	11.2	15	3.85	8.77	2.96	3.54	42	14.7	<50
Sodium	mg/l	262	309	1336	263	971	1405	2080	316	3456	630	532	1449	1058	<100
Chloride	mg/l	251	475	2892	369	1610	1986	2898	193	3665	765	210	592	3187	<100
Fluoride	mg/l	1.99	1.52	0.54	0.36	1.78	0.55	0.17	0.34	0.24	0.42	0.73	0.16	0.42	0 - 1
Nitrate	mg/l	<0.25	<0.25	<0.25	<0.25	<0.25	0.57	<0.25	<0.25	<0.25	0.67	<0.25	<0.25	<0.25	0 - 6
Sulphate	mg/l	36.5	14.3	67.4	59.2	2.5	83.3	17.7	34.6	161	48.5	695	197	93.7	<00
Aluminium	mg/l	<0.63	<0.63	<0.63	<0.63	0.041	0.045	0.139	0.028	0.039	0.062	<0.63	<0.63	<0.63	<0.15
Copper	mg/l	<0.17	<0.17	<0.17	<0.17							<0.17	<0.17	<0.17	<1
Iron	mg/l	<0.15	<0.15	<0.15	<0.15	0.0109	0.028	0.125	1.591	0.0101	0.0115	<0.15	<0.15	<0.15	<0.1
Manganese	mg/l	<0.17	<0.17	<0.17	<0.17	0.097	0.195	0.641	0.613	0.305	0.022	0.21	0.44	0.39	<0.05
Zinc	mg/l	<0.02	0.04	0.05	0.09							0.08	0.09	0.02	<3
Ammonia as N	mg/l	<1.5	<1.5	<1.5	<1.5							<1.5	<1.5	<1.5	<1
Sodium Adsorption Ratio (SAR)	Calculated	10.07	9.96	17.60	6.59	20.73	20.02	29.46	7.36	26.73	11.31	16.99	15.52	12.93	<8

ns = No Quality Range in Reference Guideline, Orange = Above DWAF (1996) Ideal Water Quality Ranges

10.1.6. Hydropedology

The hydropedological study was conducted by GCS (2024) and is included as **Appendix 7** of the EIA. The hydropedology report evaluates the risk and potential impacts on hydropedology flow drivers which may result from the proposed mining activities. Potential impacts on soils, specifically wetland soils and wetland flow drivers, were investigated. The hydropedology report will supplement the WUL amendment for the proposed activities.

The proposed opencast pits at Somkhele may infringe into wetlands as well as areas which are terrestrial in nature. It is thus required to determine the recharge mechanism of the wetland systems within and in close proximity to the proposed mining activity areas to ensure that impact on hydropedologically important areas is minimised.

The study area crosses a plinthic catena (iron and manganese concretion). Plinthic soils are characterised by an impermeable layer which impedes vertical flow of water and encourages lateral flow in the vadose zone. The dominance of seep wetlands within the focus area is indicative that hillslope processes are significant drivers of the systems within the focus area since seep wetlands recharge the valley bottom wetlands.

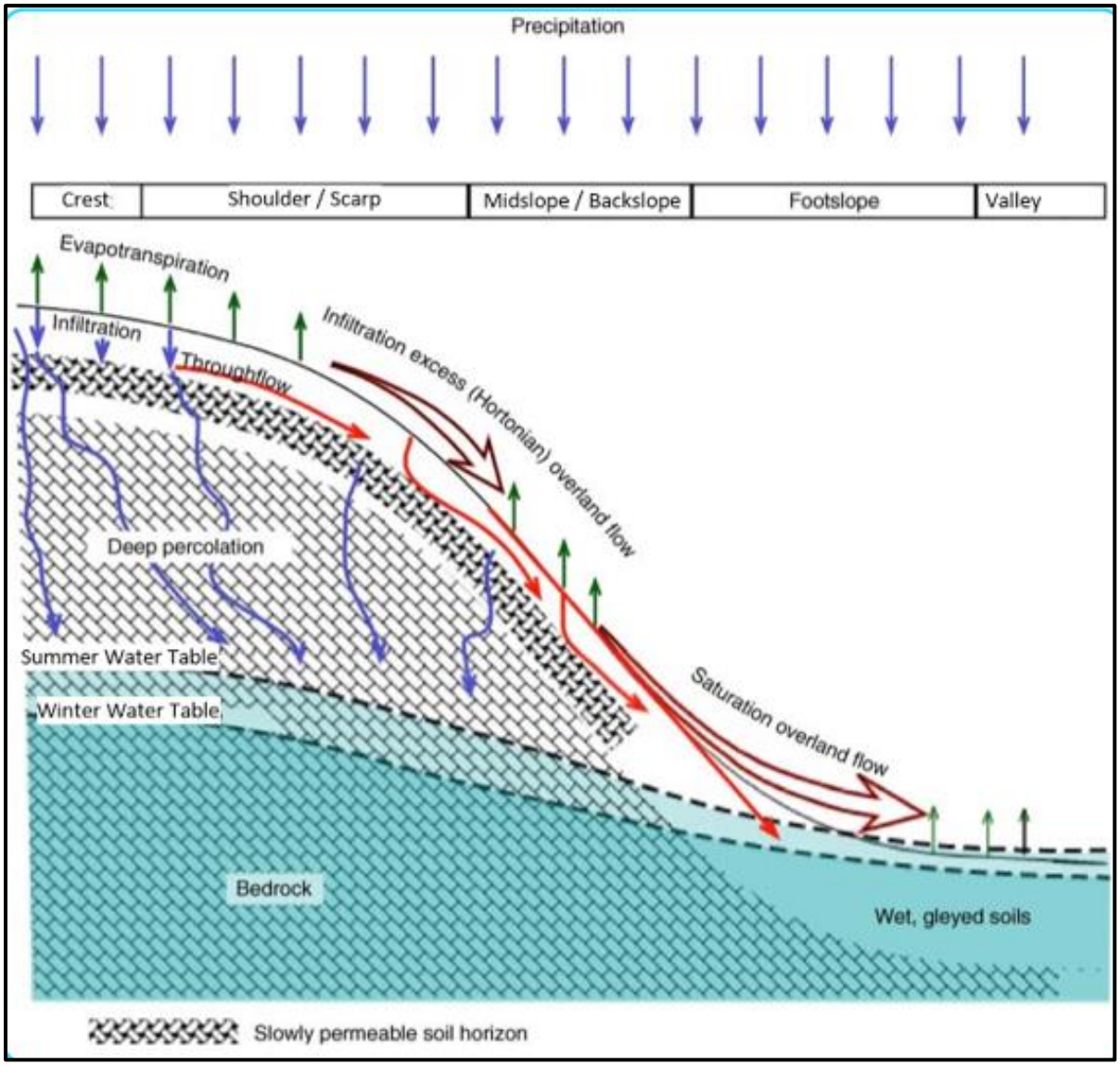


Figure 10-11: Land morphology concept

The open cast activities will impact on portions of some wetlands and their associated wetland drivers, leading to reduced ecostatus of some of the wetlands. The proposed project will have an impact of varying severity on the wetland systems associated with the focus area. Some portions of the wetlands will be excavated, and some wetlands will have impacts on hydropedological processes associated with edge effects of mining affecting them while other systems will largely remain unimpacted from a hydropedological point of view.

The hydropedological contribution of the wetland systems was calculated using simple hydrological principles in efforts to quantify the hydropedological percentage loss due to the proposed project both on a local and catchment scale (refer **Figure 10-11**). The results are presented below.

Four (4) sub-catchments (hydrological response units – HRUs) were delineated for the project area and described the natural drainage of the site. Drainage is via several non-perennial streams. Major rivers in the area include the Nyalazi River (flowing downstream of the Mahujini area) and the Mnyaba River (downstream of Ophondweni). No major rivers are associated with Emalahleni. The major rivers are seen as non-perennial as flowing water is rarely observed. The dominant land types for the sub-catchment are shown in Figure 2-2 (DFFE, 2021). The four (4) major sub-catchments were further dub-divided into several hydropedology HRUs using a 1:200 stream count and 30 m Advanced Land Observation Satellite (ALOS) Global Digital Surface Model (DSM).

Table 10-13: Sub-catchment characteristics

Sub-Catchment		GW HRU01	GW HRU02	GW HRU03	GW HRU04
Area (km²)		198.120	12.667	28.592	101.90
Longest Drainage Line (km)		35.60	3.47	7.5	10.06
Average Slope (%)		0.30%	0.45%	0.31	0.22%
Slope (%)	**< 3**	7.81%	11.77%	5.69%	5.61%
	3 - 10	39.09%	70.11%	40.04%	43.41%
	10 - 30	51.19%	17.75%	53.10%	47.82%
	> 30	1.91%	0.37%	1.17%	3.16%
Land Cover	**Thick bush & plantation**	43.26%	48.88%	59.64%	31.82%
	Light bush & farmlands	82.60%	55.58%	65.67%	81.32%
	Grasslands	0.91%	0.07%	2.17%	0.27%
	No Vegetation	1.05%	1.55%	0.46%	0.58%

A soil investigation took place in the proposed Emalahleni, Ophondweni and Mahujini areas. The soil survey revealed that the areas are typically associated with shallow soils (about 80% of the total area), the remainder being well-drained soils of variable depths (about 20%). The same soil types were encountered in all the mining areas and this is to be expected due to similar geological conditions.

Soil data were evaluated for the project area to produce a soil distribution map. The soil map was used to categorize the hydrological soil types (HST), into the following categories:

- Recharge;
- Stagnating;
- Responsive (shallow);

- Responsive (saturated);
- Interflow (A/B); and
- Interflow (soil/bedrock).

Several hydrological soil types (HST), as well as hillslopes, were identified for the proposed mining areas (refer **Figure 10-12**). The HSTs and hydropedology processes for the areas are summarised as follows:

Emalahleni:

- Three dominant soil flow paths were identified.
- The hillslope is characterised by recharge (shallow) soils (deep and shallow variants). Vertical flow through and out of the profile into the underlying bedrock is the dominant flow path. These soils are deep and freely drained and are experiencing the leaching of nutrients to underlying soil horizons. Recharge to the regional groundwater table is expected to occur via the saturated soils and will follow the hydraulic head associated with the regional water table.
- In several areas, shallow soils were identified. limited soil cover on hard rock will cause shallow (responsive) soil hydrological conditions. Hydromorphic properties signify the temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction. Vertical percolation (shallow or deep recharge) out of the soil profile into the underlying bedrock is expected.
- Due to the likely presence of fractures in the host rock, vertical percolation via these preferential flow paths in contact with the overlying soils may take place. These zones will act as groundwater recharge areas.

Ophondweni:

- Two dominant soil flow paths were identified.
- In a small area associated with the well-drained soils classified as the recharge (shallow) type were observed. Vertical flow through and out of the profile into the underlying bedrock is the dominant flow path. These soils are deep and freely drained and are experiencing the leaching of nutrients to underlying soil horizons. Recharge to the regional groundwater table is expected to occur via the saturated soils and will follow the hydraulic head associated with the regional water table.
- The bulk of the area is characterised by shallow soils and shallow bedrock occurrences. limited soil cover on hard rock will cause shallow (responsive) soil hydrological conditions. Hydromorphic properties signify the temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction. Vertical percolation (shallow or deep recharge) out of the soil profile into the underlying bedrock is expected.
- Due to the likely presence of fractures in the host rock, vertical percolation via these preferential flow paths in contact with the overlying soils may take place. These zones will act as groundwater recharge areas.

Mahujini:

- Three dominant soil flow paths were identified.
- In a small area associated with the well-drained soils classified as the recharge (shallow) type were observed. Vertical flow through and out of the profile into the underlying bedrock is the dominant flow path. These soils are deep and freely drained and are experiencing the leaching of nutrients to underlying soil horizons. Recharge to the regional groundwater table is expected to occur via the saturated soils and will follow the hydraulic head associated with the regional water table.

- The bulk of the area is characterised by shallow soils and shallow bedrock occurrences. limited soil cover on hard rock will cause shallow (responsive) soil hydrological conditions. Hydromorphic properties signify the temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction. Vertical percolation (shallow or deep recharge) out of the soil profile into the underlying bedrock is expected.
- In some areas on the hillslope, particularly in the crest and foot-slope positions (depending on where on the landscape and which hillslope – refer to below), shallow bedrock soils classified as interflow (A/rock or soil/bedrock) types exist.
- Hydromorphic properties signify the temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction.
- Due to the likely presence of fractures in the host rock, vertical percolation via these preferential flow paths in contact with the overlying soils may take place. These zones will act as groundwater recharge areas.

Several existing and likely future hydropedological impacts were identified and are discussed in Section 11. is observed that mining will severely impact several HRUs. The cumulative impact associated with each area is summarised as follows:

- Emalahleni – High pre-mitigation, and moderate post-mitigation.
    - The mine footprint is small in context to the hydropedology HRUs.
- Ophondweni – Very high pre-mitigation, and moderate post-mitigation.
    - Several HRUs will be altered due to the mine footprint.
- Mahujini – Very high pre-mitigation, and moderate post-mitigation.
    - Several HRUs will be altered due to the mine footprint.

The impact of mining on the hydropedology flow drivers can be managed by the implementation of stormwater diversion and attenuation systems. Moreover, it is predicted that introducing more potential interflow in un-impacted catchments has presented the opportunity to offset the negative impacts in other sub-catchments.

The resource management objectives (RMO) in terms of hydropedology will be to maintain or improve the current PES and EIS of the quaternary catchment (larger scale) and any river/wetland that may be present within the delineated hydropedology HRUs. This should be the target during the mining phase and closure phase. The severity of a sub-catchment scale can be improved by incorporating stormwater attenuation back into the environment. An attenuation infiltration/exfiltration trench was sized to offset existing and potential future hydropedological impacts. No dedicated hydropedology buffer areas are proposed, and the focus should be on the proposed mitigation measures. Several mitigation measures that need to be considered are available in Section 12.2.

Based on the findings of this assessment GCS believes that the proposed activities pose a moderate risk to the hydropedological environment, and impacts can be managed. It is further assumed that mitigation options to offset negative impacts as predicted by this study for Tendele Mining will be implemented into the EMPr during the operational and closure phases of the project. The approval of the activity should be considered to enable Tendele Mining to excavate the coal within MR10041 and to ensure that there are future jobs or the local communities as well as to add to the South African economy and export markets.

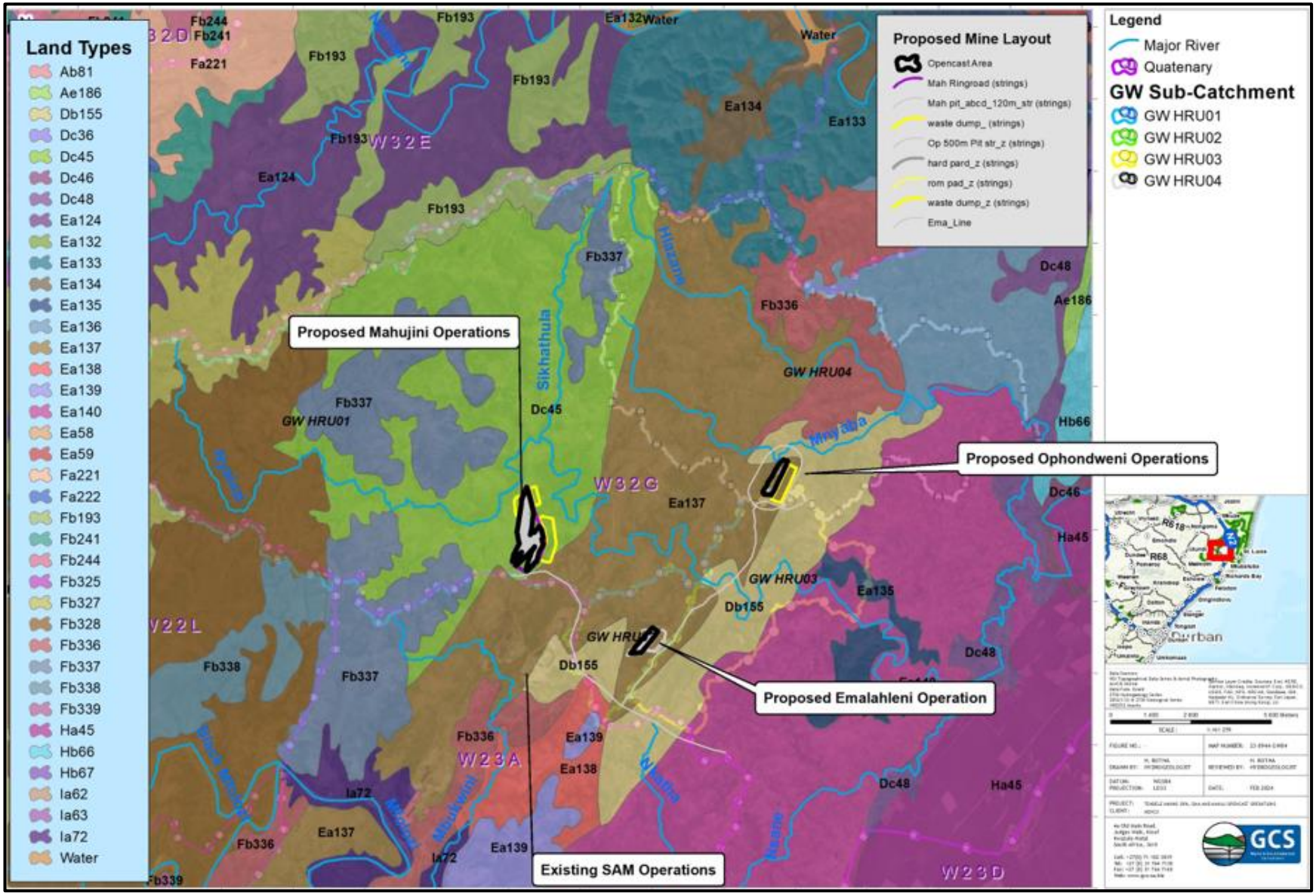


Figure 10-12: Soil types encountered within project area

10.1.7. Surface Water

The Surface Water Assessment undertaken during the EIA Phase is attached to this report as **Appendix 8**. The specialist study was undertaken by EcoPulse during 2024 and covers all areas of the Mining Right in relation to surface water, aquatic ecology as well as wetlands.

The proposed mining areas of Ophondweni, Emalahleni and Mahujini are located within quaternary catchments W32G and WMA 4 (Pongola to Mtamvuna) (refer **Figure 10-13**) and are drained by the Nyalazi River and the Mnyaba River. The Mahujini area borders the W23A quaternary catchment that is drained by the ephemeral flowing KwaLuhlanga River. The mining areas are drained by seasonally flowing rivers that has its confluence with the Mfolozi River. The project area is situated downstream of the confluence of the White and Black Mfolozi tributaries.

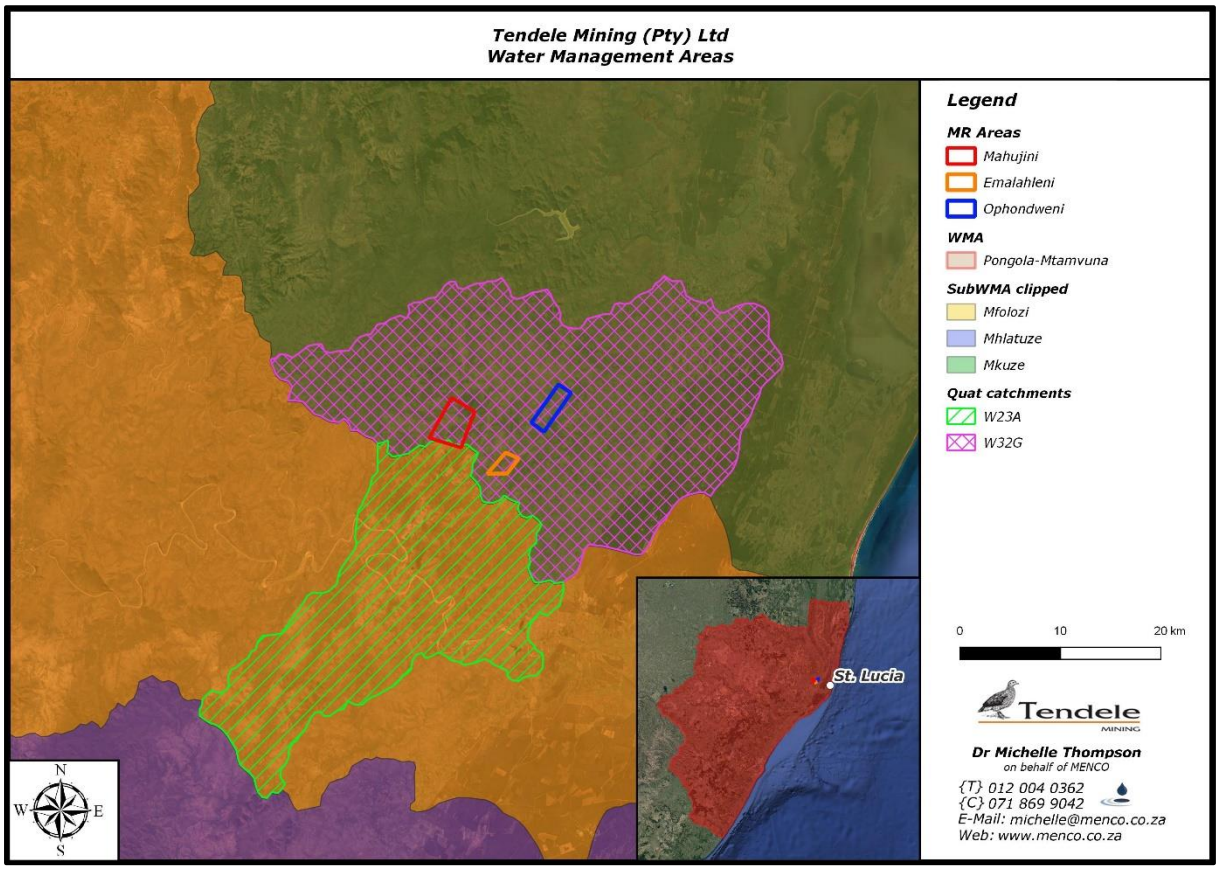


Figure 10-13: Mining areas in relation to quaternary catchments

10.1.7.1. Water Quality

The surface water quality within the project area for the period up to 2013 is indicated in **Table 10-14**. The water quality database has been updated with the latest water quality data presented in **Table 10-26** as part of the Eco-Pulse Study (2024).

Table 10-14: Background water quality data for Areas 4 and 5

Variable	Unit	SSW1	SSW2	SSW3	DWS: RQO
pH		7.1	8	8.1	6 – 9
EC	mS/m	93	62	165	<70

Variable	Unit	SSW1	SSW2	SSW3	DWS: RQO
TDS	mg/l	626	386	864	<450
Calcium	mg/l	35	36	40	<32
Magnesium	mg/l	26	28	43	<30
Sodium	mg/l	108	62	258	<100
Potassium	mg/l	17	12	3	<50
Acidity as $CaCO_3$	mg/l	16	<10	<10	-
T Alk	mg/l	166	237	391	-
Chloride	mg/l	154	51	254	<100
Sulphate	mg/l	25	9.1	51.6	<200
Nitrate as N	mg/l	0.16	0.01	0.09	<6
Fluoride	mg/l	1.5	0.71	0.54	<1
Aluminum	mg/l	0.08	0.006	0.007	<0.15
Iron	mg/l	0.21	0.05	0.02	<0.1
Manganese	mg/l	0.02	<0.02	<0.02	<0.05

If compared to the relevant Water Quality Standards as illustrated in **Table 10-15**, the surface water quality is within the acceptable range for livestock watering. The raw water sources sampled is not fit for potable use without treatment.

Table 10-15: Relevant Water Quality Standards

Variable	SANS 241:2015	SAWQG: Domestic	SAWQD: Livestock
pH	≥5 to ≤ 9.7	6 - 9	
Conductivity EC mS/m	≤170	≤70	
Total Dissolved Solids TDS mg/l	≤1200	0 – 450	0 - 2000
Calcium as Ca in mg/l	-	0 – 32	0 - 1000
Magnesium as Mg in mg/l	-	0 - 30	0 – 500
Sodium as Na in mg/l	≤200	0 – 100	0 2000
Potassium as K in mg/l	-	0 – 50	-
Chlorides as Cl in mg/l	≤300	0 – 100	0 - 1500
Sulphate as SO_4 in mg/l	≤250	0 – 200	0 - 1000
Nitrate as NO_3 in mg/l	-	0 - 6-	0 – 100
Fluoride as F in mg/l	-	0 – 1,0	0 – 2
Aluminum as Al in mg/l	-	0 – 0,15	0 – 5
Iron as Fe in mg/l	≤3	0 – 0,1	0 – 10
Free Saline Ammonia NH_4 mg/l	≤1,15	0 – 1,0	-
Total Hardness in mg/l	-	50 – 100	-
Turbidity	≤5	0 – 1	-
Ortho-phoshate as P in mg/l	-	-	-
Suspendid Solids as SS in mg/l	-	≤20	-
Total Alkalinity as $CaCO_3$ in mg/l	-	-	-

10.1.7.2. Stormwater

As part of the Water Use License Application process a Stormwater Management Plan (SWMP) was compiled by GCS (2019) in support of the Integrated Water and Waste Management Plan (IWWMP).

Clean and dirty water areas were mapped out for each mining area, based the mining infrastructure provided and the topography. The storm water sub-catchments are presented in **Figure 10-14** to **Figure 10-16** for each of the mining areas.

The pit, waste rock dump (WRD), ROM pad (within pit), hard park (within pit) and ring road was considered to be dirty areas for all mining areas. The hard park and ROM stockpiles were moved within the pit areas of Ophondweni, Emalahleni and Mahujini in order to reduce the dirty water footprint area of the mining operations. Alternatively, due to steep slopes that prevent heavy vehicle movement for the transport of the product, it could be moved next to the dump area.

Proposed channel drainage measures for each area include a set of lined channels (to capture and transport dirty water) and unlined earth channels (to capture and transport clean water) presented in **Figure 10-14** to **Figure 10-16**. It is proposed that runoff from all dirty water catchment areas be captured in a lined stormwater drain and stored in a HDPE lined PCD for reuse in the mine process and/or dust suppression. Runoff rain water from the clean water catchment is diverted away/around to ensure that this water does not mix with the dirty water areas. Where clean water runoff cannot be diverted, water is captured in clean storm water/attenuation structures.

The stormwater management measures at each of the pits are discussed below:

Ophondweni

- The pit itself is positioned on a watershed between two drainage lines. The problem however is that part of the ring road crosses a non-perineal stream and will have to be diverted around the pit and ring road. This diversion section will release the water into the drainage line downstream. This is a triggered section 21(c) and (i) water use covered in the WULA.
- The Waste Rock Dump (WRD) is positioned over a water course, hence the construction thereof should be from the south toward the north to limit the amount of dirty water as mining progresses. Two PCDs are required at this development one to the east of the pit to capture water from the WRD and one to the west of the pit used as storage for the dirty water from within the pit.
- It is proposed that the WRD, east of Ophondweni pit, be shaped as indicated in **Figure 10-14**. Due to topography runoff in a channel around the WRD would not be able to flow into the PCD without major cuts of more than 15 m. Reshaping of this WRD will reduce the cut required for channel construction.

Emalahleni

- Two drainage lines pass through the pit, both drainage lines are upstream of the pit and the proposed waste rock dumps (WRD). The design of the clean water system allows for clean water upstream of the infrastructure to be diverted around the infrastructure into the stream nearby.
- Three PCDs are proposed to manage the water from the dirty areas on both sides of the pit, one for each of the waste rock dumps and another for dirty water within the pit and a section of the WRD south of the pit.
- The pit and ring road are very close to drainage lines to the north of the pit, which is the lowest point in terms of the infrastructure. Dirty water from these areas

will have to be captured in a localised sump and pumped to the PCD or sloped to run into the pit from where it can be pumped to the PCD.

- Clean water from the topsoil stockpile area west of the pit will join the clean water diversion channel to the west of the pit and into the stream nearby.

Mahujini

- A drainage line, capturing water from three different delineated sub catchments, crosses to the south of the pit, which will cause clean water to run into the pit. Hence it is proposed that storm water retention/attenuation dam/s be constructed before the pit to prevent clean water mixing with dirty water.
- Four PCDs are proposed as the dirty areas are on both sides of the pit and on opposite sides of a non-perineal stream. Two will capture dirty water from the waste rock dumps on the eastern side of the pit, one on the north eastern side of the pit and one to capture dirty water from the WRD to the west of the pit.
- Due to the size of the mining development, it is also proposed that the pit be developed in phases to limit the size of the PCD's required. Phasing the development could also mean that PCD's and other water management infrastructure could be developed in phases.
- Stormwater dams are proposed to capture clean water catchments to the south and west of the pit as these catchments cannot be diverted around the pit. This water can be used within the mining process or pumped into the environment. Clean water catchments to the southeast of this pit cannot be diverted around the WRD. It is proposed that clean water be captured and stored in the existing earth dam (SW3), indicated in **Figure 10-16**, with a controlled spillway release.

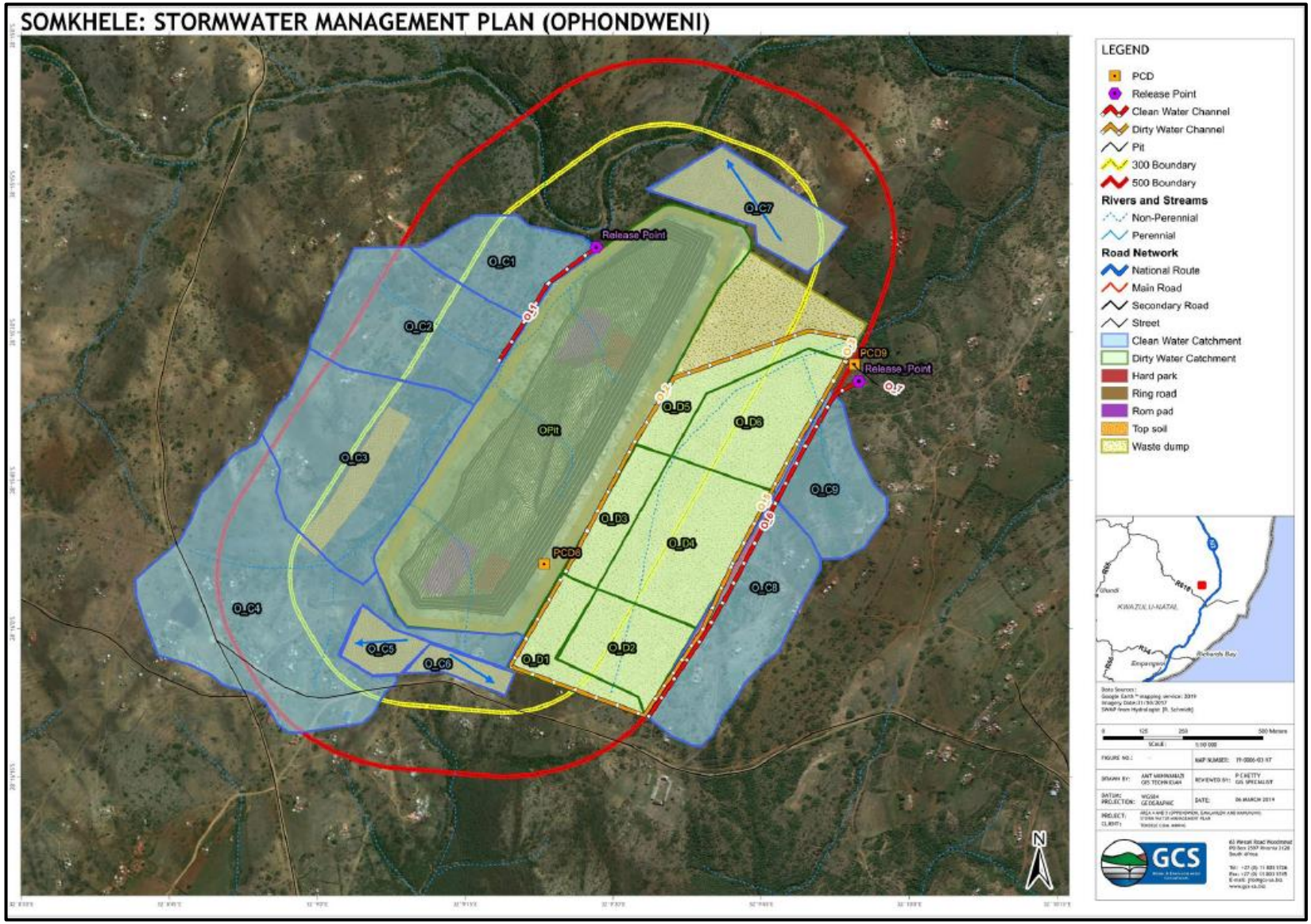


Figure 10-14: Stormwater management plan for Ophondweni

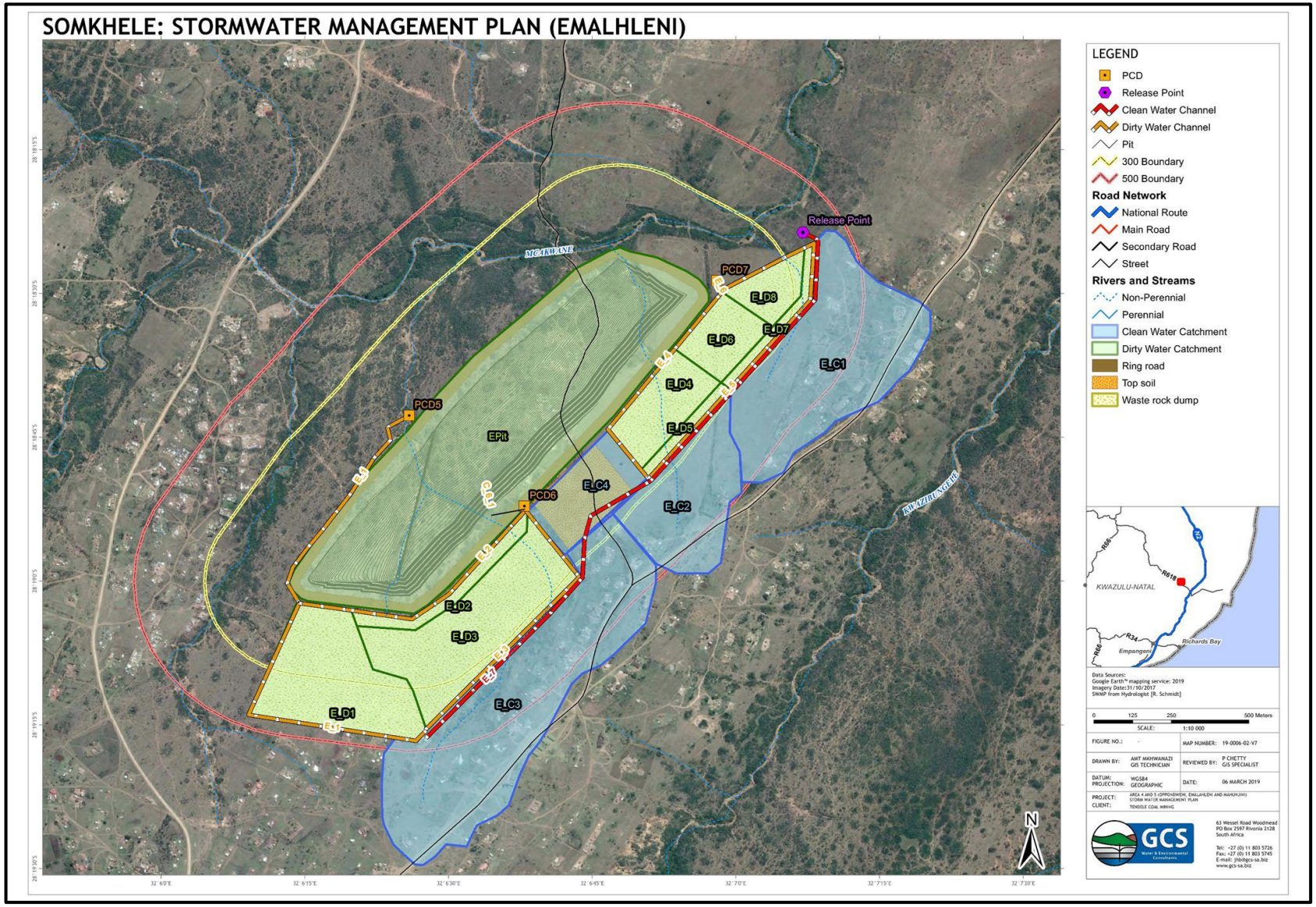


Figure 10-15: Stormwater management plan for Emalahleni

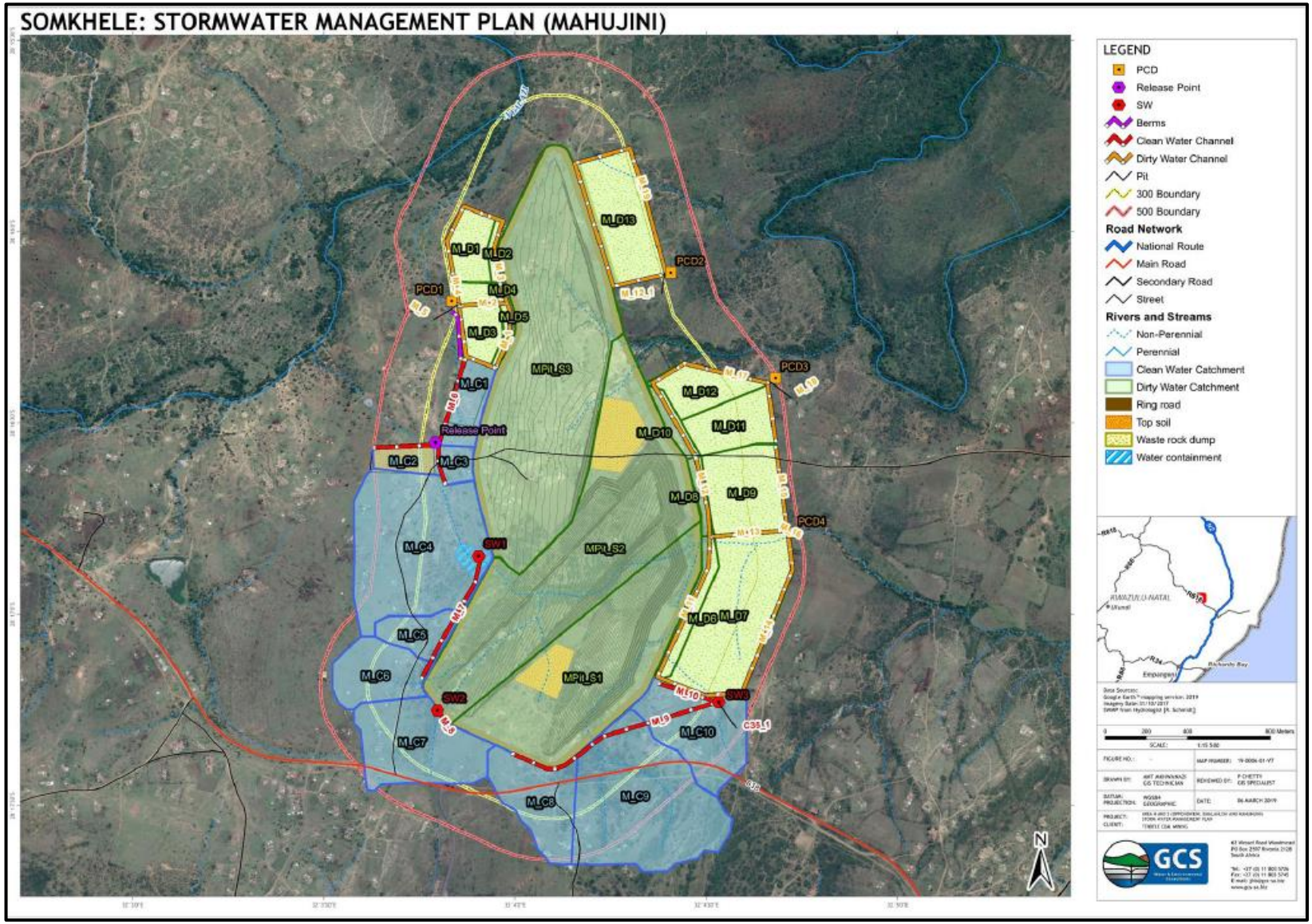


Figure 10-16: Stormwater management plan for Mahujini

10.1.8. Wetlands

A wetland delineation study (GCS, 2020) was conducted for the project area that has indicated that wetlands occur within the Ophondweni area. During the update of the EIA process Eco-Pulse (2024) was commissioned to conduct a wetland delineation study. The wetland study is included as **Appendix 8** of the EIA. Also refer to **Appendix 7** which deals with the hydropedology and the recharge of the wetland soils.

Three (3) HGM units were identified within the 500-meter protective buffer zone in relation to the mining right area (**Figure 10-17**).

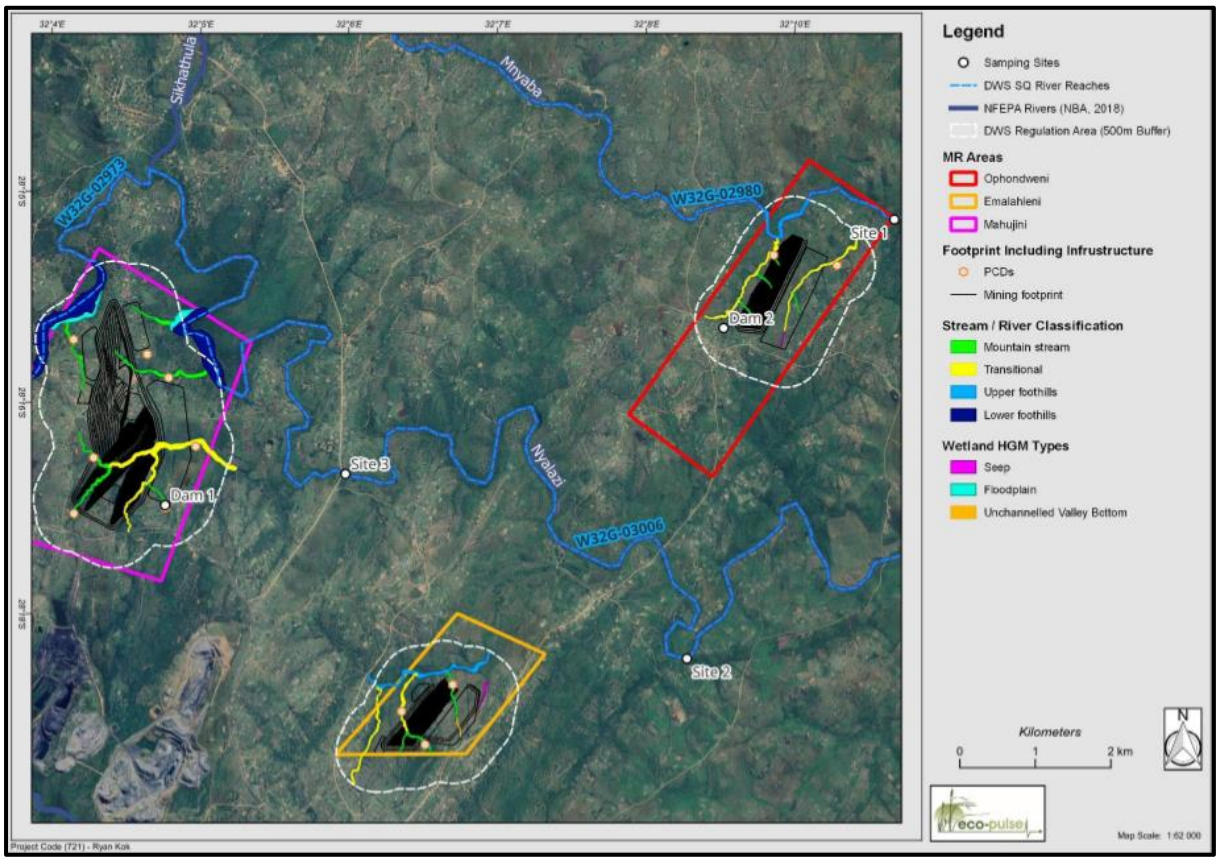


Figure 10-17: NFEPA Rivers and wetlands in relation to the project area

The identified wetland units (A, B and C) are temporary Channelled Valley Bottom Wetlands associated with a larger non-perennial stream dominated by disturbed, monotypic grassland dominated by *Sporobolus* species with isolated occurrences of *C. textillis* stands (refer **Figure 10-18**).

Table 10-16: Monitoring sites used by Eco-Pulse

Site name	Type	Latitude	Longitude
Site 1	Mnyaba River	28°15'12.20"S	32°10'24.77"E
Site 2	Nyalazi River	28°18'19.05"S	32° 8'43.78"E
Site 3	Nyalazi River	28°17'0.37"S	32° 5'58.33"E
Dam 1	Impoundment	28°17'14.48"S	32° 4'31.13"E
Dam 2	Impoundment	28°15'58.58"S	32° 9'1.49"E

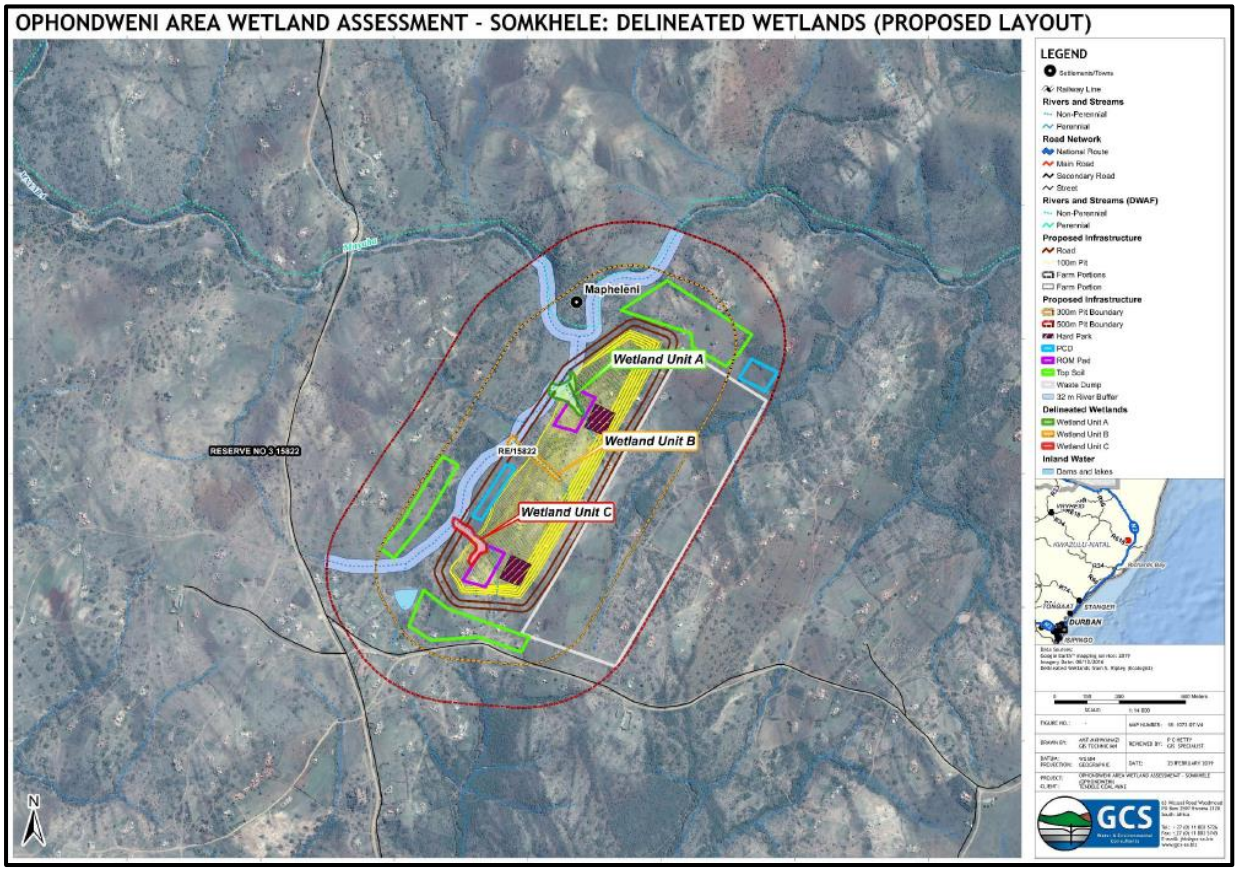


Figure 10-18: Delineated wetlands at Ophondweni in relation to mine layout

10.1.8.1. Vegetation Indicator

The study area forms part of the Savannah Bioregion. The type of vegetation that occurs within the Study Area is the Zululand Lowveld. During the assessment, the dominant vegetation species observed within the study area were recorded. Hydrophilic vegetation associated with frequently saturated soils is indicated in **Table 10-17**. The hydrophilic vegetation was used as wetland indicators to aid in the delineation process and are characterised as temporary, seasonal and permanent zone species.

Table 10-17: Dominant vegetation species associated with the wetlands

Temporary	Seasonal	Permanent
Bidens pilosa *Chloris gayana* *Helichrysum aureum* *Pennisetum purpureum* *Searsia lancea* *Setaria sphacelata* *Sporobolus pyramidalis*	*Bidens pilosa* *Chloris gayana* *Echinochloa pyramidalis* *Eragrostis inamoena* *Helichrysum aureum* *Pennisetum sphacelatum* *Schoenoplectus brachyceras* *Searsia lancea* *Setaria sphacelata* *Sporobolus pyramidalis*	*Andropogon eucomus* *Echinochloa pyramidalis* *Eragrostis inamoena* *Persicaria lapathifolia* *Potamogeton schweinfurthii* *Schoenoplectus brachyceras* *Sporobolus pyramidalis*

10.1.8.2. Present Ecological Status

The Present Ecological State (PES) for the HGM units was determined to be that of a Moderately Modified (C) for Wetland Unit A, B and C. The most significant impact was that of alien invasive plants within the wetland catchment and encroaching within the downstream drainage areas. All three HGM units had an overall intermediate level of service. Wetland Units A, B and C showed a Moderate (C) level of importance for the Ecological Integrity & Sensitivity and the Direct Human Benefits were rated as Marginally (D) important. The Hydrological Functional Importance was rated as Moderate (C) for Wetland Units A, B and C.

The results of the wetland delineation study are contained in **Table 10-18** below.

Table 10-18: Ophondweni wetland delineation results

Name	HGM Type	Size (ha)	PES	EIS	REC
Unit A	CVB	1,11	C	Moderate	C
Unit B	CVB	0,71	C	Moderate	C
Unit C	CVB	0,84	C	Moderate	C

10.1.9. Hydrology

The Hydrological Assessment (GCS, 2024) is included as **Appendix 9** of the EIA Report.

The hydrology study found that twelve (12) hydrological response units (HRUs) describe the natural drainage for the site (refer **Figure 10-19**). The delineated sub-catchments relate well to desktop-delineated drainage lines for the project area. The sites are situated in close proximity to the Nyalazi and Hlazane Rivers and non-perennial Sikhathula and Mnyaba Rivers from W32G. The sites are also in close proximity to the headwaters of the Nkatha River and the non-perennial Mbukwini River of quaternary catchment W23A. The Sikhathula is a tributary of the Nyalazi which confluences near the Mahujini MR area. The Nyalazi flows in a generally eastern direction. Where the Nsane River joins the Nyalazi, the general direction shifts to the north-eastern. The Mnyaba River is a tributary of the Hlazane River, which confluences with the Nyalazi River approximately 5 km north-east of the Nsane/Nyalazi confluence. The Nyalazi River continues after the Hlazane confluence and flows into Lake St. Lucia approximately 25.6 km downstream.

The Emalahleni Mining Right area(MR) is situated within the HRU10 sub-catchment. Drainage from the Emalahleni MR area is via numerous unnamed non-perennial drainage lines that flow towards the Mcakwane River which is also classified as a non-perennial drainage line. The Ophondweni MR area is situated on the watershed divide between HRU11 and HRU12. The majority of the operations are situated within HRU12. The southern topsoil stockpile falls partially within HRU11. Drainage from the south-western sections of the Ophondweni MR area will be via various unnamed non-perennial drainage lines that flow south towards the Nyalazi River approximately 1.3 km downstream in a direct line. Drainage from the north-eastern sections of the MR area will be via unnamed non-perennial drainage lines that flow north-east towards the Mnyaba River that flows through the MR area. The Mahujini MR area is situated across the watershed divide between HRU03 and HRU09. The western section of the Mahujini MR area drains via non-perennial drainage lines that flow north to north-west towards the Nyalazi River. The Nyalazi River also flows through the north-western and north-eastern sections of the Mahujini MR area. Drainage from the eastern section of the Mahujini MR area will be in a general eastern direction via various non-perennial drainage lines towards the Nyalazi River that flows through the MR area.

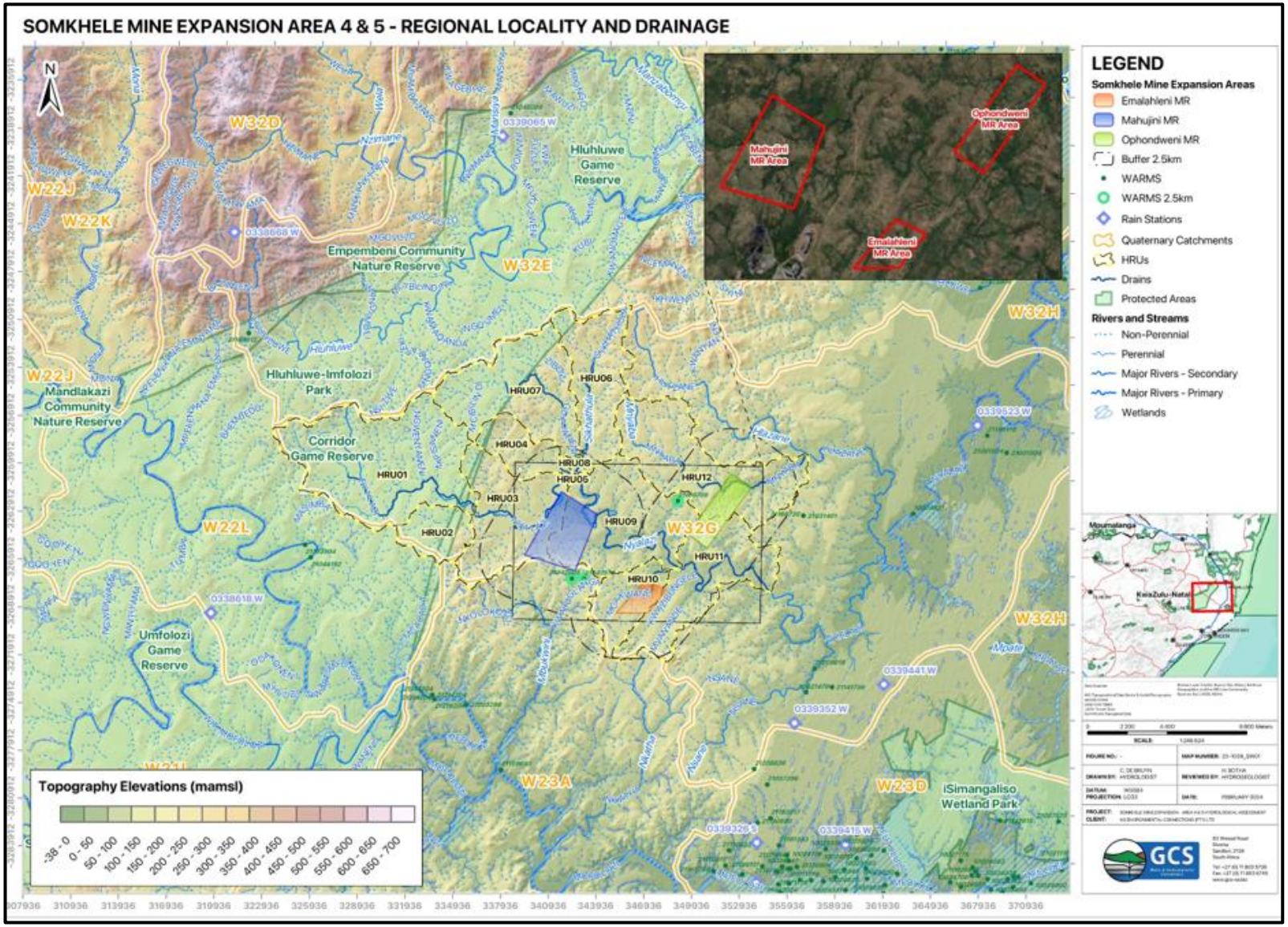


Figure 10-19: Regional locality and drainage

10.1.9.1. Emalahleni drainage

The Emalahleni MR area is situated within the HRU10 sub-catchment. Drainage from the Emalahleni MR area is via numerous unnamed non-perennial drainage lines that flow towards the Mcakwane River which is also classified as a non-perennial drainage line. The Mcakwane River flows underneath the D2289 to join the Nyalazi approximately 1.6km downstream in a direct line.

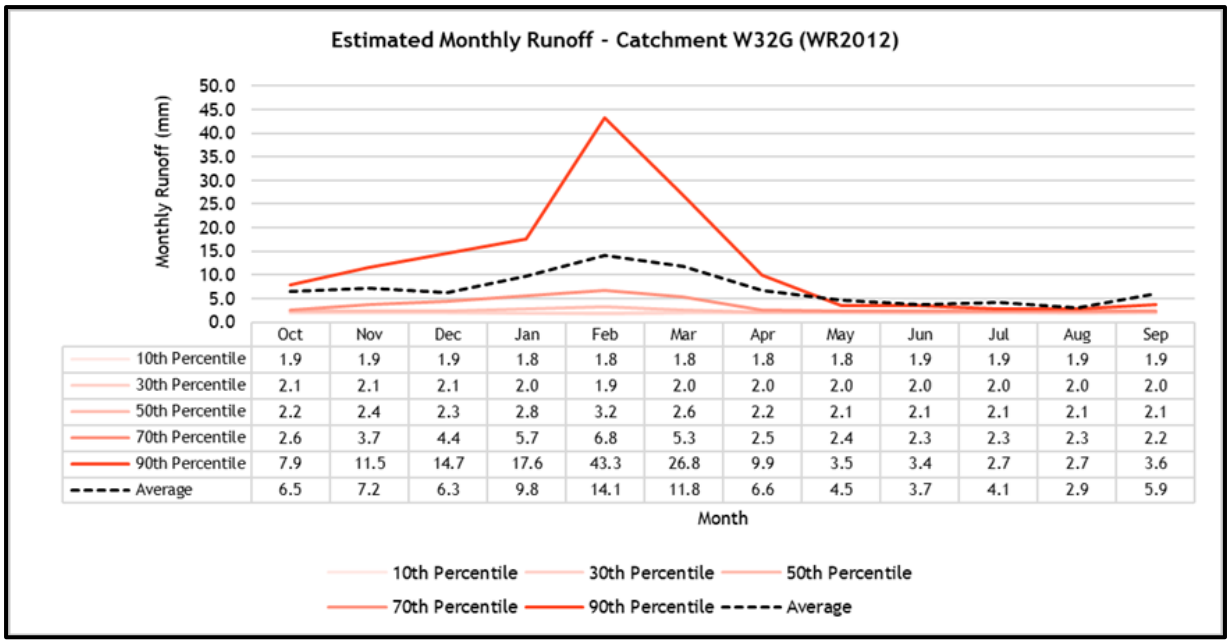
10.1.9.2. Ophondweni drainage

The Ophondweni MR area is situated on the watershed divide between HRU11 and HRU12. The majority of the operations are situated within HRU12. The southern topsoil stockpile falls partially within HRU11. Drainage from the south-western sections of the Ophondweni MR area will be via various unnamed non-perennial drainage lines that flow south towards the Nyalazi River approximately 1.3km downstream in a direct line. Drainage from the north-eastern sections of the MR area will be via unnamed non-perennial drainage lines that flow north-east towards the Mnyaba River that flows through the MR area.

10.1.9.3. Mahujini drainage

The Mahujini MR area is situated across the watershed divide between HRU03 and HRU09. The western section of the Mahujini MR area drains via non-perennial drainage lines that flow north to north-west towards the Nyalazi River. The Nyalazi River also flows through the north-western and north-eastern sections of the Mahujini MR area. Drainage from the eastern section of the Mahujini MR area will be in a general eastern direction via various non-perennial drainage lines towards the Nyalazi River that flows through the MR area.

10.1.9.4. Runoff



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
10th Percentile	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9
30th Percentile	2.1	2.1	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
50th Percentile	2.2	2.4	2.3	2.8	3.2	2.6	2.2	2.1	2.1	2.1	2.1	2.1
70th Percentile	2.6	3.7	4.4	5.7	6.8	5.3	2.5	2.4	2.3	2.3	2.3	2.2
90th Percentile	7.9	11.5	14.7	17.6	43.3	26.8	9.9	3.5	3.4	2.7	2.7	3.6
Average	6.5	7.2	6.3	9.8	14.1	11.8	6.6	4.5	3.7	4.1	2.9	5.9

Figure 10-20: Simulated natural (unmodified) average runoff for W32G

Runoff from natural (unmodified) catchments for quaternary catchment W32G is simulated in WR2012 (WRC, 2015) as being equivalent to 83.5 mm/a (or 9% of the MAP) as

illustrated in **Figure 10-20**Figure 10-20. This is approximately 54.06 Mm³/a normalised mean annual runoff (NMAR) for the surface area of quaternary catchment W32G.

10.1.9.5. Flood line assessment

Flood peak flow for the perennial and non-perennial stream portion associated with the sub-catchments was estimated with the Rational Method (RM3), Standard Design Flood (SDF) and Midgley & Pitman (MIPI) Method. **Table 10-19** provides a summary of the design rainfall data used to calculate peak flows, and time concentrations were calculated based on the sub-catchment size and parameters. The upper limit "U" was used to estimate worst-case peak flows.

Table 10-19: Summary of design rainfall data used for peak flow estimation

Duration	Return Period (years)						
	2	5	10	20	50	100	200
5 min	15.1	23.6	30.9	39.7	54.4	68.8	86.7
10 min	19.5	30.4	39.9	51.2	70.2	88.7	111.9
15 min	22.6	35.3	46.3	59.5	81.4	102.9	129.9
30 min	29.6	46.2	60.6	77.8	106.6	134.8	170
45 min	34.7	54.1	71	91.1	124.8	157.8	199
1 hr	38.8	60.5	79.4	101.9	139.6	176.4	222.6
1.5 hr	45.4	70.9	92.9	119.3	163.4	206.5	260.6
2 hr	50.8	79.2	103.9	133.4	182.7	231	291.4
4 hr	63.5	99	129.9	166.7	228.4	288.7	364.2
6 hr	72.3	112.8	148	190	260.2	328.9	415
8 hr	79.4	123.8	162.4	208.4	285.5	360.8	455.2
10 hr	85.3	133	174.5	223.9	306.8	387.7	489.1
12 hr	90.4	141.1	185	237.5	325.3	411.2	518.7
16 hr	99.2	154.7	203	260.5	356.9	451	569
20 hr	106.6	166.3	218.1	279.9	383.4	484.6	611.4
24 hr	113	176.3	231.3	296.8	406.6	513.9	648.4
1 day	98.9	154.2	202.3	259.7	355.7	449.5	567.2
2 days	118.6	185	242.6	311.4	426.6	539.1	680.2
3 days	131.9	205.7	269.8	346.3	474.4	599.6	756.5
4 days	139.5	217.5	285.3	366.2	501.7	634.1	800
5 days	145.6	227.2	298	382.5	523.9	662.2	835.4
6 days	150.9	235.3	308.7	396.2	542.8	686	865.5
7 days	155.5	242.5	318.1	408.3	559.3	706.9	891.8

The outcome of the flood line modelling based on the HEC-RAS 6.3.1 software is illustrated in **Figure 10-21** to **Figure 10-23**.

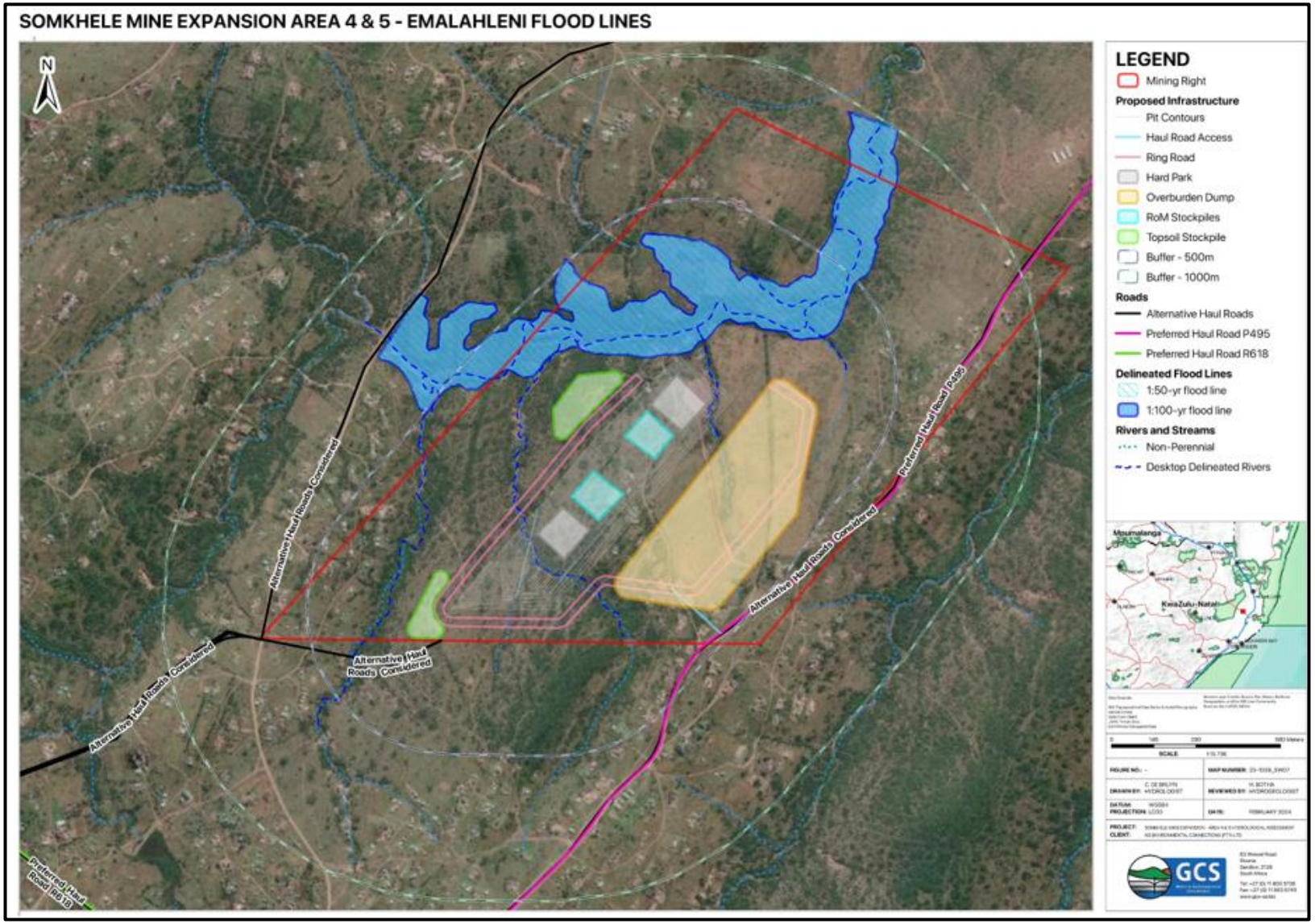


Figure 10-21: Simulated flood line for Emalahleni

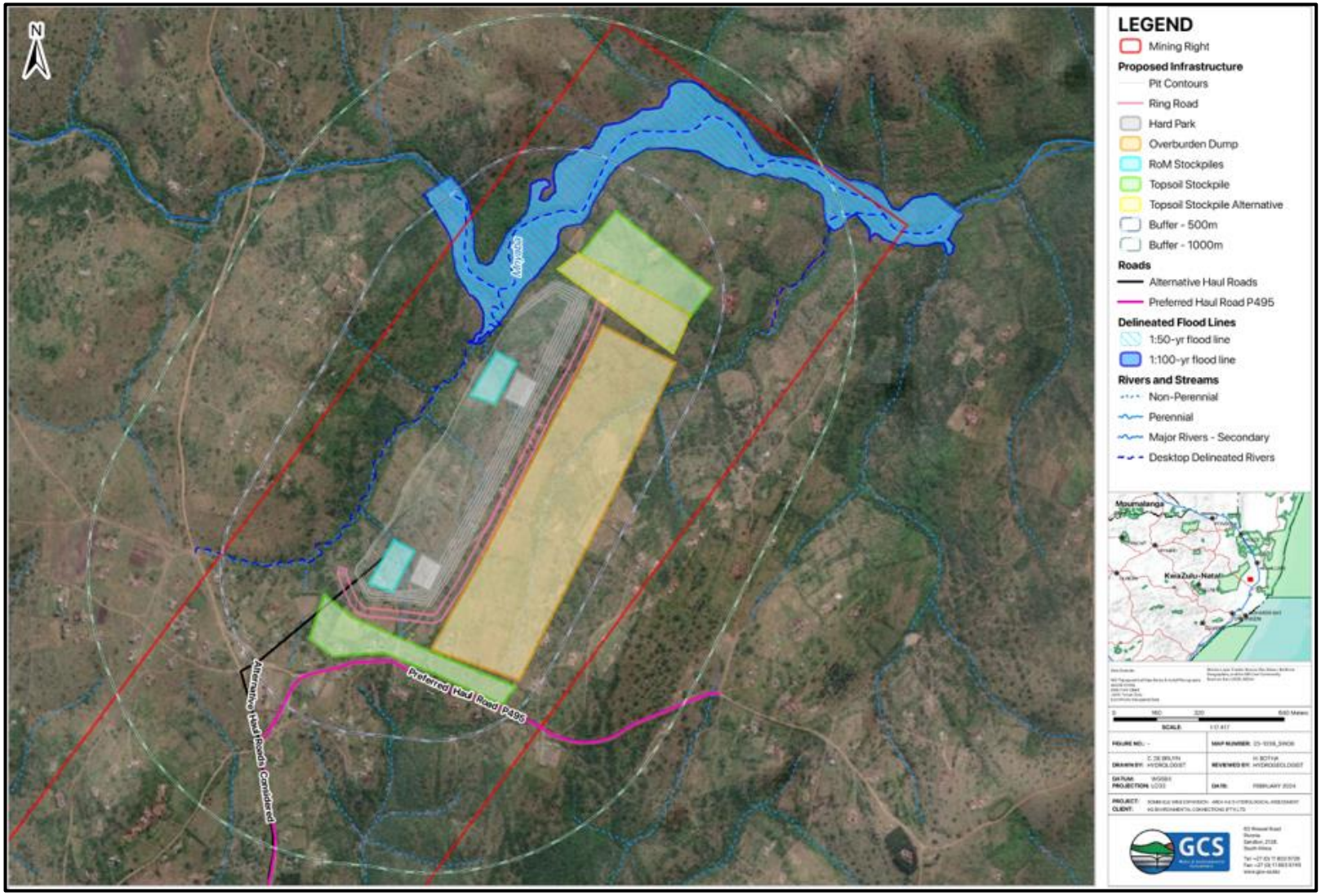


Figure 10-22: Simulated flood lines for Ophondweni

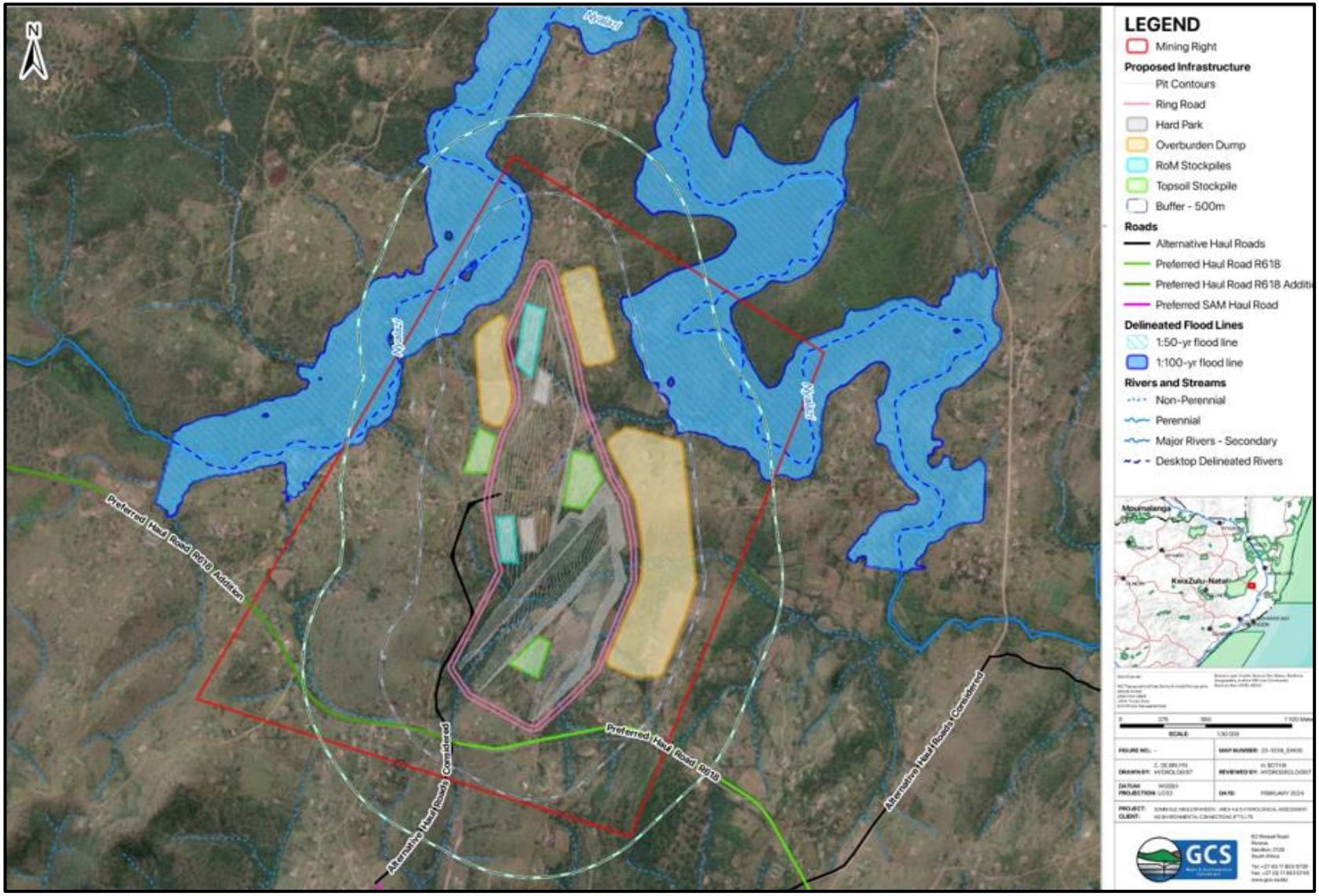


Figure 10-23: Simulated flood lines for Mahujini

10.1.10. Flora and Fauna

10.1.10.1. Flora

A vegetation Impact assessment Study for possible future mining areas at Emalahleni, Mahujini and Ophondweni was completed by David Styles Consulting (2019, 2024).

All of the proposed sites host much settlement of a historical nature and support large numbers of goats and some cattle. Parts of the sites were also evidently formerly settled or cultivated. Vegetation in these areas is degraded or secondary. There is only one vegetation type shown present on the sites in national vegetation mapping available from SANBI (2019) or revealed by surveying, namely Zululand Lowveld. This is a vulnerable type (Mucina & Rutherford 2006) and ecosystem (Government Gazette 34809, Government Notice 1002, 9 December 2011). There is a very small amount of riparian vegetation along seasonally dry drainage lines or small rivers.

Although little of the Zululand Lowveld vegetation on the sites is in very good condition, large numbers of protected species occur. These fall into two categories: firstly, National Forest Act protected trees, which include *Sideroxylon inerme* (White Milkwood), with sparse occurrences, and *Sclerocarya birrea* subsp. *caffra* (Marula) which is more common, particularly on the Mahujini site. Secondly there are a range of smaller herbaceous or succulent species protected by the KwaZulu-Natal provincial conservation ordinance. These include species in the plant families *Amaryllidaceae*, *Apocynaceae*, *Asphodelaceae*, *Passifloraceae*, *Hyacinthaceae* and *Iridaceae*. Some of these, such as *Aloe* species, are very abundant.

10.1.10.1.1. Alien Invasive Plants

In terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) declared weeds and alien invasive plants are categorised as follow:

- Category 1: Plants are prohibited and must be controlled;
- Category 2: These plants are used commercially and can be grown in demarcated areas, providing that there is a permit and steps are taken to prevent their spread;
- Category 3: These plants have been used ornamentally, but may no longer be planted.
- Existing plants may remain, as long as all reasonable steps are taken to prevent their spreading, except if they occur within the flood line of watercourses and wetlands (in which case they must also be removed).

The vegetation study revealed that alien plant invasions are evident on all sites but that Ophondweni is in particular more impacted. The main problem invasive species are *Chromolaena odorata* (Chromolaena), some *Lantana cam* (Lantana) and *Psidium guajava* (Guava).

10.1.10.1.2. SVI 23 Zululand Lowveld

Little of the Zululand Lowveld appears to be in completely natural condition. This is mainly because of a large goat population, together with grazing by cattle. Browsing and grazing ultimately does affect woody plant composition, as small examples of more palatable species are removed to a greater extent. This certainly alters the

herbaceous composition of the vegetation, as many of these species are particularly vulnerable to these impacts.

Only some of the vegetation is considered to be in good condition. Most can be described as being in fair condition, although towards the margins of the mapped extent it may be transitional with the Degraded Vegetation. The vegetation comprises for the most part low or shrubby thicket or a thicket-grassland mosaic. Species of *Diospyros, Euclea, Gymnosporia* and sometimes *Dichrostachys cinerea* remain the most common constituents.

The best examples of this Zululand Lowveld vegetation, where there is greater tree and herbaceous diversity, occurs close to river or drainage line banks, where inclines deter livestock to some extent, and where faster vegetation rates aid survival of other species. This greater diversity is represented by some of the following: *Acokanthera oppositifolia, Cussonia zuluensis, Gymnosporia maranguensis, Euclea divinorum, Hippobromus pauciflora, Mystroxylon aethiopicum* subsp*. schlechteri, Kraussia floribunda, Schotia brachypetala* and *Spirostachys africana*. The drainage lines and more importantly the rivers with which they intersect may contain some larger examples of *Vachellia robusta* or very rarely *Ficus sycomorus*. However, most of the species mentioned are shrubby rather than taller tree species and the woody plant growth lacks stature and is less than 6 m tall. *Aloe parvibracteata* is common in this vegetation.

10.1.10.1.3. Threatened and Rare Species

A comprehensive red list assessment has been undertaken for the flora of South Africa by the South African National Biodiversity Institute (Raimondo et al 2009). The red listing follows the classification of the International Union for the Conservation of Nature (IUCN) and includes some additional categories for species not in danger of extinction, but considered of conservation concern (see **Figure 10-24**, below). The IUCN equivalent of these categories is Least Concern (LC).

It is documented that few threatened species are associated with Zululand Lowveld vegetation (Styles, 2019). No rare or Red Listed plants were seen in the sites. However, as noted under Provisos, while the vegetation at Ophondweni, Emalahleni and Mahujinii was walked in a representative way, not every part of the thicket vegetation could be investigated and the vegetation was eviscerated as a result of low rainfall.

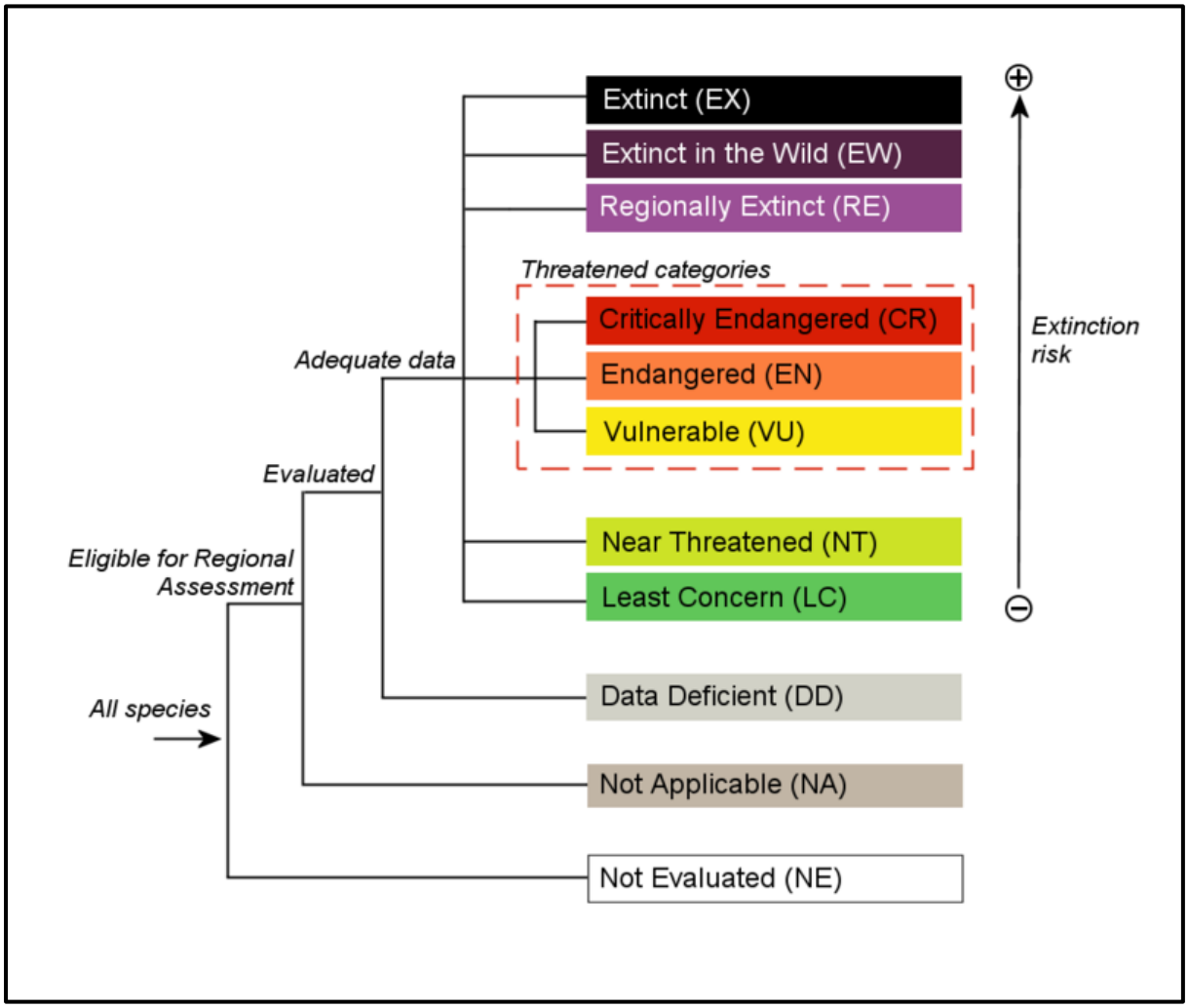


Figure 10-24: South African red list categories

Melhania polyama is assessed as Rare and is only known from the Hluhluwe-Umfolozi Game Reserve. It is possible that this species occurs. Based on other surveying in the area (at Esiyembeni), some other species in addition to *Melhania polygama* may also occur on these sites, although unlikely at Ophondweni where the vegetation has been more impacted upon by surrounding settlement. These species are:

- *Salpinctium natalense* (Rare)
- *Elaeodendron transvaalense*, the Bushveld Saffron (Near Threatened)

No Red Listed plants were found in the study area that are considered species of conservation according to national red list categories. Although not observed suring the field survey, based on other broad area records, *Melhania polygala* (Rare), *Elaeodendron transvaalense* (Near Threatened) and *Salpinctium natalense* (Rare) may still be found. These species will be better searched for after sustained rains have fallen and herbaceous plants are growing more vigorously. **Table 10-20** reflects the protected tree species located within the project area.

Table 10-20: Protected trees in terms of National Forest Act

Species	Ophondweni	Emalahleni	Mahujini
	(estimated number)		
Sclerocarya birrea subsp. *caffra*	c.50	c.20	>200

Sideroxylon inerme	30 -50	20+	Present

Large numbers of smaller protected species in terms of the KZN Provincial conservation Ordinance occur in the study area. The main species present are *Aloe parvibracteata*, *A. marlothii, Eulophia petersii, Ledebouria asperifolia and L. ovatifolia.* Although protected, these are not rare species and are not threatened. Species which were observed to occur in the hundreds and even the thousands on the sites were not recorded individually. Reference is made to **Table 10-21** for a complete list of the protected vegetation species.

Table 10-21: Plants Protected by KZN Provincial Conservation Ordinance

Species	Ophondweni	Emalahleni	Mahujini
	(estimated number)		
Adenia digitata (Passifloraceae)	-	<10	-
Aloe marlothii (Asphodelaceae)	30 – 40	c.50	>300
Aloe parvibracteata (Asphodelaceae)	>2000	10,000+	Common
Ammocharis coranica (Amaryllidaceae)	100+	100+	100+
Ansellia Africana (Orchidaceae)	2	-	-
Bonatea cf. *porrecta* (Orchidaceae)	1 seen	-	-
*Bulbine asphodelides (*Asphodelaceae)	-	2 seen	-
Ceropegia cf. *linearis* (Apocynaceae)	1 seen	-	-
Ceropegia nilotica (Apocynaceae)		1 seen	
Ceropegia pachystelma (Apocynaceae)	1 seen		
Ceropegia racemose subsp. *Setifera*	1 seen	-	-
Dietes iridioides (Iridaceae)	c.50	-	-
*Dioscorea cotinifolia (*Diocoraceae)	Present	Present	Present
Dipcadi sp (Hyacinthaceae)	-	1 seen	-
*Drimia elata (*Hyacinthaceae)	2 observed	-	-
Drimiopsis maculate (Hyacinthaceae)	c.10		
Drimiopsis woodie (Hyacinthaceae)	4 observed		
*Eulophia petersii (*Orchidaceae)	c.50	500+	
Eulophia speciosa (Orchidaceae)	1 seen		
Habenaria are aria (Orchidaceae)		c.10	
Huernia hystrix subsp. *hystrix*		2 patches	
Ledebouria asperifolia (Hyacinthaceae)	>1000	>1000	>1000
Ledebouria marginata (Hyacinthaceae)	1 seen		
Ledebouria ovatifolia (Hyacinthaceae)	>1000	>1000	>1000
Ledebouria zebria (Hyacinthaceae)	>100	>100	>100
Scadoxus puniceus (Amaryllidaceae)	2 seen		
Stapelia gigantea (Apocynaceae)		1 seen	

10.1.10.2. Fauna

10.1.10.2.1. Mammals

Approximately seventy-seven species of mammal are known to occur or likely to occur within the region (Child et al. 2016, Skinner & Chimimba 2005, Monadjem *et al.* 2020, MAMMAL MAP 2023). It is likely that a fair proportion of these may be occur, and a semi-natural but somewhat depauperate community of mammals will be present within the broader study area, primarily in better quality habitats. Given the pressures the area is under and the degree of transformation, many mammal guilds are absent or very rare/irregular. This relates particularly to large mammals – large carnivores are essentially absent, and it is likely that meso-carnivores (smaller carnivores such as mongooses) will

also be rare; a recent study showed that populations of this group of mammals are lower in populated areas outside of protected areas in northern KZN (Pretorius, 2022). Similarly, most antelope have been extirpated, through hunting and overutilisation of forage by domestic livestock. Community members confirmed that antelope were rare and hunted locally (two sets of hunters with dogs were seen during the survey). One community member indicated that only two small antelope species remained, and described Common and Natal Red Duiker. The spoor of Common Duiker was detected during the survey Bats that require tall woodland and forest for roosting sites are also likely rare or absent. The mammal community is therefore expected to consist primarily of a number of rodents, shrews and a subset small carnivore, some species of bats, and two antelope species.

Twelve species of conservation importance are known or have been predicted to occur in the broader region (Child et al. 2016), (refer **Table 10-22**). However, almost all are expected to be rare-absent from the study area, given degraded and unsuitable habitat, and pressures on the area. One species, Natal Red Duiker, likely persists in small numbers, restricted to dense wooded areas associated with drainage lines. A community member confirmed this during the site visit, indicating that there were two small antelope in the area, one of which was a red colour and only seen in dense woodland.

Table 10-22: Rare and threatened mammals occurring or likely to occur within broader Project Area

Common Name	Scientific name	Conservation Status[2]	Comment	Occurrence
Leopard	*Panthera pardus*		Widespread in natural habitats with cover and prey.	Regular within HIP. May occasionally occur in denser wooded areas, particularly closer to drainage lines
African Wild Dog	*Lycaon pictus*	RD - EN	Large areas of natural woodland and grassland with adequate prey base.	Present in HIP. Apart from occasional excursions by groups, confined to the park. Will not occur within the study area.
African Marsh Rat	*Dasymys imcomtus*	RD - NT	Confined to rank vegetation in and adjacent to wetlands in grassland.	Confined to rank vegetation in and adjacent to wetlands in grassland
Swamp Musk Shrew	*Crocidura mariquensis*	RD – NT	Suitable habitat is very limited in extent, localised and isolated across the study area – expected to be absent from the study area	Habitat is not present – will not occur
Sclater's Forest Shrew	*Myosorex sclateri*	RD - VU	Recorded from the surrounding region, but confined to areas with higher rainfall and mesic	Habitat is not present – will not occur

[2] RD = Red Data; EN = Endangered; VU = Vulnerable; NT = Near Threatened

Common Name	Scientific name	Conservation Status[2]	Comment	Occurrence
			vegetation types - suitable habitat is not available within the study area, and it is expected to be absent from the site	
Four-toed Elephant Shrew	*Petrodomus teradactylus*	RD - NT	Dense woodlands and thickets	Habitat is not present – will not occur
African Stripped Weasel	*Poecilogale albinucha*	RD - NT	Occurs primarily in good quality grassland in KZN	Seemingly rare in the region. Habitat is suboptimal – expected to be rare or absent from the study area
Serval	*Leptailurus serval*	RD - NT	Requires dense, reasonable quality grassland and grassy savanna, primarily in proximity to wetlands	Uncommon in the broader region. No suitable habitat is present within or adjacent to the study area – expected to be absent
Cape Clawless Otter	*Aonyx capensis*	RD – NT	Occurs in perennial waterbodies	Expected to be rare or absent, given the lack specific suitable habitat
Natal Red Duiker	*Cephalopus natalensis*	RD – NT	Forest and dense woodland	Much of the study area is unsuitable. Likely to occur and be restricted to in denser woodland associated with drainage lines east of the development footprints
Blue Duiker	*Phiantomba monticola*	RD – VU	Forest and other densely wooded habitats	Rare in the broader region, where it is restricted to forest, notably northern HIP. Habitat is not suitable within the study area, and will not be present
Damara Wooley Bat	*Kerivoula argentata*	RD	Moist wooded habitats, often associated with larger river systems	Recorded from HIP and likely under-recorded. However, likely to be rare- absent in the study area, given the general lack of large trees and well-developed riparian forest

10.1.10.2.2. Avifauna

Important Bird and Biodiversity Areas (IBAs) are sites of global significance for bird conservation, identified nationally through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria (Marnewick et al. 2015). The criteria for the identification of IBAs are based on the presence of:

- Threatened species;
- Assemblages of restricted-range and biome-restricted species: and
- Large concentrations of congregatory species, referred to collectively as IBA 'trigger' species.

The study site is not within an IBA; the closest IBAs are the HIP IBA (SA 060), whose eastern border is approximately 10km west of the study area and the iSimangaliso Wetland Park (SA078), whose western border is about 17km east of the study area.

10.1.10.2.3. Reptiles

In a national context, the broader region's reptile diversity is very high, and the QDC and adjacent areas are in line with that, with at least 88 reptile species recorded (Bates et al. 2014; ADU 2022). Several of these are however restricted to the coastal belt, and won't be present this far inland. The study area is expected to support a moderately rich reptile fauna, in the region of 30-40 species, given the natural habitats present. Natural vegetation areas will be of most importance for these, richness will be very much lower in transformed and heavily degraded areas.

Two Red Data reptile species is known from the broader area (IUCN 2018, Bates *et al.* 2014) (refer **Table 10-23**). However, neither is expected to be present, given that the site lacks habitat for the one and is outside of known range for the other.

Table 10-23: Rare and threatened reptiles

Common Name	Scientific name	Conservation Status	Comment	Occurrence
Nile Crocodile	*Crocodylus niloticus*	RD - NT	Occurs in subtropical water bodies – large rivers and lakes	None of the rivers within the study area hold sufficient amount of water for sufficient lengths of time to support this species – the two main systems are dry or reduce to isolated pools for much of the year. As a result, it is considered that this species will not be present within the study area
Natal Hinged Tortoise	*Kinixys natalensis*	RD - VU	Dry rocky habitat in thornveld and thicket, often in mountainous areas	Although some sources include records close to the coast, these are likely in error

Common Name	Scientific name	Conservation Status	Comment	Occurrence
				(Pers obs. Dr F. Ihlow pers comm. Bourquin 2004). No confirmed records exist for HIP or east of the park, and it seems probable that this species is not present within the study area

10.1.10.2.4. Amphibians

The study area sits within a broader area that supports high amphibian species diversity (Minter et al. 2004). In a biogeographical context, the study area falls within a region that has been described in terms of amphibian fauna as the 'Maputaland Assemblage (Alexander *et al.* 2004), an area generally characterised by very high species diversity but fairly low levels of endemism and few range-restricted species, within a national context. Richness locally is fairly high, with at least 44 species recorded from the Quarter Degree Cell (QDC)s and surrounding areas (Minter *et al.* 2004, ADU 2022). Most frogs are tied to some degree to aquatic habitats for part of their life-cycle, and will use seasonal or permanent wetlands, slow flowing streams and other waterbodies for breeding. Good quality breeding habitat is very limited however within the study area, being restricted to a few localised, small wetlands, short- term pools in the riverbeds, and a few small dams with limited fringing and emergent vegetation. As a result, it is expected that frog populations will be localised and not very extensive. Frogs also require adjacent terrestrial habitats for foraging, sheltering (particularly during the dry season) and to facilitate dispersal between breeding sites. It is therefore important that adequate terrestrial habitat and connectivity to other natural habitats, particularly breeding sites is maintained, to ensure the persistence of breeding populations. Given the location and habitats available, it is likely that that the site supports a fairly rich frog fauna, in the region of 20 species, but that these are mostly confined to the vicinity of the few breeding sites available.

Three species considered of conservation importance are known from the broader area (Branch & Harrison 2005, ADU 2022, IUCN 2017) (**Table 10-24**). It is possible that one of these is present, but, as indicated, breeding habitats are highly limited and fragmented, and it would likely be highly localised if present.

Table 10-24: Rare and threatened amphibians

Common Name	Scientific name	Conservation Status	Comment	Occurrence
Spotted Shovel-nosed Frog	*Hemisus guttatus*	RD –NT	Utilises shallow, still or slow-moving waterbodies for breeding and moves in surrounding grassland or woodland habitats.	Known from aquatic ecosystems in the broader area both west and east of the site. May occur in and around the few small wetland

Common Name	Scientific name	Conservation Status	Comment	Occurrence
				systems recorded in the study area
Natal Leaf-folding Frog	*Afrixalus spinifrons spinifrons*	EKZNW sensitive specie	Utilises shallow waterbodies, with dense emergent vegetation, and utilizes surrounding grassland or woodland habitats, in higher rainfall areas.	Unlikely to be present, given slightly out of known range and environmental envelope, and very limited, suboptimal habitat present
Power's Reed Frog	*Hyperolius poweri*	Rare – possible RD candidate	Utilises shallow waterbodies with emergent vegetation for breeding and moves in surrounding grassland or woodland habitats	Unlikely to be present, given slightly out of known range and environmental envelope, and very limited, suboptimal habitat present

10.1.10.2.5. Invertebrates

Invertebrates are in general poorly known. However, some groups have more information available on them While their habitats are incompletely known, most sensitive invertebrate species, and natural communities, primarily occur in largely undisturbed habitats. Millipedes and molluscs require moisture and shelter and most are restricted to areas with some woody cover. Butterflies are reliant on specific habitats and the presence of species-specific host and food plants. Specialized orthopterans (grasshoppers, katydids etc) generally require higher quality specialised habitats.

Millipedes

The site falls within the region that supports some of the higher millipede diversity and levels of endemism in the country (Hamer & Slotow 2002). Millipedes require cover and organic material to eat. Greatest diversity and presence of sensitive species occurs in natural habitats, although some species can tolerate a degree of disturbance, however, they are rare-absent in transformed areas and areas lacking in shelter. As a result, areas of the study area that have been transformed, highly disturbed and overgrazed will be very poor for millipede fauna. However, where better quality dense wooded habitat occurs, particularly closer to drainage lines, a fair diversity is likely to be present. A number of localised and sensitive species are known in the area, and although poorly known, their distributions and habitat requirements suggest that a portion of these may occur in naturally wooded areas of the study area

Butterflies

The study area falls within a region of high richness (Mercenero et al. 2013, LEPIMAP 2023). It was evident from the field survey that large numbers and diversity of butterflies are present in areas of higher quality vegetation. This is much lower in disturbed and transformed areas. Few sensitive species are known to occur, and most of these are unlikely to be present, or would be restricted to better quality wooded habitats.

As such, these groups can be expected to be reduced in diversity and numbers of specialised species within the study area in general, but some areas, notably better-quality wooded habitats may still support semi-natural populations, including some sensitive species.

Snails

The broader area supports a high relative snail diversity and endemism in a national context (Herbert & Kilburn 2004, Govender 2007, Perera 2021), and there are some localised endemic species that are recorded from the broader area, a portion of which may be present within the study area (Natal Museum Malacology Dept database). Snails require shelter and moisture, and within the study area would be restricted to denser, better quality wooded habitats, and absent from transformed areas and overgrazed grassy areas.

10.1.11. Aquatic Ecology

In terms of the issued WUL (Number 06/W23A/BCGIJ/2549) for Tendele, the mine has conducted several aquatic ecological studies to determine the Present Ecological State (PES) of the receiving water courses. From these studies it was concluded that by using the index Habitat Integrity (IHI) methodology, the condition of the streams in the study area ranges from a PES Class A to C. The latest specialist study was conducted by EcoPulse (2024) and is included as **Appendix 8** of this Report.

10.1.11.1. Water Quality

In-situ water quality data was obtained during the February 2024 field survey. The water quality data is presented in **Table 10-25** below.

Table 10-25: *In-situ* Water Quality

Variable	Unit	Site 01	Site 02	Site 03	Dam 1	Dam 2
pH	-	8.96	8.8	7.82	9.61	8.99
Temperature	°C	30.5	24.2	25	30.9	32.7
Dissolved Oxygen	%	98.3	45	10	115.2	55.8
Dissolved Oxygen	mgO_2/l	7.19	3.66	0.7	7.2	3.62
Total Dissolved Solids	mg/l	669.5	754	248	180.7	112.4
Electrical Conductivity	µS/m	1133	1147	381	310	198.7
Salinity	ppt	0.5	0.58	0.18	0.13	0.08

In addition to in situ water analysis, water samples were submitted to a SANAS accredited laboratory for analysis. The results have been presented below in **Table 10-26.** Several reported results were below the SANAS accredited levels of quantification (LOQ) used by the laboratory. This made it difficult to compare these to available target water quality ranges set out by DWAF (1996). As such, the raw data from the laboratory analysis has been presented as a lower confidence representation of the actual concentrations at the time. Importantly, TWQRs often represent ideal concentrations and don't necessarily point towards a major impact or threat to surface water quality.

Furthermore, the comparison of once-off sampling results to TWQR's should be done with caution, acknowledging the very low sample size.

Table 10-26: Water Quality data obtained from sampled sites (February 2024)

Variable	Unit	Site 01	Site 02	Site 03	Dam 1	Dam 2	TWQR[3]
Aluminium as Al	µg/l	12.29	75.89	266.06	15.07	187.74	5
Arsenic as As	µg/l	0.38	0.49	0.84	0.67	0.69	10
Baron as B	µg/l	117.77	105.81	72.38	60.49	53.74	-
Calcium as Ca	mg/l	46.61	108.65	18.18	21.89	9.53	-
Cobalt as Co	µg/l	0.15	0.33	0.34	1.16	0.95	-
Chromium as Cr	µg/l	0.98	0.91	1.13	0.65	0.74	7
Copper as Cu	µg/l	13.21	4.02	2.87	3.61	3.71	0.3
Iron as Fe	µg/l	9.32	37.69	453.50	52.56	2319.02	-
Leas as Pb	µg/l	0.37	0.44	0.76	0.58	2.17	0.2
Mercury as Hg	µg/l	0.30	0.77	0.19	0.18	0.13	0.04
Manganese as Mn	µg/l	0.82	58.26	4.21	12.19	76.75	180
Nickel as Ni	µg/l	1.14	3.43	3.16	2.10	2.62	-
Magnesium as Mg	mg/l	40.69	53.35	14.26	12.12	6.04	-
Potassium as K	µg/l	6.29	10.31	6.86	10.58	8.68	-
Zinc as Zn	µg/l	6.27	3.26	3.58	4.25	5.37	2
Chloride as Cl	mg/l	244.93	203.90	74.46	49.15	23.72	-
Cyanide as Cn	µg/l	2.00	15.00	6.00	4.00	2.00	1
Cyanide (Total) as Cn	µg/l	13.57	15.41	12.78	14.95	19.27	1
Fluoride as F	mg/l	0.33	0.23	0.25	0.24	0.26	-
Sodium as Na	mg/l	147.05	122.19	57.24	30.30	23.62	
Sulphate as SO_4	mg/l	34.38	60.74	0.89	1.06	3.88	
Alkalinity as $CaCO_3$	mg/l	218	356	114	99	74	
pH at 25°C	-	8.55	7.84	7.41	8.83	8.09	
Ammonia as NH_4	mg/l	0.09	0.18	0.52	0.06	0.32	
Nitrate ass N	mg/l	0.2	0.2	0.36	0.2	1.75	
Suspended Solids as SS	mg/l	16	58	34	70	54	
Total Dissolved Solids	mg/l	746	878	354	272	176	
Electrical Conductivity as EC	mS/m	141.8	158.4	51.9	37.2	23.3	

10.1.11.2. Habitat Integrity Assessment

The Index of Habitat Integrity (IHI) differs from the IHAS in that it provides an assessment of the perceived impacts and modifications to the stretch of river under investigation. This index considers impacts to the riparian zone as well as the instream aquatic habitat. The results of the habitat integrity assessment for the sites are provided in **Table 10-27**.

The modification to flow for the instream habitat was rated as the highest impacts for many of the sites (site SOM_003, SOM_005, SOM-007, SOM_008, SOM_009 and SOM_010). This can be attributed to the road crossings, which transect the streams, creating the pooling of water upstream of the crossing and impacting the flow rate of the stream. Bed modification was rated relatively high and is due to the road crossing preventing the downstream transport of sediment.

Water quality was rated as having a large impact at monitoring site SOM_005 due to high readings *in situ* measurements for TDS and EC. This indicates the system is moderately modified (Category C).

[3] DWAF Water Quality Guidelines, 1996

Table 10-27: HIA results for an aquatic ecology summer survey at the Somkhele Project site

Instream Criteria	**Weight**	**SOM_001**	**SOM_003**	**SOM_004**	**SOM_005**	**SOM_007**	**SOM_008**	**SOM_009**	**SOM_010**
Water abstraction	14	0	0	0	0	0	0	0	0
Inundation	10	0	0	0	0	0	0	0	0
Water quality	14	0	0	0	15	0	9	9	0
Flow modifications	13	0	12	0	12	12	12	12	12
Bed modifications	13	0	10	0	10	10	10	10	10
Channel modifications	13	0	8	0	0	0	0	0	0
Presence of exotic macrophytes	9	4	3	5	3	3	6	4	4
Presence of exotic fauna	8	0	0	0	0	0	0	0	0
Solid waste disposal	6	5	5	0	0	0	0	0	0
TOTAL (100)	100	2.6	17.9	1.8	20.9	12.5	19.8	17.9	12.9
Instream Habitat Integrity (%)		97	82	098	79	87	80	82	87
Instream Habitat Integrity Class		**A**	**B**	**A**	**C**	**B**	**B**	**B**	**B**
Riparian Zone Criteria									
Water abstraction	13	0	0	0	0	0	0	0	0
Inundation	11	0	0	0	0	0	0	0	0
Water quality	13	0	0	0	15	0	9	9	0
Flow modifications	12	0	6	0	6	6	6	6	6
Channel modifications	12	0	5	0	5	5	5	5	5
Removal of indigenous vegetation	13	0	0	0	0	0	0	0	0
Exotic vegetation encroachment	12	3	2	5	3	2	8	5	5
Bank erosion	14	20	11	0	8	11	5	15	5
TOTAL (100)	100	12.6	12.4	2.4	19.0	12.4	16.6	20.8	10.5
Riparian Habitat Integrity (5)		87	88	98	81	88	83	79	90
Riparian Habitat Integrity Class		**B**	**B**	**A**	**B**	**B**	**B**	**C**	**B**
Total Integrity Score		92	85	98	80	88	82	81	88
Total Integrity Class		**A**	**B**	**A**	**B**	**B**	**B**	**B**	**B**

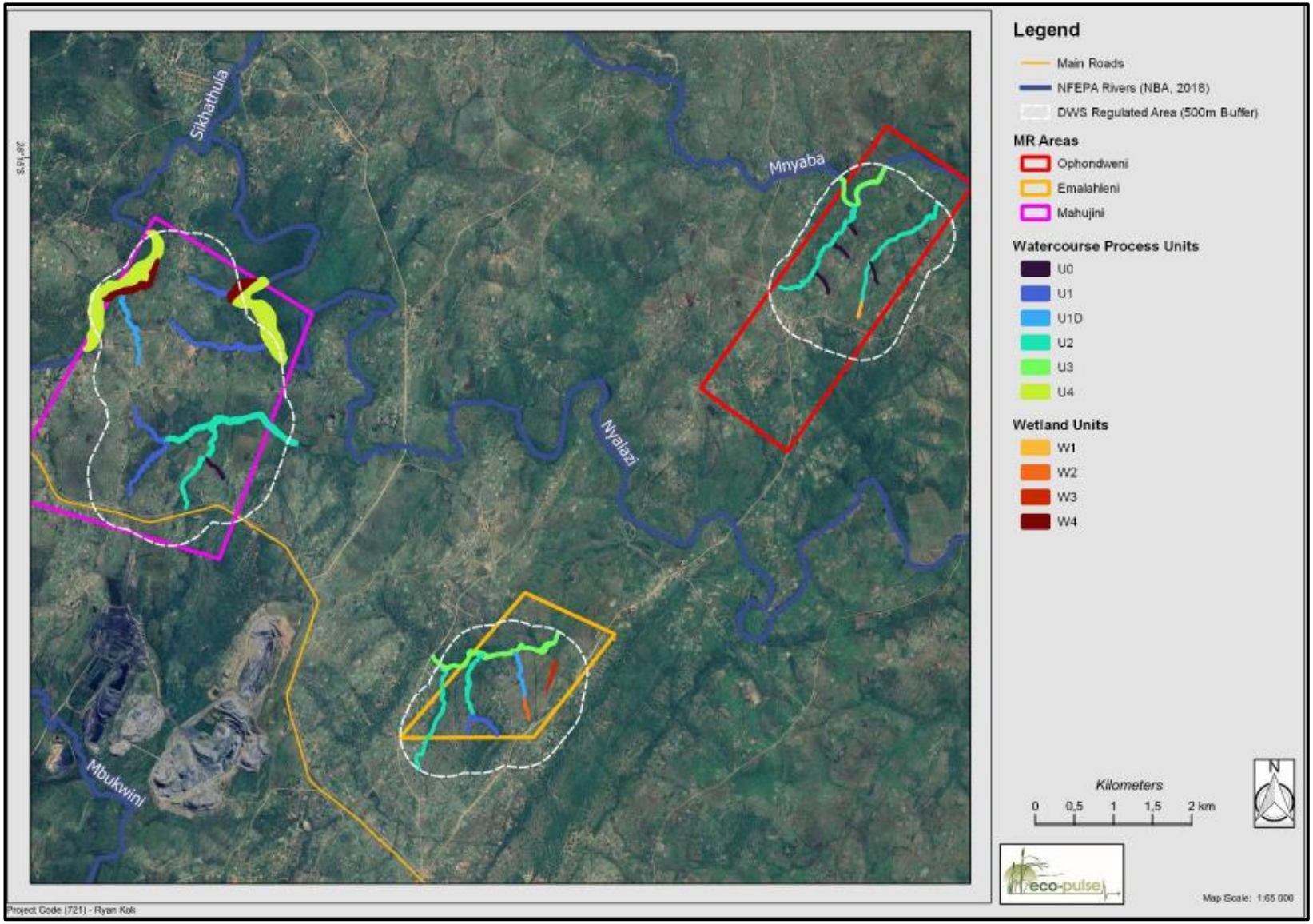


Figure 10-25: Watercourse and wetland process unit labelling

Bank erosion was an additional impact observed to the modification of flow and bed for the riparian zone, and was rated as severe for site SOM_001 and also noteworthy at 3, 7 and 9. Livestock grazing and drinking from the stream were observed and erosion of the bank are most likely caused by the livestock trampling and damaging riparian vegetation, leaving the banks exposed and vulnerable to erosion.

10.1.11.3. Macro-invertebrate Assessment Index

Macroinvertebrates were sampled according to the sampling methodology set out by Dickens and Graham (2002) for the SASS5 protocol. Given the lack of appreciable flowing water, the pools represent a lentic habitat type and the derived data cannot be considered to reflect ecosystem health in the same way as a SASS5 compliant river site (Dickens and Graham 2002). Findings therefore only represent a benchmark against which future monitoring can be assessed and are interpreted against the availability and diversity of instream habitat. A summary of the SASS5 results has been provided in **Table 10-28**.

Table 10-28: Results of the SASS5 Assessment

Site	Habitat Rating IHAS	Number of Taxa	SASS5 Score	ASPT
1	Poor – 49%	11	56	5.1
2	Poor – 38%	13	58	4.9
3	Poor – 31%	8	31	3.9

Available instream habitat (biotopes) for sampling was limited, linked with the low flows and the predominance of sandy alluvial instream habitat. Habitat availability and diversity influenced aquatic macroinvertebrate diversity at all three sites. Site 2 and Site 3 in particular had very poor biotope ratings. This should be considered together with the water quality results which indicate high dissolved salts, low DO and very warm temperatures. Overall, the sites were only marginally suitable as macro-invertebrate habitat, and results should be interpretated as such.

In terms of individual taxa sensitivity to water quality variations, no highly sensitivity taxa were recorded at any of the sites. Several moderately sensitive taxa were recorded at Site 1 and 2, including *Atyidae, Caenidae, Leptophlebiidae, Gomphidae* and *Naucoridae*. At Site 3, the only moderately sensitive taxa recorded was *Atyidae*. The remaining taxa recorded at Site 3 were low sensitivity (tolerant) taxa.

10.1.11.4. Fish Response Assessment Index

To better understand fish species that may occur in the study area, available resources were reviewed. Based on the DWS (2014) database, thirty-one (31) species have been listed as possibly occurring in the study area, although majority are rated as low to moderate confidence in their presence. Only *Mugil cephalus and Oreochromis mossambicus* were rated as high confidence in presence. Based on data available from the online Freshwater Biodiversity Information System (FBIS) for nearby river sites, *Enteromius paludinosus* and *Enteromius trimaculatus* were noted.

Once-off rapid electro-fishing surveys were undertaken using a SAMUS backpack Electrofisher at the three river sites. Habitat for sampling was limited and electrofishing efforts were limited to isolated pool habitats at each site. Four (4) different species were recorded across all three sites, namely *Enteromius paludinosus, Enteromius trimaculatus,*

Clarias gariepinus and Oreochromis mossambicus. Of the four species recorded, *E. paludinosus and E. trimaculatus* were the most sensitive due to their moderate sensitivity to no-flow conditions. Such species require flow during certain phases of the life-cycle phases. Generally, increased habitat suitability and availability resulting from increased flow benefits these species (DWS, 2014). Both *E. paludinosus* and *E. trimaculatus* breed in the summer rainy season in the region. With the observed low flow conditions in the river systems surveyed, breeding is likely to be limited to selected periods when flows allow for suitable connectivity between river segments and creates preferred habitat for spawning.

C. gariepinus and *O. mossambicus* are considered tolerant (low sensitivity) species and are able to thrive under relatively modified physico-chemical water quality conditions and low to no-flow conditions. Fish diversity was likely strongly influenced by instream habitat availability for individual fish species preferences. There is however a possibility that additional species listed in **Table 10-29** may occupy the river systems surveyed and were not observed at the time. These should be identified though more detailed fish surveys that should be implemented as part of a monitoring programme established for the project. Importantly, while the species recorded were not highly sensitive to no-flow and water quality modifications, the pool habitats they occupy are highly sensitive to flow modifications (reduced flow) and water quality impacts due to reduced dilution capacity. The populations of fish that occupy these systems are reliant on these habitats for refugia during the dry season and periods of extended low rainfall which can occur in the region.

Table 10-29: Fish survey data

Species	Common Name	Site 1	Site 2	Site 3
Enteromius paludinosus	Straightfin barb	10	4	8
Enteromius trimaculatus	Threespot barb	22	28	32
Clarias gariepinus	Sharptooth catfish	-	2	-
Oreochromis mossambicus	Mozambique tilapia	15	10	8

10.1.11.5. Present Ecological Status

The latest Present Ecological Status, Ecological Importance and Sensitivity Study conducted for the W23G quaternary catchment representing the wet-season for 2024 by Eco-Pulse is depicted in **Table 10-30**.

Table 10-30: Summary of PES, EIS and REC for water courses assessed within study area

Watercourse Unit	PES	EIS	REC	RMO
Stream Process Unit U0 (Mountain streams)	B	D	B	Maintain
Stream Process Unit U1 (Mountain streams)	B	D	B	Maintain
Stream Process Unit U1d (Mountain streams)	C	D	C	Maintain
River Process Unit U2 (Transitional River)	B	C	B	Maintain
River Process Unit U3 (Upper Foothills)	B	C	B	Maintain

10.1.12. Noise

The Noise Impact Assessment undertaken during the EIA Phase is appended to this report as **Appendix 10**. The objective of the study is to assess what the current ambient noise levels are in the area as well as what the significance of the noise impacts from the Project will be on the surrounding area.

10.1.10.1 Baseline Assessment

Ambient sound levels were measured in the vicinity of the project area in a semi-continuous manner over a period of 2-nights (resulting in approximately 1,000 daytime and 500 night-time measurements – each with a duration of 10-minutes) during December 2023, with the data indicating significantly elevated ambient sound levels.

Ambient sound levels were mainly dominated by:

- natural noises (birds, insects and some wind-induced), with insect noises significantly influencing night-time noise levels;
- voices from residents and children, with this noise mainly impacting on the daytime ambient sound levels; and
- Road traffic noises (measurement locations near the R618).

Considering the average fast-weighted sound level data collected in the area, average:

- daytime fast-weighted sound levels ranged from 35 to more than 66 dBA, with average sound levels being 49.3 dBA. The average equivalent level over the full daytime periods is 53.8 dBA for the 6 measurement locations. Only considering the average fast-weighted values, sound levels are typical of a sub-urban noise district, setting a zone sound level of 50 dBA for the daytime period; and

- night-time fast-weighted sound levels ranged from 37 to just more than 70 dBA, with average sound levels being 54.1 dBA. The average equivalent level over the full night-time periods is 56.1 dBA for the 6 measurement locations. Only considering the average fast-weighted values, night-time sound levels were elevated at all the measurement locations, uncharacteristic of a typical rural or sub-urban noise district. Considering the spectral data as measured at three locations, insect sounds were significant and the reason for the elevated night-time ambient sound level. Considering the developmental character of the area, a zone sound level of 40 dBA would be used.

The mine should also limit the noise level to less than 60 dBA on the boundary (70 dBA during the daytime period, and 60 dBA at night for a 70 dBA day-night noise limit). However, even when complying to this noise limit, keeping the noise levels at receptors within acceptable limits could be a challenge when a mining industry are operating close to a residential area.

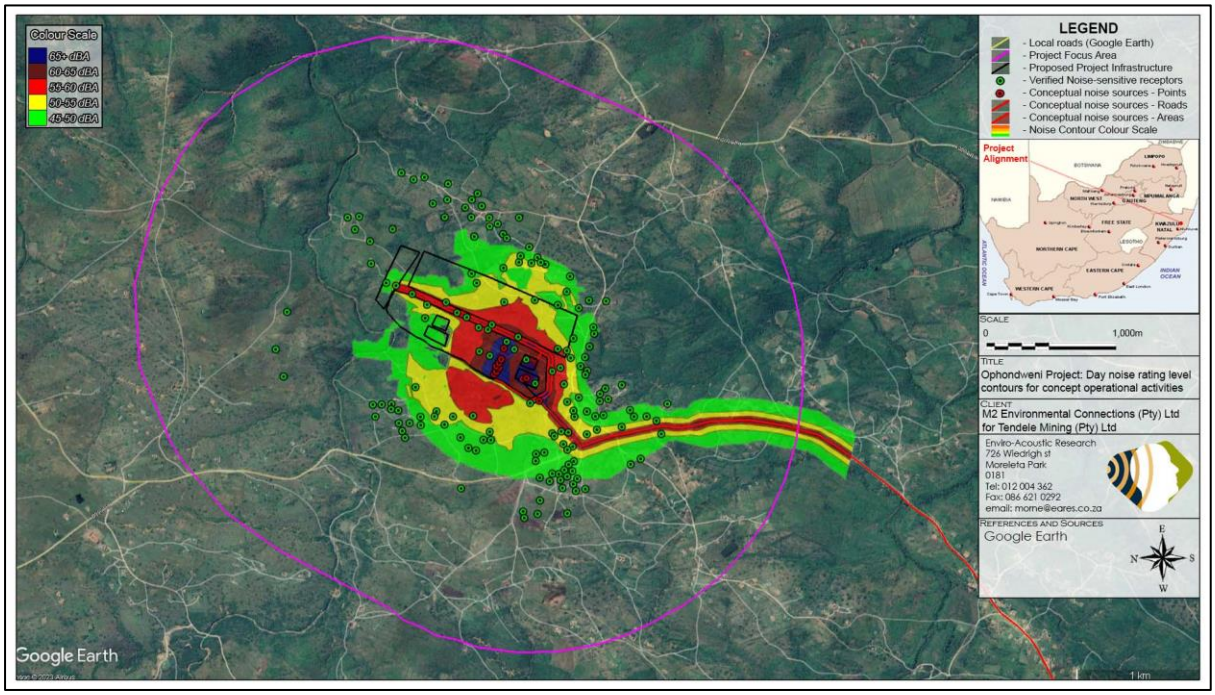


Figure 10-26: Projected day time noise rating levels for Ophondweni

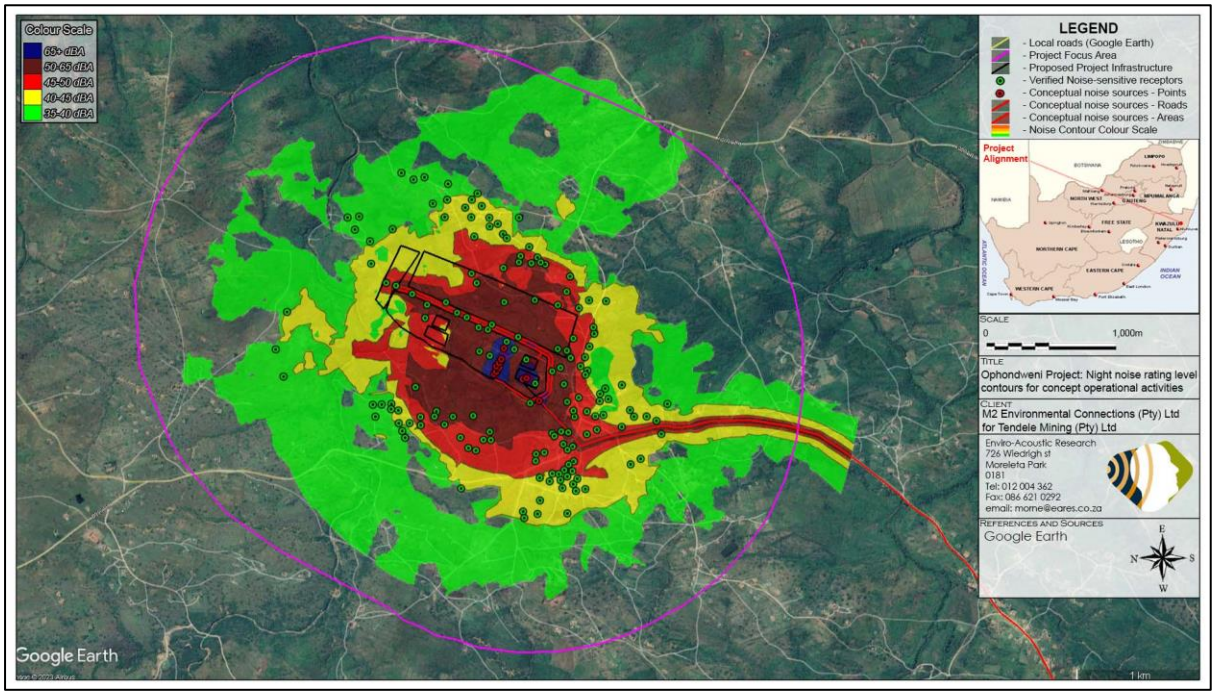


Figure 10-27: Projected night time noise rating levels for Ophondweni

10.1.10.2 Potential Noise Sources

Increased noise levels are directly linked with the various activities associated with the construction, as well as the operational phase of the mining activity. Noise emitted by the construction and operations can be associated with various noise sources, including mechanical sources due to operation of equipment, material impact noises (such as the noise made when materials are dropped at a height to ground level), electrical noise

(reverse hooters from equipment or the "whine" of an electrical pump) and noises from vehicles moving around.

It should be noted that this noise impact assessment considers conceptual scenarios to estimate the potential impact of noise on the surrounding NSR and should not be seen as a reflection of mining schedule, or specific noise levels at receptors at any specific times. Conceptual noise modelling considers the potential mining schedule, but select locations of noise sources to illustrate a potential worst-case scenario. Noise levels calculated in this manner is used to estimate the potential noise impact at all the identified NSR.

This report will focus on two potential scenarios, namely:

- Construction activities taking place at the start of the mining activity (at each mining area). Both a day- and night-time scenario will be investigated, with equipment operating on ground level (no berms between activities and NSR), with various equipment operating simultaneously (worst-case scenario);
- Operational activities continuing from the construction activities. This includes various mining activities taking place close to existing NSR. Both a day- and night-time scenario will be investigated for each project, with the noise model considering the effect of 10 m berms between the mining area and NSR, as well as a number of mining activities taking place 10 and 20m below ground surface. The operational model does include a 20m berm for a section at the Mahujini project. This is also used to assess the potential effectiveness of berms, stockpiles and deposits.

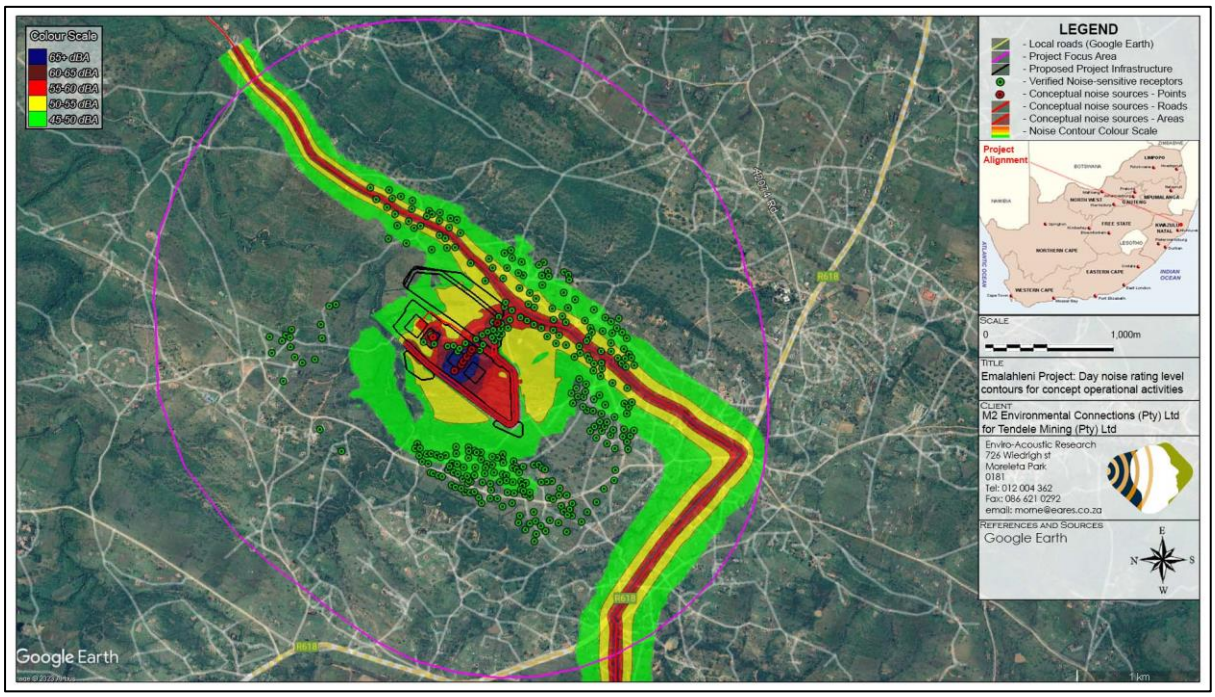


Figure 10-28: Projected day time noise rating levels for Emalahleni

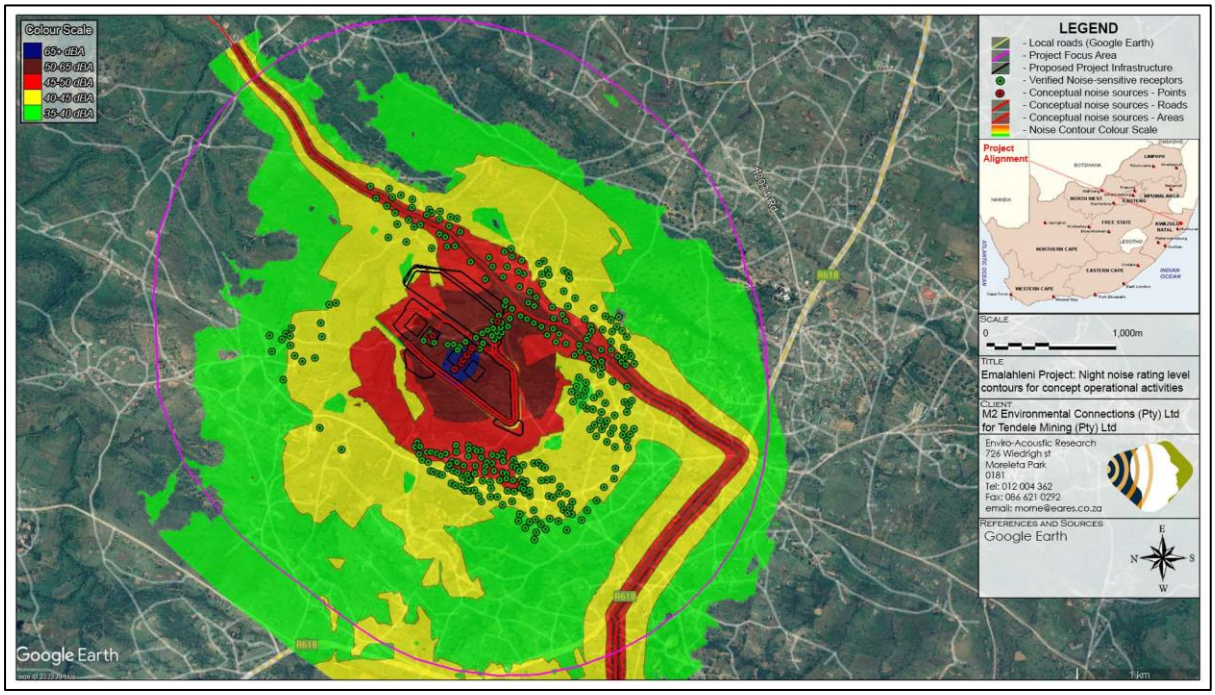


Figure 10-29: Projected night time noise rating levels for Emalahleni

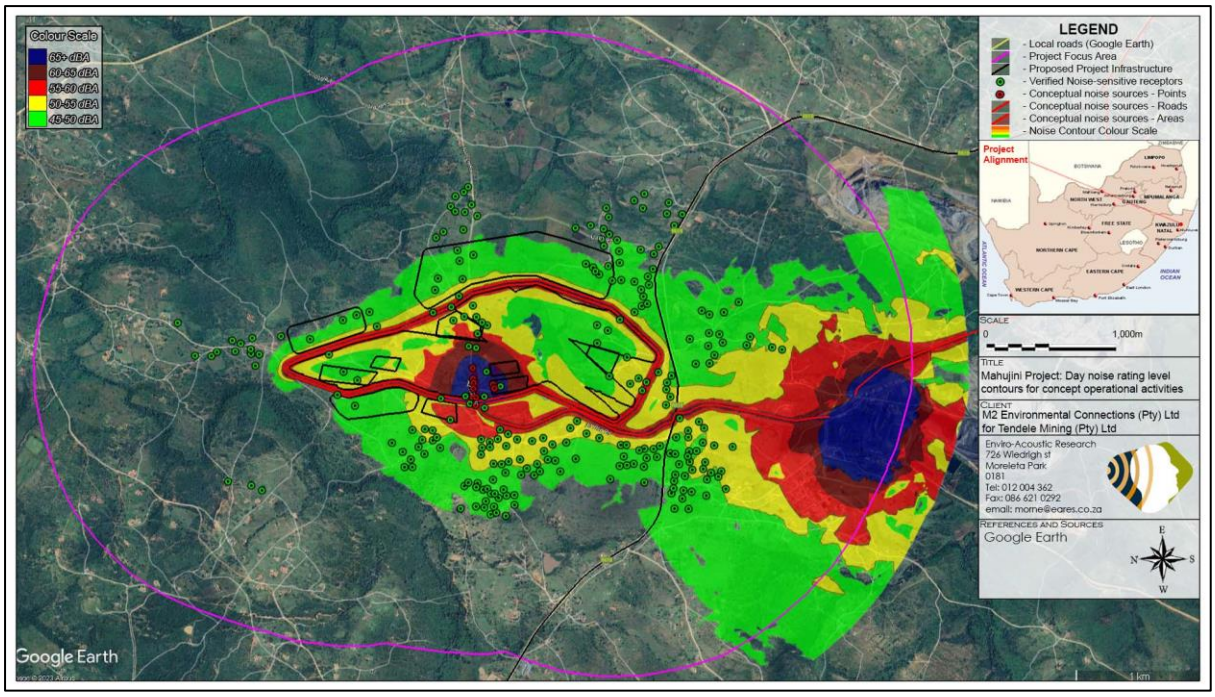


Figure 10-30: Projected day time noise rating levels for Mahujini

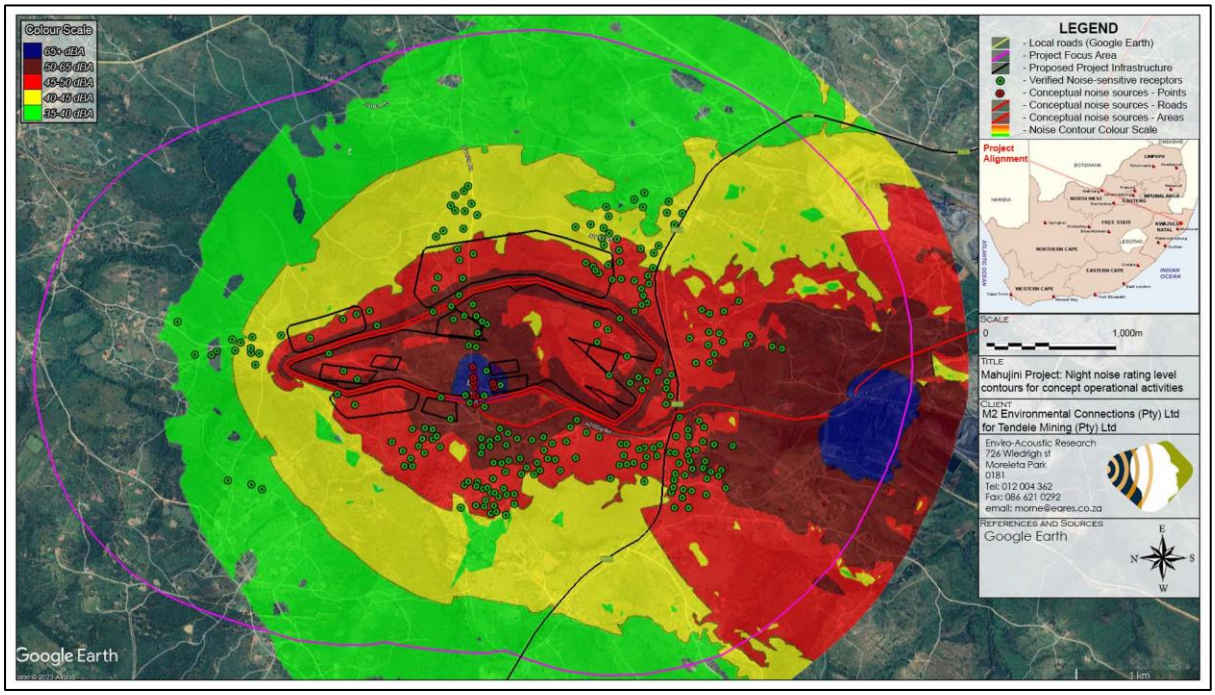


Figure 10-31: Projected night time noise rating levels for Mahujini

Coal will be mined through an opencast bench mining method, with the assessment using two conceptual scenarios to illustrate potential noise levels close to NSR. To allow for the mining of 100,000 tons/month, the conceptual scenarios for the following activities will be assumed for the noise model:

- vegetation will be stripped ahead of mining using bulldozers. A number of cuts will be stripped and available for drilling between the active topsoil stripping operations and the open voids;
- the topsoil will be loaded onto dump trucks by excavators and hauled to stockpiles or areas that require rehabilitation. It will be assumed that the topsoil will be used to develop berms around the mining sites up to a height of 10m;
- drilling operations on the overburden taking take place 24 hours per day;
- loading of mining residue onto trucks by excavators and hauled to stockpiles (or residue deposits) or areas that require rehabilitation;
- loading and hauling of RoM from the active mining areas to the RoM pad;
- high-intensity area noise sources of approximately 15,000 m^2 (to account for undefined equipment such as water bowsers, cable reelers etc.) at active box-cut and RoM areas;
- low-intensity areas noise source of approximately 5,000 m^2 (to account for low intensity noises) at the hardpark areas; and
- Material stockpiling and handling at the RoM area; and
- A mobile crushing and screening plant near the open coalface.

The level and character of the noise during this phase is more constant than with the construction phase, but can be more intrusive, especially if an impulsive[4] component is generated at night (such as noise associated from material handling and crushing

[4] A sound characterized by brief excursions of sound pressure (transient signal) that significantly exceed the ambient sound level.

activities). A list of mining equipment (and activities) that may be used at this project are defined in **Table 10-31**, with this assessment considering a potential worst-case scenario.

Table 10-31: Sound power emission levels used for modelling

Equipment	Sound power level, dB re1 pW, in octave band, Hz							SPL
Process	63	125	250	500	1000	2000	4000	(dBA)
Point noise sources (dBA re 1 pW)								
Bulldozer	118.3	115.2	111.0	109.1	107.5	103.0	97.0	113.3
Crushing / Screening / Processing	121.1	122.3	120.1	120.0	117.3	112.5	106.3	121.7
Drilling Machine	121.6	123.3	118.3	115.3	114.2	113.9	111.3	120.8
Dumper/Haul truck/ADT	102.5	108.6	106.5	105.4	104.5	99.2	97.2	113.0
Excavator	113.8	114.2	110.3	108.3	106.3	103.9	103.7	113.0
Feed Screen (various)	86.0	95.0	95.0	101.0	101.0	103.0	102.0	108.1
Front End Loader ("FEL")	109.0	106.7	107.3	97.9	95.8	92.5	87.6	116.0
General noise	95.0	100.0	103.0	105.0	105.0	100.0	100.0	110.0
Grader - Operational Hitachi	107.7	107.9	106.8	106.2	104.2	101.1	97.2	108.9
Material handling / Coal loading	111.6	104.1	105.2	102.2	97.1	91.3	87.9	113.6
Mobile crushing / screening	114.2	109.5	106.2	106.0	104.1	102.2	101.0	109.6
Road Transport truck (30t, FM)	90.0	101.0	102.0	105.0	105.0	104.0	99.0	109.4
Area noise sources (dBA/m^2 re 1 pW)								
General Noise (High-intensity)	95.0	100.0	103.0	105.0	105.0	100.0	100.0	65.0
General Noise (Low-intensity)	95.0	100.0	103.0	105.0	105.0	100.0	100.0	55.0

As with all noises, the audibility, as well as the potential of a noise impact on receptors, is determined by factors such as the sound character, spectral frequencies, number and magnitude of maximum noise events, the average noise levels etc. Potential maximum noise levels generated by a range of equipment and the potential extent of these sounds are presented in **Table 10-32**, with **Table 10-33** illustrating the equivalent (average) noise levels and potential extent.

The scenarios also consider the potential cumulative effect due to potential coal processing activities at the existing Tendele coal plant. As actual noise measurements could not be collected at the existing plant (plant was not active during the site visit), worst-case sound power emission levels were considered. It is assumed that existing Tendele processing plant will be operational during the future operational phase and worst-case activities were considered for existing activities to illustrate potential cumulative noise rating levels. The following activities were included:

- 5x Crushing/Screening activities;
- 2x Material handling activities; and
- Low-intensity area noise sources in the vicinity of the processing plant of approximately 90,000 m^2 (to account for undefined activities that may take place over the larger area, vehicles moving around, smaller processing activities and equipment operating, etc.).

Table 10-32: Potential maximum noise levels generated by construction equipment

Equipment Description[5]	Impact Device?	Maximum Sound Power Levels (dBA)	Operational Noise Level at given distance considering potential maximum noise levels (Cumulative as well as the mitigatory effect of potential barriers or other mitigation not included – simple noise propagation modelling only considering distance) (dBA)											
			5 m	10 m	20 m	50 m	100 m	150 m	200 m	300 m	500 m	750 m	1000 m	2000 m
Backhoe	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Chain Saw	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Compactor (ground)	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Dozer	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Drill Rig Truck	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Dump Truck	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Excavator	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Flat Bed Truck	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Front End Loader	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Generator	No	116.7	91.7	85.7	79.6	71.7	65.7	62.1	59.6	56.1	51.7	48.2	45.7	39.6
Grader	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Impact Pile Driver	Yes	129.7	104.7	98.7	92.6	84.7	78.7	75.1	72.6	69.1	64.7	61.2	58.7	52.6
Mounted Impact Hammer	Yes	124.7	99.7	93.7	87.6	79.7	73.7	70.1	67.6	64.1	59.7	56.2	53.7	47.6
Pickup Truck	No	89.7	64.7	58.7	52.6	44.7	38.7	35.1	32.6	29.1	24.7	21.2	18.7	12.6
Pumps	No	111.7	86.7	80.7	74.6	66.7	60.7	57.1	54.6	51.1	46.7	43.2	40.7	34.6
Roller	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Slurry Plant	No	112.7	87.7	81.7	75.6	67.7	61.7	58.1	55.6	52.1	47.7	44.2	41.7	35.6
Soil Mix Drill Rig	No	114.7	89.7	83.7	77.6	69.7	63.7	60.1	57.6	54.1	49.7	46.2	43.7	37.6
Tractor	No	118.7	93.7	87.7	81.6	73.7	67.7	64.1	61.6	58.1	53.7	50.2	47.7	41.6
Vibratory Pile Driver	No	129.7	104.7	98.7	92.6	84.7	78.7	75.1	72.6	69.1	64.7	61.2	58.7	52.6
Warning Horn	No	119.7	94.7	88.7	82.6	74.7	68.7	65.1	62.6	59.1	54.7	51.2	48.7	42.6
Welder/Torch	No	107.7	82.7	76.7	70.6	62.7	56.7	53.1	50.6	47.1	42.7	39.2	36.7	30.6

[5]Equipment list and Sound Power Level source: http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

Table 10-33: Potential equivalent noise levels generated by various equipment

Equipment Description	Equivalent (average) Sound Levels (dBA)	Operational Noise Level at given distance considering equivalent (average) sound power emission levels (Cumulative as well as the mitigatory effect of potential barriers or other mitigation not included – simple noise propagation modelling only considering distance) (dBA)											
		5 m	10 m	20 m	50 m	100 m	150 m	200 m	300 m	500 m	750 m	1000 m	2000 m
Ball Mill (Secondary) (FM)	107.0	82.1	76.1	70.0	62.1	56.1	52.5	50.0	46.5	42.1	38.6	36.1	30.0
Bulldozer CAT D10	111.9	86.9	80.9	74.9	66.9	60.9	57.4	54.9	51.3	46.9	43.4	40.9	34.9
Coal Pulverisers	96.0	71.0	65.0	58.9	51.0	45.0	41.4	38.9	35.4	31.0	27.5	25.0	18.9
Cyclone (dewatering)	109.0	84.1	78.0	72.0	64.1	58.0	54.5	52.0	48.5	44.1	40.5	38.0	32.0
Crusher (Primary, hard rock)	122.4	97.5	91.4	85.4	77.5	71.4	67.9	65.4	61.9	57.5	53.9	51.4	45.4
Drilling Machine	120.3	95.3	89.3	83.2	75.3	69.3	65.7	63.2	59.7	55.3	51.8	49.3	43.2
Dumper/Haul truck - Bell 25 ton	108.4	83.5	77.5	71.4	63.5	57.5	53.9	51.4	47.9	43.5	40.0	37.5	31.4
Dryer Stack	102.0	77.0	71.0	65.0	57.0	51.0	47.5	45.0	41.5	37.0	33.5	31.0	25.0
Dryer Gas Generator	104.6	79.6	73.6	67.6	59.6	53.6	50.1	47.6	44.1	39.6	36.1	33.6	27.6
Excavator	112.0	87.0	81.0	75.0	67.0	61.0	57.5	55.0	51.4	47.0	43.5	41.0	35.0
Feed Screen (crusher, mill etc.)	108.1	83.2	77.1	71.1	63.2	57.1	53.6	51.1	47.6	43.2	39.6	37.1	31.1
FEL - Bell L1806C	102.7	77.7	71.7	65.7	57.7	51.7	48.2	45.7	42.1	37.7	34.2	31.7	25.7
Flotation (Agitation gearbox)	104.4	79.4	73.4	67.3	59.4	53.4	49.8	47.3	43.8	39.4	35.9	33.4	27.3
General noise	108.8	83.8	77.8	71.8	63.8	57.8	54.2	51.8	48.2	43.8	40.3	37.8	31.8
Grader - Operational Hitachi	108.9	83.9	77.9	71.9	63.9	57.9	54.4	51.9	48.4	43.9	40.4	37.9	31.9
Grizzly Feeder	96.1	71.2	65.1	59.1	51.2	45.1	41.6	39.1	35.6	31.2	27.6	25.1	19.1
JBL TLB	108.8	83.8	77.8	71.8	63.8	57.8	54.3	51.8	48.3	43.8	40.3	37.8	31.8
Pumps (Cavity, slurry, etc.)	89.5	64.5	58.5	52.5	44.5	38.5	35.0	32.5	28.9	24.5	21.0	18.5	12.5
Road Transport truck (30t, FM)	109.6	84.7	78.7	72.6	64.7	58.7	55.1	52.6	49.1	44.7	41.1	38.7	32.6
Screen	87.1	62.2	56.1	50.1	42.2	36.1	32.6	30.1	26.6	22.2	18.6	16.1	10.1
Substation	80.9	55.9	49.9	43.9	35.9	29.9	26.4	23.9	20.4	15.9	12.4	9.9	3.9
Thickener (Concentrate)	106.7	81.7	75.7	69.7	61.7	55.7	52.2	49.7	46.2	41.7	38.2	35.7	29.7
Thickener (Tailings)	104.7	79.7	73.7	67.7	59.7	53.7	50.2	47.7	44.2	39.7	36.2	33.7	27.7

10.1.13. Blasting and Vibration

The Blasting and Vibration Impact Assessment for the Somkhele Mine Extension Project was conducted by EARES during 4 – 8 December 2023 and is attached as **Appendix 17** to the EIA. Information sought during the field survey was to identify surface structures present in a 2000 m radius from the proposed open pit areas of Emalahleni, Ophondweni and Mahujini. These structures referred to as Blast Sensitive Structures (BSR) and Potential Sensitive Structures (PSS) include houses, schools, places of religion and gathering as well as roads, powerlines and general infrastructure which will require consideration during modelling of blasting operations.

The BSR for the various project areas are indicated in **Figure 10-32** to **Figure 10-34**.

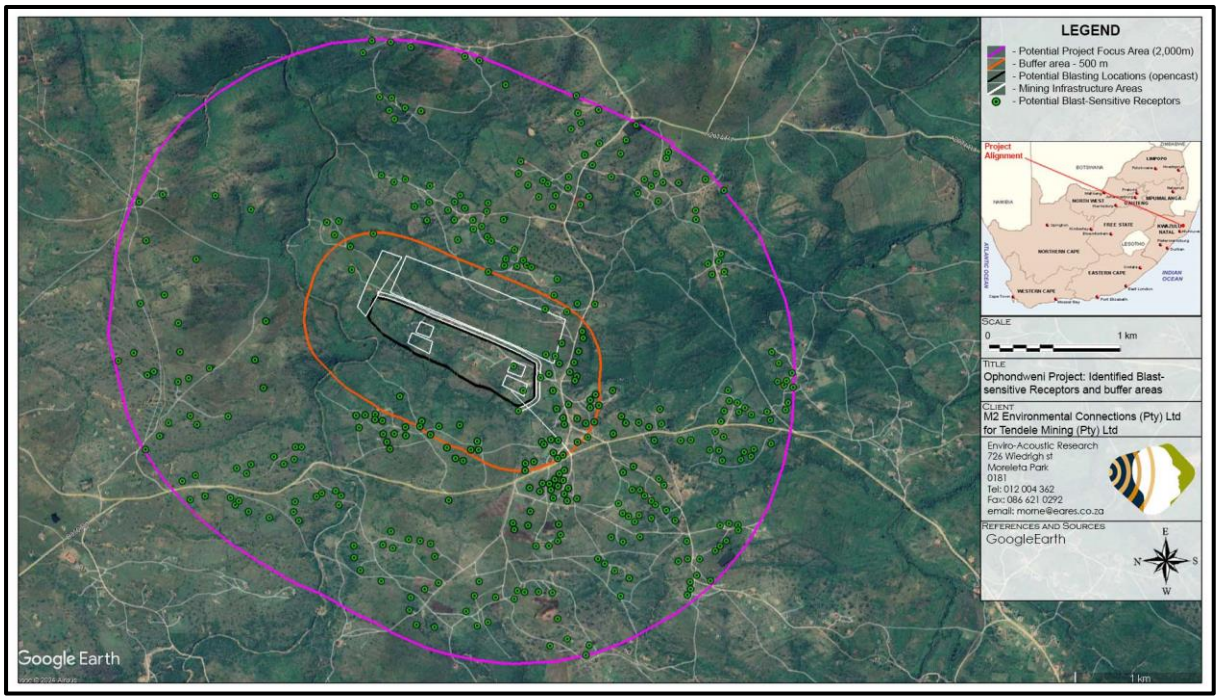


Figure 10-32: Potential BSR within 2000m of blasting area for Ophondweni

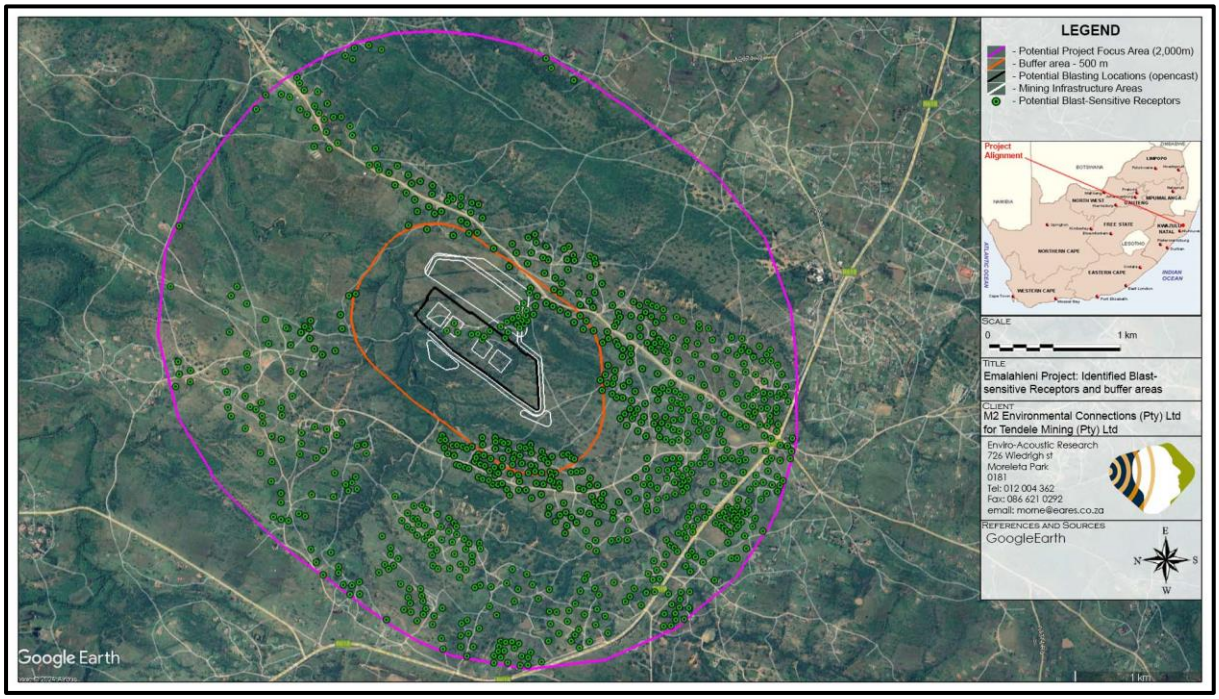


Figure 10-33: Potential BSR within 2000m of blasting area for Emalahleni



Figure 10-34: Potential BSR within 2000m of blasting area for Mahujini

Blasting and vibration have the potential to generate significant impacts on the receiving environment. There are several aspects that need to be considered prior to the design of a blast. These factors include:

- Desired fragmentation – Material digging/handling/crushing equipment available, any sizing requirements of the blasted rock;
- Rock quality and character – Type of rock (hard, porous, soft), presence of joints, faults, dykes, other intrusions, voids or incomplete zones, presence of water in boreholes;

- Site and safety limitations – Location of structures or property to be protected, distance to utilities or infrastructure, vibration and airblast considerations, traffic control requirements, sensitivity of blast sensitive receptors; and

- Equipment and material limitations – Type and sizes of available drilling equipment, type of explosives available.

For a new project, when little information is available, the following principles are considered:

- The blast is more efficient when one or more free face is available (the rock being blasted can break into a certain direction). This is generally possible during typical opencast mine blasting[6];
- For boxcut or developmental blasting (blasting in a confined environment) an open void or space must be available into which the blasted rock can move/expand. In such instances sufficient timing delays should be implemented to ensure that fractured rock from the initial blastholes is expelled to allow room for following blastholes to expand;
- The better the explosives are confined in the borehole (charging process, or the use of an explosive such as an emulsion) the more efficiently the energy is converted to breaking the rock;
- Local geology (strength and character of the rock) and the amount of energy available (from explosion) will determine the burden spacing that can be successfully blasted;
- The optimal borehole diameter should consider fragmentation required, bench height (or the depth of the development/shaft/boxcut), the local geology though the availability of certain drilling equipment may at times be a determining factor;
- Smaller borehole diameters (with smaller burden and spacings) will allow better fragmentation with lower blasting vibration impacts. Smaller borehole diameters unfortunately increase borehole drilling and blasthole loading costs;
- Larger borehole diameters will allow taller bench heights, with larger burden and spacing distances. Drilling and explosive loading costs are less, though blasting vibration impacts could increase.

Once a borehole diameter is selected, an initial blast design could be created using available guidelines and reference manuals. The performance of the blast must continuously be monitored to ensure that the blast is optimized as illustrated in the flow diagram illustrated in **Figure 10-35** below.

[6] A presplit blast is done during the initial development of the boxcut to provide a partial open face.

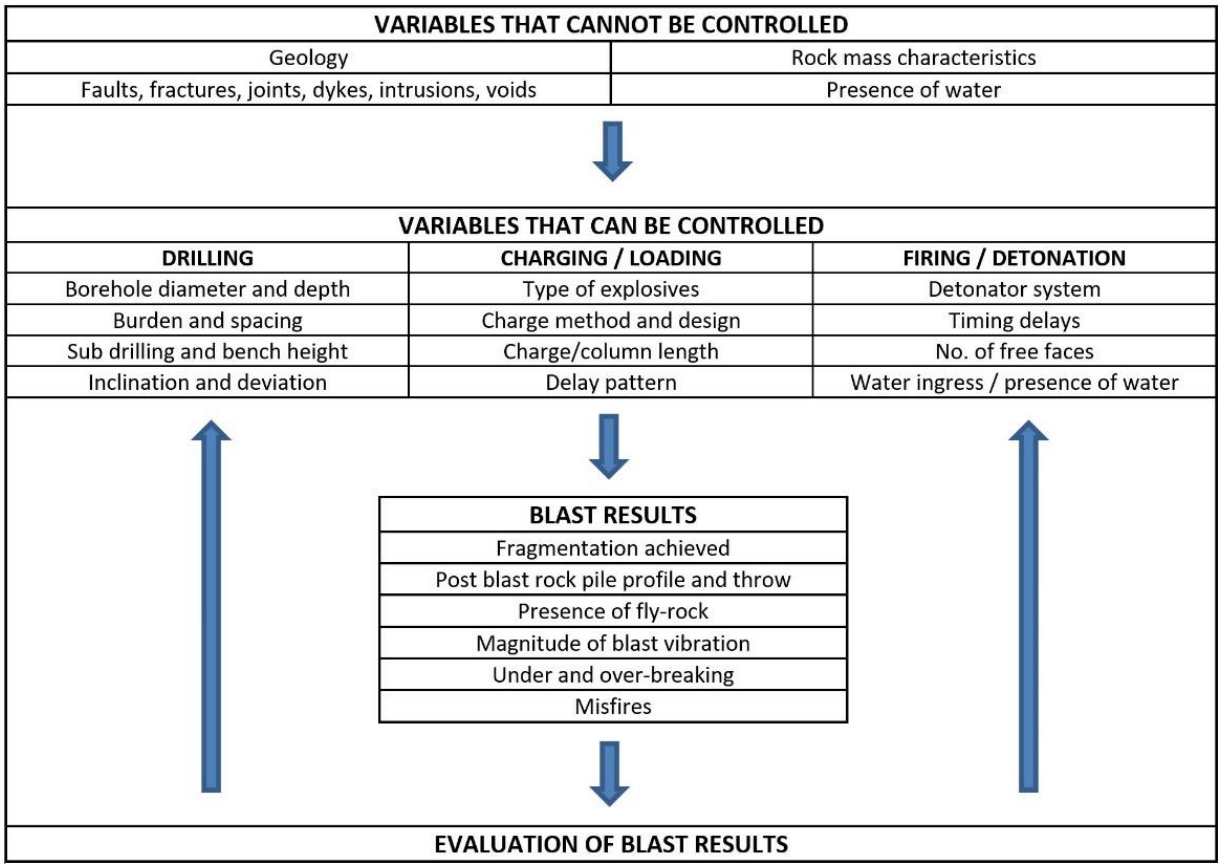


Figure 10-35: Flow diagram illustrating continues optimisation of blasting parameters

Blasting parameters was available for existing mining activities in the project area, and this data was evaluated and considered for this assessment (refer **Table 10-34**).

Table 10-34: Summary of blasting variables from the existing Tendele Mining operations

Date	Blast	Hole diameter (mm)	Burden (m)	Spacing (m)	Max depth (m)	Ave Depth (m)	Stemming (m)	Ave Charge Depth (m)	Distance (m)	Velocity (mm/s)	Frequency (Hz)	Airblast (dB)	Max charge (kg)
2022/04/06	66	165/152	4.5	4.5	9.8	6.2	2.06	4.1	500	1.23	8.83	119.3	200.4
2022/04/08	187	152	4.1	4.5	23.6	15.2	3.9	11.3	444	5.54	8	116.6	520.6
2022/04/08	187	152	4.1	4.5	23.6	15.2	3.9	11.3	477	8.66	10	120.5	520.6
2022/04/08	187	152	4.1	4.5	23.6	15.2	3.9	11.3	477	2.76	10.67	123.1	520.6
2022/04/21	67	165	4.5	4.5	23.5	18.1	2.97	15.1	700	0.22	256	126.1	600
2022/04/21	67	165	4.5	4.5	23.5	18.1	2.97	15.1	500	4.35	32	125	600
2022/04/21	67	165	4.5	4.5	23.5	18.1	2.97	15.1	500	5.23	64	130	600
2022/04/28	69	165	4.5	4.5	14.7	10.3	2.64	7.7	500	2.06	36	120.9	360
2022/04/28	69	165	4.5	4.5	14.7	10.3	2.64	7.7	463	2.93	11	126.9	360
2022/04/28	69	165	4.5	4.5	14.7	10.3	2.64	7.7	660	1.95	9.85	121.6	360
2022/02/03	182	140	4	4	13.6	10.7	5.1	5.6	390	2.62	10	106.9	270
2022/02/09	60	165	4.5	5	24	16.6	3.6	13	500	5.21	10.4	107.5	550
2022/02/09	60	165	4.5	5	24	16.6	3.6	13	500	3.86	9.1	132.3	550
2022/02/21	183	152	4.1	4.5	21	16.5	2.8	13.7	445	5	7.9	106	460
2022/02/21	183	152	4.1	4.5	21	16.5	2.8	13.7	452	13.25	16.5	121.6	460
2022/02/25	63	165	4.5	4.5	21.1	10.3	1.94	8.4	500	3.86	32	119	520
2022/02/25	63	165	4.5	4.5	21.1	10.3	1.94	8.4	750	2.35	14.6	124.1	520
2022/02/25	63	165	4.5	4.5	21.1	10.3	1.94	8.4	500	2.85	32	115.2	520
2022/06/03	73	165	4.5	4.5	19.5	10	2.97	7	500	2.25	32	125.3	520
2022/06/03	73	165	4.5	4.5	19.5	10	2.97	7	600	1.74	7	116.6	520
2022/06/03	73	165	4.5	4.5	19.5	10	2.97	7	460	2.42	51	123.8	520
2022/06/08	74	165	4.5	4.5	23.1	20.8	2.27	18.5	750	1.93	10.67	134.7	582
2022/06/08	74	165	4.5	4.5	23.1	20.8	2.27	18.5	500	3.06	13.47	134.1	582
2022/06/08	74	165	4.5	4.5	23.1	20.8	2.27	18.5	500	8.8	11.64	130.9	582
2022/06/15	75	165	4.5	4.5	22.6	19.2	2.88	16.3	500	3.48	39.4	118.3	620
2022/06/15	75	165	4.5	4.5	22.6	19.2	2.88	16.3	700	2.2	18.9	131.1	620
2022/06/15	75	165	4.5	4.5	22.6	19.2	2.88	16.3	550	4.96	56.9	123.1	620
2022/06/27	76	165	4.5	4.5	22.6	17	3.18	13.8	500	4.5	8	128.6	600
2022/06/27	76	165	4.5	4.5	22.6	17	3.18	13.8	500	3.48	17	117.9	600
2022/06/27	76	165	4.5	4.5	22.6	17	3.18	13.8	750	1.64	11	124.5	600
2022/03/03	185	152	4.1	4.5	22.9	16.8	1.7	15.1	440	6.43	8.26	116.1	460
2022/03/03	185	152	4.1	4.5	22.9	16.8	1.7	15.1	470	7.79	8.8	115.9	460
2022/03/03	185	152	4.1	4.5	22.9	16.8	1.7	15.1	730	1.6	9.1	111.2	460

10.1.13.1 Blasting and Human Perception

Human response to blasting is subjective, as two people will react differently to the same vibration event depending on where they are in a structure, their frame of mind and their personality. Unfavourable reactions to vibrations may often result in complaints. When residents feel a blast, they may become concerned about damage to their home.

The threshold peak particle velocity of ground vibration perception is about 0.51 mm/s for most people. This is 1/100 of the limit of 50 mm/s commonly used for construction blasting. People in different living environments normally perceive blasting as negative. If a project is not perceived as beneficial to a community, blasting on the project may be unwelcome.

In addition, during a blast event, people inside a building tend to perceive\experience\feel the vibrations differently than people outside a building. People inside a structure are immersed in the vibration event and often cannot tell the source of the vibration. The windows may rattle and there may be other structure responses that enhance their perception of the event. They can also perceive structure vibrations that are well below levels that could possibly cause threshold damage, yet, due to the fear of potential damage, this perception could be result in an increased response (stress, complaints, etc.). On the other hand, a person outside a structure will not notice any of the structure responses. Therefore, their perception of the event will generally be much less, mainly relating to the audible noise or the pressure changes relating to the air blast.

10.1.13.2 Why Blasting Concerns Communities

For hard rock mining, blasting is considered as the most efficient and economical method used for fragmenting rocks masses. Nonetheless, in reality only 20-30% of the available energy is used for rocks fragmentation and displacement, while the rest is wasted in the form of ground vibration, air blast, noise and fly-rocks.

Ground vibration and air blast are a matter of great concern as they could result in damage to existing surface structures and generate nuisances to the receptors in the vicinity of mines.

Currently there are no specific legislation pertaining to blasting vibration levels, air blast levels and fly rock control in South Africa. However, most developed countries have ground vibration standards, although most of these standards are based on the following three standards/guidelines, namely:

- Vibration criteria as published by the US Bureau of Mines (USMB) and the US Office of Surface Mining (OSM) – USBM RI 8507 only focus on potential blasting impacts.
- The Swiss standards (SN 640 312a) that are effectively three different standards; one used for blasting, one for pile driving and one used for machines and traffic.
- Vibration limits as developed by the Federal Transit Administration (FTA Noise and Vibration Manual) – used for road construction and traffic.

The Blasting and Vibration Report used the vibration criteria as published by the US Bureau of Mines (USMB) to define the potential impact of blasting vibration on the surrounding environment.

10.1.13.3 Ground Vibration

Humans begin to perceive ground vibration at around 0.12 mm/s PPV, a level significantly lower than the vibration level where damage may start to occur. The longer a vibration of a given peak velocity lasts; the more disturbing people will find it. In addition, the longer a vibration lasts, the greater the probability of it causing damage, all other things being equal. It should be noted that there is no correlation between vibration complaints and the ground vibration level, as people may start to complain about vibration even at very low levels.

Chiappetta (2000) and Griffin (1996) defined ground vibration levels for different frequencies as defined in **Table 10-35** and illustrated in **Figure 10-36**.

Table 10-35: Human response to ground vibration

Effects on Humans	Ground vibration Level (mm/s)	Comment (FRA, 2012)
Imperceptible	0.025 – 0.076	The vibration level ± 270 - 130 m from a vibratory roller
Barely perceptible	0.076 – 0.254	The vibration level ± 130 - 58 m from a vibratory roller
Distinctly perceptible	0.254 – 0.762	The vibration level ± 58 - 28 m from a vibratory roller
Strongly perceptible	0.762 – 2.540	The vibration level ± 28 - 13 m from a vibratory roller
Disturbing	2.540 – 7.620	The vibration level closer than 13 m from a vibratory roller
Very disturbing	7.620 – 25.400	The vibration level right next to a vibratory roller

Vibration damage probability, as with many other quantities in science, roughly follows an S-shaped "sigmoid curve", as a function of vibration intensity. Over a range of low vibration intensities, no houses are damaged. At these low intensities, people may be able to feel the vibration, even though no visible damage is done. At the highest vibration velocities (intensities), virtually all structures experiencing the vibration can visibly be damaged. Essentially all the people feeling such a high intensity vibration will be made distinctly uncomfortable by it. This report uses a limit of 2.54 mm/s as a potentially disturbing and 7.6 mm/s very disturbing.

The USBM RI 8507 standard is generally accepted in South Africa. This standard was developed through research and available data over a number of years and focus on the protection of structures from potential damage. It uses an analysis graph that considers vibration amplitudes and frequency to define the risk of potential structural damage due to ground vibration (see also **Figure 10-36**). To minimise complaints from receptors, vibration levels should ideally be kept beneath the "unpleasant" curve (this is measured from actual blasts).

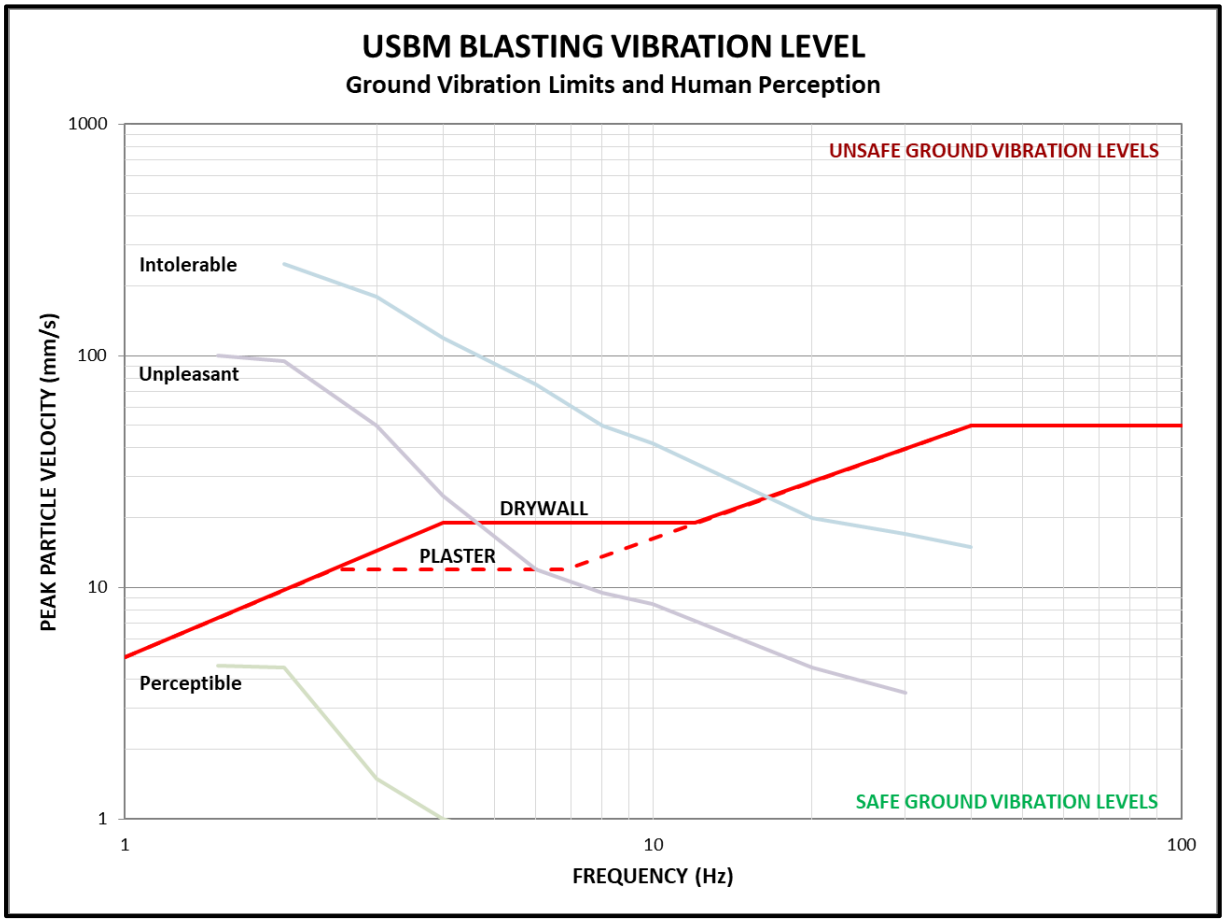


Figure 10-36: Human vibration sensitivities and potential structural damage compared to the RI 8507 limits

To avoid damage to buildings, ground vibration levels should be within the "safe" area as highlighted in **Figure 10-36**. Information from USBM RI 8507 indicates that 50% of homes will experience "threshold damage" at a velocity of about 51 mm/s. For "minor" damage, that 50% point is at about 76 mm/s, while for "major" damage, it is at about 100 mm/s. At the 5% probability level, the PPV for threshold damage from blasting vibrations is about 18 mm/s, based on the same data (drywall construction). The OSM and RI 8507 19 mm/s mid-frequency limits are, thus, set at a level which has approximately a 5% probability of causing damage to a drywall from direct ground vibration.

These limits are developed for different types of structures and materials and highlighted in **Table 10-36**. This report will use the vibration limits as defined below, including a 6 mm/s limit for potential sensitive structures (though none were identified for this project). This assessment will also use a limit of 50 mm/s for potential cement dams, even though Bauer (1977) reports cracking of concrete blocks at a PPV of 203 mm/s. This may be a very precautious approach, as the cement structures may be reinforced concrete (which would be more resilient to vibration impacts). There are no guidelines for graves and sites of cultural importance, with this report considering a limit of 150 mm/s for graves and sites of cultural significance.

Table 10-36: Ground vibration limits for various structures

Material / Structure	Ground vibration limit (mm/s)
National Roads / Tar Roads / Railways	150
Electrical Lines (steel pylons) and steel structures	75
Steel pipelines, cement dams	50
Sensitive Plant equipment, mortar and brick houses, boreholes[7]	25
Sensitive structures, adobe and informal houses	6
Buildings extremely susceptible to vibration damage	3

10.1.13.4 Air blast concerns

Air blasts can cause discomfort to persons and, at high levels, damage to structures. At very high levels, it may even cause injury to people. Air blasts could also interact with structures and create secondary noises which people detect, raising their concern about the blasting activity. While rare, window breakage may be the result of an air blast. Air blast levels that may result in damage were estimated by Persson (1994) and Oriard (2002) and is defined in **Table 10-37**.

Table 10-37: Air blast levels that may result in damage or complaints

Descriptor	Acoustic Level (dB)
Air pressure from an 11 m/s wind gust.	110
Annoyance threshold in Australia. Mildly unpleasant.	115
Recommended limit in Australia for sensitive sites.	**120**
Resonant response of large surfaces (roofs, ceilings). Complaints start.	130
Limit for human irritability, USBM and OSMRE limit.	**134**
Some windows break.	150
Most windows break.	170
Structural Damage.	180

10.1.13.5 Fly-rock concerns

Fly rock is a significant danger to people, equipment and structures with damage due to this being undeniable. Mines therefore go through significant effort to ensure that the risks from fly rock are absolutely minimized due to the potential penalties to the mine if fly-rock complaints are registered. These penalties may be institutional consequences (regulatory directives, fines, legal action) and monetary compensation. As such there should be no risk of fly rock at structures or where people or animals may congregate. This is the main reason for the 500 m exclusion zone around blasting activities.

10.1.14. Visual

The Visual Impact Assessment (VIA) Report conducted by GCS Water and Environmental Consultants (GCS, 2024) is attached as **Appendix 4** to the EIA.

[7] Boreholes may be associated with the cement dams, water reservoirs and BSR

The initial Visual Impact Assessment (VIA) was conducted in 2013 and was later updated in 2020 for the reason that the 2013 assessment did not account for all mining infrastructure and the impact rating system differed to the system applied to the more recent VIA. Another updated VIA needed to be completed in 2023 as per recommendation in the previous VIA for any change in designs of the existing or proposed mining pits or overburden dumps.

The effect that the proposed mining areas will have on the environment was modelled to quantify the extent of their visual effect by using the proposed elevations available. Potential receptors were initially identified within a 10-kilometre radius of the site which included the identified main receptors, namely the Hluhluwe-iMfolozi Park (HiP) and the R618 regional road.

The overall results of the visual impact of the proposed mining areas showed that the HiP will experience a medium to high and a low to medium visual impact to the west of the park boundary looking in an easterly direction towards the visual triggers. Additionally, medium to high and medium visual impacts were noticed approximately 16 km along the R618 eastwards of the park. Overall, the analysis indicated that the visual impacts of the proposed mining areas will be constrained mostly to the north and the south of the mining areas and will have a medium to high impact along portions of the R618 and a low to medium impact within the HiP. This is due to the changes in topographic ranges in the region acting as a screen for the development to the park and portions of the R618.

10.1.15. Social

10.1.15.1. Population Distribution and Growth

The Socio-Economic Impact Assessment as conducted by Urban Econ covers the greater region and include communal areas such as Esiyembeni and Myeki that is not part of the primary project area of Emalahleni, Ophondweni and Mahujini. The primary area of impact had a total of 14,702 residents and 2,940 households in 2022. In contrast, the secondary area of impact, which is the wider region of Mtubatuba municipal area, encompasses 175,425 individuals and 34,905 households (refer **Table 10-38**). The primary area of impact represents approximately 8.0% of the entire Mtubatuba municipal area. This suggests that the proposed development will directly affect only a limited segment of the population, while the majority of the Mtubatuba municipal area will only experience indirect impacts.

Table 10-38: Population Statistics

Community	Population	Households	Average Household Size
Myeki	4706	939	5,0
Machibini	3064	606	5,1
Ophandweni	2795	654	4,3
Esiyembeni	832	186	4,5
Mahujini	2674	554	4,8
Mtubatuba	175425	34905	5,0

10.1.15.2. Age and Gender

Table 10-39 below depicts the age distribution of the population within the area of impact.

Table 10-39: Age distribution within primary area of impact

Age Group Years	Myeki	Machibini	Ophondweni	Esiyembeni	Mahujini
	%				
0 – 9	57,4	55,4	57,2	57,1	57,7
10 – 19	16,0	15,0	18,7	20,2	20,7
20 – 29	6,2	4,6	7,6	8,0	7,5
30 – 44	1,6	4,2	6,6	6,5	5,5
45 – 54	4,4	8,3	5,2	3,2	3,0
55 – 64	1,5	7,2	1,8	2,5	2,7
65+	12,9	5,3	2,9	2,5	2,9

The data demonstrates that, across the primary area of impact, the majority of the populace falls within the age range of 0 to 9 years. About 22% of the population falls within the age range of 20 to 64 years, which is the demographic most inclined to engage in economic activities. The remaining populace is comprised of individuals outside the working-age bracket and relies on the economically active segment of the population. The considerable working-age population will encounter numerous benefits as a result of the mining activities. Throughout the mining phase, it will reap the advantages of an increased number of employment opportunities introduced to the area.

The analysis of a gender profile is essential for promoting gender equality, empowering women, addressing gender disparities, and fostering inclusive and sustainable development outcomes that benefit all members of the community. **Table 10-40** below depicts the gender profile of the affected communities.

Table 10-40: Gender profile

Area	Male	Female	Total
Myeki	47%	53%	100%
Machibini	45,7%	54,3%	100%
Ophondweni	45,2%	54,8%	100%
Esiyembeni	43,8%	56,2%	100%
Mahujini	45,4%	54,6%	100%

The primary area of impact is headed by women, accounting for at least 53% of the total population. This gender distribution in this area will have profound implications for mining activities. The mining company and stakeholders will have to ensure the promotion of gender equality in its operations, this will potentially enhance the positive impacts, mitigate adverse effects, and contribute to more inclusive and sustainable outcomes for all members of the community.

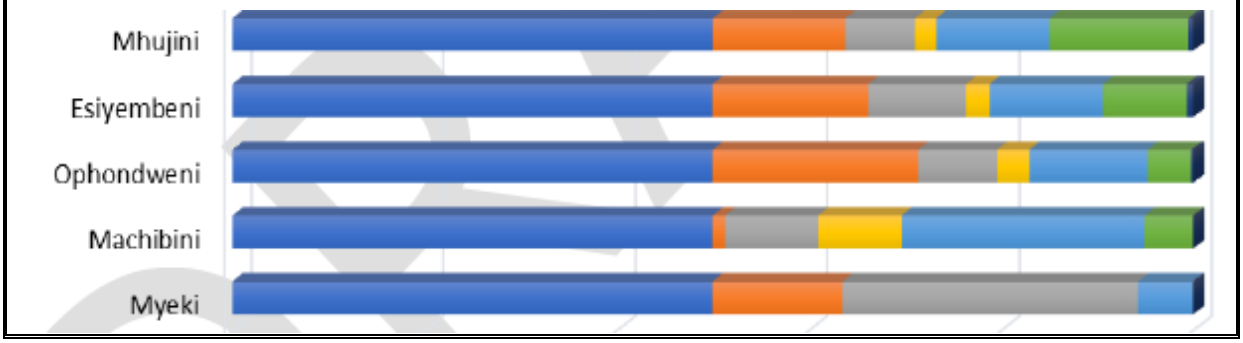
10.1.15.3. Education Level

The educational profile of a region is an essential element in evaluating the socio-economic impacts of mining development. A well-educated population can positively influence workforce readiness, community engagement, infrastructure development, environmental awareness, and overall social and economic well-being. Conversely, areas with lower education levels may face challenges in maximizing the benefits and mitigating the potential negative impacts associated with mining activities.

Table 10-41 below depicts the education profile of the Project Area.

Table 10-41: Education Profile

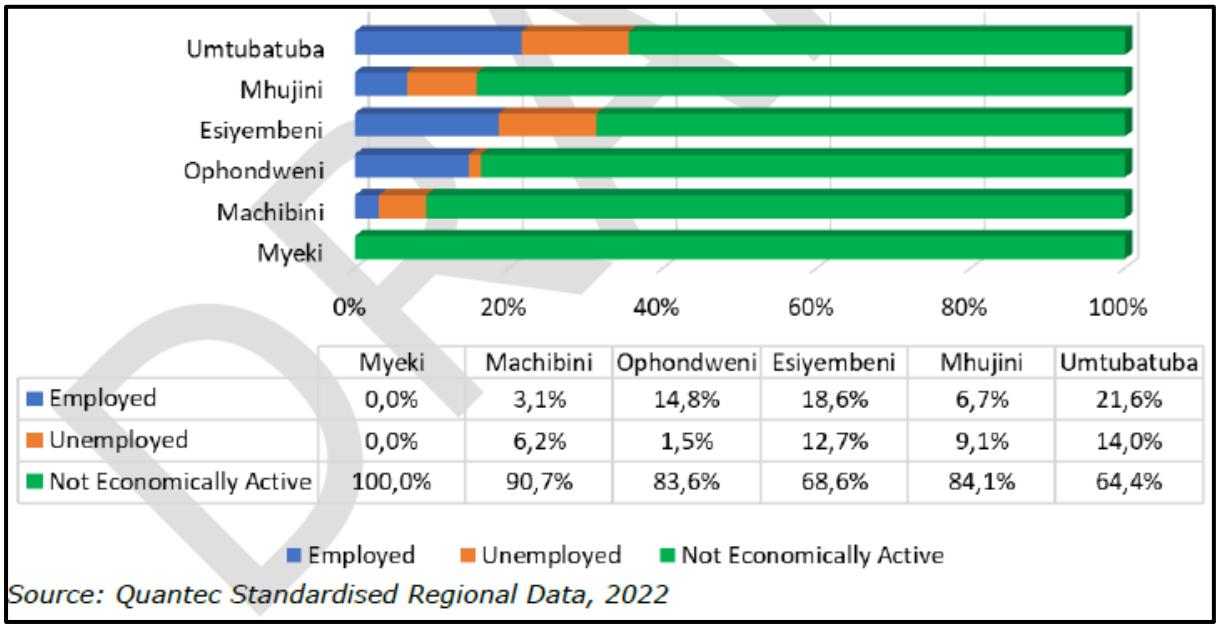
Education level	Myeki	Machibini	Ophondweni	Esiyembeni	Mahujini
No Schooling	50,0%	50,0%	50,0%	50,0%	50,0%
Some primary	13,5%	1,2%	21,4%	16,2%	13,8%
Complete primary	30,8%	9,7%	8,2%	10,2%	7,3%
Some Secondary	0,0%	8,7%	3,4%	2,4%	2,2%
Grade 12	5,7%	25,3%	12,3%	11,9%	11,8%
Higher	0,0%	5,1%	4,6%	8,7%	14,5%
Unspecified	0,0%	0,0%	0,2%	0,6%	0,5%



In the primary area of impact, the majority of the population has no schooling, this may pose significant challenges to both the mining operations and the local population. This poses limits on the number of people within working age population who have decent skill levels (see figure below). Majority of the working age population in the primary area of impact is semi-skilled and low skilled, accounting for 39.5% and 30.4% respectively.

10.1.15.4. Employment Levels

The employment levels in an area are a critical factor in assessing the socio-economic impact of a potential mining development. The impact of employment can be multifaceted and has implications for various aspects of the community. The figure below (refer **Figure 10-37**) depicts the employment profile for the population within the Project area.



	Myeki	Machibini	Ophondweni	Esiyembeni	Mhujini	Umtubatuba
Employed	0,0%	3,1%	14,8%	18,6%	6,7%	21,6%
Unemployed	0,0%	6,2%	1,5%	12,7%	9,1%	14,0%
Not Economically Active	100,0%	90,7%	83,6%	68,6%	84,1%	64,4%

Figure 10-37: Employment status of population ages 15 - 64 within area of impact

In terms of employment by sector, the community, social and personal services sector accounts for the largest employment at 29.6%. Wholesale and retail trade accounts for the second largest share at 19.8%, followed by the agricultural sector and finance and insurance both accounting for 13.2%. The mining sector accounts for the second lowest sector share of employment at 1.4%, the proposed mining activities in the area have a potential to enhance employment in this sector and other sectors such as construction industry and the transportation and storage industry.

Table 10-42: Primary area of impact Employment by Sector

Sector	Employment %	GVA %
Agriculture, forestry and fishing	13,2	11,8
Mining and quarrying	1,3	3,2
Manufacturing	5,4	8,4
Electricity, gas and water	0,4	2,4
Construction	5,4	3,1
Wholesale and retail trade, catering and	19,8	9,8
Transport, storage and communication	3,4	8,2
Finance, insurance, real estate	13,2	16,9
General government	8,4	12,8
Community, social and personal services	29,6	23,6

10.1.15.5. Employment Levels

The household income plays a pivotal role in evaluating the socio-economic consequences of mining ventures by providing significant insights on poverty levels, income distribution, economic diversification and the external costs associated with resource extraction. Examining these factors allows stakeholders to reach well-informed conclusions about project planning, implementation, and mitigating measures to maximize benefits and minimize adverse effects on local communities. **Table 10-43** below depicts the household income within the zone of influence.

Table 10-43: Average annual household income for primary area of impact

Threshold	Myeki	Machibini	Ophondweni	Esiyembeni	Mahujini
No income	10,8%	26,8%	44,6%	0,1%	20,4%
R1 – R4,800	0,5%	0,1%	12,3%	0,1%	6,4%
R4,801 – R9,600	2,7%	1,3%	37,4%	0,1%	4,7%
R9,601 – R19,200	21,0%	6,5%	4,0%	0,6%	19,9%
R19,201 – R38,400	36,4%	14,5%	1,0%	1,7%	31,0%
R38,401 – R76,800	13,8%	22,1%	0,3%	0,1%	7,8%
R76,801 – R153,600	6,4%	1,5%	0,2%	42,3%	4,5%
R153,601 – R307,200	8,0%	26,4%	0,0%	0,0%	2,6%
R307,201 – R614,400	0,4%	0,5%	0,0%	0,0%	1,8%
R614,401 – R1,228,800	0,0%	0,4%	0,1%	0,0%	1,8%
R1,228,801 – R2,457,600	0,0%	0,0%	0,0%	0,0%	0,0%
> R2,457,601	0,0%	0,0%	0,0%	0,0%	0,0%

The primary area of impact is characterised by very low-income and low-income households. Ophondweni accounts for the highest number of households under the low-income category at 99.9% followed by Mahujini accounting for the second lowest percentage of households at 94.7%. In terms of the greater regional context, Esiyembeni is the only area with the majority of households under the emerging middle-class category, households within this category account for an estimated 55.1% of the total households.

The income levels within the affected communities highlight a need for more ways for people to earn money and to earn a satisfactory living monthly income. Considering this, the proposed development could play a crucial role in boosting employment and, as a result, improving monthly incomes for people in these regions.

The mining and quarrying sector is the second lowest contribution to the municipality's GVA at 3.2% (refer **Table 10-42**). The proposed mining activities in the area will have positive implications in terms of growth for this sector.

10.1.16. Cultural Heritage

The Cultural Heritage Impact assessment was conducted by PGS Heritage (Pty) Ltd and is included as **Appendix 5** of the EIA.

An archival and historical desktop studies were undertaken during 2014, 2020 and 2024 to provide a historic framework for the project area and surrounding landscape. This was augmented by a study of available historical and archival maps and an assessment of previous archaeological and heritage studies completed for the area. The desktop study revealed that the surroundings of the study area are characterised by a long and significant history, whereas previous archaeological and heritage studies from this area have revealed several archaeological and heritage sites from the surroundings.

10.1.16.1. Paleontological Context

A Palaeontological Impact Assessment was conducted by Banzai Environmental (March, 2024).

The Somkhele mine Extension is underlain by Jurassic dolerite and the Letaba Formation of the Karoo Igneous Province, the Ntabene and Emakwezini Formation both of the Beaufort Group as well as the Vryheid Formation of the Ecca Group (Karoo Supergroup). The potential fossiliferous sedimentary bedrocks of the Beaufort and Ecca Groups have often been thermally metamorphized by overlying dolerite sills thus compromising their palaeontological sensitivity. The PalaeoMap of the South African Heritage Resources Information System (SAHRIS) indicates that the sediments of Jurassic Dolerite are Zero, the Letaba Formation has a Low Palaeontological Sensitivity, that of the Ntabene Formation is High, while that of the Emakwezini Formation and Vryheid Formations are Very High (Almond et al., 2013; SAHRIS website). Based on the DFFE Screening Report, the suggested area has a Very High Palaeontology Theme Sensitivity. Updated geology (2014, Council for Geosciences, Pretoria) indicates that the Somkhele Mine extension is underlain by the Elliot Formation and Molteno Formations (Stormberg Group) as well as the Emakwezini Formation and Vryheid Formation of the Beaufort Group.

Based on a four-day field survey supported by desktop research it was detected that fossiliferous outcrops were detected within the footprint of the proposed development. The fossil heritage is of scientific and conservational interest. This finding is in agreement with the Very High Sensitivity allocated to the development area by SAHRIS Palaeo-sensitivity Map (refer **Figure 10-38**).

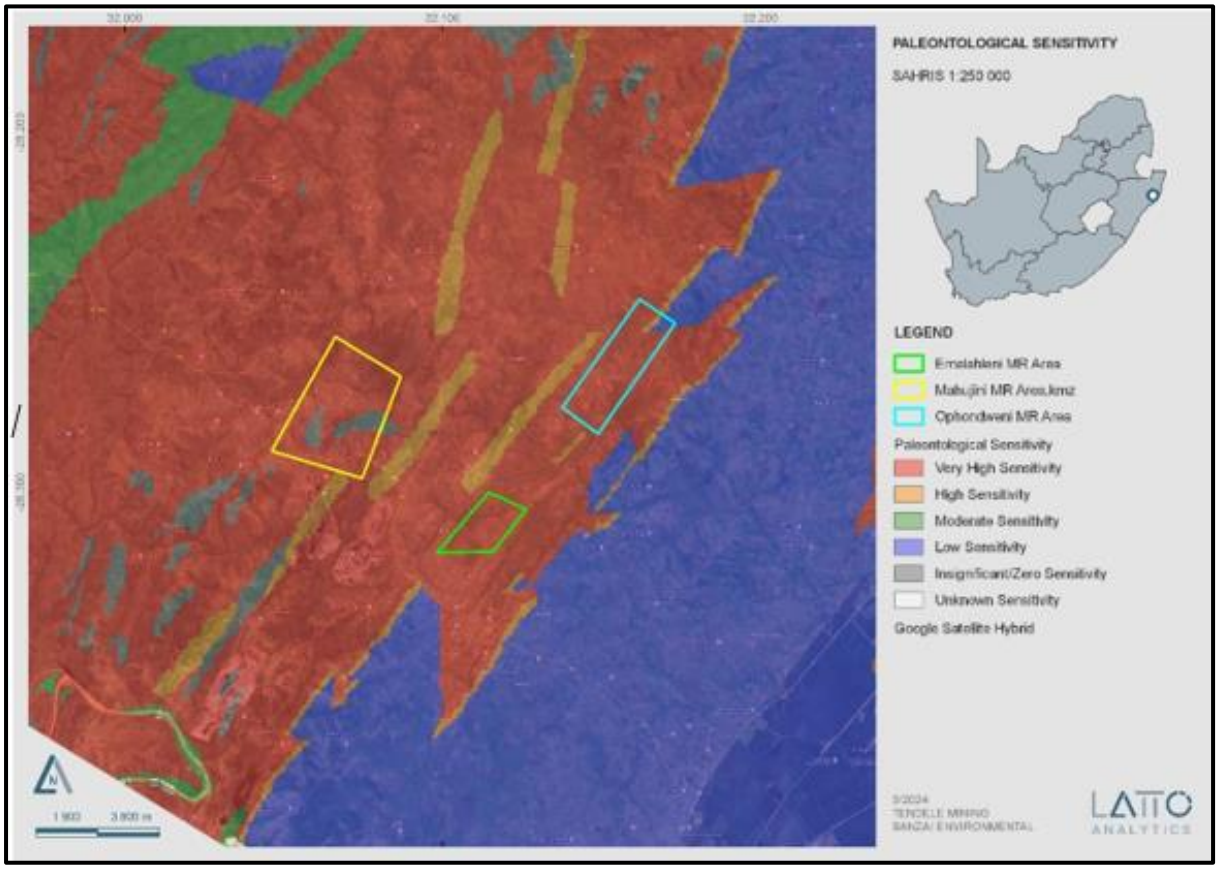


Figure 10-38: SAHRIS Palaeo-sensitivity map

The Emakwezini Formation consists chiefly of fossiliferous, brown, grey and greenish-grey mudstones with coal seams, as well as subordinate yellow-white or white, primarily medium-, but locally coarsely grained, commonly feldspathic sandstones. Very rarely, discontinuous limestone lenses are present.

In the upper parts of the Emakwezini Formation the Bordy and Prevec (2008) study uncovered the following plant fossils for first time: *Dictyopteridium flabellatum, Rigbya arberioides, Lidgettonia spp.,* and *Trizygia speciosa*. Investigations in the lower part of the formation and in actively mined coal seams new flora includes the glossopterid fructification *Ottokaria sp*. and the sphenopsid *Schizoneura gondwanensis*. The former is known from the Lower Permian while the latter is typical of the Upper Permian in South Africa. The above-mentioned flora is atypical of South African Glossopteris flora (Bordy and Prevec, 2015) and is thus important for study and collection.

Previous work on fossil plants from borehole core and railway cuttings include that of Etheridge (1902), Seward (1907) and Plumstead (1970). These authors describe various taxa namely *Glossopteris spp., Ottokaria sp., Vertebraria indica, Schizoneura gondwanensis, Phyllotheca spp*. and *Dictyopteridium* in carbonaceous shales associated with coal seams. Plumstead (1970) allocated the Emakwezini Formation to the Upper Permian by the presence of *Dictyopteridium* and *Phyllotheca spp*. The study by Banzai (2024) has encountered fossilized leaves as illustrated in **Figure 10-39**.



Figure 10-39: Fossilized leaf imprints found *in situ* in mudstone

10.1.16.2. Heritage Resources identified

PGS Heritage has completed an updated Heritage Impact Assessment (HIA) Report during March 2024. The study covers all three areas that form part of the Somkhele Extension Project. The Mahujini study is covered in a separate report and is included as part of **Appendix 5** of the EIA.

The first fieldwork by PGS was undertaken in 2018 and 2019. During this fieldwork, PGS identified:

- A total of 24 archaeological and heritage sites in the Ophondweni area, including 11 archaeological records and 14 heritage sites;
- A total of 25 archaeological and heritage sites in the Emalahleni area, including six archaeological records and 19 heritage sites; and
- A total of 47 graves were recorded during the household survey. These graves included 21 households and 3 burial grounds. No photographs of the graves were taken during this survey, out of respect for the Next-of-Kin.

In 2024, PGS undertook more fieldwork as part of the HIA update to capture existing and new heritage resources located within the development footprint areas currently proposed. This fieldwork included additional heritage and household surveys to cover areas not previously assessed and also to address any gaps identified in the previous fieldwork. During these additional surveys, PGS identified additional sites across the updated Ophondweni and Emalahleni footprints and the proposed haul road. These newly identified sites were collated with the previous fieldwork findings and the grave information recorded

by the mine to produce a single heritage inventory for each area. In this regard, it is important to note that the Nyalazi River was taken as the boundary between the two areas in terms of heritage sites identified during the haul road assessment. As a result, sites identified on the Emalahleni side of the river were included in the sites for that area. Similarly, sites identified on the Ophondweni side of the river were included in that area's sites.

The collated inventory of heritage sites, combining the results of the previous and current fieldwork and the grave information collected by the mine, revealed that a total of 115 heritage sites are located within the Emalahleni area, whereas a total of 94 heritage sites are located within the Ophondweni area. A summary of the different heritage resource types is provided in **Table 10-44** below.

Table 10-44: Heritage Resource Types Identified

Resource Type	Emalahleni	Ophondweni	Mahujini
Ancestral Prayer Hut	47	14	1
Archaeological Site	11	1	5
Built Heritage	13	9	2
Burial Grounds	41	69	6
Religious Sites (Other)	3	1	-
TOTAL	**115**	**94**	**14**

10.2. Description of Current Land Uses

10.2.1. Land Capability

Land capability of the Mtubatuba Municipality is theoretically significantly high. Only an estimated 20% of the total land area of the municipality has land with minor limitations to agricultural production. The remaining 80% is either not arable or has severe limitations to agriculture (refer **Table 10-45**). Unfortunately, the limited land for agriculture is decimated by extensive settlement and other land uses. Currently, it appears that commercial agriculture is not a viable land use option for a development programme can be targeted (Mtubatuba SDF, 2018).

Table 10-45: Distribution of Agricultural Land in the project Area

Land Potential	Untransformed Land (ha)	Transformed Land (ha)
Very high land potential	22410,63	44357,49
High land potential	11486,51	4535,30
Good land potential	9867,35	21898,57
Moderately good land potential	24064,19	20640,74
Relatively good land potential	3279,32	3057,83
Low land potential	163,69	38,22
TOTAL	**71271,69**	**94528,1**

Based on the site evaluation, the land capability of the Ophondweni site falls in land capability Class 3 in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (1998), Government Gazette, 20 MARCH 2020): Soils not suitable for arable agriculture, but suitable for grazing (refer **Figure 10-40**).

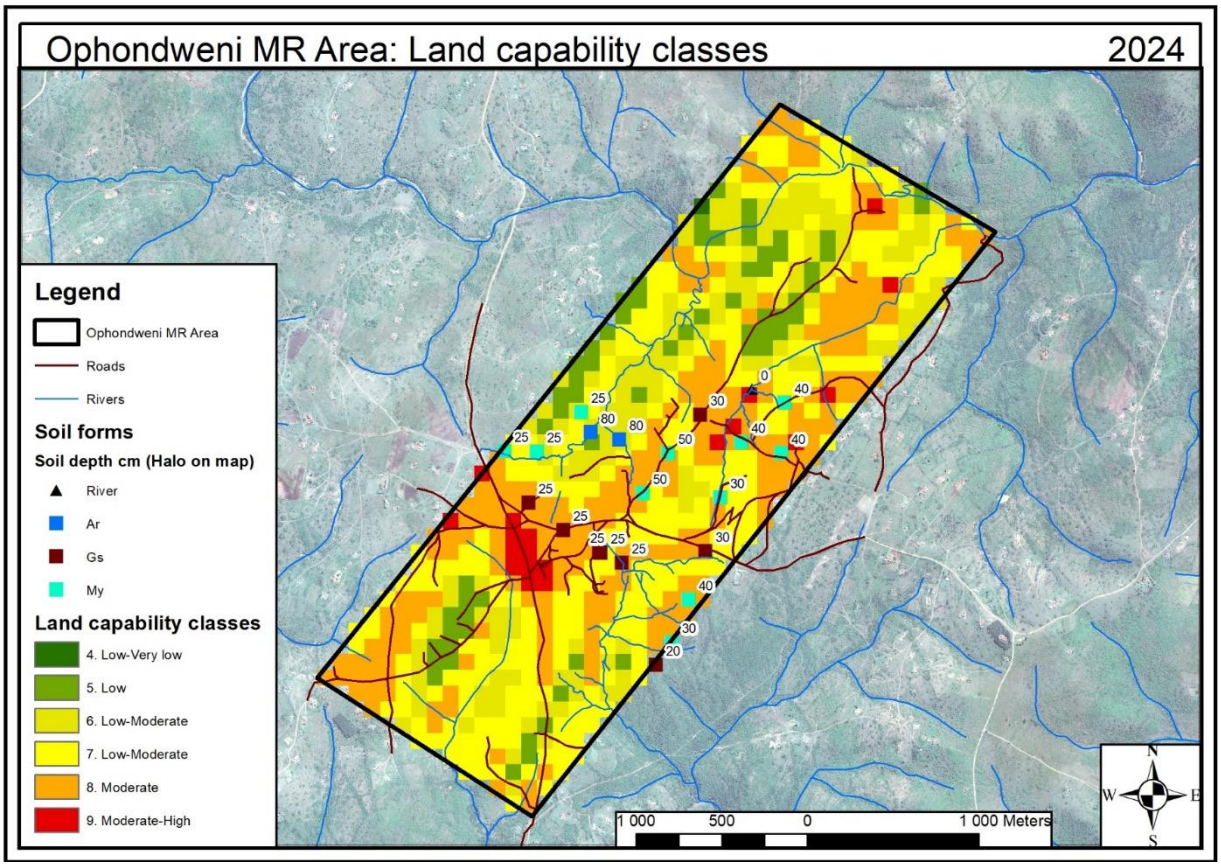


Figure 10-40: Land capability map for Ophondweni

The main variables determining the soil's agricultural potential include the effective depth (mostly <40 cm), clay content (13 to 31%) and rainfall (900 mm) and slope (higher or lower than 8%). The soil forms are mainly Mayo, Glenrosa and Cartref, which represents very shallow and/or swelling-shrinking soils. The soils of Emalahleni are not suitable for arable agriculture from an agricultural viewpoint, but is suitable for grazing, woodland or wildlife (refer **Figure 10-41**). The subsistence farmers have a high value towards cattle and grazing which should be respected. Presently the land is over grazed in large areas, but grazing capacity is not adhered too.

10.2.1.1. Class VII and VIII

The soils at Somkhele are grouped as between Class VII to VIII according to the Klingebiel & Montgomery (1961) classification. The study area has poor suitability with no dominant class as a result of:

- Bush encroachment
- Erosion consisting of sheet (very poor vegetation coverage), rill and donga types
- It is therefore not possible to give an actual agricultural potential class because of combination of abovementioned factors and is classed as a "no dominant" class

As a result of the complexity of the area the class VII to VIII grouping can be justified as outlined below.

- Land in Class VII has very severe limitations that makes it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife.

- Restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as:
  - Very steep slopes.
  - Erosion.
  - Shallow soil.
  - Stones.
  - Low water-holding capacity.
- Land in Class VIII cannot be expected to return significant on-site benefits from management for crops, grasses or trees, although benefits from wildlife use, watershed protection or recreation may be possible.
- Badlands, rock outcrop, sandy beaches, river wash, mine tailings and other nearly barren lands are included in Class VIII.
- Physical conditions are such that it is impractical to apply such pasture or range improvements as seeding, liming and fertilizing.
- Depending on soil characteristics and climate, land in Class VII may be well or poorly suited to woodland.

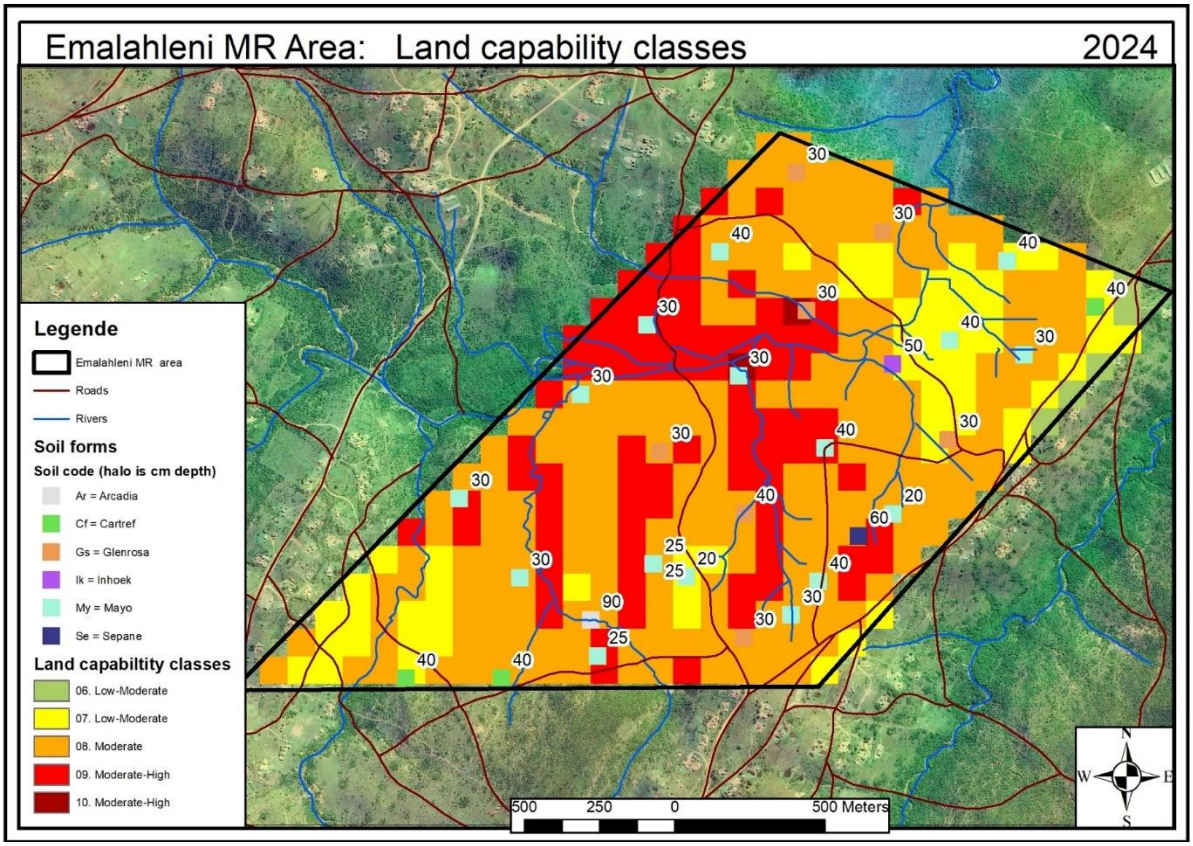


Figure 10-41: Land capability for Emalahleni

10.2.2. Land Use

The land use in the project area forms part of the economic activities which are directly and indirectly water dependent.

The water users in the primary sector that is directly dependant involves irrigation agriculture and commercial forestry. They are divided into the main crops and tree species that are produced in the Usutu to Mhlathuze Catchment. Sugar cane irrigation and gum

trees are the prominent water users that initiate secondary and tertiary sector economic activities. These water users produce different products that keep the sugar and sawmills operational. Several ecotourism facilities are also operating in the study area with the HiP most notable.

10.3. Description of Specific Environmental Features

10.3.1. Rivers and Wetlands

10.3.1.1. River

The project area is drained by the Mfolozi River as part of the W23A quaternary drainage area. The river system has a Present Ecological status of Class B downstream of the Hluhluwe iMfolozi Park (HiP) and an Ecological Importance and Sensitivity rating of Moderate. Further downstream of HiP the Ecological Class falls to Class E due to extensive forestry, irrigated sugar cane and canalisation (DWS, 2022). The main tributaries are the Nyalazi and Mzinene Rivers. The characteristics of the catchment is summarised in **Table 10-46**.

Table 10-46: Regional characteristics of catchment area

Attribute	Project Details
Water User	Tendele Mining Pty (Ltd)
Water Management Area	Pongola to Mtamvuna
Sub-water Management Area	Mfolozi
Quaternary Drainage Region	W23G
Level 1 Eco-region	North Eastern Uplands
Level 2 Eco-region	14.04
Rivers	Black Mfolozi, Nyalazi, Mzinene Rivers
DWS Ecological Importance	High
Rec. Ecological Category	**Class C: Moderately Modified**
SANBI 1999 PES	**Class C: Moderately Modified**
DWAF 2000 PES	**Class C: Moderately Modified**
SANBI NFEPA Status	High

10.3.1.2. Wetlands

According to the Reserve study for the Usutu to Mhlathuze catchments (DWS, 2022) the wetlands in the Upper Umfolozi are mostly in a Class D to F condition. Identified impacts stem from coal mining, sugar cane, forestry and saw mill activities within the catchment. The most notable wetlands in the catchment are the Fuyeni Reedbed, Mvamazi Pan and the Umfolozi Riverine Floodplain. These wetland systems are partly protected. A prominent wetland feature in the catchment is the iSimangaliso Wetland Park as illustrated in **Figure 10-42**.

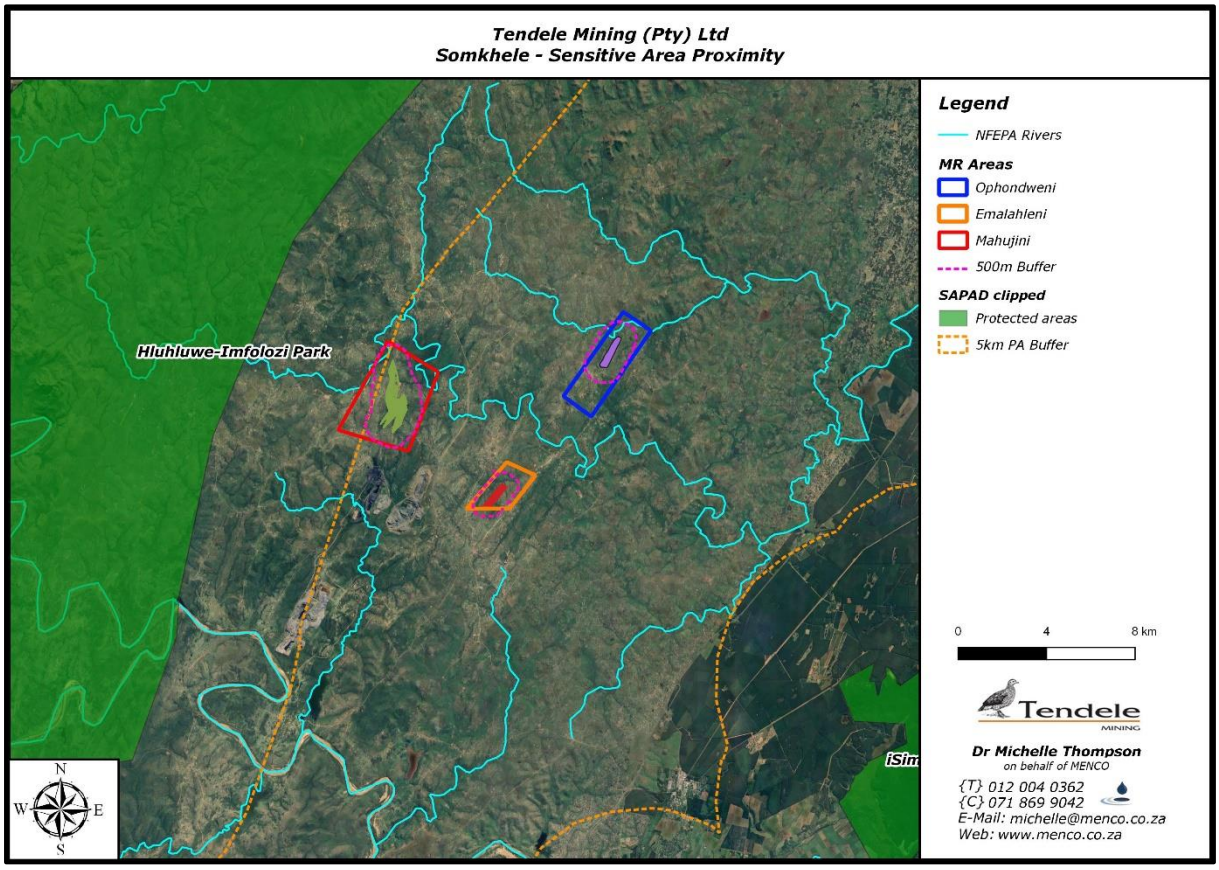


Figure 10-42: Specific environmental features in the catchment

10.3.1.3. Aquatic Ecology

The PES of a river is expressed in terms of various components, i.e. drivers (physico-chemical variables, geomorphology, hydrology) and biological responses (fish, riparian vegetation and aquatic macro-invertebrates), as well as in terms of an integrated state, the EcoStatus. Different processes are followed for each component to assign a category from A to F (where A is natural, and F is critically modified). The Black Umfolozi is rated as a NFEPA with a PES Class C implying that the river is "Moderately Modified". The main reason for this classification is due to the following impacts:

- Coal mining operations and associated consequences;
- Irrigation return-flows and rising salinity levels. The sugarcane plantations along the coastal belt are critical to the Gross Domestic Product (GDP) of the area, together with the sub-tropical fruit grown in the area. Farmers inland concentrate on vegetable, dairy and stock farming;
- Areas of poor land management have resulted in high sedimentation levels in river systems;
- Most of the local municipal WWTW are only partially functional and therefore contribute to some form of pollution within the river catchments.

10.3.2. Terrestrial Landscape and Habitat

There is a large area of more intact Zululand Lowveld south-east of the Emalahleni Site, over 360 hectares in extent. This appears to have been more protected due to its occurrence between stream and drainage lines, beyond which settlement has not yet

penetrated. It is nonetheless facing grazing and browsing impacts, which appear to be quite severe. Furthermore, perhaps due to these impacts (i.e. livestock roam or are herded in), parts are under-burned as a result of which what was likely a more balanced thicket and grassland mosaic is becoming increasingly dominated by thicket. Much of this comprises familiar problem plants and "bush encroachers" such as *Dichrostachys cinerea* (Sickle Bush).

It is in the grassland component of this mosaic that the following species occur, although very locally:

- Species X (Critically Endangered)
- *Oxygonum dregeanum* subsp. *streyi* (Endangered)
- Sensitive Species 1076

These all occur in very small numbers. There are estimated to be no more than 10 examples of Species X, and only a handful of *Oxygonum dregeanum* subsp. *streyi.* Very few species are considered endemic or nearly endemic to the Zululand Lowveld vegetation type and ecosystem, however Species X is likely endemic and the only known population occurs east of Emalahleni (whereas the other threatened species are much more widespread in eastern South Africa and not at any risk of global extinction if eliminated locally). Therefore, protection of Species X has greatest priority.

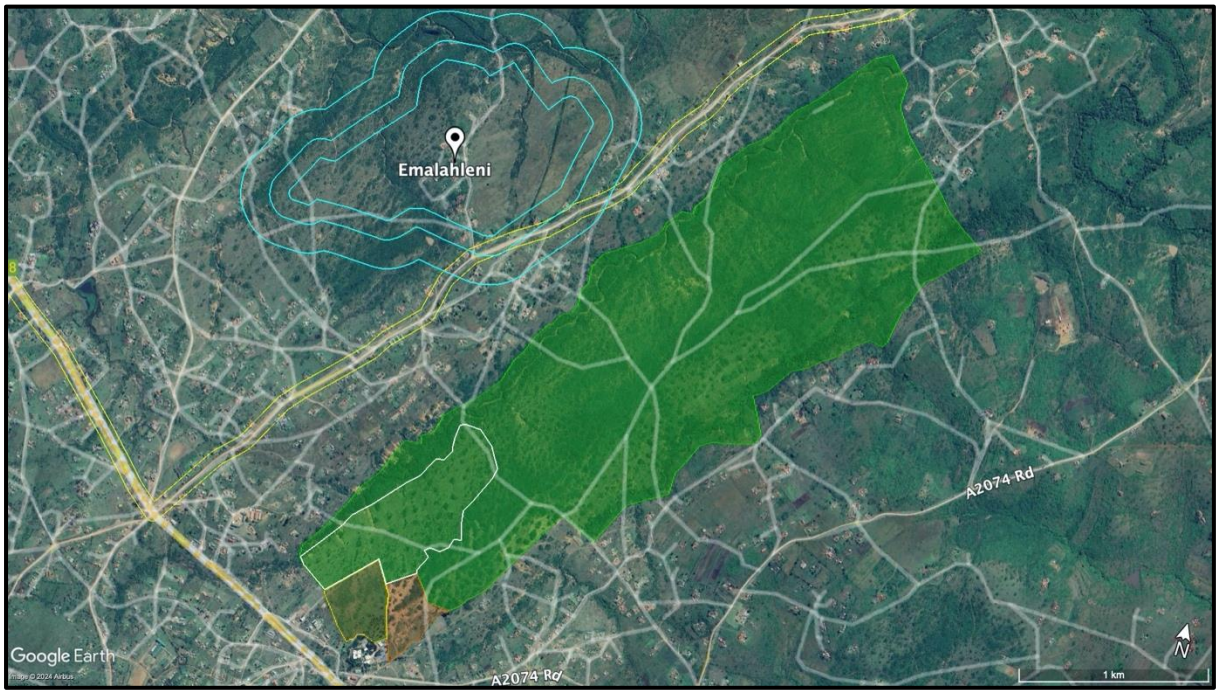


Figure 10-43: Special habitats and species occur south east of Emalahleni

However, Species X is only known from one locality and entirely at risk of extinction due to current land use and management practices that are not connected with mining, although changes in local settlement due to mining can accelerate the risk. Such a small population is considered scarcely viable, and rapid steps are taken to increase it, combined with more years of inappropriate management, it may flicker out entirely.

The only way large numbers of plants can be generated is likely by tissue culturing lines into hundreds of plants and then planting examples from the different lines in nodes that maximize genetic diversity, throughout all remaining suitable habitat, as well as recovering

suitable habitat by ending livestock impacts and reversing bush encroachment. It will likely take up to 4-5 years from tissue culture commencement to produce plants large enough to sustain if planted out, and so material should be gathered as soon as possible and this process started now.

With reference to **Figure 10-43**, the **yellow shaded area** (managed by the African Health Research Institute (AHRI)) but becoming bush-encroached by underburning, with alien plant invasion also evident. **Orange area** is where there is reduction by sand-mining that is likely unauthorized/unlawful. **White-outlined area** – Core habitat for Species X and other threatened species. This is a more open, grassland dominated part of the mosaic. **Green area** – full extent the more intact Zululand Lowveld that no longer offers best habitat for these specis, but which could be improved to this end if protected from livestock, with a programme implemented to ensure regular burning (i.e. not over- or under-burning, counter bush-encroachment and alien plant invasion. This will return it to historical state and provide more open habitat suitable for the threatened species that occur. Ideally, any area managed in this way will also become a formal protected area.

10.3.3. Cultural Heritage

Several traditional burial places are known to occur with the project area related to the proposed mining activities Ophondweni, Emalahleni and Mahujini. Such burials comprise one or more ancestral graves that are typically located within or close proximity to homesteads rather than the formal cemeteries operated by the Local Municipalities. The graves usually comprise stone-packed mounds, with or with-out a headstone. Due to the deflation of the mound and the scattering of the stones the older graves become increasingly more difficult to identify.

Within the project area it is evident that all human remains have a high heritage significance at all levels due to their spiritual, social and cultural values. These burial areas may not be altered in any way without the permission of the families (next of kin) and the required permit as issued by Amafa Research Institute.

10.3.4. Infrastructure

The mining infrastructure needed to commence with mining activities at Somkhele will have a significant impact on the destruction of natural vegetation and biodiversity within the mining area based on findings as contained in the Vegetation Impact Assessment Report (refer **Appendix 18**).

The mining of the anthracite deposit is fixed and the only alternative considered is opencast mining. The mine layout has taken into account the location of the sensitive environmental receptors and has design the layout plans accordingly. Due consideration was given to vegetation units as per Provincial C-Plan, the assessment of habitats as per specialist investigation as well as the delineation of sensitive areas such as protective buffers, Critical Biodiversity Areas (CBA's), Ecological Support Areas (ECA's) and delineated wetlands (refer **Figure 10-42**).

EKZNW's conservation planning tools classify the province into a number of categories depending on their predicted value for biodiversity and for contributing to meeting the province's conservation targets.

The CBAs are divided into two subcategories, namely Irreplaceable and Optimal. The CBA categories are based on the optimised outputs derived using systematic conservation planning software, with the Planning Units (PU) identified representing the localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved. The distribution of the biodiversity features is not always applicable to the entire extent of the PU, but is more often than not confined to a specific niche habitat e.g. a forest or wetland reflected as a portion of the PU in question. In such cases, development could be considered within the PU if special mitigation measures are put in place to safeguard this feature(s) and if the nature of the development is commiserated with the conservation objectives (EKZNW 2016).

Ecological Support Areas are required to support and sustain the ecological functioning of CBAs. For terrestrial and aquatic environments, these areas are functional but are not necessarily pristine natural areas. They are however required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, and which also contributes significantly to the maintenance of Ecological Infrastructure (EI).

Interrogation of these data show that the site does not fall within any areas classified as CBAs or ESAs (refer **Figure 10-44**). Nearest CBAs are 4km west of Mahujini, 3,5km east of Emalahleni, and 2km south-east of Ophondweni footprints.

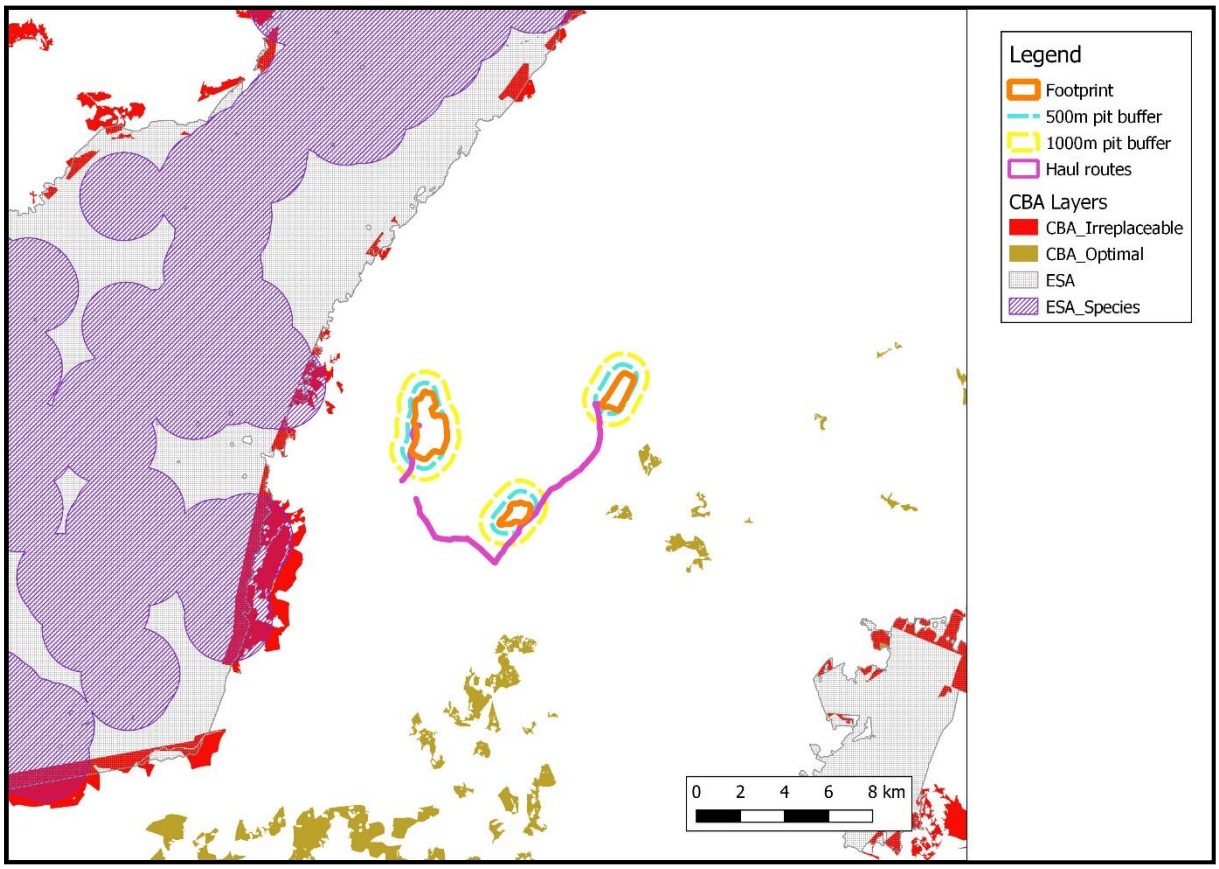


Figure 10-44: Proposed mining development in relation EKZNW CBA layer

The majority of the study site falls within the vegetation type Zululand Sourveld (SVI23). The remnant natural vegetation is mapped as currently fairly fragmented, but a large portion of the southern area of Emalahleni, and western portions of Mahujini, are mapped to have blocks of intact vegetation. This ecosystem is currently classified as Least Concern,

as it is considered to have undergone low rates of natural habitat loss and biotic disruptions (RLE 2022). This ecosystem occurs from north-east eSwatini and Mpumalanga border in the north, through to Hluhluwe and Ulundi areas in the south, and consists of a spectrum of grassland, woodland and thicket- mosaic habitats.

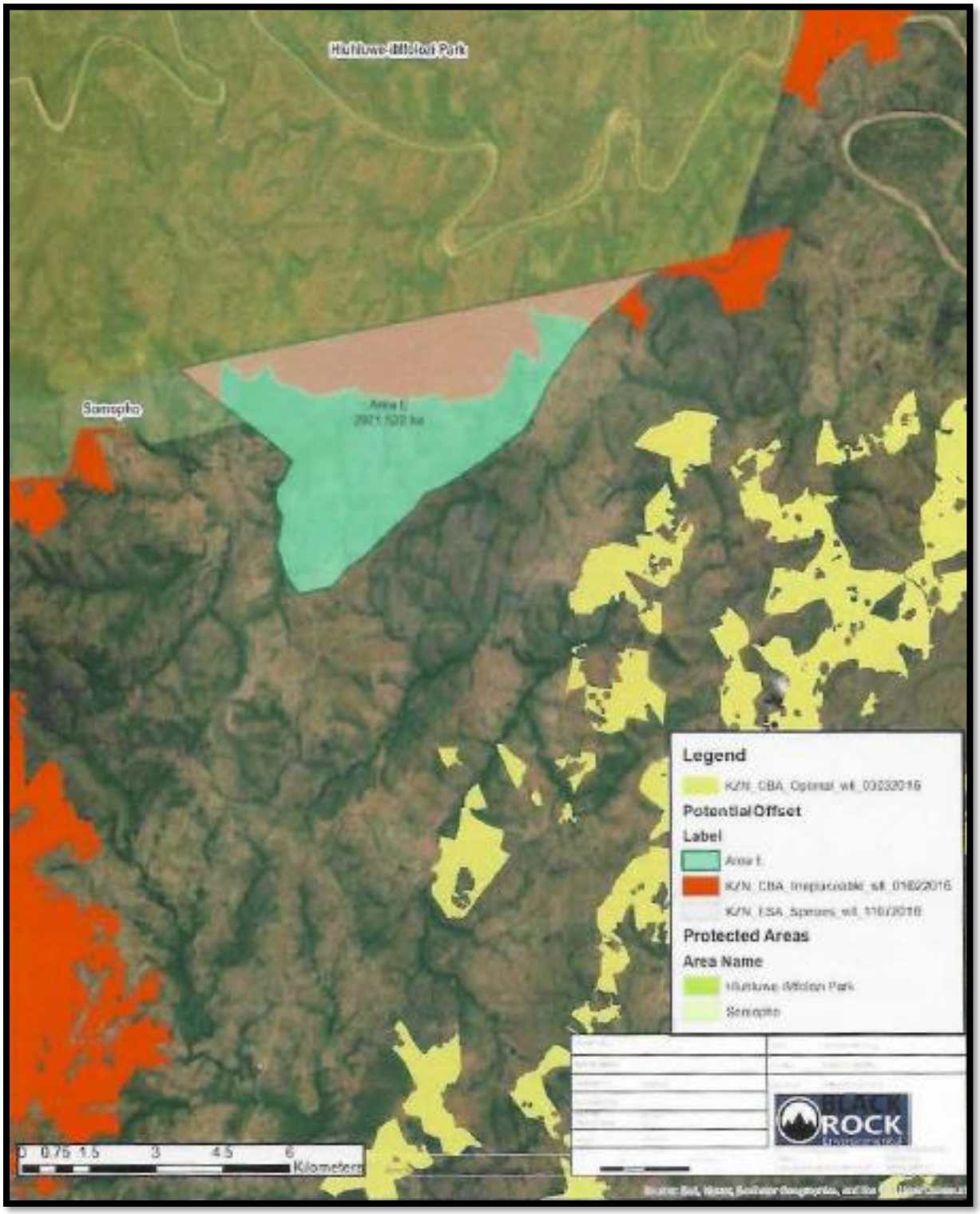


Figure 10-45: Biodiversity-offset area as Option 1

10.4. Environment and Current Land Use Map

As illustrated in **Figure 10-46** to **Figure 10-48** all three proposed mining areas have similar land uses.

The land use entails cultivated subsistence farming with savannah grassland utilised for livestock grazing. All proposed mining areas are surrounded by dense village settlements.

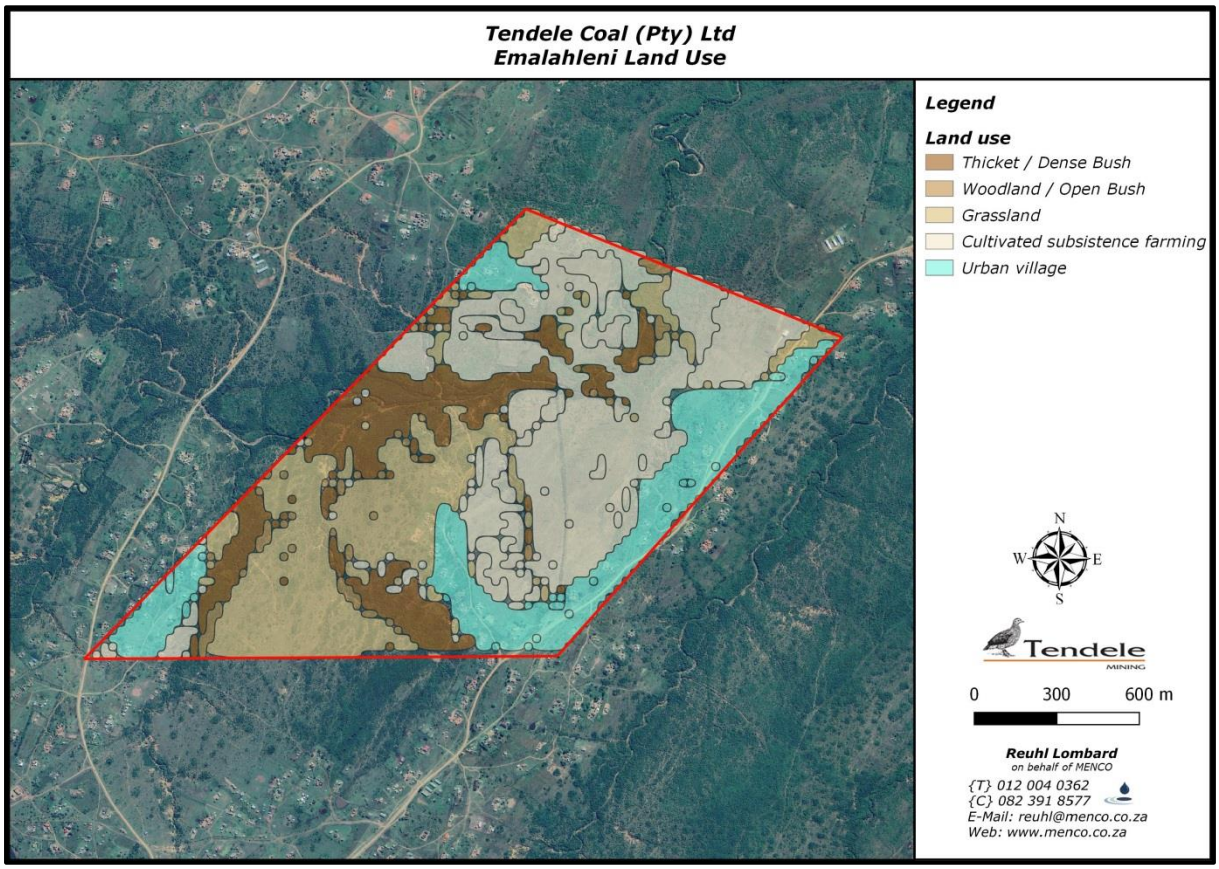


Figure 10-46: Land use map for the Emalahleni Area

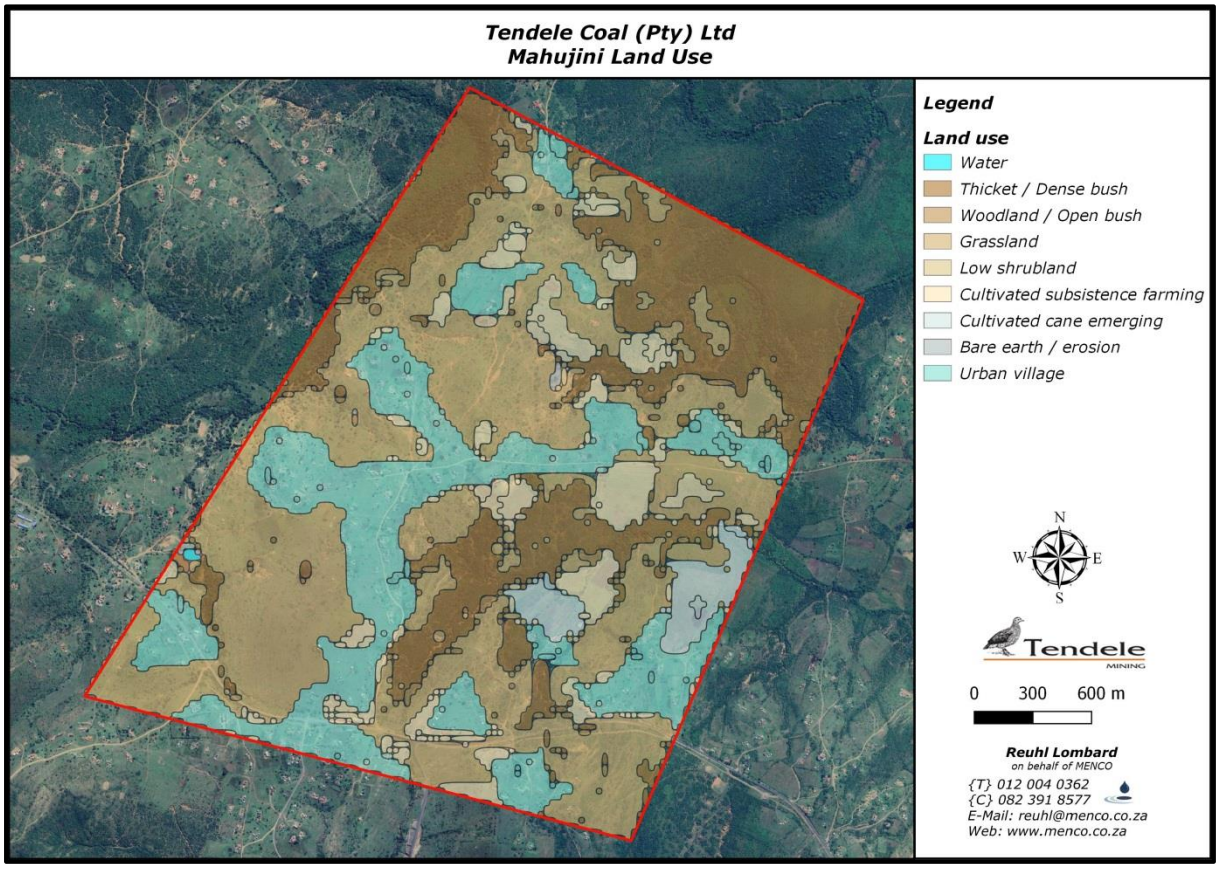


Figure 10-47: Land use map for the Mahujini Area

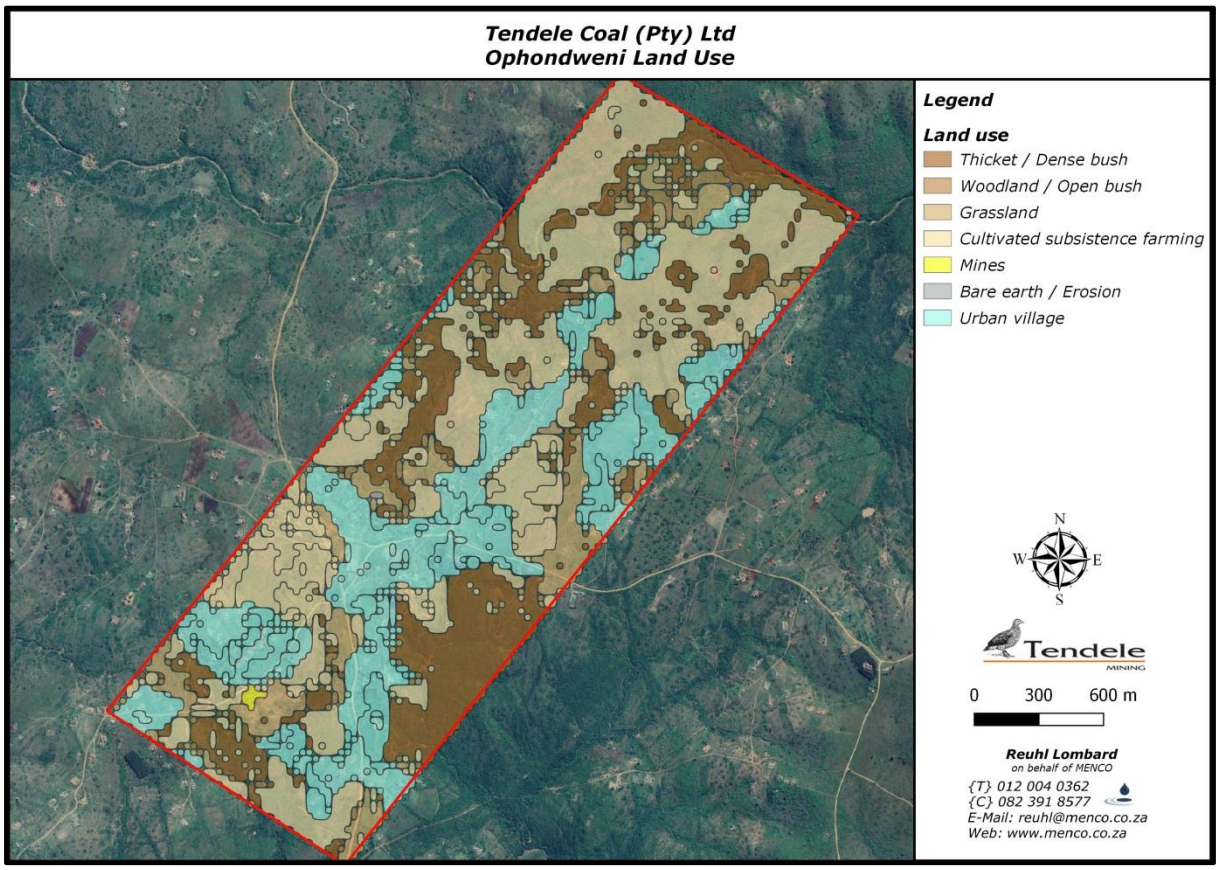


Figure 10-48: Land use map for the Ophondweni Area

10.5. Climate Change

A climate change study was conducted by Rayten Engineering Solutions (2024) and is attached as **Appendix 13** to this EIA Report. As there are currently no gazetted legislation for conducting Climate Change Impact Assessment (CCIA) the mentioned report has been compiled using international best practice guidelines, while GHG Protocol Corporate Accounting and Reporting Standard as well as ISO/SANS 14064-1 was used to conduct the GHG calculations.

10.5.1. Greenhouse Gas (GHG) Emissions

Scope 1 emissions (direct GHG emissions) and Scope 2 emissions (energy indirect emissions) were quantified. Scope 3 emissions (other indirect GHG emissions) were excluded due to a lack of necessary information available to accurately assess scope 3 emissions. It should however be noted that only Scope 1 and Scope 2 emission calculations are required in terms of the GHG Reporting Protocol. Where possible, Scope 3 emissions should be included to obtain a more holistic overview of the total GHG emissions attributable to the mine's operations.

The following activities are expected to be key sources of GHG emissions at the proposed Somkhele Extension Project:

- Blasting (fugitive emissions resulting from the combustion of Enaex Vertex A (Ammonium nitrate-based blend) 65% Emulsion 35% Prills);
- Truck and mining equipment emissions from combustion of fuels;
- Other combustion processes (e.g., diesel);
- Processing of anthracite (standard washing and screening);
- Septic/chemical ablution facilities for containing sewage;
- Electricity consumption from the mobile security offices and access control, mobile offices, weighbridge, and extra lighting plants (supplied by the generator); and
- Construction of required infrastructure onsite.

Other GHG emission sources include:

- Employee commute and business travel;
- Transportation of coal and general waste offsite for beneficiation and disposal;
- Storage of anthracite in stockpiles and transportation for export or collection by clients.

Additionally, the clearing of land and the drainage of wetland areas during the construction and operational phase may result in the loss of a carbon sequestration source. When terrestrial carbon sinks are cleared, stored carbon is released into the atmosphere. Thus, land clearing will not only result in the potential loss of a carbon sequestration source but may also release stored carbon dioxide (CO_2) to the atmosphere. It should also be noted that land and especially wetlands are also considered emitters of GHGs. As this is a fairly new science, research is still ongoing to constrain the impact of wetland and/or grassland removal on climate change, which currently remains largely unknown.

The GHG emissions were calculated for the mine, for the 10-year LoM, based on available information provided during the compilation of the CCIA report. Information on upstream

and downstream suppliers and customers was limited, therefore Scope 3 GHG emissions could not be calculated for the purposes of this CCIA.

The amount of hard overburden varies across the 10-year LoM, therefore the amount of GHG emissions fluctuates across each year. The total Scope 1 and Scope 2 carbon footprints for the Somkhele Mine Extension project for Years 2024 to 2033 (based on available information provided during the compilation of this report) are **236 337.29 tonnes CO_{2e}** and **360 tonnes CO_{2e}**, respectively. The total carbon footprint (Scope 1 and 2) for the Somkhele Mine Extension project, for Years 2024 to 2033, is expected to be **236 697.29 tonnes CO_{2e}**.

Table 10-47: Total annual GHG emissions for the Project (2024 – 2028)

Scope	Category	Emission Source	2024 Total Emission (tonnes CO_{2e})	2025 Total Emission (tonnes CO_{2e})	2026 Total Emission (tonnes CO_{2e})	2027 Total Emission (tonnes CO_{2e})	2028 Total Emission (tonnes CO_{2e})
1	Mobile combustion	Diesel (100% mineral)	22338,72	22338,72	22338,72	22338,72	22338,72
1	Fugitive emissions	Explosives	325,88	1093,32	1396,21	906,91	1640,78
Total Scope 1			22664,60	23432,05	23734,94	23245,64	23979,51
2	Electricity	Electricity	36	36	36	36	36
Total Scope 2			36	36	36	36	36
3	Other indirect	Other indirect sources - upstream / downstream	0,00	0,00	0,00	0,00	0,00
Total Scope 3			0,00	0,00	0,00	0,00	0,00
Total Carbon Footprint			22700,60	23468,05	23770,94	23281,64	24015,51
Total Carbon Footprint (Mega tonnes)			0,022701	0,023468	0,023771	0,023282	0,024016
Total Carbon Footprint (Gigatonnes)			0,000023	0,000023	0,000024	0,000023	0,000024

Referring to South Africa's carbon budget of 3.74 to 10.10 $GtCO_{2e}$ depending on the scenario (refer to **Table 10-48**), and the proposed mine's calculated GHG emissions of 0.0002367 Gt CO_{2e} (236 697.29 tonnes CO_{2e}), the mine's share of the remaining carbon budget will be 0.0063% for a 1.5°C scenario and 0.0023% for a 2°C scenario.

Table 10-48: GHG Emissions rating table

Scenario	tCO_{2e}	1,5°C	2,0°C
South Africa's carbon budget based on proportion of local population.		3,74 Gt CO_{2e}	10,1 Gt CO_{2e}
Somkhele Mine Extension's share of South Africa's RCB		0,0003%	0,0001%
Low impact by project – emissions up to:	10,000	0,0003%	0,0001%
Medium impact by project – emissions up to:	1,000,000	0,0267%	0,0099%
High impact by project – emissions up to:	10,000,000	0,2673%	0,0990%

11. IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT DURATION AND PROBABILITY

Several specialist studies as per Plan of Study contained in the FSR were undertaken for the EIA phase of the project (refer to **Table 11-1** below).

Table 11-1: Specialist studies and associated Appendices

Specialist Study	Appendix
Agricultural and Soils Impact Assessment	**3**
Landscape/Visual Impact Assessment	**4**
Archaeological and Cultural Heritage Impact Assessment	**5**
Paleontological Impact Assessment	**6**
Hydropedology/Wetland Impact Assessment	**7**
Wetland and Surface Water Impact Assessment	**8**
Hydrology Assessment	**9**
Noise Impact Assessment	**10**
Traffic Impact Assessment	**11**
Geohydrological Assessment	**12**
Climate Impact Assessment	**13**
Health Impact Assessment	**14**
Socio-Economic Assessment	**15**
Ambient Air Quality Impact Assessment	**16**
Blasting and Vibration	**17**
Vegetation (Plant Species) Assessment	**18**
Terrestrial Faunal Biodiversity Assessment	**19**
Geotechnical Study (Rock Engineering)	**20**
Rehabilitation and Closure	**21**
Visual and Noise Compensation	**22**
Civil Engineering Design	**23**
Social and Labour Plan	**24**
Relocation Action Plan	**25**
Biodiversity Offset	**26**

11.1. Soil Impact Assessment

During the construction phase, the impacts to consider are those relating to the disturbance of the natural soil site. When soil is stripped, the physical properties are changed and this impacts on the soil health. During soil stockpiling, the soils' chemical properties will change unless managed. These will lead to loss of the topsoil layer. Vehicles will drive on the soil surface during the construction phase, thereby causing compaction of the soils. This reduces infiltration rates and ability for plant roots to penetrate the compacted soil. Vegetation cover will be reduced and runoff potential will be increased. In which increased runoff potential will lead to increased erosion hazards. Soils should be handled with care from the construction phase through to the decommissioning phase. Topsoil and subsoil should not be stockpiled together as the topsoil's seed bank and natural soil fertility would be diluted. The relevant Project activities and their potential impacts on soils are provided in the Table below and discussed in subsequent subsections.

11.1.1. Construction

Nature: Large volumes of topsoil will be removed in preparation for open pit mining and site infrastructure. The removed soil will be stockpiled and can be lost if not managed correctly.		
	Without mitigation	**With mitigation**
Loss of soils during construction phase due to poor housekeeping and management of stock piles		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Highly (4)
Significance	**Moderate (40)**	**Moderate (32)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Loss of resource	Loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: • Erosion must be controlled in run off areas especially in specific positions where donga erosion is present (Emalahleni). • During all new development care should be taken not to enhance erosion and it should be controlled as soon as erosion is observed. • Surface areas should not be left bare for extended periods of time, but should always be vegetated or covered with suitable coverage to prevent dust formation.		
Cumulative Impacts: Increased impact in terms of loss of agricultural land		
Residual Impacts: Loss of existing agricultural potential and land use capability		

11.1.2. Operational Phase and Decommissioning Phase

Soil will be susceptible to compaction from heavy construction equipment and vehicles when soil is stripped and stockpiled. Soil compaction reduces ability of plants to absorb water due to soil pores being decreased, reduces water infiltration rate and bulk density increases. When topsoil is removed from the infrastructure areas, the land capability is reduced to nothing and land use will change from intensive cultivation to mining. There is loss of agricultural potential and topsoil degradation. The land capability during this phase will be reduced from classifiable to non-classifiable.

Nature: Large volumes of topsoil will be removed in preparation for open pit mining and site infrastructure. The removed soil will be stockpiled and can be lost if not managed correctly.		
	Without mitigation	**With mitigation**
Ineffective housekeeping and management of stockpiles and exposed areas		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Highly (4)
Significance	**Moderate (40)**	**Moderate (32)**

Removal of soil layers will impact on land capability and potential land use due to compaction and erosion		
Extent	Regional (2)	Regional (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Highly (4)
Significance	**High (65)**	**Moderate (44)**
Loss of topsoil as a resource caused by wind erosion, rainwater runoff		
Extent	Regional (2)	Regional (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Very High (4)
Significance	**High (65)**	**Moderate (52)**
Loss of land use and land capability, no mitigation possible because land use change		
Extent	Regional (2)	Regional (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Very High (4)
Significance	**High (85)**	**Moderate (52)**
Status (positive or negative)	Negative	Negative
Restoration of land capability to its pre-mining state or agreed upon alternative.		
Extent	Regional (2)	Regional (2)
Duration	Permanent (5)	Long term (4)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Medium probability (3)
Significance	**High (85)**	**Moderate (36)**
Status (positive or negative)	Negative	Positive
Reversibility	Very low	Very low
Irreplaceable loss of resources	Loss of resource	Loss of resource
Can impacts be mitigated?	Yes	Yes

Mitigation:

- Follow adequate stripping guidelines (refer to Section 14 (Tables 15 - 17) of the Soil, Land Use and Land
- Capability Assessment report, Appendix 3);
- Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks;
- If possible, topsoil should be stripped during dry months, as to reduce compaction
- Only clear vegetation when and where necessary;
- Only remove topsoil when and where necessary;
- Ensure topsoil is stored in one dedicated stockpile, 10 m high and away from drainages lines and surface water;
- Only the designated access routes are to be used;
- If erosion occurs, corrective actions must be taken to minimise any further erosion from taking place;
- Soils to be stripped according to the soil stripping ratios and stockpiled accordingly;
- Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for nutrients and soil pH, and vegetating the stockpiles to reduce erosion;
- Compaction of the removed topsoil should be avoided by prohibiting traffic on stockpiles;
- Prevent unauthorised borrowing of stockpiled soil; and
- Ensure proper storm water management designs are in place

Cumulative Impacts: Land use will be changed from agriculture to mining, thus increasing the impact on soils.

Residual Impacts: Loss of existing agricultural potential and land use capability

11.2. Blasting and Vibration Impact Assessment

The potential impacts of ground vibration, air blast levels and fly rock risks were determined using methods provided by the USBM. A potential blast design was estimated considering the potential bench height (when considering the depth to the coal resource), with this assessment indicating:

- That ground vibration levels may be unpleasant to BSRs when blasting take place within approximately 800 m from structures used for residential activities (precautious evaluation using a worst-case scenario). The impact is of a potential **High** significance and mitigation is required and proposed that could reduce the significance of potential impact of vibration levels on BSR to **Low**;
- Though no sensitive structures were specifically identified, ground vibration levels could be of **High** significance to any sensitive structures located within 600 m from the proposed opencast pits. Mitigation is required and included that could reduce the significance of potential impact of vibration levels on such buildings to **Low**;
- That ground vibration levels could be of **High** significance to any brick buildings located within 240 m from the proposed opencast pits. Mitigation is required and included that could reduce the significance of potential impact of vibration levels on such buildings to **Low**;
- Though no cement structures were specifically identified within 200m from the opencast pits, ground vibration levels could be of **High** significance once blasting activities take place closer than 116 m from any cement dams, steel or cement pipelines or other cement structures. Mitigation is required and included that could reduce the significance of potential impact of vibration levels on the dams to **Low**;
- No steel pylons were identified within 200m from the opencast pits and ground vibration levels would be of a **Low** significance;
- That ground vibration levels impacting on the R618 would be of a **Low** significance;
- Air blast levels will be clearly audible to all surrounding receptors and the significance will be **High** for the closest BSRs. Additional mitigation is recommended and included to reduce potential complaints and annoyance with the project. Due to the sensitivity of people to the significant loud noise as well as secondary vibration of large surfaces (due to the change in air pressure) associated with a blasting event, BSRs must be informed about the potential impacts. It is possible that people may still complain about the perceived blast effects even after the implementation of mitigation measures;
- There may be a risk of **Medium** significance of fly rock to BSR, livestock and mine equipment/infrastructure. Management measures are available to ensure that risks are minimised.

Nature: Blasting and ground vibration impacts in relation to human responses		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Medium - long term (4)	Medium - long term (4)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Possible (2)
Significance	**High (85)**	**Low (30)**

Status (positive or negative)	Negative	
Reversibility	Yes – High	Yes - high
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • All BSR (and livestock) staying closer than 500 m from opencast area should be moved further than 500 m from the blasting area before the blast is detonated; • The potential vibration levels should be discussed with the surrounding BSRs during the EIA process. They should be notified that the vibration levels were calculated but some people may find the vibration levels unpleasant (especially during a large blasts). BSRs should be notified that, while they can feel the vibration level, their houses and other structures are in no danger (very low risk of potential damage); • Mine should initiate a forum to inform the close residents about the likely vibration and air blast levels, the proposed blasting schedule and warning methodology the mine will employ before a blast as well as a warning to residents that, when they are indoors during a blast, vibration of windows and ceilings may appear excessive. • When blasting closer than 800 m from any BSR, the blast should be controlled (reducing the detonation/charge per delay - with a delay of at least 8 ms between consecutive detonations) for a vibration level less than 2.54 mm/s at the identified BSR, which could include: o The mine can use a smaller borehole diameter (and a tighter associated drilling pattern) that would reduce the quantity of explosive detonated per delay; o The mine can reduce the bench-height and associated blast design; o The mine can reduce the mass of explosives per borehole using techniques such as air decking to reduce the MIC; • The mine should measure blasting vibration levels during blasts to confirm onsite constants; • The developer should erect clear signs indicating blast dates and times on all roads within 1,000 m from the blasting areas. A blast schedule should be provided to the BSRs staying in the area.		
Cumulative Impacts: Not relevant for blasting vibration assessment (refer specialist report)		
Residual Impacts: Increased damage to household structures		

11.3. Visual Impact Assessment

11.3.1. Construction Phase

It is anticipated that the impacts during the construction phase of the activity will be of medium negative significance for the majority of the impacts (refer to Table below). It is also anticipated that dust creation will be of low significance.

Nature: Negative impact on the aesthetical character and landscape of the Somkhele area		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (30)**	**Low (18)**
Status	Negative	Neutral
Landscape visual change		
Extent	Local (2)	Site (1)

Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (36)**	**Low (18)**
Status	Negative	Neutral
Dust creation stemming from all mining areas		
Extent	Site (1)	Site (1)
Duration	Short term (2)	Short term (1)
Magnitude	Low (4)	Low (4)
Probability	Medium probability (3)	Low probability (2)
Significance	**Low (21)**	**Low (12)**
Status	Negative	Neutral
Light pollution, glare, spill light and sky glow		
Extent	Local (2)	Site (1)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (30)**	**Low (21)**
Status (positive or negative)	Negative	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: • Limit construction footprint & vegetation stripping • Remove vegetation in a "natural manner", avoiding any harsh lines • Minimise construction duration • Remove vegetation in a "natural manner", avoiding any harsh lines • Dust suppression • Choose suitable types of lighting that minimize glare • Only focus light sources on where it is needed		
Cumulative Impacts: Property devaluation due to damage caused by blasting		
Residual Impacts: Cracked houses, increased groundwater pollution		

11.3.2. Operational Phase

It is anticipated that the impacts during the operational phase of the activity will be of medium negative significance as described in the Table below.

Nature: Drilling and blasting of pits cause negative impact on the aesthetical character and landscape of the Somkhele area		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Very High (10)	High (8)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (48)**	**Low (28)**
Status	Negative	Negative
Dust creation stemming from all mining areas		

Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (42)**	**Low (28)**
Status	Negative	Negative
Change of visual character - all mining areas		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Medium term (4)
Magnitude	High (8)	Moderate (6)
Probability	High probability (4)	Medium probability (3)
Significance	**Moderate (56)**	**Moderate (36)**
Status	Negative	Negative
Change of visual character – sensitive receptor areas		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Medium term (4)
Magnitude	Moderate (6)	Low (4)
Probability	High probability (4)	Medium probability (3)
Significance	**Moderate (48)**	**Moderate (30)**
Status (positive or negative)	Negative	Negative
Dust creation impact on sensitive receptor areas		
Extent	Local (2)	Local (2)
Duration	Medium (4)	Medium term (4)
Magnitude	High (8)	Medium (6)
Probability	Highly (4)	Medium probability (3)
Significance	**Moderate (56)**	**Moderate (36)**
Status	Negative	Negative
Change of visual character – sensitive receptor areas		
Extent	Site (1)	Site (1)
Duration	Medium term (4)	Medium term (4)
Magnitude	Medium (6)	Low (4)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (33)**	**Low (27)**
Status	Negative	Negative
Light pollution, glare, spill light and sky glow		
Extent	Local (2)	Local (2)
Duration	Short term (1)	Short term (1)
Magnitude	High (8)	Low (4)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (33)**	**Low (21)**
Status	Negative	Neutral
Impact on ecotourism – HiP's wilderness status		
Extent	Local (2)	Local (2)
Duration	Medium (4)	Medium (4)
Magnitude	High (8)	Moderate (6)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (42)**	**Moderate (36)**

Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

- Limit visual intrusion as far as possible by introducing natural berm from overburden topsoil not exceeding 4 meters in height
- Set up visual screens such as tree lines along perimeter fence
- Reduce exposed surface areas
- Dust suppression daily
- Set visual screens up along perimeter fence of the proposed mining areas
- Accumulate overburden such that it simulates the natural topography of the region.
- Regulate the speed at which heavy machinery/vehicles move to reduce dust dispersion
- Regulate the speed at which heavy machinery/vehicles move to reduce dust dispersion
- Keep topsoil stockpiles to a minimum height (not in excess of 4 meters) at any given time
- Choose suitable types of lighting that minimize glare
- Only focus light sources on where it is needed
- Adhere to all mitigation measures for each impact within each phase of the activity

Cumulative Impacts: Refer decommissioning phase section below

Residual Impacts: Permanent change in landscape visual character

11.3.3. Decommissioning Phase

Nature: Drilling and blasting of pits cause negative impact on the aesthetical character and landscape of the Somkhele area

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (42)**	**Moderate (42)**
Status	Positive	Positive
Change of visual character - all mining areas		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	High (8)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (36)**	**Moderate (42)**
Status	Positive	Positive
Change of visual character – sensitive receptor areas		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Medium term (4)

Magnitude	High (8)	Moderate (6)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (42)**	**Low (24)**
Status	Negative	Neutral
Dust creation impact on sensitive receptor areas		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Medium term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (36)**	**Low (24)**
Status (positive or negative)	Negative	Neutral
Light pollution, glare, spill light and sky glow		
Extent	Local (2)	Local (2)
Duration	Short term (1)	Medium term (4)
Magnitude	High (8)	Moderate (6)
Probability	Medium probability (3)	Low probability (2)
Significance	**Moderate (33)**	**Low (24)**
Status	Negative	Neutral
Change of visual character – sensitive receptor areas		
Extent	Site (1)	Site (1)
Duration	Medium term (4)	Medium term (4)
Magnitude	Medium (6)	Low (4)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (33)**	**Low (27)**
Status	Negative	Negative
Light pollution, glare, spill light and sky glow		
Extent	Local (2)	Local (2)
Duration	Short term (1)	Short term (1)
Magnitude	High (8)	Low (4)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (33)**	**Low (21)**
Status	Negative	Neutral
Impact on ecotourism – HiP's wilderness status		
Extent	Local (2)	Local (2)
Duration	Medium (4)	Medium (4)
Magnitude	High (8)	Moderate (6)
Probability	Medium probability (3)	Medium probability (3)
Significance	**Moderate (42)**	**Moderate (36)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources		
Can impacts be mitigated?	Yes	Yes
Mitigation: • Minimise deconstruction duration • Ensure effective rehabilitation and remediation of the backfilled pits • Reshape the overburden dumps to simulate the surrounding topography • Regulate the speed at which heavy machinery/vehicles move to reduce dust dispersion		

• Dust suppression measures to be implemented • Choose suitable types of lighting that minimize glare • Only focus light sources on where it is needed • Adhere to all mitigation measures for each impact within each phase of the activity • Monitor rehabilitation for a year after rehabilitation activities are completed
Cumulative Impacts: The modelled results show that a high visual impact will be experienced within the immediate vicinity of the proposed and existing mining areas. Medium to high impacts will be experienced approximately 9 km to the north and the south of the mining areas and approximately 6 km to the east and west. The HiP will experience a medium to high and a low to medium visual impact to the west of the park boundary looking in an easterly direction towards the visual triggers.
Residual Impacts: Permanent scarred topography and aesthetical change in landscape character

11.4. Heritage Impact Assessment

A negligible number of archaeological resources was uncovered during the field component of this HIA however, a substantial amount of heritage resources was identified. These came in the form of:

- The remains of multiple, historical, abandoned traditional homesteads, which have a **Medium/High** heritage significance rating due to their association with infant burials;
- Several standing structures that are over 60 years old, however, have a **Low** heritage significance rating due to their common occurrence on the landscape;
- Various ancestral prayer huts and trees associated with traditional veneration activities. These structures and sacred places have a **High** heritage significance; and
- Multiple burial grounds, altogether containing approximately one hundred and fifty (150) to two hundred (200) known graves that have a **High** heritage significance rating.
- The cultural landscape of the area is rated as having a **Medium/High** heritage significance

Considering the possible direct impacts on the above heritage resources the envisaged rated impact based on the impact rating scales is calculate in the Table below.

Nature: Impact on cultural heritage		
	Without mitigation	**With mitigation**
Traditional homesteads		
Extent	Site (1)	The structures within the mining right area will be permanently destructed and hence no mitigation proposed
Duration	Permanent (5)	
Magnitude	High (10)	
Probability	Definite (5)	
Significance	**High (80)**	
Status (positive or negative)	Negative	
Structures older than 60 years		
Extent	Site (1)	
Duration	Permanent (5)	
Magnitude	Low (4)	

Probability	Definite (5)	
Significance	**Moderate (50)**	
Status (positive or negative)	Negative	
Destruction of burial grounds and graves / Re-burial as mitigation		
Extent	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (10)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	**High (80)**	**High (60)**
Status (positive or negative)	Negative	Positive
Change in the cultural landscape		
Extent	Site (1)	N/a
Duration	Permanent (5)	
Magnitude	High (10)	
Probability	Definite (5)	
Significance	**High (80)**	
Status (positive or negative)	Negative	
Reversibility	Low	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated?		

Mitigation:

- A detailed social consultation process, at least 60 days in length, as required by the KZNARIA as well as the National Health Act and its Regulations, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation.
- Bilingual site and newspaper notices indicating the intent of the relocation(s).
- Permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.
- An exhumation process that will safeguard the legal rights of the families as well as that of the mining company.
- The process must be done by a reputable company well versed in the mitigation of graves

Cumulative Impacts:

The development of coal mining infrastructure within the study area would have an immediate and damaging effect on the heritage resources discussed in this report. This impact would be severe and irreversible.

Residual Impacts: Overall loss of cultural heritage

Excavations will change the existing topography and may possibly destroy or even permanently close-in fossils at or below the ground surface. These fossils will then be lost for research.

	Without mitigation	**With mitigation**
Traditional homesteads		
Extent	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Highly likely (4)	Improbable (2)
Significance	**Medium (56)**	**Low (24)**
Status (positive or negative)	Negative	Neutral

Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
- Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

Cumulative Impacts:

The development of coal mining infrastructure within the study area would have an immediate and damaging effect on the heritage resources discussed in this report. This impact would be severe and irreversible.

Residual Impacts: Potential for irreplaceable loss of palaeontological findings

11.5. Geohydrological Impact Assessment

11.5.1. Construction Phase

The following activities are anticipated during the construction phase of the project:

- Typical earthworks are required to clear the areas;
- Construction of access roads;
- Establishment of service platforms, material handling areas and other temporary infrastructure;
- Dust suppression of access roads;

- Placing of topsoil in designated areas; and
- Constructing laydown areas and temporary stormwater systems and berms.

Nature: Destruction of vadose zone, clearing topsoil from footprint areas will influence rate of infiltration to shallow groundwater system and spillage of waste could impact on groundwater pollution		
Disturbing vadose zone during soil excavations/construction activities.	**Without mitigation**	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Medium probability (3)	Low probability (2)
Significance	**Low (24)**	**Low (16)**
Poor quality seepage from machinery used to excavate soils. Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Medium probability (3)	Low probability (2)
Significance	**Low (24)**	**Low (16)**
Erosion and sedimentation runoff may enter the stream (worst case). To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Minor (2)	Minor (2)
Probability	Low probability (2)	Improbable (1)
Significance	**Low (12)**	**Low (6)**
Poor quality seepage from machinery used to excavate soils. Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Minor (2)	Minor (2)
Probability	Low probability (2)	Improbable (1)
Significance	**Low (12)**	**Low (6)**
Status (positive or negative)	Neutral	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: • Only excavate areas that apply to the project area; • Backfill the material in the same order it was excavated; • Cover excavated soils with a temporary vegetation liner • Retain as much indigenous vegetation as possible; • Park heavy machinery in hard park (lined) areas; • Conduct visual soil assessments for signs of hydrocarbon pollution/spills; • Use temporary stormwater systems to prevent erosion and managed sediment runoff		
Cumulative Impacts: No cumulative imparts during pre-planning/construction phases		

Residual Impacts: None during construction phase

11.5.2. Operational Phase

The activities during the operational phase include all mining operations until the end of LOM:

- Opencast mining;
- Opencast dewatering; and
- PCD for stormwater and pit water, slurry dam depositions, discard depositions, seepage from overburden and backfilled opencast operations (rollover method), seepage from the beneficiation area, and dirty runoff from surface water infrastructure.

The identified risks for the operational phase include:

- The destruction of the localised geological units as the opencast workings are developed. This impact is permanent and is therefore not included in the impact table as no mitigation measures can be recommended.
- Opencast mining will result in groundwater inflows into the pits which need to be pumped out for mine safety and will lead to a lowering of groundwater levels in the surrounding aquifers.
- Dewatering activity is predicted to impact the spring streamflow, and little can be done to avoid this impact. A marginal impact in terms of groundwater contribution to the baseflow is expected due to local streams being ephemeral.
- Analyses showed that mine-influenced water (MIW) formation is expected, and poor-quality leachate can occur. This can influence the water quality in the surrounding aquifers. However, groundwater flow directions for the operational mine will be directed towards the opencast workings and contaminant migration away from the mining areas will be limited during active mining.
- Poor quality seepage associated with coal transport via haulage roads, concurrent backfilling of opencast pits, overburdened rock, and ROM stockpiles is expected.

Except for the destruction of the geology and the lowering of the water table, which is an expected impact from any mining project, the other identified impacts during the operational phase are rated moderate to low after mitigation and management measures are applied and it is not likely to negatively affect any decisions on the proceeding of the project.

One of the most effective mitigation measures is the use of the existing groundwater and numerical model as a management and predictive tool. Long-term monitoring data and an optimised groundwater monitoring network will provide valuable information to update and re-run the model annually. Monitoring groundwater levels is also critical to ascertain how affected groundwater users may be compensated for losses of groundwater related to the mining operations and to distinguish such from seasonal groundwater level drops. Updates to the model will have to include rainfall, geological, a mining plan and infrastructure data updates. Regular updates will increase the prediction accuracy as well as provide long-term trends and allow for intervention and timely prevention measures. It is further advised that fuel spill and oil clean-up kits are kept on-site to mitigate any hydrocarbon contamination if it occurs.

Nature: Destruction of local aquifer, decrease in groundwater levels, impact on baseflow feeding streams, generation of leachate that impacts on groundwater quality		
	Without mitigation	**With mitigation**
Disturbing vadose zone during soil mining		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Medium probability (3)
Significance	**High (60)**	**Moderate (30)**
Poor quality seepage from machinery used to excavate soils. Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer and enter the stormwater system		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Medium probability (3)
Significance	**Moderate (45)**	**Low (24)**
Sediment runoff because of dust suppression and movement of vehicles at the site		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Medium probability (3)
Significance	**Moderate (45)**	**Low (24)**
Poor quality runoff into the environment (if hydrocarbon contamination takes place at the site). The impact will be on local soils as there are no watercourses associated with the site.		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Medium probability (3)
Significance	**Moderate (45)**	**Low (24)**
Erosion and sedimentation runoff may enter the non-perennial stream and wetland area (worst case).		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Minor (2)	Minor (2)
Probability	Low probability (2)	Improbable (1)
Significance	**Low (12)**	**Low (6)**
Dewatering required at opencast operations could impact baseflow to the nearby streams.		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Medium probability (3)
Significance	**High (65)**	**Moderate (39)**
Over abstraction from boreholes at the site. Groundwater dewatering due to mining activity.		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Medium probability (3)
Significance	**High (65)**	**Moderate (39)**

Poor quality seepage from machinery used to excavate soils. Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Medium probability (3)
Significance	**High (65)**	**Moderate (39)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Keep excavations as small as possible. • Ensure that sediment barriers are in place at mining sites, to prevent sediment runoff and erosion. • Visual soil assessments for signs of contamination during construction (monthly) • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during construction (monthly)Have fuel cleanup kits available on site. • Ensure that stormwater is monitored annually for contaminants. • Use temporary or permanent stormwater systems (as per this report) to prevent erosion and manage sediment runoff. • Visual inspections of all vehicles entering and operating at the site. • Ensure that silt fences are installed on steep slopes downstream of workings, to capture any excess sediment in runoff water. • Ensure that groundwater captured in the excavations is released to the downstream environment. • Ensure that attenuation structures are installed downstream of opencast operations to enable artificial recharge and interflow to downstream wetland soils. Do not abstract more than what is required, or as determined by the borehole sustainable yield testing. • Ensure that the borehole collar is protected, to prevent any environmental runoff into the borehole. • Have fuel and oil spill cleanup kits on site and clean up these areas immediately. • Ensure that building material stockpiles are covered with a suitable temporary cover or placed in bunded areas to reduce poor-quality seepage probability. • Visual soil assessments for signs of contamination during construction (monthly)		
Cumulative Impacts: The largest cumulative impact notable of mentioning is the potential combined regional scale impact on groundwater quantity and quality.		
Residual Impacts: Potential for the generation of AMD, increased risk for groundwater pollution.		

11.5.3. Decommissioning Phase

The closure and decommissioning phases will be per an agreed and approved closure plan for the proposed workings. This will include:

- Cessation of mining operations and rehabilitation.
- Backfill and closure of the opencast with waste rock dump material (Mahujini); and
- Flooding of mining works and resultant altering of the groundwater flow regime for the flooding period.

The identified risks for these phases include:

- Rebounding water levels.

- Potential for MIW generation if pits are not completely flooded and rainwater ingress into the workings is not managed.
- Migration of groundwater contaminant plumes and contaminated groundwater seepage to nearby streams and or water users.
- Depending on the pit water balance, closure topography and closure designs (i.e. capped to prevent infiltration vs. no capping layer) the pit can decant at the lowest topographical area and negatively impact groundwater and stream quality. As an alternative, a pit lake can be considered to form a thermal sink and prevent contaminant movement into the surroundings, with the overburden placed below the pit lake water level to prevent oxidation of S-bearing minerals.

Nature: Rehabilitation of cessation of mining operations, decommissioning of abstraction boreholes and oxidation of backfill material leading to AMD generation		
	Without mitigation	**With mitigation**
Rehabilitation of mining operations.		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	High (4)	High (4)
Significance	**Medium (44)**	**Medium (44)**
Status	Positive	Positive
Poor quality seepage from machinery used to decommission and rehabilitate the mine operations.		
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Medium probability (3)	Low probability (2)
Significance	**Low (24)**	**Low (16)**
Rehabilitation of plants, stockpiles, settlement, and drying dams.		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	High (8)
Probability	Very High (4)	Very High (4)
Significance	**Medium (52)**	**Medium (52)**
Status	Positive	Positive
Poor quality seepage		
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	Moderate (6)
Probability	Very High (4)	Low probability (2)
Significance	**Moderate (52)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility		
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during rehabilitation (monthly) • Dispose of high sulfate-bearing material in the deepest parts of the pits. • Compact seed the overburden in the opencast void to achieve a 1-2% recharge.		

• Slope topography to promote runoff and prevent rainfall accumulation on top of the rehabilitated workings. • Explore Pitlakes to form a thermal sink and avoid any transport away from the mined workings. The water can also likely be applied for agricultural purposes.
Cumulative Impacts: The largest cumulative impact notable of mentioning is the potential combined regional scale impact on groundwater quantity and quality.
Residual Impacts: Long-term leachate of impaired quality groundwater

11.6. Hydropedology

The impact on hydropedological functions is founded on basic principles of geohydrology. The general hydropedological flow drivers coupled with geohydrological processes will be altered during opencast mining activities. The following components will highly likely be impacted and will depend on the geomorphology and HSTs of a specific sub-catchment and associated hillslopes, namely:

- Interflow (vertical or lateral or both) will be intercepted and removed.
- Groundwater flow and deep lateral seepage will be intercepted and removed.
- Runoff from the upper reaches of the sub-catchment will be intercepted and removed (if not diverted).
- Direct rainfall into an opencast working will be pumped out.
- Runoff from the operations is most likely free draining back to the environment but will be intercepted in active mine works areas. Captured runoff/stormwater needs to be diverted and released upstream of the wetland systems to maintain the hydropedological functions.

11.6.1. Construction and Operational phase

There is a growing potential to impact the soil interflow processes, namely:

- Alteration to natural hydropedological flow paths by infilling or cut and fill activities.
- Impacts on the macro-soil structure.
- Impacts on the hydropedological processes supporting the watercourses.

This will result in subsequent impacts on soil structure & land capability and could compromise soil quality. These impacts are expected from the preparation to the closure phase of the project. There is the potential for soil contamination and suppression of natural hydropedological flow drivers as a result of the mining (soil stripping excavations and open cast pits). Potential contaminants from the project are expected to include fuels and hydrocarbons.

Nature: Dumping of soil in or near watercourses will likely have an impact on the soil flow dynamics. For wetland areas identified infilling may change flow volumes (as the material will likely become dry over time) and new predominant soil flow processes will form (i.e. form responsive to interflow type). Similarly, if the waste rock is placed upstream of identified wetlands there may be more runoff into the wetlands, altering the natural flow system. Watercourses in the area (mainly perennial streams as non-perennial streams in this area tend to be ephemeral) may be subjected to receive less interflow or more interflow, depending on the position of the placement of the waste rock

(i.e. infilling of drainage line will cause suppress natural interflow, as opposed to upstream which could promote interflow but likely increase runoff).		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Moderate (33)**
Status	Negative	Negative
Shallow lateral water seepage and percolation are associated with the opencast operation. The mining will entail strip mining (the depths of the pit are uncertain as the designs are conceptual), and it is anticipated that limited removal of deep lateral water seepage may occur (i.e. the cone of depression will be limited to the maximum depth of the mine works).		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Moderate (33)**
Status	Negative	Negative
Soil water interception at opencast pits and stormwater systems. Surface water interception and reduced rainfall runoff to watercourses and drainage servitudes. Natural groundwater recharge may also be reduced.		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Moderate (33)**
Status	Negative	Negative
Stormwater attenuation infiltration or exfiltration pit. Development of dedicated stormwater attenuation infiltration or exfiltration trenches to enhance hydropedological flow into the wetland area.		
Extent	Site (1)	Site (1)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**High (60)**	**High (60)**
Status	Positive	Positive
Access roads opencast operations & stockpiling / WRD. Areas that were backfilled with collapsible soils; or steep pit slopes may cause soil subsidence/ hanging wall erosion. Soil structure may be compromised		
Extent	Local (2)	Site (1)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Low (4)
Probability	Definite (5)	Medium (3)
Significance	**High (65)**	**Low (24)**
Status (positive or negative)	Negative	Low negative
Soils/mining material placed near watercourses may be prone to erosion and sedimented runoff if high precipitation occurs in the area. It may take some time for these areas to		



stabilise (i.e. to establish new interflow soil dynamics). There may also be secondary seepage from these mine materials/soils which could impact soil-water quality. Seepage/leakages/overland flow from oil & fuel spills from vehicles parked and operating at the mine may compromise soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table.		
Extent	Local (2)	Site (1)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Low (4)
Probability	Probable (3)	Medium (3)
Significance	**Moderate (39)**	**Low (24)**
Status (positive or negative)	Negative	Low negative
Reversibility	Low reversible	Partly reversible
Irreplaceable loss of resources	Intermediate loss	Low loss
Can impacts be mitigated?	Yes	Yes
Mitigation: The following mitigation measures could be implemented: • Ensure clean stormwater is conveyed to the natural environment. • Ensure that an infiltration/exfiltration trench is installed to offset potential negative impacts associated with the new mining areas, and to improve interflow into the known wetland area. Without the proposed stormwater attenuation system, the 32 m buffer will not be possible as the impact on the wetland system could be severe. • Placing a suitable geotextile in areas near or on top of watercourses/wetlands, before placement of the soils, may help maintain some sub-surface soil processes. • Compact and revegetate eroded areas. • Establish where the waste rock will be placed, and if the area is suitable to receive the excavated material. • Implement the proposed stormwater infiltration/exfiltration trench. • Ensure pit slopes are kept as per best practice guidelines, to reduce wind erosion and compromise the slope stability • Retain as much indigenous vegetation as possible during the ongoing activities or re-vegetate areas prone to erosion. • All mine and laydown footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential.		
Cumulative Impacts: The largest cumulative impact notable of mentioning is the potential combined regional scale impact on soil flow processes.		
Residual Impacts: Reduced soil conductivity through interception of recharge potential		

11.6.2. Decommissioning phase

The activities will generally entail rehabilitation and site clean-ups, whereby the aim would be to restore natural flow processes. The following is anticipated and assumes that the opencast pit will be backfilled (or maintained as a pit lake), the processing yard, crushers and graders will be removed and rehabilitated, and most of the sand residues will be backfilled:

- New hydropedology flow regimes will form as a result of the backfilled opencast pit. Backfill material properties will not be similar to the in-situ soil properties and will likely promote interflow from the pit into the surrounding areas. If a pit lake is considered, interflow and seepage from the pit lake into the soils and bedrock will take place.

Nature: Soil interflow processes: • Alteration to natural hydropedological flow paths by infilling or cut and fill activities.

• Impacts on the macro-soil structure. • Impacts on the hydropedological processes supporting the watercourses.		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	**Moderate high (50)**	**Moderate high (50)**
Status (positive or negative)	Positive	Positive
Poor quality seepage from machinery used to decommission and rehabilitate the mine operations.		
Extent	Local (2)	Local (2)
Duration	Medium-term (3)	Medium (3)
Magnitude	Low (2)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**Low moderate (35)**	**Moderate (33)**
Status (positive or negative)	Negative	Positive
Cession of mining activity and rebound of the groundwater table. Rehabilitation of plants, stockpiles, settlement and drying dams. Decommissioning of the boreholes used for groundwater supply.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	High (8)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Moderate (48)**	**Moderate (48)**
Status (positive or negative)	Positive	Positive
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during rehabilitation (monthly)		
Cumulative Impacts: The largest cumulative impact notable of mentioning is the potential combined regional scale impact on soil flow processes.		
Residual Impacts: Wetland health to be affected as caused by reduced recharge potential – destruction of the flow-boundaries of 15 – 22% within the vadose soil zone		

11.7. Surface Water Impact Assessment

During the construction phase various activities contribute towards impacts on the receiving water courses. Vegetation removal with destruction and damage to the soil layers allows for sedimentation and erosion leading towards water quality degradation. Various other construction activities have the potential to cause water pollution.

11.7.1. Construction Phase

Nature: Direct physical loss of freshwater habitat and riparian destruction		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)

Duration	Long-term (4)	Medium-term (3)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Moderate (30)**
Status (positive or negative)	Negative	Negative
Water quality deterioration caused by pollution stemming from mining activities		
Extent	Local (2)	Site (1)
Duration	Medium-term (3)	Short-term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (52)**	**Low (27)**
Status (positive or negative)	Negative	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Avoid delineated riparian areas • Undertake construction during low flow season • Limit instream habitat disturbance during construction phase • Implement rehabilitation activities to address temporary disturbance • Implement rehabilitation activities to address temporary disturbance • Implement stormwater management measures • Construct PCD's • Implement monitoring program		
Cumulative Impacts: Destruction of freshwater habitat		
Residual Impacts: Water quality deterioration		

11.7.2. Operational Phase

Nature: Direct physical loss of freshwater habitat and riparian destruction due to permanent destruction of drainage pattern		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**High (75)**	**High (75)**
Status (positive or negative)	Negative	Negative
Water quality deterioration caused by pollution stemming from mining activities		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Probable (3)
Significance	**High (70)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation: • Avoid delineated freshwater riparian areas during mining, including the dumping of overburden and placement of stockpiles. • Limit instream habitat disturbance during future repairs and/or maintenance. • Implement post-construction river rehabilitation strategy where necessary. • Limit access to instream and riparian habitat. • Rehabilitate any erosion or vegetation clearing impacts as soon as practically possible. • Implement water management plan and PCD for containment of contaminated water. • Implement monitoring
Cumulative Impacts: Permanent loss of 17.38 ha freshwater habitat in the W23G quaternary
Residual Impacts: Impaired water quality rendering it not fit for use, reduction in catchment yield due to disruption of drainage line

11.7.3. Decommissioning Phase

Nature: Direct physical loss of freshwater habitat and riparian destruction		
	Without mitigation	**With mitigation**
Extent	Local (2)	Site (1)
Duration	Long term (4)	Medium term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Low probability (2)
Significance	**Moderate (36)**	**Low (20)**
Status (positive or negative)	Negative	Neutral
Water quality deterioration caused by pollution stemming from mining activities		
Extent	Local (2)	Site (1)
Duration	Long term (4)	Medium term (3)
Magnitude	High (8)	High (8)
Probability	Definite (5)	probable (3)
Significance	**High (70)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Determine the potential for ARD • Separate clean and dirty water systems as part of rehabilitation • If required, implement passive system • Implement monitoring program		
Cumulative Impacts: Accumulation of dissolved metals in sediments creating toxic Environment macro-invertebrates reducing the diversity of aquatic life		
Residual Impacts: Accumulation of heavy metals in river sediments. Increased potential for health risks		

11.8. Air Quality Impact Assessment

The level of impact of surface mining activities associated with the Proposed Somkhele Operations is assessed using the methodology as outlined in the EIA (refer section 13). The overall impact is identified to result in medium negative impacts in terms of particulates and dustfall if mitigation measures are implemented.

11.8.1. Construction Phase

It is foreseen that the impacts stemming from the construction phase will be similar as for the operational phase.

11.8.2. Operational Phase

The operational phase activities include material handling, stockpiles, wind erosion from stock pile areas, drilling and blasting as well as bulldozing.

Nature: Impact due to fugitive dust due to material handling exposed areas, stockpiles/dumps, mining activity (excavators, FELs, etc.); truck loading and offloading operations; drilling, blasting. Vehicle dust entrainment, truck exhaust emissions and any other mining vehicle/equipment exhaust emissions		
Dustfall – 24H	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Moderate (6)
Probability	High (4)	High (4)
Significance	**Moderate (52)**	**Moderate (44)**
PM_{10} – 24H		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	Very High (10)	Moderate (6)
Probability	High (4)	High (4)
Significance	**High (60)**	**Moderate (44)**
PM_{10} - Annual		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	High (8)	Moderate (6)
Probability	High (4)	High (4)
Significance	**Moderate (52)**	**Moderate (44)**
$PM_{2.5}$ – 24H		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	Moderate (6)	Low (4)
Probability	High (4)	High (4)
Significance	**Moderate (44)**	**Moderate (36)**
$PM_{2.5}$ - Annual		
Extent	Local (2)	Local (2)
Duration	Medium (3)	Medium (3)
Magnitude	Moderate (6)	Low (4)

Probability	Medium (3)	Medium (3)
Significance	**Moderate (33)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Barely reversible	Partly reversible
Irreplaceable loss of resources	Intermediate loss	Low loss
Can impacts be mitigated?	Yes	Yes
Mitigation: The following dust mitigation measures could be implemented: • Water sprays for drilling, blasting and bulldozing; • Water sprays for material handling operations; • Emissions due to blasting can be reduced by scheduling of blasting to occur during calm wind conditions; • Water spraying for stockpile areas and material/product storage areas; • Wind breaks at coal storage areas • Usage of vegetation, topsoil and rock amour on large stockpiles; • Immediate clean-up of any material; • Conduct regular site inspections; • Development of dust management plan		
Cumulative Impacts: Somkhele Operations are anticipated to result in high cumulative impacts close to the operational areas in terms of dustfall.		
Residual Impacts: Increased health risks for the Directed Affected Communities		

11.8.3. Decommissioning Phase

11.9. Noise Impact Assessment

Impact Assessment: Daytime Construction Activities at Ophondweni. Ambient sound levels were measured at a number of locations over a 2 night-period resulting in more than 1,000 10-minute measurements. The average daytime sound level was 49 dBA (average long-term fast-weighted sound level) with the daytime ambient sound levels ranging between 35 and 66 dBA. Considering the ambient sound levels measured, the developmental character of the area as well as audible observations, the recommended daytime zone sound level was 50 dBA, with an upper noise limit of 55 dBA.

11.9.1 Construction Phase

Nature: Numerous simultaneous activities during the day		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Highly Likely (4)	Possible (2)
Significance	**Medium (39)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of construction noise impact could be high for daytime construction/mining activities and additional mitigation measures are required and recommended as follows:		

• The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR; • The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • The applicant must implement a noise monitoring programme at residential dwellings in the area; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads.
Cumulative Impacts: The mining activities (construction) at Ophondweni will not result in a cumulative noise impact.
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

Considering developmental character of the area, the recommended night-time zone sound level was 40 dBA, with a night-time noise rating level of **45 dBA**. It is recommended that the applicant should implement measures to ensure that NSR are subject to noise levels less than 45 dBA, ensuring a maximum equivalent noise level less than 35 dBA inside typical dwellings (to comply with Table 1 of SANS 10103:2008).

Nature: Numerous simultaneous activities during night		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (80)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of construction noise impact could potentially be high for night-time construction/mining activities and additional mitigation measures are required and recommended. The significance of the noise impact can be reduced to low, and potential measures that would reduce the significance include: • The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize significant noise-generating activities (such as drilling closer than 500m from NSR; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize simultaneous night-time construction activities closer than 500m from NSR;		

• The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR; • The mine can negotiate the relocation of selected NSR; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads); • The mine can negotiate the relocation of selected NSR; • The mine must consider the use of white noise generators on all vehicles instead of tonal reverse alarms; • The mine should minimize night-time trucks travelling though the community, especially trucks travelling empty on corrugated roads; and • The applicant must implement a noise monitoring programme at residential dwellings in the area. Data from the noise monitoring programme can be used to update the noise model, the noise impact and potential mitigation measures. The mine can use the services of an acoustic specialist in the management of noise impacts (after the noise model was updated and calibrated).
Cumulative Impacts: The mine will not result in a cumulative noise impact.
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

Construction activities at Emalahleni: Ambient sound levels were measured at a number of locations over a 2 night-period resulting in more than 1,000 10-minute measurements. The average daytime sound level was 49 dBA (average long-term fast-weighted sound level) with the daytime ambient sound levels ranging between 35 and 66 dBA.

Considering the ambient sound levels measured, the developmental character of the area as well as audible observations, the recommended daytime zone sound level was 50 dBA, with an upper noise limit of 55 dBA. The potential noise rating levels, as well as the significance are defined per NSR

Nature: Numerous simultaneous activities at Emalahleni during the day		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Highly Likely (4)	Possible (2)
Significance	**High (60)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of construction noise impact could be high for daytime construction/mining activities and additional mitigation measures are required and recommended as follows: • The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR;		

• The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • The applicant must implement a noise monitoring programme at residential dwellings in the area; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads.
Cumulative Impacts: Noise from the mining activity will cumulatively add to the noise from traffic from the Ophondweni project. The effect however is relatively minor (around 3 dBA).
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

Nature: Numerous simultaneous activities at Emalahleni during night		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (80)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of construction noise impact could potentially be high for night-time construction/mining activities and additional mitigation measures are required and recommended. The significance of the noise impact can be reduced to low, and potential measures that would reduce the significance include: • The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize significant noise-generating activities (such as drilling closer than 500m from NSR; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize simultaneous night-time construction activities closer than 500m from NSR; • The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR; • The mine can negotiate the relocation of selected NSR; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads);		

• The mine can negotiate the relocation of selected NSR; • The mine must consider the use of white noise generators on all vehicles instead of tonal reverse alarms; • The mine should minimize night-time trucks travelling though the community, especially trucks travelling empty on corrugated roads; and • The applicant must implement a noise monitoring programme at residential dwellings in the area. Data from the noise monitoring programme can be used to update the noise model, the noise impact and potential mitigation measures. The mine can use the services of an acoustic specialist in the management of noise impacts (after the noise model was updated and calibrated).
Cumulative Impacts: Noise from the mining activity will cumulatively add to the noise from traffic from the Ophondweni project. The effect however is relatively minor (around 3 dBA).
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

Impact assessment at Mahujini – Construction Phase: Daytime

Nature: Numerous simultaneous activities during the day – Mahujini		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Very High (10)	Moderate (6)
Probability	Highly Likely (4)	Possible (2)
Significance	**High (64)**	**Low (24)**
Status (positive or negative)	Negative	Positive
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of construction noise impact could be high for daytime construction/mining activities and additional mitigation measures are required and recommended as follows: • The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR; • The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • The applicant must implement a noise monitoring programme at residential dwellings in the area; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads.		
Cumulative Impacts: Noise from the mining activity will slightly add to cumulative noises from the existing processing plant.		
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.		

Ambient sound levels were measured at a number of locations over a 2 night-period resulting in more than 500 10-minute measurements. The average night-time sound level was 54 dBA (average long-term night-time fast-weighted sound level) with night-time ambient sound levels ranging between 37 and 70 dBA. Due to the very high night-time ambient sound levels, this assessment will use an ambient sound level of 45 dBA.

Considering developmental character of the area, the recommended night-time zone sound level was 40 dBA, with a night-time noise rating level of **45 dBA**. It is recommended that the applicant should implement measures to ensure that NSR are subject to noise levels less than 45 dBA, ensuring a maximum equivalent noise level less than 35 dBA inside typical dwellings (to comply with Table 1 of SANS 10103:2008).

Nature: Numerous simultaneous activities at Mahujini during night		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long-term (3)	Long-term (4)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (84)**	**Low (26)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No loss of resource	No loss of resource
Can impacts be mitigated?	Yes	Yes

Mitigation: The potential significance of construction noise impact could potentially be high for night-time construction/mining activities and additional mitigation measures are required and recommended. The significance of the noise impact can be reduced to low, and potential measures that would reduce the significance include:

- The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). These berms should be as high as possible (at least 10m recommended). Barriers/berms should only be constructed during the day-time period and should not have any gaps;
- Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize significant noise-generating activities (such as drilling closer than 500m from NSR;
- Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize simultaneous night-time construction activities closer than 500m from NSR;
- The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits, new haul roads, etc.), before active mining activities are closer than 500m from these NSR;
- The mine can negotiate the relocation of selected NSR;
- The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads);
- The mine can negotiate the relocation of selected NSR;
- The mine must consider the use of white noise generators on all vehicles instead of tonal reverse alarms;
- The mine should minimize night-time trucks travelling though the community, especially trucks travelling empty on corrugated roads; and

• The applicant must implement a noise monitoring programme at residential dwellings in the area. Data from the noise monitoring programme can be used to update the noise model, the noise impact and potential mitigation measures. The mine can use the services of an acoustic specialist in the management of noise impacts (after the noise model was updated and calibrated).
Cumulative Impacts: Noise from the mining activity will slightly add to cumulative noises from the existing processing plant.
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

11.9.2 Operational Phase

Ambient sound levels were measured at a number of locations over a 2 night-period resulting in more than 1,000 10-minute measurements. The average daytime sound level was 49 dBA (average long-term fast-weighted sound level) with the daytime ambient sound levels ranging between 35 and 66 dBA.

Considering the ambient sound levels measured, the developmental character of the area as well as audible observations, the recommended daytime zone sound level was 50 dBA, with an upper noise limit of 55 dBA.

Nature: Numerous simultaneous operational activities during the day		
Ophondweni Area	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium -term (3)	Medium -term (3)
Magnitude	High (8)	Moderate (6)
Probability	Likely (3)	Possible (2)
Significance	**Medium (39)**	**Low (22)**
Emalahleni Area		
Extent	Local (2)	Local (2)
Duration	Medium -term (3)	Medium -term (3)
Magnitude	High (8)	Moderate (6)
Probability	Likely (3)	Possible (2)
Significance	**Medium (39)**	**Low (22)**
Mahujini Area		
Extent	Local (2)	Local (2)
Duration	Long -term (4)	Long -term (4)
Magnitude	High (8)	Moderate (6)
Probability	Likely (3)	Possible (2)
Significance	**Medium (42)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No Loss of resource	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of the daytime operational noise impact is medium for the activities as conceptualised for a worst-case scenario. Additional mitigation measures are required and recommended, including: • The applicant to continue with the mitigation measures recommended for construction phase; and		

• Continued review of noise levels, the locations of berms as well as project schedule/planning to ensure that berms (ranging in height 4-10m), stockpiles and deposits are located optimally to manage noise.
Cumulative Impacts: Noise from the mining activity will slightly add to cumulative noises from the existing processing plant
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

Ambient sound levels were measured at a number of locations over a 2 night-period resulting in more than 500 10-minute measurements. The average night-time sound level was 54 dBA (average long-term night-time fast-weighted sound level) with night-time ambient sound levels ranging between 37 and 70 dBA. Due to the very high night-time ambient sound levels, this assessment will use an ambient sound level of 45 dBA.

Considering developmental character of the area, the recommended night-time zone sound level was 40 dBA, with a night-time noise rating level of 45 dBA. It is recommended that the applicant should implement measures to ensure that NSR are subject to noise levels less than 45 dBA, ensuring a maximum equivalent noise level less than 35 dBA inside typical dwellings (to comply with Table 1 of SANS 10103:2008).

Nature: Numerous simultaneous operational activities during the night		
Ophondweni Area	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Medium -term (3)	Medium -term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (80)**	**Low (24)**
Emalahleni Area		
Extent	Regional (3)	Regional (3)
Duration	Medium -term (3)	Medium -term (3)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (80)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Mahujini Area		
Extent	Regional (3)	Regional (3)
Duration	Long -term (4)	Long - term (4)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Possible (2)
Significance	**High (85)**	**Low (26)**
Reversibility	High	High
Irreplaceable loss of resources	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: The potential significance of a noise impact is high for night-time operational activities as conceptualised for the worst-case scenarios. It is assumed that the mitigation proposed for the construction phase was implemented, especially the relocation of NSR staying within the future opencast mining areas. Mitigation measures are required and recommended. Measures that would reduce the significance include:		

• The applicant to continue with the mitigation measures recommended for construction phase; • Continued review of noise levels, the locations of berms as well as project schedule/planning to ensure that berms, stockpiles and deposits are located optimally to manage noise; and • The applicant should minimize night-time hauling and transport activities (between 21:00 and 05:00) on public roads.
Cumulative Impacts: Noise from the mining activity will slightly add to cumulative noises from the existing processing plant.
Residual Impacts: This impact will only disappear after mine decommissioning and closure is completed.

11.9.3 Decommissioning Phase

The Decommissioning Phase is considered as the phase which begins after the last mineral resource is processed, main rehabilitation activities start and ends when the facility receives a Mine Closure Certificate.

Activities that can take place include:

- Decommissioning and rehabilitation of the remaining infrastructure unless it is required for post-mining impact management or for the final end land use. This includes the following:
    - Removal of all remaining redundant infrastructure;
    - Removal of any contaminated soil;
    - The rehabilitation of disturbed areas including the necessary ripping of compacted soils and the shaping of rehabilitated areas to ensure free drainage;
    - Placement of topsoil on rehabilitated surface areas followed by seeding (if necessary to re-establish vegetation);
    - Monitoring and maintenance of the rehabilitated areas; and
    - Application for a Closure Certificate for the site.

However, while there are numerous activities that can take place during the decommissioning stage, the potential noise impact will only be discussed in general. This is because the noise impacts associated with the decommissioning phase is normally significantly less than both the construction and operational phases for the following reasons:

- Final decommissioning normally takes place only during the day, a time period when existing ambient sound levels are higher, generally masking most external noises for surrounding receptors; and

There is a lower urgency of completing this phase and less equipment remains onsite (and are used simultaneously) to affect the noise levels during decommissioning.

11.10. Flora Impact Assessment

The proposed mining development will cause direct destruction or degradation of vegetation, as shown in Annexure 1 of the specialist report attached as **Appendix 18** of the EIA. This includes some Zululand Lowveld vegetation in fair to good condition, especially along seasonally dry drainage lines and rivers.

While no special habitats or threatened species were found on the proposed mining sites, there is a need to avoid indirect impacts on the special habitat and threatened species beyond, within 400 metres to 1,5 km of the Emalahleni site.

The following impacts were observed on all sites:

- Former cultivation of fields (reportedly for sugar cane according to local guides at Emalahleni, but this cannot be confirmed). Certainly, some form of large-scale agriculture occurred in part;
- Small-scale cultivation;
- Grazing by cattle and grazing and browsing by goats. This appears to be quite heavy and reduced grassy growth in parts to very low stature, notwithstanding a summer of good rain and extensive foliation of the woody and shrubby vegetation. It also appears to have reduced grass and herbaceous plant diversity, and resulted in overexpression of species which are low-growing, spiny or likely unpalatable to these animals (such as *Crabbea hirsuta – low growing with spiny bracts*, *Dicoma zeyheri* subsp. *argyrophyllum* – spiny *and Lippia javanica – unpalatable;*
- Harvesting of timber/wood;
- Alien plant invasion;
- Unnatural expression of certain plants. This mainly applies to *Lippia javanica* (the latter most conspicuous at Ophondweni), which is avoided by livestock; and
- Sand-mining at a further distance to the south-east of the Emalahleni site, which may be unauthorized.

11.10.1. Construction Phase

Nature: Destruction of vegetation (> 20 hectares) of indigenous vegetation for the establishment of the mining infrastructure		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	High (4)	Medium (3)
Significance	**High (60)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Low reversibility	Low reversibility
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Implement Alien Invasive Species control program • Re-vegetation • Dust control measures		
Cumulative Impacts: Increased Zululand lowveld biome destruction		
Residual Impacts: Loss of Zululand Lowveld vegetation		

11.10.2. Operational Phase

During the operational phase rehabilitation will be limited due to the undulating landscape and the status of concurrent rehabilitation practices.

Nature: On-going destruction of Zululand Lowveld as opencast mining progresses over time		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Highly likely (4)
Significance	**High (75)**	**High (60)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Partially	Partially
Mitigation: • Controlling vehicle and pedestrian traffic, ensuring it is confined and kept out of the any natural area beyond the footprints through confining it to designated roads and work areas. • Controlling dust generated by vehicles, especially heavy vehicles. • Implementing an alien plant control programme on the sites and through the mining right areas. • Ensuring that waste material or refuse does not percolate into the remaining natural area and making regular checks and clean-ups as necessary		
Cumulative Impacts: The special habitat of Zululand Coastal Thornveld (south east of Emalahleni) as a transitional habitat is likely to become under threat as an indirect impact		
Residual Impacts: Less area under environmental protection (EKZNW) to meet with conservation targets		

11.10.3. Decommissioning Phase

Nature: Reinstatement of vegetation following rehabilitation by implementing measures as per Rehabilitation and Closure Plan		
	Without mitigation	**With mitigation**
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	High (8)	Moderate (6)
Probability	High (4)	Medium (3)
Significance	**High (60)**	**Moderate (33)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Partial reversible
Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Implement biodiversity offset • Re-seeding of areas where germination failure has occurred; • Alien and weed eradication and control; • Erosion monitoring and installation, upgrade or repair of erosion control structures • Progress of rehabilitation versus set targets; • Appropriate time for re-introduction of livestock; • Veld management practices including burning regimes (to be advised by the Department of Agriculture);		

• Upgrade and/or maintenance of runoff control/diversion structures (first two years or longer as determined by monitoring); • Maintenance of cut-off trenches; • Monitoring of pollution control structures i.e. in-pit evaporation ponds; • Surface water monitoring and future requirements; • Groundwater monitoring and future requirements; • Rehabilitation monitoring and future requirements; and • The maintenance and aftercare period are set for a minimum of two to three years after decommissioning. However, ongoing monitoring will determine the most applicable time at which to cease maintenance and aftercare procedures.
Cumulative Impacts: Increased threat of alien invasive plant encroachment on all disturbed area and transition areas (ecological support areas) reduced
Residual Impacts: Increased risk for bush encroachment

11.11. Faunal Impact Assessment

The potential impacts to fauna of the individual development footprints have been evaluated for all phases as specified below.

Nature: Loss of habitat associated fauna within Emalahleni and Ophondweni footprint		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Loss of habitat associated with resettlement		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (64)**	**Moderate (52)**
Status	Negative	Negative
Impact on aquatic ecosystems, hydrology and water quality including downstream communities		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (56)**	**Moderate (44)**
Status	Negative	Negative
Degradation of undeveloped areas adjacent to mining footprint		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)

Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Alien plant infestation		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (56)**	**Moderate (44)**
Status	Negative	Negative
Faunal disturbance		
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (55)**	**Moderate (40)**
Status	Negative	Negative
Air quality and dust		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (44)**	**Moderate (36)**
Status	Negative	Negative
Light pollution		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (52)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	yes

Mitigation:

- Footprint reduction and appropriate footprint placement where possible
- Offsetting where appropriate
- Improved management of remaining undeveloped portions of the site.
- Extent of new settled areas is minimised, and largely planned to avoid areas of higher biodiversity value
- Offsetting where appropriate
- Footprint reduction and appropriate footprint placement where possible
- Adequate buffers in place
- Aquatic ecosystems not modified
- Adequate stormwater management
- Maximise permeable surfaces within footprint
- Adequate pollution prevention and control systems
- Monitoring of water quality and ecosystem health
- Effective alien control programme and monitoring
- Dust suppression
- Adhering to regulated air quality levels

• Routine air quality monitoring • All activities restricted to footprint area • Light levels regulated and minimised
Cumulative Impacts: Loss of terrestrial habitat
Residual Impacts: Loss of terrestrial biodiversity

Nature: Loss of habitat associated fauna within Mahujini footprint		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Loss of habitat associated with resettlement for Mahujini community		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (64)**	**Moderate (44)**
Status	Negative	Negative
Impact on aquatic ecosystems, hydrology and water quality including downstream communities		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (56)**	**Moderate (44)**
Status	Negative	Negative
Degradation of undeveloped areas adjacent to mining footprint		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Alien plant infestation		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (64)**	**Moderate (44)**
Status	Negative	Negative
Faunal disturbance		
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)

Probability	Definite (5)	Definite (5)
Significance	**Moderate (55)**	**Moderate (40)**
Status	Negative	Negative
Air quality and dust		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (44)**	**Moderate (36)**
Status	Negative	Negative
Light pollution		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (52)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • As above for Emalahleni and Ophondweni development footprint		
Cumulative Impacts: The consecutive impacts from mining activities have a larger significance on the receiving terrestrial environment.		
Residual Impacts: Loss of terrestrial faunal biodiversity		

11.12. Hydrology

11.12.1. Construction Phase

The following activities are anticipated during the construction/preparation phase of the project:

- Typical earthworks are required to clear the sites.
- Excavation for the establishment of water management dams and systems.
- Establishment of access roads.
- Dust suppression on roads and construction areas.
- Establishment of service platforms, material handling areas and other temporary infrastructure.
- Establishment of stockpiles (topsoil and overburden).

Nature: Disturbing vadose zone soils during excavations/construction activities.		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Likely (3)	Improbable (1)
Significance	**Low (24)**	**Low (6)**
Status	Negative	Neutral

Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Likely (3)	Improbable (1)
Significance	**Low (24)**	**Low (6)**
Status	Negative	Neutral
Surface water contamination and sedimentation from the following activities: Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). Contaminant transport in runoff. To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Minor (2)	Minor (2)
Probability	Low probability (2)	Improbable (1)
Significance	**Low (12)**	**Low (6)**
Status	Neutral	Neutral
Poor quality seepage from machinery used to excavate soils. Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Likely (3)	Improbable (1)
Significance	**Low (24)**	**Low (6)**
Status	Negative	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

- Only excavate areas applicable to the project area.
- Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils.
- Cover excavated soils with a temporary liner to prevent contamination.
- Retain as much indigenous vegetation as possible.
- Exposed soils are to be protected using a suitable covering or revegetating.
- Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site.
- Visual soil assessments for signs of contamination during construction (monthly)
- Install a temporary cut-off trench to contain poor-quality runoff (if required).
- Visual inspections of all vehicles entering and operating at the site.
- Visual assessment for signs of erosion or contamination.
- Implementation of stormwater recommendations.
- Cover any temporary construction material stockpiles.
- Park heavy machinery in lined areas and place drip trays under vehicles at the site.
- Have fuel and oil spill cleanup kits on site and clean up these areas immediately.
- Ensure that building material stockpiles are covered with a suitable temporary cover or placed in bunded areas to reduce poor-quality seepage probability.
- Visual soil assessments for signs of contamination during construction (monthly)

Cumulative Impacts: Increased surface runoff from disturbed areas causing erosion and sedimentation

Residual Impacts: Permanent altered drainage lines causing occasional flooding in certain areas

11.12.2. Operational Phase

The following activities are anticipated during the operational phase of the project:

- Opencast mining.
- Opencast dewatering; and
- PCDs for stormwater and pit water, slurry dam depositions, discard deposition, and dirty runoff from surface water infrastructure and stockpiles.

Nature: Disturbing vadose zone soils during mining		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Likely (3)
Significance	**Moderate (45)**	**Low (27)**
Status	Negative	Neutral
Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer and drainage system.		
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Likely (3)	Low probability (2)
Significance	**Low (27)**	**Low (12)**
Status	Negative	Neutral
Stormwater Runoff: Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). Increased runoff due to compaction of surfaces and changes in surface topography		
Extent	Local (2)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Moderate (6)	Minor (2)
Probability	Likely (3)	Likely (3)
Significance	**Moderate (36)**	**Low (18)**
Status	Negative	Neutral
Water quality: Contaminant transport in runoff from sediment to oil and fuel spills; Spillage of PCDs and stormwater conduits.		
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Likely (3)
Significance	**Moderate (45)**	**Low (18)**
Status	Negative	Negative
Groundwater dewatering due to mining activity and poor-quality seepage from mining machinery.		
Extent	Local (2)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Moderate (6)	Minor (2)

Probability	Likely (3)	Likely (3)
Significance	**Moderate (36)**	**Low (18)**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Keep excavation as small as possible. • Ensure that sediment barriers are in place at mining sites, to prevent sediment runoff and erosion. • Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site. • Visual soil assessments for signs of contamination during operations (monthly) • Implementation of stormwater recommendations. • Water quality monitoring • Routine hydraulic monitoring of the stormwater systems (monthly). • Visual inspections of all vehicles entering and operating at the site. • Visual assessment for signs of erosion or contamination. • Cover any stockpiles with appropriate materials such as ECBs. • Vegetation of bare soils in unused areas. • Water quality monitoring. • Visual inspection of stormwater systems. • Spills should be cleaned or managed immediately. • Do not over-abstract. • Ensure borehole collars are protected from environmental runoff. • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Have fuel and oil spill cleanup kits on site. • Ensure stockpiles are covered with a suitable cover or in bunded areas to reduce poor-quality seepage. • Visual soil assessments for signs of contamination (monthly).		
Cumulative Impacts: The largest cumulative impact is the potential combined regional scale impact on runoff quantity and quality. The footprint of the operations collectively is approximately 0.83% of the quaternary area. The footprint of the stormwater catchments that will not be contributing to the runoff within the quaternary catchment is 0.98% of the total area of quaternary catchment W32G.		
Residual Impacts: Permanent impact on catchment hydrology and drainage		

11.12.3. Decommissioning Phase

The closure and decommissioning phases will be per an agreed and approved closure plan for the proposed workings. This will include:

- Cessation of mining operations and rehabilitation.
- Backfill and closure of the opencast with waste rock dump material; and
- Flooding of mining works and resultant altering of the groundwater flow regime for the flooding period.

Nature: Rehabilitation of mining operations.		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	High (8)	High (8)
Probability	Likely (3)	Highly likely (4)
Significance	**Moderate (36)**	**Moderate (48)**
Status	Positive	Positive
Rehabilitation: Poor quality seepage from machinery used to decommission and rehabilitate the mine.		

Extent	Site (1)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Likely (3)	Improbable (1)
Significance	**Low (27)**	**Low (6)**
Status	Negative	Neutral
Rehabilitation of plants, stockpiles, settlement, and drying dams.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	High (8)	High (8)
Probability	Likely (3)	Highly likely (4)
Significance	**Moderate (36)**	**Moderate (48)**
Status	Positive	Positive
Cession of mining activity and rebound of the groundwater table.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	High (8)	High (8)
Probability	Likely (3)	Highly likely (4)
Significance	**Moderate (36)**	**Moderate (48)**
Status	Positive	Positive
Decommissioning of the boreholes used for groundwater supply.		
Extent	Site (1)	Site (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	High (8)	High (8)
Probability	Likely (3)	Highly likely (4)
Significance	**Moderate (36)**	**Moderate (48)**
Status	Positive	Positive
Stormwater Runoff: Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). Increased runoff due to compaction of surfaces and changes in surface topography		
Extent	Local (2)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Moderate (6)	Minor (2)
Probability	Likely (3)	Likely (3)
Significance	**Moderate (36)**	**Low (18)**
Status	Negative	Neutral
Water quality: Spillage of PCDs and stormwater conduits		
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Medium-term (3)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Likely (3)
Significance	**Moderate (45)**	**Low (18)**
Status	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:		

• Visual soil assessments for signs of contamination during operations (monthly • Dismantling of stormwater systems if viable after decommissioning and rehabilitation. • Visual assessment for signs of erosion or contamination. • Cover any stockpiles with appropriate materials such as ECBs. • Revegetation • Dismantling of PCDs if viable after waste rock dumps have been backfilled. • Visual inspection of stormwater systems. • Spills should be cleaned or managed immediately. • Communities Support for Tendele Mine
Cumulative Impacts: The largest cumulative impact is the potential combined regional scale impact on runoff quantity and quality. The footprint of the operations collectively is approximately 0.83% of the quaternary area. The footprint of the stormwater catchments that will not be contributing to the runoff within the quaternary catchment is 0.98% of the total area of quaternary catchment W32G.
Residual Impacts: Long-term pollution of the perennial and non-perennial drainage lines of the area

11.13. Wetland Impact Assessment

Several moderate risks were identified for the construction phase of the project. The most notable risks identified to wetlands during the construction phase of the project pertaining to the stripping and stockpiling / transporting of top soil, and the removal of vegetation and excavations required for the proposed 120 m pit location. The input of toxic heavy metal and salt contaminants, arising from activities related to the establishment of the construction phase was identified as a moderate risk.

11.13.1. Construction Phase

Nature: The most significant construction impact is the direct physical loss or modification of freshwater habitat where infrastructure advances into delineated wetlands and watercourses.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Highly probable (4)
Significance	**High (75)**	**High (60)**
Status (positive or negative)	Negative	Negative
Alteration of hydrological and geomorphological processes		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Medium term (3)
Magnitude	Medium (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (48)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Impacts to ecological connectivity and/or ecological disturbance impacts		
Extent	Local (2)	Site (1)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Highly probable (4)	Probable (3)

Significance	**Moderate (40)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Implement stormwater management design requirements as per GN704R • Pollution control dam (PCD) design and placement to prevent seepage and contamination • Implement general site management principles in terms of access control and construction camps • Implement stormwater erosion and sediment control measures • Management of fauna and flora • Implement Alien Invasive Plant Control Programme		
Cumulative Impacts: The permanent loss of 17 ha of wetland habitat		
Residual Impacts: Loss of habitat for species reliant on wetland habitats		

The risks identified during the operational and decommissioning phases of the project were mostly determined to be low. The most notable risks were that of the alteration of surface runoff flow paths and flows in nearby drainage lines and potential inputs of toxic heavy metal and salt contaminants which were determined to be moderate risks before mitigation. These risks related to the movement of vehicles and machinery in area and the possible indirect (accidental) contamination of the nearby watercourse areas. Larger drainage areas (32 m buffer from the Mnyaba River Channel) would be avoided during the construction phase and also the operational phase; this was able to reduce the risks to low/negligible.

11.13.2. Operational Phase

Most of the risks were re-allocated a low-risk rating, assuming that the prescribed mitigation measures will be implemented and taking into consideration that the larger drainage areas (running south to north) be avoided. The moderate risks, post mitigation, of stripping and stockpiling / transporting of top soil, and the removal of vegetation and excavations are unavoidable given the current placement and proposed site layout. If possible, the proposed pit location should be broken up into segments so that the streams and Wetland Units A, B and C are preserved. If possible, these wetland units should be afforded a 30 m buffer from any mining development. If avoidance is not possible, for substantiated reasons, an offset may be investigated.

Nature: Direct physical loss or modification of freshwater and wetland habitat		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Highly probable (4)
Significance	**High (75)**	**High (75)**
Status (positive or negative)	Negative	Negative
Alteration of hydrological and geomorphological processes		

Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (56)**	**Moderate (42)**
Status (positive or negative)		
Impacts to ecological connectivity and/or ecological disturbance impacts		
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (48)**	**Low (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Avoid delineated wetlands and riparian areas • Utilise best practise guidelines and design principles where watercourse transgression is unavoidable • Limit instream habitat disturbance • Limit access to riparian and wetland habitat • Implement protective buffer zones as no-go areas • Rehabilitate any erosion within delineated areas as soon as possible		
Cumulative Impacts: Increased loss of wetland habitat and eco-services within the W23G catchment		
Residual Impacts: Permanent loss of wetland habitat		

11.13.3. Decommissioning Phase

Nature: Direct physical loss or modification of freshwater and wetland habitat		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Medium term (3)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (40)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Alteration of hydrological and geomorphological processes		
Extent	Local (2)	Site (1)
Duration	Long term (4)	short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Moderate (36)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Impacts to ecological connectivity and/or ecological disturbance impacts		
Extent	Local (2)	Site (1)

Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (48)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Backfilling of voids • Replacement of topsoil and subsoils • Contouring of the land • Re-vegetation • Removal of all infrastructure (pipeline, power lines) • Rehabilitation of all roads no longer required • Implement wetland offset, if required		
Cumulative Impacts: Reduction of wetland areas in the region with altered drainage patterns causing a permanent loss of wetland eco-services		
Residual Impacts: Permanent loss of wetland habitat		

11.14. Aquatic Impact Assessment

11.14.1. Construction Phase

The impacts for the construction phase will be similar as for the Operational phase.

11.14.2. Operational Phase

Nature: The identified major impacts on the aquatic systems included instream modifications, solid waste disposal and erosion of river banks. Erosion is most likely caused by the livestock trampling and damaging riparian vegetation, leaving the banks exposed and vulnerable to erosion.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium (3)	Short to Medium (2)
Magnitude	Moderate (6)	Low (4)
Probability	Medium (3)	Low (2)
Significance	**Medium (33)**	**Low (16)**
Status (positive or negative)	Negative	Positive
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

- All staff involved in work within and near to freshwater (river/stream/wetland) habitats must receive basic environmental awareness training relating specifically to the need to protect freshwater ecosystems.
- All relevant staff on the property are to be informed of the sensitivity of the wetlands/rivers and the need to avoid damaging/polluting these sensitive aquatic environments.
- Site supervisors must ensure that impacts are confined to designated mining areas as far as possible.

• As far as possible, all mining-related activities and infrastructure should remain outside of the riparian / wetland zones and recommended buffer zones (as per *see section 6.1 of Specialist Report*), in line with the conditions and requirements of Regulation GN704 of the National water Act. • All watercourses and their buffer zones in the vicinity of any mining operations should be clearly demarcated. • These demarcated areas should be considered as "out of bounds" for all vehicles and personnel. • Where encroachment of mining into watercourses is unavoidable, it must be ensured that impact footprints are minimised and that no activities encroach any further than indicated on the mining/infrastructural design masterplan. • No vehicles should be permitted to cross drainage lines or wetland areas except via existing or planned routes. • When locating temporary construction camps and equipment yards, watercourses and areas susceptible to soil erosion and/or water contamination must be avoided. • Attempts must be made to situate the camp on flat ground that is at least 50m away from the edge of the nearest delineated watercourse. • The location of the camp site should be approved by the appointed Environmental Control Officer (ECO). • Appropriate signage around the wetlands/streams could also be erected to raise awareness amongst worker/employees at the site.
Cumulative Impacts: Stream and habitat modification in the W23G catchment
Residual Impacts: Impacted drainage system with loss of catchment yield

11.14.3. Decommissioning Phase

Nature: Impact on ecological integrity and sensitivity of receiving water courses		
	Without mitigation	**With mitigation**
Extent	Local (2)	Site (1)
Duration	Medium term (3)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Low probability (2)
Significance	**Moderate (44)**	**Low (18)**
Status (positive or negative)	Negative	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Implement Freshwater Ecosystem Monitoring Programme • Implement Alien Plant Monitoring and Control Program • Implement Biodiversity Offset		
Cumulative Impacts: The PES and EIS of the W23G catchment deteriorate to a Lower Health Class (currently Class B to C)		
Residual Impacts: River systems with impaired water quality, reduced river health and water less fit for use		

11.15. Social Impact Assessment

11.15.1. Construction

The mine expansion project necessitates the relocation of residents, a decision met with

varying degrees of acceptance among community members, as 139 out of 143 families have signed relocation agreements. At the time of writing this report, the majority of the families have already relocated.

Nature: Population displacement and relocation		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Highly probable (4)
Significance	**High (75)**	**High (60)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Provide timely and clear information to affected communities about the need for relocation, the process involved, and the support available. • Offer fair and adequate compensation to displaced residents, considering not only the costs associated with the relocation but also the intangible losses such as cultural heritage and social connections. • Provide support services to facilitate the transition, including assistance with transportation, moving logistics and cultural practices. • Engage in open dialogue to address concerns and gather feedback from residents.		
Cumulative Impacts: Improved living conditions		
Residual Impacts: Loss of partial livelihood for resettled communities		

11.15.2. Operational and Decommissioning Phases

Nature: Population influx driven by employment opportunities		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Short-term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (1)
Significance	**Medium (48)**	**Low (6)**
Status (positive or negative)	Negative	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No loss	No loss
Can impacts be mitigated?	Yes	Yes
Mitigation: • Prioritize hiring local residents for job opportunities created by the mine expansion, providing training programs and skills development initiatives to enhance their employability and reduce dependence on migrant labour. • 80% of hiring will come from the local community in the area.		
Cumulative Impacts: Improved living conditions		
Residual Impacts: None		

Nature: Increase of crime within study area		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium-term (3)	Short-term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Improbable (1)
Significance	**Medium (33)**	**Low (6)**
Status (positive or negative)	Negative	Neutral
Reversibility	Yes	Yes
Irreplaceable loss of resources		
Can impacts be mitigated?	Yes	Yes
Mitigation: • Establish community policing initiatives that foster partnerships between law enforcement agencies, residents, and local businesses. • Provide resources for community members to learn about crime prevention techniques and access support services. • Increase security measures such as installing surveillance cameras, improving lighting, and employing security personnel to patrol high-risk areas.		
Cumulative Impacts: Improved living conditions		
Residual Impacts: None		

Nature: Increase in social conflict within the study area		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Short-term (2)
Magnitude	Very High (10)	High (8)
Probability	Highly probable (4)	Probable (3)
Significance	**High (64)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources		
Can impacts be mitigated?	Yes	Yes
Mitigation: • Foster open and transparent communication channels between the mining company and local communities. Engage in meaningful dialogue to understand community concerns, address grievances, and collaboratively develop solutions. • Involve community members and other stakeholders in decision-making processes related to the mine expansion. Empower local representatives to voice community • interests and ensure their concerns are considered. • Ensure fair and equitable compensation for land acquisition. Provide opportunities for community members to participate in negotiations and decision-making regarding compensation packages. • Prioritize hiring local residents for job openings created by the mine expansion.		
Cumulative Impacts: Improved living conditions		
Residual Impacts: None		

Nature: Expanding a mine can lead to cultural erosion in affected communities, posing challenges to preserving traditional heritage and ways of life. The arrival of outside workers and changes to the local environment disrupt cultural practices and social bonds.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium-term (3)	Short-term (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (1)
Significance	**Low (27)**	**Low (5)**
Status (positive or negative)	Neutral	Neutral
Reversibility	Yes	Yes
Irreplaceable loss of resources	N/A	N/A
Can impacts be mitigated?	Yes	Yes
Mitigation: • Engage with affected communities in meaningful dialogue, respect their cultural values and rights, and incorporate their perspectives into decision-making processes related to the mine expansion.		
Cumulative Impacts: None		
Residual Impacts: None		

11.16. Traffic Impact Assessment

The proposed construction, operations decommissioning will generate additional traffic volumes along the roads within the study area. Whilst, there will be an increase in traffic flows the road network can easily accommodate the increased traffic flows due to the fairly low existing traffic volumes. The intersections operate at good levels of service. Minor delays and queuing will be encountered at intersections. However, there is no reason for concern given the low volumes of traffic that will be generated by the proposed development.

The impact of the additional traffic generated by the proposed development on the existing traffic conditions (road capacity and congestion) during the construction phase, the operational phase and the decommissioning are illustrated in the Tables below.

Nature: Impact of the generated traffic on the existing traffic conditions on road P235 (R618) during Construction, Operational and Decommissioning phases		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (1)	Short term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Moderate (6)	Low (4)
Significance	**Low (30)**	**Low (20)**
Status (positive or negative)	Negative	Neutral
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation: • Compliance with Road traffic ordinances
Cumulative Impacts: Increased traffic on dirt road could give rise to increased sediment from road material washes into wetlands causing siltation
Residual Impacts: Poor stormwater drainage could lead to erosion and river bank destabilisation

The increase in light and heavy vehicles generated by the proposed development will have a minimal impact on the existing road space available for pedestrians and cyclists. As mentioned previously, the pedestrian is adequately accommodated by existing verges and no cycle activity was noted on the surrounding road network. An increase in pedestrian activity could easily be accommodated on the verges of the surrounding road network without impeding on the travel way of the road. Workers employed to work at the pits are likely to reside within a reasonable walking distance and are likely to commute to and from work on foot. Alternatively, these workers will use public transport and will be dropped off in the vicinity of the pits. Therefore, the volume of pedestrian activity is likely to increase, however these pedestrians will be adequately serviced by the wide verges.

Nature: Impact of generated traffic on haul road and the potential safety of road users inclusive of pedestrians and cyclists during the operational phase.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Medium (3)
Significance	**Moderate (45)**	**Low (27)**
Status (positive or negative)	Negative	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Dust emissions during road construction		
Extent	Local (2)	Site (1)
Duration	Short term (1)	Medium term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Medium (3)
Significance	**Moderate (35)**	**Low (27)**
Status (positive or negative)	Negative	Neutral
Reversibility	Yes	Yes
Potential loss of sensitive riparian vegetation		
Extent	Local (2)	Local (2)
Duration	Long-term (5)	Long-term (5)
Magnitude	High (10)	Moderate (6)
Probability	Highly likely (4)	Highly likely (4)
Significance	**Moderate (68)**	**Moderate (52)**
Status	Negative	Negative
Reversibility	No	No
Stormwater runoff can cause transportation of eroded sediments impacting on downstream water resources		

Extent	Local (2)	Local (2)
Duration	Short term (1)	Short term (1)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly likely (4)	Medium (3)
Significance	**Moderate (36)**	**Low (27)**
Status (positive or negative)	Negative	Neutral
Reversibility	No	No
Creation of dust due to haulage trucks		
Extent	Local (2)	Local (2)
Duration	Long term (5)	Medium term (2)
Magnitude	High (10)	Moderate (6)
Probability	Definite (5)	Medium (3)
Significance	**High (85)**	**Moderate (30)**
Status (positive or negative)	Negative	Neutral
Reversibility	Yes	Yes
Ponding of stormwater during a flood can result the road being filled to a point where water can rise and flow over the road		
Extent	Local (2)	Local (2)
Duration	Long term (5)	Medium term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly likely (4)	Medium (3)
Significance	**Moderate (52)**	**Low (27)**
Status (positive or negative)	Negative	Neutral
Reversibility	Yes	Yes
Mitigation: • Improve road vehicle capacity; • Implement speed limit on haul road; • All intersections to be upgraded • Provide public transport to the work place; • Upgrade roads vertical alignment to include wide verges for improved road safety for users • Public transport should make provision for loading and offloading bays; • No stoppage in roadways as it could lead to fatal accidents		

11.17. Health Impact Assessment

The baseline health status and vulnerability of the receptor communities to the health impacts of PM2.5 were assessed based on available mortality data for the uMkhanyakude DM and, in the younger (<15 years) and the older (65+) age groups, KwaZulu-Natal mortality data were used. The reason for this was that DM data specific to these age groups were not available. Identified vulnerabilities were considered in the health impact ratings for the Somkhele anthracite mine expansions.

The pre-mitigation health impacts are conservatively rated as:

- Medium negative at Mahujini
- Low negative at Ophondweni and Emalahleni

The post-mitigation health impacts are conservatively rated as:

- Low negative at Mahujini, Ophondweni and Emalahleni

Nature: Increased occurrences of human health effects associated with exposure to PM2.5 at Mahujini. Health affect assessed include natural mortality, cardiovascular bronchitis (acute and chronic) as well as lung cancer		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Medium (3)	Improbable (1)
Significance	**Moderate (42)**	**Low (13)**
Status (positive or negative)	Negative	Negative
Reversibility	-	
Irreplaceable loss of resources	-	
Can impacts be mitigated?	Yes	Yes
Mitigation: Dust suppression as recommended in the AQIA		
Cumulative Impacts: Long-term health issues leading to a rise in healthcare costs and reducing overall well-being		
Residual Impacts: Overall decrease in community health		

Nature: Increased occurrences of human health effects associated with exposure to PM2.5 at Ophondweni. Health affect assessed include natural mortality, cardiovascular bronchitis (acute and chronic) as well as lung cancer		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Medium (2)	Improbable (1)
Significance	**Low (28)**	**Low (13)**
Status (positive or negative)	Neutral	Neutral
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Dust suppression as recommended in the AQIA		
Cumulative Impacts: Long-term health issues leading to a rise in healthcare costs and reducing overall well-being		
Residual Impacts: Mortality rate to increase		

Nature: Increased occurrences of human health effects associated with exposure to PM2.5 at Emalahleni. Health affect assessed include natural mortality, cardiovascular bronchitis (acute and chronic) as well as lung cancer		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)

Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Low (1)	Improbable (1)
Significance	**Low (14)**	**Low (13)**
Status (positive or negative)	Neutral	Neutral
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Dust suppression as recommended in the AQIA		
Cumulative Impacts: Increase in road traffic with the associated decrease in road safety		
Residual Impacts: High potential for road incident (road kills) and accidents; Mortality rate to increase		

11.18. Climate Change

Louw *et al.* (2020) have developed an impact rating system to assess the impact of projects on climate change (refer to **Table 10-48**). Based on this impact rating system, the Somkhele Mine Extension's GHG emissions, in terms of a percentage of South Africa's carbon budget, are considered to be medium impact in terms of the magnitude/severity of the proposed mine's GHG emissions and climate change impacts. The expected GHG emissions for the LoM mine (based on information provided) is 236 697.29 tonnes CO_{2e} (0.0063% of SAs carbon budget, at a 1.5°C scenario).

Nature: The activities conducted during the operation of the mine will result in GHG emissions. The emissions are considered significant and will have an impact on climate change. The significance assessment below has taken the GHG emission of the mine, at a total of 236 697.29 tonnes CO_{2e} for the LoM, into consideration		
	Without mitigation	**With mitigation**
Extent	International (5)	International (5)
Duration	Permanent (5)	Long-term (4)
Magnitude	Moderate (3)	Low (2)
Probability	Definite (5)	Definite (5)
Significance	**High (65)**	**Moderate (55)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Complete loss (4)	Complete loss (4)
Can impacts be mitigated?	Yes	Yes
Mitigation: The greatest contributor to the mine's GHG emissions (based on information provided) was the combustion of diesel for use in mining vehicles and equipment/plant. It should be noted that information pertaining to Scope 3 emissions was limited (and could not be assessed). Mitigation measures to reduce the mine's overall carbon footprint could include the application of energy efficiency measures (to reduce diesel consumption) such as: • an energy efficient materials movement strategy; • energy efficient overburden removal; • energy efficient mine haul trucks, in-pit crushers and conveyors; • using low carbon energy sources;		

• solar power as an alternative energy source to reduce the dependence on diesel for electricity generation; • carbon offsets can be introduced; • Energy efficiency of cooling systems used in the offices and staff accommodation; • Lighting in the offices, accommodation and around the mine pit; and • Changing human behaviour towards improving energy efficiency (creating an organisational culture towards reducing emissions).
Cumulative Impacts: The impact is rated as high but with mitigation it is rated a moderate.
Residual Impacts: Contribution towards overall Global Warming impacts

11.19. Cumulative Impacts

11.19.1. Soils

Nature: Continued opencast mining activities at Ophondweni, Emalahleni and Mahujini will increase the disturbance of land with loss and degradation of soils with ultimate impact on land use capability

	Without mitigation	**With mitigation**
Extent	Regional (2)	Regional (2)
Duration	Permanent (5)	Long term (4)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Medium probability (3)
Significance	**High (85)**	**Moderate + (36)**
Status (positive or negative)	Negative	Positive
Reversibility	Very low	Low
Irreplaceable loss of resources	Loss of resource	Loss of resource
Can impacts be mitigated?	Yes	Yes

Mitigation:

- A two-stage approach can be implemented where pioneer species are planted to create a soil environment for sub-climax species. After some time (2-3years) climax species can be introduced. There are many case studies where reseeding is necessary because the sub-climax and climax grass species die-back after the first or second season. The reason being the soil ecosystem is not conducive to sub-climax and climax species.
- It is recommended that the establishment of the vegetative cover commence with the sowing of a selection of pioneer grass species comprising:
  - Kweek (*Cynodon Dactylon*) (7kg/ha),
  - grasses adapted to the local environment
  - Rhodes Grass (*Chloris Gayana*) (7kg/ha)
  - Oulandsgras (*Eragrostus Curvula*) (6kg/ha)
- The seedbank in the kraal manure will contain some of these species as well a range of broadleaves (including Amaranthus species that is crucial in the disturbed soil environment to create the conditions for sub-climax and climax species to flourish once the soil growing conditions has improved

Cumulative Impacts: The cumulative impact on land use will be converting into open cast mining and infrastructure areas resulting in loss of agricultural land in that area for the mining life (10 years). After mining, however, it is anticipated that land can be restored. Surrounding land use can be broadly defined as subsistent agricultural under cultivation and grazing on rural land. The land can be restored to grazing.

Residual Impacts: Permanent loss of the agricultural potential of the area

11.19.2. Heritage

The development of coal mining infrastructure within the study area would have an immediate and damaging effect on the heritage resources discussed in this report. This impact would be severe and irreversible. It is the opinion of the authors that while the proposed development of coal mining infrastructure is plausible, however, it will result in a high heritage impact that may only proceed under the strict condition of the recommended mitigation measures.

Nature: Cumulative Impact rating on heritage resources		
	Without mitigation	**With mitigation**
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	High (4)
Significance	**High (75)**	**Moderate (48)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes

Mitigation:

- If all Projects in the area apply the mitigation measures the impact on the environment will be Moderate.

Cumulative Impacts: **Cultural Heritage:**

- A buffer area of at least 100m around the burial grounds and graves and a buffer area of at least 30m around other heritage sites would be required. The existing Heritage Management Plan must be implemented where heritage resources remain in place.
- A detailed social consultation process, at least 60 days in length, as required by the KZNARIA and the National Health Act and its Regulations, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation.
- The establishment of bilingual site and newspaper notices indicating the intent of the relocation.
- Obtaining all permits from all the relevant and legally required authorities.
- An exhumation process that keeps the dignity of the remains and family intact.
- An exhumation process that will safeguard the legal rights of the families and that of the mining company.
- The process must be done by a reputable company well-versed in the mitigation of graves.

All proposed mitigatory measures as proposed by the Heritage Specialist need to be followed for the following impacts;

- Burial grounds and graves;
- Historical homestead sites;
- Ancestral prayer huts and religious sites;
- Cultural landscape;
- Old Somkhele Mine Area and Railhead;
- Stone aged sites; and
- Unidentified Heritage Resources

Residual Impacts: Loss of cultural heritage on a regional scale

11.19.3. Palaeontology

Impacts on Palaeontological Heritage are only likely to happen within the construction and operational phase. No impacts are expected to occur during the decommissioning phase.

Nature: Cumulative Impact rating on loss of Fossil Heritage at Ophondweni, Emalahleni and Mahujini.		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very High (10)	High (8)
Probability	Highly Probable (4)	Medium Probability (3)
Significance	**Medium (46)**	**Low (30)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • As per construction and operational phase		

11.19.4. Visual

The cumulative results showed that the HiP will experience a medium to high and a low to medium visual impact to the west of the park boundary looking in an easterly direction towards the visual triggers. Overall, the cumulative analysis indicated that the visual impacts of the proposed and existing mining areas will be constrained mostly to the north and the south of the mining areas and will have a medium to high impact along portions of the R618 and a medium to low impact within the HiP. This is due to the changes in topographic ranges in the region acting as a screen for the development to the park and portions of the R618.

Nature: Cumulative Impact rating on HiPs Wilderness status – overburden dumps		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very High (10)	High (8)
Probability	Medium Probability (3)	Medium Probability (3)
Significance	**Moderate (51)**	**Moderate (45)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Implement agreed Off-Set agreement and visual offset plan as part of biodiversity offset plan for EKZN Wildlife HiP Wilderness zones		

11.19.5. Surface Water

Nature: Permanent modification of freshwater habitat and deterioration of water quality		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)

Probability	Definite (5)	Probable (3)
Significance	**High (70)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Similar as for the operational phase		
Cumulative Impacts: Impaired water quality less fit for potable/domestic use, less water available for livestock watering		
Residual Impacts: Poor water quality, lowered River Health class, loss of aquatic ecology		

11.19.6. Social- Economic

The cumulative socio-economic impacts of a mine expansion project, considering the various factors mentioned above, can be complex. On one hand, there may be economic benefits such as job creation, increased income, and infrastructure development, which can contribute to short-term growth and development within the community. However, there are some negative socio-economic consequences, including population displacement, social conflicts, health risks, and cultural erosion.

Population displacement can disrupt social networks, undermine community cohesion, and create challenges in accessing essential services, housing, and employment opportunities for displaced residents. This, coupled with social conflicts arising from disputes over land rights, employment, and compensation, can lead to heightened tensions and divisions within the community.

Cumulative impacts include:

1) Long-term health issues leading to a rise in healthcare costs and reducing overall well-being.
2) Long-term improvement in standard of living
3) Long Term economic growth allowing for development.

Nature: Long-term health issues and increase Healthcare Costs of residents		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Long-term (4)
Magnitude	Very High (10)	Low (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (64)**	**Medium (32)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Implement measures to monitor and control air pollution generated by mining activities. Establish protocols for monitoring water quality in surrounding water bodies to prevent contamination from mine wastewater.		

Provide comprehensive health and safety training for mine workers to prevent accidents, injuries, and occupational illnesses. Develop and implement community health programs that provide access to healthcare services, health education, and preventive measures. This includes vaccination campaigns, disease screening, and promotion of healthy lifestyle practices.
Cumulative Impacts: Long-term health issues leading to a rise in healthcare costs and reducing overall well-being.
Residual Impacts: Increased health expenditure

Nature: Long-term improvement of living standard		
	Without Enhancement	**With Enhancement**
Extent	Regional (3)	Local (2)
Duration	Long-term (4)	Permanent (5)
Magnitude	High (8)	Very High (10)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (45)**	**High (68)**
Status (positive or negative)	Positive	Positive
Nature: Long-term economic growth allowing for development		
Extent	Regional (3)	Local (2)
Duration	Long-term (4)	Permanent (5)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (39)**	**High (60)**
Status (positive or negative)	Positive	Positive
Can impacts be enhanced?	Yes	Yes
Enhancement measures: • Develop infrastructure such as roads, bridges, and utilities to support the expansion. This benefits the local community and attracts further investment. • Prioritize hiring from the local community and provide training programs to develop local skills. This creates jobs, reduces unemployment, leading to economic stability in the region. • Encourage diversification of the local economy beyond mining by supporting the development of other industries such as tourism, agriculture, or manufacturing Addressing these cumulative socio-economic impacts requires a holistic approach that balances economic development with social and environmental considerations. It involves proactive measures to mitigate negative impacts, such as implementing robust environmental and social management plans, promoting community engagement and empowerment, and investing in sustainable development initiatives and implementing Just Transition principles that prioritize the well-being and resilience of local communities over the long term.		
Residual Impacts: Improvement in life style, quality of life and general economic upliftment of the community		

11.19.7. Air Quality

In terms of the cumulative assessment, overall – the proposed Somkhele Operations are anticipated to result in high cumulative impacts close to the operational areas in terms of

dustfall. However, the impacts are anticipated to decrease with increasing distance from the operational areas.

Nature: Somkhele Operations are anticipated to result in high cumulative impacts close to the operational areas in terms of dustfall**.**		
PM_{10} and $PM_{2.5}$ dust outfall	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	High (8)	Moderate (6)
Probability	Highly likely (4)	Highly likely (4)
Significance	**High (72)**	**Moderate (44)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Identify the main sources of dust and target control efficiencies for each source to ensure acceptable limits; • Implement the mitigatory measures as per AQIA report		
Cumulative Impacts: Increase in dust particles leading towards a situation that the ambient air quality standards are exceeded offsite.		
Residual Impacts: Increased health issues within community		

11.19.8. Fauna and Flora

The potential cumulative impacts to fauna of the individual development footprints have been evaluated for all phases as specified below.

Nature: Loss of habitat and associated fauna within development footprint		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Loss of habitat associated with resettlement		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (64)**	**Moderate (52)**
Status	Negative	Negative
Impact on aquatic ecosystems, hydrology and water quality including downstream communities		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)

Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (56)**	**Moderate (44)**
Status	Negative	Negative
Degradation of undeveloped areas adjacent to mining footprint		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (70)**	**Moderate (55)**
Status	Negative	Negative
Alien plant infestation		
Extent	Regional (3)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (4)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**High (64)**	**Moderate (44)**
Status	Negative	Negative
Faunal disturbance		
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (55)**	**Moderate (40)**
Status	Negative	Negative
Air quality and dust		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (44)**	**Moderate (36)**
Status	Negative	Negative
Light pollution		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	**Moderate (52)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: • Where appropriate, negotiation and determination of acceptable offsets must take place through processes with relevant parties. • The final layout must have an effective stormwater and water quality management plan in place. • An alien plant management and monitoring plan must be put in place for both mine site activities and road expansion		

• Monitoring of the following components as a minimum must be routinely performed, by external assessors, and appropriately addressed by the client   ○ Stormwater management   ○ Water quality and aquatic ecosystem health   ○ Alien plants   ○ Air quality
Cumulative Impacts: Main potential cumulative impacts, if not mitigated, are 1) habitat loss and degradation of natural areas, within and adjacent to the footprint, including better quality habitat primarily outside the footprint, both through a) direct loss from the footprint and associated impacts of the development, and b) from further habitat loss in surrounding areas by relocated communities, and 2) impacts to hydrology and water quality for downstream ecosystems, including the downstream sections of the Nyalazi River.
Residual Impacts: Loss of faunal habitat and decrease in regional biodiversity

11.19.9. Wetlands

Nature: Alteration of hydrological and geomorphological processes impacting negative on the ecoservices of wetland systems		
	Without mitigation	**With mitigation**
Extent	Local (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (3)
Probability	Definite (5)	Probable (3)
Significance	**High (75)**	**Low (27)**
Status (positive or negative)	Negative	Positive
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Offset	Offset
Mitigation: • Implement wetland offset to replace the reduction 17.38 ha of destructed wetland systems		
Cumulative Impacts: As for operational phase		
Residual Impacts: Wetland habitat restored (equivalent hectares)		

12. METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

During the Environmental Impact Assessment data gathered and studies conducted are used to identify the risks associated with the proposed project. All issues that have been identified as posing significant risks to the environment will be identified and prioritised. Management of these issues will be determined and will form part of this risk assessment.

The methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks are contained in **Table 12-1** and **Table 12-2** below.

Table 12-1: Criteria used for Environmental Risk Assessment

Status of Impact		
Positive	A benefit to the holistic environment	
Negative	A cost to the holistic environment	
Neutral	No cost or benefit to the holistic environment	
Probability of Impact		
Score	**Severity/beneficial effect**	**Description**
0	None	Impact will not occur
1	Improbable	Less than 15% sure of an impact occurring
2	Low probability	Between 15 – 40% sure of an impact occurring
3	Medium probability	Between 40-60% sure that impact will occur
4	Highly probable	Between 60-85% sure that impact will occur
5	Definite	More than 85% sure impact will occur
Duration of Impact		
Score	**Severity/beneficial effect**	**Description**
1	Short Term	Less than 2 years
2	Short to Medium Term	2-5 years
3	Medium Term	6-25 years
4	Long Term	26-50 years
5	Permanent	50 years and more
Scale of Impact		
Score	**Severity/beneficial effect**	**Description**
0	None	No impact
1	site	Within the site boundary
2	Local	Affects immediate surrounding area
3	Regional	Extends substantially beyond the site boundary but only affects the region or province
4	National	Affects country
5	International	Affects are beyond the country and possible globally
Magnitude of Impact		
Score	**Severity/beneficial effect**	**Description**
2	Minor	Effects observable – environmental impacts reversible with time without human intervention
4	Low	Effects observable – impacts reversible with rehabilitation
6	Moderate	Effects observable – affected area restored to acceptable environmental state
8	High	Extensive effects – irreversible alteration to the environment
10	Very High/Don't know	Extensive permanent effects with irreversible alteration

The significance of the impacts is calculated by multiplying the consequence of the impact by the probability of the impact. **Table 12-2** below illustrates the methodology used to calculate the significance of the impact.

Table 12-2: Significance Rating

Consequence of the Impact
Consequence = Magnitude + Duration + Scale

Significance of Impact		
Significance = Consequence x Probability		
Significance	**Score (out of 100)**	**Rating**
Low	1 – 30	
Medium	31 – 59	
High	60 +	

Table 12-3: Mitigation Prediction Criteria

Reversibility of impact		
Reversible	1	The impact on natural, cultural and / or social structures, functions and processes is totally reversible.
Partially	2	The impact on natural, cultural and / or social structures, functions and processes is partially reversible.
Irreversible	3	Where natural, cultural and / or social structures, functions or processes are altered to the extent that it will permanently cease, i.e. impact is irreversible.
Irreplaceable loss of resources		
Replaceable	1	The impact will not result in the irreplaceable loss of resources.
Partially	2	The Impact will result in a partially irreplaceable loss of resources.
Irreplaceable	3	The impact will result in the irreplaceable loss of resources.
Potential of impacts to be mitigated		
High	1	High potential to mitigate negative impacts to the level of insignificant effects, or to improve management to enhance positive impacts.
Medium	2	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
Low	3	Little or no mechanism exists to mitigate negative impacts.

12.1. Positive and Negative Impacts that the Proposed Activity will have on the Environment and Community that may be affected

This section provides an explanation of the site layout and he sensitivity analysis, alternatives and aspects that were considered during the finalisation of the layout. Section 11 describes all the expected impacts from the various project activities.

Table 12-4 provides a summary of the overall positive and negative impacts associated with the main alternatives considered for the Project.

Table 12-4: Alternatives considered and their impacts

Alternative	Option	Positive Impact	Negative Impact
Mine design and layout			
Mining Method	Open cast	Opencast mining is considered the more feasible option for the Somkhele Project	Several households will have to be relocated
	Underground	Visual impact will be less, overall environmental impacts will be reduced	The depth of the seams as well as the complexity of the geology does not warrant underground mining options
	Highwall	Based on the geology with the excavation as per opencast mining, opportunities may arise to use the highwall to create adit for underground mining	Due to complexity of geology, the establishment of adits will only be considered feasible once opencast activities have commenced
Haulage of Coal	By rail – not considered as there is no close by rail network	Could have relieved heavy vehicle road congestion on the regional road network	Available District roads to be used causing increased road safety risk
	By road	Transportation of coal product direct to washing plant, District roads to be upgraded	District Road (P495) will be impacted by coal trucks with the associated
No-Go Option	Termination of Somkhele project	Various households will not be disturbed by relocation; Ecologically sensitive areas will not be disturbed	Macro-economic benefits in terms of employment to locals, levies, taxes and royalties to Government and major economic contributions towards the LED plan will not realised

12.2. Possible Mitigation Measures that could be applied and the Level of Risk

The mitigation measures for each identified risk have been proposed by the various appointed specialists and are comprehensively covered in **Table 14-1** as well as **Table 6-1** and **Table 7-1** as per Part B: EMPr.

12.3. Motivation where No Alternative Sites were considered

The Somkhele Extension Project is obliged in terms of the MPRDA to conduct there envisaged mining activities within the areas as depicted in the issued Mining Right Areas and as illustrated in **Figure 1-1** (Regulation 2(2) Map). Therefore, no alternative sites were considered as the available mineral resources in the area are already allocated to other Mineral Right Holders.

12.4. Statement Motivating the Alternative Development Location within the Overall Site

As stated in terms of Section 12.3 above, the preferred overall sites are based on the location of the identified anthracite coal seams. However, the sensitivity analyses undertaken for each specialist study were used to inform the preferred infrastructure. Identified wetlands were excluded from the pit and infrastructure as far as possible. Ephemeral drainage lines will be directly affected by the proposed mining development.

The layout has also considered the proximity of surrounding residential areas and a buffer between the mining footprint and the residential areas (of Ophondweni, Emalahleni and Mahujini/Machibini) as well as surrounding watercourses. As outlined all Ophondweni and Emalahleni households within the direct impacted active mining zone (500m) will be relocated in accordance with the signed agreements and Mahujini households within the direct impacted active mining zone (500m) will be relocated in accordance with the mutually agreed Relocation Action Plan and the stipulations as depicted in the MHSA.

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

The mine layout was informed by various environmental and technical specialist studies. The initial site layout that was presented during the scoping phase was not changed substantially during the EIA phase. The impacts and risks discussed in Section 11 are applicable to the final site layout plan shown in **Figure 8-1** earlier.

14. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The potential impacts per activity and per phase are detailed in **Table 14-1** below.

Table 14-1: Assessment of each identified impact as per activity

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
Pre-construction/Planning phase													
Soil	Loss of soil resource due to vegetation clearing, compaction and erosion.	1	1	4	5	30	Not reversible	1	1	2	5	20	Appoint specialist to conduct soil impact assessment
	Soil pollution caused by waste generation and incorrect disposal.	1	1	4	3	18	Completely reversible	1	1	4	3	18	Compile Mine infrastructure layout plan with dedicated areas for dumps and stockpile areas
	Soil contamination through hydrocarbon spillages.	1	1	2	3	12	Completely reversible	1	1	2	3	12	Ensure that areas where oils are used is planned with hardened surfaces and oil traps
Hydrology	Impact on the vadose zone soils and subsequent aquifer	1	3	4	3	24	Completely reversible	1	3	2	1	6	Minimise the footprint, retain as much as possible vegetation
Surface and groundwater	Surface and groundwater contamination through hydrocarbon spillages.	1	3	2	2	12	Completely reversible	1	3	2	1	6	Ensure the implementation of oil traps during the planning phase
Vegetation	Alien plant infestation on disturbed areas.	2	1	2	4	20	Completely reversible	2	1	2	4	20	Compile alien invasive control program
Animal Life	Disturbance of animal species caused by increased noise and human activity.	2	1	2	4	20	Partially reversible	2	1	2	4	20	As part of mine planning identify sensitive areas that might be subject to biodiversity off-set
Air quality	Dust generation contributing to the	2	1	2	5	25	Completely reversible	2	1	2	5	25	Appoint specialist to conduct air impact assessment

[8] S=spatial; d=duration; M=magnitude; P=probability; SR=Significance Rating

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	decrease in the ambient air quality.												
Noise	Potential increased in the ambient noise levels associated with the use of construction machinery, transformers and power tools during dismantling activities.	2	1	4	5	35	Completely reversible	1	1	2	3	12	Appoint specialist to conduct noise impact assessment
Visual	Visual intrusion caused by poor handling of construction waste	2	1	4	4	28	Completely reversible	2	1	4	4	28	Appoint specialist to conduct visual impact assessment
Socio-economic	Temporary employment opportunities for construction contractors or other labourers – Impact is positive	2	1	2	4	20	N/A	2	1	2	4	20	Appoint specialist to conduct socio-economic impact assessment Set targets for local procurement, employment and enterprise development; Appoint a Community Liaison Officer (CLO) for the duration of the construction phase.
Health, Safety, Security	Impact of mining on rural communities, possible relocation to be considered, commence with liaison	2	2	2	2	12	Completely reversible	2	2	2	2	12	Establish committee to address potential issues related to health and safety
Construction Phase													
Geology	Disturbance of geological profile caused by the	2	5	2	4	36	Not reversible	2	5	2	4	36	Follow the mining methodology as depicted in

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	establishment of the initial cut and ramps												the approved Mining Works program
Topography	Alteration of the natural topography caused by site establishment and soil stripping.	2	4	6	4	48	Partial reversible	2	5	6	3	39	The operational plan must make provision for an accurate topographical survey of the mining area before any mining operations are to commence in order to determine the topographical baseline that the area will need to be returned to during the rehabilitation phase.
Soils	Alteration to the biophysical, chemical and physical characteristics of the soils caused by soil stripping.	2	5	6	4	52	Not reversible	2	5	6	4	52	All soils should be stripped in a dry or near-dry state as possible, no soil stripping after or during rainfall events. All soils will be stripped and stockpiled for use in rehabilitation of the site. Soils should be stockpiled as close to harvested area as possible.
	Loss of soil resource (soils covered or removed) due to sterilisation, erosion (wind and/or water) and compaction.	2	5	10	4	68	Partial reversible	2	5	6	4	52	Long-term stockpiling (> 6 months) must be re-vegetated by sowing with suitable grass/legume mix. No soil stockpiles must be placed within 1:100-year flood lines. Soil should not be handled during high wind conditions.

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	Soil contamination from hydrocarbon spillages from construction vehicles and machinery.	2	1	6	3	27	completely reversible	2	1	6	3	27	Treat contaminated soil with peat sorb and apply MAP treatment
Land capability and use	Loss in agricultural potential caused by site establishment and soil stripping.	2	5	2	4	36	Not reversible	2	5	2	4	36	Aim to keep the natural habitats within the study area intact – specifically those that are connected to other natural areas outside the study area extent.
	Change of land use from agriculture to mining.	2	4	8	4	56	Reversible overt time	2	5	8	3	45	The disturbed area must be kept to the minimum needed for the mining operation.
Vegetation	Loss and degradation of vegetation resulting in the disturbance of ecological functioning.	2	4	6	5	60	Partial reversible	2	4	6	3	36	Only areas earmarked for immediate opencast mining (per section) should be cleared of vegetation.
	Disturbance in vegetative growth caused by dust outfall on vegetation outside the development footprint area.	2	1	6	4	36	Reversible	2	2	4	3	24	Remove vegetation during periods of low rainfall or dry periods
	Destruction of natural habitat forcing animals to relocate.	2	4	4	4	40	Not reversible	2	4	4	4	40	A concurrent rehabilitation and re-vegetation plan should be implemented as and when areas become available for rehabilitation.
Animal life	Harm to animals as a result of increased human activity in the area.	2	1	6	3	27	Not reversible	2	5	2	3	27	Areas beyond the designated development footprint areas should remain no-go areas for

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													mining personnel and vehicles.
	Disturbance of animal species especially sensitive bird species nesting in and around the remaining natural areas.	2	1	2	4	20	Partial reversible	2	1	2	4	20	Significance is low, no specific mitigatory measures will be required
Surface water	Alteration of drainage patterns and the amount of water entering the surface water resources down gradient of the site	1	4	8	5	65	Reversible	1	3	6	3	30	Compile a Storm water management plan. Apply for required Water Use License. Design criteria for infrastructure to comply with GN 704 Regulation
	Sedimentation of downstream surface water resources caused by erosion and sediment runoff from cleared areas.	3	1	8	4	48	Not reversible	3	1	8	4	48	A system of clean water channels must be designed and constructed to ensure that all water that falls outside the stockpile area is diverted clear of the deposit.
	Decrease in natural surface water runoff to surrounding watercourses caused by storm water management.	3	1	6	5	45	Not reversible	2	5	4	4	44	Identify and where possible, maximise areas of the mine that will result in clean storm water runoff (for example open veld areas) as well as infrastructure associated with the mine (for example office areas) and ensure that runoff from these areas is routed directly to natural

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													watercourses and not contained or contaminated
	Deterioration in surface water quality due to hydrocarbon, sewage or other waste spillages ending up in surrounding watercourses.	2	3	8	4	52	Partial reversible le	1	2	6	3	27	Apply for WULA, compile IWWMP, follow the management activities in the IWWMP and WUL conditions, comply with RQO's for the catchment
Wetlands	Loss and disturbance of watercourse habitat and fringe vegetation.	2	5	8	5	75	Partial reversible	2	5	8	4	60	Don't mine within the protective buffer zone of delineated wetland
	Alteration of hydrological and geomorphological processes	2	4	6	4	48	Partial reversible	2	3	4	3	27	Ensure application for a section 21(c), (i) water use in terms of the NWA which will stipulate the compilation of a compulsory wetland rehabilitation plan
	Impacts to ecological connectivity and/or ecological disturbance impacts	2	2	6	4	40	Partial reversible	1	2	4	3	21	Implement duty of care and remediation of environmental damage; implement wetland offset if required
Groundwater	Removal of vegetation and topsoil will decrease the recharge of aquifers.	2	3	4	3	24	Reversible	1	3	4	2	16	Appoint specialist to conduct groundwater impact assessment
	Contamination of the underlying aquifer through hydrocarbon spillages.	1	3	2	2	12	Reversible	1	3	2	1	6	Implement the recommendations as per specialist studies
Air Quality	Reduction in the ambient air quality through the creation of fugitive dust	2	1	4	5	35	Reversible	1	4	4	3	27	Implement air quality monitoring program (PM_{10})

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	from construction vehicles, drilling and blasting.												Commence with dust suppression by means of water spraying
Noise	Increase in ambient noise levels caused by infrastructure establishment.	2	1	8	5	55	Reversible	1	4	4	4	36	Implement noise and dust management measures. Noise emanating from construction machinery and equipment should be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment. Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria.
Visual	Aesthetics of surrounding areas	6	2	2	3	30	Not reversible	6	1	2	2	18	Limit construction footprint Remove vegetation in a "natural manner", avoiding any harsh lines; dust suppression; Only focus light sources on where it is needed
	Landscape visual change	8	2	2	3	36	Not reversible	6	1	2	2	18	
	Dust creation	4	2	1	3	21	Reversible	4	1	1	2	12	
	Light pollution, glare, glow	6	1	2	4	36	Reversible	4	1	2	3	21	
Socio-economic	Increase in employment opportunities - Positive	2	4	8	5	70							Maximise the number of locals sourced for employment. Set targets for local procurement, employment and enterprise development; Appoint a Community Liaison

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													Officer (CLO) for the duration of the construction phase. Formulate and implement the affirmative procurement strategy once the mining right has been awarded.
Health, Safety, Security	Increased potential for accidents within the construction site.	3	1	6	3	30	Not reversible	2	3	4	3	27	Implement all recommendations of the Traffic Impact Assessment Report, to reduce and mitigate potential haul road safety issues, pedestrian safety and traffic congestion. Communicate with the local authority with regards to haul road upgrade and repairs to the road surfaces that might be required. Make a complaints' register available at the entrance to the construction site and address complaints speedily.
Traffic	Increased generated traffic on existing road conditions	2	1	2	6	30	Reversible	2	1	2	4	20	Upgrade road with wide verges; Provide public transport to work place
	Impact on road users, pedestrians, cyclists	2	1	1	6	24	Reversible	2	1	1	4	16	
Heritage and paleontological	Degradation of heritage and paleontological resources.	2	5	4	4	44	Not reversible	2	5	2	3	27	Somkhele Heritage management plan must be adhered to. No mining within 100meters of Graves.

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													Compliance with MHSA and AMAFA.
Operational Phase													
Aquatic Ecology	Stream modification, erosion, sedimentation, riparian vegetation destruction	2	3	6	3	33	Reversible	2	2	4	2	16	Implement mitigation measures as per issued WUL
Climate Change	Emission of Greenhouse Gasses contributing towards global warming	5	5	3	5	65	Irreversible	5	4	2	5	55	Implement energy efficient measures to reduce the overall carbon footprint
Geology	Total removal of target ore body.	2	5	8	5	75	Not reversible	2	5	6	5	65	Adhere to the methodology as contained in the MWP. Back fill the open pits by means of approved rehabilitation plan
Topography	Alteration of the natural topography caused by the shift of opencast pits, coal stockpiles and overburden stockpiles	2	4	8	5	70	Reversible over time	2	5	6	4	52	The operational plan must make provision for an accurate topographical survey of the mining area before any mining operations are to commence in order to determine the topographical baseline that the area will need to be returned to during the rehabilitation phase. A 1:3 re-sloping to be implemented
Blasting and Vibration	Cracking of buildings and blasting impacts	2	5	8	4	56	Reversible over time	2	5	2	3	27	Review blasting management plan/SOP. Third party monitoring of blasts, select charge weights for optimal efficiency and ensure they are

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													not higher than necessary. Only daytime blasts, control quantity and quality of stemming and use modern blasting techniques
Soils	Alteration to the biophysical, chemical and physical characteristics of the soils caused by soil stripping.	2	5	6	5	65	Not reversible	2	5	6	5	65	The topsoil must be stockpiled separately and used for the construction of berms: the gradient of the sidewalls must be such as to prevent excessive wash during storms. These must be managed to prevent soil loss through erosion and excessive dust.
	Loss of soil resource caused by sterilisation, erosion and compaction over the mine footprint area.	2	5	10	5	85	Partial reversible	2	5	6	4	52	The topsoil and subsoil must be managed to ensure effective rehabilitation back to the pre mining land capability during the decommissioning phase.
	Contamination of soils located at the processing plant complex, sewage facilities and workshop.	1	4	8	5	65	Partial reversible	2	4	6	4	48	Remove the maximum amount of topsoil and store for use in post-construction rehabilitation.
	Loss of soil resource due to cracking caused by poorly consolidated concurrent rehabilitation at surface.	1	5	8	4	56	Not reversible	1	5	6	4	48	Compacted soils must be ripped to correct any compaction created by the heavy traffic utilized during the mining operation and

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													rehabilitated with the addition of appropriate fertilizers.
Land capability and use	Disruption of ecosystems and potential loss of agricultural land, land capability being reduced to mining.	2	5	10	5	85	Reversible over time	2	4	6	4	48	Aim to keep the natural habitats within the study area intact – specifically those that are connected to other natural areas outside the study area extent.
	Land use will remain altered and potential agricultural land will be lost.	2	5	10	5	85	Not reversible	2	5	8	4	60	The disturbed area must be kept to the minimum needed for the mining operation.
Vegetation	Total destruction of the remaining natural vegetation inside the mining area.	2	5	10	5	75	Not reversible	2	5	8	4	60	Protected species should be relocated or kept in a holding nursery to be used during the rehabilitation process.
	Potential invasion of alien plants on disturbed areas.	2	4	8	4	56	Completely reversible	2	2	4	3	27	Weed eradication plan that is active at Somkhele must include areas disturbed by pit extension
	Dust outfall and blown coal dust will affect the adjacent undisturbed vegetation directly by settlement on the leaves and indirectly through contamination of soil and surface water.	2	4	6	4	48	Reversible	2	2	4	3	24	Implement dust suppression management practices
Animal life	Displacement of indigenous animal and bird species	2	4	8	5	70	Partial reversible	2	5	4	4	44	The footprint of disturbed area must be kept to a minimum.

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	caused by increased human activity in the area.												
	Fatalities in terrestrial mammals.	2	4	8	3	42	Not reversible	2	2	6	4	40	Reduce the fragmentation of faunal habitat by confining the area of disturbance. This particularly applies to the riverine vegetation
Hydrology	Disturbed vadose zone	1	4	4	5	45	Reversible	1	4	4	3	27	Minimise disturbed footprint
	Storm water runoff	2	4	6	3	36	Reversible	1	3	2	3	18	Implement SWMP
	Water quality deterioration	1	4	4	5	45	Reversible	1	3	2	3	18	Routine hydraulic inspection and monitoring
Surface water	Alteration of drainage patterns and the amount of water entering the surface water resources down gradient of the site.	2	5	8	5	75	Not reversible	2	5	8	5	75	Diverting all clean water away from contaminated mining areas using diversion berms and drains
	Potential contamination of surface water with coal.	2	4	8	5	70	Not reversible	2	4	6	3	36	Capturing all contaminated runoff and using the water at the plant as part of an on-going water recycling plan.
	Surface water contamination through operational wastes generated.	3	4	8	4	60	Not reversible	2	4	6	3	36	Ensure the minimisation of contaminated areas, reuse of dirty water wherever possible.
	Surface water contamination due to sedimentation from overburden deposition.	3	4	6	3	39	Not reversible	2	4	4	3	30	Identify and where possible, maximise areas of the mine that will result in clean storm water runoff (for example open veld areas) as well as infrastructure associated with

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													the mine (for example office areas) and ensure that runoff from these areas is routed directly to natural watercourses and not contained or contaminated.
Wetlands	Loss and disturbance of wetland habitat and ecoservices	2	5	8	5	75	Partial reversible	2	5	8	5	75	Implement the recommendations as per hydropedological study
	Alteration of hydrological and geomorphological processes	2	4	8	4	56	Partial reversible	2	4	8	3	42	No mining activities within protective buffer zone, implement section 21(c), (i) WUL conditions
	Impacts to ecological connectivity and/or ecological disturbance impacts	2	4	6	4	48	Partial reversible	2	4	6	3	36	Implement mitigatory measures as per Eco-Pulse specialist study
Groundwater	Destruction of local aquifer, decrease in groundwater levels, impact on baseflow feeding streams, generation of leachate that impacts on groundwater quality	1	3	8	5	60	Not reversible	1	3	6	3	30	Implement groundwater management measures as per issued WUL
	Drawdown of water table due to the dewatering of the aquifers.	2	3	8	5	65	Reversible over time	2	3	8	3	39	The mine annually updates groundwater models. The models together with quarterly monitoring show any potential pollution.
	Leaching/Seeping of contaminants from the	2	3	8	5	65	Not reversible	2	3	8	3	39	Groundwater monitoring boreholes should be installed

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	PCDs, slurry dams, ROM and overburden stockpile areas polluting the aquifer.												to comply with the minimum requirements as set by governmental guidelines
	Aquifer contamination caused by polluted water migrating away from the mining area (leachate plume).	1	3	6	5	45	Not reversible	1	3	4	3	24	Ensure that the appropriate design facilities (berms, storm water channels etc.) are constructed to ensure clean and dirty water is separated at the coal handling facilities. Separate the aquifer from the facility by lining the pollution control dams with an HDPE liner (2mm). The workshop and diesel storage area should be sufficiently bunded, and the water should be collected at the lowest point of the site. Water retention dams (or PCDs) should be lined to prevent ingress of contamination. Groundwater quality must be monitored on a quarterly basis.
	Over abstraction from boreholes at the site. Groundwater dewatering due to mining activity	2	3	8	5	65	Reversible	2	3	8	3	39	Groundwater abstraction should not exceed aauthorised limits
	Poor quality runoff into the environment (if	1	3	6	5	45	Reversible	1	3	4	3	24	Ensure that sediment barriers are in place at mining sites, to

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	hydrocarbon contamination takes place at the site). The impact will be on local soils as there are no watercourses associated with the site.												prevent sediment runoff and erosion. Park heavy machinery in lined areas and place drip trays under vehicles at the site. Visual soil assessments for signs of contamination during construction (monthly)
	Erosion and sedimentation runoff may enter the non-perennial stream and wetland area (worst case).	1	3	2	2	12		1	3	2	1	6	Implement stormwater management measures
Air Quality	Reduction in ambient air quality through fugitive dust caused by operational activities.	2	4	10	5	80	Partial reversible	2	2	6	3	30	Somkhele Mine uses water bowsers for dust suppression. Continue with existing dust suppression mitigation measures currently utilized by the mine.
	Reduction in the ambient air quality through greenhouse gas emissions.	2	5	10	5	85	Not reversible	2	3	6	3	33	Calculate the carbon footprint of the proposed project during its operational phase (if any).
Noise	Increase in ambient noise level at the site and surrounding communal area.	2	4	10	5	80	Completely reversible	2	2	4	3	24	Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered,

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													ensuring that the seam gap between the hood and vehicle body is minimised; The applicant includes a component covering environmental noise in the Health and Safety Induction to sensitize all employees and contractors about the potential impact from noise, especially those employees and contractors that have to travel past receptors at night, or might be required to do work close (within 1,000m) to NSRs at night; The applicant investigates any reasonable and valid noise complaint if registered by a receptor staying within 1,000 m from the location where construction activities are taking place. A complaint register, keeping a full record of the complaint, must be kept by the Developer; The use of vehicle horns should be minimized where possible;

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													The construction vehicles must remain on-site as far as possible during the construction period; Erect noise barriers between the noise source and receptors; Ensure good public relations and communications; and A Biannual Environmental Noise Measurement Programme (Monitoring Programme) needs to be implemented.
Visual	Change of Visual Character	6	4	2	4	48	Partial Reversible	4	4	2	3	30	Set visual screens up along perimeter fence of the proposed mining areas; Dust Suppression; Regulate the speed at which heavy machinery/vehicles move to reduce dust dispersion
	Dust creation	8	4	2	4	56		5	4	2	3	33	
	Glare, spill light, sky glow	7	1	2	3	30	Reversible	5	1	2	3	24	
	HiPs Wilderness Status	8	4	2	3	43	Not reversible	6	4	2	3	36	
Socio economic	Damage to roads by haul trucks running through the application area.	3	4	6	4	52	Completely reversible	2	2	4	3	27	Implement management measures as per Traffic Impact Assessment
	Additional employment opportunities through the implementation of the SLP.	3	5	8	5	**80**	N/A						Maximise the number of locals sourced for employment. Set targets for local procurement, employment and enterprise development; Appoint a Community Liaison

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													Officer (CLO) for the duration of the construction phase. Formulate and implement the affirmative procurement strategy.
	Economical injection to the local area through the implementation of the SLP.	3	4	8	5	**75**	N/A						No mitigation required – positive impact for the Region
	The local and regional road transport network will suffer additional pressure from the haulage trucks.	3	4	6	5	65	Reversible	2	2	4	4	32	Implement all recommendations of the Traffic Impact Assessment Report, to reduce and mitigate potential road safety issues, pedestrian safety and traffic congestion. Communicate with the local authority with regards to potholes and possible repairs to the road surfaces that might be required. Make a complaints' register available at the entrance to the construction site and address complaints speedily.
	Disruptions in daily living and movement patterns for surrounding communities, landowners, tenants and road users	3	4	8	4	60	Partial reversible	2	2	6	3	30	Implement the recommendations as per specialist study regarding socio-economic issues

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	Relocation of individuals and households	3	5	8	4	64	Not reversible	3	5	6	4	56	Assess the need for relocation as part of the Socio-Economic Assessment and implement the recommended mitigation/management measures based on the findings as contained in the RAP
	Loss of agricultural and rural community jobs	3	4	8	4	60	Not reversible	2	3	6	4	44	Implement recommendations and agreements as per Resettlement plan
	Damage to surrounding infrastructure caused by ground vibrations and fly rock.	2	4	8	4	56	Not reversible	2	2	6	3	30	Implement recommendations as RAP
Health, Safety, Security	Increase in criminal activities.	3	4	8	3	45	Partial reversible	2	2	4	3	27	Implement security measures at the mining site
	Health and safety risks for workers	2	4	4	3	30	Not reversible	2	4	2	3	24	Dust suppression, speed limits, dust monitoring, support HIV&TB educational programs, support local health facilities, water monitoring, correct disposal, storage and handling of waste
	Increase potential for traffic accidents	3	4	6	3	39	Not reversible	2	4	4	3	30	Implement speed limit of 40 km/hr
	Potential fires fuelled by combustible hydrocarbons	2	4	6	3	36	Not reversible	2	2	2	3	18	Implement fire drills
	Health and safety risks for local community	3	4	6	4	52	Not reversible	2	4	4	3	30	Post information boards about public safety hazards and

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													emergency contact information.
Traffic Existing road condition, capacity and road safety	Relevant road sections (reconstructing/repairing of roads)	2	3	4	5	45		2	3	4	3	27	Upgrade to comply with 5-year design horizon; P235/P495 intersection to be upgraded to typical B1 intersection
	Vertical road alignment	2	3	4	5	45		2	3	4	3	27	Upgrade road as per Engineering design
	Available sight distance at intersections	2	3	4	2	18		2	3	4	2	18	Sight distance acceptable as per B1 Intersection design
	Speed limits	2	3	4	4	36		2	3	4	3	27	Speed limit of 40km/h acceptable
	Pedestrian movements (with reference to access roads and intersections	2	3	4	5	45		2	3	4	3	27	Pedestrian crossing at intersection; Create safe space for pedestrians
	Public transport loading and off-loading	2	3	4	5	45		2	3	4	3	27	Create loading and offloading bays; Public transport should not stop in roadways as it could lead to fatal accidents
Heritage and paleontological	Degradation of heritage and paleontological resources.	3	4	8	3	45	Partial reversible	2	4	4	3	30	In the event that fossil remains are discovered, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the Environmental Control Officer (ECO) in charge.

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													A qualified palaeontologist must be employed to conduct a full PIA field assessment of the study area. The PIA report will make specific recommendations for mitigation measures, if necessary.
Decommissioning/Closure													
Topography	Altering the established topography by reshaping it to emulate pre-mining environment.	2	1	8	4	44	N/A	2	5	4	3	33	Reshaping of footprint area to allow for naturally free draining topography during concurrent rehabilitation.
	Ponding on areas due to bulking failure and lack of compaction	2	1	6	4	36	Reversible	2	2	4	3	27	Ensure that all rehabilitated areas are free draining with no water ponding
Soils	Loss of soil resource through erosion and cracking of surface from areas of unconsolidated rehabilitation.	2	5	2	4	36	Not reversible	2	5	2	4	36	Topsoil and subsoil should be replaced in the correct sequence on soft overburden material to ensure that subsurface limiting layers are not created.
	Loss of soil resource due to compaction and contamination during the removal of infrastructure.	2	1	10	3	39	Not reversible	2	1	6	3	27	Replaced soil should be re-vegetated, naturally or with indigenous seeds (as required).
	Amelioration of soils and recovery of topsoil to "baseline" conditions that is conducive for	2	5	6	3	39	N/A	2	5	6	3	39	Conduct on-going monitoring for subsidence and or cracking to surface. Where needed implement backfilling of

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	commercial scale production of adapted crops.												cracks and landscaping of collapsed areas
Land use and capability	Slow positive impact on areas requiring rehabilitation and transforming mining to a state of post-mining, engineered agricultural and wilderness areas.	2	5	10	5	85	Partial	2	4	8	4	52	Reshaping of footprint area to allow for naturally free draining topography during concurrent rehabilitation.
	Land use will change from mining back to agriculture and wilderness areas.	2	5	10	5	85	Partial	2	5	6	3	39	Natural re-vegetation will occur, unlikely that disturbed mining area will have post mining conditions
Vegetation	Re-vegetation of previous natural areas and topdressing in an aim to establish pastures for livestock grazing.	2	5	8	4	60	Partial	1	4	6	3	33	Monitor the basal coverage, areas that are barren needs to be re-vegetated
	Alien Infestation resulting from the introduction of species not naturally occurring (nurse grass species) in the area.	2	1	4	4	28	Reversible	2	1	4	4	28	Implement AIP
Animal life	Positive impact of livestock breeding and naturally assisting the transformation back to natural state.	2	5	6	3	39	N/A	2	2	4	3	27	Implement a Bio-diversity off-set plan to reinstate wilderness areas lost due to mining

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	Slow positive impact as animal species return to the re-habilitated areas, although they will be disturbed by decommissioning and rehabilitation activities.	2	5	4	3	33	N/A	2	2	2	3	18	Ensure that no hunting or harvesting for bush meat is taking place in the rehabilitated areas
Surface water	Direct physical loss of freshwater habitat and riparian destruction	2	4	6	3	36	Reversible	1	3	6	2	20	Ensure riparian rehabilitation was done in accordance with the conditions as specified in the WUL. Storm water drains must have energy dispersers to minimise the impact of erosion and bank destabilisation
	Free drainage and natural surface water patterns stabilisation.	2	5	6	3	39	N/A	2	5	4	3	30	All rehabilitated areas must be free draining and re-vegetated
	Surface water contamination associated with removal of process plant and associated infrastructure.	2	1	8	3	33	Reversible	2	1	4	3	21	Implement rehabilitation measures, divert affected water to PCD for containment, remove contaminated soils, follow measures to deal with contaminated land
	Decanting resulting in the contamination of surface water resources down gradient of the mining area.	2	4	8	5	70	Reversible	1	3	8	3	36	Implement passive water treatment strategy incorporating interception of decant, neutralisation by calcite with supernatant

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
													directed to a constructed wetland
Groundwater	Aquifer contamination caused by polluted water migrating away from the mining area (leachate plume).	2	3	8	4	52	Not Reversible	2	3	6	3	33	Where leachate is generated, it must be contained separately from water which is only slightly polluted through contact with the waste. All mined areas should be flooded as soon as possible to minimise oxygen from reacting with the remaining pyrite. Mining should remove all possible coal from the mining area and separate acid forming and non-acid forming material. Deposit acid forming material at the base of the pit. The final backfilled opencast topography should be engineered such that runoff is directed away from the mining areas. Quarterly groundwater sampling must be conducted to establish a database of groundwater quality to assess plume movement trends
	Rehabilitation and recovery of groundwater levels after	2	3	6	4	44	N/A	2	3	6	4	44	No mitigation required. This is a positive impact. Ground

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	the cessation of dewatering.												water levels and quality monitoring to continue for 5 years to determine the potential for decant.
	Rehabilitation of plants, stockpiles, settlement, and drying dams.	2	3	8	4	52	N/A	2	3	8	4	52	
Air quality	Increase dust levels for a short period during decommissioning activities.	2	1	4	5	35	Completely reversible	2	1	2	4	20	Continue with dust monitoring until steady state conditions have been achieved
Noise	Increase noise levels for a short period during decommissioning activities.	2	1	4	3	21	Completely reversible	2	1	4	3	21	After mining has ceased, no noise will be generated. No mitigation required
Traffic	Road users and road safety	2	1	1	2	8	Reversible	2	1	1	2	8	Comply with TMH 16 COTO Manual; visual recording indicating pre- and post-road conditions; Repair all distress and damaged incurred to satisfaction of DOT engineer
Visual	Landscape visual change	6	4	2	3	36	Not reversible	6	4	2	3	36	Minimise deconstruct on duration; Regulate the speed at which heavy machinery/vehicles move to reduce dust dispersion; Only focus light sources on where it is needed
	Change of Visual Character	8	4	2	3	42	Partial	6	4	2	2	24	
	Dust creation	6	4	2	3	36	Reversible	6	4	2	2	24	
	Glare, spill light, sky glow	7	1	2	3	30	Reversible	5	1	2	3	24	
	HiPs Wilderness Status	8	4	2	3	42	Partial	6	4	2	3	36	
Socio-economic	On decommissioning of the mine various labours will	3	5	6	5	70	N/A	3	2	8	3	39	Implementation of the skills transfer, and training

Aspect	Impacts	S[8]	D	M	P	SR No Mitigation	Reversible	S	D	M	P	SR With Mitigation	Mitigation
	be left without employment.												programs as contained in the SLP
	Loss employment opportunities.	3	2	6	4	44	N/A	3	2	8	3	39	Skills transfer would allow for opportunities to establish new local businesses in future
Wetland	Alteration of hydrological and geomorphological processes	2	5	8	5	75	Reversible	2	3	4	3	27	If triggered, wetland offset to replace 27ha of destructed systems
Post Closure													
Visual	Landscape visual change	8	5	2	4	60	Positive	10	5	2	4	68	Vegetation of residual slopes; Creating pit lakes

15. SUMMARY OF SPECIALIST STUDIES

All specialist studies conducted in support of the Environmental Authorisation for the Somkhele Extension Project are summarised in

Table 15-1.

Table 15-1: Summarised Specialist Studies

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
Air Quality	• Have clearly defined hauling routes/vehicle access areas. These areas should be treated for dust suppression. • All main hauling roads should be treated for dust suppression. A combination of a fixed irrigation system and use of water trucks is recommended. A fixed irrigation system can reduce operational costs associated with dust mitigation of haul roads. • Conduct regular cleaning/sweeping of paved road surfaces to prevent the accumulation of dust. • Conduct regular maintenance and checks for haul road surfaces. • Immediate clean-up of any spillage. • All material that is being transported should be covered during transport (where possible). • Control the number of trucks on the road, weight of trucks and the travelling speed. Implement strict vehicle speed limits (e.g. 20-40 km/h). • Switch off engines whilst not in use; • Establish a maintenance schedule to ensure proper maintenance of the trucks & mobile equipment; • Water sprays for material handling operations (e.g. wet material before excavating and offloading/loading trucks). • Water sprays for drilling, blasting and bulldozing activities. Long-range high-volume irrigation emitters are recommended. • Emissions due to blasting can be reduced by scheduling blasting to occur during calm wind conditions, wetting down entire blast area prior to blast and implementation of measures that reduce blow-out of stemming material and fines from the blast hole (e.g. use of water cartridges or bullets and blasting balls). • Water spraying for stockpiles and material storage areas. Water spraying of topsoil stockpiles should be avoided to prevent contaminating or damaging topsoil that can be used for rehabilitation purposes. • Wind breaks at coal storage areas or fine material storage piles that are prone to dust emissions. • Use vegetation, topsoil and/or rock armour on large stockpiles and dumps that are prone to wind erosion.	All recommendations included in the Report	Refer Mitigation and Management Measures as outlined in Sections 10.1.4 and 11.8 as well as the recommendations provided in Part B, Section 9.1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• Immediate clean-up of any material (i.e. coal, waste rock/overburden and topsoil) spillages. • Conduct regular site inspections to ensure the dust mitigation measures are being implemented • Regular visual inspections		
Aquatic Ecology	• Biannual sampling continues at all current sites as well as the new sites (in the future mining areas) added this year, when possible; • Sampling should be undertaken after a minimum time period of 4 weeks following a rainfall event, for non-perennial rivers. Sampling within this time frame would be indicative of flood conditions and not of mining-related impacts; and • It is recommended that the monitoring of site SOM_004 is removed from the biomonitoring programme and replaced by site SOM_007. This is recommended due to the limited representation of habitat at SOM_004. This change would enable a more accurate interpretation of the ecological status of the aquatic resources associated with Somkhele Mine.	Recommendation in respect of bio-monitoring program included	Refer to the revised bio-monitoring plan as per Part B, section 0
Agricultural, Soils, Land Use	The following recommendations are made: **Stripping** • Strip the topsoil to depth of 40-50cm and stockpile on the closest allocated area for the stockpiles • Utilize the latest freshly disturbed soils immediately on the discard dump as rehabilitation material. In that way the effect of long fallow syndrome (loss of soil microbial activity and organic carbon) is negated • The top soils must not be stockpiled higher than 6m to alleviate natural compaction and the creation of anaerobic conditions in the topsoil. • The sub-soil can be stripped to a depth above the solid, ferricrete layer, or weathered saprolite material. The sub-soil must be stripped and stockpiled separately from the top-soil. **Rehabilitation soil fertility and nutrition** • An integrated biological and chemical approach is recommended to improve the fertility status and ensure a proper growth	Included as part of the Rehabilitation Plan	Refer Table 5-1, Table 6-1 and Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	medium is created for the grass species to germinate and establish in the covering layer. • The soil chemical analysis must be taken before using in rehabilitation activities • 30-50t/ha of well composted kraal manure and 3-4t/ha of dolomitic lime well incorporated is recommended as a starter to initiate biological activity in the soil 6-8 weeks before seeding • This kraal manure will provide sufficient nutrients for germination and root development • The kraal manure has the added advantage that it contains vital broadleaf and grass species to get a fairly quick basal cover • Other humic and fulvic acids as well as growth stimulants (various products on the market) can also be used to enhance microbial activity with the seeding process • It is recommended that soils recovered from stockpiles for use in rehabilitation and vegetation establishment be sampled and tested to confirm their soil chemistry and fertility status and the need for addition of fertilisers and ameliorants. **Seeding with grass species and broadleaf weeds** • A two-stage approach can be implemented where pioneer species are planted to create a soil environment for sub-climax species. After some time (2-3years) climax species can be introduced. There are many case studies where reseeding is necessary because the sub-climax and climax grass species die-back after the first or second season. The reason being the soil ecosystem is not conducive to sub-climax and climax species. • It is recommended that the establishment of the vegetative cover commence with the sowing of a selection of pioneer grass species comprising: o Kweek (Cynodon Dactylon) (7kg/ha), o grasses adapted to the local environment o Rhodes Grass (Chloris Gayana) (7kg/ha) o Oulandsgras (*Eragrostus curvula*) (6kg/ha) • The seedbank in the kraal manure will contain some of these species as well a range of broadleaves (including Amaranthus species that is crucial in the disturbed soil environment to create		

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	the conditions for sub-climax and climax species to flourish once the soil growing conditions has improved.		
Blasting and Vibration	Recommendation is made that the blasting activities associated with the Somkhele Expansion projects be authorized subject to compliance with the conditions of the EMP, on condition that: • The Blasting report be updated if the blast design is changed where more than 2,597 kg explosives are detonated per delay; • Report be updated if the location of the opencast pit is moved with more than 100 m; and, • Report be updated if the blast parameters changed with the mine making use of borehole with a larger diameter than considered in this report (165 mm), the depth of the boreholes or if the burden and spacing distances are increased.	Recommendations included in the EIA Report	Refer to Section 7
Climate change	• Implement an energy efficient materials movement strategy; • Energy efficient overburden removal; • Energy efficient mine haul trucks, in-pit crushers and conveyors; • Using low carbon energy sources; • Solar power as an alternative energy source to reduce the dependence on diesel for electricity generation; • Carbon offsets can be introduced; • Energy efficiency of cooling systems used in the offices and staff accommodation; • Lighting in the offices, accommodation and around the mine pit; • Changing human behaviour towards improving energy efficiency (creating an organisational culture towards reducing emissions).	All recommendations included in the Report	Refer Mitigation and Management Measures as outlined in Sections 10.5 and 11.18 as well as the recommendations provided in Part B, Section 9.1
Geotechnical Investigation	• CSIRO Recommendations for large opencast operations only to be used at pre-feasibility level based on lack of borehole data • The holes examined for Mahujini exhibit very different geotechnical environments; • MMD 012 gives results very similar to the current mining areas, therefore preliminary design can use the 62° overall slope angle;	Recommendations considered in the design of the MWP	Refer MWP

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• MMD 011 suggest a flatter slope angle, but recommendation to be used with caution		
Health Impact Assessment	• No specific recommendations were made with regard to health • Dust mitigatory measures as recommended in the RAHIA and AQIA reports are implemented as strictly as possible	Recommendations as per AQIA included	Refer Part B; Section 7.1
Heritage	A grave relocation process must be undertaken. • A detailed social consultation process, at least 60 days in length, as required by the KZNARIA as well as the National Health Act and its Regulations, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation. • Bilingual site and newspaper notices indicating the intent of the relocation(s). • Permits from all the relevant and legally required authorities. • An exhumation process that keeps the dignity of the remains and family intact. • An exhumation process that will safeguard the legal rights of the families as well as that of the mining company. • The process must be done by a reputable company well versed in the mitigation of graves •	Recommendations included	Refer section 11.4 and Part B, Section 7.1
Hydrology	**Flood Management** • The hydrology assessment has concluded that the flood risk associated with the proposed mining activities is low. However, to ensure the safety of on-site personnel, some flood protections have been proposed in the unlikely event that the inundation zone water level rises above the modelled results. Further modelling could be conducted if high-resolution topography is made available**.** **Stormwater** ***Assess site constraints*** • Specific vegetation that may need to be identified and/or isolated from the site disturbance. • The type of construction should consider landform. Avoid slab-on-ground construction on steep sites. • Up-slope drainage catchments that must be diverted around the work site.	Recommendations included, especially in terms of the requirements for the WULA as well as the siting of infrastructure to be kept outside of the delineated flood lines	Refer Section 7 of the EMPr

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• Workspace limitations may require site-specific sediment control measures and/or the extensive use of skips or bins for material storage and waste management. • Expected rainfall intensity during the period of disturbance (wet season vs dry season). • Construction is recommended to occur during the dry season. ***Stabilise site entry*** • A stabilised site access must be established and, if possible, limited to one point only. The access allows for construction vehicles to enter the work area while preventing the unnecessary tracking of sediment onto the nearby environment from multiple locations. A stabilised entry/exit point normally consists of a stabilised rock pad. ***Prevent erosion*** • Suitable material storage areas must be located up-slope of the main sediment barrier (e.g., sediment fence). • Stockpiles kept on site for more than two weeks will require an impervious cover (e.g., builder's plastic or geofabric) to protect against raindrop impact. Stockpiles of sandy material located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. • On steep sites and sites with limited available space, erodible materials may need to be stored in commercial-sized bins or mini-skips before use. ***Water Balance*** • Install flow meters in most of the water circuits to enable future calibration		
Noise	• Implementation of the proposed mitigatory measures will reduce annoyance levels; • Implement grievance procedures to address noise complaints • Implement Noise Monitoring program	Not all mitigation measures as proposed are seen as feasible: Mining of 16-hour shifts between 06:00 – 22:00 still to be resolved; Berms of height of 10m not practical	Refer Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
Paleontological	**Historic structures and homesteads** • It is recommended that with the input of the traditional council and elders, homesteads are identified that represents traditional aspects of the area; • These homesteads should then be documented through layout drawing and photographic documentation of structures; • It is recommended that with the input of the traditional council and elders the history of Ophondweni, Emalahleni and Mahujini including and historic lineages to be documented through video and voice recording; • It is recommended that the transcript and photos are compiled into a document that provides the history for each homestead and family; • The above can be done with the assistance of an experienced oral historian. **Ancestral prayer huts and trees** • As part of a large-scale resettlement project conducted by an experience resettlement specialist the measures required at a minimum will be: • Detailed stakeholder engagement with the affected families to identify the needs and practices to be performed in the event that the household will be relocated; • A final signed agreement on the ceremonies and at what stage of the household relocation this process will take place. • It is recommended that the cultural landscape is documented prior to mining through: • Panoramic photography and video documentation; • Landscape documentation of homestead positions; • Documentation of vistas and viewpoints from homesteads and viewpoints; • To be included in the historical documentation and final product that includes the total historic and recent cultural and living landscape of this community.	If required, the recommendations as proposed will be followed	Refer Table 5-1, Table 6-1 and Table 7-1
Socio-Economic	• Implementing robust environmental management practices to mitigate potential environmental risks.	To enhance the benefits and mitigate the negative impacts of the project, all	Refer Table 5-1, Table 6-1 and Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• Enhancing community engagement efforts to foster dialogue, address concerns, and incorporate local perspectives into decision-making processes. • Investing in skills development and training programs to maximize local employment opportunities and promote economic empowerment. • Collaborating with local authorities to upgrade infrastructure and improve service delivery to meet the needs of expanding populations.	recommendations are included.	
Visual and Landscape	• In order to mitigate a medium negative impact to a low negative impact the mitigatory measures as per specialist study needs to be implemented; • Rehabilitation measures need to be executed appropriately; • Visual impacts on the R618 and the HiP can be reduced if appropriate mitigation measures are applied; • If the designs of the existing proposed mining pits or overburden dumps are altered, an updated VIA should be completed	Recommendations considered in alignment with Rehabilitation Plan for implementation where practical possible	Refer Table 5-1, Table 6-1 and Table 7-1
Geohydrology	The following can be done to improve the assumptions and understanding of the groundwater aquifer and hence improve the numerical groundwater model confidence: • All new exploration boreholes drilled in the area should note groundwater occurrences as well as strike depths. The data can be used to update the conceptual hydrogeological model which is incorporated into the numerical flow model. • Water levels of dedicated monitoring boreholes that will be drilled, as well as any new boreholes which are discovered in the area during routine hydrocensus updates, should be monitored (quarterly dedicated holes, bi-annual hydrocensus). • Dewatering volumes (during mining) should be recorded daily and reported bi-monthly (if any, as this assessment predicts that mining will take place above the water table). • Include the new opencast operation areas into the geochemical monitoring programme once mining starts. • The data will be used to update the geochemical model annually based on results from ongoing groundwater monitoring.	Recommendations included	Refer Table 5-1, Table 6-1 and Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• Updating the geochemical model will help to verify source terms (sources of the risks) which are used as input parameters to the numerical groundwater model. • Update the numerical groundwater flow and transport model annually to: • Track the sulphate plume movement into the surrounding aquifer; • Track preferential flow paths and changes to groundwater flow; • Ensure no monitoring network gaps exist (i.e. check if the monitoring network is representative of the site); and • Update the numerical groundwater model annually. • Continue with quarterly groundwater quality and groundwater level monitoring during the operational phase of Mahujini, Emalahleni and Ophondweni; and, within two to four years following the decommissioning phase, to establish post-closure groundwater level and quality trends. • The monitoring information must be used to update, verify, and re-calibrate the predictive tools used during the study to increase confidence in the closure objectives and management plans. • The numerical model platforms can be updated on an annual basis to confirm groundwater and pollution transport movement into the environment. • Once the model is updated the groundwater monitoring plan and mine water treatment plans can be updated.		
Vegetation	Little of the Zululand Lowveld vegetation on the considered future mining sites is in completely natural condition. Most has been impacted upon by closely surrounding settlement, which has resulted in felling of trees and large browsing and grazing impacts. This may explain why woody vegetation is dominated by only a few species which may be unpalatable to livestock and less useful for firewood or timber. Although this needs to be confirmed further into the summer and after more rainfall, this may also explain absence of many herbs. • That the offset is implemented;	Tendele is currently in the process to implement the Biodiversity Offset Plan	Refer Table 6-1 and Table 7-1 as contained in Part B - EMPr

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• All efforts are made to prevent damage or destruction to vegetation outside of the proposed development area, and negative impacts are confined within the 100 m buffer. • Less common herbaceous protected species are relocated with proper care, into similar habitat in the area where they will not be at risk of disturbance or destruction in future. Examples are *Adenia digitata*, orchids including *Eulophia petersii* and *Ceropegia* species. • Commencing a growing programme for Species as identified as soon as possible. This will likely require tissue culturing. • The mined areas are grassed with suitable indigenous species once mining is completed. • Alien invasive species are controlled on the sites during mining and that post-closure alien plant control work continues for at least three more years. • Community consultation and support, including consultation with AHRI which owns a small part of the special habitat. • Fencing which will need to be maintained. • Preferably excluding cattle and livestock, at least in the Core Area of the Special Habitat; • A comprehensive system of firebreaks will need to be set in place, to prevent attempts to set fires at annual frequency. Burning should not occur more than once every two years, and it should also not be omitted for more than three years; • Alien plant invasion occurs and this must be eradicated; • "Bush encroachment" and problem plant indigenous species should be destroyed and there should otherwise be an effort to reverse the conversion of grassland to thicket.		
Traffic	The following recommendations were made regarding mitigatory measures to be included in the EMPr: • Ensure a stormwater management plan is implemented, and that all stormwater systems are kept clean of any debris to reduce flooding risk. • Ensure that eroded areas are re-vegetated, to ensure reduced sedimentation risk and reduced runoff volumes to the streams.	Recommendations are included	Refer section 11.6 as well as Table 7-1 of Part B: EMPr

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• Conduct monthly inspections and maintenance of the site to ensure that vegetation cover is adequate. • Unblock stormwater systems that have silted up, and clear debris that may have accumulated in storm culverts after storm events.		
Terrestrial Biodiversity	The Terrestrial Faunal Specialist has made the following recommendations: • Where appropriate, negotiation and determination of acceptable Biodiversity Offset must take place through processes with relevant parties. • The final layout must have an effective stormwater and water quality management plan in place. • An alien plant management and monitoring plan must be put in place for both mine site activities and road expansion • Monitoring of the following components as a minimum must be routinely performed, by external assessors, and appropriately addressed by the client o Stormwater management o Water quality and aquatic ecosystem health o Alien plants o Air quality • During construction and operation, all efforts must be made to minimise sediment input, pollution and disturbance to areas away from the infrastructure footprint area - no waste or materials of any kind must be allowed to enter the surrounding areas during construction or operation. This should be monitored by an independent assessor.	Tendele has signed an Off-Set Agreement and is in the process to implementing the biodiversity – offset plan agreed with Ezemvelo KZN Wildlife	Please refer to Section 11 as well as Table 7-1 of the EMPr as depicted in Part B of the Report
Wetland	The following recommendations are applicable for this project: • A water quality monitoring plan must be compiled and implemented; • An alien plant removal and management strategy must be implemented; • Placement of the infrastructure (e.g. Topsoil Stockpile, Pit road and Dam(s)) to be designed to sit outside the 32 m buffer of the drainage channel and the Mnyaba River buffer;	The recommendation with regards to the protective buffer zone considered as it is also required in terms of the WUL. Section 21(c) and (i) water uses authorised by the DWS	Refer Table 5-1, Table 6-1 and Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	• The Mnyaba River and drainage areas and buffer zones must be avoided at all times.		
Hydropedology	The following recommendations regarding mitigation measures can be considered as part of the EMPr: • Ensure clean stormwater is conveyed to the natural environment. • Ensure that an infiltration/exfiltration trench is installed to offset potential negative impacts associated with the new mining areas, and to improve interflow into the known wetland area. Without the proposed stormwater attenuation system, the 32 m buffer will not be possible as the impact on the wetland system could be severe. • Ensure fuel spill cleaning kits are on site. • It is recommended that mitigation measures, as described in Section 11 be implemented during the construction and operational phase of this project. • The following should be considered in terms of stormwater management during the construction and operational phase of the project **Assess the site constraints and any site-specific concerns, including:** • Specific vegetation that may need to be identified and/or isolated from the site disturbance. • The type of construction should consider landform. Avoid slab-on-ground construction on steep sites. • Up-slope drainage catchments that may need to be diverted around the work site. • Workspace limitations may require site-specific sediment control measures and/or the extensive use of skips or bins for material storage and waste management. • Expected rainfall intensity during the period of disturbance (wet season vs dry season). **Stabilise the site entry/exiting points:** • A stabilised site access must be established and if possible, limited to one point only. The access allows for construction vehicles to enter the work area while preventing the	The recommendations as proposed will be followed as it overlaps with similar recommendations made by the specialists in the field of Soils, Geohydrology, Hydrology and vegetation	Refer Table 5-1, Table 6-1 and Table 7-1

Study	Recommendation as per Specialist report	Recommendation Included in EIA Report	Reference to section in Report - where included
	unnecessary tracking of sediment onto the nearby environment from multiple locations. A stabilised entry/exit point normally consists of a stabilised rock pad. **Prevent erosion & manage stockpiles:** • Suitable material storage areas must be located up-slope of the main sediment barrier (e.g., sediment fence). • Stockpiles (ROM) kept on site for more than two weeks will require an impervious cover (e.g., builder's plastic or geofabric) to protect against raindrop impact. Stockpiles (ROM) located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. **Manage site waste:** • Adequate waste containers must be provided on-site and maintained in a way that potential and actual environmental harm resulting from such material waste is minimised.		

16. ENVIRONMENTAL IMPACT STATEMENT

16.1. Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is utilised to summarise all of the potential environmental impacts identified during each phase of the Somkhele Anthracite Extension Project. The significance of the impacts associated with the relevant project phases being pre-mitigation and post-mitigation are summarised in **Table 16-1**, **Table 16-2** and

Table 16-3.

Table 16-1: Summary of impacts – Construction Phase

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
Agricultural / Soils	Loss of soils due to ineffective management	Moderate	Low
Visual / Landscape	Impact on aesthetics	Moderate	Low
	Visual change in landscape	Moderate	Low
	Dust creation	Low	Low
	Glare, spill light, sky glow	Moderate	Low
Archaeological/Cultural	Loss of cultural heritage / Reburial	High	Moderate (+)
	Destruction and disturbance of heritage sites	High	Low
Paleontological	Loss of fossil heritage	Medium	Low
Aquatic/Surface Water	Stream modification, riparian vegetation destruction	Moderate	Low
	Physical loss of freshwater habitat	High	High
	Impact on water quality	Moderate	Low
Hydrology	Disturbing vadose zone soils	Low	Low
	Poor quality seepage	Low	Low
	Surface water contamination	Low	Low
	Groundwater contamination	Low	Low
Noise	Ophondweni: Day activities	Moderate	Low
	Emalahleni/Mahujini: Day operations	High	Low
	All areas: Night activities	High	Low
Traffic	Dust emissions from haul roads	Moderate	Low
	Construction of haul roads	High	Moderate
	Loss of riparian vegetation	High	Moderate
Geohydrology	Disturbing vadose zone	Low	Low
	Potential for hydrocarbon pollution	Low	Low
	Erosion and sedimentation	Low	Low

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
	Poor quality seepage	Low	Low
Climate	Low increase GHG emission	Low	Low
Health	Increased occurrence of human health	Low	Low
Socio-Economic	Displacement and resettlement of communities	High (-)	High (-)
	Increase in job opportunities	High (+)	High (+)
Air	Dustfall over 24hr	Low	Low
Blasting/Vibration	Small blast may be required	Low	Low
Plant/Vegetation	Destruction of vegetation	High	High
	Alien invasive plant encroachment	High	Moderate
Animals/Fauna	Loss of habitat	High	High
	Loss of habitat – resettlement	High	Moderate
Wetland	Direct physical loss or modification of wetland habitat	High	High
	Alteration of hydrological and geomorphological processes	Moderate	Low
	Impacts to ecological connectivity and/or ecological disturbance	Moderate	Low

Table 16-2: Summary of impacts – Operational Phase

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
Agricultural / Soils	Loss of soil due to poor management	Moderate	Moderate
	Removal of sol layers and impact on land use	High	Moderate
	Loss of topsoil, wind erosion ad rainwater runoff	High	Moderate
	Loss of land use capability	High	Moderate
Visual / Landscape	Change of visual character	Moderate	Low
	Dust creation	Moderate	Low
	Change in character – mining	Moderate	Moderate
	Glare, spill light, sky glow	Moderate	Low
	HiPs wilderness status	Moderate	Moderate
Archaeological/Cultural	Ancestral prayer huts	High	Moderate
	Traditional homesteads	High	Moderate
	Structures older than 60 years	High	Moderate
	Burial grounds	High	Moderate
	Archaeological sites	Moderate	Low
	Cultural landscape	High	Moderate
Paleontological	Loss of fossil heritage	Medium	Low
Aquatic/Surface Water	Stream modification, erosion, sedimentation, riparian vegetation destruction	High	Moderate
	Physical loss of freshwater habitat	High	High
	Impact on water quality	High	Moderate
Geohydrology	Disturbing vadose zone	High	Moderate
	Poor quality seepage	Moderate	Low

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
	Sediment runoff, poor quality infiltration	Moderate	Low
	Dewatering of aquifer	High	Moderate
	Over abstraction	High	Moderate
	Groundwater pollution	High	Moderate
Noise	All areas: Day activities	Moderate	Low
	All areas: Night activities	High	Low
Traffic	Impact on road safety	High	Moderate
	Stormwater runoff from roads	Moderate	Low
	Increased traffic, impact air quality	High	Moderate
	Water ponding on roads	Moderate	Low
Hydrology	Disturbing vadose zone soils	Moderate	Low
	Poor quality seepage	Moderate	Low
	Stormwater runoff – hydrocarbons	Moderate	Low
	Water quality deterioration	Moderate	Low
	Groundwater contamination	Moderate	Low
Climate	Increased GHG emission, increased carbon footprint	High	Moderate
Wetlands	Direct physical loss or modification of wetland habitat	High	High
	Alteration of hydrological and geomorphological processes	High	Moderate
	Impacts to ecological connectivity and/or ecological disturbance	Moderate	Low
Health	Increased health issues due to PM_{10} and $PM_{2,5}$ exceedances	Moderate	Low
	Respiratory tract infections due to impaired air quality	Moderate	Low
Socio-Economic	Influx of jobseekers and increase in crime	Moderate	Low
	Health related impacts	Medium	Medium
	Population displacement	High (-)	High (-)
	Population increase	Moderate	Minor
	Increase in social conflict	High (-)	Moderate
	Cultural erosion	Moderate	Low
	Job opportunities	High (+)	High (+)
	Increase in household income	High (+)	High (+)
	Increase in Government income	High (+)	High (+)
Air	Dustfall – 24Hr	Moderate	Moderate
	PM_{10} – 24 Hr	High	Moderate
	PM_{10} – 24 Annual	Moderate	Moderate
	$PM_{2,5}$ – 24Hr	Moderate	Moderate
	$PM_{2,5}$ – 24 Annual	Moderate	Moderate
Blasting/Vibration	Ground vibration levels - humans	High	Low
	Ground vibration levels - structures	High	Low
	Air blast impacts	High	Low
	Fly rock	Moderate	Low
Plant/Vegetation	Transformed Zululand Lowveld	High	High
	Increased alien invasive plants	High	Moderate
	No habitat for threatened species	High	High

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
Animals/Fauna	Loss of habitat	High	Moderate
	Impact aquatic systems	Moderate	Moderate
	Degradation of adjacent areas	High	Moderate
	Alien plan infestation	High	Moderate
	Faunal disturbance	Moderate	Moderate

Table 16-3: Summary of impacts – Decommissioning and Closure Phase

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
Agricultural / Soils	Restoration of land to pre-determined land use	High (-)	Moderate (+)
Visual / Landscape	Landscape visual change	Moderate (+)	Moderate (+)
	Rehabilitation – shaping	Moderate (+)	Moderate (+)
	Change visual character	Moderate	Low
	Dust creation	Moderate	Low
	HiPs wilderness status	Moderate	Low
Archaeological/Cultural	Burial grounds	High	Moderate
	Archaeological sites	Moderate	Low
Paleontological	No impact foreseen	None	None
Aquatic/Surface Water	Direct physical modification freshwater habitat	Moderate	Low
	Impact on water quality	High	Moderate
	Impact ecological connectivity	Moderate	Low
Hydrology	Rehabilitation of disturbed areas	Moderate (+)	Moderate (+)
	Rehabilitation plants, stockpiles, PCD	Moderate (+)	Moderate (+)
	Cessation of mining, rebound of aquifer	Moderate (+)	Moderate (+)
	Stormwater runoff, erosion	Moderate	Low
Noise	Significant reduction in noise levels – day time	Moderate	Low
	Significant reduction in noise levels – day time	Low	Low
Traffic	Improved road conditions	Moderate	High (+)
	Improved road drainage	Moderate	High (+)
Geohydrology	Long-term leachate	Moderate	Moderate
	Rehabilitation and positive impact on aquifer	Moderate (+)	Moderate (+)
Climate	Use of diesel generators will cease	Low	Low
	GHG emissions lowered	Low	Low
Health	Long-term asthmatic conditions due to exposure to fugitive emissions	Low	Low

Aspect	Potential Impact	Significance	
		Prior Mitigation	Post Mitigation
Socio-Economic	Long-term improvement standard of living	Moderate (+)	High (+)
	Long-term economic growth	Moderate (+)	High (+)
Air	Dust fall	Low	Low
Blasting/Vibration	Small blasts for demolition	Low	Low
Plant/Vegetation	No rehab, only secondary plants	High	High
	Increased erosion risks	High	High
	Unknown impacts on conservation	High	High
	No further investigation into special habitats (species x)	High	High
Animals/Fauna	Faunal disturbance	Moderate	Moderate
Wetland	Alteration of hydrological and geomorphological processes	High	Moderate

16.2. Final Site Map

Final site maps for the mining areas are included in Part B – EMPr. Reference is made to the following Figures:

- Emalahleni: refer **Figure 3-1**;
- Ophondweni: refer **Figure 3-2**; and
- Mahujini: refer **Figure 3-3.**

16.3. Summary of Positive and Negative Implications and Risks of the proposed activity and Identified Alternatives

The positive and negative implications were assessed based on impacts incurred during the construction, operational and decommissioning phases of the Somkhele Project. The summarised main (high and moderate) impacts are provided for each phase below.

17. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

The Draft 2024 EIA/EMP seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment and the surrounding Somkhele communities will be mitigated, controlled and monitored.

The Draft 2024 EIA/EMP will address the environmental impacts and possible unplanned events during each phase of the Project (construction, operational, decommissioning and post-closure). Due consideration must be given to environmental protection during the entire lifespan of the Project. In order to achieve this objective a number of environmental recommendations are made that relates to environmental protection. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- Minimise the extent of an impact during the life of the Project;
- Ensure effective and appropriate rehabilitation of disturbed areas;
- Prevent long-term environmental degradation; and
- Reduce the risk of long-term residual impacts

18. FINAL PROPOSED ALTERNATIVES

Jinyela (Pty) Ltd conducted a Traffic Impact Assessment (December, 2023) for various haulage routes for the proposed Somkhele Extension Project. The mine's management are contemplating three alternative haulage routes to transport anthracite from the Emalahleni and Ophondweni Pits to the wash plant at the Somkhele mine. The proposed haulage routes predominantly comprise of roads that form part of the provincial road network, which falls under the jurisdiction of the KwaZulu Natal Department of Transport (KZN DoT). The Mahujini Pit is not expected to be operational in the near future and thus is not included within any of the analysis in the Traffic Impact Assessment study. Once negotiations have concluded and the pit is ready to be developed a separate traffic report will be prepared addressing any traffic concerns.

The three proposed haulage routes are on shown on **Figure 18-1** hereafter. Haulage Route 1 is shown in blue, Haulage Route 2 is shown in yellow and Haulage Route 3 is shown in orange. The solid lines denote where the existing roads will be used for haulage while the dotted lines indicate the sections of the route that will require the construction of new roads.

As the Emalahleni Pit lies between the Tendele Mine and the Ophondweni Pit only the trip to the Ophondweni Pit will be described in this section.

Assessment Haulage Route 1:

Route 1 commences at the wash plant at the Tendele Mine and proceeds out of the mine in a general easterly direction onto a gravel road that is privately owned by the mine. This route then continues on this gravel for approximately 1.5km until it intersects with the P235 (R618) at an existing at-grade T-junction intersection. This intersection is a priority stop controlled intersection.

This route then traverses along the P235 in easterly direction for approximately 1.7km until it intersects with the P495 at an existing at-grade four-legged intersection. This intersection is a priority stop controlled intersection. Thereafter, this route turns onto the P495 heads in a northerly direction for approximately 8.9km until it intersects with an unnamed local gravel access road in close proximity to the Ophondweni pit. Then, the route then traverses along for a further 150m on this local gravel access road until it terminates at the proposed pit.

Assessment Haulage Route 2:

Route 2 also commences at the wash plant at the Tendele Mine and proceeds out of the mine in a general northerly direction onto a proposed new gravel road that will be privately owned by the mine. This route then continues on this gravel for approximately 900m until it intersects with the P235 and P348 at an existing at-grade intersection. This intersection is a priority stop controlled intersection.

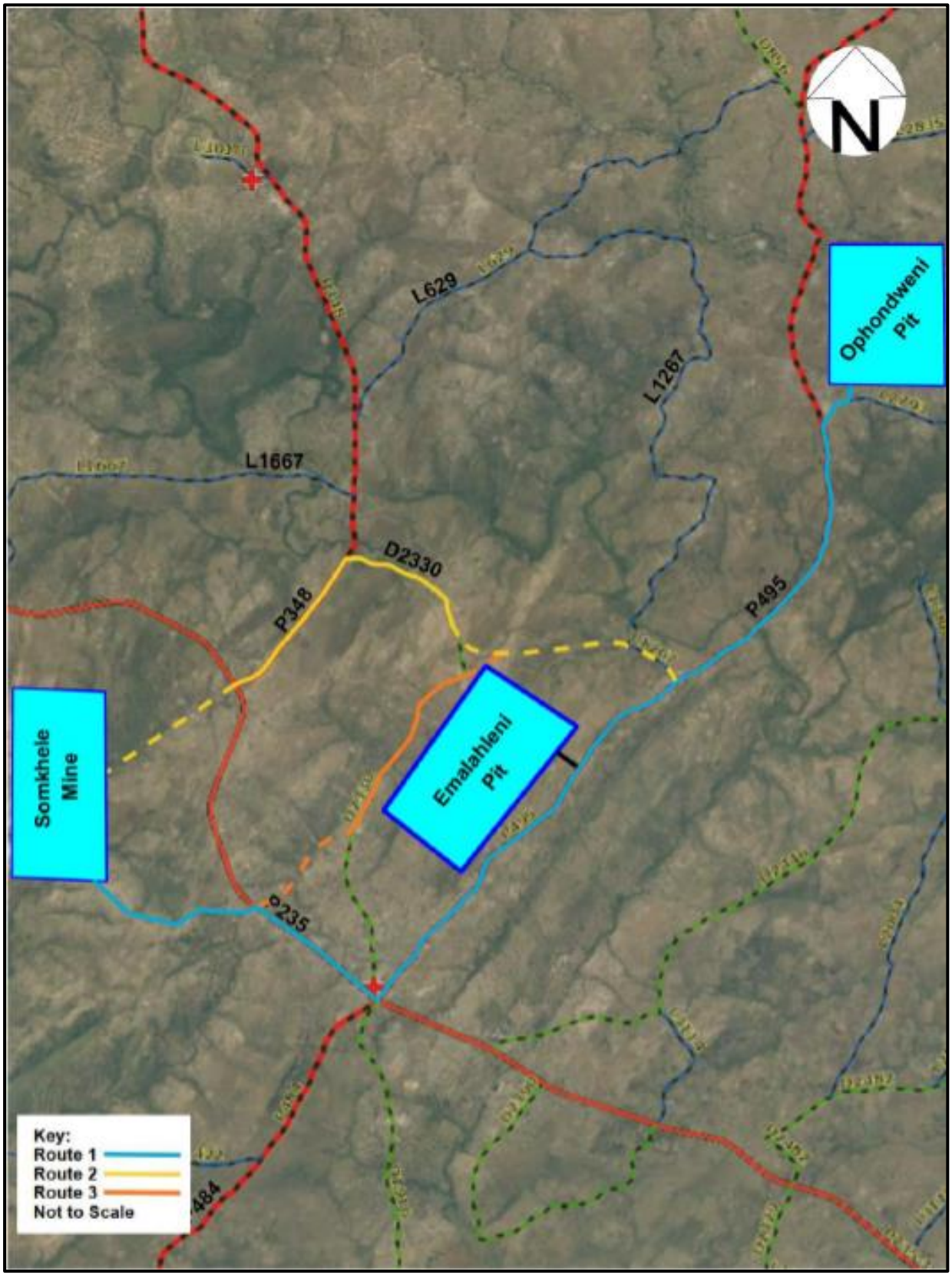


Figure 18-1: Proposed Routes for the Emalahleni and Ophondweni Pits

This route then traverses across the P235 in a northerly direction onto the P348 where it traverses along for approximately 1.9km until it intersects with the D2330 at an existing

at- grade four-legged intersection. This intersection is a priority stop controlled intersection.

Thereafter, this route continues on the D2330 in an easterly direction for approximately 1.1km until it intersects with an un-named local gravel access road where it traverses for a further 2,1km in an easterly direction until it intersects with the L1267. The route then continues along the L1267 in an easterly for approximately 750m until it intersects with the P495. Thereafter, this route continues to the Ophondweni pit on exactly the same route as Route 1 for the final 4.2km of its journey to the pit.

Assessment Haulage Route 3:

Route 3 also commences at the wash plant at the Tendele Mine and proceeds out of the mine in a general easterly direction onto a gravel road that is privately owned by the mine. This section of Route 3 is exactly the same as Route 1. This route then continues on this gravel for approximately 1.5km until it crosses the P235 at a proposed new underpass. From this new underpass, it continues on an un-named local gravel access road where it traverses for a further 2km in a northerly direction until it intersects with the D2330. Thereafter, the route continues along the D2330 for approximately 2,7km until it reaches a proposed new gravel road that will be constructed for this project. The route will continue along this new gravel road for a further 375m until the routes joins an existing un-named gravel road. Thereafter, Route 3 will traverse along this un-named gravel road, then onto L1267 and then finally onto the P495. Thereafter, this route will continue to the Ophondweni pit in the same manner as the Routes 1 and 2.

Each of the proposed corridors had been assessed from several different perspectives and rated according to various criteria, to determine the most preferred route to transport the anthracite from the pit to the mine. Each criterion was given a rating between 1 and 5, with 5 being the most preferred and 1 being the least preferred.

Please refer to **Figure 18-2** illustrates the typical B1 - Intersection design for the first 50 meters in all directions for P495, P235 access roads as well as the mine access road. The P495 is a public road to be used or the haulage of coal from the Ophondweni and Emalahleni pits to the washing plant located at Area 2.

The preferred haul road to be implemented for the Mahujini pit is illustrated in **Figure 18-3**. The decision was based by on the following criteria:

- Alternative (Option 3) has the least impact on the environment;
- Haul road 3 has the minimum traffic obstruction;
- Implementation of alternative 3 is rated as most economic feasible;
- Haul road 3 has least impact on road safety insofar it relates to visual sight as the intersection will be raised to same level as current P235 District Road.

Table 18-1 to **Table 18-3** for an assessment of the alternatives considered.

Figure 18-2 illustrates the typical B1 - Intersection design for the first 50 meters in all directions for P495, P235 access roads as well as the mine access road. The P495 is a public road to be used or the haulage of coal from the Ophondweni and Emalahleni pits to the washing plant located at Area 2.

The preferred haul road to be implemented for the Mahujini pit is illustrated in **Figure 18-3**. The decision was based by on the following criteria:

- Alternative (Option 3) has the least impact on the environment;
- Haul road 3 has the minimum traffic obstruction;
- Implementation of alternative 3 is rated as most economic feasible;
- Haul road 3 has least impact on road safety insofar it relates to visual sight as the intersection will be raised to same level as current P235 District Road.

Table 18-1: Assessment of Route 1

Criteria	Comment	Rating
Traffic Impact	The current LoS on all the roads that form Route 1 are good. The expected LoS on all the roads that form Route 1, will be good during the implementation of this project	5
Travel Time	Although this route is marginally longer than the other routes, this route will result in shortest travel times from the route options due to the better travel speeds that can attained as a result of a superior geometric alignment of the entire route.	5
Horizontal Alignment	The horizontal alignment is predominantly gentle and conducive to the movement of heavy vehicles.	5
Vertical Alignment	Fairly gentle gradients throughout the length of the route and conducive to the movement of heavy vehicles.	5
Socio-economic impact	Moderate impact on socio economic impact on the local communities as the dwellings and homesteads are setback far back from the travel way.	4
Safety	Generally good throughout.	4
Stormwater	Poor throughout	1
Cost of upgrading / construction	It is recommended that the intersection of P235 and P495 is upgraded to a B1 type intersection	4
TOTAL		**33**

Table 18-2: Assessment of Route 2

Criteria	Comment	Rating
Traffic Impact	The current LoS on all the roads that form Route 2 are good. The expected LoS on all the roads that form Route 2, will be good during the implementation of this project	5
Travel Time	This route will result in longer travel times as opposed to route 1 due to the sub-standard geometric alignment of some sections of the route.	4
Horizontal Alignment	The horizontal alignment of the L1267 and the un-named gravel is sub-standard.	2
Vertical Alignment	Fairly gentle gradients throughout the length of the route except on the L1267 and the un-named gravel which are sub-standard.	3
Socio-economic impact	Moderate impact on socio economic impact on the local communities as the dwellings and homesteads are setback far back from the travel way.	4
Safety	Generally satisfactory throughout except on L1267.	3
Stormwater	Poor throughout	1
Cost of upgrading / construction	Construction is required for a new section of road and the L1267 requires major upgrading. The intersection of the L1267 and D495 needs to be re-configured.	2
TOTAL		**24**

Table 18-3: Assessment of Route 3

Criteria	Comment	Rating
Traffic Impact	The current LoS on all the roads that form Route 3 are good. The expected LoS on all the roads that form Route 3, will be good during the implementation of this project	5
Travel Time	This route will result in the longest travel times from the 3 options due to the sub-standard geometric alignment of some sections of the route.	2
Horizontal Alignment	The horizontal alignment of the L1267 and the un-named gravel is sub-standard.	2
Vertical Alignment	Fairly gentle gradients throughout the length of the route except on the L1267 and the un-named gravel which are sub-standard.	3
Socio-economic impact	High impact on socio economic impact on the local communities as some dwellings and homesteads are located very to the travel way on some sections of the route.	1
Safety	Generally poor on the gravel access roads and on L1267.	2
Stormwater	Poor throughout	1
Cost of upgrading / construction	Construction is required for a new section of road and the L1267 requires major upgrading. The construction of an underpass that is required at the crossing of the P235 has been omitted which when considered will substantially increase the overall construction cost on this route	1
TOTAL		**17**

It is evident from the assessment that the most preferred route from a traffic and transportation perspective is Route 1, as it attained the highest score of the three proposed routes. The levels of service on the existing road network are good and the impact of the haulage trucks on the overall capacity and LoS of the existing road network is negligible in the context of the volumetric capacity of these roads.

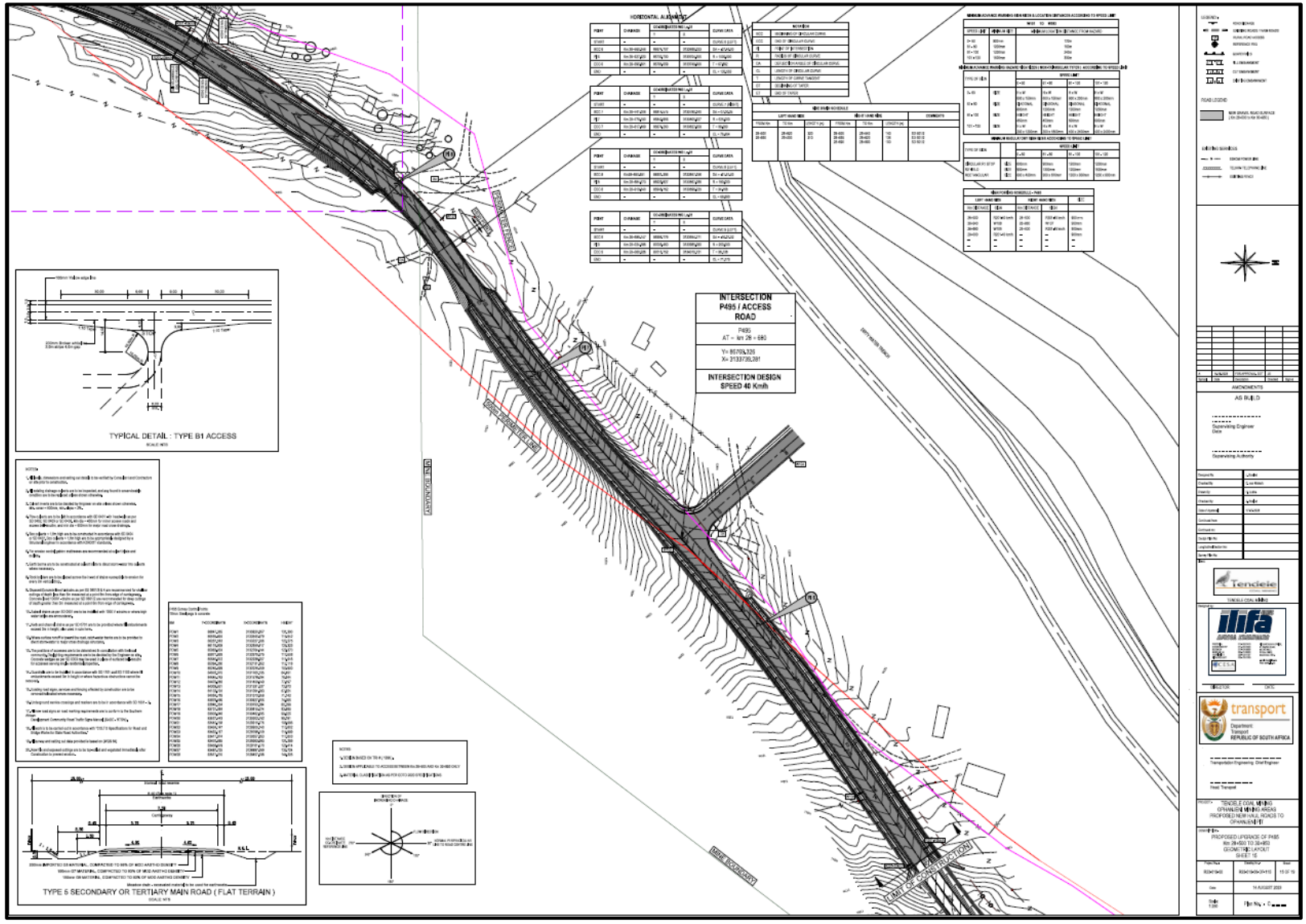


Figure 18-2: Proposed intersection for the P495 access road

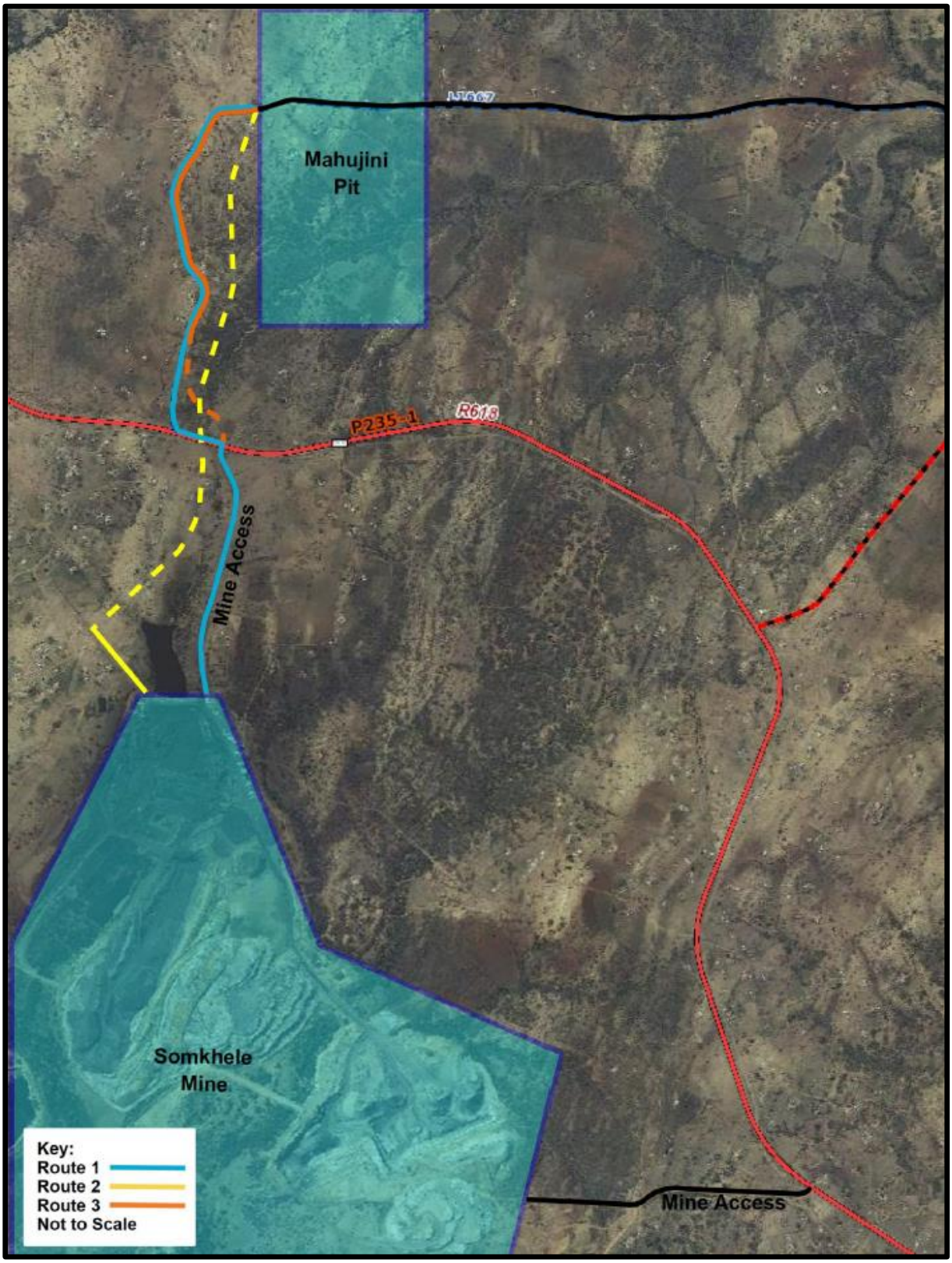


Figure 18-3: Alternative haul roads considered for the Mahujini Pit

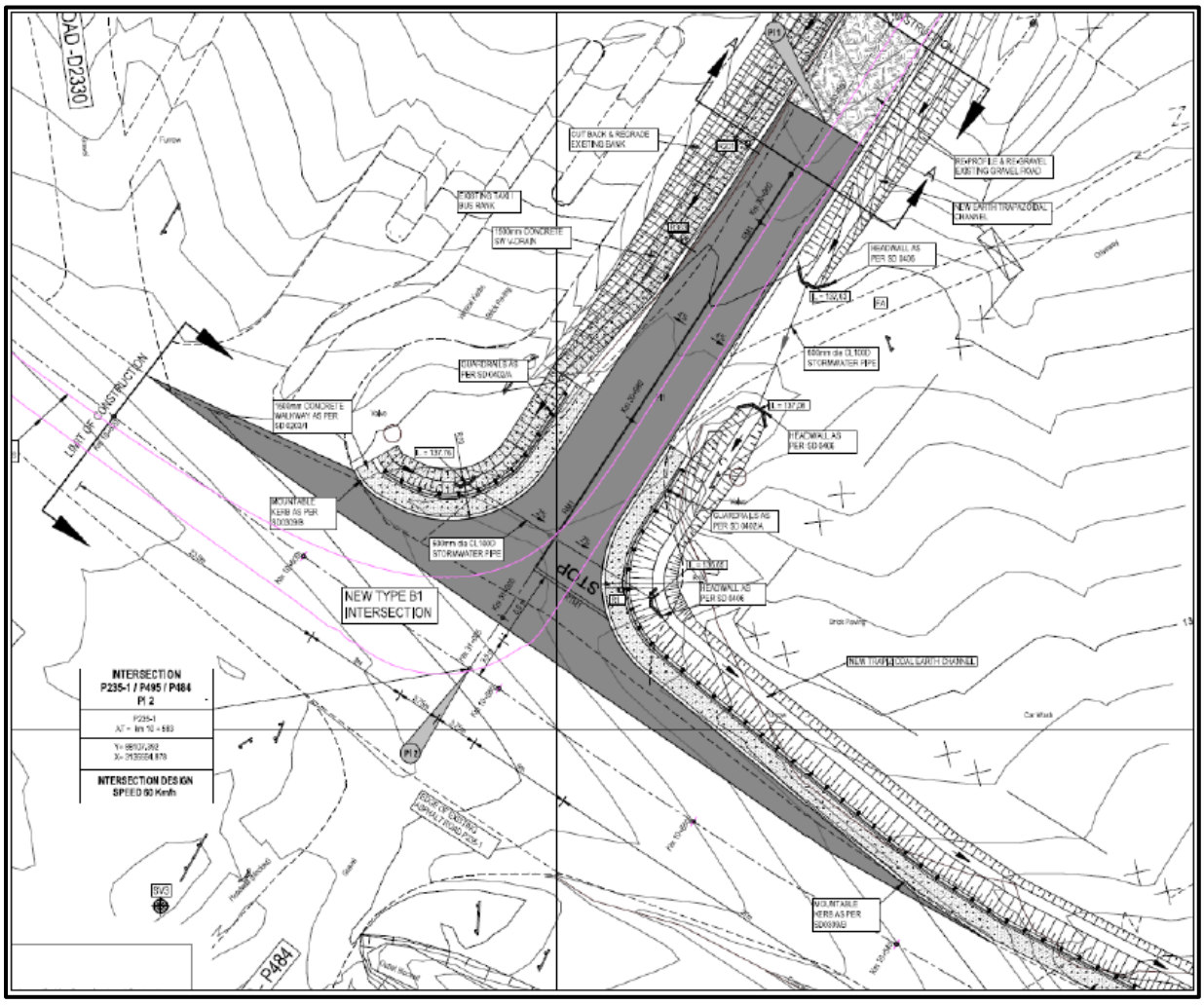


Figure 18-4 Layout P235/P495 intersection type B1

19. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

Although every attempt was made to provide the specialists access to the Mahujini/Machibini areas, several constraints were experienced due to some minority community hostility early in the PPP. Under the leadership of the Inkosi, additional community meetings were held on 24 January 2024 and 4 February 2024 with the concerned members of the Mahujini and Machibini. The objective of these meetings was to resolve the conflict with the minority members which has subsequently led to approval be granted for the specialist to conduct their fieldwork.

This has unfortunately delayed the finalisation of some of the specialist reports to be included in the draft EIA. In this instance it will be a requirement for the specialist as listed below to complete the studies prior to submission to the Regulatory Authority for final decision making before mining can commence at Mahujini.

The following specialist studies have been delayed due to initial community intervention:

The Traffic impact Assessment dealing with the haul road from Ophondweni, Emalahleni and Mahujini towards the intersection with Somkhele process Plant.

20. DESCRIPTION OF ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

20.1. EIA Assessment

Various specialist studies were conducted as part of the EIA phase. In terms of the Terrestrial Faunal Biodiversity Assessment (Harvey Ecological, 2023) the following assumptions and limitations are relevant.

- The purpose of the faunal terrestrial field assessment was not to perform a biodiversity species inventory, given the fact that most faunal species are cryptic or not permanently present, and not easily detected within a short space of time. However, the techniques outlined above are considered adequate for the scope of this assessment.
- Some fauna are poorly known, both in terms of distribution and habitat requirements, and are highly cryptic. This applies particularly to many invertebrates. In these cases, all available information, together with expert opinion and the precautionary principle are used when assessing likelihood of occurrence and distribution on site.
- Given the size of the area assessed, together with limited access, and very dense vegetation in places, the entire area was not covered. However, a large spatial representation was accessed and all main land cover types and areas of greater potential interest were examined, allowing for a good understanding of the ecology of the area.
- Additional areas are being considered for relocation of local people currently living within the proposed mining footprints. These have not been finalised and are not specifically considered as part of this Report.

20.2. Soil Impact Assessment

Desktop information was used during events where areas are not accessible due to terrain obstacles, dongas and bush encroachment.

20.3. Heritage Impact Assessment

The following assumptions and limitations regarding this study and report exist:

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. In fact, due to the dense vegetation and steep topographic gradients found within the study area, it is highly likely for the present identified heritage sites not be a complete record of all the archaeological and heritage resources located within the study area.
- Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to

assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

- The present scope of work did include a palaeontological desktop study. A separate study was commissioned and acts as a stand-alone report.

20.4. Groundwater Impact Assessment

Impact quantification in terms of the Geohydrological Assessment is based on the numerical groundwater model. There are uncertainties in the groundwater flow field simulated by a numerical model. The model uncertainties are as follows:

- It is assumed that the recharge into the aquifer has not changed significantly from pre-mining conditions.
- Artificial recharge or reduced recharge as a result of mining in the area was not incorporated into the model. The recharge in opencast pits, overburden stockpiles and rehabilitated pits will be incorporated in future modelling endeavours (when more on-site testing and rainfall data are available).
- Groundwater-specific yield and specific storage values were derived from reported ranges for the rock types encountered in the study area.
- The model does not consider kinetic mineral reactions (i.e. oxidation of pyrite within the rock). However, long-term SO_4 loads (Botha, 2020) for overburden (spoil) and coal waste types were applied to relevant areas (i.e. to transport cells in the model domain which represents overburden or coal waste, respectively).
- The model grid was constructed based on the regional geology map for the area and refined in areas where it is available drilling log data and/or geophysical data.

The following assumptions and limitations about the dewatering model:

- No groundwater inflow data into opencast workings are available. Hence, the drawdown model could not be calibrated. Based on available pump test data, an aquifer yield in the order of 0.01 to 0.5 l/sec is typically associated with water-bearing fractures.
- The dewatering model does not take into consideration artificial recharge which may occur from slurry and discard backfilling operations.
- The aquifer drawdown/dewatering zones are illustrated by 0.5 to 1 m drawdown contours.
- Dewatering cells applied to the mining areas are in the same order as the aquifer rock transmissivity values (determined by pump testing). And conductance (C) for the dewatering cells was calculated as follows:

$$C = k/D \qquad \textbf{Equation 1}$$

where:

C is the drain conductance (1/T).
k is the hydraulic conductivity of the cell the drain is assigned to; (L/T); and
D is the thickness of the cell the drain is assigned to (L).

- Artificial recharge for disturbed mining areas and residue stockpiles were derived from available literature (Hughes, 2004).
- Groundwater-specific yield and specific storage values were derived from reported ranges for the rock types encountered in the study area.
- The model does not consider climate change.

20.5. Air Quality

20.5.1. Assumptions

- Data/information provided by the client between January and February 2024 and used as input into the model were assumed to be accurate and complete at the time of modelling;
- All hauling and material handling activities (truck loading/offloading) were assumed to occur for 20 hours a day for 6 days a week, based on information provided by the client;
- Drilling was assumed to occur for 8 hours a day for 6 days a week and blasting assumed to occur twice a week between 12:00 – 17:00 in the afternoon, based on information provided by the client;
- Bulldozing activities assumed to occur for 24 hours a day for 6 days a week, as confirmed by the client;
- Material throughputs were calculated using the information provided by the client and include:
- Maximum monthly production rate of 400 000 tonnes of waste (overburden) and 120 000 tonnes of coal produced from each of the proposed Emalahleni and Ophondweni opencast pits;
    - Maximum monthly production rate of 800 000 tonnes of waste (overburden) and 240 000 tonnes of coal produced from the proposed Mahujini opencast pit.
    - 120 000 tonnes of coal transferred from each of the Emalahleni and Ophondweni coal stockpile areas to the Plant at Area 2, per month.
    - 240 000 tonnes of coal transferred from the Mahujini coal stockpile area to the existing Plant at Area 2, per month
- Mitigation measures that were considered in this study included:
    - water spraying on the unpaved haul routes and ROM stockpiles (assumed to achieve at least 40% control efficiency);
    - water spraying during drilling and truck offloading activities (assumed to achieve at least 70% control efficiency);
    - 30% control efficiency associated with the waste dumps due to the presence of hard rock and material in the waste material/overburden;
    - re-vegetation at the topsoil stockpiles (assumed to achieve at least 90% control efficiency).
- The location and dimensions for most of the modelled sources were based on the information provided by client. Where information was not provided or was unknown, assumptions were made.

20.5.2. Limitations

- Emission sources included in this model are limited to the proposed Somkhele Operations surface activities;

- Detailed information for each emission source is required for input into the model, such as the dimensions, material throughputs, material characteristics and the exact locality of the sources. In some instances, not all these details are known. To account for the emissions, assumptions and estimates were made where necessary.
- The study is limited by the amount of detailed information that could be provided at the time of modelling.

20.6. Noise Impact Assessment

Selecting an ideal measurement location could be difficult, with various criteria assessed to identify the viability of a certain location as a point to define ambient sound levels. When selecting a measurement location, the most important criteria would be:

1. Availability of a measurement location (access to a certain area suitable for monitoring, or permission to deploy instruments at a location);

2. Security of the instrument (minimise risk to the technician; prevent theft; sabotage of the equipment);

3. Safety of the equipment (ensure that it does not prevent, interfere or limit typical agricultural or household activities; ensure that the instrument are not in a location where an animal could damage the instrument); and lastly,

4. The suitability of the measurement location to define ambient sound levels (the presence of certain trees or equipment, wetland or other water resources will influence ambient sound level significantly).

As such, after ensuring that the instrument is safe and secure, there are various environmental factors that could influence ambient sound levels measured. These constraints and limitations are discussed below and could include:

- Seasonal changes in the surrounding environment can influence typical ambient sound levels, as many faunal species are more active during warmer periods than the colder periods. As an example, cicada is usually only active during warmer periods. Certain *cicada* species can generate noise levels up to 120 dB for mating or distress purposes, sometimes singing in synchronisation magnifying noise levels they produce from their tymbals;

- Defining ambient sound levels using the result of one 10-minute measurement may be very inaccurate (very low confidence level in the results) relating to the reasons mentioned above, and measurements over a longer-term period is critical;

- Some equipment that could influence measurements may be missed when deploying instruments, or, the equipment may not the audible. This could include equipment such as hidden water pumps and associated pipelines and outflows, ESKOM stepdown transformers, hidden compressors, inverters, condensers or other electrical equipment, etc. While not audible during deployment, such equipment may significantly influence ambient sound levels during quiet periods;

- Type, the number and sizes of trees in the vicinity of the instrument, as well as the distances between the microphone and these trees. Certain trees, especially fruiting trees could attract birds and other animals that will significantly impact on ambient sound levels;

- Type and number of animals in the vicinity of the microphone. Dogs, chickens, geese, etc. generate different noises randomly both night and day, and other livestock (sheep, goats, cattle, horses, etc.) kept in enclosures will also raise noise levels, especially if these animals are penned in large numbers;

- Measurements over wind speeds of 3 m/s could provide data influenced by wind-induced noises. However, when determining the ambient sound levels associated with increased wind speeds, it is desired to measure ambient sound levels at higher wind speeds;

- Ambient sound levels recorded near rivers, streams, wetlands, trees and bushy areas can be high due to faunal activity which can dominate the sound levels around the measurement point (specifically during summertime, rainfall event or during dawn chorus of bird songs). This generally is still considered naturally quiet and accepted as features of the natural environment, and in various cases sought after and pleasing. Ambient sound level data measured in such area however should not be used to develop an opinion in the potential prevailing ambient sound levels in the larger area;

- Exact location of a sound level meter in an area in relation to structures, infrastructure, vegetation, wetlands and external noise sources will influence measurements. It may determine whether you are measuring anthropogenic sounds from a dwelling, or environmental ambient baseline contributors of significance (faunal, roads traffic, railway traffic movement etc.); and

- As a residential area develops the presence of people will result in increased dwelling related sounds. These are generally a combination of traffic noise, voices, animals and equipment (incl. TV's and Radios). The result is that ambient sound levels will increase as an area matures.

20.7. Aquatic Impact Assessment

The following general limitations are noted:

- This report deals exclusively with a defined area and the extent and nature of watercourses in that area.
- Additional information used to inform the assessment was limited to desktop data and GIS coverage's available for the province at the time of the assessment.
- Given the size of the study area, and time constraints and access constraints, a few of the watercourses in the study area could not be verified in the field.
- Sampling by its nature means that not all parts of the study area were visited. The assessment findings are thus only applicable to those areas sampled, which were extrapolated to the rest of the study area.
- Systematic sampling of selected watercourses was undertaken. The outer boundary of the riparian and wetland zones identified can be considered accurate

in the vicinity of these transects. Between transects the outer boundary had to be extrapolated using aerial photography and 10m elevation contours and, as such, the accuracy of such extrapolated sections has limitations and is open to the interpretation of the delineator.

20.8. Socio-Economic Assessment

The Socio-Economic Impact Assessment by Urban -Econ was conducted based on several assumptions, which include but are not limited to:

- Project-related information supplied by the Environmental Assessment Practitioner and the client for the analysis is assumed to be reasonably accurate.
- The secondary data sources used to compile the socio-economic baseline (demographics and the dynamics of the economy) although not exhaustive, can be viewed as being indicative of broad trends within the study area.
- The identification of possible impacts is in part based on the existing desktop-level knowledge of the socio-economic environment.
- Possible impacts, as well as stakeholder responses to the identified impacts, cannot be predicted with complete accuracy, even when circumstances are similar and these predictions are based on research and years of experience, taking the specific set of circumstances into account.

The limitations for the study include the following:

- The latest available stats at local municipal level and sub place were used as the primary source of data. Where possible, this has been augmented with data obtained from the Quantec Standardised Regional Dataset which contains some of the most widely accepted projections of StatsSA data up to 2022. The information and data used in this report is as accurate and as most recent indication of the Mtubatuba Municipality population that the information allows. However, due to the inconsistencies in the sources as indicated above, the information does not align in all cases.
- The demarcation of the affected community areas is not fully aligned between different sources of information. This causes the data between the various sources to not be completely correlated mainly because of differences in the naming and demarcation of the sub-places, municipal wards and local place names.
- Despite the difficulties presented in the above data sources, it is believed that the profiles of the communities are of a sufficient level of accuracy to reflect the current status of the social position of the communities.

20.9. Blasting and vibration

It is not the purpose of this assessment to calculate exact vibration levels, or the precise level of the air overpressure, but to use various tools to identify potential issues of concern. Due to unknowns this assessment leans towards a precautious approach, rather over-estimate the distance that fly-rock may travel, the ground vibration or the air blast levels. However, the following assumptions and limitations must be noted:

- Blast parameters were derived from blast variables as recorded from existing blasts at the adjacent Tendele Mine;

- This impact assessment does not make a statement on the acceptability of the blast design as evaluated (viable bench height, fracturing, throw, powder factors, drilling cost, blasting cost, etc.) and only assesses the potential impacts considering the available information;
- The report is based generally on a desktop assessment, considering feedback from the project EAP as well as observations made during the December 2023 site visit. The status of structures and the associated uses were not assessed. It is required that the mine completes a survey of all structures and boreholes (location, depth, yield, static water level, ground water quality, usage, etc.) located within 2,000 m from the proposed opencast pits. The mine must determine the status and state of the structures (before first blasting taking place) located within 2,000m (as per DMRE Memo);
- Boreholes was not identified and verified, and it was assumed that boreholes may be located close to residential structures and water dams/reservoirs;
- Attenuation rates for ground vibration levels are based on site constants calculated as recorded from actual blasts in the vicinity of the expansion projects;
- Calculations are based on an ideal situation, with the bedrock having constant characteristics, whereas in practice the geology is complex with faults, dykes, folds, stratigraphical layers etc. This means that each blast may be different;
- This report assumed that blasting will take place during the afternoon when atmospheric conditions are the most unstable with no inversion layer, or a potential inversion layer that is high with no overcast conditions; and
- There are residential houses and other structures within the area earmarked for opencast mining (and other project infrastructure). It is assumed that the people and livestock located in this area will be relocated and that any cement dams and water reservoirs will be destroyed (have no further use).

20.10. Rehabilitation and Closure Assessment

Based on the location of the facility being close to populated areas, the following assumptions with respect to the removal of facilities have been used:

- Brick buildings and infrastructure serving as offices can be put to beneficial use upon closure of the mine and thus should not be removed if there is an adequate use for these buildings post-closure. This "adequate use" should be determined before final closure and rehabilitation measures are formally implemented;
- If an agreement is to be reached with the community and or any other organization to take over the occupation of one or more buildings, then a formal agreement to that extent needs to be entered into and signed by all parties concerned. The Department of Mineral Resources also needs to be alerted to this fact, and adequate legal arrangements need to be made in this regard;
- The final land-use for the rehabilitated mining areas is envisaged to be community dams in some areas and grazing,
- All temporary office structures (i.e. container offices) will be removed at no cost to the mine; however, the footprint must be rehabilitated;
- Steel structures, electrical and mechanical machinery have a residual scrap value which will result in removal by scrap dealers at no cost to the party responsible for rehabilitation of the mine;

- The processing plants will be removed in its entirety; if no longer economic valued for beneficiation
- All haul and access roads will be rehabilitated unless the community wishes for them to remain.

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

21.1. Reasons why the Activity should be authorised or not

During the construction phase there are a number of both biophysical and socio-economic impacts that could potentially occur should development of the project site be initiated. As per Section 11 (Part A) and **Table 6-1** (Part B) the potential of these impacts can be reduced to Moderate to Low. However, there are several impacts that even with mitigation implemented would still remain of a high significance rating. These high significance impacts are largely related to the impacts resulting from the clearing of sensitive biodiversity in the proposed footprint and areas surrounding the Somkhele Extension Project. The most significant impacts are associated with the initial direct loss of habitat, loss of species of conservation concern and impacts on ecological processes. The specialists have made a concerted effort during the information gathering phase to ensure that all biodiversity, soil and geohydrological surveys were able to be completed and as such all data was able to be surveyed/ collected.

The worst-case scenario is thus presented and as the impact stands, based on best-practice guidelines, a biodiversity offset would be required to compensate for these high significance impacts. As of 6th May 2024, Tendele has signed an Off-Set Agreement and agreed the implementation of a biodiversity Off-Set Plan (refer to **Appendix 26**). Protected plant permits for the removal of protected species would also need to be obtained from the relevant competent authorities.

An identified high impact that featured predominantly during the public consultation process is associated with the relocation of directly affected communities in order for the mine development to proceed. This would include the requirement for the relocation of graves which could significantly impact the social well-being of families and descendants. The number of graves and their locality is well understood although access to the areas had been being restricted, the needed surveys were able to be completed. The relocation of people would be undertaken in accordance with best practice guidelines as part of the RAP. The RAP process was conducted in parallel with the EIA process but did not form part of the EIA. However, all the identified impacts stemming from the RAP was covered by the Socio-economic impact assessment and was therefore indirectly covered in the EIA. It is acknowledged that this process could result in trauma and distress amongst the affected communities and is identified as a potential high risk to the project. In the interim the RAP and the associated resettlement plan have been completed and agreed for Ophondweni and Emalahleni and will be negotiated for the Mahujini area. Currently 139 families of 143 have signed the agreements and since January 2024 has started with the relocation process.

This plan needs to be mutual agreed in Mahujini and contractually sealed prior to any construction and mining work taking place within the footprint of the mining right area. In addition, the social impacts associated with the Somkhele Project need to be understood within the socio-political context of the receiving environment and the directly impacted communities. The risk of social and political interference in the construction and operation of the Somkhele Project remains high within the affected communities given high level of unemployment and the social unrest coupled with the localised political instability.

Several positive outcomes have been identified as part of the Socio-economic impact assessment. The Somkhele Mine has been in operation for the past sixteen years contributing enormously towards the economic wellbeing of the surrounding communities. It was determined that the Mine has contributed almost R3,0 Billion in direct benefits to 40,000 local community members. These benefits include the following:

- More than 15,000 people benefitted from over R1,74 Billion paid in salaries;
- The minimum salary paid by the mine far exceeds the Social Grant paid by Government through the South African Social Security Agency (SASSA);
- Monies spent on SLP and community projects in the Mpukunyoni area;
- Monies spent on procuring services from more than 70 community-based entrepreneurs benefitting more than 4,000 people;
- 21,542 people have received different forms of training over the last 16 years.

The above-mentioned benefits would have not materialised if the mining operation was to be terminated. During full mining operations, Somkhele mining project employs close to 1,600 employees with 87% of these workers being from the Mpukunyoni Community around the mine.

In an area where the unemployment figure is well over 70%, the majority of the communities surrounding the mine are in favour of the project as they rely on social grants to survive. The loss of these jobs and procurement opportunities as a consequence of the Mine closing will leave more than 12,000 people from this community without any form of income and with no prospects of finding alternative employment. The continued operation of the Mine will ensure that benefits in the order of R4.7 Billion will flow directly to the community around the Mine over a 10-year period. These benefits include employment, procurement opportunities for local businesses and Social and Labour Plan spend, including training and water provision (amongst other benefits). In addition, the Mine will contribute significantly to the South African economy through PAYE, company tax and royalties.

It is duly captured in the Comment and Response Register that the proposed mining development experienced a mixed reception in the local communities, especially the community of Mahujini. It was clear that the communities of Ophondweni and Emalahleni being in favour due to the economic benefits the mine is likely to bring to this area (as furthermore demonstrated by an IPILRA vote in fovour of the mine in excess of 90%).

The minority of the residence in the opposing community of Mahujini was eventually convinced to participate in the process and progress was made to support the Public Participation Process initiated for the Somkhele Project. It is not possible for the EAP as part of this EIA to decide on behalf of the local community what should happen in future as there are still driving forces active to terminate the project. It is noted that if the Mahujini community located on the mine footprint remains opposed to the mine following

the completion of the RAP the mine will not be able to progress in Mahujini as resettlement is a voluntary process.

The findings of the impact assessment undertaken show that there is the potential for significant impacts throughout all phases of the project, however, with the effective implementation of the EMPr, careful planning, successful completion of the biodiversity offset, RAP, WUL, and ongoing engagement with all stakeholders and potentially affected parties, there is no biophysical, social or economic reason why the project should not be authorised for continuation of mining activities on Areas 4 and 5 in accordance with the valid Mining rights for these areas.

21.2. Conditions that must be included in the Authorisation

21.2.1. Specific conditions to be included into the Compilation and Approval of the EMPr

The management actions as per **Table 7-1**: Part B as well as the monitoring requirements specified under Section 9 of the EMP must form part of the conditions to be included in the Environmental Authorisation. Reference is also made to Regulation 26 of GN 982 Regulation of NEMA that additional conditions could be included in the EA that are not specifically captured in the EMPr. In this regard the applicant must comply with all applicable environmental legislation whether specifically mentioned in the EIA Report or not.

It is hereby proposed that the following additional conditions be considered in the EA for inclusion:

- The relocation of the families at Mahujini to be negotiated in line with the Resettlement Action Plan needs to be completed prior to any blasting activities on the Mahujini mining area footprint;
- The geohydrological drilling at Mahujini needs to drill an additional groundwater monitoring borehole downstream of the mining activities;
- The issued Water Use License for the Project must be amended to cater for all new identified water uses inclusive of the update of all coordinates where mining infrastructure transgresses the water courses on the sites

21.2.2. Rehabilitation Requirements

The requirements as per approved Rehabilitation and Closure Plan must be followed.

22. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The period for which the Environmental Authorisation is required is twenty (20) years.

23. UNDERTAKING

DECLARATION BY THE SPECIALIST

I, Johan Maré, declare that -

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the Specialist

M2 Environmental Connections (Pty) Ltd

Name of Company

15 May 2024

Date

24. FINANCIAL PROVISION

24.1. Explanation of how the aforesaid amount was derived

The financial provision calculations by BlackRock Consulting (February 2024) were done in accordance with the requirements as contained in Regulation 6 of the Financial Provision Regulations (2015).

The financial provision estimate was calculated based on the Financial Provision Regulations (refer GNR 1147 dated 20 November 2015). The estimated financial provision required for the rehabilitation and closure of the proposed Project is depicted in **Table 8-1** of the EMPr (refer Part B). The total amount for the three areas is R 237 053 278.

It should be noted that the environmental liability only focused on the proposed mining activities at Somkhele and was calculated by means of the DMR standard method for assessment of mine closure. Activities incorporated into the calculation included the demolition and management of physical infrastructure, rehabilitation of the waste facilities as well as the rehabilitation of the affected areas at Ophondweni, Emalahleni and Mahujini. Tendele Mining, as the applicant, is liable for the rehabilitation and closure of the mentioned areas and has no further liability for additional areas.

24.2. Confirmation that this amount can be provided for from Operating Expenditure

As Tendele Mining has an already approved Mining Right for the areas under investigation, they are obliged to provide the DMR with the following statutory information:

- Annual Rehabilitation Plan;
- Care and Maintenance Plan;
- Final Rehabilitation and Closure Plan;
- Environmental Risk Assessment Report (ERA).

The liability assessment as per ERA report, conducted on an annual basis, ensures that the financial provision is in line with the closure cost. The Rehabilitation and Closure Plan (Blackrock, 2024) contains all the statuary documentation and information following the June 2023 audit was submitted during October 2023 to the DMRE in terms of section 24N of the Act. Tendele is in the process to finalise the June 2023 audit and once completed this will be submitted to the DMRE.

As the mine is currently not in operation, it is perceptible that the calculated amount still needs to be secured as part of the operating expenditure.

25. DEVIATIONS FROM APPROVED SCOPING REPORT AND PLAN OF STUDY

No deviations occurred as per Plan of Study contained in the Final Scoping Report apart from the fact that no Radio-activity Assessment was conducted. Radio-activity is not associated with anthracite mining and is more applicable to the gold and uranium mining sectors.

25.1. Deviations from the Methodology used in Determining the Significance of Potential Environmental Impacts and Risks

Regulation 50(c), of the MPRDR (2004) under the MPRDA (2002) requires an assessment of nature (status), extent, duration, probability and significance of the identified potential environmental impacts of the proposed mining operation. All of the appointed specialist complied with the requirement. Although the majority of the specialists applied the equation – "$\boldsymbol{Significance = (Extent + Duration + Magnitude)\, x\, Probability}$", several specialists' reports have applied different impact assessment criteria with the associated significance scales colour coding that vary from report to report. In this regard the following equations had been used;

Significance Rating = (Extent + probability + reversibility + loss of resources+ duration + cumulative effect) x magnitude/intensity**.**

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

25.2. Motivation for the Deviation

In order to ensure a uniform and consistent representation on impact quantification, the methodology as per section 12 of the EIA was used. The methodology is the same as contained in the FSR. However, the EIA methodology as per FSR was applied on those specialist reports that used their own EIA methodology.

26. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

26.1. Impact on the Socio-Economic Conditions of any Directly Affected Person

Considering the lengthy Public Participation Process with the affected communities, it is evident that numerous Directly Affected Persons (and/or communities) will be impacted by the proposed mining activities. The concerns and objections were noted and formed part of the Scope of Work to be conducted by Urban-Econ as the appointed Socio-Economic Impact Assessment specialists (refer **Appendix 15**) of the EIA. These impacts were quantified as per section 11.15 of the EIA based on the pre-determined baseline conditions as depicted in section 10.1.15 of the EIA.

From the studies conducted it is clear that persons in the vicinity of the mine will experience positive and negative impacts stemming from the proposed Project. Physical displacement of households located in the direct 500-meter footprint area of the proposed pits have been identified as a major adverse socio-economic impact that needs to be resolved by the mine. The proposed mitigation measures namely the development of a Resettlement Action Plan and grievance mechanism have been prepared, contractually agreed between the parties and are in the process of being implemented. This is relevant for the communities of Emalahleni and Ophondweni with the community of Mahujini in the initial stage of engagement.

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

The Heritage Impact Assessment (**Appendix 5**) was conducted by PGS Heritage and completed for all areas as part of this Project. this ambit. Before any development could progress on site a detailed cultural heritage survey and grave assessment must be undertaken to identify potential 'national estate' and relevant permits would then need to be put in place. The specialist complied with the requirements of section 3(2) of the NHRA as outlined below:

According to Section 3(2) of the NHRA the following is considered as 'national estate':

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including -
  - ancestral graves;
  - royal graves and graves of traditional leaders;
  - graves of victims of conflict;
  - graves of individuals designated by the Minister by notice in the Gazette;
  - historical graves and cemeteries; and
  - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including -
  - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - objects to which oral traditions are attached or which are associated with living heritage;
  - ethnographic art and objects;
  - military objects;
  - objects of decorative or fine art;
  - objects of scientific or technological interest; and
  - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section I (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Potential impacts and risks on heritage resources were investigated and assessed, and where possible, mitigation measures were provided (refer sections 10.1.16 and 11.3 of the EIA)

The Project area's cultural, heritage and paleontological assessment demonstrated that the identified heritage resources categories range from very high to low significance.

The proposed Somkhele Project would result in a direct negative impact on burial grounds and graves located within the proposed open pit infrastructure of Ophondweni and Emalahleni as well Mahujini. This will have irreversible impacts on these resources. However, reburial of graves are part of the RAP and the required permits from KZNARIA are in place to mitigate the impact on cultural heritage.

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

The mentioned sections of the Act deals with an Application for the Renewal of a Mining Right. Tendele Mining's Somkhele Extension Project is not a renewal of a Mining Right but an update of an earlier approved EIA and EMPr as submitted by GCS (2014).

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Item 1(a): DETAILS OF THE EAP

The details of the Environmental Assessment Practitioner (EAP) are included in Section 2.1 of the Environmental Impact Assessment Report (EIAR).

2. Item 1(b): DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Reference is made to the EIA (Part A) and Section 5.2: List of Activities associated with the Project.

3. Item 1(c): COMPOSITE MAP

Please refer to **Figure 3-1** to **Figure 3-3** for the composite maps of the project areas.

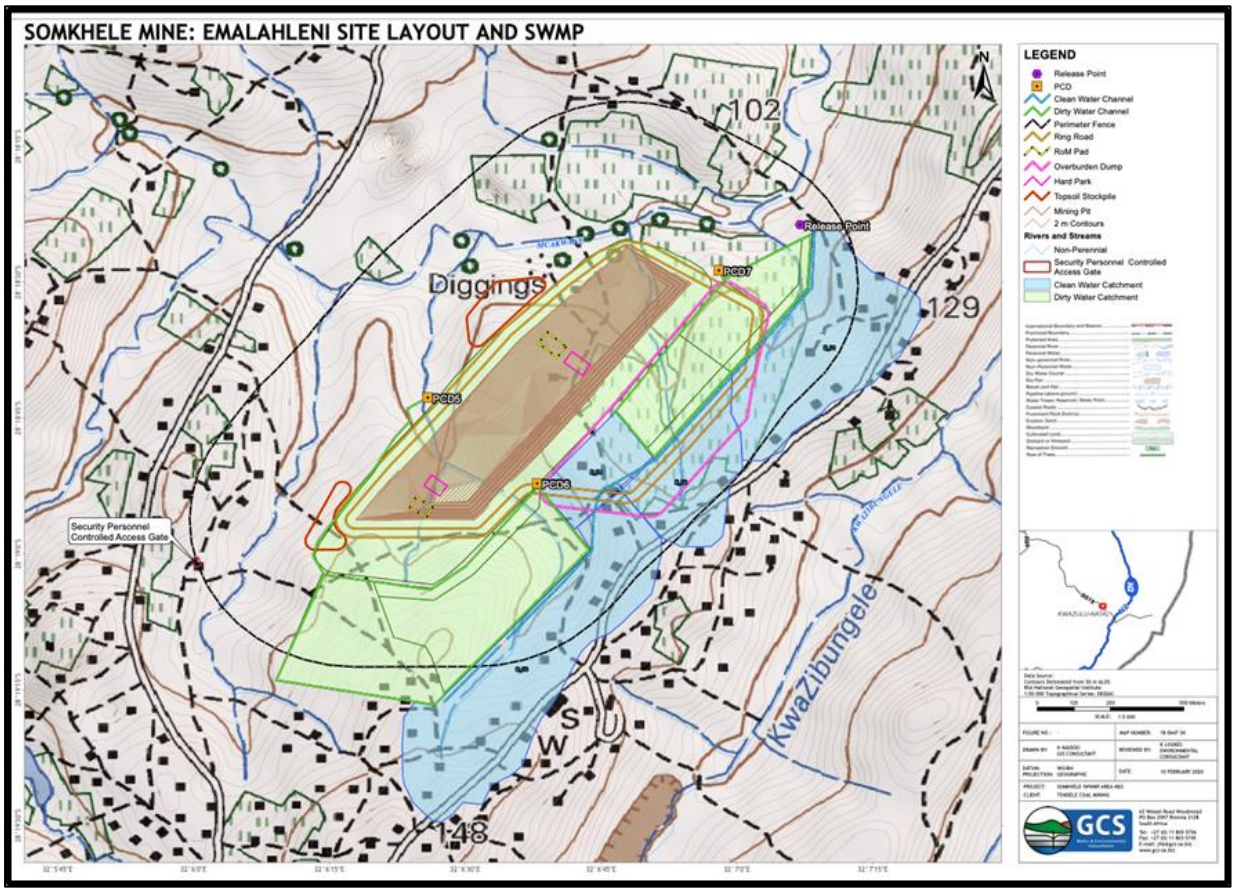


Figure 3-1: Composite map of the Emalahleni Site

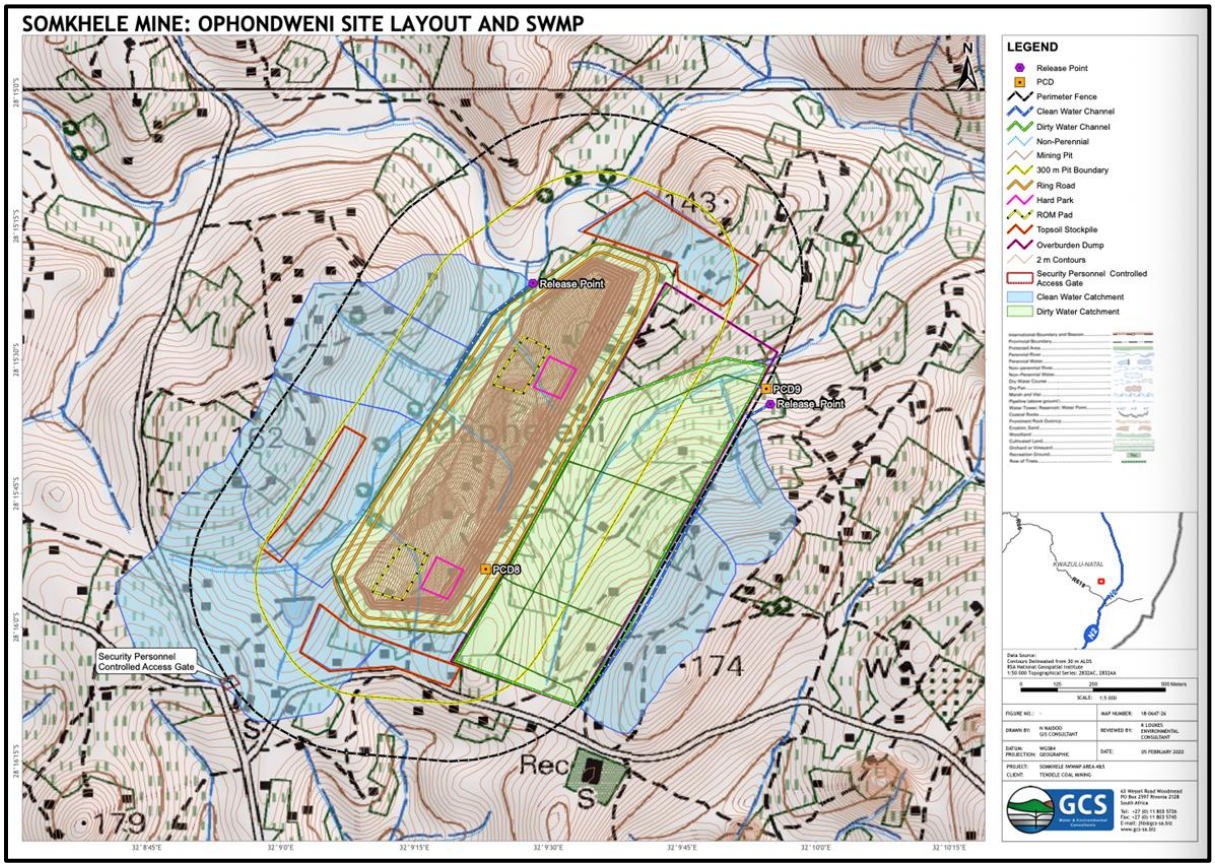


Figure 3-2: Composite map of the Ophondweni Site

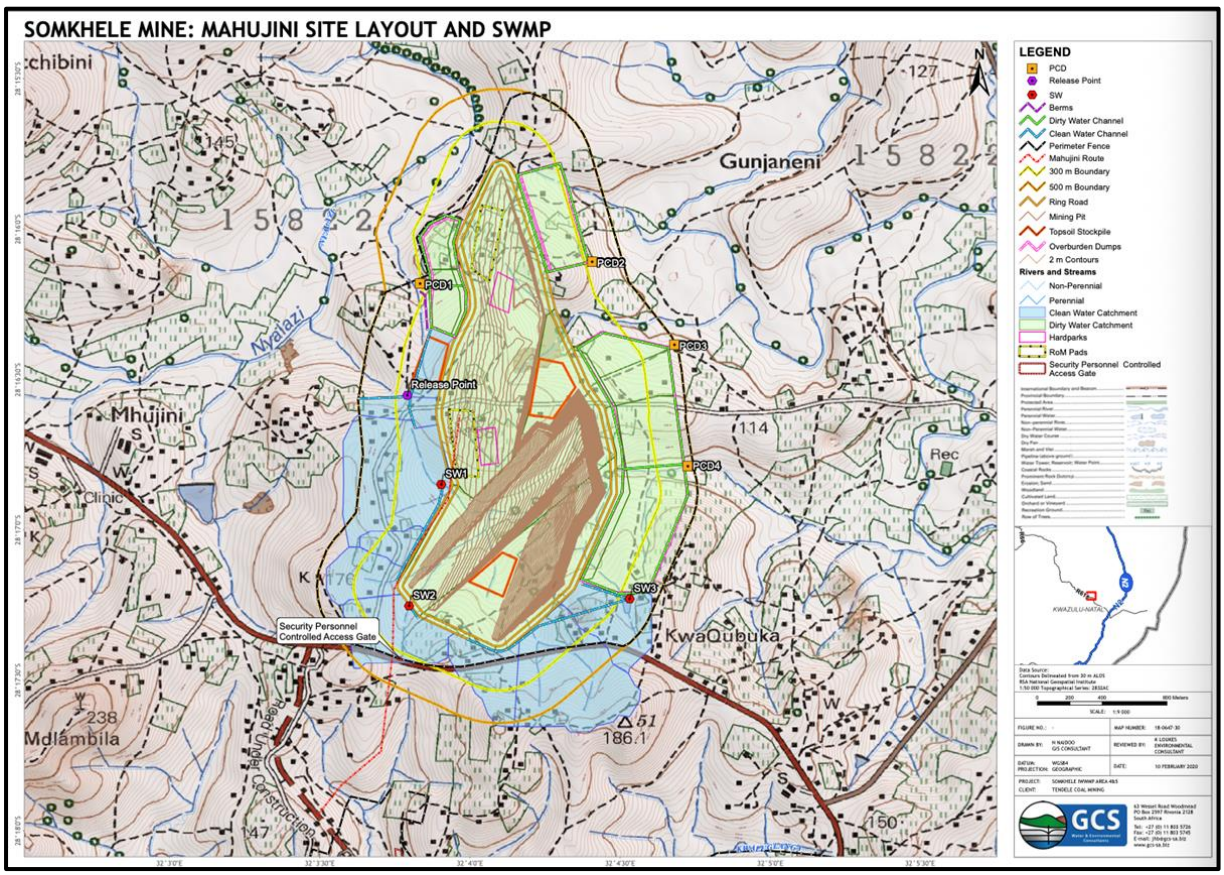


Figure 3-3: Composite map of the Mahujini Site

4. Item 1(d): DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.1. Item 1(d)(i): Determination of Closure Objectives

Closure and rehabilitation are a continuous series of activities that begin with planning prior to the project's design and construction, and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. Not only will the implementation of this concept result in a more satisfactory environmental conclusion, but it will also reduce the financial burden of closure and rehabilitation.

The following points outline the main objectives for rehabilitation:

- Achieve a final land use that is sustainable and meets both legislative requirements and stakeholder needs.
- Maintain and monitor all rehabilitated areas following re-vegetation and, if this monitoring shows that the objectives have been met, make an application for closure;
- Consider the Principles of Sustainability as a guideline when Closure Plan is formulated;
- Comply with local, district and national regulatory requirements (refer to Part A: Section 6 of the main document,); and
- Follow a comprehensive consultation and communication process with all stakeholders.

The following points outline the main objectives for rehabilitation:

- Provides concrete, site-specific and typically measurable statements of what closure activities or measures aim to achieve;
- Reinstate land use/land capability requirements for the area;
- Revegetation of disturbed areas;
- Surface water monitoring to continue for 5 years;
- Groundwater monitoring to continue for 5-10 years or until steady state conditions;
- Rehabilitation monitoring post closure to continue for 5-years; and
- Air quality monitoring and post closure modelling for 5-years

Rehabilitation and closure objectives have been tailored to the project at hand. This Rehabilitation, Decommissioning and Mine Closure Plan aim to assist Tendele Mining in carrying out successful rehabilitation for the proposed Somkhele Mining Project.

4.2. Item 1(d)(ii): Process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a Listed Activity

It is a legal requirement to report pollution incident as stipulated in terms of section 20(3) of the NWA as well as section 30 of NEMA. An Environmental Response Plan is a process to respond rapidly and effectively to and manage emergency situations that may arise at the mine. The Environmental Response Plan must have the following objectives:

- Categorisation of emergency situations through hazard identification and to define procedures for responses to the situations;
- Assigning responsibilities for responding to emergency situations;
- Implementation of an effective system to receive, record and communicate reports of environmental incidents and emergencies; and
- Ensuring that all environmental incidents or emergencies are investigated and the necessary procedures are in place to implement corrective and preventative actions to a recurrence of the incident.

The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the following:

- Occupational Health and Safety OHSAS 18001; and
- The Mine Health and Safety Act, 1996 (Act No. 29 of 1996).

In the event of an emergency, the Emergency Response Plan/Procedure will be consulted and the required actions implemented. To facilitate the effective implementation of the procedures, copies of the Emergency Response Plan will be placed in accessible and visible locations around the site **Figure 4-1** below provides for a general overview of the Emergency Response Procedure.

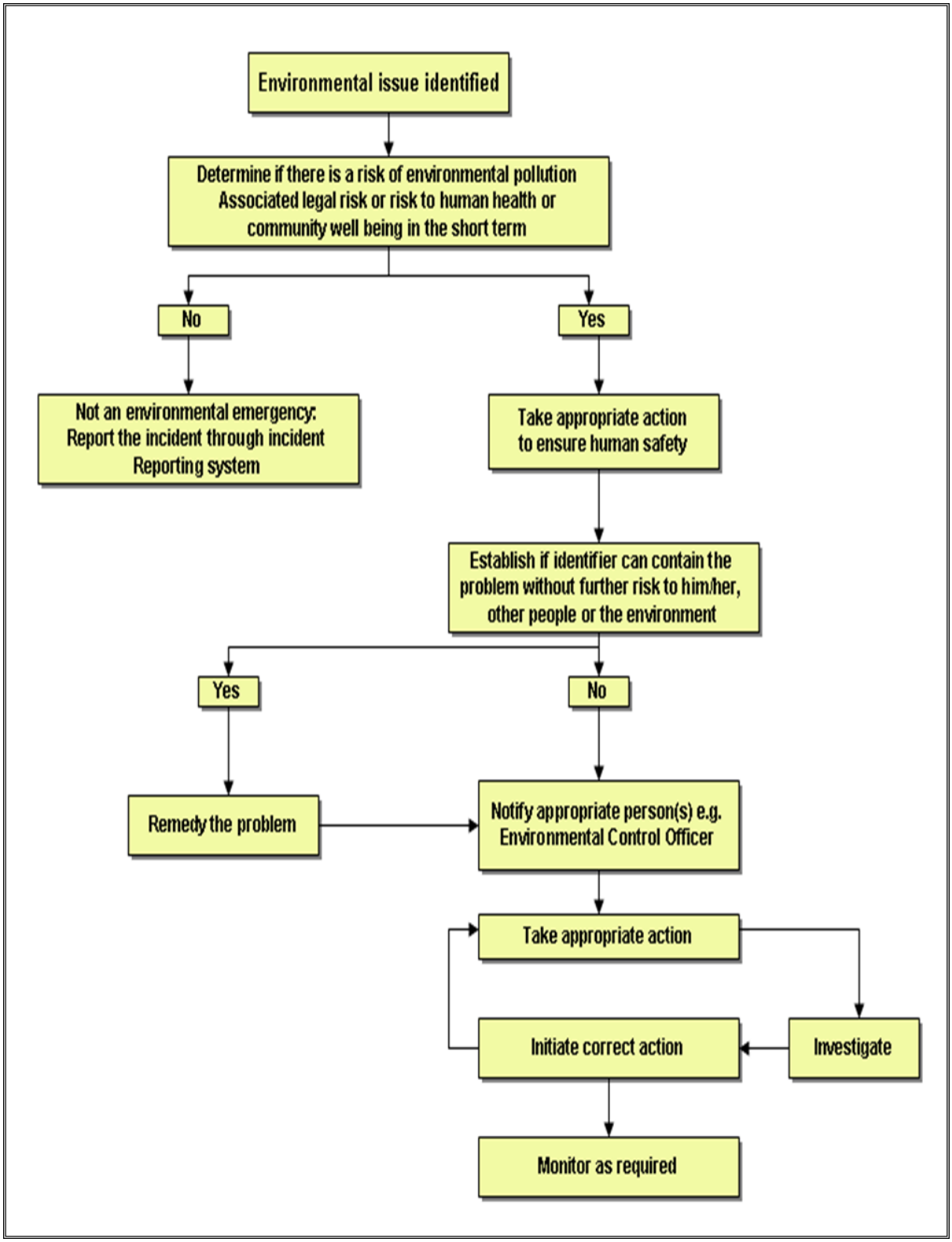


Figure 4-1: Emergency Response Procedure

- **Communication**

A list of emergency contact numbers will be displayed at various locations around the site. If the emergency has the potential to affect surrounding communities, the communities will be alerted via alarm signals or contacted in person.

- **Training and Emergency Situation**

The efficiency of the Emergency Response Plan must be tested by running training programmes and frequent emergency simulations. This will aid to prepare employees to respond in case of emergencies.

- **Reporting**

Reporting on an emergency incident should be done in accordance with the format and structure required in terms section 30(5) of NEMA in which the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.

In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed. In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an incident has had, could have had, is having, or will have a negative impact on human health or well-being.

4.3.Item 1(d)(iii): Potential Risk of Acid Mine Drainage

Two (2) types of static testing were used to assess the acid (short and long-term) and neutralisation potential of the rock at the proposed mining operations, namely Acid-Base Accounting (ABA) and Net Acid Generation (NAG).

4.3.1.Acid Base Accounting

ABA is a static test where the net potential of the rock to produce acidic drainage is determined. The percentage sulfur (% S), the AP (acid potential), the NP (neutralisation potential) and the Net Neutralization Potential (NNP) of the rock material are determined in this test, as an important first-order assessment of the potential leachate that could be expected from the rock material. The ABA screening criteria as described by (Price, 1997) are listed in **Table 4-1**. The components of an ABA analysis are further explained below:

- If pyrite is the only sulphide in the rock the AP is determined by multiplying the % S with a factor of 31.25. The unit of AP is kg $CaCO_3$/t rock and indicates the theoretical amount of calcite neutralized by the acid produced.
- The NP is determined by treating a sample with a known excess of standardized hydrochloric or sulfuric acid (the sample and acid are heated to ensure a complete reaction). The paste is then back titrated with standardized sodium hydroxide to determine the amount of unconsumed acid. NP is also expressed as kg $CaCO_3$/t

rock to represent the amount of calcite theoretically available to neutralize the acidic drainage; and

- NNP is determined by subtracting AP from NP (EPA, 1994).

Table 4-1: ABA and NAG screening criteria

ABA: NPR Screening Criteria			ABA: %S Screening Criteria			ABA: NNP Screening Criteria		
Potential Acid Generation	**NP: AP (NPR)**	**Comments**	**Potential Acid Generation**	**% S**	**Comments**	**Potential Acid Generation**	**NP: AP (NPR)**	**Comments**
Rock Type I: Likely Acid Generating.	< 1	Likely AMD generating.	Rock Type IV: No Potential for Long-Term Acid Generation	< 0.3%	The sample may produce AMD bit will be short term.	Rock Type IV: No potential Acid Generation.	> 20	No AMD potential
Rock Type II: Possibly Acid Generating.	1-2	Possibly AMD is generated if NP is insufficiently reactive or is depleted at a faster rate than sulphides.				Rock Type I: Likely Acid Generation.	< -20	Likely AMD potential
Rock Type III: Low Potential for Acid Generation.	2-4	Not potentially AMD generating unless significant preferential exposure of sulphides along fracture planes, or extremely reactive sulphides in combination with insufficient reactive NP.	Rock Type I: Likely Long-Term Acid Generation	> 0.3%	Potential for long-term AMD.	Uncertain	20 to -20	The sample may become acidic or remain neutral. Use the conjunction of the other criteria to resolve this uncertainty.
Rock Type IV: No Potential for Acid Generation.	> 4	No further AMD testing is required unless materials are to be used as a source of alkalinity.						

For the material to be classified in terms of its AD potential, the ABA results could be screened in terms of its NNP, % S and NP: AP ratio as follows:

- A rock with NNP < 0 kg $CaCO_3$/t will theoretically have a net potential for acidic drainage. A rock with NNP > 0 kg $CaCO_3$/t rock will have a net potential for the neutralization of acidic drainage. Because of the uncertainty related to the exposure

of the carbonate minerals or the pyrite for reaction, the interpretation of whether a rock will be net acid generating or neutralizing is more complex. Research has shown that a range from -20 kg $CaCO_3$/t to 20 kg $CaCO_3$/t exists which is defined as a "grey" area in determining the net acid generation or neutralization potential of rock. Material with an NNP above this range is classified as Rock Type IV - No Potential for Acid Generation and material with an NNP below this range as Rock Type I - Likely Acid Generating; and

- (Soregaroli & Lawrence, 1998) further states that samples with less than 0.3% sulphide sulphur are regarded as having insufficient oxidisable sulphides to sustain long-term acid generation. Material with a % S below 0.3% is therefore classified as Rock Type IV - No Potential for Acid Generation, and material with a % S of above 0.3%, as Rock Type I - Likely Acid Generating.

In the NAG test hydrogen peroxide (H_2O_2) is used to oxidize sulphide minerals to predict the acid generation potential of the sample. The NAG test provides a direct assessment of the potential for a material to produce acid after a period of exposure (to a strong oxidant) and weathering. The test can be used to refine the results of the ABA predictions (refer to **Table 4-2**).

In general, the static NAG test involves the addition of 25 ml of 30% H_2O_2 to 0.25 g of sample in a 250 ml wide-mouth conical flask, or equivalent. The sample is covered with a watch glass and placed in a fume hood or well-ventilated area. Once "boiling" or effervescing ceases, the solution can cool to room temperature and the final pH (NAG pH) is determined. A quantitative estimation of the amount of net acidity remaining (the NAG capacity) in the sample is determined by titrating it with NaOH to pH 4.5 (and/or pH 7.0) to obtain the NAG Value (Lapakko & Lawrence, 1993).

Table 4-2: NAG screening methods used

Rock Type	NAG pH	NAG Value (H_2SO_4 kg/t)	NNP ($CaCO_3$ kg/t)
Rock Type Ia. High-Capacity Acid Forming.	< 4	> 10	Negative
Rock Type Ib. Lower Capacity Acid Forming.	< 4	≤ 10	-
Uncertain, possibly Ib.	< 4	> 10	Positive
Uncertain.	≥ 4	0	Negative
Rock Type IV. Non-acid Forming.	≥ 4	0	Positive

4.3.2. Leachate Results

Samples were taken by GCS during December 2023 and submitted to Aquatico Laboratories (Pty) Ltd for analysis. The data sheets are included as Appendix D of the Geohydrological Assessment by GCS (2024). The laboratory results are depicted in

Table 4-3.

Table 4-3: Geochemical and Hydrochemisty data for Somkhele project

Analyses	Sample Number							
	Unit	1	2	3	4	5	6	7
AQL Geo-milling 75µm	-	yes	yes	yes	yes	yes	yes	yes
AQL Paste pH (1:2)	pH	7,95	8,12	7,76	8,97	7,94	7,85	8,19
AQL Net Acid generation	H_2SO_4 Kg/t	1,11	0	0,701	0	0,459	0,491	0,736
AQL NAG_{pH}	pH	4,05	4,5	4,22	4,88	4,29	4,27	4,15
AQL Total Sulphur	%	0,199	0,147	0,024	0,016	<0,01	0,01	0,031
AQL Total SO_4 Sulphur	%	0,047	0,051	<0,01	<0,01	<0,01	<0,01	<0,01
AQL Sulphide Sulphur	%	0,153	0,096	0,043	0,032	0,027	0,045	0,051
AQL Acid potential based Total Sulphur	$CaCo_3$ Kg/t	6,22	4,59	0,750	0,5	<0,312	<0,31	0,969
AQL Acid potential-based Sulphide Sulphur	$CaCo_3$ Kg/t	4,75	3,0	1,34	1,0	0,844	1,41	1,59
AQL Neutralising Potential (NP)	$CaCo_3$ Kg/t	9,67	11,4	2,4	18,7	2,08	18,1	5,12
AQL Nett Neutralising potential (NNP)	Kg/t-	4,92	8,4	1,06	17,7	1,24	16,7	3,53
AQL NP / AP (TS)	-	1,56	2,4	3,21	37,4	33,6	58,0	5,29
AQL NP / AP (SS)	-	2,04	3,8	1,79	18,7	2,47	12,8	3,22

With reference to **Table 4-1** above, the material from Somkhele analysed for their acid forming potential, is it evident that all four Rock Types are present within the project area. Therefore, the risk of the generation of AMD is present at the mining sites. Considering the results in terms of the NAG Screening method, the material falls within the category rock Type 1b – Lower capacity for Acid Forming.

4.4. Item 1(d)(iv): Steps taken to Investigate, Assess and Evaluate the impact of Acid Mine Drainage

GCS Water and Environmental Consultants (2019) has conducted an Acid Mine Drainage (AMD) decant assessment study in support of the Water Use License Application. This was done as a follow-up investigation whereby decant elevations and probability of decant to occur was addressed in the geohydrological assessments for Areas 1, 2, 3, 4, 8 and Area 9. The results are contained in **Table 4-4**. With reference to **Figure 4-2**, a potential decant area is indicated.

Table 4-4: Likely decant associated with Areas 4 and 5

Mining Area	Opencast Pit	Anticipated Decant Elevation (masml)	Estimated Decant Quantity (m^3/day)	Estimated Decant Quality (TDS in mg/l)	Probability
Area 4	Mahujini	110 to 111	180 – 400	300 – 900	Low
Area 4	Emalahleni	88 to 90	180 – 350	300 – 900	High – below pre-mining water level
Area 5	Ophondweni	89 to 90	90 - 250	300 - 900	High – below pre-mining water level

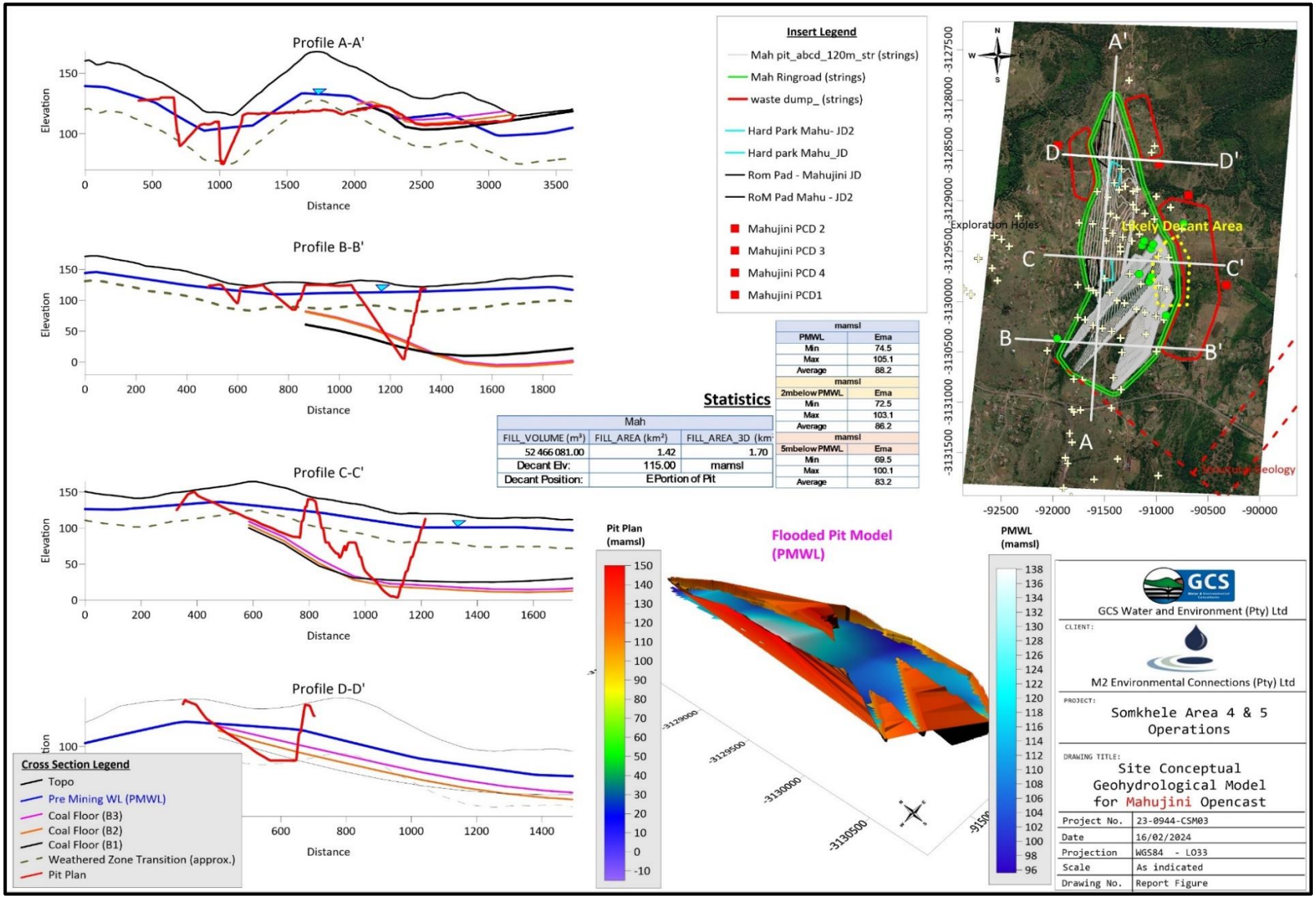


Figure 4-2: Conceptual geohydrological model for Mahujini indicating potential decant area

4.5.Item 1(d)(v): Engineering or Mine Design Solutions to be implemented to avoid or remedy Acid Mine Drainage

Tendele has appointed GCS (2019) to compile an Acid Mine Drainage Management Plan (AMDMP) which were based on Best Practise Guidelines.

- Identify geological materials to be encountered during mining including defining any materials that require AMD management (i.e. overburden, coal discard and slurry).
- Include risk assessment and management to refine strategies and implementation steps.
- Integrate fully with mine plans and closure objectives.
- Include operational controls such as standard operating procedures (SOPs), key performance indicators (KPIs) and quality assurance and quality control (QA/QC) procedures.
- Clearly identify and define roles, responsibilities, and accountabilities for mine operation staff.
- Develop data management, analysis, and reporting scheme to track the implementation of the AMD Plan.
- Include specific targets such as the meeting of specific discharge water quality.

The management plan to remedy the impacts from AMD will be continuously updated as illustrated in **Figure 4-4**.

AMD Management Plan for Somkhele (GCS, 2024)

Mine decant or poor-quality seepage will need to be treated before it is discharged into the receiving environment. Available geochemistry data shows that shale and pyritic sandstone (overburden material) are representative of AMD conditions with acidic pH values and high salt and metal concentrations. Based on available data, two (2) treatment systems are considered:

- Active water treatment system; and
- Semi-passive water treatment system.

The treatment systems are discussed in the sub-sections below. In selecting a suitable water treatment system, the following factors should be considered:

- Composition of the inlet water;
- Specific cations of product water;
- Infrastructure and space available;
- Capital expenditure (CAPEX);
- Operational expenditure (OPEX); and
- Waste generation.

Active water treatment

Active water treatment is highly effective at treating AMD, however, this treatment option has high long-term operational costs. The following water treatment options may be considered:

- *Reverse osmosis process*:
    - In this process, very high-purity water is recovered by reverse osmosis, and the salts in the solution are concentrated and kept in solution using anti-scaling technology. The supersaturated solutions are then treated in precipitation reactors in a controlled environment thereby removing excess soluble salts from the solution. The reactors can be designed and operated for the removal of specific salts or the generation of a mixed salt. In some cases, lime may be added, and the reactors then operated for "cold lime softening" and the pH elevated.

- *Ion exchange process*:
    - Ion exchange processes are provided as an adsorption barrier against the breakthrough of dissolved ions in the water. Cation exchange resins are employed to remove cations followed by anion exchange resins for the removal of anions. Although there are several ion exchange small-scale pilot plants used for the treatment of mine water, there are currently no large-scale installations being operated for the treatment of water before discharge. Ion exchange has, however, been used in large installations to produce demineralised water for use in power stations. Once the salts are adsorbed onto the resins, these need to be selectively removed. Although ion exchange can ensure acceptable water quality, the need for chemical addition and the disposal of large volumes of highly concentrated brine waste must be addressed. The options for brine disposal include:
        i. Neutralisation is necessary as the chemicals are either acidic or caustic;
        ii. Evaporation is necessary as all the salts report to the regeneration as dissolved;
        iii. Disposal of the concentrated solutions to a waste site; or
        iv. Production of saleable by-products is possible; however, the quantities probably make this non-viable.

Semi-passive water treatment

Passive treatment of AMD is the preferred method of treating contaminated mine water. These systems are low maintenance, low-cost and take advantage of naturally occurring processes (i.e. oxidation, reduction, or microbial breakdown) at the given site (IMWA, 2018). Based on available chemistry data, the following treatment options could be considered:

1. *Limestone diversion wells*:
    - A typical well consists of a circular casing, often sunk into the ground at a shallow level alongside a stream (refer **Figure 4-3**). Water is forced into the well using the elevation difference that creates a hydraulic head. This often involves damming water upstream. The water is flushed into the centre of the well through a pipe and exits the pipe near the bottom of the well. The water then flows upwards, fluidising the limestone substrate.

Calcium carbonate reacts with the contaminated water to raise the pH and increase alkalinity, thus allowing for the removal of metal contaminants. Treated water can then be discharged to a nearby watercourse.

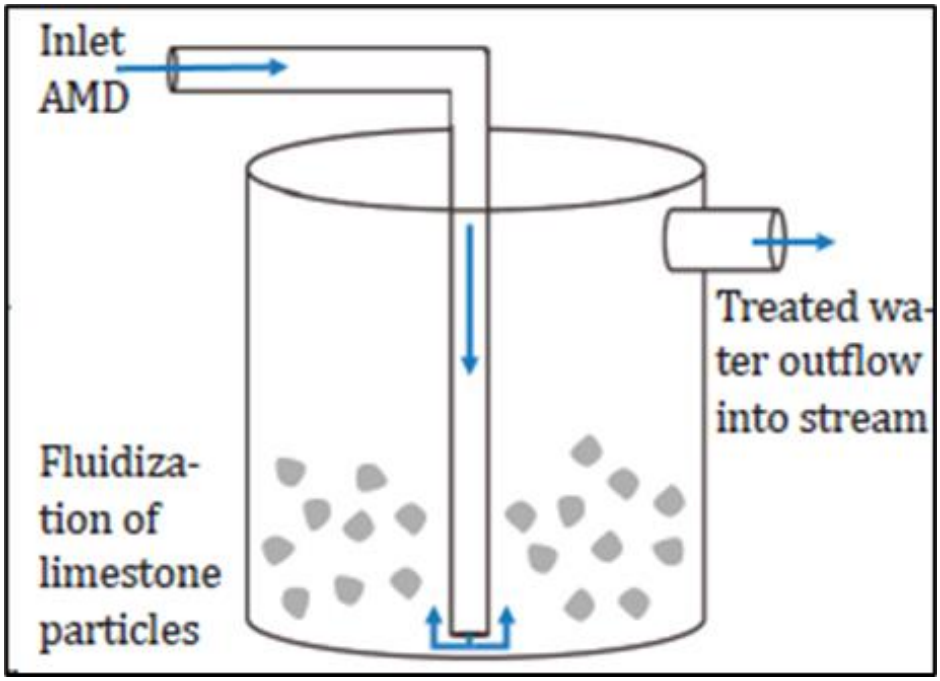


Figure 4-3: Limestone diversion well (from IMWA, 2018)

2. *Linear Flow Channel Reactor* (LFCR)

   - The operation of the integrated process relies on the formation of niche environments within the LFCR, partitioning a distinct aerobic zone at the air-liquid interface and an anaerobic zone within the bulk volume of the reactor. The Sulphate Reducing Bacteria (SRB) in the bulk volume reduces sulphate, in the presence of a suitable electron donor, to sulphide. The sulphide is partially re-oxidised by Sulphur Oxidising Bacteria (SOB) under oxygen-limiting conditions at the air-liquid interface, forming a floating sulphur biofilm.

Artificial wetlands:

- If the contaminated mine water is of adequate quality (environmentally acceptable in accordance with the conditions of the Water Use License [WUL]), the water can be discharged into an artificial wetland system constructed downstream of the pit(s). This will ensure a "walk away solution" without additional cost, in terms of post-closure.

Pit lakes:

- A mine pit lake (more often simply called a pit lake) is the result of open-pit surface mining operations. Open pits are excavated to extract a large ore body, and when these open pits are deeper than the water table the mining company needs to pump groundwater from them continuously to allow for mining to take place. Once the ore body is depleted, the pumps

that are keeping the pit dry are turned off and the open pit floods with water. The flooding process generally continues for several years until the lake surface is approximately equal to the original elevation of the water table.

Site-specific Measures

It is anticipated that a semi-passive artificial wetland treatment system may be sufficient to treat diffuse decant at the proposed opencast pits (due to the expected alkaline pH, low metal and high SO_4 concentration). illustrates how a typical semi-passive treatment system could be installed at Mahujini, Emalahleni and Ophondweni, to treat any decant which may occur.

Alternatively, and if found feasible, pit lakes should be considered. The coal seam that will be mined is thick, and the possibility of there not being enough material to backfill and rehabilitate the opencast operations exists.

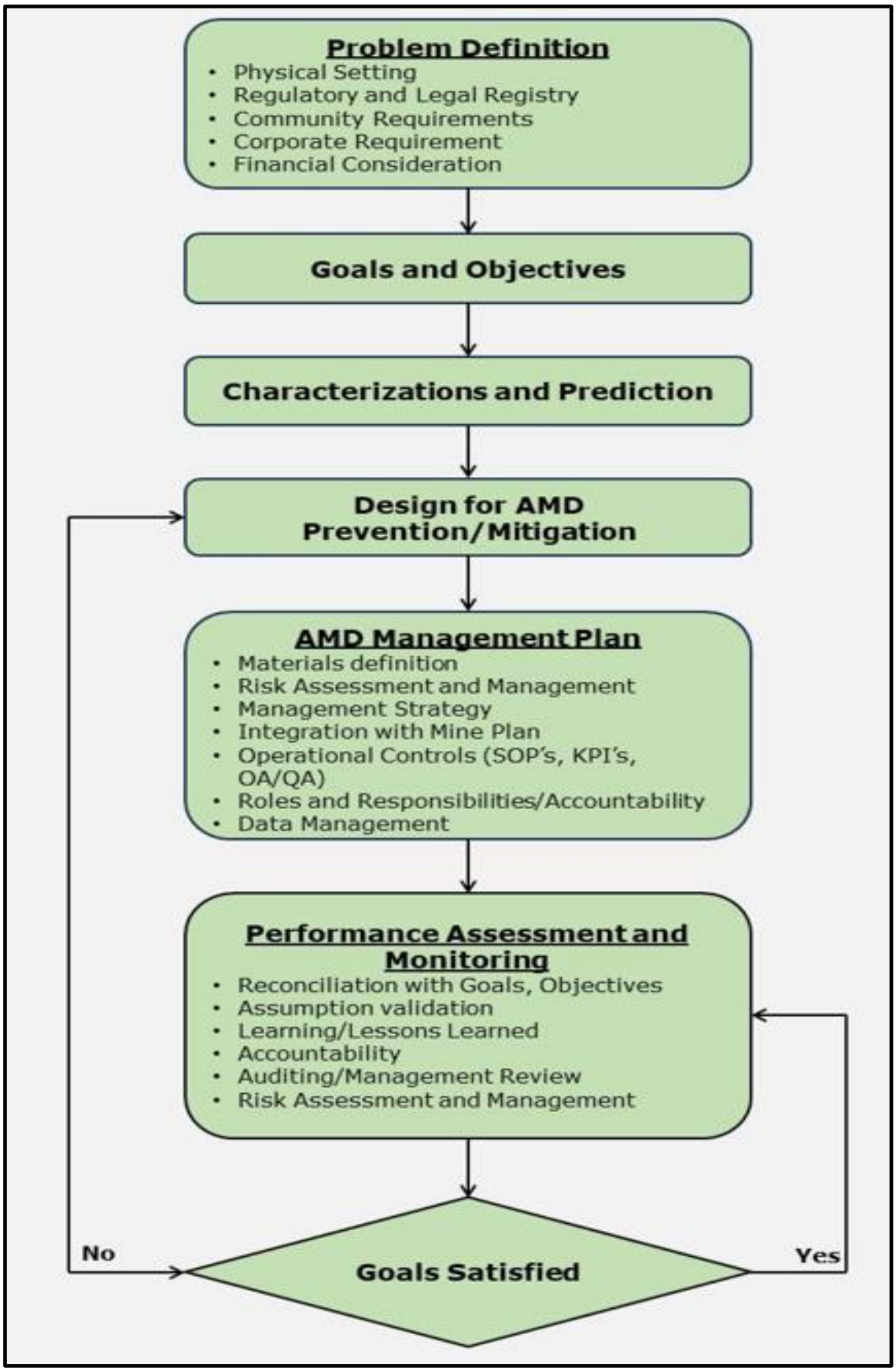


Figure 4-4: Flowchart for AMD Performance Assessment and Review

4.6. Item 1(d)(vi): Measures that will be put in place to Remedy any residual or cumulative Impact that may result from Acid Mine Drainage

Several management options will be available to Tendele based on the conceptual strategies for the storage and handling of earth and rock materials that could minimise the potential for Acid Mine Drainage. Control measures are provided as input to the design of spoil dumps and coal residue disposal sites.

To comply with leading practices, Tendele will confirm lithology, mineralogy, acid potential and volumes during the course of mining to ensure any AMD risks are articulated and managed appropriately. The management options include:

- Selective placement of waste rock material;
- Encapsulation of potential acid forming materials;
- Co-disposal of potential acid forming materials;
- Disposal of acid forming materials under saturated conditions;
- Minimise footprint area of acid forming materials

In terms of selective placement, the strategy is to selectively place potential acid forming (PAF) material (weathered overburden or other) preferentially in the middle of a waste rock dump; or opencast workings for encapsulation by non-acid forming materials. The advantage of this strategy from an AMD risk mitigation perspective is that the encapsulation will result in limiting the available of oxygen and water to PAF materials though operations and though mine closure.

Co-disposal with PAF material entails the mixture of course (discard) and fine (slurry) waste products to reach an optimum cemented waste mixture, in terms of the ability of air and water to move through the pore spaces. Reduced air and water flow greatly reduces the AMD risk associated with the material.

For existing and future opencast workings where the co-disposal technique will be implemented, disposal will consist out of the construction of a series of cells or ponds within the discard material, which will be filled with slurry; or dried slurry layers encapsulating discard ponds. A series of these cells will be constructed; and as the one cell is filled the other cell will be left to dry. A synthetic flocculent polymer will be introduced to aid with rapid settlement of the slurry particles and aid in water recovery. This will also greatly increase the drying rate of the slurry material.

With regards to the disposal of PAF material under saturated conditions, the strategy is to dispose coal residue products under conditions which will unavoidably induce saturation of the material for mine closure. The aim is to ensure that the PAF material is situated at least 2-5 metres below pre-mining groundwater levels (mbpgl) to reduce oxygen ingress into the waste material.

Subsequently, if less oxygen and oxygenated water ingress (i.e. rainwater infiltration) is obtained, less oxidation of pyrite baring minerals in the coal residue and overburden can be achieved. The main focus of the waste disposal protocol for Somkhele will therefore be to endeavour less saline drainage (SD) from the waste material.

4.7.Item 1(d)(vii): Volumes and Rate of Water Use required for the Mining, Trenching or Bulk Sampling Operation

Tendele Mine has applied for a Water Use License (WUL). In terms of issued WUL No. 16/2/7/W23D/1/1 the mine has an entitlement for raw water abstraction of 735,720 m^3/annum from the Mfolozi River. The volume of water is sufficient to cater for all water uses at the various mining activities. The individual water uses for Emalahleni, Ophondweni and Mahujini areas are detailed in **Table 4-6**.

4.8.Item 1(d)(viii): Has a Water Use License been applied for

Tendele Mining (Pty) Ltd has applied for a Water Use License Application for the Somkhele Coal Project. The Somkhele Mine has several authorised water uses as indicated in **Table 4-5**. The water uses are executed on Portion 0, No 15822 Reserve, 3 GV of 15822 held under Title Deed T093/2002 by the Ingonyama Trust as the property owner.

Table 4-5: Authorised Water Uses

Activity	License Number	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Section 21(a): Taking of Water				
Abstraction from Mfolozi River	16/2/7W23D/1/1	735,720	750,000	28°22'8.5293"S 32°01'11.1118"E
Section 21(b): Storing Water				
Myenge Dam 2	06/W23A/BCGIJ/2549	753,720	50,000	28°18'02.01"S 32°03'39.60"E
River Dam	06/W23A/BCGIJ/2549	753,720	3,000	28°22'08.06"S 32°01'11.00"E
Section 21(c), (i): Impeding, diverting, change natural characteristics of water course				
Nkolokotho Stream Haul Road Crossing 1	06/W23A/BCGIJ/2549	N/A	N/A	S28°18' 54.482" E32° 03' 8.103"
				S28°18'54.630" E32°03' 8.017"
				S28°18'54.8892" E32°03' 8.5211"
				S28°18'54.482" E32°03' 8.103"
Nkolokotho Stream Haul Road Crossing 2	06/W23A/BCGIJ/2549	N/A	N/A	S28°18'48.4308" E32°03'20.30039"
				S28°18'48.3300" E32°03'20.0591"
				S28°18'48.0276" E32°3'20.231"
				S28° 18'48.1601" E 32° 03'20.5200"
				S28° 18' 48.4308" E32°03'20.30039"
Kwaluhlanga River Crossing	06/W23A/BCGIJ/2549	N/A	N/A	S 28° 18' 51.8831 E 32° 04' 6.8159"
				S 28° 18' 52.8839 E32°04' 7.9464"
				S28°18' 53.9892" E32°04' 6.9959"
				S28° 18' 52.8839" E32° 04' 6.2004"
				S28°18' 51.8831

Activity	License Number	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
				E32°04' 6.8159"
Unnamed Crossing	06/W23A/BCGIJ/2549	N/A	N/A	S28° 20' 36.3803" E32° 03' 33.8291"
				S28° 20' 36.9060" E32° 03' 34.4304"
				S28° 20' 36.4020" E32° 03' 35.2871"
				S28° 20' 35.8439" E32° 03' 34.6212"
				S28° 20' 36.3803" E32° 03' 33.8291"
Section 21(g): Disposing of Waste				
Myenge Dam 1	06/W23A/BCGIJ/2549	722,334	49,000	S28°18' 17" E32°03' 30"
Plant Header Dam	06/W23A/BCGIJ/2549	1,657,972	3,170	S 28°18' 6.76" E 32°3' 29.99"
North Pit RWD	06/W23A/BCGIJ/2549	32,657	5,000	S 28°21' 5.502" E 32°01 '46.92"
Dust Suppression Haul Road Area 1	06/W23A/BCGIJ/2549	27,760	-	S28° 21' 5.1080" E32° 01' 45.1184"
Dust Suppression Haul Road Area 2	06/W23A/BCGIJ/2549	90,000	-	S28° 18' 44.4527" E32° 03' 16.2287"
Product Coal Stockpiles	06/W23A/BCGIJ/2549	26,565	35,000	S 28°18' 13.98" E 32°3' 41.814"
RWD Pit A 1	06/W23A/BCGIJ/2549	1,065,365	4,000	S 28°18' 59.54" E 32°03' 12.88"
RWD Pit A 2	06/W23A/BCGIJ/2549	1,065,365	4,000	S 28°19' 05.45" E 32°03' 14.91"
Settling Pond 1	06/W23A/BCGIJ/2549	1,678,841	7,654	S 28°18' 31.69" E 32°03' 28.31"
Settling Pond 2	06/W23A/BCGIJ/2549	1,678,841	8,817	S 28°18' 28.19" E 32°03' 30.87"
Settling Pond 3	06/W23A/BCGIJ/2549	1,678,841	1,838	S 28°18' 25.39" E 32°03' 33.62"
Settling Pond 4	06/W23A/BCGIJ/2549	1,678,841	2,096	S 28°20' 53.85" E 32°02' 0.128"
Platform Stormwater Dam	06/W23A/BCGIJ/2549	19,590	12,000	S 28°18' 24.30" E 32°03' 38.95"
Slurry Pit A	06/W23A/BCGIJ/2549	1,123,634	1,200,000	S 32° 03' 6.62" E 28°19' 8.57"
Plant Stormwater Dam	06/W23A/BCGIJ/2549	29,768	4,000	S 28° 18' 21.72" E 32°03' 36.10"
Workshop PCD 1	06/W23A/BCGIJ/2549	2,429	1,000	S 28°18' 25.07" E 32°03' 57.69"
Workshop PCD 2	06/W23A/BCGIJ/2549	2,429	1,000	S 28°18' 26.61" E 32°03' 57.97"
RWD Kwaluhlanga	06/W23A/BCGIJ/2549	11,960	5,000	S 8°18' 19.042" E 32°04' 6.725"
Discard Dump	06/W23A/BCGIJ/2549	15,180	20,000	S 28°18' 28.50" E 32°03'50.904"
ROM Stockpiles	06/W23A/BCGIJ/2549	15,180	2,000	S 28°18' 25.081" E 32°03' 50.904"
Plant 1 ROM Stockpiles	06/W23A/BCGIJ/2549	40,000	5,800	S 28°18' 14.836 E 32°03' 34.62"

Activity	License Number	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
ROM Stockpile Area 1 Central	06/W23A/BCGIJ/ 2549	30,000	5,000	S 28°21' 8.208" E 32°02' 10.100"
ROM Stockpile Area 1 South Pit	06/W23A/BCGIJ/ 2549	30,000	5,000	S 28°21' 48.982" E 32°01'30.049"
ROM Stockpile Area 1 North Pit	06/W23A/BCGIJ/ 2549	30,000	5,000	S 28°20' 30.969" E 32°02'9.810"
Conservancy Tank: Guard	06/W23A/BCGIJ/ 2549	72	3	S 28°18' 6.295" E 32°03' 46.004"
Conservancy Tank: Plant	06/W23A/BCGIJ/ 2549	192	20	S 28°18' 19.251" E 32°03' 34.119"
Conservancy Tank: Workshop	06/W23A/BCGIJ/ 2549	732	30	S 28° 18' 21,250 E 32° 3' 54,963"
Conservancy Tank: TC	06/W23A/BCGIJ/ 2549	216	12	S 28°18' 1.593" E 32°03' 33.493"
Section 21(j): Dewatering				
Dewatering North Pit A	06/W23A/BCGIJ/ 2549	421,720	-	S 28°20' 53.85" E 32°02' 0.128"
Dewatering Pit A	06/W23A/BCGIJ/ 2549	1,123,634	-	S 28°19' 8.577" E 32°03' 16.62"
Dewatering Pit BDE	06/W23A/BCGIJ/ 2549	136,920	-	S 28°18' 52.89" E 32°03' 32.24"

The water uses seen as additional to the already approved water uses are listed in **Table 4-6** below.

Table 4-6: Water Uses relevant to Somkhele Extension Project

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Section 21(a): Taking of Water				
Community Borehole A	T7093/2002 Portion 0 No. 15822 Reserve No. 3	114,482	-	S 28° 22'36.85" E 32° 1'32.32"
Borehole B		85,672	-	S 28°22'20.58" E 32° 1'21.98"
Borehole C		98,067	-	S 28°22'40.41" E 32° 1'34.09"
Borehole D		79,004	-	S 28°22'30.75" E 32° 1'28.44"
Borehole E		105,465	-	S 28°22'14.64" E 32° 1'17.46"
Borehole F		20,226	-	S 28°22'43.23" E 32° 1'35.37"
Borehole G		20,277	-	S 28°22'46.19" E 32° 1'36.95"
Section 21(b): Storing Water				
Myenge Dam 2	T7093/2002 Portion 0 No. 15822 Reserve No. 3	200,000		S 28°18'2.01" E 32°3'39.60"
Mahujini Stormwater Dam 1		16,000		S 28°16'53.42" E 32° 3'56.11"
Mahujini Stormwater Dam 2		6,000		S 28°17'17.35" E 32° 3'46.57"
Mahujini Stormwater Dam 3		4,000		S 28°17'14.97" E 32° 4'31.13"

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Luhlanga Attenuation Dam		10,358		S 28° 19' 17.56" E 32° 4' 43.80"
Section 21(c), (i): Impeding, diverting, change natural characteristics of water course				
Luhlanga Area, Demolishment of Drainage Line 1	T7093/2002 Portion 0 No. 15822 Reserve No. 3	N/A	N/A	S 28°19'14.87" E 32° 4'33.16"" to S 28°18'59.79" E 32° 4'26.85"
Nkolokotho Stream Haul Road Crossing 2		N/A	N/A	S 28°18'59.79" E 32° 4'26.85" to S 28°19'1.27" E 32° 4'41.48"
Mining infrastructure within 500m of wetland, HGM1		N/A	N/A	S 28°21'40.64" E 32°1'06.03" to" S 28°21'27.41" E 32°1'17.35"
Mining infrastructure within 500m of wetland, HGM 2		N/A	N/A	S 28°19'30.57" E 32°3'46.19" to S 28°18'26.92" E 32°4'23.82"
Ophondweni Ring Road Drainage Line Crossing 1		N/A	N/A	S 28°15'30.84" E 32° 9'21.29" to S 28°15'36.20" E 32° 9'16.56"
Ophondweni Ring Road Drainage Line Crossing 2		N/A	N/A	S 28°15'47.44" E 32° 9'9.26" to S 28°15'47.85" E 32° 9'10.26"
Ophondweni Ring Road Drainage Line Crossing3		N/A	N/A	S 28°15'22.45" E 32° 9'27.31" to S 28°15'23.86" E 32° 9'27.10"
Ophondweni Ring Road Drainage Line Crossing 4		N/A	N/A	S 28°15'25.51" E 32° 9'25.56" to S 28°15'31.39" E 32° 9'20.30"
Ophondweni Ring Road Drainage Line Crossing 5		N/A	N/A	S 28°15'33.84" E 32° 9'18.62" to S 28°15'35.82" E 32° 9'18.58"
Ophondweni Pit within Drainage Line 1		N/A	N/A	S 28°15'25.64" E 32° 9'25.61" to S 28°15'35.53" E 32° 9'30.73"
Ophondweni Pit within Drainage Line 2		N/A	N/A	S 28°15'37.04" E 32° 9'19.92" to S 28°15'47.12" E 32° 9'24.33"
Ophondweni Pit within Drainage Line 3		N/A	N/A	S 28°15'48.97" E 32° 9'11.76" to S 28°16'2.44" E 32° 9'15.05"
Ophondweni Waste Rock Dump Drainage Line Crossing		N/A	N/A	S 28°15'32.12" E 32° 9'50.56" to S 28°16'6.69" E 32° 9'29.71"

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Ophondweni Road Drainage Line Crossing		N/A	N/A	S 28°15'48.85" E 32° 9'7.69"
Ophondweni infilling of wetlands 1		N/A	N/A	S 28°15'26.59" E 32° 9'23.54" to S 28°15'31.37" E 32° 9'28.24"
Ophondweni infilling of wetlands 2		N/A	N/A	S 28°15'35.13" E 32° 9'17.23" to S 28°15'41.10" E 32° 9'24.88"
Ophondweni infilling of wetlands 3		N/A	N/A	S 28°15'47.09" E 32° 9'8.82" to S 28°15'53.49" E 32° 9'11.32"
Emalahleni Ring Road Drainage Line Crossing 1		N/A	N/A	S 28°18'51.96" E 32° 6'18.87" to S 28°18'53.48" E 32° 6'19.08"
Emalahleni Ring Road Drainage Line Crossing 2		N/A	N/A	S 28°18'44.22" E 32° 6'25.63" to S 28°18'45.18" E 32° 6'26.13"
Emalahleni Ring Road Drainage Line Crossing 3		N/A	N/A	S 28°18'53.69" E 32° 6'35.03" to S 28°18'54.41" E 32° 6'35.83"
Emalahleni Ring Road Drainage Line Crossing 4		N/A	N/A	S 28°18'25.30" E 32° 6'48.12" to S 28°18'26.47" E 32° 6'48.66"
Emalahleni Ring Road Drainage Line Crossing 5		N/A	N/A	S 28°18'36.56" E 32° 6'50.93" to S 28°18'37.46" E 32° 6'51.59"
Emalahleni Pit within Drainage Line 1		N/A	N/A	S 28°18'46.58" E 32° 6'26.82" to S 28°18'52.83" E 32° 6'33.92"
Emalahleni Pit within Drainage Line 2		N/A	N/A	S 28°18'26.86" E 32° 6'48.86" to S 28°18'35.08" E 32° 6'50.28"
Emalahleni Waste Rock Dump 1 Drainage Line crossing 1		N/A	N/A	S 28°18'54.56 E 32° 6'36.05" to S 28°19'2.87" E 32° 6'40.32"
Emalahleni Waste Rock Dump 2 Drainage Line crossing 1		N/A	N/A	S 28°18'38.11" E 32° 6'51.48" to S 28°18'47.03" E 32° 6'52.94"
Emalahleni Waste Rock Dump 2 Drainage Line crossing 2		N/A	N/A	S 28°18'26.36" E 32° 7'4.96" to S 28°18'31.57" E 32° 7'6.98"

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Emalahleni Haul Road Drainage Line Crossing 1		N/A	N/A	S 28°18'58.20" E 32° 6'8.31"E
Emalahleni Haul Road Drainage Line Crossing 2				S 28°19'12.60" E 32° 5'32.55"
Mahujini Ring Road Drainage Line Crossing 1		N/A	N/A	S 28°16'52.15" E 32° 3'55.92" to S 28°16'52.69" E 32° 3'56.85"
Mahujini Ring Road Drainage Line Crossing 2		N/A	N/A	S 28°17'10.37" E 32° 3'45.69" to S 28°17'10.09" E 32° 3'47.09"
Mahujini Ring Road Drainage Line Crossing 3		N/A	N/A	S 28°17'14.55" E 32° 3'49.05" to S 28°17'15.49" E 32° 3'48.41"
Mahujini Ring Road Drainage Line Crossing 4		N/A	N/A	S 28°17'18.69" E 32° 4'11.68" to S 28°17'19.70" E 32° 4'12.09"
Mahujini Ring Road Drainage Line Crossing 5		N/A	N/A	S 28°16'58.69" E 32° 4'25.51" to S 28°17'6.10" E 32° 4'23.37"
Mahujini Ring Road Drainage Line Crossing 6		N/A	N/A	S 28°16'48.73" E 32° 4'29.16" to S 28°16'51.78" E 32° 4'28.17"
Mahujini Ring Road Drainage Line Crossing 7		N/A	N/A	S 28°16'20.52" E 32° 4'19.08" to S 28°16'21.64" E 32° 4'18.35"
Mahujini Ring Road Drainage Line Crossing 8		N/A	N/A	S 28°16'17.15" E 32° 4'16.40" to S 28°16'17.95" E 32° 4'17.94"
Mahujini Pit within Drainage Line 1		N/A	N/A	S 28°16'7.35" E 32° 4'7.46" to S 28°16'15.72" E 32° 4'14.69"
Mahujini Pit within Drainage Line 2		N/A	N/A	S 28°16'26.20" E 32° 4'13.27" to S 28°16'31.40" E 32° 4'7.93"
Mahujini Pit within Drainage Line 3		N/A	N/A	S 28°16'50.08" E 32° 4'26.37" to S 28°17'14.59" E 32° 3'49.07"
Mahujini Pit within Drainage Line 4		N/A	N/A	S 28°17'17.75" E 32° 4'11.13" to S 28°17'5.33" E 32° 4'20.24"
Mahujini Waste Rock Dump 1 Drainage Line Crossing 1		N/A	N/A	S 28°17'6.62" E 32° 4'23.75" to S 28°17'12.55"

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
				E 32° 4'30.05"
Mahujini Waste Rock Dump 2 Drainage Line Crossing 1		N/A	N/A	S 28°17'52.14" E 32° 3'33.33"
Mahujini Waste Rock Dump 2 Drainage Line Crossing 2		N/A	N/A	S 28°16'47.88" E 32° 4'42.77" to S 28°17'7.18" E 32° 4'35.28"
Mahujini Haul Road Drainage Line Crossing 1				S 28°17'52.87" E 32° 3'33.41"
Mahujini Haul Road Drainage Line Crossing 2		N/A	N/A	S 28°17'10.87" E 32° 3'44.41"
PCD 1 Mahujini River crossing		N/A	N/A	S 28°16'3.81" E 32° 3'45.54"
PCD 3 Mahujini River crossing		N/A	N/A	S 28°16'19.37" E 32° 4'32.67"
PCD5 Emalahleni River crossing		N/A	N/A	S 28°18'40.55" E 32° 6'25.71"
Section 21(g): Disposing of Waste				
Dust suppression Area 1, 2, 8, 9	T7093/2002 Portion 0 No. 15822 Reserve No. 3	412,858	-	S 28°18'49.46" E 32° 4'3.82"
Disposal of slurry and discard in Pit BDE (Area 2)		7,889,161		S 28°18'46.69" E 32° 3'35.35"
Disposal of slurry and discard KwaQubuka Pit (Area 9)		1,814,400	-	S28°19'11.38" E 32°04'22.86"
Luhlanga Box Cut 0 Waste Rock Dump		55,500	-	S28°19'19.74" E 32°04'34.55"
Dust suppression for area Ophondweni		105,908	-	S28°15'47.04" E 32°09'17.32"
Ophondweni ROM Stockpile 1		14,320	-	S28°15'54.02" E 32°09'13.53"
Ophondweni ROM Stockpile 2		14,071	-	S28°15'30.91" E 32°09'27.08"
Ophondweni Waste Rock Dump		45,270	-	S28°15'51.89" E 32°09'33.74"
Ophondweni Hard Park 1		8,806	-	S28°15'54.81" E 32°09'18.12"
Ophondweni Hard Park 2		9,436	-	S28°15'32.10" E 32°09'30.75"
Ophondweni PCD 8		16,000	-	S28°15'42.96" E 32°09'14.82"
Ophondweni PCD 9		45,270	-	S28°15'25.27" E 32°09'54.12"
Dust suppression for area Emalahleni		36,539	-	S28°18'54.84" E 32°06'39.67"
Emalahleni ROM Stockpile 1		35,375	-	S28°18'37.09" E 32°06'39.67"
Emalahleni ROM Stockpile 2		42,214	-	S28°18'56.89" E 32°06'23.20"
Emalahleni Waste Rock dump 1		262,526	-	S28°19'9.05" E 32°06'26.54"
Emalahleni Waste Rock dump 2		135,822	-	S28°18'38.00" E 32°06'57.21"

Activity	Property	Volume/ Dimension (m^3/a)	Capacity (m^3)	Coordinates
Emalahleni Hard Park 1		17,328	-	S28°18'52.54" E 32°06'26.79"
Emalahleni Hard Park 2		16,984	-	S28°18'39.15" E 32°06'42.39"
Emalahleni PCD 5		13,010	-	S28°18'40.58" E 32°06'25.88"
Emalahleni PCD 6		17,560	-	S28°18'55.57" E 32°06'37.84"
Emalahleni PCD 7		15,730	-	S28°18'28.53" E 32°06'59.31"
Dust suppression at Mahujini		95,949	-	S28°16'45.51" E 32°03'51.22"
Mahujini ROM stockpile 1		43,286	-	S28°16'43.44" E 32°03'51.22"
Mahujini ROM stockpile 2		42,555	-	S28°16'45.51" E 32°03'58.68"
Mahujini Waste Rock Dump 1		11,113	-	S28°15'58.90" E 32°04'17.37"
Mahujini Waste Rock Dump 2		16,648	-	S28°16'48.55" E 32°04'36.60"
Mahujini Waste Rock Dump 3		10,857	-	S28°16'10.06" E 32°03'54.66"
Mahujini Hard Park 1		18,337	-	S28°16'43.63" E 32°04'30.47"
Mahujini Hard Park 2		17,474	-	S28°16'12.86" E 32°04'06.12"
Mahujini PCD 1		16,240	-	S28°16'03.16" E 32°03'46.43"
Mahujini PCD 2		17,360	-	S28°16'09.44" E 32°04'22.19"
Mahujini PCD 3		20,630	-	S28°16'19.61" E 32°04'32.58"
Mahujini PCD 4		45,960	-	S28°16'48.67" E 32°04'45.59"
Section 21(j): Dewatering				
Dewatering Ophondweni Pit	T7093/2002 Portion 0 No. 15822 Reserve No. 3	485,766	-	S28°15'44.52" E 32°09'21.96"
Dewatering Emalahleni Pit		131,160	-	S28°18'47.64" E 32°06'31.75"
Dewatering Mahujini Pit		141,569	-	S28°16'50.67" E 32°04'01.62"

5. Item 1(d)(ix): IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Table 5-1: Proposed mitigatory measures for Somkhele Project

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
Site preparation, vegetation clearance and topsoil removal	Agricultural land use Capability and Soils	Construction	Open pit areas and mining infrastructure footprint	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • Only the designated access routes are to be used to reduce any unnecessary compaction; • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; • Topsoil stockpiles are to be kept to a maximum height of 10 m; • If possible, topsoil should be stripped during dry months, as to reduce compaction; • Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles; • The stockpiles must be vegetated in order to reduce the risk of erosion; and	All conditions as per issued Environmental Authorisations	Immediate with commencement of construction activities and site infrastructure development

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Handling of the stripped topsoil must be minimised to ensure the structure does not deteriorate.		
	Air Quality	Construction		• Site clearing must be done in phases; • Use of suppressants and binders on exposed areas to reduce dust generation; • The area of disturbance at all times must be kept to a minimum and no unnecessary clearing, digging or scraping must occur, especially on windy days (with wind speed ≥ 5.4 m/s); • The drop heights when loading onto trucks and at tipping points should be minimised.	Compliance with PM_{10} and $PM_{2,5}$ PM_{10} (75 µg/m^3) and dust fallout (1 200 mg/m^2/day	Monthly analysis and quarterly reporting
	Aquatic Ecology	Construction		• Minimise the removal of vegetation in the infrastructure footprint area to prevent erosion and sedimentation of the river systems; • Re-vegetation of the disturbed areas within the construction footprint once construction is completed; • Soils compacted by heavy machinery in areas that are not utilised post construction can be ripped to allow infiltration;	GN509 Regulation, WUL conditions	As per WUL, normally bi-annual once during dry and wet seasons

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Ensure that storm water management structures are within good working condition through • regular inspection, especially after large storm events; • Where storm water enters river systems, sediment/silt and debris trapping, as well as energy dissipation control measures must be put in place; • Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow; • The vegetation of unpaved roadsides; and • Inspection of paved and unpaved roads to monitor for erosion.		
	Biodiversity (Fauna and Flora)	Construction		• Relocation of infrastructure; • Rehabilitation with native grass species; • Relocation of Red Data species, should any species be recorded in developing footprint area during vegetation clearing; and	GNR 3569 dated June 2023; NEMBA 57 of 2003	During LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Implement an alien management plan.		
	Cultural Heritage	Construction		• Reduce through the completion of a BGGC process and compilation /implementation of a CMP	NHRA Section 36; Chapters IX and XI of the NHRA Regulations	Prior to construction phase
	Groundwater	Construction		• Site clearance and construction activities should take place above the water table, if applicable. No impact on the groundwater is expected if the activities take place above the water table; • Site clearance should be kept to a minimum area and short duration, if possible; • If trenches are going to be excavated below the water level, dewatering of the aquifer to lower the water table locally can be considered to ensure that the construction takes place above the groundwater level and the water quality remains acceptable. The abstracted water can be utilised for dust suppression, vegetation irrigation or discharged to pollution control dams for evaporation. Since the	Promulgated Groundwater Reserve for W23G quaternary	During LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				groundwater is not expected to be polluted at this stage, the utilisation of the water for activities such as dust suppression or irrigation will not cause negative environmental impacts; • The PCD should not be placed on areas with the potential for increased infiltration to groundwater, such as over fault zones; and • PCD should be lined to pro-actively prevent infiltration of contaminated seepage water.		
	Surface Water	Construction		• Clearing of vegetation must be limited to the development footprint area, and the use of existing access roads must be prioritised so as to minimise construction of new access roads in these areas; • If possible, construction activities must be prioritised to the dry months of the year (May-October) to limit mobilisation of sediments or hazardous substances from construction vehicles used during site clearing;	Set RQO's for W23A and W23G quaternary catchments; WUL conditions	During LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• The proposed topsoil and overburden stockpiles must be covered or vegetated as soon as possible to prevent sediment erosion. Location of measures as per SWMP; • Contaminated storm water runoff from this area will be routed through trenches to silt trap sumps at the bottom of the stockpiles; • Contaminated storm water runoff from the sump will be routed through channels to the PCDs for reuse; • Water quality monitoring should be implemented as a management option; • Haul roads must be well compacted to avoid erosion of the soil into the streams; • Dust suppression on the haul roads and cleared areas must be regularly undertaken; and • All dirty water channels must be constructed and placed within the dirty water infrastructure areas, such that all dirty water runoff emanating from these areas are captured		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				and contained to a dirty water containment facility. The proposed channels should be lined and sized to cater for the 1:50 year storm event.		
	Noise: Noise levels an increase in the excess of 7 dBA above ambient noise levels at certain receptors within the Project Area	Construction	Impacting only on certain receptors within the zone of influence	• Restricting construction activities and mining activities to daylight hours (06:00 – 18:00) and not during weekends and public holidays; • Locating of diesel generator away from noise sensitive receptors, as well as placing generators on isolation mounts and installation of secondary silencers; • Mining related machines and vehicles to be serviced to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Reversing alarms on vehicles should be broadband reversing alarms which emit directional, lower, less intrusive sound; • Environmental noise monitoring to establish	National Noise Control Regulations SANS 10301; SANS 10328	Upon registration of noise compliant

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				compliance with the regulations and to verify the predicted noise levels; and • Switching off equipment when not in use.		
	Visual	Construction		• Where possible use fencing that will screen the project area from nearby • receptors; • Limit the height and footprint area of temporary laydown areas and facilities for the construction workers. • Vegetation should only be removed when and where necessary. • Topsoil should only be removed when and where necessary; • Topsoil stockpiles should be vegetated with grasses integral to Zululand Lowveld bioregion such as *Cynodon dactylon, Dichrostachys cinera, Dicoma argryphylla, Eragrostis superba, Euclea crispa, Euclea divinorum, Euphorbia ingens, Gymnosporia senegalensis* and *Themeda triandra*) where possible so as to blend into the surrounding	Reinstating Sense of Place	Upon commencement of mining

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				landscape and reduce dust generation; • Limit the footprint area of topsoil stockpiles where possible; • Limit the height of the topsoil stockpile to 20 m; and • Apply dust suppression techniques to limit dust generated from topsoil stockpiles.		
	Wetlands	Construction; Operational		• Obtain the required WUL authorisation for mining within the protective buffer zone of a delineated wetland; • There are no mitigation measures for loss of wetland habitat; and • Avoid and minimise impacts where possible, else rehabilitate and offset wetland sections.	Section 19 of the NWA; Section 21 (c), (g) and (i) of the NWA; Section 24 of the Constitution; NEM:BA; NEMA; Department of Water and Forestry (DWAF) Guidelines for the delineation of wetlands (2005); Mining and Biodiversity Guideline (DEA et al., 2013).	Only required if wetlands are destructed and then implemented as part of offset
	Social	Construction; Operational	Approximate 1600 job opportunities to be created	• Assign preferred employment status to those experiencing the bulk of the negative project • impacts (communities located within and	Mineral and Petroleum Resource Development Act (Act of 2002); National Environmental Management Act (Act of 1998);	Pre-construction until end of Life of Mine

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				surrounding the Project footprint e.g. Emalahleni • Community, Ophondweni, Mahujini, etc.); • Promotion of local, female and youth employment to achieve and where feasible exceed the targets set out by the Mining Charter; • Where possible labour-intensive construction methods should be promoted; • Verification of local residential status through consultation with appropriate authorities (e.g. municipal structures, community leaders, and landowners) • Consult neighbouring businesses/mines to determine if they would be willing to make their skills registers available; • Identify required core skills, expand skills audits to community and align and implement training and skills development initiatives to findings of audit; • Expand skills development programmes, especially ABET programmes, to	Employment Equity Act, 1998 (Act No. 55 of 1998); Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997); Labour Relations Act, 1995 (Act No. 66 of 1995); Skills Development Act (Act No. 97 of 1998 as amended); and Company employment policies as contained in the Somkhele Mining Project's SLP	

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				include surrounding communities; • Recruitment via a registry of job seekers and potentially coordinated through the Department of Labour; • Provide local employees with reference letters certificates of completion for in-house (on-the-job) training; • Monitor sub-contractors in terms of local employment targets; • Provide focused training to construction phase employees from the host communities to increase their chances for employment during the operations; • The Project's database of the local labour pool should be updated to include people who were previously employed by the Project during the construction/ operational phases.		
Increased traffic and vehicular movement	Road safety	Construction; Operational	Haul road upgrading and maintenance	• Erection of signage; • Implementing speed limit of 30 km/h on site, 60 km/h on district Road); and	Road Safety Manual of DoT; Provincial Roads Act, 2001 (Act 4 of 2001): Sections 6, 9 and 12	Prior to operational phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Restricting driving heavy trucks at night.		
	Fauna and Flora	Construction; Operational; Closure	Access road construction		SANBI, NEMA, NEMBA, GN 320 R protocols	Prior to commencement of mining
Construction of mining related infrastructure	Air Quality	Construction		• Activity must be carried out judiciously to ameliorate dust emissions; • Use of suppressants on exposed areas to reduce dust generation.	Chamber of Mine Guidelines; MHSA	Construction phase
	Groundwater	Construction		• Overburden and topsoil stockpiles should be managed to minimise infiltration of contaminants to the groundwater; • The vegetation of the stockpile and covering them with soil to minimise rainfall infiltration and mobilisation of dissolved metals; • Groundwater monitoring program to be initiated; • Placement of the PCD on areas with the least potential for increased infiltration to groundwater, such as away from fault zones; • All contaminant, storm water, waste and hazardous waste storage facilities and other contaminated water storage areas (PCD)	In compliance with the issued WUL conditions	Construction phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				should be lined to prevent infiltration of contaminated seepage water proactively. • Monitoring of groundwater quality and water levels is recommended with continuous refining and updating of the monitoring network based on the results obtained. • PCD should be operated in such a way that it does not overflow more than once in 50 years.		
	Noise	Construction		• Restricting construction activities and mining activities to daylight hours (06:00 – 18:00) and not during weekends and public holidays; • Locating of diesel generator away from noise sensitive receptors, as well as placing generators on isolation mounts and installation of secondary silencers; • Mining related machines and vehicles to be serviced to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers;	SANS 10328 and SANS 10103	LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Reversing alarms on vehicles should be broadband reversing alarms which emit directional, lower, less intrusive sound; • Environmental noise monitoring to establish compliance with the regulations and to verify the predicted noise levels; and • Switching off equipment when not in use.		
	Surface Water	Construction		• Ensure all the dirty water emanating from the dirty water areas will be collected via silt traps before entering the PCD. This water should be stored for re-use within the mine so as to prevent unnecessary discharge into the environment. • Should the contained water be more than the water use requirement, the Best Practice Guidelines (BPGs) advise that the water be recycled or as the last resort be treated to acceptable levels and discharged either to the natural environment or be supplied to other industries as a lower grade of water.	BPG A4 – PCD's; BPG G1 – Stormwater Management; BPG G4 – Impact Prediction; BPG H1 – Integrated Mine Water Management; GN 704 Regulations	LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
	Socio-Economic	Construction	Local communities	• The impact is positive; measures to maximise the stimulation of the economy may include procurement of goods and services from local business where feasible; • Recruit local labour; • Sub-contract to local construction companies; • Use local suppliers where viable and arrange with the local Small and Medium and Micro Enterprises to provide transport, catering and other services for the construction crew; • Use labour intensive construction methods, where feasible; • Sub-contract to local construction companies; • Use local suppliers; • Set-up a skills desk at the local municipal office and in the nearby communities to identify skills available in the community and assist in recruiting local labour during both construction and operation; • Ensure that the main contractor shares knowledge with the sub-contracting companies	Adherence to SLP commitments; RAP; IPILRA	Prior to commencement of mining up to end of LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				during the construction period; • Encourage the main contractor to offer internships and learner ships, especially to those coming from the local communities; • Employ labour intensive methods in construction; • Sub-contract to local construction companies; • Use local suppliers where viable and arrange with the local Small and Medium Enterprises to provide transport, catering, and other services for the construction crew; • No enhancement; • The establishment of the mine should be done with a minimal impact on the agricultural land and on the footprint of the properties; • Engage with directly affected farmers and landowners on alternative farming locations and investigate ways to minimise loss of agricultural production. • Off-set impact by training local small-scale farmers		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				as stated in SLP in order to have no net loss; • If feasible, continue utilising land not affected by the mine's footprint for subsistence agricultural production; • Where possible, ensure that land preparation and rehabilitation activities implemented during various staged of the mine's lifecycle allow for restoration of land to above-grazing capacity, • i.e. suitable for crop production; • Mitigation measures proposed by visual and noise specialists should be strictly adhered to, to minimise the probability and intensity of the visual exposure in the area; • Independent appraisals of properties and land values in the area adjacent to the site to determine the baseline before the project's implementation is advisable; • Educate and inform the affected parties on the potential environmental impacts that could ensue and the activities to		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				adequately manage perceptions regarding potential effects of the project on the surrounding land uses; • Engage with respective researchers and specialists to determine with greater certainty the effect that any negative environmental impacts could affect the production of sugar cane, macadamia and other produces on the nearby farms (USM and UVS); • Engage with adjacent landowners and compile the baseline, as well as monitor the effects of the mining activity on the production at the potentially affected farms; • In the event that the production is affected and proven to be the result of mining activity, engage with adjacent landowners and investigate appropriate alternatives suitable for all the parties to ensure overall production is not affected (relocation, expansion of other facilities, etc.); and		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Strictly adhere to environmental specialists' recommendations.		
	Wetlands, streams and riparian zones	Construction		• The edge of the non-directly impacted wetlands and at least a 32 m buffer, if possible, must be clearly demarcated in the field as no-go zones that will last for the duration of the construction phase. • Employees / contract workers need to be educated about the sensitivities of the wetland habitat. • Wetland monitoring must be carried out during the construction phase by a wetland specialist to ensure no unnecessary impact to wetlands is realised; and if so that a remedy is put in place as soon as possible. • Refer to the Surface Water Report for details on a Storm Water Management Plan that is to be carried out. This must be in operation during the construction phase and wetlands must be highlighted as sensitive receptors.	GN509 Regulations	Prior to commencement of construction phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Refer to the Fauna and Flora Report for mitigation measures relating to floristic impacts as well as faunal species disturbances; and • An alien and invasive plant species management programme must be in place from the construction phase.		
Drilling, blasting and development of box-cut for strip mining, including stockpiling of overburden	Air Quality	Construction	Localised impact extending across the sites to nearby settlements of Emalahleni, Ophondweni and Mahujini	• Activity must be carried out judiciously to ameliorate dust emissions; • Wet drilling	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) – National Dust Control Regulations (2013).	LoM
	Noise, vibration	Construction		• Restricting construction activities and mining activities to daylight hours (06:00 – 18:00) and not during weekends and public holidays; • Locating of diesel generator away from noise sensitive receptors, as well as placing generators on isolation mounts and installation of secondary silencers; • Mining related machines and vehicles to be serviced	National Noise Control Regulations SANS 10328 and SANS 10103	LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Reversing alarms on vehicles should be broadband reversing alarms which emit directional, lower, less intrusive sound; • Environmental noise monitoring to establish compliance with the regulations and to verify the predicted noise levels; and • Switching off equipment when not in use.		
	Visual	Construction		• Apply dust suppression techniques to limit the dust from the demolition area; • Use shade cloth/netting to screen the demolition area; • Ensure all infrastructure is demolished and removed from the site; • Limit the quantity and time of rubble stored on site; • Ensure that the open pit is backfilled with material	To minimise the negative visual impacts caused by the change of land use from rural subsistence agriculture to mining.	From pre-construction until decommissioning and Closure

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				from the overburden stockpiles; • Rehabilitate all disturbed areas; • Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; • Spread topsoil over the rehabilitated area; • Ensure that surface water and drainage lines are rehabilitated; • Re-vegetate the rehabilitated areas with indigenous grasses		
	Cultural Heritage	Construction, Operation (relating to graves)	27 km^2 covering the entire Mining Right Area	• Reduce through the completion of a BGGC process for Emalahleni, Ophondweni, Mahujini areas and compilation / implementation of a CMP • Avoid though amendment of the mine layout and infrastructure design. Where not feasible, a BGGC, RAP and GRP must be completed	Section 36 and 38 of NHRA read together with chapters IX – XI of the NHRA Regulations	Pre-construction
Storage of hazardous materials (fuel, explosives) as well as waste and sewage	Environmental pollution	Construction, Operation	Impacts limited to the sites and immediate surroundings	• Strict adherence to products and waste management plan; • Handled, stored and disposed hazardous substances in accordance with the local regulations;	NEM: WA; Norms and Standards for Waste (2013)	Commencement of Construction Phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Store hazardous substances in clearly labelled containers; • Emergency situations must be dealt with promptly i.e. spills. • Provision of secondary containment for fuel storage.		
General Mining operations	Climate change and GHG emissions	Construction, Operation	Impact is rated on an international scale	• an energy efficient materials movement strategy; • energy efficient overburden removal; • energy efficient mine haul trucks, in-pit crushers and conveyors; • using low carbon energy sources; • solar power as an alternative energy source to reduce the dependence on diesel for electricity generation; • carbon offsets can be introduced; • Energy efficiency of cooling systems used in the offices and staff accommodation; • Lighting in the offices, accommodation and around the mine pit; and • Changing human behaviour towards improving energy efficiency (creating an	Currently no South African standard, Apply Best International Practice: GHG Protocol Corporate accounting and Reporting Std; ISO/SANS 14064-1	During LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				organisational culture towards reducing emissions).		
Operation and maintenance of the topsoil and overburden stockpiles	Soils, Land Use and Land Capability	Operational	Open pits at Emalahleni, Ophondweni and Mahujini with surrounding infrastructure	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; and • Only the designate access routes are to be used to reduce any unnecessary compaction.	Guidelines: Chamber of Mines;	Ongoing through LoM
	Goundwater pollution	Operational, Decommissioning		• Overburden and discard stockpiles should be managed to minimise infiltration of contaminants to the groundwater. • The vegetation of the stockpile and covering them with soil to minimise rainfall infiltration and mobilisation of dissolved metals. • Groundwater monitoring.	Best Practise Guidelines (BPG): G4 Impact prediction	Groundwater monitoring must commence from the start of the construction phase. Infrastructure design to be completed before construction commence
Site preparation, topsoil stripping, overburden stripping	Impact on air quality	Operational	Stripping to occur in phase, 1st box cut at Emalahleni	• Stripping must be done in phases in accordance with the mining plan; • Use of suppressants and binders on exposed areas to reduce dust generation; • The area of disturbance at all times must be kept to a	NEMAQA and National Dust Control Regulations	Simultaneously with commencement of construction phase and on-going for the remainder of the project

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				minimum and no unnecessary clearing, • digging or scraping must occur, especially on windy days (with wind speed ≥ 5.4 m/s); • The drop heights when loading onto trucks and at tipping points should be minimised.		
	Visual	Operational phase	Project sites	• Apply dust suppression techniques to limit the dust from the demolition area; • Ensure all infrastructure is demolished and removed from the site; • Limit the quantity and time of rubble stored on site; and • Rehabilitate all disturbed areas. • To increase the neutral visual impacts caused by demolition and removal of all infrastructure.		Operational phase
Site Clearance	Biodiversity, Fauna and Flora	Construction, Operational, Decommissioning	Disturbed areas within Mining Right	• Implement alien eradication management plan; • Implement biodiversity management plant	NEMA; NEMBA and Biodiversity Offset Regulations	Operational phase
Increase in traffic, vehicular activities due to coal haulage	Fauna and Flora	Construction, Operational, Decommissioning	Access Roads, R495, R613	• Upgrade and maintain road network; • Upgrade intersections; • Erect signage to indicate road works ahead	Department of Transport Road Regulations	Construction phase, Operational phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
Construction of pollution control dams (PCDs)	Groundwater	Operational	9 X PCDs with storage capacity of 208 000m^3	• Avoid placement of the pollution control dam on areas with the potential for increased infiltration to groundwater, such as over fault zones. • All contaminant, storm water, waste and hazardous waste storage facilities and other contaminated water storage areas (pollution control dam) should be lined to prevent infiltration of contaminated seepage water proactively. • Monitoring of groundwater quality and water levels is recommended with continuous refining and updating of the monitoring network based on the results obtained. • All pollution control dam should be operated in such a way that it does not overflow more than once in 50 years	NWA: Section 21(g) WUL; GN 267 Regulations GN704 Regulations BPG A4: Pollution Control Dam	PCD designs to be completed as part of WULA prior to commencement of mining; Groundwater monitoring must commence with start of construction
Coal Haulage to washing plant	Air quality	Operational	Local on P235, P495, R613, 93 trips per 7hr shift	• Limit the speed of vehicles on the haul roads to reduce dust; and • Improve road network with intersection to comply with B1 for road safety; • Asphalt the first 50 m of intersection;	SANRAL regulations; DoT – KZN approval NEMAQA – PM10 Standards	Construction and operational phases

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Haul roads should be watered frequently by means of a water bowser to suppress dust.		
Open pit mining to various depths varying 50 to 150 m	Biodiversity	Operational	Open pits at Emalahleni, Ophondweni and Mahujini with surrounding infrastructure	• Rehabilitation of disturbed areas; • Topsoil stockpiles should be vegetated with grasses: Kweek (*Cynodon Dactylon*) (7kg/ha), grasses adapted to the local environment, Rhodes Grass (*Chloris Gayana*) (7kg/ha), Oulandsgras (*Eragrostus Curvula*) (6kg/ha) where possible so as to blend in with the surrounding landscape and reduce dust generation; • Limit the footprint area of topsoil stockpiles where possible; • Limit the height of the topsoil stockpile to 20 m; • Ensure the soft overburden and hard overburden stockpiles do not exceed the proposed height of 20 m;	Biodiversity offset as per GN 3569 Regulation	Operational phase and on-going up to closure and decommissioning phases
	Pit dewatering; Groundwater	Operational	Project area of 27km^2	• Store the dewatered water in dedicated pollution control dams (PCD 1 – 9) and ensure that the dams have sufficient storage capacity. If that is not possible, re-introduce	Compliance with conditions of the issued WULA	LoM

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				treated water into the streams after ensuring that they meet the required river quality objectives. • Affected receptors (if proven through monitoring) should be compensated. • Ensure that backfilled areas are rehabilitated and re-vegetated; • Place all material which could generate leachates at the base of the pits so that groundwater contamination is minimised. • Groundwater monitoring, to assess the time series water level and quality impacts and trends; and • Update the numerical model as more groundwater information is collected.		
	Wetland and hydropedology	Operational		There are no foreseen mitigation actions that may significantly lessen the impact on the receiving catchment. However, the following should be done: • Dirty water from the storm water system and pollution control dam should be treated and released back into the surrounding	WULA in terms of section 21(c) and (i) of NWA; Section 19 of NWA; NEMA and NEMBA; DWS Guidelines for wetland delineation as well as GN267 Regulations	Preplanning phase and design phases, operational phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				wetland systems; downstream of the dewatering cone of depression. • The haul roads and servitude must also have well-designed stream crossings and drainage areas, which should be maintained. The wetlands outside of this must be demarcated as no-go areas. • Dust management programme must be in place; • The haul roads and servitude must be monitored and maintained to best operating standards. This should be done in the dry season (May – August). • The wetland must be monitored on a regular basis to ensure no residual impact to the wetland and river is realised; and if so that remediation measures are followed. • If possible, truck loads should be covered; particularly in dry and windy seasons. • Berms must be maintained as a buffer between the		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				coal handling area and the sensitive receiving environment.		
General operational mining activities	Aquatic ecology	Operational	Mfolozi River catchment	• Diversion trench and berm systems which diverts clean storm water around pollution sources and convey and contain dirty water to pollution control impoundments; • Barrier systems, including synthetic (HDPE liners), clay and geological or other approved mitigation methods to minimise contaminated seepage and runoff from stockpiles and pollution control facilities from entering the local aquatic systems; • Where storm water enters river systems from disturbed sites, sediment and debris trapping, as well as energy dissipation control measures must be put in place; • The planting of indigenous vegetation around pollution control impoundments and structures should be completed as this has been shown to be effective in erosion and nutrient control;	NWA and issued WULA in accordance with section 40 of the Act	Life of Mine

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Ensure that all the dirty water emanating from the dirty water areas be collected in the respective PCD's for re-use within the mine, to prevent unnecessary discharge into the environment; • The dirty water collection trenches should be cleaned regularly to reduce the build-up of washed off coal fines and ensure they are able to accommodate and convey the 1:50 year peak flows. This material should be disposed to an appropriate licenced facility • Stockpiling should be monitored so that the side slopes do not encourage erosion of the slopes resulting in silt transported into the trenches from the stockpiles, allowing some silt to settle on the dirty water site rather than in the channels; and • In addition to the control of storm water, water quality supplemented by aquatic ecology monitoring should form part of the system where water in the PCD's and surrounding		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				streams are monitored for quality. This ensures that pollution sources are monitored during the mining process.		
	Socio-economic	Construction, Operational	Creation of 1,600 job opportunities	• Assign preferred employment status to those experiencing the bulk of the negative project impacts (communities located within and surrounding the Project footprint e.g. Emalahleni, Ophondweni, Mahujini); • Promotion of local, female and youth employment to achieve and where feasible exceed the targets set out by the Mining Charter; • Where possible labour-intensive construction methods should be promoted; • Verification of local residential status through consultation with appropriate authorities (e.g. municipal structures, community leaders, and landowners) • Consult neighbouring businesses/mines to determine if they would be willing to make their skills registers available;	Constitution of South Africa; Mineral and Petroleum Resource Development Act (Act of 2002). National Environmental Management Act (Act of 1998 Employment Equity Act, 1998 (Act No. 55 of 1998); Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997); Labour Relations Act, 1995 (Act No. 66 of 1995); Skills Development Act (Act No. 97 of 1998 as amended); and Company employment policies and SLP.	Prior to start of construction and on-going throughout Life of Mine

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Identify required core skills, expand skills audits to community and align and implement training and skills development initiatives to findings of audit; • Expand skills development programmes, especially ABET programmes, to include surrounding communities; • Recruitment via a registry of job seekers and potentially coordinated through the DoL; • Provide local employees with reference letters certificates of completion for in-house (on-the-job) training; • Monitor subcontractors in terms of local employment targets; • Provide focused training to construction phase employees from the host communities to increase their chances for employment during the operations; • The Project's database of the local labour pool should be updated to include people who were employed by the Project		

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				during the construction phase.		
	Macro Economic	Construction	Local communities	• Procurement of goods and services from local business where feasible, will increase benefits to the local economy, but will not change the rating; • Explore local procurement prospects; • Employ local labour to increase benefit to the local community; • The mine is required by law to adhere to the provisions detailed in the Social and Labour Plan – no augmentation measures required; • Investigate opportunities to increase local procurement and localise mine's expenditure; and • Explore opportunities to employ as many people from the local communities as possible.	Mineral and Petroleum Resource Development Act (Act of 2002). National Environmental Management Act (Act of 1998 Employment Equity Act, 1998 (Act No. 55 of 1998); Basic Conditions of Employment Act, 1997 (Act No. 75 of 1997); Labour Relations Act, 1995 (Act No. 66 of 1995); Skills Development Act (Act No. 97 of 1998 as amended); and Company employment policies and SLP	Life of Mine
Development of Mining Infrastructure and Operation	Surface Water	Operational	Sub-Catchment of Mfolozi River	• Containment of pollutants and Zero Effluent Discharge Policy; • Vehicles must only be serviced within designated service bays; • The management of general and other forms of waste must ensure	SANS Specifications (1200)	Life of Mine

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				collection and disposal into clearly marked skip bins that can be collected by approved contractors for disposal to the appropriate disposal sites; • The fuel, lubricant and explosives storage facilities must be located on a hard standing area (paved or concrete surface that is impermeable), roofed and bunded in accordance with SANS1200 specifications. This will prevent mobilization of leaked hazardous substances; and • An emergency spillage response plan and spill kits should be in place and accessible to the responsible monitoring team. The Material Safety Data Sheets (MSDS) should be kept on site for the Life of Mine for reference to anytime in terms of handling, storage and disposal of materials.		
Drilling and Blasting	Noise impact	Operational	Impacting on adjacent communities within the delineated impact zone	• All Directed Affected Communities within the 500 m radius of active mining zone to be relocated;	National Noise Control Regulations	Upon commencement of Operational phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Blasting to be restricted to time limits which will have least impact on residents		
	Blasting and Vibrations	Operational Pit	Open pits	• Conduct crack survey before any blasting commences; • Increase stemming length; • Use quality stemming material; • Controls put in place for management of stemming lengths; • Relocate POI's of concern at least 650m; • Implementation of proper blast designs; • Use correct product; • Control product quality; • Prevent sleep time for charged blast holes; • Ensure same day charge and blast; • Reduce Charge Mass/Delay.	NEMA Mine Health and Safety Act, 1996 (Act No. 29 of 1996) Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) Explosives Act, 2003 (Act No. 15 of 2003)	Operational phase
	Air Quality	Operational	Localised extending across the mining right area to adjacent settlements	• Activity must be carried out judiciously to ameliorate dust emissions; and • Wet drilling	National Environmental Management: Air Quality Act, Act.39 of 2004; Ambient air quality - Limits for common pollutants, SANS1929:2005. National Environmental Management: Air	Measurements need to start prior to commencement of mining

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
					Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.	
	Visual	Operational	Adjacent local communities	To minimise the negative visual impacts caused by loading and hauling overburden (including topsoil, soft overburden and hard overburden): • Apply dust suppression techniques to limit the dust generated from the blasting; • Ensure that the open pit is backfilled with material from the overburden stockpiles; • Rehabilitate all disturbed areas; • Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; • Spread topsoil over the rehabilitated area; • Ensure that surface water and drainage lines are rehabilitated; • Re-vegetate the rehabilitated areas with grasses adopted to the local environment such as: *Cynodon dactylon,*	NEM: AQA	Operational phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				Digitaria eriantha, Eragrostis tef, Chloris Gayana and *Eragrostis curvula;* • Ensure all the mitigation/management actions outlined in the Closure and Rehabilitation reports are conducted.		
	Cultural Heritage	Operational	Within the 500m impact zone of areas subject to relocation	• Compilation and implementation of a RAP; • Reduce through the completion of a BGGC process	Section 36: NHRA NHRA Regulations; SAHRA (2007) Minimum Standards	Pre-construction
Handling of ROM, stockpiling and discard overburden	Air Quality	Operational	Extend of emissions within footprint of project sites	• The drop heights when loading onto trucks and at tipping points should be minimised; • The use of dust suppressants and binders on haul roads to reduce dust generation; • There is a need to set maximum speed limits on haul roads and to have these limits enforced.	National Environmental Management: Air Quality Act, Act.39 of 2004; Ambient air quality - Limits for common pollutants, SANS1929:2005. National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.	Monitoring to commence prior to mining and to continue throughout LoM
Power Generation (Diesel Generators)	Air Quality	Construction, Operational	Footprint of mining infrastructure;	• Selective catalytic reduction technology; and • Use of electrostatic precipitators;	As above	Monitoring to commence prior to mining and to

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
			Can extend outside the mine boundary as gaseous pollutants are easily dispersed	• Gas scrubbers.		continue throughout LoM
Handling, storage of hazardous material	Air Quality	Operational	Limited to footprint of mining areas	• Handled, stored and disposed hazardous substances in accordance with the relevant regulations; • Store hazardous substances in clearly labelled containers; • Deal with emergency situations promptly i.e. spills; • Provision of secondary containment for fuel storage.	NEMAQA, NEMWA Ambient air quality - Limits for common pollutants, SANS1929:2005. National Environmental Management: Air Quality Act (Act.39 of 2004) – Listed Activities and Associated Minimum Emission Standard, 2013.	Monitoring to commence prior to mining and to continue throughout LoM
Demolition of infrastructure	Land Use and Capability, Soils	Decommissioning; Closure	Within footprint of open pits and mining infrastructure	• Compacted areas must be ripped to loosen the soil structure; • Implement rehabilitation measures as defined in rehabilitation report; • Topsoil should be replaced for rehabilitation purposes only; and • Stockpiles should be used for their designated final purposes.	Closure Guidelines: Chamber of Mine	Closure phase, Decommissioning and Rehabilitation phases
	Wetlands	Decommissioning; Closure	Localised	• The edge of the wetlands and at least a 32 m buffer	NWA – sections 19, 21(c) and (i);	Closure phase, at least 180 days

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				must continue to be clearly demarcated as no-go areas and sensitive receptors. • The rehabilitation footprint kept as small as possible and non-impacted wetlands must be avoided. • Careful attention must be given to handling wetland soils, if any. • Wetland monitoring must be carried out during the rehabilitation phase to ensure no unnecessary impact to wetlands is realised; and if so that a remedy is put in place as soon as possible. • Please refer to the full Rehabilitation Plan Report (**Appendix 20**) as part of this EIA for full mitigation and management actions. • An alien invasive plant management plant must be implemented.	WUL conditions NEMA & NEMBA; Department of Water and Forestry (DWAF) guidelines for the delineation of wetlands (2005); Mining and Biodiversity Guideline (DFFE, 2023).	prior to cessation of mining activities
	Surface Water	Decommissioning; Closure	Immediate to the site and downstream of mining activities	• Use of accredited contractors for removal or demolition of infrastructures must be ensured; • Seeding and re-vegetation of the backfilled area must be implemented, where seeding is not effective, this must be repeated until	GN 704: Regulation 9 describes the temporary or permanent cessation of mine or activity. At cessation of operations, the persons operating a mining activity	Closure

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				it becomes sustainable; and • The constructed dirty water trenches will have to remain until post closure. This will ensure dirty water is captured and contained during removal of infrastructures.	should ensure that all pollution control measures have been designed, modified, constructed and maintained so as to comply with these regulations.	
	Air Quality	Decommissioning; Closure	Impact limited to site and immediate surroundings	• The dismantling area disturbed must be kept to a minimum; • Drop heights when offloading must be minimised; • Limit demolition activities to non-windy days; Rehabilitated landscape should be vegetated; and • Use of dust suppressant on dirt roads and exposed areas.	NEMAQA and Dust Control Regulations	Measurement must commence prior to the decommissioning operation and few months after it ends.
	Noise	Decommissioning; Closure	Local, not extending beyond project area	• Restricting decommissioning activities to daylight hours (06:00 – 18:00) and not during weekends and public holidays; • Mining related machines and vehicles to be serviced to the designed requirements of the machinery/vehicles to ensure noise suppression mechanisms are effective	National Noise Control Regulations; SANS 10103:2008	During commencement of Closure Phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				e.g. installed exhaust mufflers; and • Switching off equipment when not in use.		
	Visual	Decommissioning; Closure	Local, extend somewhat beyond project area	• Ensure all infrastructure is demolished and removed from the site; • Limit the quantity and time of rubble stored on site; and • Rehabilitate all disturbed areas.	As per approved Rehabilitation Plan: Increase the neutral visual impacts caused by demolition and removal of all infrastructure.	Closure
Rehabilitation of disturbed footprint of Project Area	Fauna and Flora	Decommissioning; Closure	Within Mining Right Areas	• Implement Alien Invasive Control Management Plan	NEMA, NEMBA	Closure
	Aquatic Ecology/ Groundwater	Decommissioning; Closure	Mining Right Area – 27 km^2	• Consider the most appropriate technology to manage residual risk of AMD; • Conduct monitoring	NWA Implement measures as per IWWMP/RSIP	Closure, Post mining Rehabilitation
	Air Quality	Decommissioning; Closure	Impact limited to immediate surrounding areas	• The dismantling area disturbed must be kept to a minimum; • Drop heights when offloading must be minimised; • Limit demolition activities to non-windy days; Rehabilitated landscape should be vegetated; and • Use of dust suppressant on dirt roads and exposed areas.	National Ambient Air Quality Standard; NEM: AQA 1210	LoM
	Visual	Decommissioning; Closure	Site, Local	• Ensure that the open pit is backfilled with material from the overburden stockpiles;	Chamber of Mines Rehabilitation Guidelines,	Closure

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Rehabilitate all disturbed areas; • Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; • Spread topsoil over the rehabilitated area; • Ensure that surface water and drainage lines are rehabilitated; • Re-vegetate the rehabilitated areas with grasses: • Kweek (*Cynodon Dactylon)* (7kg/ha), • grasses adapted to the local environment • Rhodes Grass (*Chloris Gayana*) (7kg/ha) • Oulandsgras (*Eragrostus Curvula*) (6kg/ha), and • Ensure all the mitigation/management actions outlined in the Closure and Rehabilitation reports are conducted.	Approved Rehabilitation Plan	
Post Closure Monitoring	Soils, Land Use and Capability	Post Closure	Footprint of open pits	• The rehabilitated areas must be assessed once a year for compaction, erosion and fertility; • Compacted areas must be ripped to loosen the soil structure;	Guidelines: Chamber of Mines on Rehabilitation; Approved Rehabilitation Plan	Closure Phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				• Only designated access routes should be used to reduce any unnecessary compaction; and • Corrective actions must be taken to minimise any further erosion from taking place		
	Groundwater	Post Closure	Local but will extend beyond mining area over years	• Capture AMD decant before joining the streams, treat it and re-introduce it into the streams. • Management solutions should be upon agreement with the impacted stake holders. • Monitoring of groundwater water levels and mine inflow rates. • ▪Update numerical model and decant rates as aquifer information becomes available.	DWS Reserve requirements (PES, EIS, RQO) SAWQG: Drinking, Irrigation, Livestock Watering	Closure Phase
	Surface water	Post Closure	Project area and downstream water users	• Decant capture and treatment prior to discharge into the stream • Conduct bi-annual SASS 5	DWS Reserve requirements (PES, EIS, RQO) SAWQG: Aquatic Ecology, Drinking, Irrigation, Livestock Watering	Closure Phase
	Wetlands	Post Closure	Local, within mining footprint	• Long-term passive water treatment options will need to be investigated by Tendele to prevent untreated AMD decant	Section 19 of the NWA Section 21 (c), (g) and (i) of the NWA	Closure Phase

Activities	Aspect Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standard	Timeline for Implementation
				water from entering the catchment. • Groundwater and wetlands must be monitored post-mining for potential decant. • Rehabilitation and remediation actions must be in place to respond to any decant or AMD discharge that is unforeseen.	Section 24 of the Constitution NEM:BA NEMA Department of Water and Forestry (DWAF) guidelines for the delineation of wetlands (2005); Mining and Biodiversity Guideline (DFFE, 2023).	

6. Item 1(e): IMPACT MANAGEMENT OUTCOMES

Table 6-1: Impact management outcomes for the Somkhele project

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
Site clearance; Top soil removal	Loss of topsoil and agricultural land	Soils, Land use, Land Capability	Construction	• Follow proper site clearing procedures • Stormwater management plan	Management of soils/land in accordance with Chamber of Mines Guidelines
	Loss of habitat for fauna and flora	Biodiversity	Construction	• Compile Conservation Management Plan/Biodiversity Offset Management Plan • Rehabilitation Plan	Management of invasive species in accordance with NEMBA Regulations
	Loss of biodiversity	Fauna and Flora	Construction	• Compile Conservation Management Plan/Biodiversity Offset Management Plan • Rehabilitation Plan	Minimise loss of habitat based on final mining layout plans; NEMBA 57 of 2003
	Potential loss of Red Data Species	Biodiversity	Construction	• Relocation of any Red Data Species encountered within mining area • Conservation Management Plan; • Alien Invasive Control Management Plan; • Rehabilitation Plan	Minimisation of loss of Red Data Species, Minimise mining activities within CBA's
	Fragmentation of ecosystems and habitats with increased risk of alien plant invasion	Biodiversity	Construction	• Alien Invasive Management Plan; • Rehabilitation Plan; • RSIP	Prevention of the impacted areas to degrade below their PES and EIS
	Surface water quality deterioration due to suspended solids entering streams	Aquatic Ecology	Construction	• Bio-monitoring; • Stormwater management	Management of the receiving water environment to maintain the PES and within set RQO's

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Hydropedalogical impact due to disturbance of wetland soils with loss of wetland eco-services and habitat	Wetlands	Construction	• Apply Mitigation Hierarchy; • Wetland Monitoring – Level 2; • Stormwater Management Plan; • Wetland Offset	Compensate for the loss of wetland habitat by means of wetland offset
	Erosion and sedimentation due to increased runoff from denuded areas resulting in sedimentation of downstream water resources	Surface Water	Construction	• Stormwater Management Plan; • Surface water monitoring; • Bio-monitoring	Conditions in the WUL for the management of the riparian habitat
	Impact on air quality due to dust generation during windy conditions, potential for wind erosion	Air quality	Construction	• Dust Management Plan; • Dust monitoring	Minimise the generation of fugitive dust, compliance with PM_{10} and $PM_{2,5}$ standards
	Noise disturbance from machinery in excess of 7dB	Noise	Construction	• Vehicle maintenance plan	Minimise noise levels
	Visual negative impact on the receiving environment due to higher visibility from the HiP area	Visual Socio-Economic	Construction	• Dust Management Plan; • Dust Monitoring Plan; • Mine Layout planning	Minimise negative visual impacts
	Topsoil removal and stockpiling will contribute towards further negative visual impacts	Visual	Construction	• Dust Monitoring program	Minimised negative impacts
Mine Infrastructure Construction	Loss of topsoil – erosion, compaction, land capability and land use	Soils, Land Use & Capability	Construction	• Development in accordance with Mine Plan • Site clearance procedures	Management of soils/land in accordance with Chamber of Mines Guidelines
	Mining activity within a natural ecosystem is a negative impact to habitat integrity.	Wetlands, Riparian Zones	Construction	• Development in accordance with Mine Plan to exclude sensitive areas; • Apply mitigation hierarchy in terms of offset requirements; • Bio-monitoring	Wetland Offset Guidelines

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Mining development and construction over sensitive riparian habitats resulting in the loss of degradation of aquatic habitat.	Aquatic Ecology, Surface water	Construction	• Development in accordance with Mine Plan • Apply	Set standards in terms of PES, EIS and RQO's as stipulated in the issued WUL
	The construction of surface infrastructure will have a negative visual impact on the receiving environment, especially towards the nearby Hluhluwe Imfolozi Park. The surface infrastructure will change the sense of place of the Project area from a rural agricultural sense of place to an industrial/mining sense of place. Construction area lighting at night will have a negative visual impact on the receiving environment. The construction area lighting will be visible from a distance of up to 10 km and will draw attention to the Project area. This will also have a negative impact on the sense of place.	Visual	Construction	• Development in accordance with Mine Plan	To minimise the negative visual impacts caused by the construction of infrastructure
Relocation of households and infrastructure	Relocation of households and infrastructure will have a negative social and heritage impact on the receiving environment. Change of land use from rural agriculture to mining will have a negative visual impact on the receiving environment. This change of land use will change the sense of place of the Project	Socio-economic, Heritage, Visual	Construction	• Mine Planning and Layout • Relocation Action Plan	DMR Guideline on Resettlement of Mining Affected Communities

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	area and surrounds from an agricultural sense of place to an industrial/mining sense of place resulting in a loss of scenic character and increased visual disturbance. The change of land use will contribute to the cumulative impacts of mining on the regional environment.				
Burial grounds and graves	Loss of cultural heritage	Heritage	Construction	• A detailed social consultation process, at least 60 days in length, as required by the KZNARIA as well as the National Health Act and its Regulations, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation. • Bilingual site and newspaper notices indicating the intent of the relocation(s). • Permits from all the relevant and legally required authorities. • An exhumation process that keeps the dignity of the remains and family intact. • An exhumation process that will safeguard the legal rights of the families as well as that of the mining company.	Compliance with conditions as per issued permit by KZNARIA

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
				• The process must be done by a reputable company well versed in the mitigation of graves •	
Stockpile and Discard Dump construction	Loss of topsoil, erosion and compaction	Soil, Land use & Capability	Construction	• Mine Planning and Layout; • Site clearance procedures • Stormwater management	Management of soils/land in accordance with Chamber of Mines Guidelines
	Increased noise disturbance levels due to construction machinery	Noise	Construction	• Vehicle maintenance plan • Vehicle activity to be conducted between 6:00 – 22:00	Operate within allowable noise limits (<45dB – day; <35dB - night)
Increased traffic and vehicular activity on district roads	Road-kills and disturbance of fauna and potential loss of fauna diversity	Fauna and Flora	Construction	• Conservation management plan; • Speed control on roads; • Mine design on haul roads • Maintenance plan and haul road upgrade	Compliance with Department of Transport Road maintenance standards
	Increase in ambient noise levels at surrounding communities due to vehicular activities	Noise	Construction	• Mine design; • Vehicle maintenance	Minimise noise levels
	Increased dust fallout	Air	Construction	• Dust control management plan	Minimise the generation of fugitive dust, compliance with PM_{10} and $PM_{2,5}$ standards
Blasting and Development of Initial Box-Cut for Mining	Change of land use from rural agriculture to mining will have a negative visual impact on the receiving environment. This change of land use will change the sense of place of the Project area and surrounds from a rural sense of place to an industrial/mining sense of place	Visual	Construction	• Mine Design and layout • Blasting plan • Dust Management Plan	Minimisation of negative visual impact caused by blasting

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	resulting in a loss of scenic character and increased visual disturbance. The change of land use will contribute to the cumulative impacts of mining on the regional environment.				
	Blasting and development of the initial box-cut for mining will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The box-cut will dramatically contrast the surrounding rural area as it will result in a scar on the landscape.	Visual	Construction	• Mine Design and layout • Blasting plan • Dust Management Plan	Minimisation of negative visual impact caused by blasting
	Increase in ambient noise levels at surrounding communities	Noise	Construction	• Mine Design and layout • Blasting plan • Noise Management Plan	Minimisation of negative noise impact caused by blasting
	Destruction of burial grounds and graves	Heritage	Construction	• Mine Design and layout • Blasting plan • Reburial and relocation plan • Conservation management plan	Protection of heritage and Zulu culture
	Job creation	Social	Construction	• Implementation of SLP • Procurement Policy • Employment Strategy • Recruitment Policy	Ensure that local labour is appointed; Procurement of local goods and services as per agreement with labour unions
	Local economy to benefit due to multiplier effects	Socio-Economic	Construction	Manage and maximise through: • Implementation of SLP	Procurement of local goods and services

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
				• Procurement Policy • Employment Strategy • Recruitment Policy	
	Development and upliftment of the adjacent communities of Ophondweni, Emalahleni and Mahujini	Social	Construction	• Implementation of SLP	Surrounding communities' benefits through SLP and Local Economic Development Plan (LED)
	Displacement of households and agricultural land	Social	Construction	• Implementation of Relocation Action Plan; • Grievance mechanism	To ensure that directly affected households are compensated fairly
	Disruption of daily movement patterns due to traffic related to coal haulage	Traffic	Construction	• Traffic Management Plan	To minimise the disruption caused by increased traffic
	Influx of people seeking employment resulting in pressure on local services, growth in informal settlements, increase in crime, increase in social pathologies and conflict between locals and new comers	Social	Construction	• Grievance mechanism • Influx Management Plan	To manage and minimise the impact on service delivery and resources, spread of social pathologies and potential conflict within communities
	Health and Safety issues resulting from mining and construction activities	Health	Construction	• Health and Safety Policy	To minimise injuries to employees during construction
	Direct and indirect impacts on surrounding land users due to the presence of the mine (impact on HiP tourism, sense of place etc.)	Socio-Economic	Construction	• Environmental Monitoring Programmes • Environmental Management Plan • Emergency Response Plan • Biodiversity Offset Agreements • Integrated Water and Waste Management Plan • Storm Water Management Plan • Rehabilitation Plan • Grievance Mechanism	Minimisation and mitigation of negative impacts on the properties surrounding the Somkhele mining operation; Ensure surrounding communities benefit from the development

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Opposition from stakeholders (MCEJO, GET) because of perceived negative impacts	Social	Construction	• Grievance mechanism • Communication protocol • Open Days	Management of stakeholders concerns and perceptions
	Gradual increase in anthracite production	Macro-economic	Construction	• Execution of Mining works program • SLP	Adjacent communities to benefit from the Project
	GDP impact	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Adjacent communities to benefit from the Project
	Employment	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Adjacent communities to benefit from the Project
	Skills Development and Training	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Adjacent communities to benefit from the Project
	Impact on household income	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Adjacent communities to benefit from the Project
	Increased Government income (Royalties and Taxes)	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	To ensure Government benefit from the Project
	Impact on rural livelihoods due to sterilisation of agricultural and grazing land	Socio-economic	Construction	• SLP • RAP	To ensure affected communities are fairly compensated
	Impact on property values	Macro-economic	Construction	• SLP • RAP	To ensure affected communities are fairly compensated

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
Vegetation clearance (>20 ha)	Loss of habitat in terms of fauna and flora	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Minimise loss of KZN Lowveld habitat
	Loss of biodiversity (decrease in species)	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Minimise loss of KZN Lowveld habitat
	Potential loss of threatened species/Red Data	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Minimise loss of KZN Lowveld habitat
	Noise disturbance (>35dB)	Noise	Operational	• Mine design and layout plan	Minimise noise levels
	Stripping of topsoil and soft overburden will have a negative visual impact on the receiving environment. As the Project area is stripped it will become noticeable to nearby receptors as it will contrast the surrounding area.	Visual	Operational	• Mine design • Dust management • Rehabilitation	Minimise impact on visual caused by stripping
Open pit mining, overburden removal	Disruption of drainage system and reduction in catchment yield	Surface water	Operational	• No mitigation	Compliance with catchment RQO's
	Reduction in groundwater yield due to ingress into open pits	Ground water	Operational	• Ground water monitoring plan • Potable water supply to affected households	Minimise groundwater quantity related impacts to affected receptors
	Contamination of groundwater caused by PCD seepage and waste stockpiling	Ground water	Operational	• Ground water monitoring plan • Potable water supply to affected households	Minimise groundwater quantity related impacts to affected receptors
	Perforation of rock and groundwater reserves leading to severe hydrological and geomorphological impacts to wetlands and catchment due to draw down cone	Wetlands	Operational	• Mitigation hierarchy and offsets; • Storm water management • Wetland Rehabilitation	Compensate for the loss of wetland habitat and prevent unnecessary impacts on wetlands

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Noise disturbance	Noise	Operational	• Noise mitigation plan	Minimise noise levels
	Blasting and ground vibration could damage houses and infrastructure (roads)	Blasting	Operational	• Blasting and vibration monitoring plan • House crack survey • Implement blasting buffer zone	Prevent ground vibrations from impacting on sensitive receptors and from damaging the integrity of structures
	Air Blast could damage houses	Blasting	Operational	• Blasting and vibration monitoring plan • House crack survey • Implement blasting buffer zone	Prevent ground vibrations from impacting on sensitive receptors and from damaging the integrity of structures
	Fly rock could damage property and injuries to humans and livestock	Blasting	Operational	• Implement blasting buffer zone	Prevent fly rock from damaging houses/infrastructure
	Impact of noxious fumes on houses and roads	Blasting, Health	Operational	• Air quality control procedure	To prevent noxious fumes from impacting on home steads and sensitive receptors
	Removal of overburden (including drilling and blasting of hard overburden) will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The open pit will dramatically contrast the surrounding agricultural area as it will result in a scar on the landscape.	Visual	Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	To minimise the negative visual impacts caused by overburden removal
	Destruction of burial grounds and graves	Heritage	Operational	• Heritage conservation management plan	Prevent loss of cultural heritage

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Drilling and blasting of coal will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The open pit will dramatically contrast the surrounding rural area as it will result in a scar on the landscape. Once the anthracite is removed from the open pit there will be insufficient material to backfill the open pit completely and a void will remain. This will result in a permanent and irreversible negative visual impact on the receiving environment.		Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	To minimise the negative visual impacts caused by open pit mining
Mining surface infrastructure	Development and operation of surface infrastructure resulting in runoff that could result in contamination of rivers	Surface water	Operational	• Storm water management; • Separate clean from dirty water • Contain dirty water	Compliance with WUL conditions Adherence to RQO's
	The operational mining activities occurring within an ecologically sensitive catchment, which pose significant potential negative impacts to functioning wetlands and catchment.	Wetlands	Operational	• Apply mitigation hierarchy; • Implement wetland offset • Wetland rehabilitation; • Ensure clean stormwater is conveyed to the natural environment.	Wetland compensation

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
				• Ensure that an infiltration/exfiltration trench is installed to offset potential negative impacts associated with the new mining areas, and to improve interflow into the known wetland area. Without the proposed stormwater attenuation system, the 32 m buffer will not be possible as the impact on the wetland system could be severe.	
	Loss of topsoil – erosion and compaction	Agricultural, land use, soils	Operational	• Apply proper site clearance procedures • Storm water management	Soil management in accordance with Chamber of Mines Guidelines
Increased haulage and vehicular traffic	Road-kills and disturbance of fauna and potential loss of fauna diversity	Traffic Health	Operational	• Traffic management plan • Conservation management plan	Compliance: Provincial Road regulations
	Increase in ambient noise levels at surrounding communities due to vehicular activities	Noise	Operational	• Noise management plan	Minimise noise levels
	Noise disturbance	Noise	Operational	• Noise management plan	Minimise noise levels
	Vehicular activity on haul roads will have a negative visual impact on the receiving environment. Dust from the vehicular activity will also have a negative visual impact.	Air	Operational	• Mine design and layout • Dust control	Minimise the negative visual impacts caused by hauling material
	Maintenance of the haul roads may require the acquisition of additional material such as from borrow pits which will have a negative visual impact on the receiving environment.	Traffic	Operational	• Road Maintenance plan	Minimise the negative visual impacts caused by hauling material

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
Power generation to sustain mining	Green House Gas emission	Climate Change	Operational	• Minimise emission of fugitive gasses	SA standard for CO is 1 hour limit value of 30 000 µg/m and 8 hourly limit (10 000 µg/m)
Storage ROM, hauling, coal stockpiling, overburden dumps	Runoff of water which has come into contact with the carboniferous material will contain various pollutants that may contaminate downstream river reaches.	Aquatic ecology	Operational	• Storm water management plan; • Bio-monitoring	Compliance with WUL conditions; Adherence to catchment Reserve requirements
	Runoff could result in contamination of rivers	Surface water	Operational	• Storm water management; • Implement IWWMP	Compliance with WUL conditions; Adherence to catchment Reserve requirements
	Noise disturbance	Noise	Operational	• Noise management plan	Minimise noise levels
	Stockpiling of overburden (including topsoil, soft overburden and hard overburden) will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact. The impact of the stockpiles will occur for the life of the Project. This impact will be reversed when the material from the stockpiles is used to backfill the open pit (soft overburden and hard overburden) and rehabilitate the Project area (topsoil) during the decommissioning and closure phase.	Visual	Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	To minimise the negative visual impacts caused by open pit mining
Drilling, blasting, crushing,	Reduction in runoff and catchment yield	Surface water	Operational	• No mitigation	Compliance with WUL conditions;

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
stockpiling, hauling					Adherence to catchment Reserve requirements
	Pollutants with runoff impact on surface water quality	Surface water	Operational	• Storm water management; • Containment of dirty water; • Re-use, recycle and minimise	Compliance with WUL conditions; Adherence to catchment Reserve requirements
	Impact on air quality caused by dust generation	Air	Operational	• Dust control management plan • Rehabilitation Plan	To minimise the generation of fugitive dust, PM_{10} and $PM_{2.5}$
	Noise disturbance	Noise	Operational	• Implement Noise Control Plan	Minimise noise levels
	Stockpiling of ROM coal will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact.	Visual	Operational	• Mine design and layout plan • Dust control plan • Rehabilitation Plan	To minimise the negative visual impacts caused by stockpiling
	Loss of access to burial grounds and degradation on intrinsic value	Heritage	Operational	• Implement heritage Conservation Plan	Prevent loss of heritage resources
General mining related operational activities	Creation of employment	Macro-economy	Operational	• SLP implementation	Ensure surrounding communities benefit from the development
	Contribute towards local economic growth	Macro-economy	Operational	• SLP implementation; • LED participation	To ensure goods and services are procured locally and local suppliers are developed
	Communities become dependent on the mine for sustaining economic development	Macro-economy	Operational	• SLP; • LED	To ensure that skill transfer and training programs are developed
	Increased product production	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy	Ensure that MWP are fully developed

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
				• Recruitment Policy	
	Impact on local GDP	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	To ensure goods and services are procured locally and local suppliers are developed
	Impact on local employment	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	To ensure goods and services are procured locally and local suppliers are developed
	Impact on skills development and Training	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	To ensure goods and services are procured locally and local suppliers are developed
	Impact on local household income	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	To ensure goods and services are procured locally and local suppliers are developed
	Impact on Government Revenue	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	To ensure that Levies and Royalties are paid
Closure and demolition of mining infrastructure	Loss of topsoil – erosion, compaction, land capability and land use	Soils	Decommissioning	• Implement Closure Plan	Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation
	Pollution of water due to dirty runoff	Surface water	Decommissioning	• Storm water management • RSIP implementation • Rehabilitation Plan	Compliance with WUL conditions; Adherence to catchment Reserve requirements

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	Siltation of surface water resources due to increased erosion from exposed surfaces	Surface water	Decommissioning	• Storm water management • RSIP implementation • Rehabilitation Plan	Compliance with WUL conditions; Adherence to catchment Reserve requirements
	Similarly to the construction and operational phase, the decommissioning and rehabilitation activities occurring within an ecologically sensitive catchment pose significant potential negative impacts to functioning wetlands and catchment. Furthermore, the rehabilitated area could cause major negative impacts due to spread of alien invasive vegetation, increased soil compaction erosion and subsequent sedimentation into the wetland ecosystems.	Wetlands	Decommissioning	• Mitigation Hierarchy • Storm Water Management Plan	To compensate for the loss of wetland habitat and prevent unnecessary impacts on wetlands
	Road-kills and disturbance of fauna	Health Fauna	Decommissioning	• Conservation Management Plan	To minimise the loss of faunal diversity
	Reduced air quality due to dust generation from rehabilitation and wind erosion	Air	Decommissioning	• Dust Management Plan • Dust Monitoring Programme	To minimise the generation of fugitive dust, PM_{10} and $PM_{2.5}$
	Noise disturbance	Noise	Decommissioning	• Noise Control Management	To minimise noise levels
	Demolition and removal of all infrastructure will have a negative visual impact on the receiving environment. Dust from the demolition process will also have a negative visual impact. Once the infrastructure is removed and rehabilitation of the disturbed areas is complete,	Visual	Decommissioning	• Rehabilitation and Closure Plan • Dust monitoring	To minimise the negative visual impacts caused by operation of open pits

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
	there will be an overall neutral visual impact on the receiving environment.				
Rehabilitation of the Project Areas: Emalahleni; Ophondweni; Mahujini	Loss of topsoil – erosion, compaction and land capability	Soils	Decommissioning	• Rehabilitation Plan	Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation
	Habitat fragmentation and increased establishment of alien plant species.	Fauna and Flora	Decommissioning	• Rehabilitation Plan	Minimise the loss of habitat
	Rehabilitation (including spreading of soil, re-vegetation and profiling or contouring) will have a negative visual impact on the receiving environment. Once coal is removed from the open pit there will be insufficient material to backfill the open pit completely and a void will remain. This will result in a permanent and irreversible negative visual impact on the receiving environment. This impact will be reduced if the Project area is re-contoured and profiled to create a free-draining topography. Once rehabilitation is complete and the Project area has re-contoured and profiled to create a draining topography to store water in the pit. There will be an overall neutral visual impact on the receiving environment.	Visual	Decommissioning	• Rehabilitation Plan; • End Land Use Implementation Plan	Minimise negative visual impacts
Post Closure Monitoring	Loss of topsoil – erosion, fertility and compaction	Soils	Post Closure	• Rehabilitation and Closure Plan	Soil Management in terms of the Chamber

Activity	Impacts	Aspects Affected	Phase	Mitigation Measure/Type	Standard to be achieved
					of Mines Guidelines for Rehabilitation
	Groundwater Contamination after closure	Ground water	Post Closure	• Ground water Monitoring • Closure Plan • Implementation of AMD Management Plan • Passive Treatment	To minimise groundwater contamination
	Mine decanting and contamination of surface water bodies	Ground water	Post Closure	• Ground water Monitoring • Closure Plan • Implementation of AMD Management Plan • Passive/Active Treatment	To minimise groundwater contamination
	Post-mining water decant is predicted to occur once the final void has been rehabilitated and groundwater levels are allowed to return back to natural level. It is anticipated that this decant will be acid forming.	Surface water; Wetlands	Post Closure	• Closure Plan • AMD Treatment (Passive/Active) • Ground water monitoring	To compensate for the loss of wetland habitat and prevent unnecessary impacts on wetlands
	Post-mining decant of groundwater will have negative impacts on the downstream water quality.	Aquatic ecology	Post Closure	• Long-term containment; • Surface water monitoring • Ground water monitoring • Bio-monitoring	To prevent and minimise erosion and the loss of aquatic habitat

7. Item 1(f): IMPACT MANAGEMENT ACTIONS

Table 7-1: Management actions for the Somkhele Project

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
Site clearance; Top soil removal	Loss of topsoil and agricultural land	Soils, Land use, Land Capability	Construction	• Ensure proper storm water management designs are in place; • If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place; • Only the designate access routes are to be used to reduce any unnecessary compaction; • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks; • Topsoil stockpiles are to be kept to a maximum height of 10 m; • If possible, topsoil should be stripped during dry months, as to reduce compaction; • Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles; • The stockpiles must be vegetated in order to reduce the risk of erosion; and • Handling of the stripped must be minimised to	Immediate during all phases of the project	GN704R, BPG A4 – PCD BPG G1 -SWM BPG G3 – Monitoring BPG H1 – IMWM PBG H4 - Water treatment

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				ensure the structure does not deteriorate.		
	Loss of habitat for fauna and flora	Biodiversity	Construction	• Compile Conservation Management Plan/Biodiversity Offset Management Plan Rehabilitation Plan	All phases of the project	NEMBA; NEMA GN320 Regulation
	Loss of biodiversity	Fauna and Flora	Construction	• Compile Conservation Management Plan/Biodiversity Offset Management Plan • Rehabilitation Plan	Life of Mine	Rehabilitation Plan and Biodiversity Offset; GN3569 Regulation
	Potential loss of Red Data Species	Biodiversity	Construction	• Relocation of any Red Data Species encountered within mining area • Conservation Management Plan; • Alien Invasive Control Management Plan; • Rehabilitation Plan	Life of Mine	GN 3569 Regulation; SANBI
	Fragmentation of ecosystems and habitats with increased risk of alien plant invasion	Biodiversity	Construction	• Alien Invasive Management Plan; • Rehabilitation Plan; • RSIP	Life of Mine	Latest RQO's as promulgated in terms of Reserve requirements
	Surface water quality deterioration due to suspended solids entering streams	Aquatic Ecology	Construction	• Bio-monitoring; • Stormwater management	Life of Mine Monitoring must commence from the start of the construction phase	Latest RQO's as promulgated in terms of Reserve requirements
	Hydropedology impact due to disturbance of wetland soils with loss of wetland eco-services and habitat	Wetlands	Construction	• Apply Mitigation Hierarchy; • Wetland Monitoring – Level 2; • Stormwater Management Plan; • Wetland Offset	Life of Mine	As per DWS Guideline Risk Matrix February 2024
	Erosion and sedimentation due to increased runoff from denuded areas resulting in sedimentation of downstream water resources	Surface Water	Construction	• Stormwater Management Plan; • Surface water monitoring; • Bio-monitoring	Life of Mine Monitoring must commence from the start of the construction phase	Regulation GN 704, Compliance with Water Quality Planning Limits of Management Units

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
						in the Mfolozi River
	Impact on air quality due to dust generation during windy conditions, potential for wind erosion	Air quality	Construction	• Dust Management Plan; • Dust monitoring	Monitoring must commence from the start of the construction phase	Dust fallout and PM standards as per NAAQS
	Noise disturbance from machinery in excess of 7dB	Noise	Construction	• Vehicle maintenance plan	Immediately the construction phase commences.	SANS 10328 and SANS 10103
	Visual negative impact on the receiving environment due to higher visibility from the HiP area	Visual Socio-Economic	Construction	• Dust Management Plan; • Dust Monitoring Plan; • Mine layout planning		
	Topsoil removal and stockpiling will contribute towards further negative visual impacts	Visual	Construction	• Dust Monitoring program	LoM - monitoring must commence from the start of the construction phase	PM10 (75 µg/m3) and dust fallout (1 200 mg/m2/day).
Mine Infrastructure Construction	Loss of topsoil – erosion, compaction, land capability and land use	Soils, Land Use & Capability	Construction	• Development in accordance with Mine Plan • Site clearance procedures	Final Mine layout to be completed during Planning phase; LoM	Chamber of Mine Guidelines
	Mining activity within a natural ecosystem is a negative impact to habitat integrity.	Wetlands, Riparian Zones	Construction	• Development in accordance with Mine Plan to exclude sensitive areas; • Apply mitigation hierarchy in terms of offset requirements; • Bio-monitoring	Construction Phase	NEMA; NEMBA
	Mining development and construction over sensitive riparian habitats resulting in the loss of degradation of aquatic habitat.	Aquatic Ecology, Surface water	Construction	• Development in accordance with Mine Plan • Apply WUL conditions	LoM	NFEPA, NEMWA; NWA RQO's
	The construction of surface infrastructure will have a negative visual impact on the receiving environment, especially towards the nearby Hluhluwe Imfolozi	Visual	Construction	• Development in accordance with Mine Plan	LoM	To minimise the negative visual impacts caused by development of mining footprint

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Park. The surface infrastructure will change the sense of place of the Project area from a rural agricultural sense of place to an industrial/mining sense of place. Construction area lighting at night will have a negative visual impact on the receiving environment. The construction area lighting will be visible from a distance of up to 10 km and will draw attention to the Project area. This will also have a negative impact on the sense of place.					
Relocation of households and infrastructure	Relocation of households and infrastructure will have a negative social and heritage impact on the receiving environment. Change of land use from rural agriculture to mining will have a negative visual impact on the receiving environment. This change of land use will change the sense of place of the Project area and surrounds from an agricultural sense of place to an industrial/mining sense of place resulting in a loss of scenic character and increased visual disturbance. The change of land use will contribute to the cumulative impacts of mining on the regional environment.	Socio-economic, Heritage, Visual	Construction	• Mine Planning and Layout • Relocation Action Plan	Prior to any mining activity within the Mining Right area	IFC Guidelines DMRE Guidelines on Resettlement
Stockpile and Discard Dump construction	Loss of topsoil, erosion and compaction	Soil, Land use & Capability	Construction	• Mine Planning and Layout; • Site clearance procedures • Stormwater management	Stockpile design should be completed before	NEMWA; BPG G4: Impact Prediction

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
					the construction starts; ongoing through LoM	
	Increased noise disturbance levels due to construction machinery	Noise	Construction	• Vehicle maintenance plan • Vehicle activity to be conducted between 6:00 – 22:00	Monitoring to commence immediately with commencement of construction phase	National Noise Control Regulations, SANS 10103:2008
Increased traffic and vehicular activity on district roads	Road-kills and disturbance of fauna and potential loss of fauna diversity	Fauna and Flora	Construction	• Conservation management plan; • Speed control on roads; • Mine design on haul roads • Maintenance plan and haul road upgrade	Immediately with construction phase commencement	NEMBA GN320 Regulations
	Increase in ambient noise levels at surrounding communities due to vehicular activities	Noise	Construction	• Mine design; • Vehicle maintenance	Each noise compliant to be investigated	SANS 10103
	Increased dust fall-out	Air	Construction	• Dust control management plan	During all phases with monthly analysis and quarterly reporting	Dust fallout and PM standards as per NAAQS
Blasting and Development of Initial Box-Cut for Mining	Change of land use from rural agriculture to mining will have a negative visual impact on the receiving environment. This change of land use will change the sense of place of the Project area and surrounds from a rural sense of place to an industrial/mining sense of place resulting in a loss of scenic character and increased visual disturbance. The change of land use will contribute to the cumulative impacts of mining on the regional environment.	Visual	Construction	• Mine Design and layout • Blasting plan • Dust Management Plan	Immediately when the construction phase commences; Ongoing through LoM	MHSA

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Blasting and development of the initial box-cut for mining will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The box-cut will dramatically contrast the surrounding rural area as it will result in a scar on the landscape.	Visual	Construction	• Mine Design and layout • Blasting plan • Dust Management Plan	Immediately the construction phase commences	To minimise the negative visual impacts caused by soil stripping and vegetation clearance
	Increase in ambient noise levels at surrounding communities	Noise	Construction	• Mine Design and layout • Blasting plan • Noise Management Plan	Construction phase and ongoing through LoM	SANS 10328 and SANS 10103
	Destruction of burial grounds and graves	Heritage	Construction	• Mine Design and layout • Blasting plan • Reburial and relocation plan • Conservation management plan	Prior to commencement of any mining activity	SAHRA (2007) Minimum Standards
	Job creation	Social	Construction	• Implementation of SLP • Procurement Policy • Employment Strategy • Recruitment Policy	Construction phase and ongoing through LoM	Measures taken to control influx of job seekers will be in line with the mine's safety and security standards.
	Local economy to benefit due to multiplier effects	Socio-Economic	Construction	Manage and maximise through: • Implementation of SLP • Procurement Policy • Employment Strategy • Recruitment Policy	Construction phase and ongoing through LoM	Household income above living standard (Improved living standards)
	Development and upliftment of the adjacent communities of Ophondweni, Emalahleni and Mahujini	Social	Construction	• Implementation of SLP	Immediately when construction phase commences	Improve conditions above minimum living standard
	Displacement of households and agricultural land	Social	Construction	• Implementation of Relocation Action Plan; • Grievance mechanism	Prior construction phase commences	Improve conditions above living standards

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Disruption of daily movement patterns due to traffic related to coal haulage	Traffic	Construction	• Traffic Management Plan	Immediately when construction phase commences	
	Influx of people seeking employment resulting in pressure on local services, growth in informal settlements, increase in crime, increase in social pathologies and conflict between locals and new comers	Social	Construction	• Grievance mechanism • Influx Management Plan	Immediately when construction phase commences	Measures taken to control influx of job seekers will be in line with the mine's safety and security standards.
	Health and Safety issues resulting from mining and construction activities	Health	Construction	• Health and Safety Policy	Immediately when construction phase commences	OHSA standards
	Direct and indirect impacts on surrounding land users due to the presence of the mine (impact on HiP tourism, sense of place etc.)	Socio-Economic	Construction	• Environmental Monitoring Programmes • Environmental Management Plan • Emergency Response Plan • Biodiversity Offset Agreements • Integrated Water and Waste Management Plan • Storm Water Management Plan • Rehabilitation Plan • Grievance Mechanism	Immediately when construction phase commences	As stated in approved and issued EMP
	Opposition from stakeholders (MCEJO, GET) because of perceived negative impacts	Social	Construction	• Grievance mechanism • Communication protocol • Open Days	Ongoing through LoM	SLP
	Gradual increase in anthracite production	Macro-economic	Construction	• Execution of Mining works program • SLP	Operational phase	MWP; SLP
	GDP impact	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Operational phase	SARS
	Employment	Macro-economic	Construction	• SLP • LED	LoM	Mine's safety and security standards

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				• Procurement Policy • Employment/Recruitment Policy		
	Skills Development and Training	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Immediately when construction phase commences and ongoing through LoM	Local labour forced trained and skills developed
	Impact on household income	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Immediately when construction phase commences and ongoing through LoM	Appointment of local labour force
	Increased Government income (Royalties and Taxes)	Macro-economic	Construction	• SLP • LED • Procurement Policy • Employment/Recruitment Policy	Immediately when construction phase commences and ongoing through LoM	Goods and services are procured locally and local suppliers are developed
	Impact on rural livelihoods due to sterilisation of agricultural and grazing land	Socio-economic	Construction	• SLP • RAP	All phases of mining	Ensure community benefits from project development
	Impact on property values	Macro-economic	Construction	• SLP • RAP	Prior to commencement of mining	As per contractual agreement contained in the RAP
Vegetation clearance (>20 ha)	Loss of habitat in terms of fauna and flora	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Alien management plan to be implemented after construction quarterly for 2 years and after decommissioning quarterly for 2 years.	NEMBA 57 of 2003
	Loss of biodiversity (decrease in species)	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Construction phase; Ongoing through LoM	NEMBA 57 of 2003 SANBI, 2019

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Potential loss of threatened species/Red Data	Fauna/Flora	Operational	• Biodiversity Conservation Management • Alien Invasive Management • Rehabilitation	Construction phase; Ongoing through LoM	NEMBA 57 of 2003; SANBI, 2019
	Noise disturbance (>35dB)	Noise	Operational	• Mine design and layout plan		SANS 10328 and SANS 10103
	Stripping of topsoil and soft overburden will have a negative visual impact on the receiving environment. As the Project area is stripped it will become noticeable to nearby receptors as it will contrast the surrounding area.	Visual	Operational	• Mine design • Dust management • Rehabilitation	Construction phase and through LoM	To minimise the negative visual impacts caused by mining
Open pit mining, overburden removal	Disruption of drainage system and reduction in catchment yield	Surface water	Operational	• No mitigation	Immediate with construction phase	Compliance with Resource Quality Objectives for W23G
	Reduction in groundwater yield due to ingress into open pits	Ground water	Operational	• Ground water monitoring plan • Potable water supply to affected households	Monitoring to commence immediately with construction phase	Conditions in WUL; NWA
	Contamination of groundwater caused by PCD seepage and waste stockpiling	Ground water	Operational	• Ground water monitoring plan • Potable water supply to affected households	Monitoring to commence immediately with construction phase	Compliance groundwater Reserve, RQO's
	Perforation of rock and groundwater reserves leading to severe hydrological and geomorphological impacts to wetlands and catchment due to draw down cone	Wetlands	Operational	• Mitigation hierarchy and offsets; • Storm water management • Wetland Rehabilitation	LoM	Maintaining Health Class C; EIS of High
	Noise disturbance	Noise	Operational	• Noise mitigation plan	Monitoring to commence immediately with construction phase	SANS 10328 and SANS 10103
	Blasting and ground vibration could damage houses and infrastructure (roads)	Blasting	Operational	• Blasting and vibration monitoring plan • House crack survey	LoM; Monitoring to commence	DMRE Memo; CSIR Guideline;

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				• Implement blasting buffer zone	immediately with construction phase; Survey prior to blasting	Prevent ground vibrations from impacting on sensitive receptors and from damaging the integrity of structures
	Air Blast could damage houses	Blasting	Operational	• Blasting and vibration monitoring plan • House crack survey • Implement blasting buffer zone	Operational phase	Minimise the negative visual impacts caused by blasting
	Fly rock could damage property and injuries to humans and livestock	Blasting	Operational	• Implement blasting buffer zone	Operational phase	IFC Guidelines
	Impact of noxious fumes on houses and roads	Blasting, Health	Operational	• Air quality control procedure	Immediate with commencement of construction phase	National Air Quality Standards
	Removal of overburden (including drilling and blasting of hard overburden) will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The open pit will dramatically contrast the surrounding agricultural area as it will result in a scar on the landscape.	Visual	Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	Management must commence prior to the start of operation and then through life of project	To minimise the negative visual impacts caused by mining
	Destruction of burial grounds and graves	Heritage	Operational	• Heritage conservation management plan	Pre-planning	IPILRA SAHRA (2007) Minimum Standards
	Destruction of fossils	Palaeontology	Operational	• Implement Chance find procedure If a chance find is	Only when fossils are encountered –	NHRA

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				made, the person responsible for the find must immediately **stop working**, and all work in the immediate vicinity of the find must stop as well. • The individual who discovered the item must immediately **report** his or her direct supervisor, who must then notify his or her management and the ECO or site manager. The ECO or site manager must notify the relevant Heritage Agency (South African Heritage Resources Agency, SAHRA) of the discovery. (Contact information: SAHRA, 111 Harrington Street, Cape Town, South Africa. PO Box 4637, Cape Town 8000, South Africa. Fax: +27 (0)21 462 4509. Tel: 021 462 4502. Web address: www.sahra.org.za). • Photographs of the find from various perspectives, as well as GPS coordinates, must be submitted to the Heritage Agency. • Within **24 hours** of the discovery, a preliminary report must be sent to the Heritage Agency, which must include the following: 1) the date of finding; 2) a description of the discovery; and 3) a description of the fossil and its context (depth	Construction and operational phase	SAHRA (2007) Minimum Standards

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				and position of the fossil), as well as GPS coordinates. • Photographs of the discovery (the more the merrier) must be of high quality, in focus, and accompanied by a scale. Photographs of the vertical part (side) where the fossil was discovered are also required. • Upon receipt of the preliminary report, the Heritage Agency will notify the ECO (or site manager) whether a palaeontologist rescue excavation or collection is required. • The place must be guarded to prevent future damage. There should be no attempt to remove material from their environment. Stabilize the exposed items and cover them with a plastic sheet or sand bags. The Heritage organization will also be able to advise on the best way to protect the find. • If the fossil cannot be stabilized, the ECO (site manager) may carefully collect the fossil. • Once the Heritage Agency has received the written authorization, the mine may continue with the mining activity in the affected area. • Fossil finds must be placed in tissue paper and in an appropriate box while necessary care must be		

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
				taken to remove any fossil material from the rescue site.		
	Drilling and blasting of coal will have a negative visual impact on the receiving environment. Drilling and blasting will result in noise and dust thereby attracting attention to the Project area. Dust from blasting will have a negative visual impact. The open pit will dramatically contrast the surrounding rural area as it will result in a scar on the landscape. Once the anthracite is removed from the open pit there will be insufficient material to backfill the open pit completely and a void will remain. This will result in a permanent and irreversible negative visual impact on the receiving environment.		Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	Operational	Prevent ground vibrations from impacting on sensitive receptors and from damaging the integrity of structures
Mining surface infrastructure	Development and operation of surface infrastructure resulting in runoff that could result in contamination of rivers	Surface water	Operational	• Storm water management; • Separate clean from dirty water • Contain dirty water	Operational	Compliance with Resource Quality Objectives for W23G DWAF's BPG Guidelines
	The operational mining activities occurring within an ecologically sensitive catchment, which pose significant potential negative impacts to functioning wetlands and catchment.	Wetlands	Operational	• Apply mitigation hierarchy; • Implement wetland offset • Wetland rehabilitation	Operational	To compensate for the loss of wetland habitat and prevent unnecessary impacts on wetlands

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Loss of topsoil – erosion and compaction	Agricultural, land use, soils	Operational	• Apply proper site clearance procedures • Storm water management	Commence during construction phase through LoM	Soil Management in terms of the Chamber of Mines Guidelines for Rehabilitation
Increased haulage and vehicular traffic	Road-kills and disturbance of fauna and potential loss of fauna diversity	Traffic Health	Operational	• Traffic management plan • Conservation management plan	During Preplanning phase throughout LoM	DoT Guidelines on Road Safety
	Increase in ambient noise levels at surrounding communities due to vehicular activities	Noise	Operational	• Noise management plan	During construction phase throughout LoM	National Noise Control Regulations, SANS 10103:2008
	Noise disturbance	Noise	Operational	• Noise management plan	During construction phase throughout LoM	SANS 10328 and SANS 10103
	Vehicular activity on haul roads will have a negative visual impact on the receiving environment. Dust from the vehicular activity will also have a negative visual impact.	Air	Operational	• Mine design and layout • Dust control	During construction phase throughout LoM	Standards as per NAAQS
	Maintenance of the haul roads may require the acquisition of additional material such as from borrow pits which will have a negative visual impact on the receiving environment.	Traffic	Operational	• Road Maintenance plan	During Preplanning phase throughout LoM	DoT Guidelines on Road Maintenance
Storage ROM, hauling, coal stockpiling, overburden dumps	Runoff of water which has come into contact with the carboniferous material will contain various pollutants that may contaminate downstream river reaches.	Aquatic ecology	Operational	• Storm water management plan; • Bio-monitoring	Construction and through LoM; Monitoring commences immediately with construction phase	GN704 Regulations
	Runoff could result in contamination of rivers	Surface water	Operational	• Storm water management; • Implement IWWMP	LoM	GN704R
	Noise disturbance	Noise	Operational	• Noise management plan	Immediate and ongoing through LoM	SANS 10103

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Stockpiling of overburden (including topsoil, soft overburden and hard overburden) will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact. The impact of the stockpiles will occur for the life of the Project. This impact will be reversed when the material from the stockpiles is used to backfill the open pit (soft overburden and hard overburden) and rehabilitate the Project area (topsoil) during the decommissioning and closure phase.	Visual	Operational	• Mine Design • Dust Management Plan • Rehabilitation Plan	Design must be completed prior to construction phase; Management ongoing through LoM	To minimise negative visual impacts
Drilling, blasting, crushing, stockpiling, hauling	Reduction in runoff and catchment yield	Surface water	Operational	• No mitigation due to destruction of drainage lines • Drainage to be captured in pit lakes and	Construction phase	WUL conditions; SWM as per GN704 Regulations
	Pollutants with runoff impact on surface water quality	Surface water	Operational	• Storm water management; • Containment of dirty water; • Re-use, recycle and minimise	Commence during construction phase through LoM	MHSA
	Impact on air quality caused by dust generation	Air	Operational	• Dust control management plan • Rehabilitation Plan	Commence during construction phase through LoM	Dust fallout and PM standards as per NAAQS
	Noise disturbance	Noise	Operational	• Implement Noise Control Plan	As per lodged compliant	SANS 10103
	Stockpiling of ROM coal will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact.	Visual	Operational	• Mine design and layout plan • Dust control plan • Rehabilitation Plan	Commence during construction phase through LoM	MHSA

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Loss of access to burial grounds and degradation on intrinsic value	Heritage	Operational	• Implement heritage Conservation Plan	Prior to construction phase	SAHRA (2007) Minimum Standards
General mining related operational activities	Creation of employment	Macro-economy	Operational	• SLP	Commence during construction phase through LoM	Ensure local labour force benefit from Project
	Contribute towards local economic growth	Macro-economy	Operational	• SLP; • LED	Commence during construction phase through LoM	Ensure participation through LED programme
	Communities become dependent on the mine for sustaining economic development	Macro-economy	Operational	• SLP; • LED	Commence during construction phase through LoM	Improved living standards
	Increased product production	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	Household income above living standard (Improved living standards)
	Impact on local GDP	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	Household income above living standard (Improved living standards)
	Impact on local employment	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	Household income above living standard (Improved living standards)
	Impact on skills development and Training	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	Ensure community labour force are skilled and trained
	Impact on local household income	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	Household income above living standard (Improved living standards)

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Impact on Government Revenue	Macro-economy	Operational	• SLP • LED • Procurement Policy • Employment Strategy • Recruitment Policy	Commence during construction phase through LoM	MPRDA, Employment Equity Act; Labour Relations Act
Closure and demolition of mining infrastructure	Loss of topsoil – erosion, compaction, land capability and land use	Soils	Decommissioning	• Implement Closure Plan	During decommissioning phase	Chamber of Mines Guidelines on Rehab
	Pollution of water due to dirty runoff	Surface water	Decommissioning	• Storm water management • RSIP implementation • Rehabilitation Plan	During decommissioning phase	Compliance with Resource Quality Objectives for W23G
	Siltation of surface water resources due to increased erosion from exposed surfaces	Surface water	Decommissioning	• Storm water management • RSIP implementation • Rehabilitation Plan	During decommissioning phase	Compliance with Resource Quality Objectives for W23G
	Similarly to the construction and operational phase, the decommissioning and rehabilitation activities occurring within an ecologically sensitive catchment pose significant potential negative impacts to functioning wetlands and catchment. Furthermore, the rehabilitated area could cause major negative impacts due to spread of alien invasive vegetation, increased soil compaction erosion and subsequent sedimentation into the wetland ecosystems.	Wetlands	Decommissioning	• Mitigation Hierarchy • Storm Water Management Plan	During decommissioning phase	Wetland offset guidelines
	Road-kills and disturbance of fauna	Health Fauna	Decommissioning	• Conservation Management Plan	LoM	MHSA
	Reduced air quality due to dust generation from rehabilitation and wind erosion	Air	Decommissioning	• Dust Management Plan • Dust Monitoring Programme	LoM	National Air Quality Standards

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Noise disturbance	Noise	Decommissioning	• Noise Control Management	LoM	National Noise Control Regulations, SANS 10103:2008
	Demolition and removal of all infrastructure will have a negative visual impact on the receiving environment. Dust from the demolition process will also have a negative visual impact. Once the infrastructure is removed and rehabilitation of the disturbed areas is complete, there will be an overall neutral visual impact on the receiving environment.	Visual	Decommissioning	• Rehabilitation and Closure Plan • Dust monitoring	Commencement of Closure and Decommissioning Phase; Closure Plan/RSIP to be compiled 180 days prior to cessation of activities	As per Rehab and Closure Plan
Rehabilitation of the Project Areas: Emalahleni; Ophondweni; Mahujini	Loss of topsoil – erosion, compaction and land capability	Soils	Decommissioning	• Rehabilitation Plan	Rehabilitation monitoring post closure to continue for 5-years	As per Rehab and Closure Plan
	Habitat fragmentation and increased establishment of alien plant species.	Fauna and Flora	Decommissioning	• Rehabilitation Plan	Rehabilitation monitoring post closure to continue for 5-year	As per Rehab and Closure Plan
	Rehabilitation (including spreading of soil, re-vegetation and profiling or contouring) will have a negative visual impact on the receiving environment. Once coal is removed from the open pit there will be insufficient material to backfill the open pit completely and a void will remain. This will result in a permanent and irreversible negative visual impact on the receiving environment. This impact will be reduced if the	Visual	Decommissioning	• Rehabilitation Plan; • End Land Use Implementation Plan	Commencement of Closure and Decommissioning Phase; Closure Plan/RSIP to be compiled 180 days prior to cessation of activities	Sections 43(4), 55, 57, 60 and 62 of MPRDA; Section 24(R)(1) of NEMA

Activity	Potential Impacts	Aspects Affected	Phase	Mitigation Measures and Actions	Time Period: Implementation	Compliance with Standards
	Project area is re-contoured and profiled to create a free-draining topography. Once rehabilitation is complete and the Project area has re-contoured and profiled to create a draining topography to store water in the pit. There will be an overall neutral visual impact on the receiving environment.					
Post Closure Monitoring	Loss of topsoil – erosion, fertility and compaction	Soils	Post Closure	• Rehabilitation and Closure Plan	Rehabilitation monitoring post closure to continue for 5-years	As stated in an approved Rehab and Closure Plan
	Groundwater Contamination after closure	Ground water	Post Closure	• Ground water Monitoring • Closure Plan • Implementation of AMD Management Plan • Passive Treatment	Closure and up to 10 years post closure	SANS 241-2015
	Mine decanting and contamination of surface water bodies	Ground water	Post Closure	• Ground water Monitoring • Closure Plan • Implementation of AMD Management Plan • Passive/Active Treatment	Closure and up to 10 years post closure	SANS 241-2015
	Post-mining water decant is predicted to occur once the final void has been rehabilitated and groundwater levels are allowed to return back to natural level. It is anticipated that this decant will be acid forming.	Surface water; Wetlands	Post Closure	• Closure Plan • AMD Treatment (Passive/Active) • Ground water monitoring	Closure and up to 5 years post closure	Section 24(R)(1) of NEMA – Duty of Care
	Post-mining decant of groundwater will have negative impacts on the downstream water quality.	Aquatic ecology	Post Closure	• Long-term containment; • Surface water monitoring • Ground water monitoring • Bio-monitoring	Closure and up to 5 years post closure	Section 24(R)(1) of NEMA – Duty of Care

Table 7-2: Proposed consolidated Management Actions for Somkhele mine during all phases (C, O, D)

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
Construction Phase				
• Final mine layout planning	Impact on Sense of Place, change of land use from rural agriculture to mining,	Topography Geology Land use	• Applicable to all three mining areas applied for; • Prior to construction ensure all environmental authorisations are in place; • Obtain relevant permits for search and rescue of threatened species prior to clearing areas for mining; • Consider the recommendations from specialists prior to the finalisation of the mining infrastructure layout; • Limit construction footprint & vegetation stripping Strictly to mine layout planning, within fenced off area • Minimise construction duration. • Develop and implement a Dust management program. • Construct screening berms of approximately 3 m in height • Investigate the construction of a perimeter fence line and fence off the mining area; • Implement dust suppression measures; • Choose suitable types of lighting that minimize glare • Only focus light sources on where it is needed	NEMA NEMBA Chamber of Mines Guidelines
• Health and Safety	Potential injury to employees	Health	• Appoint a safety officer at the mine; • Ensure that all personnel are issued with the needed personal protective wear; • Develop relevant SoP's • Adhere to the requirements of the Mine Health and Safety Act, 1916 (Act No. 29 of 1996), as amended.	MHSA; OHSA
• Vegetation clearance	Change in flora composition of Zululand Lowveld	Flora	• Minimise the footprint to only cover the area required for mining infrastructure development as per mining layout plan;	NEMBA; Mining and biodiversity

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Fence off the mining area as per predetermined perimeter; • Sensitive vegetation communities such as riparian areas and wetlands should be indicated as No-Go areas; • Implement a 50m protective buffer zone around the sensitive landscapes; • Prior to the commencement of mining all threatened and red data species should be relocated in the area to be disturbed, this should be done as the mine develops. • Establish a nursery for the cultivation of floral species to be re-introduced as part of rehabilitation; • Commence with the growing of species X as soon as possible • All no-go/sensitive areas to be demarcated • Negotiate possible wetland offset • Implement Environmental Awareness Training	guideline (DEA, 2013)
• Site establishment • Infrastructure development (SWM, PCD, WRD, Hard Park, etc.) • Open pit establishment and mining	Vegetation, change in biodiversity, groundwater levels to change,	Biodiversity Groundwater Surface water	• Implement pollution control structures (PCD, stormwater channels) • Implement erosion control measures • Implement noise control measures • Install proper liner (Geomembrane), all liner installations should be done in accordance with SANS10409:2020 requirements for all waste-related infrastructure • Implement monitoring programs for groundwater, surface water, noise, dust • Visual soil assessments for signs of contamination during construction (monthly) • Install a temporary cut-off trench to contain poor-quality runoff (if required).	GNR704

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Cover any temporary construction material stockpiles. • Park heavy machinery in lined areas and place drip trays under vehicles at the site. • Have fuel and oil spill cleanup kits on site and clean up these areas immediately. • Ensure that building material stockpiles are covered with a suitable temporary cover or placed in bunded areas to reduce poor-quality seepage probability.	
• Mining footprint transgresses into protective buffer zones	Potential impact on riparian vegetation of drainage lines and wetland areas	Aquatic	• Prevent the loss of aquatic systems by avoiding sensitive (no-go) areas; • Water crossings of haul roads selected at points where the least impact could be expected by starting upstream and moving in a downstream direction. • Limit removal of riparian vegetation and prevent fragmentation of aquatic habitats to ensure ecological corridors are kept in place. • Prevent destabilisation of river beds and banks by implementing appropriate gabions and culverts where and when required; • Rehabilitate riparian areas after haul road construction • As far as possible, all mining-related activities and infrastructure should remain outside of the riparian / wetland zones and recommended buffer zones (see section 6.1), in line with the conditions and requirements of Regulation GN704 of the National water Act. • All watercourses and their buffer zones in the vicinity of any mining operations should be clearly demarcated. These demarcated	NFEPA RQO's SASS 5

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			areas should be considered as "out of bounds" for all vehicles and personnel. • Where encroachment of mining into watercourses is unavoidable, it must be ensured that impact footprints are minimised and that no activities encroach any further than indicated on the mining/infrastructural design masterplan. • No vehicles should be permitted to cross drainage lines or wetland areas except via existing or planned routes. • When locating temporary construction camps and equipment yards, watercourses and areas susceptible to soil erosion and/or water contamination must be avoided. • Attempts must be made to situate the camp on flat ground that is at least 100m away or outside the 1:100-year flood line whichever is more, from the edge of the nearest delineated watercourse.	
• Top soil stockpiling	Establishment of the box cut will result in the stripping of soils with medium agricultural potential, which will result in the loss of agricultural/soil potential	Soils	• Stockpiling should not exceed a maximum height of 5 meters or designed parameter hight; • First 30 cm of top fertile soil layer to be stockpiled separately and be used for seeding and revegetation purposes after completion of rehabilitation; • Protect stockpiled material from water runoff and erosion; • Vegetate the side slopes and surface areas where possible to prevent water and wind erosion as well as to keep soils biologically active; • Implement erosion control measures in areas where donga erosion is present or most likely to occur.	Chamber of Mines Guideline

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Due to steep slopes early water runoff measures must be implemented to prevent soil erosion. • Prevent soil erosion from roads and opencast areas by implementing appropriate stormwater management measures • Implement dust suppression measures on unpaved roads • Restrict number of roads on site to prevent compaction by heavy construction equipment • All disturbed land to be revegetated to prevent erosion and soil deterioration • All useable soils to be stripped for later use in revegetation and rehabilitation • Berms to be constructed for separation of clean and dirty water systems to prevent stormwater contamination and erosion • Preserve undisturbed top soils by utilizing the large available disturbed areas for all waste discard products.	
• Noise generation due to construction activities	Nuisance impact on adjacent occupiers of land	Noise	• Relocate all affected communities within the 500m boundary zone of the blasting area. • The mine can negotiate the relocation of selected NSR's; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads); • Limit construction to the minimum during the night time • Construct berms at strategic areas to act as noise barriers	National Noise Control Regulations

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Implement grievance procedures The mine can negotiate the relocation of selected NSR;	
• Incidental spillages from the site	Deterioration of water quality for ground and surface water sources	Groundwater; Surface water	• Construction of water containment facilities in accordance with GNR704 requirements; • Construct PCD's lined with the appropriate liner • Avoid delineated riparian areas • Undertake construction during low flow season • Limit instream habitat disturbance during construction phase • Implement rehabilitation activities to address temporary disturbance • Implement rehabilitation activities to address temporary disturbance • Implement stormwater management measures • Implement hazardous materials procedure to prevent spillages • Implement Emergency Incident procedure • Immediate remediation and rehabilitate the footprint of the spilled area • Implement ad-hoc monitoring plan to quantify extent and magnitude of spillage incident • Ensure good housekeeping practices on site	GNR704
• Incidental polluted discharges from the site • Contaminated run-off • Erosion	Deterioration of surface water quality	Surface water; Aquatic Ecology	• Reportable incident procedure to be followed as required to do so by law • Compile Action Plan/Emergency Response plan how to remediate • Ensure SWMP separates between clean and dirty water systems • Implement erosion control measures • All staff involved in work within and near to freshwater (river/stream/wetland) habitats	Section 19, NWA; Section 30, NEMA – control of emergency incidents

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			must receive basic environmental awareness training relating specifically to the need to protect freshwater ecosystems. • All relevant staff on the property are to be informed of the sensitivity of the wetlands/rivers and the need to avoid damaging/polluting these sensitive aquatic environments. • Site supervisors must ensure that impacts are confined to designated mining areas as far as possible. • As far as possible, all mining-related activities and infrastructure should remain outside of the riparian / wetland zones and recommended buffer zones (see section 6.1), in line with the conditions and requirements of Regulation GN704 of the National water Act. • All watercourses and their buffer zones in the vicinity of any mining operations should be clearly demarcated. These demarcated areas should be considered as "out of bounds" for all vehicles and personnel. • Where encroachment of mining into watercourses is unavoidable, it must be ensured that impact footprints are minimised and that no activities encroach any further than indicated on the mining/infrastructural design masterplan. • No vehicles should be permitted to cross drainage lines or wetland areas except via existing or planned routes. • When locating temporary construction camps and equipment yards, watercourses and areas susceptible to soil erosion and/or water contamination must be avoided.	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Attempts must be made to situate the camp on flat ground that is at least 100m away or outside the 1:100-year flood line whichever is more, from the edge of the nearest delineated watercourse. • The location of the campsite should be approved by the appointed Environmental Control Officer (ECO). • Appropriate signage around the wetlands/streams could also be erected to raise awareness amongst worker/employees at the site.	
• Site clearance • Construction and mining activities within 1:100-year flood line	Increased run-off and flooding	Hydrology; Surface water; Aquatic ecology; Vegetation	• Implement SWMP • Flood protection berms/gabions • Water energy disperser at outlet points to minimise erosion • All staff involved in work within and near to freshwater (river/stream/wetland) habitats must receive basic environmental awareness training relating specifically to the need to protect freshwater ecosystems. • All relevant staff on the property are to be informed of the sensitivity of the wetlands/rivers and the need to avoid damaging/polluting these sensitive aquatic environments. • Site supervisors must ensure that impacts are confined to designated mining areas as far as possible. • As far as possible, all mining-related activities and infrastructure should remain outside of the riparian / wetland zones and recommended buffer zones (see section 6.1), in line with the conditions and requirements of Regulation GN704 of the National water Act.	GNR 704

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• All watercourses and their buffer zones in the vicinity of any mining operations should be clearly demarcated. • These demarcated areas should be considered as "out of bounds" for all vehicles and personnel. • Where encroachment of mining into watercourses is unavoidable, it must be ensured that impact footprints are minimised and that no activities encroach any further than indicated on the mining/infrastructural design masterplan. • No vehicles should be permitted to cross drainage lines or wetland areas except via existing or planned routes. • When locating temporary construction camps and equipment yards, watercourses and areas susceptible to soil erosion and/or water contamination must be avoided. • Attempts must be made to situate the camp on flat ground that is at least 100m away or outside the 1:100-year flood line whichever is more, from the edge of the nearest delineated watercourse. • The location of the camp site should be approved by the appointed Environmental Control Officer (ECO). • Appropriate signage around the wetlands/streams could also be erected to raise awareness amongst worker/employees at the site.	
• Haul road construction; • Drainage line crossings	Alteration of natural drainage lines; Reduced catchment yield; Destruction of riparian areas	Surface water	• SWM design • Compliance with conditions in WUL for section 21(c), (i) water uses; • Bio-monitoring bi-annually • Surface water monitoring	BPG G1: Stormwater; GN 509, Aug 2016; SASS5

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• All sensitive areas must be demarcated and protected prior to construction. • The necessary erosion prevention and protection mechanisms must be employed to ensure the sustainability of structures and activities and to prevent sedimentation within the watercourses. • The height, width and length of structures must be limited to the minimum dimensions to accomplish the intended function. • Structures must not be damaged by floods exceeding the magnitude of floods occurring on average once in every 100 years. • Structures must be non-erosive, structurally stable and must not induce any flooding or safety hazard. • All structures must be inspected regularly for accumulation of debris, blockage, instabilities, erosion of abutments and overflow areas – debris must be removed and damages must be repaired and reinforced immediately. • The construction camp, equipment and material stockpiles must be located outside the extent of the watercourse/s and must be recovered and removed within a period of 1 (one) month after completion of activity. • All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous vegetation species as required and the use of seed nets is recommended to prevent erosion.	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• No construction is allowed within the 1:100-year flood line and/or delineated riparian habitat, whichever is the greatest, or within 500 m radius from the boundary of any wetland unless authorised in this licence. • With respect to any access roads, haul roads or crossings (temporary or permanent) please note the following: • Any damage must be repaired immediately to prevent further damage; • These must be non-polluting with respect to silt and litter that can be deposited into a watercourse; • These must facilitate the movement of aquatic and non-aquatic organisms and fauna where watercourses are crossed; and • These must be tarred or concreted in such a way that it minimizes impacts on the characteristics of any watercourses that are crossed. • Where possible, construction activities should be scheduled for dry winter months to decrease the risk of erosion during heavy thunderstorms. • Natural drainage lines and wetlands outside of the structure footprint must be treated as sensitive areas, with highly restricted use. Permissible activities inside these areas must be clearly stipulated and treated as unique situations and exceptions.	
• Box cut excavation and establishing mining footprint	Visual impact on surrounding properties and communities; Night lighting	Visual and Landscape; Socio-Economic; Air and Noise;	• Construct perimeter/fence around the box cut area; • Remove the minimum amount of vegetation	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
	Preparing area for mining increased dust and noise impacts; Increased traffic by construction vehicles on the roads	Traffic	• Where possible areas disturbed by construction will be top soiled and revegetated; • Implement dust suppression • Topsoil stockpiles to be kept to a height level not exceeding design parameters. • Place security lighting as such to minimise the impact of glare and spill light on sensitive receptors • Implement windbreakers to reduce the potential of dust movement. • Overburden dumps to be designed with a contoured approach • Continuous shaping of the dumps during operational phase as far as possible	
• Relocation of Directly Affected Communities	Potential destruction of sites of archaeological and cultural importance; Relocation of graves	Culture and Heritage	• The establishment of bi-lingual site and newspaper notices indicating the intent of the relocation. • A detailed social consultation process, at least 60 days in length, as required by the KZNARIA and the National Health Act and its Regulations, comprising the attempted identification of the next-of-kin to obtain their consent for the relocation. • Involve traditional leaders, tribal authorities and families of the Directly Affected Communities; • Conduct survey and map graves to be relocated by means of grave number, GPS coordinates, affected family with contact details and name of deceased; • Obtain required permits from Regulatory Authority; • Document the logistics regarding reburial in terms of family and spiritual	GNR 1939, March 2022

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			requirements, costs, new grave location (GPS) and time of grave removal; • Procedural requirement for relocation of graves to be incorporated in the Relocation Action Plan • An exhumation process that keeps the dignity of the remains and family intact. • An exhumation process that will safeguard the legal rights of the families and that of the mining company. • The process must be done by a reputable company well-versed in the mitigation of graves. • A buffer area of at least 100m around the burial grounds and graves and a buffer area of at least 30m around other heritage sites would be required. The existing Heritage Management Plan must be implemented where heritage resources remain in place.	
• Preparation of mining area destroy animal habitat	Migration of animal life away from the mining area; Disturbance of fauna; Air quality Light pollution	Biodiversity	• Minimisation of footprint size and restriction of disturbance surrounding footprint • Minimisation of footprint size and distribution of re-located communities • Determination and implementation of appropriate offsets • Implementation of effective stormwater management and water quality management plan • Surfacing of haulage roads to reduce dust impacts, and other dust management mitigation actions • Improved management of remaining undeveloped portions of the site. • Footprint reduction and appropriate footprint placement where possible	SANBI, 2019 IUCN criteria GN320 Regulation

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Adequate buffers in place • Adequate pollution prevention and control systems • Monitoring of water quality and ecosystem health • Effective alien control programme and monitoring • Dust suppression • Adhering to regulated air quality levels • Routine air quality monitoring • All activities restricted to the footprint area • Light levels regulated and minimised	
Operational Phase				
• Open cast mining • Vehicle movement • Blasting	Impacts on vegetation, communities, implications for biodiversity, nuisance impacts in terms of noise, vibration, dust	Socio-economic; Terrestrial biodiversity; Traffic	• The proposed mining must have no unacceptable effect on the quantity and quality of public water, which would include erosion of land and roads resulting in river siltation. • The requirements of the KwaZulu-Natal Department of Health concerning health matters relating to the operation must be strictly complied with at all times. • Toilet facilities must not cause any water pollution or health hazard. • With respect to the disposal of sewage or any other effluent or solid waste, the requirements of the Department of Water and Sanitation and the KwaZulu-Natal Department of Health must be strictly enforced and complied with. In this regard all solid waste should be disposed at a permitted landfill site • No domestic or any other solid waste shall be disposed of on site. All waste removed from the site must be disposed off at a permitted landfill site.	Mining and Biodiversity Guideline (DEA, 2013); GNR 320, March 2020; NEMBA – GNR 83 of February 2014

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Storage of materials, chemicals, fuels etc must not pose any risk to the surrounding environment and this includes surface and ground water. • All significant spillages must be reported to the Department of Water and Sanitation and other relevant authorities. All spillages must be contained and cleaned up and all contaminants disposed off at a permitted hazardous landfill sit • Faunal species must not be harmed intentionally. • Dust suppression measures must be implemented in the mining area • Vehicles shall as far as possibly stick to established access routes so as to minimize the effects to surrounding vegetation. • The noise levels must be kept at a minimum level at all times by using correct noise suppression devices. • Non-compliance with the EMP must be reported to the Department of Mineral Resources, necessary actions and remediation measures must be proposed and undertaken. • It is recommended that for rehabilitation purposes, indigenous vegetation be used as far as possible. Rehabilitation shall as far as possibly mitigate land degradation and instability. • Rehabilitation of the land surface shall entail inter alia landscaping, levelling, top dressing, land preparation, vegetation establishment and maintenance, and weed elimination. • Land preparation shall include inter alia soil ameliorants, organic matter, fertilizer,	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			appropriate seed or planting stock, and provision of water. • As far as possible No interference with birds, mammals, reptiles and other animals that are encountered within the fenced perimeter. Therefore, no hunting, trapping or fishing shall be permitted, or the excavation of nests of wild animals. Ezemvelo KZN Wildlife can be contacted in this regard. • Minimise mining development footprint • All no-go/sensitive areas to be demarcated outside of the fenced-off mining area. • Move communities from areas within 500m of the blasting area as per RAP • Implement Environmental Awareness Training programme • Negotiate Bio-diversity Offset Agreement with EKZN Wildlife	
• Active mining activities	Potential injury to mining employees when conducting work	Health and safety	• Safety officer to ensure that all employees are properly trained and inducted in mine safety protocols; • Adhere to the requirements of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996), as amended. • All employees and contractors should receive Health and Safety induction that includes an environmental awareness component • The mine will have to apply for the necessary authorisations as prescribed in the various acts, and specifically Mine Health and Safety Act Reg 4.16 as well as recommendations regarding infrastructure within the pit areas • An application to the Department of Mineral Resources requesting permission to blast	OHSA MHAS 29 of 1996

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			within 100 m from infrastructure according to MHSA Reg 17.6(a).	
• Blasting and vibration	Ground vibration with potential structural damage, health risks due to fly rock	Blasting and vibration	• All BSR must be moved further than 500 m from the blasting zone before the blast is detonated; • The potential vibration levels should be discussed with the surrounding BSRs during the EIA process. They should be notified that the vibration levels were calculated but some people may find the vibration levels unpleasant (especially during a large blasts). BSRs should be notified that, while they can feel the vibration level, their houses and other structures are in no danger (very low risk of potential damage); • Mine should initiate a forum to inform the close residents about the likely vibration and air blast levels, the proposed blasting schedule and warning methodology the mine will employ before a blast as well as a warning to residents that, when they are indoors during a blast, vibration of windows and ceilings may appear excessive. • Blasting should be conducted in line with a well-designed blasting program • The mine can use a smaller borehole diameter (and a tighter associated drilling pattern) that would reduce the quantity of explosive detonated per delay; • The mine can reduce the bench-height and associated blast design; • The mine can reduce the mass of explosives per borehole using techniques such as air decking to reduce the MIC;	GNR.584 of 2015 MHASA 29 of 1996

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• The mine should measure blasting vibration levels during blasts to confirm onsite constants; • The developer should erect clear signs indicating blast dates and times on all roads within 1,000 m from the blasting areas. A blast schedule should be provided to the BSRs staying in the area.	
• Stockpiling and storage of discard material or material containing waste	Increased risk for pollution of water resources	Groundwater	• Only remove soft and hard overburden when and where necessary • Stockpiles should be revegetated • Apply dust suppression techniques to limit dust generation • Acid-generating material to be placed on discard dump and not mixed with overburdened material; • When voids are backfilled, pyritic material (shale, slurry) to be placed at bottom of pits and be compacted; • Ensure open pit is rehabilitated according to approved rehabilitation plan • Rehabilitated areas to be re-contoured and profiled to create free-draining topography according to approved rehabilitation plan • Geochemical model to be updated on annual basis and the data applied in the groundwater numerical model to assist with the identification of potential AMD decant points; • Potential sites of decant must be included in the groundwater monitoring program	WUL conditions NWA
• Mining activities, infrastructure transgresses into delineated sensitive areas	Impact on biodiversity, riparian areas and wetlands	Biodiversity; Wetland; Aquatic Biodiversity	• Conduct regular inspections to determine whether mining activities impact on sensitive areas; • Minimisation of footprint size and restriction of disturbance surrounding footprint by fencing off the mining area	GNR 83 of Feb 2014 MHSA 29 of 1996

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• All no-go/sensitive areas to be identified and demarcated outside of the perimeter fence • Implement Environmental Awareness Training • If required, wetland monitoring must be done throughout the life of the project to ensure that this impact is not reaching a critical level.	
• Clearance of surface areas; • Mining earthworks; • Movement of vehicles; • Mining activities	Potential health-related impacts; Dustfall exceeding allowable limits	Air Quality	• Limit vehicle speed in the mining area and haul roads(40km/h); • Implement concurrent rehabilitation and re-vegetation as far as practically possible; • Dust control measures (wetting of roads and stockpile areas); • Implement grievance procedure • Implement Occupational Health monitoring (dust, noise, fugitive gasses) • Air quality measurements (dust buckets) for PM_{10}, $PM_{2,5}$; • Water spraying for stockpile areas and material/product storage areas as far as possible • Emissions due to blasting can be reduced by scheduling of blasting to occur during calm wind conditions; • Implement windbreaks where possible • Conduct regular site inspections	Ambient air quality to remain within NAAQS and NDCR MHSA 29 of 1996
• Noise generation due to mining activities	Nuisance impact on adjacent occupiers of land	Noise	• The mine must implement management and mitigation measures to ensure that noise levels due to the activities of the mine are less than 60 dBA at the boundary of the mine (70 dBA during the day). • Less than 60 dBA during the day at all NSR (when measured over a period of 60 minutes), or less than 55 dBA when	SANS 10103:2008

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			measured over a period of 16-hours (06:00 am – 22:00 pm); • Less than 50 dBA at night at all NSR (when measured over a period of 60 minutes), or less than 45 dBA when measured over a period of 8-hours (22:00 pm – 06:00 am). • Limit the use of haulage trucks on public roads between 05:00 am to 22:00 pm; • Ensure that all machinery used is maintained and fitted with the manufacturer-recommended exhaust silencers and engine bay covers; • Use of white noise generators on all vehicles instead of tonal reverse alarms • The applicant should use available material (such as available topsoil and soft material) to construct berms/stockpiles/deposits between the proposed opencast areas and the NSR (located outside the mining area). Barriers/berms should only be constructed during the day-time period and should not have any gaps; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize significant noise-generating activities (such as drilling closer than 500m from NSR; • Unless there are a berm between NSR and active construction areas, the applicant should plan night-time activities to minimize simultaneous night-time construction activities closer than 500m from NSR; • The applicant should relocate NSR living within the area that will be developed for mining (opencast pit, stockpiles, deposits,	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			new haul roads, etc.), before active mining activities are closer than 500m from these NSR; • The mine can negotiate the relocation of selected NSR; • The applicant should plan and locate haul roads to optimize the effect of the berms (locate berms between NSR and haul roads); • The mine should minimize night-time trucks travelling though the community, especially trucks travelling empty on corrugated roads; and • The applicant must implement a noise monitoring programme at residential dwellings in the area. Data from the noise monitoring programme can be used to update the noise model, the noise impact and potential mitigation measures. The mine can use the services of an acoustic specialist in the management of noise impacts (after the noise model was updated and calibrated). • All employees and contractors should receive Health and Safety induction that includes an environmental awareness component (noise). This is to allow employees and contractors to the potential noise risks that activities (especially night-time activities) pose to the realise surrounding environment • The mine must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2000m from the active mining area	

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• The mine must investigate no hauling of Anthracite during the night-time on public roads (22:00 pm – 06:00 am)	
• Change of Land use	Impact on agricultural and livestock; Impact on subsistence farming; Impact on community's livelihood	Soils; Land Use and Capability; Socio-economic	• Stockpiled topsoil to be used in rehabilitation for end land use needs to be ameliorated. • Fence of the mining area required to: ○ Limit land use to footprint from active mining activities; ○ Implement Resettlement and relocation of affected communities • Ensure that rehabilitated areas have sufficient soil capabilities to support subsistence farming.	To minimise the loss of soil resources to be used as part of rehabilitation and to support post-closure land capability.
• Soil erosion from disturbed areas; • Soil compaction due to heavy vehicle movement; • Loss of soil fertility, depth and volume due to excavation	Loss of agricultural soils, reduced land use capabilities	Soils; Land Use and Capability	• Limit the land use change to the mining and infrastructure footprint only; • Restrict number of roads on site to prevent compaction by heavy construction equipment • Implement dust suppression measures on unpaved roads • Soils stripped and stockpiled must be protected from erosion by deflecting the runoff water • Stockpiles not to exceed a height as per design parameters • Top fertile 30 cm layer should be stockpiled separately to be used for seeding and revegetation purposes • All disturbed land to be revegetated to prevent erosion and soil deterioration • Due to steep slopes early water runoff measures must be implemented to prevent soil erosion • All useable soils to be stripped for later use in revegetation and rehabilitation	To minimise the loss of soil resources and related land capability through soil erosion.

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Berms to be constructed for separation of clean and dirty water systems to prevent stormwater contamination and erosion • Preserve undisturbed top soils by utilizing the large available disturbed areas for all waste discard products • Rehabilitate disturbed areas by replacing topsoil at depths similar to pre-mining • Apply phased land clearance to minimise change of land use over prolonged period; • Implement erosion control measures	
• Land clearance; • Haul road construction; • Infrastructure development; • Drilling and blasting; • Open pit development; • Waste Rock dumps; • Stockpiles for hards and softs; • Haul Trucks and vehicle movement; • Night lighting; • Demolition and Rehabilitation activities	Change in landscape; Change in sense of place	Visual	• Construct natural berm from overburden material to act as visual screen along the R618; • Ongoing concurrent rehabilitation practices; • Promote good housekeeping practices; • Limit vehicle speed (40km/h); • Implement dust reduction measures; • Implement wind breakers to reduce the potential of dust movement • Infrastructure to be painted to reflect and compliment surrounding landscape; • Overburden dumps to be designed with contoured approach; • Shaping of the dump to simulate the natural topography according to an approved rehabilitation plan • Lights used for mine safety illumination be faced inwards and avoid high pole top security lighting to reduce impact of light pollution; • Implement noise and visual offset in alignment with biodiversity offset; • Remove structures at decommissioning;	Visual and Aesthetic Guideline (2005)

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Conduct illumination survey on bi-annual basis to monitor influence of lights on the HiP	
• As above	Potential for detrimental impact on the receiving water resources in the area	Surface water	• Supply of alternative livestock watering due to loss of community dams; • Construct diversion berms upstream of mining areas as per approved stormwater management plan; • All dirty water containment structures must be designed and implemented in compliance with GNR704; • Separate clean water from dirty water systems; • Contaminated surface water to be contained in HDPE-lined PCD's as per approved IWWMP; • Minimise the risk for spillage of hazardous material by ensuring appropriate bunding for diesel storage, impermeable base liners for storage of chemical, drip trays to reduce hydro carbon spillages; • Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site • Visual inspections of all vehicles entering and operating at the site. • Visual assessment for signs of erosion or contamination. • Implementation of stormwater recommendations. • Implement surface water monitoring programme as per issued WUL	GNR 704; BPG A4: PCD's BPG G1: Stormwater; BPG G2: water and Salt Balance BPG G3: Water monitoring system; NFEPA RQO's

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
• As above	Emissions from mining activities cause increased levels of dust fall out impacting on quality of air	Air quality	• Implement dust suppression actions on haul roads and exposed areas to reduce dust fallout; • Where possible, introduce water sprays for material handling operations • Emissions due to blasting can be reduced by scheduling of blasting to occur during calm wind conditions; • Implement dust monitoring network • Conduct regular site inspections	ASTM 1739-98 Monitoring systems
• Use of diesel-powered mining construction equipment; • Diesel generator for electrical power	Impact on Climate Change	Climate Change	• Closure and Rehabilitation planning must consider climate modelling as part of climate change impacts to minimise the carbon footprint • Liquid fuels (such as diesel) to be stored in bunded areas • Diesel refuelling to take place at designated areas • Diesel earthmoving equipment to be maintained in good working order particularly in terms of the exhaust systems	SA's carbon budget; GHG Reporting (GNR 47257 of 7 Oct 2022)
• Site clearance; • Earthworks	Impact and potential damage to cultural heritage	Heritage and Archaeology	• Undertake surveys of the entire mining footprint prior to mining; • Implement cultural awareness program; • Apply for the required permit for reburial in the event that graves are found in the potential footprint of the mine; • Include relocation of graves and reburial as part of the RAP • A buffer area of at least 100m around the burial grounds and graves and a buffer area of at least 30m around other heritage sites would be required. The existing Heritage Management Plan must be implemented where heritage resources remain in place.	South African Heritage Resources Act; KwaZulu-Natal Heritage Act; Graves and Crematoria's Act.

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
• Clearance of surface areas for mining • Earthworks; • Blasting	Potential damage to the disturbance of palaeontological resources	Palaeontology	• If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find. • Immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. • The ESO/ECO or site manager must report the find to the relevant Heritage Agency	Change find protocol
• Blasting Activities	Impact on ground vibration; Air blast and fly rock; Damage to dwellings and infrastructure	Blasting and Vibration	• Relocation of all households within the 500m blasting impact zone as per legal requirement (MHSA); • Relocate all affected BSR within the 500 m Blast Zone. • Good housekeeping practices to be in place with each blast as per specialist recommendation; • Monitor each blast; • Undertake independent structural survey on regular basis; • Implement grievance procedure • Erect clear signs indicating blast dates and times on public roads in the vicinity of the mining area;	Approved Blast Management Plan MHSA 29 of 1996
• Employment at the mine	Improved socio-economic conditions; Improved social health	Socio-economic	• Implement the approved SLP • Establish employment policies; • Ensure the integration of resettlement planning as part of the SLP commitments; • Maximise the use of local service providers;	SLP; Procurement policy; Recruitment policy
• Upliftment of community; • Clinic and Emergency Services	Changes in access to healthcare	Community Health	• Support of local schools; • Provide health and vaccination information campaigns to raise baseline health levels	OHSA MHSA 29 of 1996

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Raise awareness regarding the dangers of STD's, TB, HIV and AIDS with employees on a bi-annual basis	
• Increased vehicular movement; • Increased haulage activities; • Transport of staff; • Road maintenance activities	Impact on road safety; Potential for animal road kills	Traffic	• Implement district road upgrade in accordance with requirements of DoT; • Introduce speed limit of 40km/h • Upgrade intersections to be compliant with DoT specifications; • Maintain the road on regular basis; • Implement dust suppression measures to reduce dust fall out; • Implement grievance and community complaints procedure	DoT, KZN Dept of Roads: Road maintenance specifications
Decommissioning Phase				
• Rehabilitation and closure	Colonisation and spread and alien vegetation species	Vegetation	• Applicable to all mining right areas applied for. • All alien and invasive weeds shall be eradicated and controlled continuously in areas which have been disturbed in connection with mining. Control of alien and invasive weeds is required in terms of the Agricultural Resources Act (no 43 of 1983) and The National Department of Agriculture, Forestry and Fisheries shall be contacted in this regard. • Such weeds include but are not limited to the following plants: o Black Wattle (*Acacia meamsii*) o Blue gum (*Eucalyptus* species) o Bramble (*Rubus cuneifolius*) o Bugweed (*Solanum mauritianum*) o Castor oil bush (*Ricinus communis*) o Guava (*Psiduim guajava*) o Lantana (*Lantana camara*) o Mexican sunflower (*Tithonia diversifolia)*, M	NEMA

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			○ Morning glory creeper (l*pomea purpurea*), Mulberry (*Morus alba*) ○ Napier grass ○ Peanut bush (*Senna* species) ○ Pepper tree (*Schinus terebinthifolius*) ○ Pereskia (*Pereskia aculeate*) ○ Red sesbania (*Sesbania punicea*) ○ Silver wattle (*Acacia dealbata*) ○ Syringa tree (*Melia azedarach*) ○ Triffid weed (*Chromolaena odorata*) • Alien plants, particularly those considered invasive in terms of the National Environmental Management: Biodiversity Act (NEMBA) will need to be removed/eradicated. • Alien plant management should specifically target the edges of natural habitat adjacent to the mining impact zone (i.e. riparian and wetland vegetation). • The accepted method for alien plant removal/control is generally cut-stump treatment followed immediately by the application of relevant herbicides to the cut surface. For larger species, these may be frilled first and then herbicide applied after. The use of a bright coloured dye mixed with the applied herbicide is recommended to indicate treated species. • No damage to or removal of indigenous tree species should be permitted during alien plant clearing. • Regular inspections should be undertaken to inform adequate follow-up treatment of alien plants.	
• Site re-vegetation	Improve land capability to pre-determined end land use	Biodiversity, Land use	• Ensure continuous rehabilitation as per approved Rehabilitation and Closure Plan;	NEMBA

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• All disturbed areas within mining footprint such as haul roads and hard park areas are ripped, top soiled and revegetated; • Berms, stockpiles and discard dump to be revegetated as per approved Rehabilitation and Closure Plan • Revegetation to be done in line with the recommendations made by the Soil Specialist Study conducted in 2024 • Only the designated access routes are to be used; • If erosion occurs, corrective actions must be taken to minimise any further erosion from taking place; • Stockpiles are to be maintained in a fertile and erosion-free state by sampling and analysing annually for nutrients and soil pH, and vegetating the stockpiles to reduce erosion; • Ensure proper stormwater management designs are in place • Conduct annual audits to monitor the rehabilitated area.	
• Re-shaping	Re-instate sense of place to by promoting communities of indigenous plants to enhance biodiversity and blend with existing vegetation	Visual	• Landscaping, contouring of the overburden dumps, revegetation and maintenance to be done in line with the approved rehabilitation and closure plan. • If not practical implementable, create pit lakes; • Install a monitoring program of rehabilitated areas for a period of one year after closure of the mining areas to determine the success of rehabilitation measures • Promote good-housekeeping practices; • Limit vehicle speed (40km/h); • Implement dust reduction measures;	Minimisation of negative visual impacts

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			• Remove structures at decommissioning; • Conduct illumination survey on bi-annual basis to monitor influence of lights on the HiP	
• Create a habitat suitable for faunal life	Enhance the destructed habitats that had a detrimental impact on fauna population to re-introduce the area after decommissioning	Fauna	• Environmental awareness program to promote environmental sensitivity amongst employees and their families to prevent poaching of animals; • No hunting of animals to be allowed; • Plant species endemic to the area to be used in rehabilitation to re-establish ecological habitats similar to pre-mining; • Monitor rehabilitation (via audits) in the long term to ensure objectives are met as per the approved Rehabilitation and Closure Plan	NEMA; NEMBA
• Establishment of pit lakes as end land use	Permanent loss of natural topography, altering of drainage lines and reduction in grazing potential as a land use	Groundwater	• As final rehabilitation, the pits to be shaped to promote the storage of water; • Pits to be re-vegetated with indigenous plant species (as per Soil Specialist Study 2024); • Groundwater levels of the boreholes to be measured for a period of 3 years after closure or until steady-state conditions are observed	DWS Groundwater Reserve, RQO's
Post Closure				
• The potential for decant at Mahujini needs to be monitored for 10 years to determine whether a deterioration in water quality is observed	Groundwater quality deterioration with associated groundwater pollution Flooding to decant level is estimated to occur 20 to 25 years after closure at Mahujini and between 40 – 60 years for Ophondweni and Emalahleni	Geohydrology	• Quarterly monitoring to be conducted on groundwater quality and groundwater level monitoring for at least a period of 3 years after closure or until steady-state conditions are observed • Monitoring information to be used for model calibration to increase confidence in impact prediction • Monitoring parameters to include: o pH, TDS, EC,	All stated Objectives as per approved Rehabilitation and Closure Plan

Mining activity	Impact	Aspect	Management Actions	Standard to be achieved
			○ $CaCO_3$, ○ Ca, K, Na, Mn, Mg, Cl, F ○ Fe, Al, Zn, Cu ○ SO_4, NO_3 • Based on monitoring results the post-closure programme needs to be re-evaluated on annual basis; • If ever required, consider AMD treatment plan based on: • Active water treatment system • Passive water treatment	

7.1. Environmental Management Roles and Responsibilities

The overall responsibility for the implementation of the EMPr is vested with the General Manager. The roles and responsibilities as delegated by the General Manager is outlined below. Also refer to **Table 9-7** for the detail on the responsible persons.

Environmental Manager

The Environmental Manager would act as Tendele Mine's on-site implementing agent and carries the responsibility to ensure that operational activities are executed in compliance with the EMPr. Any on-site decisions regarding environmental management are the responsibility of the Environmental Manager in accordance with their delegated authorities. The Environmental Manager shall oversee the Environmental Officer (EO) and ensure their responsibilities are fulfilled. The Environmental Manager reports directly to the General Manager.

Environmental Officer

A suitably qualified and trained individual appointed by Tendele Mine (Pty) Ltd prior to the operational phase of the project, would fulfil the role of the EO. The primary roles and responsibilities of the EO will be:

- To oversee the implementation of the EMPr on site in accordance with the EMPr and Tendele's internal environmental management systems;
- To visit the site on a monthly basis (or as required) and advise on areas of environmental management, or compliance with the EMPr requiring attention;
- To visit the site more regularly during the first three months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;
- To be called to site in the case of any emergency situation which may impact on the local environment;
- To liaise with various specialists and the local authorities if required, regarding issues relating to environmental management;
- To report on compliance with the EMPr specifications to Tendele Mining (Pty) Ltd;
- To facilitate environmental audits and ensure that they are undertaken, as required;
- To keep a comprehensive record of environmental management, issues of non-compliance and minutes of meetings for audit purposes;
- To ensure monitoring programmes are implemented during the operational phase; and
- To undertake any other tasks outlined in this document, on the behalf of Tendele Mining (Pty) Ltd.

The EO reports on progress with the above-mentioned tasks directly to the Environmental Manager.

Environmental Auditor (Auditor)

An independent environmental auditor (IEA) needs to be appointed to conduct the annual Environmental Performance Assessment (EPA). The independent Environmental

Professional must possess a post graduate degree in environmental studies and a minimum of five years relevant experience to act as the IEA for the project. The IEA is to be employed upon completion of the first year of operation, and is to perform an annual formal audit on the EMPr, and its implementation by the relevant parties at intervals as indicated in the environmental authorisation.

7.2. Environmental Management Financing

The financial resources for implementation of the EMPr shall be provided by Tendele Mining (Pty) Ltd's operational budget.

The Somkhele Extension Project, on behalf of Tendele Mining, must review and assess the EMPr and request the subsidiary company to allocate the requisite funds to facilitate compliance with the actions as contemplated in the Environmental Management Plan. The bulk of the items listed in the EMPr relate to required preventative maintenance, avoidance of impacts, operator legal compliance and responsible environmental management.

Somkhele must ensure that monitoring costs are included as well as contingency costs to deal with emergency incidents. These budgets are to be reviewed annually by Tendele Mining in collaboration with Somkhele and adjusted based on operational requirements and the results of the annual environmental performance and compliance audits.

8. Item 1(i): FINANCIAL PROVISION

8.1. Item (i)(1): Determination of the amount of Financial Provision

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by NEMA, as amended, which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision needs to be reviewed annually.

Closure costing was calculated by means of utilizing survey data from Somkhele. A bill of quantities was drawn up for all mining areas. This bill of quantity was entered into spreadsheet where contractor rates were applied to get a rand value for closure. Rates were sourced from various contractors. The model used to calculate life of mine closure includes inflation. Mine planning and scheduling software was used to calculate volumes and CAD software along with GIS software was utilised to calculate areas based on the plan of establishing pit lakes at Emalahleni and Ophondweni.

Mine scheduling software was used to create a final design for the areas after mining has been completed. The software provided volumes of cut and fill and volumes of load and haul required to shape the final void. A summary of the closure costs is contained in **Table 8-1**.

Table 8-1: Summary of Life of Mine Closure Costs

	Emalahleni	Ophondweni	Mahujini	Total
Sub-total for INFRASTRUCTURAL AREAS	R 130 444	R 1 131 758	R 466 630	R 1 728 832
Sub-total for MINING AREAS	R 46 185 924	R 39 926 681	R 79 098 590	R 165 211 195
SUB-TOTAL 1	R 46 971 142	R 41 058 439	R 79 565 220	R 167 594 801
(Infrastructure and related aspects)				
SUB-TOTAL 2	R 2 804 031	R 2 865 873	R 7 729 360	R 13 399 264
(Post-closure aspects)				
SUB-TOTAL 3	R 7 045 671	R 6 158 766	R 11 934 783	R 25 139 220
(Additional allowances)				
Total (Excluding) VAT	R 56 820 844	R 50 083 078	R 99 229 363	R 206 133 285
Total Including VAT	**R 65 343 971**	**R 57 595 540**	**R 114 113 767**	**R 237 053 278**

8.1.1. Item (i)(1)(a): Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2) as described in 2.4 herein

The closure vision is a materialistic description of what will be achieved with the Somkhele Extension Project's closure, compatible with regulatory requirements, specialist recommendations and underpinned by the principles of sustainable closures. The vision incorporates an overview of the post closure land uses, linked to the domain-specific closure principles and closure objectives. Therefore, is it the closure vision of Tendele Mine to obtain a sustainable, stable post mining land capability which is not significantly different from the pre-mining conditions, where health and safety is not significantly

compromised and where long-term impacts on the environment are minimised and socio-economic opportunities maximized.

The closure objectives for the Somkhele Extension Project are listed in **Table 8-2** below.

Table 8-2: Project Closure Objectives

Component	Closure Objective
Offices and associated mining infrastructure	Demolish all mining related infrastructure
Plant Infrastructure	There are no beneficiation plants associated with the Emalahleni, Ophondweni and Mahujini operations
Water management infrastructure	Reinstate free natural draining by demolishing all SWM channels. Ensure that no dirty water enters catchment by containment in selected PCD. Alternatively, design open pit as such that the final void will act as a containment facility to provide future water supply for livestock watering
ROM and product storage areas	Areas to be rehabilitated to support cultivation and arable land use, including total removal of sacrificial layers and creation of a free draining landscape.
Topsoil stockpiles and berms	Total removal of topsoil stockpiles, incorporated with the rehabilitation programme. Placement of berms, pending the content in as overburden (hard and most likely with high AMD potential) in at lower levels followed by surface shaping and placement of soft material and topsoil's sequentially.
Linear infrastructure (Haul roads)	The main access road and parking area will be rehabilitated to grazing land, partial removal of access road. All other roads and linear removals not required as it will remain in use as the District Road to neighbouring communities.
Open pits Emalahleni, Ophondweni and Mahujini	The landform will be shaped to be free draining, rehabilitated to secure a land use status compatible with livestock grazing, safe for human access and visually non-intrusive.
Post Closure Monitoring	To follow a five (5) year post closure monitoring and modelling programme to report on physical and biophysical stability prior to the formal closure application
Cost of closure risks and the cost of Regulatory Aspects, including wetlands rehabilitation/offset associated with a closure application or biodiversity offset	To annually re-assess closure risk, particular associated with landform and land use, as well as shallow and deep ground water aquifer pollution due to any source of pollution.

8.1.2. Item (i)(1)(b): Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

Tendele has had discussions with the TC and the matter was referred to the Mpukunyoni Community Mining Forum where issues related to mining activities are discussed. As several concerns related to rehabilitation were previously raised, it was deemed necessary to obtain the input from the MCMF to resolve the matter. From the community perspective the rehabilitation must address end land use in terms of improved grazing potential as well as the provision for water sources to be used for livestock watering.

In addition, the aspect of biodiversity offset as a rehabilitation requirement was discussed and negotiated with Ezemvelo KZN Wildlife. An agreement in this regard was signed during May 2024 in which the residual impacts on vegetation as well as noise and visual impacts with a cumulative offset area of 1,599.7 hectares and offset compensation of R9,9 million will be paid by Tendele as part of the Biodiversity Offset implementation Plan.

8.1.3. Item (i)(1)(c): Provide a Rehabilitation Plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at time of closure

Please refer to **Appendix 20** for the Rehabilitation Plan for Tendele Mining.

8.1.4. Item (i)(1)(d): Explain why it can be confirmed that the rehabilitation plan is compatible with closure objectives

The application for closure must be made within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion and must be accompanied by the required information, programmes, plans and reports prescribed in terms of the MPRDA and the NEMA. Section 43(4) of the MPRDA as well as Regulation 57 (MPRDA) furthermore requires the submission of a closure risk assessment, a closure plan and a performance assessment in accordance with Regulation 60, 62 and 55 of the MPRDA. These requirements will ensure that Tendele's Rehabilitation Plan will be a high-level closure application process in accordance with the closure objectives to meet the following criteria:

- The completion of a closure risk assessment, inclusive of a screening level risk assessment, a level 2 risk assessment as well as the provision of management and mitigatory measures associated with the identified closure risks;
- The completion of a closure plan setting out amongst others the closure objectives, action plans and financial provisions;
- The completion of a final EMPR performance assessment (EMP PAR);
- The completion of a Basic Assessment Process as contemplated under Listing 1, activity 22.

It is anticipated that the above-mentioned structure will be collated into an integrated application process from which the MPRDA requirements can serve as supporting documents to the NEMA application process, with submission to the DMR as the competent authority, in the case of unscheduled closure.

8.1.5. Item (i)(1)(e): Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

Please refer to Appendix B: Closure Calculations of the Rehabilitation Plan

8.1.6. Item (i)(1)(f): Confirm that the financial provision will be provided as determined

It is hereby confirmed that Tendele Mining will comply with the environmental legislative requirements for financial provisioning and rehabilitation in respect of GNR 1147 dated November 2015 as promulgated under NEMA.

A formal report required on financial guarantees related to the calculated provisions will be prepared for signage by the Chief Executive Officer (CEO) with submission to the DMR together with an audit statement from the independent IRBA-registered auditor.

9. Item 1(g): MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT

9.1. Item 1(g): Monitoring of Impact Management Actions

As per Somkhele Anthracite Extension Project, the Closure and Rehabilitation Plan for the mining areas of Emalahleni, Ophondweni and Mahujini makes provision for post closure monitoring requirements inclusive of surface and groundwater monitoring, reclamation monitoring as well as care and maintenance monitoring. The amount allocated for monitoring is listed in **Table 9-1**.

Table 9-1: Allocated budget for monitoring

Area	Post Closure Monitoring (Care and maintenance)	General Monitoring (Water and Reclamation)
Emalahleni	R 546 399	R 2 257 632.48
Ophondweni	R 593 969	R 2 271 903.57
Mahujini	R 3 006 444	R 4 722 915.97

9.1.1. Soil

With reference to the Soils Study by Eco-Soils (2024) it is proposed to conduct continuous rehabilitation, the following monitoring requirements are recommended:

- Monitoring and quality control of the stripping and stockpiling process
- Monitoring of the placement of subsoil and topsoil above the cover layer.
- Monitoring of the fertilisation and seeding process.
- Once germination and vegetative cover is established, monitoring of species composition and basal cover.
- Ad Hoc inspections after severe rainfall to determine soil loss and vegetative cover.
- Remediating actions like reseeding etc. to re-establish basal cover.
- Some sub-climax and climax species germinate after two to three years in a disturbed environment. The success of long-term seeding (basal cover and specie composition) can only be judged after three years.

9.1.2. Heritage

The following monitoring and performance indicator requirements are recommended by the specialist for implementation:

- A qualified paleontologist must be appointed for the mine extension.
- Responsible staff (ECO, Workmen and Foremen needs to be trained in identifying fossils (training should be by a qualified Paleontologist);
- Fossils finds must be placed in a stockpile for inspection by the paleontologist. The time frame of these inspections must be in consultation with the mine and paleontologist.

9.1.3. Surface Water

The surface water monitoring program as proposed by Eco-Pulse (2024) are recommended for implementation as outlined in **Table 9-2** below.

Table 9-2: Proposed surface water monitoring points

Site	Description	Coordinates	
		Latitude	Longitude
Ema_US	Non-Perineal Steam/ Drainage line	28°18'28.93"S	32° 6'11.52"E
Ema_CSW1	Non-Perineal Stream/ Drainage line	28°18'42.49"S	32° 6'13.82"E
Ema_CSW2	Impoundment	28°19'18.51"S	32° 6'27.57"E
Ema_CSW3	Non-Perineal Stream/ Drainage line	28°18'27.25"S	32° 7'6.00"E
Ema_CSW4	Non-Perineal Stream/ Drainage line	28°18'25.72"S	32° 6'32.12"
Ema_DS	Non-Perineal Stream/ Drainage line	28°18'21.85"S	32° 7'2.38"E
Oph_US	Upstream Mnyaba	28°15'19.12"S	32° 9'24.98"E
Oph_CSW1	Non-Perineal Stream/ Drainage line	28°15'51.01"S	32° 9'5.06"E
Oph_CSW2	Non-Perineal Stream/ Drainage line	28°15'18.54"S	32°10'8.46"E
Oph_DS	Down Stream Mnyaba	28°15'11.66"S	32°10'21.57"E
Mah_US	Upstream Nyalazi	28°16'20.51"S	32° 3'24.97"E
Mah_CSW1	Impoundment	28°17'13.42"S	32° 4'30.96"E
Mah_CSW2	Drainage line Nyalazi	28°16'49.44"S	32° 4'34.57"E
Mah_CSW3	Drainage line Nyalazi	28°16'18.21"S	32° 4'41.60"E

Mah_CSW4	Drainage line Nyalazi	28°15'42.88"S	32° 3'59.75"E
Mah_DS	Downstream in the Nayalazi River	28°16'36.48"S	32° 5'40.83"E

The following points are to be considered as alternative points due to the non-perennial nature of the drainage lines.

Table 9-3: Alternative surface water monitoring points

Site name	Type	Latitude	Longitude
Site 1	Mnyaba River	28°15'12.20"S	32°10'24.77"E
Site 2	Nyalazi River	28°18'19.05"S	32° 8'43.78"E
Site 3	Nyalazi River	28°17'0.37"S	32° 5'58.33"E
Dam 1	Impoundment	28°17'14.48"S	32° 4'31.13"E
Dam 2	Impoundment	28°15'58.58"S	32° 9'1.49"E

9.1.4. Aquatic Ecology

It is essential to establish a comprehensive long-term database on the receiving environment associated with the project area (inclusive of water quality and metrics of measure – SASS5). Therefore, it is crucial that a monitoring programme is implemented by the applicant with the aim in conserving and protecting the aquatic environment to the desired ecological state. A comprehensive database on the aquatic ecosystem will provide more accurate data over a timeframe in order to provide more accurate and site-specific recommendations and mitigation measures that requires implementation. **Table 9-4** below provides an overview of a typical monitoring programme associated with the Somkhele Extension Project.

Table 9-4: Bio-monitoring program

Project Phase	Monitoring Requirements	Sites to be monitored	Monitoring Frequency
Construction phase	• Bio-monitoring • Surface Water Monitoring	• Nyalazi and Mukwini Rivers • Mfolozi River • Unnamed Tributaries	• Bi-annual Bio-monitoring • Monthly Surface Water monitoring
Operational phase	• Bio-monitoring • Surface Water Monitoring	• Nyalazi and Mukwini Rivers • Mfolozi River • Unnamed Tributaries	• Bi-annual Bio-monitoring • Monthly Surface Water monitoring
Post Closure phase	• Bio-monitoring • Surface Water Monitoring	• Nyalazi and Mukwini Rivers • Mfolozi River • Unnamed Tributaries	• Bi-annual Bio-monitoring • Quarterly Surface Water monitoring

Bio-monitoring must be conducted once during the wet summer period and once during the dry winter period in order to mitigate any seasonable variability effects. It is recommended that surface water assessments be included within the bio-monitoring programme as it is generally closely interlinked to any sudden changes in bio-monitoring

data. Surface water results will also be beneficial in identifying any site-specific surface water run-off impacts related to the proposed opencast mining project.

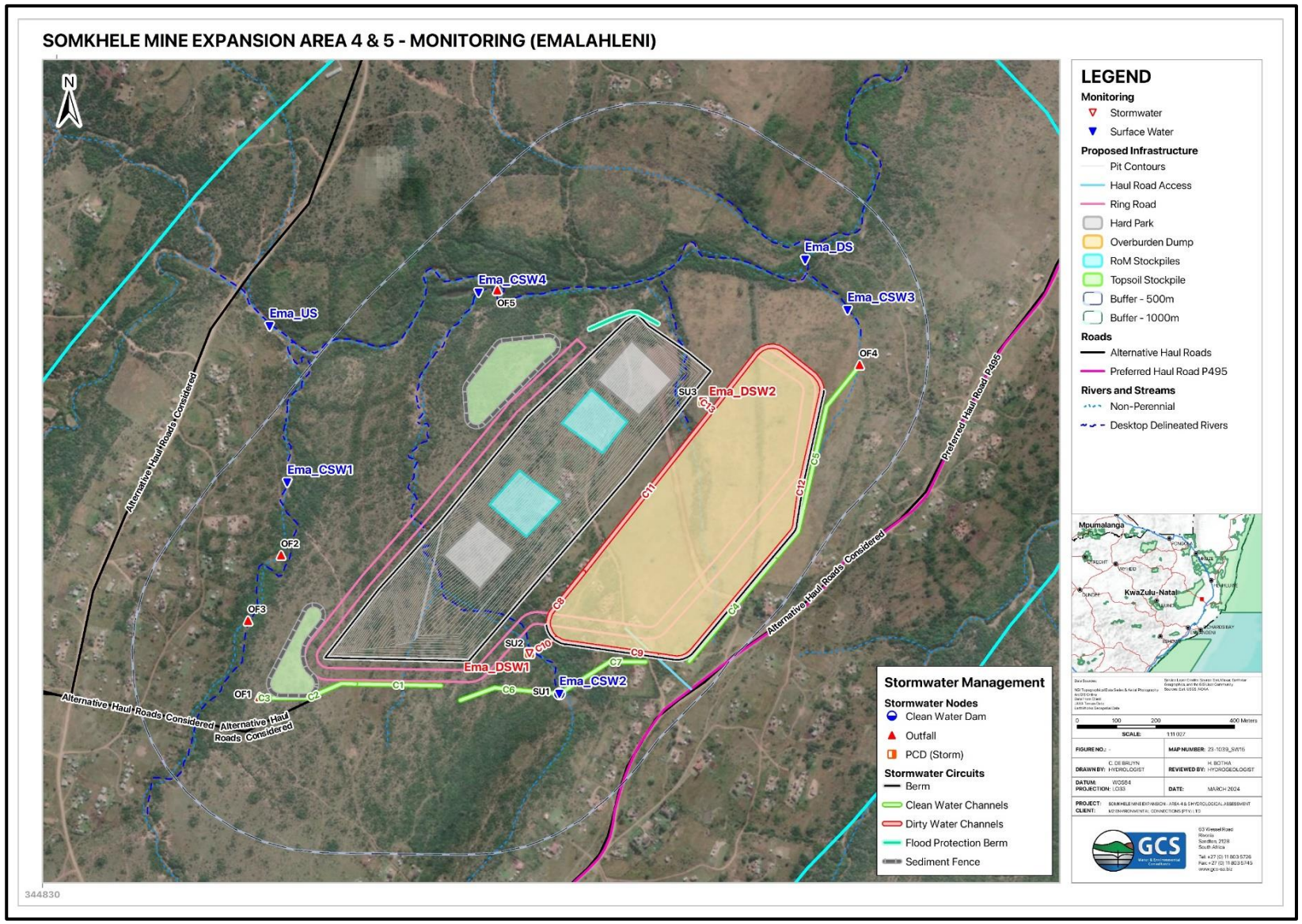


Figure 9-1: Surface water monitoring for Emalahleni

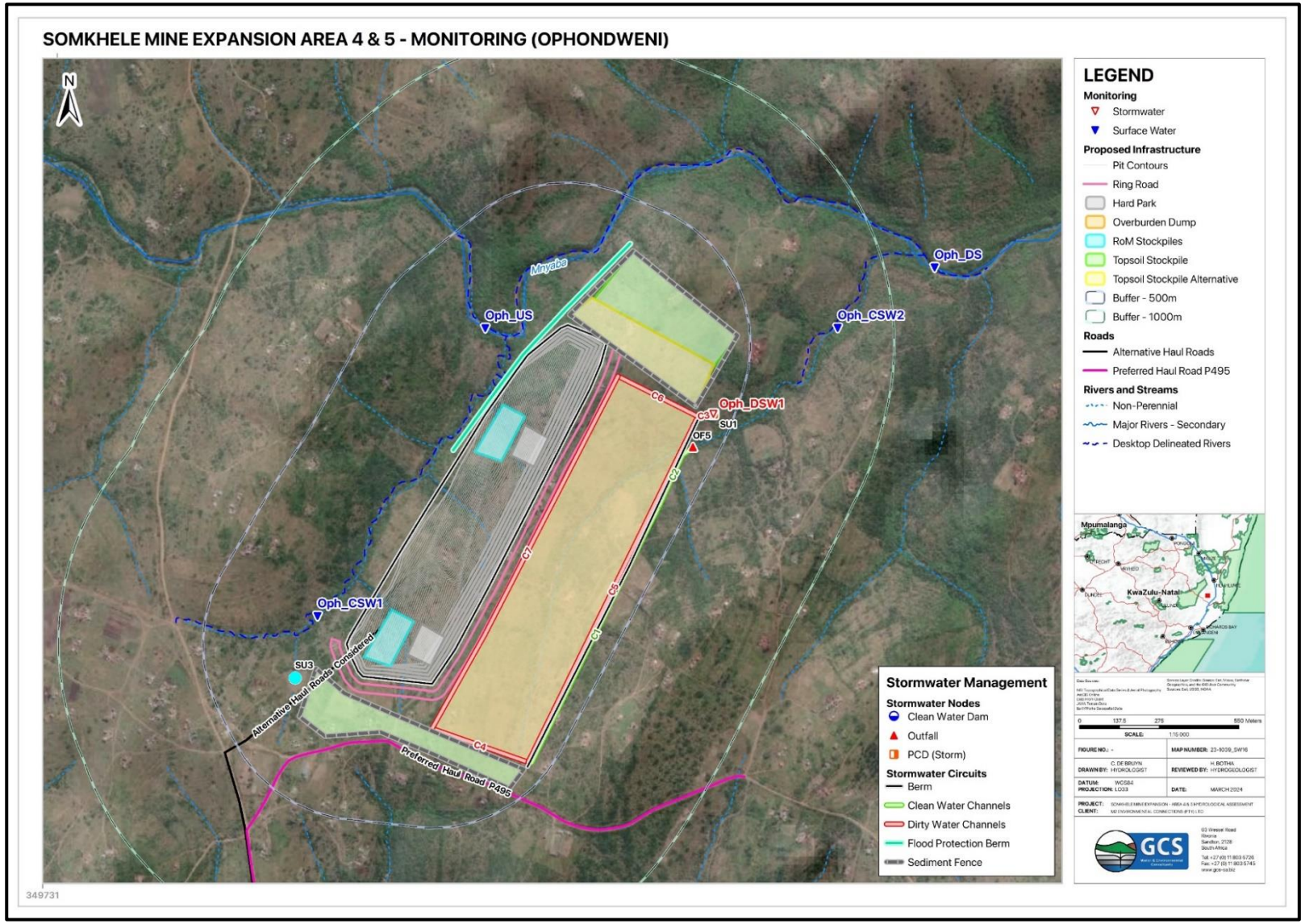


Figure 9-2: Surface water monitoring for Ophondweni

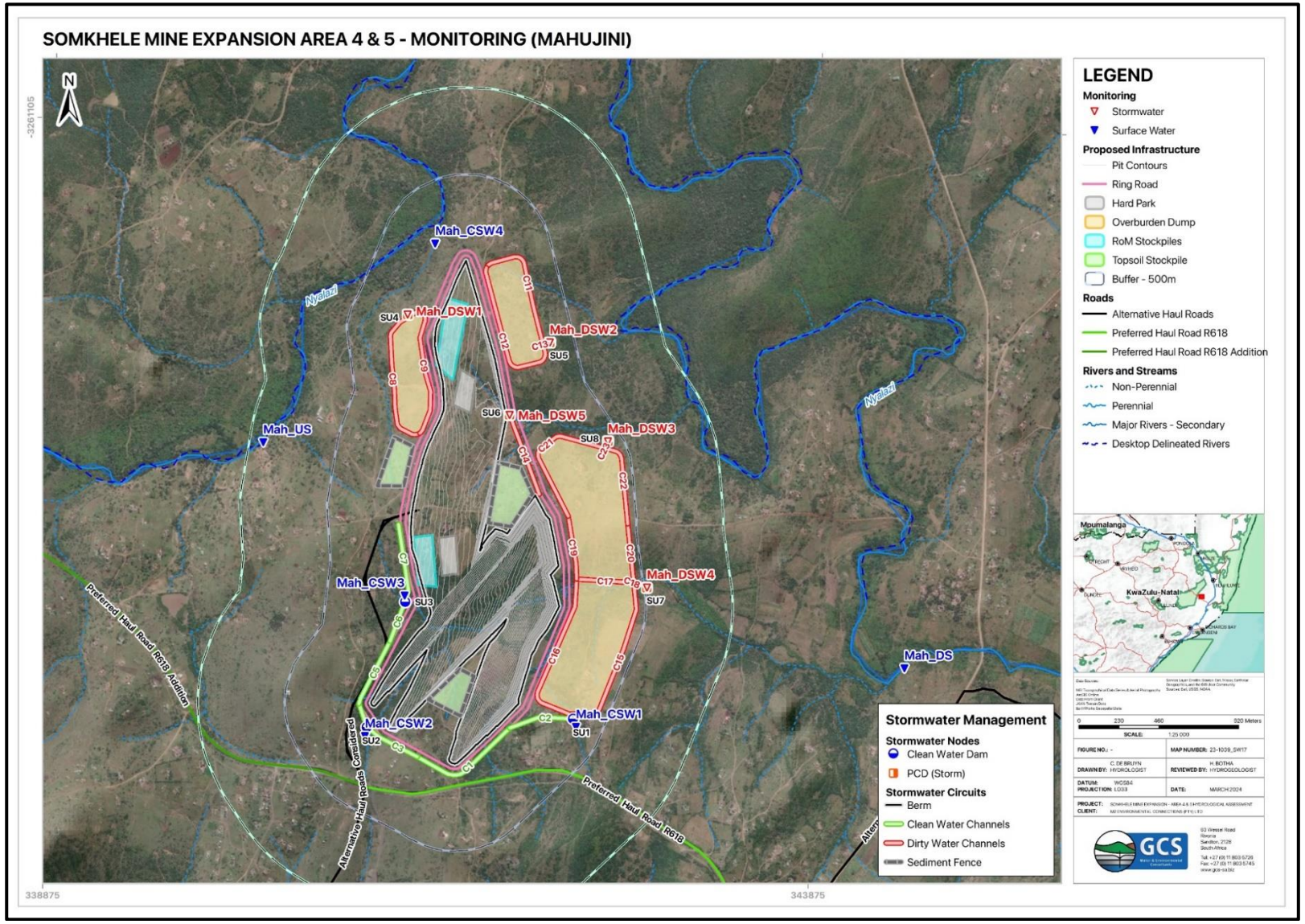


Figure 9-3: Surface water monitoring for Mahujini

9.1.5. Hydrology

It is proposed that a stormwater and surface water monitoring programme be implemented to monitor the water quality in and around the sites. Runoff entering the site and exiting the site must be monitored to ensure the quality of the runoff released into the surrounding area is of adequate quality.

Monitoring would need to be conducted as follows for all three sites:

- Monitoring during the preparation and construction phases.
- During the operational phases of the mines.
- Closure/decommissioning phase (and for a period after the activity).

It is proposed that monitoring be conducted as specified in **Table 9-5** for the duration of the activity taking place. Stormwater monitoring is recommended to be done at the end of a storm event. If concerns are noted, then monitoring must be conducted more frequently until the issues are resolved.

It is proposed monitoring takes place up to 2 years after the site is decommissioned, to establish closure water quality trends and objectives. The need for further monitoring of the site can be evaluated by the local environmental authorities or DWS representative. Monitoring responsibility is that of Somkhele.

Table 9-5: Proposed monitoring points, frequencies and sample analysis

Site	Frequency	Type	Field Measurements	Laboratory Analyses / Action
Stormwater Monitoring points	During the storm event or once the storm has subsided. Avoid sampling stagnant water.	Field assessment and laboratory (if required)	pH EC TDS Sediment load	If field measurements indicate a contaminant trend[9], i.e., visual pollution of water, it is advised that a sample be submitted for analytical testing. The following should typically be screened: • pH, Conductivity, Total dissolved solids (TDS), and total suspended solids (TSS) • Biological oxygen demand (BOD). • Sulphate and Nitrate. • Suspended sediment concentration.
Surface water monitoring	Monthly during construction. Quarterly for the duration of operations, one week after a storm event.	Field assessment and laboratory	pH EC TDS Sediment load	If field measurements indicate a contaminant trend, it is advised that a sample be submitted for analytical testing. The following should typically be screened: • pH, Conductivity, Total dissolved solids (TDS), and total suspended solids (TSS) • Biological oxygen demand (BOD). • Calcium, Magnesium, Sodium, Potassium, Carbonate, Bicarbonate, Chloride, Sulphate, Nitrate, Iron, Manganese, Fluoride, Aluminium, Total Alkalinity (TALK), Ammonia, Ammonium. • Total coliforms, E. Coli, Faecal coliforms
Hydraulic monitoring	Monthly visual inspection of stormwater systems	Field visual assessment	Flow (if possible)	Clear systems of noted debris to ensure the free flow of water during storm events

[9] Sediments increasing with each storm event is a "contaminated trend". This might indicate stormwater controls are not performing optimally and maintenance should be conducted.

9.1.6. Groundwater

Somkhele Anthracite Mine has an active groundwater and surface water monitoring program, in Areas 1 to 8. It is proposed that the boreholes drilled as part of this investigation (refer to Section 10.1.5) be included in the quarterly monitoring program. Monitoring should start at least 1 quarter before mining starts.

The following is proposed in terms of groundwater monitoring at Emalahleni, Ophondweni and Mahujini:

- Quarterly water level monitoring of the abstraction borehole should take place.
- Quarterly abstraction volumes should be taken and kept on record.
- Any dewatering volumes for opencast operations should be measured, as well as dust suppression volumes and groundwater ingress into the opencast operations. It is proposed that monthly measurements take place.
- The monitoring network should be audited annually to verify gaps and to expand the groundwater monitoring network as required. All monitoring boreholes drilled should be constructed as per specialist recommendation (refer Appendix 12, page 157, **Figure 9-4**).

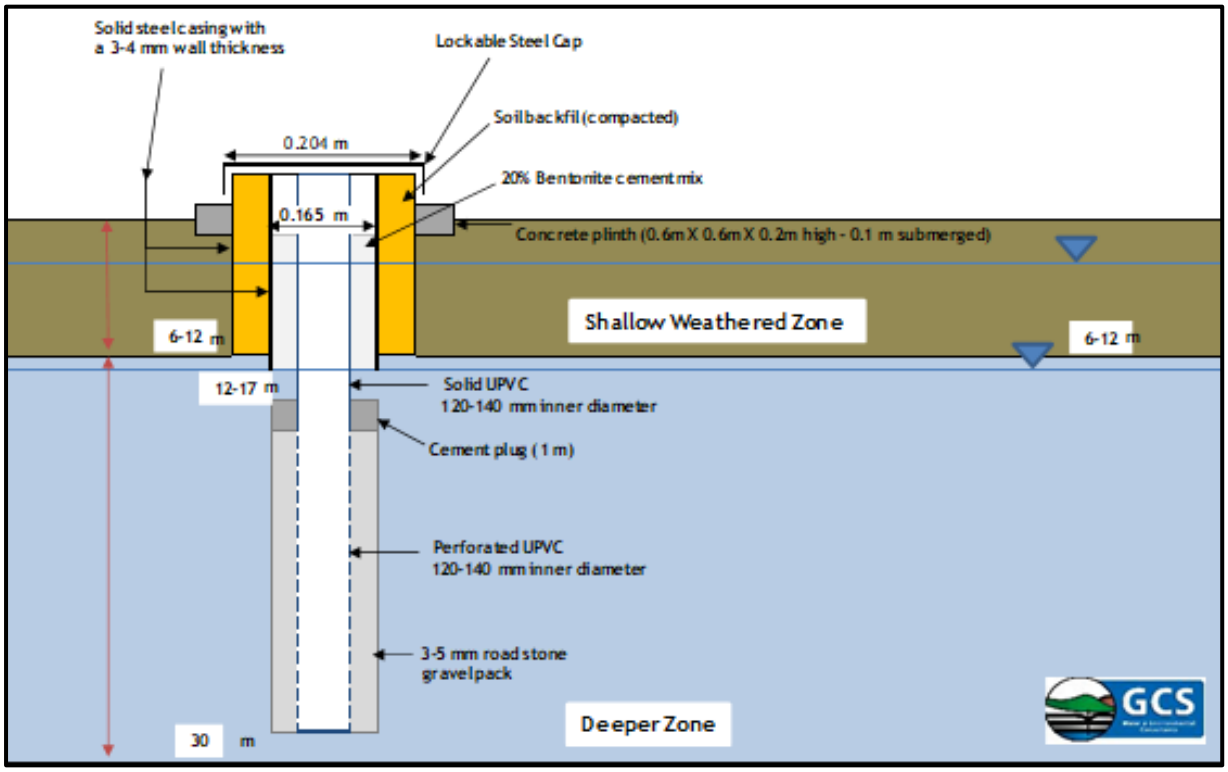


Figure 9-4: Proposed monitoring borehole construction

Groundwater monitoring should be conducted in accordance with the conditions of WUL 11/W23A/ABCGIJ/9751 stating compliance with Groundwater Limits as contained in **Table 9-6**:

Table 9-6: Groundwater Quality Limits

Variable	Limit
pH	8,64
Electrical Conductivity as EC in mS/m	482,32
Total Dissolved Solids as TDS in mg/l	2676,3
Calcium as Ca in mg/l	109,92
Magnesium as Mg in mg/l	116,17
Sodium as Na in mg/l	365,2
Potassium as K in mg/l	6,41
Total Alkalinity as TALK in mg/l	665,09
Chloride as Cl in mg/l	1179,48
Sulphate as SO_4 in mg/l	38,68
Nitrate as NO_3-N in mg/l	3,64
Fluoride as F in mg/l	0,25
Aluminium as Al in mg/l	0,01
Iron as Fe in mg/l	0,01
Manganese as Mn in mg/l	0,34
Cupper as Cu in mg/l	0,01
Zink as Zn in mg/l	0,01

9.1.7. Air Quality

It is recommended that the existing dustfall monitoring network be expanded by Tendele Coal, to include dustfall buckets in and around the three proposed Somkhele operational areas, as well as at discrete receptors located in proximity to the proposed operations. Since relatively high daily incremental PM_{10} concentrations are predicted, continuous PM_{10} monitoring is also recommended. Ambient air quality monitoring can serve to meet various objectives, including:

- compliance monitoring;
- validate dispersion model results;
- use as input for a health risk assessment;
- assist in source apportionment;
- temporal trend analysis;
- spatial trend analysis;
- source quantification; and,
- tracking progress made by control measures.

9.1.8. Fauna and Flora

It is recommended by the specialist that a management progress report will be prepared every 6 months. An annual audit of the appropriateness and status of the offset should also be conducted. The audit must include the status of the offset and once the offset is secure, the condition of the Zululand Lowveld should be established. The purpose of the audit is to verify that the objectives of the offset are being achieved and to outline areas where work is required to achieve the objectives should they not be fully achieved. A more detailed auditing and reporting template will be compiled once the offset has been secured.

9.1.9. Wetlands

Given the threat of a decline in water quality of onsite and downstream watercourses (including wetlands) associated with the mining development, it is important that a

detailed freshwater ecosystem monitoring plan be developed for the site**.** This should involve at least monthly water quality monitoring and bi-annual aquatic biomonitoring of water resource units (rivers/streams) in the vicinity of the development. This should also include regular (daily or weekly) basic visual inspections by the ECO and support staff, documenting issues such as:

- Invasive Alien Plant infestation.
- Scouring and deposition associated with storm water runoff.
- Development of erosion head cuts.
- Channel incision downstream of development.
- Blockage/siltation of culverts/pipes/side drains.
- Scouring at the location of stormwater outlets.
- Erosion or instability of road embankments.

The results of the wetland, surface water quality and aquatic biomonitoring assessments must be used to inform further management actions, remedial measures and/or the revision of mitigation strategies aimed at protecting watercourses in the study area and downstream from water quality impacts associated with the development.

9.1.10. Blasting and Vibration

Tendele Mine needs to monitor the impacts of blasting in terms of the Mine Health and Safety Regulations (Act 29 of 1996) and specifically Regulation 4.16 (2) – General Precautions:

(2) no blasting operations are carried out within a horizontal distance of 500 meters of any public building, public thoroughfare, railway line, power line, any place where people congregate or any other structure, which it may be necessary to protect in order to prevent any significant risk, unless:

a) a risk assessment has identified a lesser safe distance and any restrictions and conditions to be complied with;
b) a written application is submitted to the Principal Inspector of Mines accompanied by the following documents for approval-

(i). a sketch plan indicating the distance from the blasting area to the affected structures;
(ii). the risk assessment;
(iii). a proof of consultation with the owners of the affected structures; and
(iv). restrictions and conditions.

c) a written approval has been granted by the Principal Inspector of Mines; and
d) any restrictions and conditions determined by the Principal Inspector of Mines are complied with.

Conduct a pre-blast survey

Purpose: A pre-blast survey creates a record on paper and video of what the nearby dwellings are like before any strip mine blasting. It documents the condition of the houses, water supply and other buildings on or within the affected land. It is meant to protect the home owner and the coal company. If there is any new damage to the property once the blasting has started, having a record of its pre-blast condition may help the parties to prove the cause of the damage.

Applicable areas subject to a pre-blast survey: The following IAPs have a right to a pre-blast survey:

- A dwelling/home is within 500 m of a new opencast (strip) mine;
- An IAP which is the owner of infrastructure within the 500 m impact zone;
- An IAP that stays within an area that is undermined.

Notification: The MHSA states that persons must be informed prior to any blasting when blasting is to commence within 500 m of any public building, houses, power lines, etc.

- A written request must be addressed to the persons affected by the blasting at least 30 days before the blast

Methodology: As proposed by the Mine Health and Safety Council (MHSC): Development of a South African Minimum Standard on Ground Vibration, Noise, Air-blast and Flyrock near Surface Structures to be protected. CSIR Report SIM 14-0901 Vibration Monitoring, 31 March 2016 (Brovko F, Kgarume T, Singh N, Milev A, Wekesa B, Durrheim R, Lumbwe T, Pandelany T and Mwila M)

- A crack survey must be conducted in the presence of the home owner;
- A report containing pictures must be compiled on the condition of the property entailing an inspection of:
    - Doors;
    - Walls;
    - Windows; and
    - Foundation
- The survey must cover water supply (check that the water is clear), condition of borehole (if relevant);
- A copy of the pre-blast survey must be handed to the owner of the property with contact details of the mine where to lodge a complaint if any damage is noticed after a blast.
- A post-blasting survey will then be required in the event that a homeowner or resident makes a specific damage claim;
- The complaint should be lodged within a short but reasonable time after the blast that is alleged to have caused damage. Procedures to lodge, adjudicate and settle complaints must be well advertised and the process should be simple, transparent and fair;
- The post-blasting survey is based on the particular damage claim, and will serve simply to confirm or deny the validity of the damage claim. The damage that is the subject of the complaint should be inspected, documented, and photographed if necessary. A comparison should be made with the pre-blast survey report, and it should be possible to determine whether there were any structural and/or other conditions that might have led to the appearance of the defect independent of any blasting activity. Dust, paint, cobwebs and caulking materials in a crack indicate that it is old and probably existed before the blast.

It is preferable that the post-blast survey is conducted by an independent specialist consultant, particularly if the findings of the post-blasting survey might be to deny the damage claim.

9.1.11. Noise

Quarterly noise monitoring is recommended at, at least one NSR (per project) staying close the haulage roads, as well as measurement locations on the mining boundaries. Measurements at the NSR should be collected before the projects are developed in order to obtain a database of existing ambient sound levels (at least four monitoring events must be conducted before any activities starts to ensure a sufficient database can be compiled that represents the ambient sound levels during each of the four seasons).

Once mining starts, quarterly noise monitoring should continue at the same locations to define actual mining noise levels. Measurement locations should be adapted as mining progress. When investigating a noise complaint, measurements must be conducted at the location of the person that registered a valid and reasonable noise complaint (staying within 2,000 m from the project). A second instrument should be deployed at the mine.

Ambient sound measurements should be collected as defined in SANS 10103:2008. Long-term (at least 2 nights) measurements are recommended at the NSR staying close to haul roads, with short measurements (a minimum of 10-minutes) acceptable on the mine boundary (both night- and daytime measurements).

When investigating a noise complaint, measurements should be collected during a period or in conditions similar to when the NSR experienced the disturbing noise event. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 36 hours, covering at least a full day- (06:00 – 22:00) and two night-time (22:00 – 06:00) periods. It is suggested that an instrument be deployed near the NSR (that registered the complaint) as well as the activity/equipment associated with the noise event.

9.2. Item 1(h): Monitoring and Reporting Frequency

Table 9-8 provides for information on the monitoring and reporting frequency. In terms of the EMPr an annual Performance and Compliance Assessment will be required. The MPRDA (in terms of GNR 1147, 2015) also makes provision for annual reporting on the rehabilitation progress as well as an annual recalculation of the financial provisioning for the mine. In this regard the mine must submit the following documentation:

- Annual Rehabilitation Plan;
- Final Rehabilitation and Closure Plan;
- Environmental Risk Assessment Report.

The issued WULA has several stipulations in terms of monitoring and reporting. The mine is obliged to conduct surface water monitoring on a monthly basis, groundwater on a quarterly basis, bio-monitoring on an annual basis and wetland monitoring on an annual basis. The water quality management report needs to be submitted on an annual basis in accordance with the timeframe as stipulated in the WUL.

9.3. Item 1(i): Responsible Persons

The responsible persons appointed in terms of the requirements of the MPRDA are contained in the Table below.

Table 9-7: Appointed Responsible persons

Name	Designation	Contact
Pierre Louw	Mine Manager	082 444 3814
Nonsikelelo Mbuyazi	SHE Officer	082 895 1406
Nathi Kunene	Director: Business Development	078 815 5309

9.4. Item 1(j): Time Period for Implementing Impact Management Actions

Please refer to

Table 9-8 for the timeframes associated with the monitoring and management of environmental impacts.

9.5. Item 1(k): Mechanism for Monitoring Compliance

Table 9-8 sets out the method of monitoring the implementation of the impact management actions, the frequency of monitoring the implementation of the impact management actions, an indication of the persons who will be responsible for the implementation of the impact management actions, the time periods within which the impact management actions must be implemented and the mechanism for monitoring compliance with the identified impact management actions.

Table 9-8: Monitoring of Environmental Impacts

Activities	Impacts requiring Monitoring	Rational for Monitoring	Responsible	Monitoring Frequency
Agricultural	Soil stripping, loss of topsoil and land use capability	Monitoring the progress of concurrent rehabilitation in relation to end land use restoration	SHE Manager Appointed specialist	Annual as per section 9.1.1
Air Quality	Dust fallout exceeding $PM_{2,5}$ and PM_{10} limits	Health related impacts associated with mining activities	SHE Manager Appointed specialist	Monthly – dust fallout at selected points
Aquatic Ecology	Potential impact on receiving water resources: WQ and ecosystem habitat	Compliance with the set RQO's for the catchment in terms of macro-invertebrates, PES, EIS Class, IHAS, FRAI	SHE Manager; Appointed Aquatic Specialist	As per WUL conditions: Bi-annually – once in dry season, once in wet season
Blasting	Vibration	Potential for damage of infrastructure	SHE Manager	As per blasting schedule
Community Health and Safety	Community health and safety may be impacted by the construction and operation of the mine	Compilation of a Community Health and Safety Plan inclusive of an awareness campaign	Mine Senior Management SLP - Implementation officer	On-going
Fauna and flora	Impacts on vegetation structure and health; and impacts on faunal populations and numbers; Red Data Listed fauna and flora species	Ensuring sustainable populations of both fauna and flora persist in the Somkhele area till closure	Terrestrial Ecologist	Annual as part of EMPr Performance Assessment
General Mining Activities	Noise	Noise disturbance on DAC's	Appointed NIA specialist	Monitoring to be conducted on quarterly basis
Groundwater	Groundwater pollution, destruction of boreholes, groundwater levels, pollution plume migration, decant of AMD	Ensure compliance with groundwater Resource Quality Objectives	SHE Manager Appointed service provider	As per WUL, Quarterly groundwater quality, groundwater levels, annual update of numerical model
Socio-Economic Upliftment Program as per SLP	Mining may have impact on communities in terms of socio-economic aspects	Compliance with commitments as per SLP: Skills inventory; Training Program; ABET Program;	Mine Senior Management SLP - Implementation officer	Annually

Activities	Impacts requiring Monitoring	Rational for Monitoring	Responsible	Monitoring Frequency
		Locally recruited work force;		
Surface Water	Water quality and quantity, Compliance with RQO's	Ensuring that water management infrastructure is compliant with GN 704 Regulations	SHE Manager; Appointed specialist environmental officer	As per issued WULA
Rehabilitation	Rehabilitation of the disturbed mining footprint	Successful implementation of rehabilitation Plan	Rehabilitation Specialist	Annual progress reporting:
Site clearance	Manifestation of Alien Invasive Species	Implementation of Alien Invasive Plant Control Program	SHE Manager	Annual as part of EMPr Performance Assessment
Wetlands	Mining activities within protective buffer zone of delineated wetland and riparian zone	The wetlands immediately adjacent to the project area should be demarcated in the field as they are at particular risk of impacts. Monitoring of the activities through all phases is important to ensure all impacts are remediated as soon as possible; thus, preventing and long-term residual impacts to the system that compromises the ability of the wetland to function.	SHE Manager; Appointed Wetland Specialist	Annual; Wetland monitoring to determine PES Class and EIS
Mine Closure and post mining environmental status	Post-mining water decant is predicted to occur once the final void has been rehabilitated and groundwater levels are allowed to return back to natural level. It is anticipated that this decant will be acid forming	To detect whether any long-term residual risk will establish in the catchment; To monitor the groundwater quality and pollution plume migration	SHE Manager; Appointed Geohydrological Specialist	Bi-annually for 3 years after closure

Activities	Impacts requiring Monitoring	Rational for Monitoring	Responsible	Monitoring Frequency
	(acid mine draining, AMD)			

10. Item 1(l): FREQUENCY OF THE SUBMISSION OF PERFORMANCE ASSESSMENT REPORT

Tendele Mining will be obliged to submit an Environmental Performance Assessment Report on an annual basis to the Competent Authority. In addition, GNR 1147 on the Financial Provision Regulations further requires that an applicant for an environmental authorisation related to mining comply with the prescribed financial provisioning for the rehabilitation, closure and on-going post decommissioning management of negative environmental impacts on an annual basis:

- Assess the environmental liability in the prescribed manner to determine the financial provision for –
  - Annual rehabilitation and remediation;
  - Final decommissioning and closure activities at the end of prospecting, exploration mining or production operations; and
  - Remediation and management of latent or residual environmental impacts which may become known in future, including the pumping and treatment of polluted or extraneous water.
- Detailed itemisation and actual costs of all activities for all three above;
- Applicant or holder of a mining right/permit must ensure that the financial provision is at any given time equal to the sum of the actual costs of implementing the above for a period of at least ten years forthwith; and
- Where financial provision is made for the remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as contemplated in regulation 5(c) and 6 (c), the financial vehicle used for that purpose must, on issuance of a closure certificate in terms of the MPRDA, be ceded to the Minister responsible for mineral resources, or, if the financial vehicle contemplated in regulation 8(1)(c) is used, the trustees must authorise payment to the Minister responsible for mineral resources.

11. Item 1(m): ENVIRONMENTAL AWARENESS PLAN

11.1. Item 1(m)(i): Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

11.1.1. Objectives

Tendele have business and corporate policies in place related to the environment which clearly spells out the Environmental Objectives of the Company. In this regard, Tendele has

a Health and Safety (H&S) Policy with the objective to create a safe and healthy work environment. According to the Somkhele Project, the frequency of safety campaigns has been increased and safety awareness has improved considerably. Somkhele has confirmed that they are committed to a dynamic and comprehensive H&S programme and ZERO harm to employees and community members.

A Health and Safety programme is a combination of elements from the National Occupational Safety Association (South Africa) (NOSA) and Occupational Health and Safety Assessment Series (OHSAS) 18001 safety programmes. The following Health and Safety systems are in place at the mine:

- Quarterly Health and Safety auditing;
- Medical examinations (pre-employment, annual/periodically, at exit);
- Monthly dust monitoring;
- Monthly sampling in dams and drinking water;
- Monitoring of personal exposure to airborne pollutants;
- Seismographic Monitoring to monitor for noise and vibration exposure; and
- Health risk assessment twice a year for all staff members.

The mine has full time medical staff on site to assist in case of an emergency. Regular check- ups and tests are carried out on the workforce and appropriate action is taken where needed. Acquired Immune-Deficiency Syndrome (AIDS) awareness campaigns are carried out monthly. All employees are subject to annual medicals where their records are kept on mine and monitored by a third party.

In terms of their Environmental Policy, the Somkhele Project has committed to the following objectives:

- To maintain, protect and conserve the environment;
- To implement effective measures to minimise environmental degradation;
- To comply with prevailing legislation;
- To maintain zero tolerance to environmental pollution through a programme of continual improvement;
- To strive for the most economic utilisation of raw materials and energy resources through continual optimisation processes; and
- To continually rehabilitate waste sites and disturbed surface areas.

11.1.2. Inclusion of Open Cast Mining Areas

The Competent Persons Report (Applied Rock Engineering, 2023) will be used to provide the mine planner with geotechnical guidance when layout pit geometrics of the targeted blocks need to be done.

Although many exploration boreholes have been drilled over the years, none were formally geotechnically logged and so in order to produce some pertinent information, a number of available and newly drilled cores were logged by Applied Geological Services and Mining (AGS&M) according to a format supplied by Applied Rock Engineering. This data will provide the base source of data and most recommendations and conclusions will be based upon the same. The following recommendations will be implemented to ensure the safety of the miners:

- Emalaheni has a slightly flatter dip of bedding that should translate into a very stable footwall, but could mean more localised bench scale failures than experienced in the current mining blocks.
- The overall slope angle can be preliminary designed to the 62° used in the current mining, subject to alteration when more data becomes available.
- Some localised strata controls issues may be found around the dolerite sills and where possible the benches below such intrusions should be at least 10.m wide and preferably 15.0m wide.
- The two holes examined in Mahujini exhibit very different geotechnical environments. MMD 012 gives results very similar to the current mining, therefore the preliminary design can use the 62° overall slope angle. However, MMD 011 suggests that the slope angle *may* have to be flatter, therefore until more measured information available; this recommendation should be used with caution.
- In Ophondweni**,** no recommendation can be given to the overall slope angle as the two holes investigated gave very different results, with one hole suggesting poor ground conditions, including an elevated risk of adverse jointing daylighting out of the face that could lead to multi stack failure. The other hole suggested that conditions will be similar to that seen in the current mining.

11.1.3. Induction and Training

A Staff Induction Policy is in place at Tendele as part of a process to welcome new employees and prepare them for their new roles within the mining sector. According to Section 5 of the Mine Health and Safety Act, employers must keep a record of all training provided and all mines must submit a workplace skills plan on an annual basis to the DMRE.

The Induction and Training programme aims to provide as far as reasonably practicable a working environment that is safe and without risk to the health of employees. All personnel including contractors will undergo an initial integrated environmental awareness programme at the beginning of their contract. This programme would include:

- General environmental awareness;
- Health and safety;
- Specific issues relating to the mine that have been identified as potential impacts on the environmental, socio-economic condition and historical and cultural aspect for the relevant phase of the mining project;
- Incident reporting mechanisms;
- Conditions of the SLP; and
- Conditions of the EMPr.

The environmental awareness programme would also comply with the relevant legislation:

- Constitution of South Africa, 1996;
- Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002);
- Mine Health and Safety Act, 1996 (Act 29 of 1996);
- National Environmental Management Act, 1998 (Act 107 of 1998);
- National Water Act, 1998 (act 36 of 19980), and
- Other relevant legislation.

Each employee would be trained to assess the risks associated with the work that he/she is doing on an ongoing basis.

11.1.4. General Environmental Awareness

Tendele's Emergency Preparedness and Response chart gives a complete step-by-step instruction list on how to deal with an emergency, who to contact first, who to notify and who is responsible for various contingency plans. This chart has been developed in order to facilitate all levels of staff so that any emergency can be dealt with in a simple, efficient manner.

Training sessions will be held with staff on their work procedures with emphasis on the implementation of the required mitigation measures as stipulated in the EMPr.

11.1.5. Internal Communication and Awareness Campaign

Tendele has developed an Internal Communication Plan as part of their Strategic Business Plan. The internal Communication Plan outlines the important messages that need to be conveyed to employees. Due to the size of the organisational structure of Tendele it is required to know the details on how the message will be distributed including the channels to be used. The internal communication and awareness strategy are based on the following aspects:

- Track internal communication (emails, minutes of meetings);
- Define goals and objectives for each meeting;
- Identify the target audience;
- Choose the right internal communication tool (email, virtual meetings);
- Create the right message to be conveyed;
- Provide engaging communication;
- Schedule all internal meetings;
- Provide an employee advocacy tool;
- Identify ambassadors/shop stewards;

11.1.6. External Communication and Awareness Campaign

Tendele utilises the services of a media liaison officer to conduct external communication with the directly affected stakeholders regarding their mining operations. A media release is placed on the company's website[10] following any notable action that might have an interest to stakeholders.

11.2. Item 1(m)(ii): Manner in which risks will be dealt with in order to avoid pollution or degradation of the environment

The management of Tendele Mine shall establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant processes for external communication on its significant environmental aspects and record its decision.

[10] https://www.petmin.co.za/media-release.php

Communication is a management responsibility. All line supervisors are responsible for effective communication within their own sections. Environmental risks will be dealt with through training and communication to ensure minimal degradation of the environment.

12. Item 1(n): SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

13. Item 2: UNDERTAKING

The EAP herewith confirms: -

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

Signature of the EAP

MDTE (Pty) Ltd

Name of Company

Date

14. REFERENCES

Applied Rock Engineering (2024), Geotechnical Comparison of Targeted Blocks: Somkhele Mine

Banzai Environmental (2024), Palaeontological Impact assessment: Somkhele Anthracite Mining Expansion Project by Tendele Mining, District of Mtubatuba, KwaZulu-Natal

Black Rock Environmental (2024), Closure and Rehabilitation Assessment for the Mining Areas of Emalahleni, Ophondweni and Mahujini

Black Rock (2024), Resettlement Plan for the Community Impacted by Intended Mining Operations at Somkhele Anthracite Mine

Climate Africa, (2019). Corporate Climate Impact Assessment

CSIR (002), Coaltech 2020: Real Time Plant Efficiency Measurement by G.J. de Korte, Division of Mining Technology, Project number 4.5

Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.

Department of Environmental Affairs (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa

Department of Mineral Resources and Energy (2022), Government Notice Regulation Number 1939: Publication of the Mine Community Resettlement Guidelines 2022 for implementation, dated 30 March 2022

Department of Water and Sanitation, (2022). Classification of Significant Water Resources and Resource Quality Objectives for Water Resources in the Usutu to Mhlathuze Catchments: Status Quo and Delineation of Integrated Units of Analysis and Resource Unit Report. Prepared by: WRP Consulting Engineers (Pty) Ltd. DWS Report: EM/WMA3/4/00/CON/CLA/0222

Eco-Pulse (2024), Tendele Mining (Pty) Ltd – Somkhele anthracite Mining project, Mtubatuba Local Municipality, KwaZulu-Natal: wetland and Aquatic Ecosystem Impact Assessment, Report No EP734-01A, dated April 2024

EARES (2024), Blasting Impact Assessment for the Development of 3 Opencast Anthracite Pits as part of the Somkhele Mine Expansion Project, North-west of Mtubatuba, KwaZulu-Natal

EARES (2024), Environmental Noise Impact Assessment for the proposed Development of an Anthracite Mine as part of the Somkhele Mine Expansion Project North-west of Mtubatuba, KwaZulu-Natal

Eco-Pulse (2019), "Somkhele Mining Areas Expansion: Emalahleni, Mahujini & Ophondweni Aquatic Rehabilitation Plan: Riparian and Instream Habitats"

Eco-Pulse (2024), "Tendele Mining (Pty) Ltd – Somkhele Anthracite Project", Mtubatuba Local Municipality, KZN, Report Number EP734-01A dated 4 April 2024

Eco Soil (2024), Agricultural, Soil and Land Capability Assessment for the Tendele Emalahleni Mining Right Area

Eco Soil (2024), Agricultural, Soil and Land Capability Assessment for the Tendele Ophondweni Mining Right Area

Eco Soil (2024), Agricultural, Soil and Land Capability Assessment for the Tendele Mahujini Mining Right Area

GCS (2018), Somkhele Mine, KwaZulu-Natal: Mahujini and Emalahleni Haul Road Flood Line Analysis

GCS (2018), Geohydrological Model Update for the Somkhele Anthracite Colliery

GCS (2019), Summer Aquatic Biomonitoring Report 2019

GCS (2019), Wetland Assessment for the Ophondweni Area – Somkhele Mine

GCS (2019), Hydropedological Assessment for the Somkhele Anthracite Mine

GCS (2019), Conceptual Acid Mine Drainage Management Plan (CAMDMP) for the Somkhele Anthracite Mine

GCS (2019), Follow-Up Hydrogeological Study for Somkhele Anthracite Mine - Mining Area 4 and 5

GCS (2019), Area 4 and 5 Floodline Analysis

GCS (2019), Area 4 and 5 (Ophondweni, Emalahleni and Mahujini) Storm Water Management Plan

GCS (2019), Water Balance Update for the Somkhele Anthracite Mine - 2019

GCS (2019), Desktop Watercourse and Fauna Assessment for the Fuleni Offset, KwaZulu-Natal

GCS (2020), Somkhele Mine: Rapid Health Impact Assessment

GCS (2020), "Somkhele Anthracite Mine Area 4 and 5: Visual Impact Assessment"

GCS (2024), Geohydrological Investigation for the Proposed Ophondweni, Emalahleni and Mahujini Operations in 0041MR, Somkhele Anthracite Mine

GCS (2024), Hydropedology Investigation for the Proposed Ophondweni, Emalahleni and Mahujini Operations in 0041MR, Somkhele Anthracite Mine

GCS (2024), "Somkhele Anthracite Mine Area 4 and 5: Visual Impact Assessment 2019 Update Report", Report Number 23-1040 dated 27 March 2024

Harvey Ecological (2024), Terrestrial Faunal Biodiversity Assessment for the Proposed Somkhele Mine Expansion, uMkhanyakude District Municipality, KwaZulu-Natal

Illifa Engineering (2024), Verification for a Traffic Impact Assessment for various haulage routes from the proposed Emalahleni and ophondweni Pits to the Somkhele Mine in the Umkhanyakude District Municipality, KwaZulu-Natal

Infotox (2024), Rapid Appraisal Community Health Impact Assessment for the Somkhele Mine, Mtubatuba District Municipality, KwaZulu-Natal

MENCO (2024), Final Scoping Report as part of the Environmental Authorisation Application for Tendele Mining Activities at Emalahleni, Ophondweni and Mahujini, KwaZulu-Natal

Mtubatuba Municipality (2020), Mtubatuba Draft IDP 2020-2021-

PGS Heritage (2020), The Somkhele Anthracite Mine Ophondweni and Emalahleni Pits Near Mtubatuba, Umkhanyakude District Municipality, Kwazulu Natal Province.

PGS Heritage (2020) Palaeontological Desktop Assessment for The Proposed Somkhele Anthracite Opencast Mining Pits Within the Umkhanyakude District Municipality and The Mtubatuba Local Municipality, Kwazulu Natal

PGS Heritage (2020), Survey of Burial Grounds and Graves

PGS Heritage (2024), Somkhele Anthracite Mine Expansion Project (Ophondweni, Emalahleni) near Mtubatuba, KZN Province, Report number 747HIA-001, dated 15 March 2024

PGS Heritage (2024), Somkhele Anthracite Mine Expansion Project (Mahujini) near Mtubatuba, KZN Province, Report number 747HIA-002, dated 18 March 2024

Rayten Engineering (2024), Tendele Coal Mining: Air Quality Impact Assessment for Proposed Somkhele Opencast Anthracite Mining Project

Rayten Engineering (2024), Climate Change Impact Assessment: Tendele Mining – Somkhele Mine Extension Project

Styles, D. (2019), "Specialist Vegetation Impact Assessment for Possible Future Mining Areas at Emalahleni, Mahujini and Ophondweni"

Styles, D. (2024), Terrestrial Plant Species Specialist Assessment: Proposed Mining Areas and Associated Infrastructure at Emalahleni, Ophondweni and Mahujini

Umhlabuyalingana Municipality (2017), Final Spatial Development Framework

Umkhanyakude District Municipality (2018), Integrated Development Plan Review: 4th Generation 2018-2019

Urban-Econ (2020), "A Social Impact Assessment for The Somkhele Mine"

Urban-Econ (2024), Update of the Socio-Economic Impact Assessment for Tendele Mining: Proposed Somkhele Mine Expansion Project for Mining activities in Emalahleni, Ophondweni and Mahujini/Machibini

WKC (2019), Air Quality Impact Assessment

WKC (2020), Noise Impact Assessment

WKC (2020), Vibration Impact Assessment

List of Appendices

APPENDIX 1	CV of the EAP
APPENDIX 2	Public Participation
APPENDIX 3	Agricultural, Land Use and Soils
APPENDIX 4	Landscape and Visual Impact Assessment
APPENDIX 5	Archaeological and Cultural Heritage Impact Assessment
APPENDIX 6	Paleontology Impact Assessment
APPENDIX 7	Hydropedology Impact Assessment
APPENDIX 8	Wetland and Surface Water Impact Assessment
APPENDIX 9	Hydrology Assessment
APPENDIX 10	Noise Impact Assessment
APPENDIX 11	Traffic Impact Assessment
APPENDIX 12	Geohydrological Assessment
APPENDIX 13	Climate Change
APPENDIX 14	Health Impact Assessment
APPENDIX 15	Socio-Economic Assessment
APPENDIX 16	Ambient Air Quality Impact Assessment
APPENDIX 17	Blasting and Vibration
APPENDIX 18	Vegetation (Plant) Species Assessment
APPENDIX 19	Terrestrial Faunal Biodiversity Assessment
APPENDIX 20	Rehabilitation and Closure Plan

APPENDIX 1

CV and Qualification of the EAP

APPENDIX 2

PPP: Comment and Response Report

APPENDIX 3

Agricultural, Land Use and Soils

APPENDIX 4

Landscape and Visual Assessment

APPENDIX 5

Archaeological and Cultural Heritage Impact Assessment

APPENDIX 6

Palaeontological Impact Assessment

APPENDIX 7

Hydropedology Impact Assessment

APPENDIX 8

Wetland and Surface Water Assessment

APPENDIX 9
Hydrological Assessment

APPENDIX 10

Noise Impact Assessment

APPENDIX 11

Traffic Impact Assessment

APPENDIX 12
Geohydrological Assessment

APPENDIX 13
Climate Change

APPENDIX 14

Health Impact Assessment

APPENDIX 15

Socio-Economic Impact Assessment

APPENDIX 16

Ambient Air Quality Impact Assessment

APPENDIX 17
Blasting and Vibration

APPENDIX 18

Vegetation Impact Assessment

APPENDIX 19

Terrestrial Biodiversity Assessment

APPENDIX 20
Geotechnical Report

APPENDIX 21

Rehabilitation and Closure Plan

APPENDIX 22

Visual and Noise Compensation

APPENDIX 23

Civil Engineering Design Report

APPENDIX 24

Social and Labour Plan

Bookmark only

APPENDIX 25

Relocation Action Plan

Bookmark only

APPENDIX 26

Biodiversity Offset Agreement