Assmang (Pty) Ltd: Beeshoek Iron Ore Mine

<u>FINAL DRAFT ADDENDUM</u> Environmental Scoping Report in terms of National Environmental Management Act, 1998 and the National Environmental Management: Waste Act, 2008 for:

Beeshoek Mine Optimisation Project

Report Purpose

FINAL DRAFT (**<u>ADDENDUM</u> REPORT**)

Report Status

<u>For Stakeholder input (SECOND ROUND)</u>

Report Reference

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Tanja Bekker is registered as a Professional Natural Scientist in the field of Environmental Science with the South African Council for Natural Scientific Professions (SACNASP) and is also a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA), a legal requirement stipulated by the National Environmental Management Act, 1998. She is further certified as an ISO 14001 Lead Auditor. Her qualifications include BSc. Earth Sciences (Geology and Geography), BSc. (Hons.) Geography and MSc. Environmental Management. In addition to her tertiary qualifications, she obtained a Certificate in Project Management, and completed the Management Advancement Programme at Wits Business School.

With more than 18 years' experience in environmental management and the consulting industry, she follows a methodical and practical approach in attending to environmental problems and identifying environmental solutions throughout the planning, initiation, operation and decommissioning or closure of projects.

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Quality Control

Report Title	DRAFT Environmental Scoping Report for in terms of NEMA and NEM:WA: Beeshoek Mine Optimisation Project	
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Report Status	Final Draft - ADDENDUM	
Report Purpose	For Licence Holder Review	
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Author	Tanja Bekker	25 November 2020
Reviewer	Michelle Pretorius	14 December 2020

Amendments

Report Ref:	Nature of Amendment	Date	Report Output Ref:
21910W	External Review, minor grammatic and clarification amendments	15 December 2020	121910_D1
121910_D1	Inclusion of comments and project description clarifications issued by Licence Holder.	30 December 2020	21901_D2
21901_D2	Updated description on the Beneficiation Plant upgrades	20 January 2021	21901_D3
21901_D3	Inclusion of updated description of the Beneficiation Optimisation Project stockpile capacities and descriptions	5 February 2021	21901_D4
21901_D4	Inclusion of the potential for a dewatering tank at Village Pit.	17 February 2021	21901_FD
21901_FD	Inclusion of the Railway line project on instruction by the DMRE during meeting dated 19 March 2021 (attendees: Tanja Bekker; Ian Caldwell; Chrystal Vries; Kobus Harding; Johannes Nematatani, Machalla Ramaboea)	25 March 2021	21901_FD2

Distribution

Distributed To:	Purpose:	Date	Format/Amount
Michelle Pretorius	External Review	10 December 2020	Electronic
Tanja Bekker	Inclusion of external review	14 December 2020	Electronic
Msimelelo Silomntu; Chrystal Vries	Licence Holder Review	15 December 2020	Electronic
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Tanja Bekker	Inclusion of Licence Holder recommendations	30 December 2020	Electronic
Tanja Bekker	Inclusion of Licence Holder further recommendations	19 January 2021	Electronic
Msimelelo Silomntu; Chrystal Vries	Licence Holder Final Acceptance	21 January 2021	Electronic

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Msimelelo Silomntu; Chrystal Vries; Maryke Burger; Leonie Horn, Kobus Harding, Arno Neveling	Licence Holder Final Acceptance	3 February 2021	Electronic
Tanja Bekker	Inclusion of Licence Holder further recommendations	4 February 2021	Electronic
Msimelelo Silomntu; Chrystal Vries; Maryke Burger; Leonie Horn, Kobus Harding, Arno Neveling	Licence Holder Final Acceptance	5 February 2021	Electronic
Submission to Stakeholders for review	Stakeholder input	24 February 2021	Hard Copy: DWS, DMRE; NCDENC; DAFF; Local Municipality; Stakeholders (at Local Library in Postmasburg). Electronic copy to all registered stakeholders.
Submission of Addendum ESR to Stakeholders for review	Stakeholder input	29 February 2021	Hard Copy: DWS, DMRE; NCDENC; DAFF; Local Municipality; Stakeholders (at Local Library in Postmasburg). Electronic copy to all registered stakeholders.

Executive Summary

Introduction

Beeshoek is situated in the Tsantsabane Local Municipality, with neighbouring towns being Postmasburg, located 7km east of the mine and Kathu located 70km north of the mine.

Mining at Beeshoek was established in 1964 with a basic hand sorting operation. In 1975 a full Washing and Screening Plant was installed. Because of increased production, Beeshoek South, a southern extension of the Beeshoek Mine, was commissioned during 1999 on the farms Beesthoek and Olynfontein.

Assmang (Pty) Ltd is the holder of the new order rights in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) in respect of high-grade hematite iron ore deposits at Beeshoek on the farms Beesthoek and Olynfontein. The mining method currently entails an opencast mining operation, which consists of five (5) active opencast pits (Village Pit, HF Pit, BF Pit, East Pit, and BN Pit). Although other opencast pits are dormant at this time, these are continuously assessed in terms of their economic value. The current resources of the Mine are approximately 97.17 million tonnes with a reserve of about 26.18 million tonnes.

Beeshoek can be broadly categorised as follows:

- Northern mining area (North Mine): This area comprises active as well as historical mining areas. A number of small quarries and mine residue dumps of various categories are located within this area. The area also includes the existing iron ore beneficiation plant, tailings storage facility (slimes dam), as well as the North Opencast Pits;
- Main Offices, village (since demolished) and recreational area; and
- Southern mining area (South Mine): This area comprises large opencast pits and associated Waste Rock Dumps (WRDs). The Village Pit and associated WRD are the main activities in this area. This area also includes a crushing and screening area as pre-preparation of the Run of Mine (ROM) iron ore before being routed by overland conveyor to the Iron Ore Beneficiation Plant located at North Mine.

Project Description

Section 23(1)(a) of the MPRDA states in Section 1(a), that subject to subsection 4, the Minister must grant a mining right if the mineral can be mined optimally in accordance with the mining work programme. The mine has been awarded a Mining Right by the Department of Mineral Resources (DMRE; now Department of Mineral Resources and Energy (DMRE)) and therefore has an obligation to give effect to the following:

- The ongoing development and improvement of the Mining Work Programme which details the planned mining activities to be followed in order to mine the mineral resource optimally; and
- Optimal mining of minerals must be undertaken, as the Minerals and Petroleum Board may recommend to the Minister to direct the holder of a mining right to take corrective measures if the Board establishes that the minerals are not being mined optimally in accordance with the Mining Work Programme. The Minister may, on the recommendation of the Board, suspend or cancel a mining right if the Minister is convinced that any act or omission by the holder justifies the suspension or cancellation of the right.

Beeshoek Mine has actively investigating opportunities for the continued and sustainable mining of iron ore reserves within the approved Mining Rights Area. This application for Environmental Authorisation specifically gives effect to that and includes the following projects:

1. Specific Demarcation of Run of Mine (ROM) Stockpiles on South Mine;
2. Amendments to the design of existing WRDs in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints;
3. Increase of Opencast Pit footprint areas, as well as the undertaking of detrital mining;
4. Beneficiation Optimisation Project:
    - Development of a Jig Plant (this area will be located in the vicinity of the current plant) for the beneficiation of discard and low-grade Iron Ore;
    - Development of a WHIMS Plant for the beneficiation of slimes;
    - Development of a new surface water dam for the purposes of the Beneficiation Optimisation Projects (Jig and WHIMS Plants);
5. Development of supporting infrastructure such as power lines, roads, pipelines and improvements to storm water management systems where applicable;
6. Development of a 2.8km railway line link between the existing Beeshoek Siding and the Transnet Freight Rail (TFR) siding.

The purpose of this project is to give effect to the Section 23(1)(a) of the MPRDA requirements for the optimisation of a Mining Right, as well as the implementation of the best practical environmental management measures for the operation and management of the Waste Rock Dumps. Further to this, the proposed Beeshoek Low-Grade Beneficiation Optimisation Project is to allow Beeshoek Iron Ore to optimise the mining process and reduce mineral waste on site (in line with the National Waste Management Hierarchy), by implementing two additional Beneficiation Projects, namely a new WHIMS Plant to rework the existing slimes from the Slimes Dam and a new Jig Plant to rework the existing low-grade stockpile (Discard Dump). This project will have numerous economic and environmental benefits.

Listed Activities

In terms of the NEMA, there are three (3) listing notices which should be considered for this application. These listing notices were amended during April 2017. This amendment did not repeal the 2014 listed activities, but purely amended certain listings. Listing Notice 1 (Regulation 983) activities require a Basic Assessment Process, whereas Listing Notice 2 (Regulation 984) activities require a full Environmental Impact Assessment (EIA) Process. Listing Notice 3 (Regulation 985) activities require a Basic Assessment Process if the area falls within certain geographic zones. Beeshoek Mine is not characterised by gazetted Endangered Ecosystems, Critical Biodiversity Areas (CBAs) or located in proximity to a Protected or Conservation Area and for this reason Listing Notice 3 is not applicable to the mine.

Considering the above, the following listed activities will be triggered:

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
Project 1: Consolidation of Run of Mine (ROM) Stockpiles on South Mine	The ROM stockpile area on South Mine will be demarcated as a combined ROM stockpile area for both on-grade, off-grade and BIS. Overall Area: 35ha (no clearance of vegetation is required; this area is located on the north-eastern perimeter of the West Pit WRD (now referred to as the Village Pit South WRD) in a legally disturbed area) The current Water Use Licence (WUL) allows for the following ROM deposition on the stockpile in question – note that the deposition of ROM will not increase in annual throughput: • South Contaminated ROM 1: 4 450 000t/a • South Contaminated ROM 2 Off-Grade ROM Stockpile, including BIS: 1 920 000t/a • ROM Stockpile: 720 000t/a	x	Part 1, Regulation 29: "An environmental authorisation may be amended by following the process prescribed in this Part if the amendment; Will not change the scope of a valid environmental authorisation nor increase the level or nature of the impact, which impact was initially assessed and considered when the application was made for an environmental authorisation; or Relates to the change of ownership or transfer of rights and obligations". The change in the footprint, combining the area for the purposes of an overall ROM footprint will trigger an amendment to the current layout.	**Not Applicable (N/A)**	**N/A**
Project 2: Amendments to the design of existing Waste Rock Dumps (WRDs) in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints	Village Pit North Waste Rock Dump (VP1): Current area approximate 70ha, to be increased with approximately 26ha (final area 96ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance of about 25ha) – this will also remove the required Storm Water Dam, which was a recommendation in its associated EMPr for the Village Pit WRD EMPr, but has as yet not been constructed, due to the low run-off in this area and subsequent storm water management studies - The decommissioning of the SWD will not trigger a listed activity as the "active activity" does not entail an "operational component"). Planned operational height is 111m (upon rehabilitation 112m). GF Waste Rock Dump: Current area approximately 48ha, to be increased by about 6ha (final area about 54ha) to allow for final slope and footprint upon rehabilitation (area pending designs). Based on the location of this WRD between the Discard Dump and the existing Slimes Dam it is unlikely that any clearance will be triggered. Planned operational height is 82m (upon rehabilitation 84m).	x	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— the undertaking of a linear activity.	It is assumed that Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right in terms of the MPRDA is not relevant as no additional mining rights are required and the activities entail the expansion of approved facilities. For that reason: Category A waste activities, #13: The expansion of a	Yes – Section 21(g) for the waste rock dump expansions and potential Section 21 (c)&(i) for the presence of various dry pans in the area. GN704 Exemption requirements for the operation of unlined Mine Residue Deposits.

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	East Pit Waste Rock Dump: Current area approximately 144ha, to be increased by about 26ha (final area about 170ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance in excess of 25ha). Planned operational height is 94m (upon rehabilitation 94m). West Pit Waste Rock Dump (now referred to as the Village Pit South WRD): Current area approximately 80ha, to be increased with about 55ha (final area 135ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will likely involve clearance of about 35ha). Planned operational height is 98m (upon rehabilitation 106m). HF Waste Rock Dump (new dump on historic dump footprint): Current area approximately 20ha and used for BIS stockpiling, to be reused to allow for HF Pit waste rock disposal, as well as final slope and footprint upon rehabilitation (area pending designs). This area is located on an existing WRD footprint (no additional clearance therefore required). Planned operational height is 39m (upon rehabilitation 63m). Discard Dump: Current area approximately 28ha, to be increased to about 60ha. This area is located within the mining area, between WRDs, Slimes Dam and Opencast Pits, no clearance will be required. The heigh of the facility is planned to be up to 60m. Current WUL allows for the following deposition – note that the deposition of material will not increase in annual throughput, however the life of mine and total capacity/footprint will increase: • Village Pit North WRD: 31 500 000t/a • West Pit Waste Rock Dump (now referred to as the Village Pit South WRD): 21 413 403t/a • GF WRD: 7 721 766/a • HL Waste Rock Dump: 10 983 334t/a • BIS ROM North 1 – 2 +50 000t/a (on historic HF WRD) • East Pit Waste Rock Dump: 68 850 000t/a • Discard Dump: 9 000 000t/a		**Listing Notice 2, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **The specific height of the Village Pit WRD and the Product Stockpiles as stipulated in their respective EMPs will be increased as part of this EIA Application – this will be considered as included in a Regulation 29 Part 2 amendment which replace the height stipulations as presented in the prior EMPs. The increases in heights do not trigger specific listing notices, however the associated footprints to achieve final closure slope will trigger a Waste Management Licence Activity.**	waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule is more relevant.	

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Project 3: Increase of Opencast Footprint Areas, as well as the undertaking of detrital mining for shallow iron ore reserves, including transportation routes (Haul roads)	Village Pit (VP North), will be expanded by 375ha in the future to 436ha and will further include two satellite pits: Pit East and Pit South, each with and area of about 37ha and 22ha respectively. Clearance of vegetation will be required. The depth of the VP North is planned at 180m, with VP East and VP South 160m and 60m respectively. BN Pit area is planned to be expanded by 66ha to approximately 137ha. The depth of the opencast pit will be 162m from surface. Approximately 25ha will require vegetation clearance. EP Opencast Pit, will entail a substantial increase from about 50ha to about 1026ha. The Future Pit, linked to the East Pit is a planned new pit which will comprise of an area of an additional 976ha. This area will likely be a result of various smaller satellite pits. However for the purposes of the EIA process the overall area is considered. Clearance of vegetation will be required. For this activity it is important to note that the future pit is in its planning phase, further exploration will be required in this area. Once the final designs for the mining schedule is available this will be submitted to the DMRE for approval. It will also be at this time that a detailed waste management strategy will be developed for the management of waste rock and overburden in this area. Once this information is available the necessary Waste Management License and Water Use License will be applied for from the DMRE and DWS respectively. The depth of East Pit is planned at approximately 220m. The BF Pit will be expanded from about 30ha (comprising of 3 pits) to about 86ha. Approximately 25ha may require clearance. The dept of the BF Pit is planned at 180m. A Detrital Mining area of about 238ha will be established – it should be noted that entire area will not be utilised, only where minerals are found economically viable. Clearance of vegetation will be required. Mining in the detrital area is planned between 20-40m in depth.	x	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 2, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **Listing Notice 1, Activity 24**: The development of a road—with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— the undertaking of a linear activity.	**N/A**	Yes – Section 21 (c)&(i) for the presence of various dry pans in the area. Section 21 (j) for the abstraction of water for safe mining conditions, and the use thereof as Section 21(a) water uses. There is a further potential for an additional dewatering tank at the Village Pit. – this will be a Section 21g water uses

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	One new haul road is proposed: • Village Haul Road: 1,100m at a width of 30m (about 3.3ha) The road will be located in areas mostly disturbed with exiting mining activities or along exiting roads.				
Project 4: Development of the Beneficiation Project which will comprise of a WHIMS Plant and Jig Plant at Beeshoek	• WHIMS Plant ○ WHIMS Construction Laydown Area: approximately 1.5ha. ○ Within the laydown area, a 2 500m² Staging Stockpile comprising low grade feed material will be located. This material will be processed material (i.e. raw material) derived from the Slimes Dam. All waste (oversize and slimes) will be disposed of onto the existing Slimes Dam and no new Mine Residue Stockpile will be developed. ○ WHIMS Plant Clarifier with a capacity of 9 700m³. ○ WHIMS Plant footprint, including access road of 160m in length (approximately 4ha). ○ WHIMS Plant Central Process Dam: 0.4ha, with capacity of 5 000m³. ○ WHIMS Plant Emergency Product Stockpile: 21m² within WHIMS Plant footprint area. ○ WHIMS 1mm Product stockpile: 300m² within the WHIMS Plant footprint area. ○ Tailings Pipeline HDPE: 315mm diameter at 750m³/hr (208.3l/s): ▪ 1.1km pipeline from the WHIMS Plant Clarifier to the northern perimeter of Slimes Dam; ▪ 1.4km from the WHIMS Plant Clarifier to the southern perimeter of the Slimes Dam; and ▪ existing pipeline of 1.3km to be rerouted from the existing Beneficiation Plant Thickener directly to the WHIMS Plant.	Yes: Tailings Pipeline between WHIMS Plant and Slimes Dam.	**Listing Notice 1, Activity 10:** The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, 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—such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve.	Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right in terms of the MPRDA. This will be applicable at the WHIMS Plant for the new transfer and feed stockpiles (specifically the Staging Stockpile, which will be a designed facility). The reworking of the discard, low grade material and slimes are existing approved activities on site in terms of the approved EMPr, 2009. However for the purposes of the application, these activities will be clearly described and	Yes – Section 21 (g) and (b) water uses WHIMS: 1000m³ Process Water Tank; 9 700m³ Clarifier; 5000m³ Central Process Water Dam; 1000m³ Potable/fire Water Tank; Emergency Plant Stockpile (20m3 at any given time), Staging Stockpile (capacity 6 000m³) and 1mm Product Stockpile (capacity 1 000m³), Sewage Conservancy Tank of 6m³. Jig: 100m³ Potable Water Tank, Intermediate Stockpile (capacity 5 500m³), Arising Stockpile (capacity 6 000m³) and Low low grade Stockpile (capacity 118m³), Sewage Conservancy Tank of 6m³.
		Potentially – provision is made for the storage of chemicals where required within the confines of the Plant footprint areas.	**Listing Notice 1, Activity 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.		
		Yes – the current	**Listing Notice 1, Activity 24**: The development of a road—with a reserve wider than 13,5 meters, or where no reserve exists		

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	○ Return Water Pipeline HDPE, 280mm diameter at 400m³/hr (111l/s): 1.1km (rerouting of existing pipeline from Slimes Dam to WHIMS Plant Clarifier). ○ Process Water Pipelines (throughput below 120l/s): 350mm diameter - 1.3km [replacement of existing pipeline with new pipeline from Central Water Dam to new Process Water Tank (2 000m³ – see project 5 below) adjacent to exiting Beneficiation Plant Clarifier]. ○ Water from Central Water Dam to existing Beeshoek Plant: 200mm mild steel – 1.3km at 400m³/hr (111l/s). ○ New potable water pipeline 140mm diameter – 1.6km in length with a throughput of 28l/s from the steel potable water tank (100m³) at the new Jig Plant to combined steel potable water/fire water tanks (approximately 1000m³) at the WHIMS Plant. ○ Overland Powerline: 22kV powerline of approximately 700m in length. New Jig Plant ○ New Jig Plant footprint: approximately 2.6ha on already disturbed areas. ○ New Jig Plant Construction Laydown Area: 2ha on existing Discard Dump footprint. ○ Feed from the existing Discard Dump (low-grade material fed into a loading bin by means of front end loaders and conveyed to the Washing and Screening Plant); ○ Washing and Screening Plant; ○ Crusher building containing a high pressure grind roll (HPGR) crusher; ○ Jig located in the Jig building; ○ MCC and transformer bay; ○ Re-routed existing water pipelines (buried, internal diameter 450mm);	design indicates the need for road development (Road 1 and 2) at the Jig Plant which will be around 1km. For the purposes of this application this listed activity is included for design planning.	where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter.	listed. Note that the Jig Feed Stockpile (intermediate stockpile) will not trigger new WMLs as these will be placed on existing approved WRD footprints and are regarded as ROM feed stockpiles. All final low grade will be deposited back onto the Discard Dump. However the Arising Stockpile and Low low grade stockpile will be regarded as new WMLs as these will be derived from the current Discard Dump.	
		Yes (WHIMS Plant)	**Listing Notice 1, Activity 27**: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous **vegetation** is required for— except for the undertaking of a linear activity.		
		Yes, new clarifier at the current Jig Plant	**Listing Notice 1, Activity 34**: The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding—		

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	○ Slurry from the new Jig Plant will be pumped to the existing Plant Thickener (no new activities triggered); ○ New process water tank (located near existing Plant Thickener) – 2,000m³ (this forms part of Project 5). ○ Stockpiles [comprising of both material from the Discard Dump (also referred to as a Low Grade Stockpile] and arising low grade material from the existing Jig Beneficiation Plant). The stockpiles created from material reclaimed from the existing Low Grade Stockpile (Discard Dump) and the stockpile created with the arising material (low grade) from the existing Jig Beneficiation Plant are intermediate stockpiles created within the footprint of the existing Discard Dump (the Low Grade Intermediate Stockpile and the Arising Stockpile). Material from these intermediate stockpiles is transported to and fed into the new Jig Plant loading bin located south of the existing Low Grade Stockpile. Low low grade material from the new Jig Plant is then conveyed back to the Low Grade Stockpile footprint, deposited onto the ground and then moved back towards the existing Discard Dump. The three (3) stockpiles associated with the new Jig Plant includes the following: ▪ Low Grade -32+1mm Stockpile (Intermediate) (0,5ha) located between the existing Low Grade Stockpile (Discard Dump) and the new Jig Plant loading bin on the existing Low Grade Stockpile foot print. Low grade material transported to and from the intermediate stockpile by means of front end loaders. ▪ Arising -32+1mm Stockpile (Intermediate) (0.6ha) located between the to be constructed arisings conveyor discharge position and the new Jig Plant loading bin and within the existing Low Grade Stockpile footprint. Low grade material transported from the Arising -32+1mm Stockpile by means of front end loaders. ▪ Low low grade material from the new Jig Plant will be conveyed by means of earth moving equipment to positions adjoining the existing Discard Dump within the existing		(i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day.		
		Depending on the final road layout, certain existing roads may be redesigned.	**Listing Notice 1, Activity 56**: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—where the existing reserve is wider than 13,5 meters; or where no reserve exists, where the existing road is wider than 8 metres.		
		Yes, a WUL will be required for the construction of the Central Water Dam at the WHIMS Plant, stockpiles and	**Listing Notice 2, Activity 6**: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent. This will be specific to new dirty water tanks and new Process Water Dam.		

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	footprint (i.e. waste from the new Jig Plant to return to the approved Discard Dump footprint). No new stockpiles will be constructed outside of the demarcated Discard Dump or other Type 3 Stockpile footprints, these will however be demarcated as part of the EMPr and WUL processes. The area of the Low low Grade Dump (stockpile) (115m²). o Jig Plant Conveyors: ▪ Approximately 25m conveyor from existing plant conveyor system to feed Jig Plant to transport arising low grade material and discard (not considered dangerous goods); ▪ Approx. 330m conveyer to feed the new Jig Plant from Discard Dump feed bin. ▪ This excludes in plant conveyors). o New Jig Plant Roads interlinked: ▪ Road 1: 240m with a width of 30m. ▪ New Jig Plant Road 2: 700m with a width of 30m. ▪ Road 3: 280m with a width of 30m. ▪ Road 4: 135m with a width of about 30m ▪ Decommissioning of existing haul road: approximately 1000m in length and 30m wide. ▪ (this excludes roads to be constructed on the Plant terraces). o Overhead Powerline: 22kV powerline of approx. 620m. o Rerouting of underground electrical cable: 22kV of approx. 380m. Power supply will comprise of 22kV powerlines. Electricity will be sourced from the existing Beeshoek Substation. Minor upgrades will be undertaken within the footprint area of this substation and the feeding Eskom Substation, but no listed activities will be triggered in this regard.	potentially for smaller transfer tanks within the two plant systems.			

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	Clearance (potentially 5.6ha), note that the clearance associated with the road does not contribute to the listing activity for clearance.: o Road 1 – potential clearance of 0.1ha (considered disturbed area). o WHIMS Laydown Area: approximately 1.5ha. o WHIMS Plant footprint, including access road of 160m: approximately 4ha. o WHIMS Plant Central Process Water Dam: 0.4ha, capacity less than 50 000m³.				
Project 5: Water Management	The mine will also establish additional water storage tanks on site which will include: • A new additional storage tank near the existing BN Tank of 500m³. The purpose is to provide sufficient storage space for water from the approved in-pit dewatering activities; • 4x 10m³ plastic tanks at the existing clarifier, thickener area. To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay; • 1 x 2000 m³ process water tank adjacent to the existing Clarifier connected with a "balancing pipe". To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay; • Existing Dam: Steel Dam 250m³ with capacity to store process water and allow for the storage of top-up water; • Existing Dam: Zinc Dam: 90m³ with capacity to store input water where required. • A new dewatering tank at the Village Opencast Pit.	x	**Listing Notice 2, Activity 6**: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.		Yes, Section 21g for the storage tanks as listed under the project description: BN Tank; Plastic Tanks; Process Water Tank; Steel Dam; Zinc Dam.
Ancillary infrastructure: Topsoil stockpiles	With the expansion of area, soil layers will be stripped and place on the existing topsoil stockpiles near the detrital area, this will be dependent on the outcomes of the specialist studies.		**Listing 1, Activity 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— except for the undertaking of a linear activity.	-	

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985*)	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
Project 6: Development of a railway line and associated service road.	The line will comprise a 2.8km main link line of approximately 5.5m in width with a 5m bulk fill (varies along the alignment). The line will tie from the existing TFR Postmasburg line at the Beeshoek Iron Ore Mine, crossing over the road accessing Tommysfield Airport and thereafter under the R385 regional tar road before linking to the existing TFR Yard that services Kolomela Mine. Considering that one 4m access road will be constructed along the alignment with an 8m buffer on either side of the railway line, the approximate extent of the development is 9ha (85 400m²).	Depending on specialist outcomes	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	**N/A**	Depending on the outcomes of the specialists studies and whether pans are present – a Section 21c and/or i may be require.
		Y	**Listing 1, Activity 27**: The clearance of an area of 1 hectares 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 (likely only around the area of the bridge construction – although this could also be regarded infrastructure as part of the railway line system however in the event that it is required, this will not change the project scope).		
			Listing 2: Activity 12: The development of railway lines, stations or shunting yards excluding — (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in a mining area; or (iii) additional railway lines within the railway line reserve.		

Aim and Motivation of the Project

To allow Beeshoek to optimise the mining process and reduce mineral waste on site (in line with the National Waste Management Hierarchy), the Mine wishes to implement two additional Beneficiation Projects, namely a new WHIMS Plant to rework the existing slimes from the Slimes Dam and Jig Plant to rework the low grade material from the mining operations, as well as from the existing Low Grade Stockpile (Discard Dump). This project will have numerous economic and environmental benefits.

Economic Benefit:

Section 23(1)(a) of the MPRDA states in Section 1(a), that subject to subsection (4), the Minister must grant a mining right if the mineral can be mined optimally in accordance with the mining work programme. The Mine has been awarded a Mining Right by the DMRE; now the Department of Mineral Resources and Energy (DMRE) and therefore has an obligation to give effect to the following:

- The ongoing development and improvement of the Mining Work Programme which details the planned mining activities to be followed in order to mine the mineral resource optimally; and
- Optimal mining of minerals must be undertaken, as the Minerals and Petroleum Board may recommend to the Minister to direct the holder of a mining right to take corrective measures if the Board establishes that the minerals are not being mined optimally in accordance with the Mining Work Programme. The Minister may, on the recommendation of the Board, suspend or cancel a mining right if the Minister is convinced that any act or omission by the holder justifies the suspension or cancellation of the right.

The project will ensure that low grade minerals in the existing Low Grade Residue Stockpiles (Slimes Dam and Discard Dump) can be reworked, thereby also reducing the volumes of waste stored on site, and reducing the associated financial rehabilitation requirements and potential, although found limited, potential environmental impacts.

Giving effect to Waste Reduction:

The reworking of the mineral waste gives effect to the Waste Management Hierarchy as presented in the National Waste Management Strategy, November 2011 and also the draft Strategy of 2020. This 2011 Strategy states the following:

- A challenge experienced is the lack of a policy and regulatory environment that does not actively promote the Waste Management Hierarchy.
- The report states that while the elimination of waste in its entirety may not be feasible, it is possible through the systematic application of the Waste Management Hierarchy to reach a point within the next few decades where re-use, recycling, recovery and treatment overtake landfills as preferred options for waste management.
- The first goal presented in this strategy as a strategic goal is to “promote waste minimisation, reuse, recycling and the recovering of waste” by focusing on implementing the Waste Management Hierarchy, and with the ultimate aim of diverting waste from landfill.

The following is an abstract of Section 2.3 of the National Waste Management Strategy:

The Waste Management Hierarchy in the National Waste Management Strategy is summarised as follows:

- Waste avoidance and reduction;
- Re-use;
- Recycling;
- Recovery; and
- Treatment and disposal.

The foundation of the hierarchy, and the first choice of measures in waste management, is avoidance and reduction. This step aims for goods to be designed in a manner that minimises their waste components. Also, the reduction of the quantity and toxicity of waste generated during the production process is important.

The next stage of the hierarchy is re-using waste. Re-using an article removes it from the waste stream for use in a similar or different purpose without changing its form or properties.

After re-use comes the recycling of waste, which involves separating articles from the waste stream and processing them as products or raw materials.

These first four stages of the waste management hierarchy are the foundation of cradle-to-cradle waste management. This approach seeks to re-use or recycle a product when it reaches the end of its life span. In this way, it becomes input for new products and materials. This cycle repeats itself until as small a portion as possible of the original product eventually enters the next level of the waste management hierarchy: recovery.

As a last resort, waste enters the lowest level of the hierarchy to be treated and/or disposed of, depending on the safest manner for its final disposal.

Taking this strategy further, is the current draft National Waste Management Strategy of 2020. This strategy also focusses on the Circular Economy. A circular economy redefines economic growth by moving away from a take-make-waste industrial model to one that decouples economic activity from the environment and supports a just transition to renewable energy sources. The three key principles of a circular economy are: design out waste and pollution, keep products and materials in use and regenerate natural systems. The two (2) strategic entry points of the waste sector into waste minimisation and the circular economy is waste prevention and waste as a resource, as briefly explained below.

- Waste Prevention (as highlighted in the 2011 National Waste Management Strategy) – this emphasises avoiding and reducing waste before substances, materials and products are discarded.
- Waste as a Resource (key focus in the draft Strategy) – this focuses on stimulating a secondary resources economy based on recycling and recovery of materials and energy from waste i.e. interventions that take place after a product or material has become waste. Circularity can deliver substantial material savings throughout value chains and production processes, generate extra value, transformation of industry towards climate-neutrality, long-term competitiveness and unlock economic opportunities. In terms of the waste management hierarchy practices, recycling of waste for reuse and recovery of materials is prioritised over recovery of energy from waste. The main economic driver lies in exploiting the full potential value of waste.

Giving effect to an approved Environmental Activity as part of Environmental Management and Impact Reduction:

The 2004 Beeshoek Environmental Management Plan (EMP) clearly states that the mine residue present on site or produced by the Mine can be categorised as follows:

- Waste material: products that cannot be sold and which are deposited separately as such or used as backfill;
- Non-saleable material: product which cannot be marketed in its present form but which through treatment could become saleable;
- Contaminated material: "impure" product stockpiled separate for beneficiation to render it marketable; and
- Discard: waste material from the on-site iron ore beneficiation plant is discarded on a designated Discard Dump for reuse (i.e. reworking).

The 2004 EMP further explains the mine's intention to rework all contaminated (as from the EMP – which refers to low-grade material) iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation. Reworking relates to the following dumps: Dumps labelled on Drawings 5540-001 and 5540-002 as CD-N1 (this is the current WRD North Area) and CD-S1 (this is the current Contaminated ROM Dump on South Mine), respectively.

In Section 1.7.3 of the new order (aligned) EIA/EMP, 2009 the Estimated Reserves are discussed. It states that: "Additional iron ore is available in the contaminated dumps on the mine site and these will be reworked to meet the mine's remaining planned life of mine." The specific contaminated dumps are not stipulated in this EMP, and therefore when referring to the definition of contaminated material in the 2004 EMP as presented above, this will depend on the nature of the material and grade which will render it marketable. The EMP further commits in Section 7.3.2 to "Rework all the contaminated iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation."

In terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA), and associated regulations which came into effect on 24 July 2015, which included Mine Residue Stockpiles as listed Waste Management Activities, all such activities that commenced prior to 24 July 2015, may be regarded as lawful and need not be authorised (regulation 7(1) of GN 921 contains the relevant transitional requirements). Prior to the NEM:WA Regulations of 2015, the reclamation of residue for re-use did not require EMP amendments, as it fell within the definition of mining (as defined in the MPRDA), especially in this instance where no separate infrastructure (e.g. crushing plants) was constructed that had to be reflected in the EMPs.

Alternatives Considered

The projects presented are all located within the existing Mining Area. The activities considered in this application are linked to approved and established sites and therefore no property alternatives or location alternatives are relevant.

Activities are planned within the existing mining footprint. Limited design and layout opportunities are present.

No technological alternatives are relevant to this project. The WHIMS and JIG Plant projects will make use of proven technologies utilised within the Assmang mining system.

Application and Consultation Process

The application for the Environmental Authorisation Process was submitted to the Department of Mineral Resources and Energy (DMRE), the Competent Authority for this project, on 12 February 2021. A letter of acknowledgement from the DMRE has to date not been received, however a screenshot that the application has been uploaded onto the SAMRAD system was provided indicating the date of 25 February 2021. A Section 102 EMPr Amendment Application was submitted to the DMRE.

A meeting was held with the DMRE on 19 March 2021, during which time the DMRE indicated that the potential railway line project be included into an Addendum Application and that the draft Scoping Report must be updated to include this project (Project 6) and be resubmitted to the stakeholders for comment. This is the purpose of this report.

In terms of stakeholder consultation the following were undertaken:

- A project notification was sent to all stakeholders on the current Beeshoek Stakeholder Database;
- In accordance with GNR 982 Section 41(2)(a-b), a site notice was developed in Tswana, Afrikaans and English and placed at six (6) locations in order to inform surrounding communities and adjacent landowners of the proposed project. The site notices were placed on 12 February 2021 and at visible locations close to the site. A second round of notices were place in Afrikaans and English at the six (6) sites around the site based on the outcomes of the meeting with the DMRE, 19 March 2021.
- In accordance with GNR 982 41(2)(c) of Chapter 6 an advert was placed in the Kathu Gazette. The advert was place in both Afrikaans and English in the above newspapers on 13 February 2021. As a result of the Addendum Application and Addendum ESR, a second round of advertisements was place in English, in the same Newspaper as before. This advert was placed on 26 March 2021.
- The Scoping Report was made available on public review for a period of 30 days from 22 February 2021 to 24 March 2021). A second round of review was allowed for the Addendum Scoping Report, based on the outcomes of the meeting with the DMRE, 19 March 2021. The review period is allowed from 30 March 2021 to 29 April 2021. Note, that any comments received up until the EIA Phase will be considered for inclusion into the Final EIA Report.

To date the following comments have been raised as part of pre-consultation with authorities:

No.	Theme: General Comments / Issues			
	Issue Raised	**Date and How Issue Was Raised**	**Commentator**	**Response**
1	The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit notes the pending assessment of the impact to heritage resources and requests the following: Assessment of the impact to heritage resources must comply with section 38(3) of the NHRA, as required by section 38(8) of the NHRA; The archaeological component of the assessment must include a field-based assessment conducted by a qualified archaeologist; As the project footprint is located in areas of moderate to very sensitive as per the SAHRIS PalaeoSensitivity map, a field-based Palaeontological Impact Assessment must be conducted as part of the EIA phase of the EA application. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessment s and must be compiled by a qualitied palaeontologist.	Letter sent via email. Letter dated 12 March 2021	SAHRA	Based on the SAHRA Paleontological map the area (see figure hereafter) is of moderate to high paleontological sensitivity and a separate study was conducted for this aspect (Bamford 2021). This study concluded that it is extremely unlikely that any fossils would be preserved in the Campbell Rand Subgroup stromatolites or in the loose sands of the Quaternary. There is a very small chance that fossil may occur in palaeopans in the ancient rocks and therefore recommended that a Fossil Chance Find Protocol should be added to the EMPr. Please refer to Section 2.f.iii.12.
2	Impact & influence on neighbour farm (Aucampsrus) which is close to Beeshoek's current mining activities.	26 February 2021 Completion of BID Registration form and submitted via email.	Surrounding Landowner: Altus Viljoen Aucampsrus farm	A detailed groundwater study, including a numerical model will be undertaken as part of the EIA studies to assess the impact of mine dewatering (for safe mining conditions). Other studies will include Socio-Economic Assessment and Air Quality Assessment. For a detailed list of the specialist studies which will form part of the EIA phase please refer to Section 2.g.ii.
3	We confirm that as at the date of this letter (23-02-2021) no land claims appear on our database in respect of the property.	23 February 2021 Provision of official letter via email.	Commission on the Restitution of Land Rights	None
4	This serves to acknowledge the receipt of your documents on the above matter. We request your availability to present to the Council Committee on Technical and Community Services the contents of the application and implications for the municipal area.	25 February 2021 Submission of an email request.	Municipal Manager, Mr. Mathobela – Tsantsabane Local Municipality	The Stakeholder Consultation Specialist is in engagement with the municipality to arrange a date a time for the requested meeting.

Please refer to Annexure 3 for the copies of the received comments and requests.

Key Potential impacts

The proposed projects as part of this application are situated on the existing Beeshoek Mining Right Area. Mining activities have been present in this area since the 1935 and official started with large scale mining activities during 1964.

The mine has been investigating measures to optimise mining practices and ensure that a long-term mining economy can be maintained.

The following key positive impacts are foreseen:

- The operation of the mine due to a lawful construction of the activities will allow the mine to continue operating within the legal realm of the Environmental Legislation;
- The implementation of the Jig Plant and WHIMS Plant will allow for the reduction in waste streams by reworking this material;
- It is pertinent for the mine to ensure that there is sufficient infrastructure on site to optimise water reuse within the process water circuit;
- The ongoing expansion of the opencast mining operations within the approved Mining Rights Area gives effect to the MPRDA and will ensure a long-term industry for iron supply, as well as employment opportunities; and
- The undertaking of the detailed specialist studies will allow the mine to understand the current environmental conditions on site and will ensure that the most up to date and environmentally acceptable measures are implemented.

The key potential negative impacts which may/ will arise and for which management measures have been recommended are, but still require confirmation by specialists are:

- Construction activities may lead to an increase in dust emissions if not managed;
- By not managing the water circuit effectively, excess dewatering may be required – i.e. should additional dewatering be required, other sources of water input could potentially be reduced to offset the potential impacts;
- The large expansion in mining operations will have an impact on the ecological characteristics of the area, and strict management measures will have to be considered;
- By not maintaining the areas around the facilities, alien and invasive plant species can established;
- The mine site is located on the western edge of the Ghaap Plateau that has been identified by the Northern Cape Nature Conservation Services as a priority for conservation in the Northern Cape and is regarded as an ecologically sensitive habitat. Endoreic pans occur on the Ghaap Plateau and are prevalent within the Sishen/Postmasburg area. Various of these pans are present within the project area;
- Non-perennial drainage channel observed by the appointed hydrologist (HydroSpatial) on the south eastern boundary of the mine, which may be impacted upon due to mine expansion.

When considering the above it is clear that with the implementation of management measures negative impacts can me managed, in depth specialist studies will however be required to confirm and address this.

Some of the key management measures currently foreseen include:

- A legal assessment of all activities and future planned activities must be undertaken annually to ensure that all activities are authorised.
- The EMP and associated Environmental Authorisation (EA) once issued by the DMRE, as well as the Water Use Licence (WUL), once issued by the Department of Water and Sanitation (DWS) must be available on site at all times.
- Construction areas must be clearly demarcated to control movement of personnel and vehicles, providing clear boundaries for construction sites in order to limit the spread of impacts. Markers and pegs will be erected and maintained along the boundaries of the working areas, access roads, haul roads and paths before commencing any work. If proved insufficient for control, these shall be replaced by fencing.
- Clean and dirty water separation as part of a Storm Water Management Plan must be implemented early in the construction phase, especially down-gradient of construction areas to ensure that the natural runoff patterns are impacted as little as possible.
- Ensure that all design drawings include effective erosion control measures.
- Alien and invasive plant species eradication should be implemented on site during all development phases.
- Equipment will be well maintained to reduce excessive noise creation.
- Ensure the required erosion protection measures are monitored and corrected where necessary.
- Storage of fuels and oils, the refuelling of vehicles and equipment maintenance must be limited to designated, bunded areas. Bunds to be 110% of volume of the materials stored).
- All workers must undergo an induction which includes environmental awareness training to make them aware of the environmental incident management procedures as well as the importance of complying with management measures.
- Any significant spills (specified as part of the mine's risk assessment) must be captured in the incident reports and must be reported to the relevant department (DMRE and DWS).
- Water Conservation and Demand Management must be an ongoing commitment by the mine.

- Pipelines flows should be recorded on mine recording system (active at any time) to determine when there may be a potential leak on a pipeline.
- All rehabilitated areas should be effectively fenced off to avoid access thereto by unauthorised parties up until full rehabilitation has been achieved.

Plan of Study for EIA

The aspects of the project that will be assessed in the EIA phase are those considered by the EAP as having the potential to result in environmental and social impacts. They include:

- Impact on regional groundwater resources due to increased dewatering due to increase opencast operations in the area;
- Impact on dust emissions and air quality due to the increase in heights of WRDs;
- Loss of sensitive ecosystems relating to potential dry pans;
- Loss of threatened, endemic or protected plant species;
- Loss of habitat and impact on the natural fauna in the area;
- Loss of soils and land capability;
- Loss or impact to non-perennial watercourses;
- Establishment of alien and invasive plant species; and
- Impact on paleontological and heritage due to increase mining and clearance activities.

The following specialist studies are recommended:

- Ecology;
- Heritage and Palaeontological Assessment
- Soils and Land Use;
- Aquatic and Wetland;
- Air quality;
- Visual;
- Hydrological Assessment;
- Numerical Groundwater Assessment;
- Socio-Economic Investigation;
- Financial Rehabilitation will be based on the GlobeSight study undertaken

Commenting authorities received hard copies the Draft Scoping Report and will receive hard copies of the Draft EIA Report. No comments have been received during the draft Scoping Phase to date. All comments received from the authorities in the phases to follow, will be provided to the DMRE for considerations.

During the EIA Phase, the following information will be disclosed in the EIA Report:

- Impact assessment undertaken and results thereof;
- Management measures;
- Monitoring plans; and
- Closure objectives.

Once the comments have been received on the Draft Scoping Report the final Scoping Report will be completed. The Final Scoping Report will be submitted to the DMRE, and once accepted the proposed project will proceed into the detailed EIA Phase, which involves the detailed hydrological investigations.

The EAP will produce a Draft EIA Report after the completion of the required specialist studies. The Draft EIA Report will provide an assessment of all the identified key issues and associated impacts from the Scoping phase. All requirements as contemplated in the 2014 EIA Regulations and amendments thereto will be included in the Draft EIA Report.

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mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Draft SCOPING REPORT

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

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

NAME OF APPLICANT: **Assmang (Pty) Ltd: Beeshoek Iron Ore Mine**

TEL NO: **+27(0) 53 311 6666**

EMAIL: **Msimelelo.Silomntu@assmang.co.za**

POSTAL ADDRESS: **Private Bag X3002, Postmasburg, 8420, Northern Cape**

PHYSICAL ADDRESS: **Beeshoek Iron Ore Mine, R385, 10km outside Postmasburg (**Beeshoek Iron Ore Mine is situated on the farms Beesthoek and Olynfontein in the Kuruman Registration Division (RD). The specific farm portions on which the Mine is located include: Portion 0 of the farm Beesthoek 448 RD; Portion 1 of the farm Beesthoek 448 RD; and Portion 4 of the farm Olynfontein 475 RD)

FILE REFERENCE NUMBER SAMRAD: **Mining Right Reference Number: NC30/5/1/2/3/2/1/223**

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the valuation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

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

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

OBJECTIVE OF THE SCOPING PROCESS

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

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

SCOPING REPORT

EnviroGistics (Pty) Ltd (EnviroGistics) was appointed as the Environmental Assessment Practitioner (EAP) by the Proponent (Assmang (Pty) Ltd: Beeshoek Iron Ore Mine; hereafter referred to as 'Beeshoek' or 'the mine') to undertake the required Environmental Authorisation Process for the proposed Beeshoek Mine Optimisation Project.

This application is for the purposes of an Environmental Impact Assessment (EIA) Process in terms of the 2014 National Environmental Management Act, Act No. 109 of 1998 (NEMA) EIA Regulations (Regulation 982, together with Regulation 983, Regulation 984 and Regulation 985) as amended in 2017; as well as the National Environmental Management: Waste Act, Act No. 59 of 2008 (NEM:WA) Regulation 921 of 2013 (as amended).

The application for the Environmental Authorisation Process was submitted to the Department of Mineral Resources and Energy (DMRE), the Competent Authority for this project, on 12 February 2021. A letter of acknowledgement from the DMRE has to date not been received, however a screenshot that the application has been uploaded onto the SAMRAD system was provided indicating the date of 25 February 2021. A Section 102 EMPr Amendment Application was submitted to the DMRE.

A meeting was held with the DMRE on 19 March 2021, during which time the DMRE indicated that the potential railway line project be included into an Addendum Application and that the draft Scoping Report must be updated to include this project (Project 6) and be resubmitted to the stakeholders for comment. This is the purpose of this report. Please refer to Section 2.f.ii.2 for the outcomes of this meeting.

Please refer to Annexure 1 for the submitted application form and proof of submission.

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.a Details

1.a.i Details of the Environmental Assessment Practitioner (EAP)

EnviroGistics, established in 2015, provides independent environmental planning, permitting and consulting services to a vast array of clients throughout the mining, construction and development industry. EnviroGistics' independence is ensured with Ms Tanja Bekker being registered with both the South African Council for Natural Scientific Professions (SACNASP), and the Environmental Assessment Practitioners Association of South Africa (EAPASA) and complies with all the requirements of the South African Environmental Legislation. The EnviroGistics further holds no equity in this or any other project. EnviroGistics operates with the goal of fulfilling its vision and mission, breaking away from a general consulting mould, and striving to form an integral part of a project team. For this reason, clients will be provided with experienced, practical, technically sound, independent, objective and value adding advice and ensures support on environmental planning, permitting and compliance matters.

EnviroGistics is an independent company and has no vested interest in the outcome of the environmental assessment.

Table 1: Details of EAP

Name	Tanja Bekker
Designation	Environmental Assessment Practitioner
Postal Address	PO Box 22014, Helderkruin, 1733
Physical Address	21 Gladiolus Street, Roodekrans, 1724
Telephone Number	+27 (0) 82 412 1799
Cell Phone Number	+27 (0) 82 412 1799
Fax Number:	+ 27 (0) 86 551 5233
Email Address	tanja@envirogistics.co.za

1.a.ii Expertise of the EAP

The following table presents a summary of the EAP's experience:

Table 2: Experience of EAP

Name	Position	Qualification	Professional Registrations	Experience
Tanja Bekker	Environmental Assessment Practitioner	M.Sc. Environmental Management (RAU), now Johannesburg University)	Registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA; Reg No. 2019/306).	18 Years

			Professional Natural Scientist (Pr.Sci.Nat) in the field of Environmental Science with the South African Council for Natural Scientific Professions (SACNASP; Reg No. 400198/09) Member of the South African branch of the International Impact Assessment Association (IAIAsa) Member of the South African branch of the Environmental Law Association (ELA)	

The EAP's Curriculum Vitae was submitted along with the application form. This can be provided upon request should it be required as part of the ESR.

Education

MSc. Environmental Management - RAU (University of Johannesburg)
BSc. Geography Honours (Cum Laude) - RAU (University of Johannesburg)
BSc. Earth Sciences (Geography & Geology) – RAU (University of Johannesburg)

Career Enhancing Courses

ISO 14000 Lead Auditors Course (WTH Management)
Certificate in Project Management (Pretoria University)
Management Advance Programme (MAP 81) (Wits Business School)

Professional Affiliations

Registered member of EAPASA
Certified ISO 14001 Environmental Management System Auditor
Registered as a Professional Natural Scientist with SACNASP
Member of the South African affiliate of the IAIA
Member of the ELA of South Africa

Summary of the EAP's past experience

Ms. Bekker is registered as a Professional Natural Scientist in the field of Environmental Science with SACNASP and is also a Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA), a legal requirement stipulated by NEMA. She is further certified as an ISO 14001 Lead Auditor. Her qualifications include BSc. Earth Sciences (Geology and Geography), BSc. Hons. Geography, and MSc. Environmental Management. In addition to these tertiary qualifications, she obtained a Certificate in Project Management, and completed the Management Advancement Programme at Wits Business School.

With more than 18 years' working experience in environmental management and the consulting industry and managing various Large Account Clients, she understands the South African Regulatory System, and can advise clients with due diligence on their environmental regulatory requirements and offer a solution driven service to their project life cycle. She is equipped with exceptional project management and coordination skills, which especially enhances the service she offers clients within the environmental permitting system.

Her key focus is environmental management and compliance with extensive experience in the mining industry. Project Management and Coordination of projects form a critical component of her duties, which include project planning, initiation of projects, client, authority and stakeholder consultation, specialist coordination, budget control, process control, quality control and timeframe management. Her interest lies in a client advisory capacity, being involved during due diligence investigations, pre-project development and assisting the client and engineering team in adding value to develop the project in an environmentally sustainable manner, considering client costs and liabilities, as well as considering the implication of environmental authorisation conditions and requirements on project deliverables. Her involvement in projects has spanned over the project life cycle from Due Diligence Investigations, Pre-Feasibility Investigations, Prospecting Right Applications, Mining Right Applications, Environmental Reporting and implementation and auditing of Environmental Management Plans and Authorisations.

1.a.iii Details of the Applicant

Beeshoek is situated in the Tsantsabane Local Municipality, with neighbouring towns being Postmasburg, located 7km east of the mine and Kathu located 70km north of the mine.

Mining at Beeshoek was established in 1964 with a basic hand sorting operation. In 1975 a full Washing and Screening Plant was installed. Because of increased production, Beeshoek South, a southern extension of the Beeshoek Mine, was commissioned during 1999 on the farms Beesthoek and Olynfontein.

Assmang (Pty) Ltd is the holder of the new order rights in terms of the Mineral and Petroleum Resources Development Act, 2002 (Assmang (Pty) Ltd is the holder of the new order rights in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) in respect of high-grade hematite iron ore deposits at Beeshoek on the farms Beesthoek and

Olynfontein. The mining method currently entails an opencast mining operation, which consists of five (5) active opencast pits (Village Pit, HF Pit, BF Pit, East Pit, and BN Pit). Although other opencast pits are dormant at this time, these are continuously assessed in terms of their economic value. The current resources of the Mine are approximately 97.17 million tonnes with a reserve of about 26.18 million tonnes.

Beeshoek can be broadly categorised as follows:

- Northern mining area (North Mine): This area comprises active as well as historical mining areas. A number of small quarries and mine residue dumps of various categories are located within this area. The area also includes the existing iron ore beneficiation plant, tailings storage facility (slimes dam), as well as the North Opencast Pits;
- Main Offices, village (since demolished) and recreational area; and
- Southern mining area (South Mine): This area comprises large opencast pits and associated Waste Rock Dumps (WRDs). The Village Pit and associated WRD are the main activities in this area. This area also includes a crushing and screening area as pre-preparation of the Run of Mine (ROM) iron ore before being routed by overland conveyor to the Iron Ore Beneficiation Plant located at North Mine.

Table 3: Details of Applicant

Applicant	Beeshoek Iron Ore Mine
Postal Address	Private Bag X3002 Postmasburg 8420
Technical Manager (SHEQ)	Mr. Kobus Harding Tel: +27 (0) 53 311 6666 E-mail: kobus.harding@assmang.co.za
Environmental Superintendent	Mr. Msimelelo Silomntu Tel: +27 (0) 53 311 6666 Cell: +27 (0) 63 520 9191 E-mail: msimelelo.silomntu@assmang.co.za
Senior General Manager	Ms. Maryke Burger Telephone No: +27 (0) 53 311 6666 Email: Maryke.Burger@assmang.co.za
Mining Rights Holder	Assmang (Pty) Ltd Private Bag X3002 Northlands 2116 South Africa Contact: Andre Joubert Telephone: +27 (0) 11 770 6800 Facsimile: +27 (0) 11 268 6440 Email: andre.joubert@arm.co.za
Surface Holder	Assmang Limited Private Bag X3002 Northlands 2116 South Africa
Mining Right Ref. No.	(NC) 223MRC

1.a.iv Environmental Authorisations

In terms of the Minerals Act, 1991, an Old Order Mining Right was obtained for all mining activities on the farms Olynfontein, Portion 4, and Beesthoek, Portion RE and Portion 1, under reference number NC 5/2/2/150, dated 1 December 1993.

Because of increased production, the applicant applied for an addendum, for the "Mid-South" Section on the farm Olynfontein, which was approved by the Department of Mineral Resources (DMRE; now the Department of Mineral Resources and Energy (DMRE)) on 7 November 1997, with reference number NC 6/2/2/15. Beeshoek South (South Mine), a southern extension of the Beeshoek Mine, was commissioned during 1999 on the farms Beesthoek and Olynfontein. This mining right made provision for six opencast pits at estimated iron ore reserves of 160 million tonnes for export. The mining method currently entails an opencast mining operation, which consists of five (5) active opencast pits (Village Pit, HF Pit, BF Pit, East Pit, BN Pit). The current resources of the mine are 98 million tonnes with a reserve of 46 million tonnes.

A revision to the Environmental Management Plan (EMP) was submitted to the DMRE in August 2004. The purpose of the EMP Update was:

- To enhance the format and content of the EMP in order to be better aligned it to the current standard of EMPs;
- To reflect the latest environmental related monitoring and work conducted by the mine;
- To provide better focus on closure of the mine. This specifically addresses the rehabilitation of opencast pits and mine residue dumps; and

- To outline the process to be followed to contribute to the maintenance of quality of life during the post-closure period.

The key infrastructure associated with the 2004 EMP Update was:

- Six million tonnes per year opencast mining activity, producing iron ore for the local and export markets;
- The mine comprises a number of opencast pits located within distinct northern and southern mining areas (North and South Mines);
- The northern mining area comprised primarily the historical mining activity, with, at that time, the new BN Opencast Pit; and
- The southern mining area included the new and larger opencast pits and the dominant mining was conducted within this area.

The Old Order Mining Right was converted to a New Order Mining Right on 16 March 2012 (Ref: NC30/5/1/3/2/1/223EM) and an EMP Alignment Report, 2009 was approved by the DMRE on 7 June 2010. The EMP Alignment Report made provision for the current Village Pit Mining Operation and the demolition of the Beeshoek Village.

Subsequent to the EMP Alignment, various individual Environmental Authorisations were undertaken:

2010 EMP, for the R385 Regional Road Deviation (approved 3 May 2011). The Road Deviation was required as part of the Village Pit. The road realignment (associated with the proposed mine expansion) also required that:

- Inhabitants of Beeshoek Mine Village be moved to Postmasburg;
- Several Assmang power lines not exceeding a capacity of 22 kilovolts be relocated, one of which was located along the existing R385 Road;
- The relocation of the telephone lines along the R385 Road, which impacted on the sociable weaver nesting site on a telephone pole, take place (these have been safely relocated);
- Telephone lines and optic fiber lines will have to be relocated;
- The mine offices be moved to North Mine; and
- A communication tower alongside the current road in Beeshoek be relocated.

2013 Basic Assessment Application (approved 14 March 2014): This application was for the expansion of the BF WRD (now the Village WRD).

2014 Basic Assessment Application (approved 19 June 2015): The project entailed the development of a 35m wide and 1.45km long haul road from the Beeshoek Village Pit to the ROM Stockpile. The haul road also formed part of the associated infrastructure for the Village WRD and was depicted on plans submitted with the 2013 Basic Assessment Application.

2015 Basic Assessment Application (approved 10 March 2017): The project entails the construction of the Storm Water Dam North, which has been finalised with the Storm Water Dam North now operational.

In summary of the above, the mine is currently operational with all required environmental authorisations in terms of the following in place:

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) [also the original approval in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA)];
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA); and
- National Water Act, 1998 (Act No. 36 of 1998) (NWA).
    - The aforementioned Act makes provision for a Water Use Licence (WUL), which was obtained during 21 August 2018 and amended on 19 November 2019 to correct certain administrative errors.

Copies of the Environmental Authorisations are available from the mine.

1.b Description of the Property

1.b.i Location of the Mine and Land Ownership

Beeshoek is located in the Northern Cape Province, approximately 7km west of the town of Postmasburg. The mine is situated under the jurisdiction of the Tsantsabane Local Municipality, which is an administrative area in the ZF Mgcawu District Municipality. The mining area is situated on the farms Beesthoek and Olynfontein in the Kuruman Registration Division (RD). Please refer to Figure 1**Error! Reference source not found.** and Figure 2 presenting the local and cadastral setting of the mine, respectively.

The R385 roadway, as well as the Ore Export (OREX) Railway Line traverse the site. The overall area is characterised by intensive mining development. Various servitudes traverse the site, which include roads, telephone lines, and electricity lines.

Beeshoek falls in Quaternary Catchment D73A in the Lower Vaal Water Management Area (WMA) which has a catchment area size of 51 543km^2. The nearest watercourse to the Beeshoek mining area is the Groenwater Spruit, located approximately 5km to the southwest of the mining operations.

Please refer to the following table for the registered name, administrative jurisdiction and summary of location of the land.

Table 4: Property Information

<table>
<tr><td>Farm Name:</td><td>Beeshoek Mine Mining Rights area is located on:
• Beeshoek 448 RD, potion 0 (RE),
• Beeshoek 448 RD, potion 1 and
• Olynfontein 475 RD, portion 2, 3, 4 and 6

The surface rights and also area on which the project areas are located includes:
• Beeshoek 448 RD, potion 0 (RE),
• Beeshoek 448 RD, potion 1 and
• Olynfontein 475 RD, Portion 4.</td></tr>
<tr><td>Magisterial district:</td><td>Hay Registration Division (RD)</td></tr>
<tr><td>Distance and direction from nearest town.</td><td>Beeshoek is located in the Northern Cape Province, approximately 7km west of the town of Postmasburg. The mine traversed by the regional road R385, as well as the OREX Railway Line.</td></tr>
<tr><td>21-digit Surveyor General Code for each farm portion applicable to this application.</td><td>
<table>
<tr><th>Farm Name</th><th>Registration Division</th><th>Portion</th><th>Ownership</th><th>Title Deed</th><th>SG Code</th></tr>
<tr><td>Beesthoek 448</td><td>Hay RD</td><td>0 (RE)</td><td>Assmang Ltd</td><td>T659/1965</td><td>C03100000000044800000</td></tr>
<tr><td>Beesthoek 448</td><td>Hay RD</td><td>1</td><td>Assmang Ltd</td><td>T245/1954</td><td>C03100000000044800001</td></tr>
<tr><td>Olynfontein 475</td><td>Hay RD</td><td>4</td><td>Assmang Ltd</td><td>T4859/1998</td><td>C03100000000047500004</td></tr>
</table>
</td></tr>
</table>

The following table presents the details of the surrounding farm portions.

Table 5: Adjacent Land Ownership

Farm Name	Portion	Ownership
Doornfontein 446	1	Sishen Iron Ore Co Pty Ltd
Doornfontein 446	2	Adam Johannes Wahl
Doornfontein 446	RE	Assmang Ltd (Project Applicant)
Pensfontein 449	RE	Rahida Inv Pty Ltd
Postmasburg Erven	RE/1	Tsantsabane Municipality
Kalkfontein 475	RE	Charl Francois Viljoen
Olynfontein 475	2	Charl Francois Viljoen (mine Mining Rights Area)
Olynfontein 475	6	Tsantsabane Municipality (mine Mining Rights Area)
Ploegfontein 487	-	Sishen Iron Ore Co Pty Ltd
Soetfontein 606	-	Viljoen Familie Trust
476	-	Sishen Iron Ore Co Pty Ltd
447	-	Sishen Iron Ore Co Pty Ltd

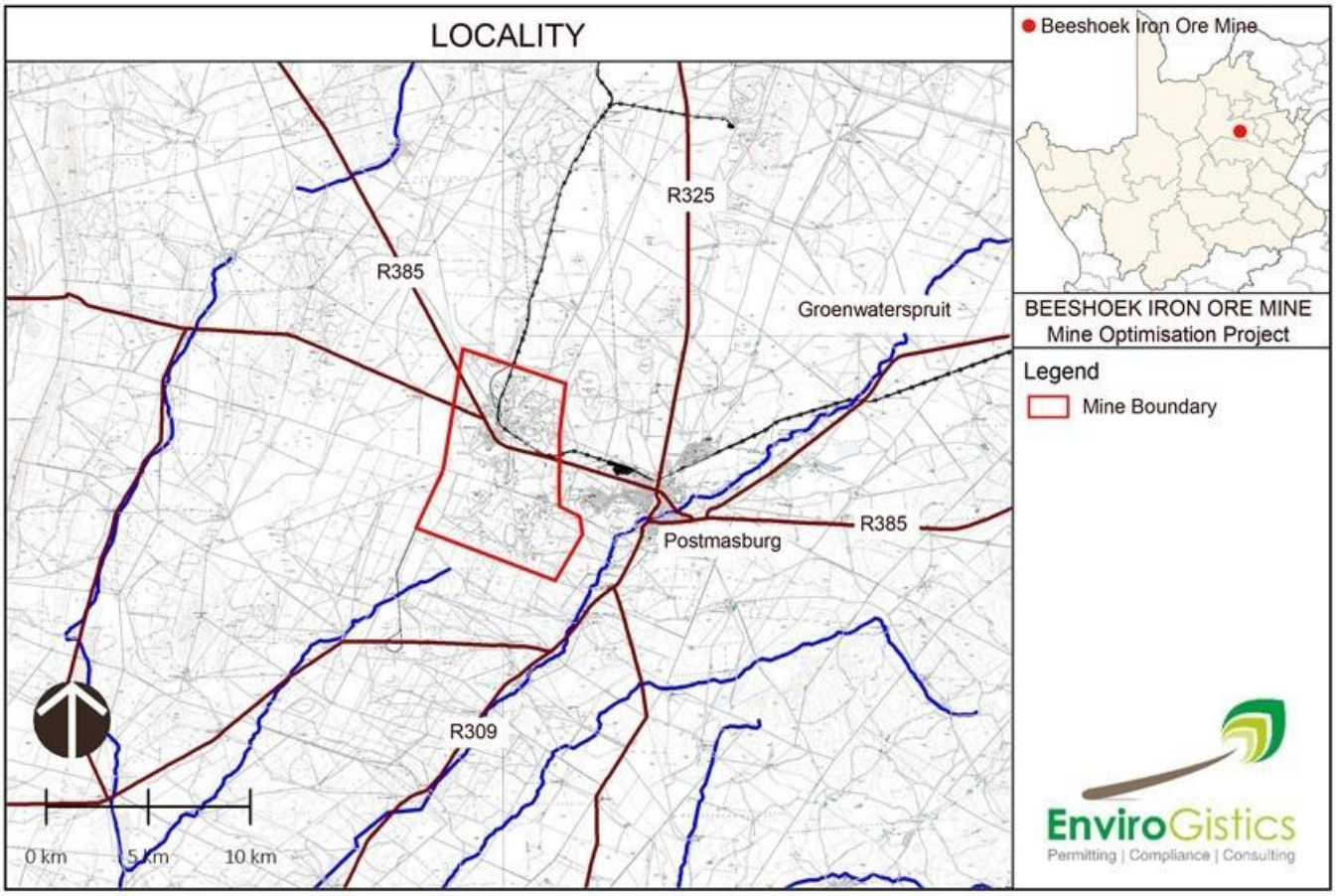

Figure 1: Local and Regional Setting of the surface operations

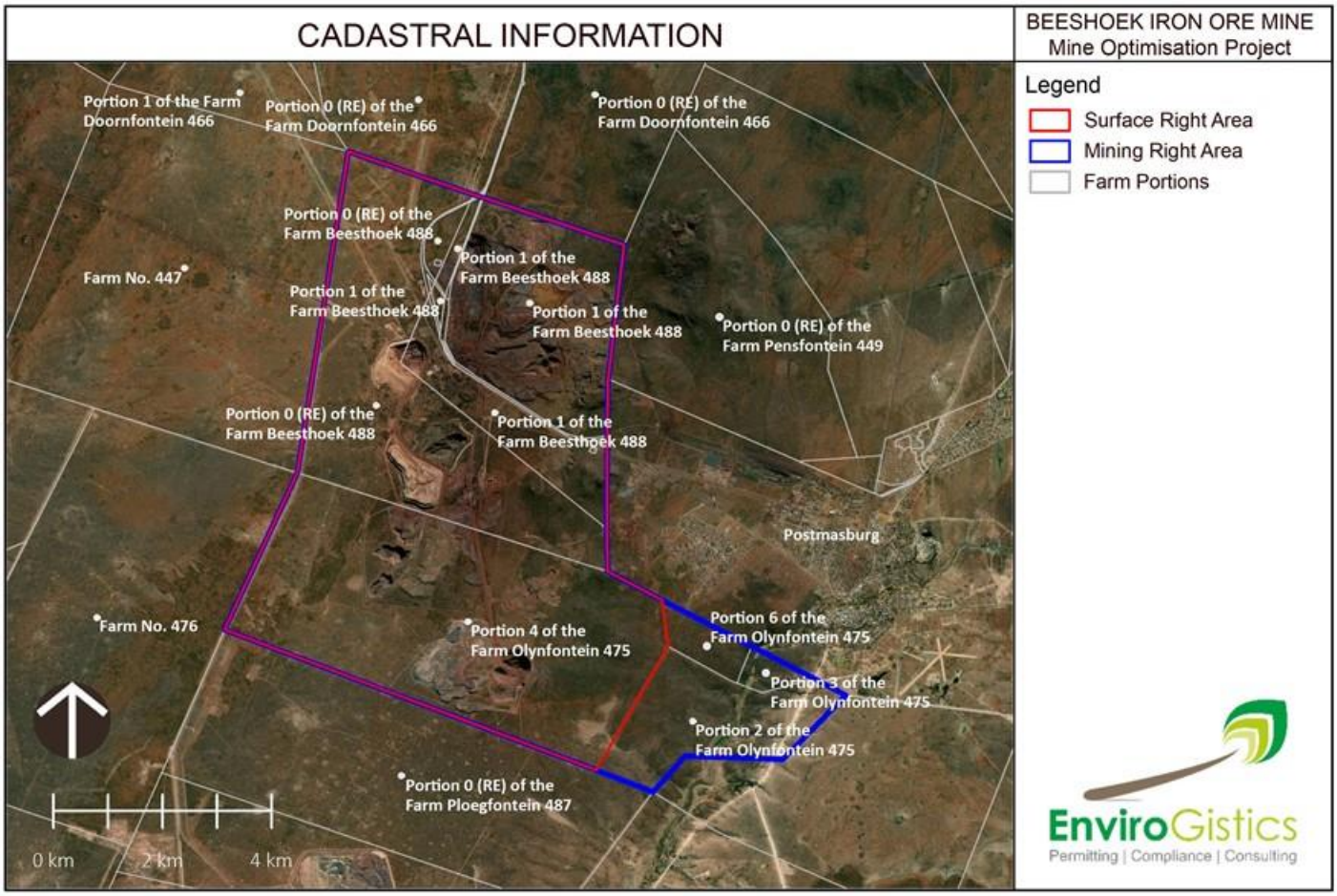

Figure 2: Cadastral Information

2 DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

Section 23(1)(a) of the MPRDA states in Section 1(a), that subject to subsection 4, the Minister must grant a mining right if the mineral can be mined optimally in accordance with the Mining Work Programme. The mine has been awarded a Mining Right by the DMRE and therefore has an obligation to give effect to the following:

- The ongoing development and improvement of the Mining Work Programme which details the planned mining activities to be followed in order to mine the mineral resource optimally; and
- Optimal mining of minerals must be undertaken, as the Minerals and Petroleum Board may recommend to the Minister to direct the holder of a mining right to take corrective measures if the Board establishes that the minerals are not being mined optimally in accordance with the Mining Work Programme. The Minister may, on the recommendation of the Board, suspend or cancel a mining right if the Minister is convinced that any act or omission by the holder justifies the suspension or cancellation of the right.

Beeshoek Mine is actively investigating opportunities for the continued and sustainable mining of iron ore reserves within the approved Mining Rights Area. This application for Environmental Authorisation specifically gives effect to that and includes the following projects:

1. Specific demarcation of ROM Stockpiles on South mine;
2. Amendments to the design of existing WRDs in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints;
3. Increase of Opencast Footprint Areas, as well as the undertaking of detrital mining;
4. Development of a Jig Plant (this area will be located in the vicinity of the current plant) for the beneficiation of discard and low-grade Iron Ore;
5. Development of a WHIMS Plant for the beneficiation of slimes;
6. Water management infrastructure; and
7. Railway Line link development of approximately 2.8km from the existing Beeshoek siding to the existing Transnet Freight Rail (TFR) siding.

The purpose of this project is to give effect to the Section 23(1)(a) of the MPRDA requirements for the optimisation of Mining Right, as well as the implementation of the best practical environmental management measures for the operation and management of the WRDs. Further to this, the proposed Beeshoek Low-Grade Beneficiation Optimisation Project is to allow Beeshoek Mine to optimise the mining process and reduce mineral waste on site (in line with the National Waste Management Hierarchy), by implementing two additional Beneficiation Projects, namely a new WHIMS Plant to rework the existing slimes from the Slimes Dam and a new Jig Plant to rework the existing low-grade stockpile (Discard Dump). This project will have numerous economic and environmental benefits.

Please refer to the following figure for the planned project layout.

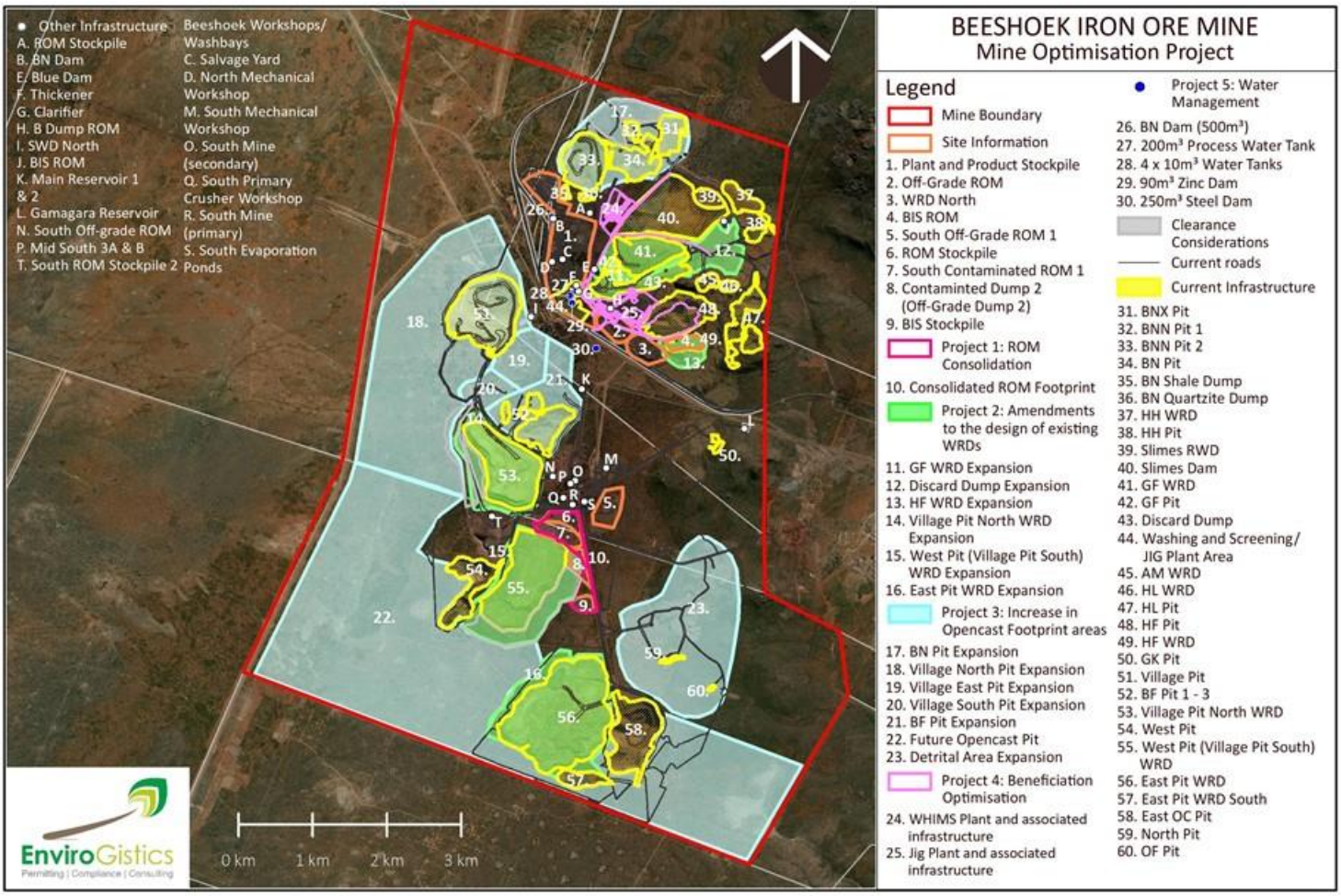

Figure 3: Beeshoek Overall Infrastructure Location – Project 1 to 5

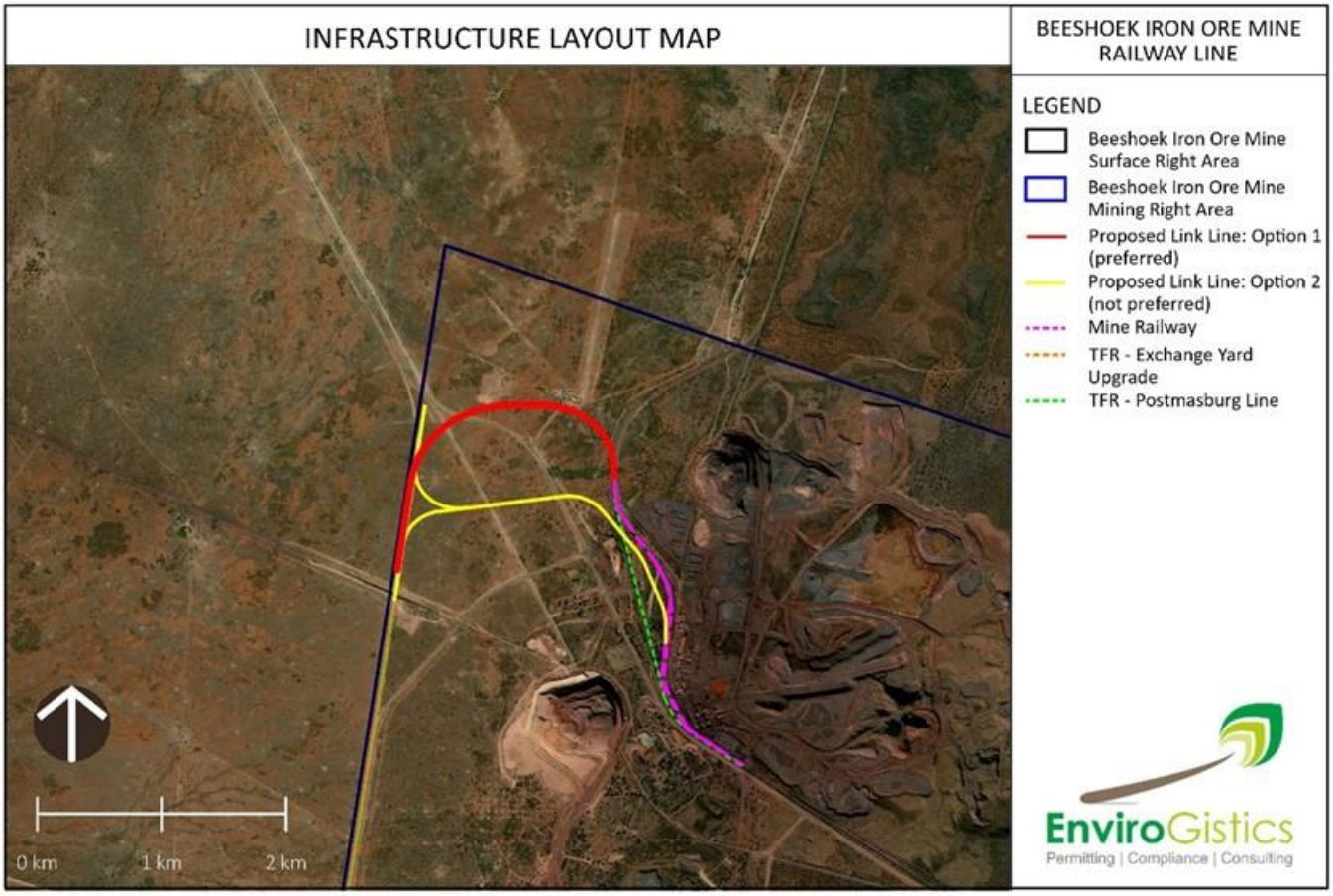

Figure 4: Beeshoek Railway Line Project – Project 6

2.a Listed Activity Location and Size (also considering other Environmental Legislation)

2.a.i National Environmental Management Act, 1998 (NEMA)

In terms of the NEMA, there are three (3) listing notices which should be considered for this application. These listing notices were amended during April 2017. This amendment did not repeal the 2014 listed activities, but purely amended certain listings. Listing Notice 1 (Regulation 983) activities require a Basic Assessment Process, whereas Listing Notice 2 (Regulation 984) activities require a full EIA Process. Listing Notice 3 (Regulation 985) activities require a Basic Assessment Process if the area falls within certain geographic zones. Beeshoek is not characterised by gazetted Threatened Ecosystems, Critical Biodiversity Areas (CBAs) or located in proximity to any Protected or Conservation Areas and for this reason Listing Notice 3 is not applicable to the mine.

The following table presents a detailed presentation of the legal activities triggering various Environmental, Water and Waste Licencing requirements.

Table 6: Applicable Listing Notices

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
Project 1: Consolidation of Run of Mine (ROM) Stockpiles on South Mine	The ROM stockpile area on South Mine will be demarcated as a combined ROM stockpile area for both on-grade, off-grade and BIS. Overall Area: 35ha [no clearance of vegetation is required; this area is located on the north-eastern perimeter of the West Pit WRD (now referred to as the Village Pit South WRD) in a legally disturbed area] The current Water Use Licence (WUL) allows for the following ROM deposition on the stockpile in question – note that the deposition of ROM will not increase in annual throughput: South Contaminated ROM 1: 4 450 000t/a South Contaminated ROM 2 Off-Grade ROM Stockpile, including BIS: 1 920 000t/a ROM Stockpile: 720 000t/a	x	Part 1, Regulation 29: "An environmental authorisation may be amended by following the process prescribed in this Part if the amendment; Will not change the scope of a valid environmental authorisation nor increase the level or nature of the impact, which impact was initially assessed and considered when the application was made for an environmental authorisation; or Relates to the change of ownership or transfer of rights and obligations". The change in the footprint, combining the area for the purposes of an overall ROM footprint will trigger an amendment to the current layout.	**Not Applicable (N/A)**	**N/A**
Project 2: Amendments to the design of existing Waste Rock Dumps (WRDs) in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints	Village Pit North Waste Rock Dump (VP1): Current area approximate 70ha, to be increased with approximately 26ha (final area 96ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance of about 25ha) – this will also remove the required Storm Water Dam, which was a recommendation in its associated EMPr for the Village Pit WRD EMPr, but has as yet not been constructed, due to the low run-off in this area and subsequent storm water management studies - The decommissioning of the SWD will not trigger a listed activity as the "active activity" does not entail an "operational component"). Planned operational height is 111m (upon rehabilitation 112m). GF Waste Rock Dump: Current area approximately 48ha, to be increased by about 6ha (final area about 54ha) to allow for final slope and footprint upon rehabilitation (area pending designs). Based on the location of this WRD between the Discard Dump and the existing Slimes Dam it is unlikely that any clearance will be triggered. Planned operational height is 82m (upon rehabilitation 84m).	x	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is	It is assumed that Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right in terms of the MPRDA is not relevant as no additional mining rights are required and the activities entail the expansion of approved facilities. For that reason: Category A waste activities,	Yes – Section 21(g) for the waste rock dump expansions and potential Section 21 (c)&(i) for the presence of various dry pans in the area. GN704 Exemption requirements for the operation of unlined Mine Residue Deposits.

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	East Pit Waste Rock Dump: Current area approximately 144ha, to be increased by about 26ha (final area about 170ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance in excess of 25ha). Planned operational height is 94m (upon rehabilitation 94m). West Pit Waste Rock Dump (now referred to as the Village Pit South WRD): Current area approximately 80ha, to be increased with about 55ha (final area 135ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will likely involve clearance of about 35ha). Planned operational height is 98m (upon rehabilitation 106m). HF Waste Rock Dump (new dump on historic dump footprint): Current area approximately 20ha and used for BIS stockpiling, to be reused to allow for HF Pit waste rock disposal, as well as final slope and footprint upon rehabilitation (area pending designs). This area is located on an existing WRD footprint (no additional clearance therefore required). Planned operational height is 39m (upon rehabilitation 63m). Discard Dump: Current area approximately 28ha, to be increased to about 60ha. This area is located within the mining area, between WRDs, Slimes Dam and Opencast Pits, no clearance will be required. The heigh of the facility is planned to be up to 60m. Current WUL allows for the following deposition – note that the deposition of material will not increase in annual throughput, however the life of mine and total capacity/footprint will increase: • Village Pit North WRD: 31 500 000t/a • West Pit WRD (now referred to as the Village Pit South WRD): 21 413 403t/a • GF WRD: 7 721 766/a • HL Waste Rock Dump: 10 983 334t/a • BIS ROM North 1 – 2 +50 000t/a (on historic HF WRD)		required for— the undertaking of a linear activity. **Listing Notice 2, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **The specific height of the Village Pit WRD and the Product Stockpiles as stipulated in their respective EMPs will be increased as part of this EIA Application – this will be considered as included in a Regulation 29 Part 2 amendment which replace the height stipulations as presented in the prior EMPs. The increases in heights do not trigger specific listing notices, however the associated footprints to achieve final closure slope will trigger a Waste Management Licence Activity.**	#13: The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule is more relevant.	

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985*)	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	• East Pit Waste Rock Dump: 68 850 000t/a • Discard Dump: 9 000 000t/a				
Project 3: Increase of Opencast Footprint Areas, as well as the undertaking of detrital mining for shallow iron ore reserves, including transportation routes (Haul roads)	Village Pit North (VP North), will be expanded by 375ha in the future to 436ha and will further include two satellite pits: Pit East and Pit South, each with and area of about 37ha and 22ha respectively. Clearance of vegetation will be required. The depth of the VP North is planned at 180m, with VP East and VP South 160m and 60m respectively. BN Pit area is planned to be expanded by 66ha to approximately 137ha. The depth of the opencast pit will be 162m from surface. Approximately 25ha will require vegetation clearance. EP Opencast Pit, will entail a substantial increase from about 50ha to about 1026ha. The Future Pit, linked to the East Pit is a planned new pit which will comprise of an area of an additional 976ha. This area will likely be a result of various smaller satellite pits. However for the purposes of the EIA process the overall area is considered. Clearance of vegetation will be required. For this activity it is important to note that the future pit is in its planning phase, further exploration will be required in this area. Once the final designs for the mining schedule is available this will be submitted to the DMRE for approval. It will also be at this time that a detailed waste management strategy will be developed for the management of waste rock and overburden in this area. Once this information is available the necessary Waste Management License and Water Use License will be applied for from the DMRE and DWS respectively. The depth of East Pit is planned at approximately 220m. The BF Pit will be expanded from about 30ha (comprising of 3 pits) to about 86ha. Approximately 25ha may require clearance. The dept of the BF Pit is planned at 180m. A Detrital Mining area of about 238ha will be established – it should be noted that entire area will not be utilised, only where minerals are found economically viable. Clearance of vegetation will be required. Mining in the detrital area is planned between 20-40m in depth.	x	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 2, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **Listing Notice 1, Activity 24**: The development of a road—with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— the undertaking of a linear activity.	**N/A**	Yes – Section 21 (c)&(i) for the presence of various dry pans in the area. Section 21 (j) for the abstraction of water for safe mining conditions, and the use thereof as Section 21(a) water uses. There is a further potential for an additional dewatering tank at the Village Pit. – this will be a Section 21g water uses.

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	One new haul road is proposed: • Village Haul Road: 1,100m at a width of 30m (about 3.3ha) The road will be located in areas mostly disturbed with exiting mining activities or along exiting roads.				
Project 4: Development of the Beneficiation Project which will comprise of a WHIMS Plant and Jig Plant at Beeshoek	• WHIMS Plant ○ WHIMS Construction Laydown Area: approximately 1.5ha. ○ Within the laydown area, a 2 500m² Staging Stockpile comprising low grade feed material will be located. This material will be processed material (i.e. raw material) derived from the Slimes Dam. All waste (oversize and slimes) will be disposed of onto the existing Slimes Dam and no new Mine Residue Stockpile will be developed. ○ WHIMS Plant Clarifier with a capacity of 9 700m³. ○ WHIMS Plant footprint, including access road of 160m in length (approximately 4ha). ○ WHIMS Plant Central Process Dam: 0.4ha, with capacity of 5 000m³. ○ WHIMS Plant Emergency Product Stockpile: 21m² within WHIMS Plant footprint area. ○ WHIMS 1mm Product stockpile: 300m² within the WHIMS Plant footprint area. ○ Tailings Pipeline HDPE: 315mm diameter at 750m³/hr (208.3l/s): ▪ 1.1km pipeline from the WHIMS Plant Clarifier to the northern perimeter of Slimes Dam; ▪ 1.4km from the WHIMS Plant Clarifier to the southern perimeter of the Slimes Dam; and	Yes: Tailings Pipeline between WHIMS Plant and Slimes Dam.	**Listing Notice 1, Activity 10:** The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, 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—such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve.	Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right in terms of the MPRDA. This will be applicable at the WHIMS Plant for the new transfer and feed stockpiles (specifically the Staging Stockpile, which will be a designed facility). The reworking of the discard, low grade material and slimes are existing approved activities on site in terms of the approved EMPr, 2009. However for the purposes of the	Yes – Section 21 (g) and (b) water uses WHIMS: 1000m³ Process Water Tank; 9 700m³ Clarifier; 5000m³ Central Process Water Dam; 1000m³ Potable/fire Water Tank; Emergency Plant Stockpile (20m3 at any given time), Staging Stockpile (capacity 6 000m³) and 1mm Product Stockpile (capacity 1 000m³), Sewage Conservancy Tank of 6m³. Jig: 100m³ Potable Water Tank, Intermediate Stockpile (capacity 5 500m³), Arising Stockpile (capacity 6 000m³) and Low low grade Stockpile (capacity 118m³), Sewage Conservancy Tank of 6m³.
		Potentially – provision is made for the storage of chemicals where required within the confines of the Plant footprint areas.	**Listing Notice 1, Activity 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.		

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	▪ existing pipeline of 1.3km to be rerouted from the existing Beneficiation Plant Thickener directly to the WHIMS Plant. o Return Water Pipeline HDPE, 280mm diameter at 400m³/hr (111l/s): 1.1km (rerouting of existing pipeline from Slimes Dam to WHIMS Plant Clarifier). o Process Water Pipelines (throughput below 120l/s): 350mm diameter - 1.3km [replacement of existing pipeline with new pipeline from Central Water Dam to new Process Water Tank (2 000m³ – see project 5 below) adjacent to exiting Beneficiation Plant Clarifier]. o Water from Central Water Dam to existing Beeshoek Plant: 200mm mild steel – 1.3km at 400m³/hr (111l/s). o New potable water pipeline 140mm diameter – 1.6km in length with a throughput of 28l/s from the steel potable water tank (100m³) at the new Jig Plant to combined steel potable water/fire water tanks (approximately 1000m³) at the WHIMS Plant. o Overland Powerline: 22kV powerline of approximately 700m in length. New Jig Plant o New Jig Plant footprint: approximately 2.6ha on already disturbed areas. o New Jig Plant Construction Laydown Area: 2ha on existing Discard Dump footprint. o Feed from the existing Discard Dump (low-grade material fed into a loading bin by means of front end loaders and conveyed to the Washing and Screening Plant); o Washing and Screening Plant; o Crusher building containing a high pressure grind roll (HPGR) crusher; o Jig located in the Jig building; o MCC and transformer bay;	Yes – the current design indicates the need for road development (Road 1 and 2) at the Jig Plant which will be around 1km. For the purposes of this application this listed activity is included for design planning.	**Listing Notice 1, Activity 24**: The development of a road—with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter.	application, these activities will be clearly described and listed. Note that the Jig Feed Stockpile (intermediate stockpile) will not trigger new WMLs as these will be placed on existing approved WRD footprints and are regarded as ROM feed stockpiles. All final low grade will be deposited back onto the Discard Dump. However the Arising Stockpile and Low low grade stockpile will be regarded as new WMLs as these will be derived from the current Discard Dump.	
		Yes (WHIMS Plant)	**Listing Notice 1, Activity 27**: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous **vegetation** is required for— except for the undertaking of a linear activity.		
		Yes, new clarifier at the current Jig Plant	**Listing Notice 1, Activity 34**: The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation		

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	○ Re-routed existing water pipelines (buried, internal diameter 450mm); ○ Slurry from the new Jig Plant will be pumped to the existing Plant Thickener (no new activities triggered); ○ New process water tank (located near existing Plant Thickener) – 2,000m³ (this forms part of Project 5). ○ Stockpiles [comprising of both material from the Discard Dump (also referred to as a Low Grade Stockpile] and arising low grade material from the existing Jig Beneficiation Plant). The stockpiles created from material reclaimed from the existing Low Grade Stockpile (Discard Dump) and the stockpile created with the arising material (low grade) from the existing Jig Beneficiation Plant are intermediate stockpiles created within the footprint of the existing Discard Dump (the Low Grade Intermediate Stockpile and the Arising Stockpile). Material from these intermediate stockpiles is transported to and fed into the new Jig Plant loading bin located south of the existing Low Grade Stockpile. Low low grade material from the new Jig Plant is then conveyed back to the Low Grade Stockpile footprint, deposited onto the ground and then moved back towards the existing Discard Dump. The three (3) stockpiles associated with the new Jig Plant includes the following: ▪ Low Grade -32+1mm Stockpile (Intermediate) (0,5ha) located between the existing Low Grade Stockpile (Discard Dump) and the new Jig Plant loading bin on the existing Low Grade Stockpile foot print. Low grade material transported to and from the intermediate stockpile by means of front end loaders. ▪ Arising -32+1mm Stockpile (Intermediate) (0.6ha) located between the to be constructed arisings conveyor discharge position and the new Jig Plant loading bin and within the existing Low Grade Stockpile footprint. Low grade material transported from the Arising -32+1mm Stockpile by means of front end loaders.		governing the release of emissions, effluent or pollution, excluding— (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day.		
		Depending on the final road layout, certain existing roads may be redesigned.	**Listing Notice 1, Activity 56**: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—where the existing reserve is wider than 13,5 meters; or where no reserve exists, where the existing road is wider than 8 metres.		
		Yes, a WUL will be required for the construction of the Central Water Dam at the WHIMS	**Listing Notice 2, Activity 6**: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent. This will be specific to new dirty water tanks and new Process Water Dam.		

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	▪ Low low grade material from the new Jig Plant will be conveyed by means of earth moving equipment to positions adjoining the existing Discard Dump within the existing footprint (i.e. waste from the new Jig Plant to return to the approved Discard Dump footprint). No new stockpiles will be constructed outside of the demarcated Discard Dump or other Type 3 Stockpile footprints, these will however be demarcated as part of the EMPr and WUL processes. The area of the Low low Grade Dump (stockpile) (115m²). o Jig Plant Conveyors: ▪ Approximately 25m conveyor from existing plant conveyor system to feed Jig Plant to transport arising low grade material and discard (not considered dangerous goods); ▪ Approx. 330m conveyer to feed the new Jig Plant from Discard Dump feed bin. ▪ This excludes in plant conveyors). o New Jig Plant Roads interlinked: ▪ Road 1: 240m with a width of 30m. ▪ New Jig Plant Road 2: 700m with a width of 30m. ▪ Road 3: 280m with a width of 30m. ▪ Road 4: 135m with a width of about 30m ▪ Decommissioning of existing haul road: approximately 1000m in length and 30m wide. ▪ (this excludes roads to be constructed on the Plant terraces). o Overhead Powerline: 22kV powerline of approx. 620m. o Rerouting of underground electrical cable: 22kV of approx. 380m. Power supply will comprise of 22kV powerlines. Electricity will be sourced from the existing Beeshoek Substation. Minor upgrades will be undertaken within the footprint area of this substation and the feeding Eskom Substation, but no listed activities will be triggered in this regard.	Plant, stockpiles and potentially for smaller transfer tanks within the two plant systems.			

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985*)	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
	Clearance (potentially 5.6ha), note that the clearance associated with the road does not contribute to the listing activity for clearance.: ○ Road 1 – potential clearance of 0.1ha (considered disturbed area). ○ WHIMS Laydown Area: approximately 1.5ha. ○ WHIMS Plant footprint, including access road of 160m: approximately 4ha. ○ WHIMS Plant Central Process Water Dam: 0.4ha, capacity less than 50 000m³.				
Project 5: Water Management	The mine will also establish additional water storage tanks on site which will include: • A new additional storage tank near the existing BN Tank of 500m³. The purpose is to provide sufficient storage space for water from the approved in-pit dewatering activities; • 4x 10m³ plastic tanks at the existing clarifier, thickener area. To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay; • 1 x 2000 m³ process water tank adjacent to the existing Clarifier connected with a "balancing pipe". To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay; • Existing Dam: Steel Dam 250m³ with capacity to store process water and allow for the storage of top-up water; • Existing Dam: Zinc Dam: 90m³ with capacity to store input water where required. • A new dewatering tank at the Village Opencast Pit.	x	**Listing Notice 2, Activity 6**: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.		Yes, Section 21g for the storage tanks as listed under the project description: BN Tank; Plastic Tanks; Process Water Tank; Steel Dam; Zinc Dam.
Ancillary infrastructure: Topsoil stockpiles	With the expansion of area, soil layers will be stripped and place on the existing topsoil stockpiles near the detrital area, this will be dependent on the outcomes of the specialist studies.		**Listing 1, Activity 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— except for the undertaking of a linear activity.	-	

NAME OF ACTIVITY	Aerial extent of the Activity (Ha or m²)	EIA LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985)*	WASTE MANAGEMENT AUTHORISATION	WATER USE LICENCE ACTIVITES Section 21 Water Uses
Project 6: Development of a railway line and associated service road.	The line will comprise a 2.8km main link line of approximately 5.5m in width with a 5m bulk fill (varies along the alignment). The line will tie from the existing TFR Postmasburg line at the Beeshoek Iron Ore Mine, crossing over the road accessing Tommysfield Airport and thereafter under the R385 regional tar road before linking to the existing TFR Yard that services Kolomela Mine. Considering that one 4m access road will be constructed along the alignment with an 8m buffer on either side of the railway line, the approximate extent of the development is 9ha (85 400m²).	Depending on specialist outcomes	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	**N/A**	**Depending on the outcomes of the specialists studies and whether pans are present – a Section 21c and/or i may be require.**
		Y	**Listing 1, Activity 27**: The clearance of an area of 1 hectares 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 (likely only around the area of the bridge construction – although this could also be regarded infrastructure as part of the railway line system however in the event that it is required, this will not change the project scope).		
			Listing 2: Activity 12: The development of railway lines, stations or shunting yards excluding — (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in a mining area; or (iii) additional railway lines within the railway line reserve.		

2.a.ii National Heritage Resources Act, 1999 (NHRA)

For this project, the following will be considered as part of the specialist studies in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) are triggered when considering:

a) Archaeological artefacts, structures and sites older than 100 years;
b) Ethnographic art objects (e.g. prehistoric rock art) and ethnography;
c) Objects of decorative and visual arts;
d) Military objects, structures and sites older than 75 years;
e) Historical objects, structures and sites older than 60 years;
f) Proclaimed heritage sites;
g) Grave yards and graves older than 60 years;
h) Meteorites and fossils; and
i) Objects, structures and sites or scientific or technological value.

Section 34 of the NHRA deals with structures that are older than 60 years. Section 35(4) of the NHRA deals with archaeology, palaeontology and meteorites. Section 36 of the NHRA, deal with human remains older than 60 years. Unidentified/ unknown graves are also handled as older than 60 years until proven otherwise.

According to Regulation 38 of the NHRA, any development or other activity which will change the character of a site exceeding 5 000m^2 in extent requires notification to the South African Heritage Resources Agency (SAHRA). This process, as well as the outcomes of the heritage and paleontological study will be undertaken as part of the Environmental Authorisation process.

2.a.iii National Environmental Management: Waste Act, 2008 (NEM:WA)

The NEM:WA, Regulation 921, dated 29 November 2013 and as amended, makes provision for lists of waste management activities that have, or are likely to have a detrimental effect on the environment. Please refer to the table before indicating the Waste Management Activities which may be triggered by this project.

2.a.iv National Water Act, 1998 (NWA)

Chapter 4 of the NWA specifically addresses the use of water and is a tool for an authority to ensure the implementation of the principle that National Government has overall responsibility over water resource management, including the equitable allocation and beneficial use of water in the public interest, including that a person can only be entitled to use water if the use is permissible under the Act. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a licence. Section 21 of the NWA identifies eleven (11) consumptive and non-consumptive water uses which must be authorised.

The activities associated with this project that will trigger WULs are presented in the table before. A detailed list will be issued with the EIA report, when the water balance for the project has been finalised.

2.b Project Description

2.b.i Amendment to exiting EMPr Statements

Beeshoek Iron Ore Mine (hereafter referred to as “the Mine” or “Beeshoek”) is actively investigating opportunities for the continued and sustainable mining of iron ore reserves within the approved Mining Right Area (MRA). This application for Environmental Authorisation specifically gives effect to that and includes the following projects:

1. Amendments to certain conditions which have been identified in the recent EMPr Environmental Audits, 2019 as “not sufficient or not practical” to address activities on site. The specific conditions which were identified for exclusion or amendment are the following (specifications on the amendments will be addressed in the EIA reports and based on the outcomes of the current specialist reports):
    - *An Environmental Audit Report as contemplated in regulation 55(1)(c) must be submitted bi-annually (from the date on which the permit was granted) to the Regional Manager: Mineral Regulations.*
    - *All vehicles will have mufflers to minimise noise emissions.*
    - *Vegetation of the soil stockpiles with suitable grass species in order to limit erosion of the outer slopes of the stockpiles.*
    - *Stockpile heights will be restricted to 1.5m.*

- *Dust extraction systems comprising of wet scrubbers will be installed at the secondary and tertiary crushing and screening plants. For crushing and screening operations at metallic mineral processing plants, fugitive dust can be controlled with wet scrubbers or baghouses. Chemical dust suppression systems will be implemented at the primary crushing and screening plants.*
- *Any storm water runoff from the outer slopes will contain some eroded residue solids. In order to prevent this from discharging into the surrounding environment, the side slopes of the WRDs will be dosed down to 1v:3h then covered with approximately 150mm topsoil and then grasses.*
- *Re-vegetated areas will be maintained by means of regular watering, weed controls and cattle-grazing exclusion until the vegetation has settled to ensure that it is stable, and that erosion does not occur.*
- *Surface water quality will be monitored to ensure that stipulated limits are not contravened.*
- *After the topsoil has been replaced the area should be ameliorated and seeded, should self-succession of vegetation not take place.*
- *The footprint (product and fines stockpiles) areas will be topsoiled and ripped.*
- *The following measures will be implemented:*
  - *The areas will be landscaped to be free draining;*
  - *The topsoil and subsoils with the appropriate seedbed as stripped during the construction and operational phases will be placed over these areas to a depth as specified by a qualified specialist. The topsoil shall be appropriately ameliorated to allow vegetation to grow rapidly if required – it should be noted that the mine will*
  - *encourage self-succession of vegetation, if this does not take place effectively a revegetation project will be implemented;*
  - *If a reasonable assessment indicates that the re-establishment of vegetation is unacceptable slow, the soil needs to be analysed and any deleterious effects must be corrected, and the area be seeded with a seed mix to specification;*
  - *Appropriate erosion control measures (i.e. contour banks) must be taken where required;*
  - *All rehabilitated areas will be fenced off up until the area is regarded as stable; and*
  - *All illegal invader plants and weeds shall be dealt with as required in terms of the relevant legislation.*

2.b.ii Project 1: Consolidation of Run of Mine (RoM) Stockpiles on south mine

2.b.ii.1 Current Status

Iron Ore rich material removed from the Beeshoek opencast operations are stored on ROM Stockpiles (both on-grade and off-grade) on site. ROM stockpiles are processed through the plant process. The on-grade and off-grade are blended when required to meet the specific market requirements.

Please refer to the following table for a list of ROM Stockpiles occurring on the mine. The ROM Stockpiles to be consolidated as part of the proposed project are highlighted in green in the table below.

Table 7: ROM Stockpiles

Name	Description	Farm Name	Farm Portion	South	East
Off-grade Waste Dump 1, 2 and 3	South Contaminated ROM 1	OLYNFONTEIN 475	4	28° 19' 1.487" S	22° 59' 57.711" E
	South Contaminated ROM 2 (including BIS)	OLYNFONTEIN 475	4	28° 19' 17.636" S	23° 0' 8.749" E
	South Off-Grade ROM 1	BEESTHOEK 448	RE 0	28° 18' 54.499" S	23° 0' 19.721" E
ROM Stockpile	South ROM Stockpile 1	BEESTHOEK 448	RE 0	28° 18' 55.383" S	23° 0' 2.324" E
South ROM Stockpile 2	Village ROM Stockpile	BEESTHOEK 448	RE 0	28°18'54.90"S	22°59'25.88"E
South Off-Grade ROM 2	Village ROM Stockpile	BEESTHOEK 448	RE 0	28°18'40.23"S	22°59'48.08"E
North Off-Grade ROM 1	ROM Stockpiles	BEESTHOEK 448	1	28°17'33.46"S	23° 0'22.67"E
BIS ROM North 1	ROM Stockpiles	BEESTHOEK 448	1	28° 17' 40.35" S	23° 0' 53.51" E
BIS ROM North 2	ROM Stockpiles	BEESTHOEK 448	1	28° 16' 57.23" S	23° 1'5.97" E
North ROM Stockpile	Stockpiles	BEESTHOEK 448	1	28° 16' 39.3" S	23° 0' 11.6" E

2.b.ii.2 Proposed Project

In areas where individual ROM stockpiles are located, these will be consolidated to allow for further capacity and operational management. The table before highlights the stockpiles applicable to the consolidation. The sites required by the mine include:

- South Run of Mine Stockpiles (ROM Stockpile, South Contaminated ROM 1 and Contaminated Dump 2) and the South BIS Stockpile. Refer to Figure 4.

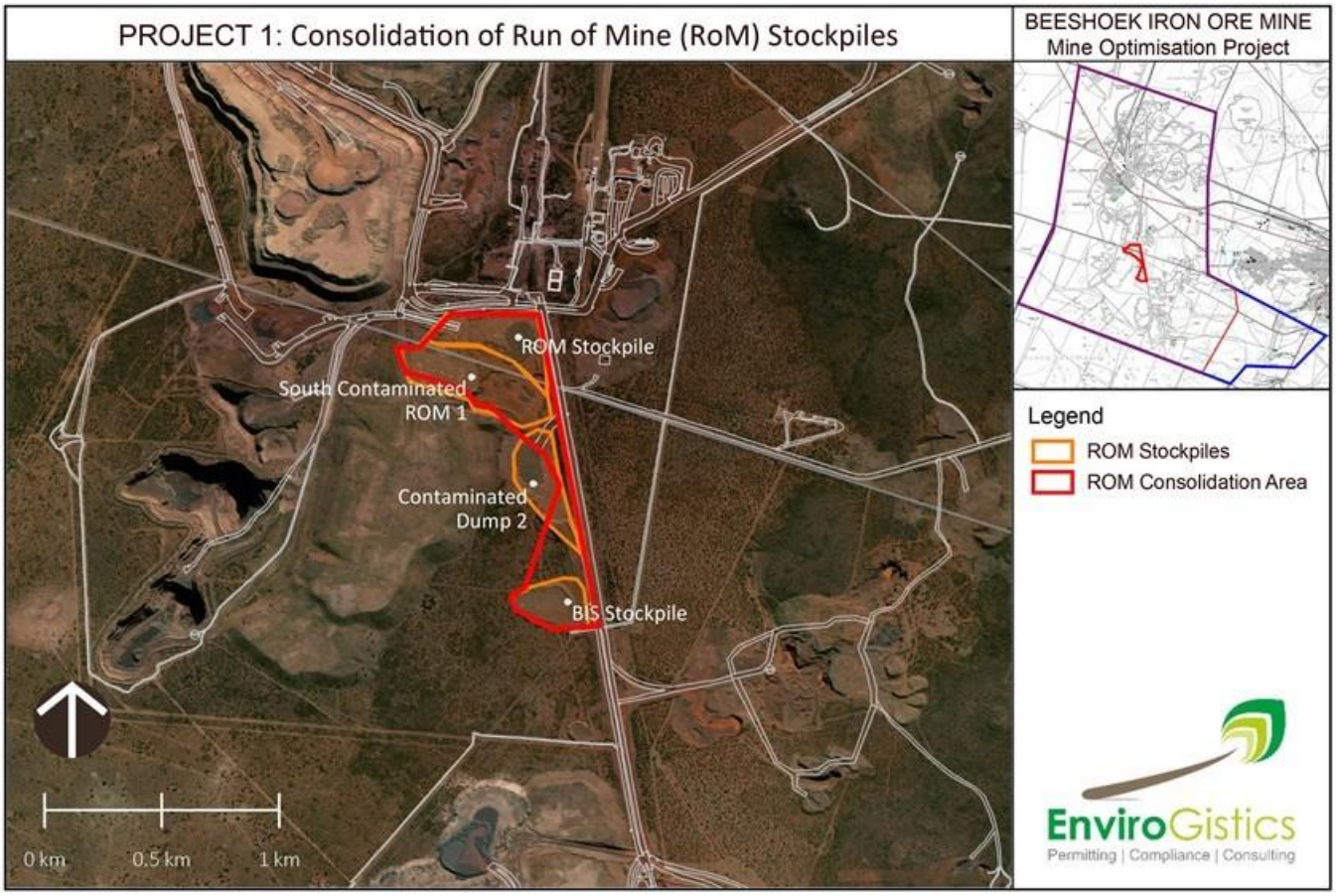


Figure 5: ROM Stockpiles (red) to be consolidated (orange)

Table 8: Project 1: Consolidation of ROM Stockpiles

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Project 1: Consolidation of Run of Mine (ROM) Stockpiles on South Mine	The ROM stockpile areas on south mine will be demarcated as a combined ROM Stockpile area for both on-grade, off-grade and BIS. The current WUL allows for the following ROM deposition on the stockpile in question – note that the deposition of ROM will not increase in annual throughput: South Contaminated ROM 1: 4 450 000t/a South Contaminated ROM 2 Off-Grade ROM Stockpile, including BIS: 1 920 000t/a ROM Stockpile: 720 000t/a	Overall Area: 35ha [no clearance of vegetation is required; this area is located on the north-eastern perimeter of the West Pit WRD (now referred to as the Village South WRD)] Operational heights may differ.	28°18'59.31"S; 22°59'48.38"E 28°18'53.98"S; 22°59'55.75"E 28°18'53.83"S; 23° 0'7.64"E 28°19'37.47"S; 23° 0'16.29"E 28°19'37.95"S; 23° 0'9.79"E 28°19'35.28"S; 23° 0'4.64"E Centre coordinate: 28°19'16.70"S; 23° 0'10.72"E	Part 1, Regulation 29: "An environmental authorisation may be amended by following the process prescribed in this Part if the amendment; a) Will not change the scope of a valid environmental authorisation nor increase the level or nature of the impact, which impact was initially assessed and considered when the application was made for an environmental authorisation; or b) Relates to the change of ownership or transfer of rights and obligations".

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Temporary Access Roads	N/A			
Permanent linear infrastructure (roads or pipelines)	N/A			
Clearance	N/A. The consolidated ROM Stockpiles on South Mine will be located within the existing cleared area associated with the existing ROM Stockpile Areas and West WRD (now referred to as the Village South WRD) to the west of the ROM Stockpile.			

2.b.iii Project 2: Amendments to the design of existing Waste Rock Dumps in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints

2.b.iii.1 Current Status

Waste Rock

The historical extent of mining operations at Beeshoek, over the course of various regulatory requirement changes, since the 1991 Minerals Act and internal allocation of management units, has resulted in changes to the original naming convention of Mine Residue Deposits, which has created extensive confusion over time. For example, the 2004 EMP makes reference to 54 Discard Dumps of varying size on the northern mining area and 10 Waste Dumps on the southern mining rea. The 2009 EMP again makes reference to Waste Rock Dumps, which include:

- "Two (2) waste rock dumps at the BN Pit at North Mine (new);
- One (1) waste rock dump, which has been constructed within the footprints of the HB
- Quarry at the North Mine (new);
- One (1) waste rock dump, situated to the south of the HH Quarry at the North Mine;
- One (1) waste rock dump, situated to the west of the HL Quarry at North Mine;
- Two (2) waste rock dumps are situated to the south of HF Quarry at the North Mine;
- Two (2) waste rock dumps are situated to the south and north of the GF Quarry respectively at the North Mine;
- One (1) waste rock dump to the east of the Beeshoek Village situated on to the north of the R385;
- One (1) waste rock dump situated to the west of the BF Quarry at South Mine;
- One (1) waste rock dump situated to the west of the crusher at South Mine; and
- One (1) waste rock dump situated to the south of the crusher at South Mine.

For this reason, a study was initiated to assess the drawings submitted with the 2004 and subsequent EMPs and the approved WUL, and a process of grouping and naming these facilities were initiated."

The waste streams associated with Beeshoek include:

- Waste Rock Dumps (WRDs):
  - North Mine:
    - BN WRD;
    - ROM Stockpile (North);
    - HH WRD;
    - HL WRD;
    - BIS ROM North 1 & 2;
    - WRD North;
    - North Off-grade ROM;
    - B Dump ROM;
    - Discard Dump;
    - GF WRD;
    - In-Plant Stockpiles;
    - Shale WRD;
    - Quartzite Stockpile; and
    - Plant Stockpiles.
  - South Mine:

- Village (previously BF) WRD (now Village Pit North WRD)
- Detrital Stockpiles;
- East Pit WRD;
- West Pit WRD (now referred to as the Village Pit South WRD);
- Contaminated ROM Stockpile 1 & 2;
- Off-grade ROM;
- South ROM;
- Village Off-grade ROM;
- Village ROM; and
- BIS ROM.

The table below present the approved WRDs according to the EMPrs.

Table 9: Mine Residue Deposits according to approved EAs/EMPrs

Name	Definition	Centre Coordinate	Slope	Footprint (approx. ha)	Height
HH Waste Rock Dump	Discard	28° 16' 56.8" S; 23° 1' 19.7" E	General slope of the WRDs are approximately 40 degrees. For the Village Pit WRD approval it is stated that at closure the side slopes will have been constructed at an angle of no steeper than 1:3.	19	Not stated/restricted in the EMP Alignment (Village Pit WRD approved height is 45m)
HL Waste Rock Dump	Discard	28°17'7.01"S; 23° 1'8.32"E		73	
Waste Rock Dump North	Contaminated Material	28° 17' 34.2" S; 23° 0' 32.7" E		15	
GF Waste Rock Dump (including BN Waste)	Discard	28° 17' 3.12" S; 23° 0' 38.58" E		43	
Discard Dump	Contaminated Material	28° 17' 12.7" S; 23° 0' 21.5" E		29	
Shale Waste Rock Dump	By product – not a Waste Product, incidental to mining operation, as this is not included into the Mining Right, it cannot be sold off as a product.	28° 16' 34.66"; 23° 0'4.95" E		3	
Quartzite Waste Rock Dump	By product – not a Waste Product, incidental to mining operation, as this is not included into the Mining Right, it cannot be sold off as a product.	28° 16' 35.21" S; 23° 0'8.60" E		1	
Village (previously BF) WRD	Discard	28° 18' 21.630" S; 22° 59' 26.890" E	No steeper than 1:3	70	45m
Detrital Stockpiles	Discard	28° 19' 40.540" S; 23° 0' 50.227" E	According to the EMP Alignment the general slope of the WRDs are approximately 40 degrees. For the Village Pit WRD approval it is stated that at closure the side slopes will have been constructed at an angle of no steeper than 1:3.	101	Never stated in EMPs – will not exceed 45m, which is the maximum approved height for WRDs on site (Village Pit WRD approved height)
East Pit Waste Rock Dump	Discard	28° 20' 17.916" S; 23° 0' 10.965" E		142	
West Pit Waste Rock Dump (now referred to as the Village South WRD)	Discard	28°19'19.70"S; 22°59'28.06"E		76	
Slimes Dam	Contaminated Material	28° 16' 27.0" S; 23° 0' 48.0" E	Disposal into old pit no slope applicable.	73	10m

The Shale and Quartzite WRDs arose from overburden removal during the development of the opencast pits. No further material is deposited on these areas. The Licence Holder may want to rework or remove these dumps from site, but will require approval from the DMRE as these are regarded as Waste Rock Dumps (i.e. does not form part of allowable mineable resources in terms of the Mining Right, and is disposed of as it is unwanted).

Discard Dump

In addition to the waste rock, material from the Jig Plant is sent to the "Discard Stockpile", which is in fact considered a stockpile with sufficient iron ore grade for reworking.

Table 10: Discard Dump

Name	Definition	Centre Coordinate	Slope	Footprint (approx. ha)	Height
Discard Dump	Contaminated Material	28° 17' 12.7" S; 23° 0' 21.5" E	According to the EMP Alignment the general slope of the waste rock dumps are approximately 40 degrees. For the Village Pit WRD approval it is stated that at closure the side slopes will have been constructed at an angle of no steeper than 1:3.	29	Not specified in EMPr. Operational hight is maximum of 60m.

It should be noted that the Mine intends to optimise approved Mine Residue Footprints. For this reason, should additional storage of discard be required or any other waste, classified within the same type (i.e. Type 3), these may be stored on such footprints (Type 3 waste stockpiled on Type 3 footprints and not specifically limited to the name of the facility). This will optimise waste disposal and reduce the need to expand Mine Residue Footprints where these are not specifically required.

Slimes Dam

An old Slimes Dam was present on site prior to the 2004 EMP. The 2004 EMP stated that the previous Slimes Dam reached the end of its life and a new Slimes Dam will be implemented. The new Slimes Dam was included into the 2009 EMP Alignment. This facility was instated within the footprints of a quarry which was located to the northeast of the Plant. The historic (old) Slimes Dam was backfilled and used for the GF WRD development.

The new Slimes Dam is operating in the same manner as the previous slimes dam.

Description

According to the Geo Tail (Pty) Ltd (Geo Tail) Slimes Dam Conceptual Design Report, 2009 (approved as part of the initial 2015 WUL), impoundment embankments and existing WRDs provide storage capacity for fine residue disposal. Waste material from opencast mining is used for embankment construction and material is placed mechanically in horizontal layers with the mining fleet. The maximum vertical height of the facility is approximately 20m along the north flank, with the vertical height of the impoundment embankment along the wet flank generally less than approximately 5m.

The slimes generated from the plant processing activities represent approximately 14-16% of ore put through the Plant. Water from the dewatering screen is pumped to a slimes dam. The slurry delivery pipeline is placed on the impoundment embankment crest. The fine residue is designed to be discharged at a concentration of approximately 25% solids by mass through pen and delivery stations from the impoundment embankments to form a beach that slopes downwards away from the embankments. Currently tests are undertaken to investigate a ring-feed method of disposal to further improve settling and capacity management. The mud is allowed to settle, and the clear water is pumped back to the plant. A supernatant pool is maintained in the immediate vicinity of the decant barge. The floating barge decants from an old quarry located in the northeast corner of the basin. The design is stated in such a manner that, if necessary, the pool will be relocated, or the embankment will be lined/ sealed to control the phreatic level in the impoundment embankment adjacent to the pool.

The slimes dam is operated on a ring feed system. Slimes are strategically deposited from the perimeter of the facility to allow for the required settling of material. This method will further assist with the remining through the WHIMS plant.

The dimensions and capacity of the Slimes Dam as per the design reports states:

Dam Classification

According to the Geo Tail Slimes Dam Conceptual Design Report, 2009, the overall safety hazard rating for the facility is 'Low', with no potential significant impact on the environment.

Design Criteria

The following design for the Slimes Dam was included in the 2009 EMP Alignment:

Table 11: Slimes Dam Design as per approved EMP

Infrastructure	Dimension	
Waste Walls	Top Width	10m
	Bottom Width	36.5m
	Height	10m
	Waste wall material requirements	615 100m^3 or 1.7 million tonnes

Rehabilitation	Waste required to rehabilitate	1 000 000 tonnes
Liner		None
Capacity		6 953 460 tonnes

The following table presents the detailed design as per the approved design report:

Table 12: Slimes Dam Design as per approved WUL (2015) and subsequent update (2018)

Infrastructure	Dimension
Full Supply Level	Total airspace volume: 7.4 million m³ or 16.7 million tonnes
Final Top Surface Area of the basin	Approximately 60ha
Final Rate of rise	Approximately 1.0m/a
Design life of mine	Approximately 12.6 years from 2009

Please refer to the following table for the location of the Slimes Dam:

Table 13: Slimes Dam Location

Name	Definition	Centre Coordinate	Slope	Footprint (approx. ha)	Height
Slimes Dam	Contaminated Material	28° 16' 27.0" S; 23° 0' 48.0" E	N/A	73	10m

Waste Classification

Mine Residue Deposits, i.e. the Slimes Dam and WRDs, present potential point sources of groundwater pollution and continued visual intrusion following closure of a mine. These facilities will, unless otherwise recovered, remain on surface at mine closure and require specific actions at closure, or concurrent to operation, to mitigate the potential long-term impacts thereof on groundwater quality (if determined by a groundwater investigation) and the visual and aesthetic character of the landscape. It should be noted that the Mine Residue Deposits have been classified as Type 3 Waste.

The mine appointed Geo Pollution Technologies (Pty) Ltd (GPT) to conduct a critical evaluation of the groundwater quality monitoring network at the mine and also to develop groundwater-related management plans. In the report (Reference ASBEE-16-1240), dated April 2016 the following was concluded:

The study stated that:

- Surface sources of contamination are currently not characterised in terms of contamination potential, which will be required if the monitoring network is to be expanded sufficiently.
- The groundwater quality limits should be re-evaluated based on exceedances from background water qualities. Pre-mining contamination status of the aquifer already exceeds WUL limits under natural conditions. Therefore, the WUL limits set unrealistic targets for water quality.
- Additional monitoring positions should be determined based on contamination potential of existing sources.

A second study was conducted by GPT, dated April 2017 (Reference ASBEE-16-1987) to determine the groundwater risk and required monitoring network amendments and address recommendations from the previous study.

According to the 2017 Groundwater Risk Assessment and Monitoring Network Audit conducted by GPT the following statements are made:

- Based on the groundwater quality analyses, solid waste analyses and liquid waste analyses, as well as the statistical analysis of the data, it can be deduced that the chemical signatures of the three (3) mediums (solid waste, liquid waste and groundwater) are quite similar.
- Additionally, it was found that the constituents found to exceed the relevant screening levels for each of the three mediums are also similar.
- Also, most of the sources are located within the dewatered area, directing any contaminants towards the active mining areas.
- Therefore, groundwater monitoring in terms of chemistry is not recommended for expansion as the effects of sources on the groundwater environment are likely to be negligible and are unlikely to be observed in samples as the chemical signatures of the different mediums are so similar.

The report also stated the following: "The available hydrogeochemical data (incl. solid waste, liquid waste and groundwater) were analysed using IBM.s SPSS v. 20. The corresponding chemical constituents between each of the samples were defined as chemical fingerprints, which could be correlated and cross-correlated with each other in an attempt to identify the similarities between the waste samples and background water quality. All the chemical compositions of the solid waste and liquid waste samples show a significant correlation (á = 0.01 or 0.05) with that of at least one background groundwater sample. This illustrates that contamination from these sources is likely to have the same geochemical signature as the local groundwater. This shows that contamination to the aquifer from the identified sources is unlikely."

A follow up study was conducted dated May 2019 by GPT. The study concluded:

- While nitrate concentration exceeds the SANS241-1:2015 standard limit in BN Pit, WG74 and WG32, none of the contaminants of concerns (Nitrates, Barium and Manganese) exceed the prescribed WUL limits;
- Of the three (3) contaminants investigated, only nitrates may be regarded as a contaminant of concern in groundwater.
- However, the occurrence of nitrate in groundwater indicates that nitrate is naturally occurring outside of the mining areas with minor contribution from the use of explosives in the mining area;
- A cone of groundwater depression has developed within the active mining area with flow directed towards the mining excavation due to mine dewatering.
- The dewatering process negates any build-up of contaminants in the groundwater on and under the mining area;
- In the mining environment, the leaching of blating residue from waste rock., slimes and mine water impoundments are also potential sources of nitrate in groundwater.
- The contribution of N-based explosives to nitrate concentration in groundwater is negligible compared to background values.
- Based on the scope and findings of the investigation within the mining area and immediate surroundings, Barium and Manganese were not regarded as contaminants of concern in groundwater; and
- Dewatering in the pits contributes significantly to minimising the potential for groundwater contamination.

The above should again be read with the following: "The available hydrogeochemical data (incl. solid waste, liquid waste and groundwater) were analysed using IBM.s SPSS v. 20. The corresponding chemical constituents between each of the samples were defined as chemical fingerprints, which could be correlated and cross-correlated with each other in an attempt to identify the similarities between the waste samples and background water quality. All the chemical compositions of the solid waste and liquid waste samples show a significant correlation (á = 0.01 or 0.05) with that of at least one background groundwater sample. This illustrates that contamination from these sources is likely to have the same geochemical signature as the local groundwater. This shows that contamination to the aquifer from the identified sources is unlikely."

2.b.iii.2 Proposed Project

The Mine indicated the need to update the heights and designs of various WRDs on site to take into consideration rehabilitation requirements. These include:

- HF WRD;
- GF WRD;
- Discard Dump (for this an operational layout will suffice);
- Village Pit North Waste Rock Dump (VP1) WRD;
- West Pit WRD (now referred to as the Village Pit South WRD);
- East Pit WRD.

The increase in the heights will also require the increase in the footprint areas to allow for the correct slope at closure.

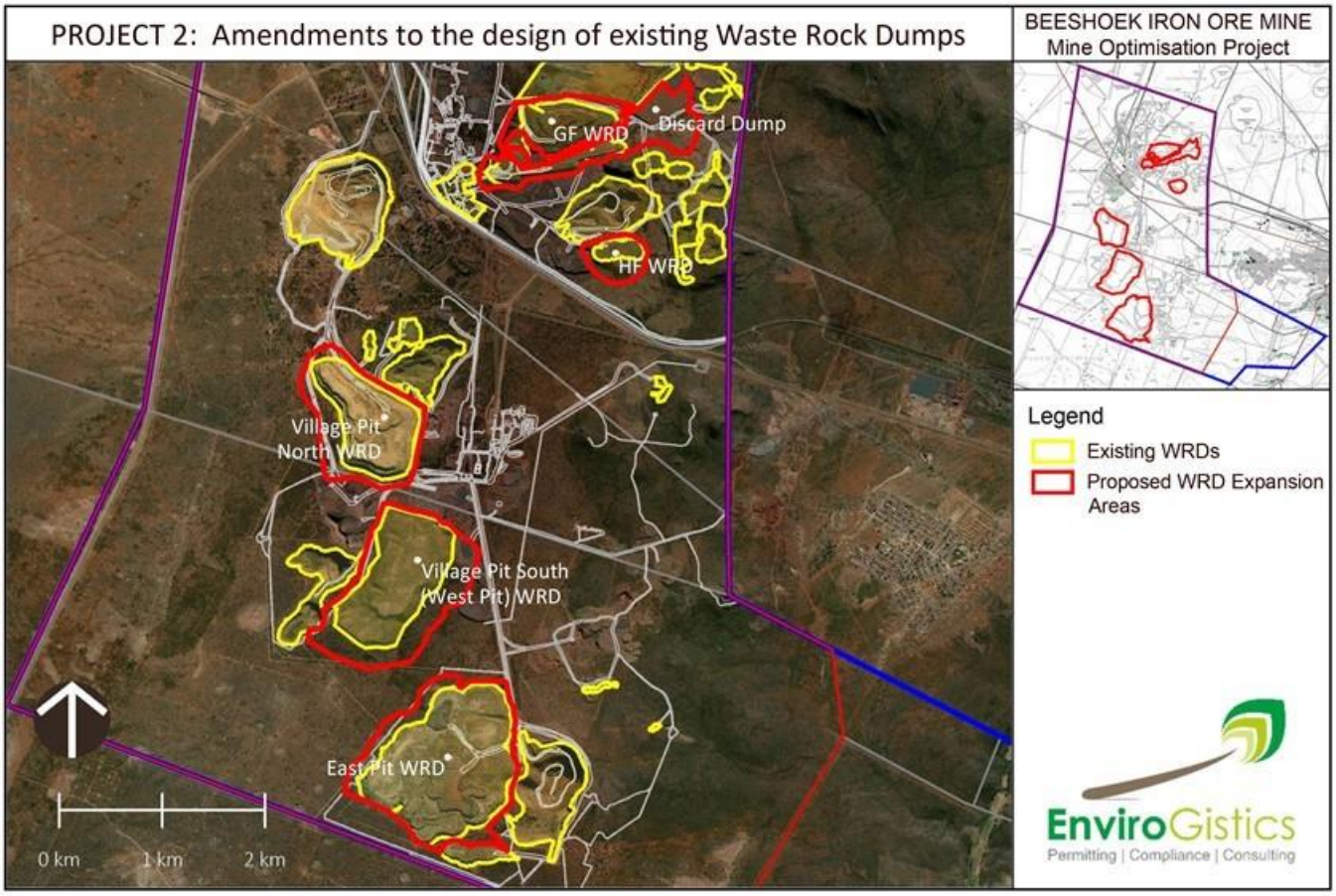


Figure 6: WRDs in question

This project also includes the demarcation of the Discard Dump and associated increase in this area. The following table describes the Environmental Authorisations associated with this part of the project:

Table 14: WRD Project

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Project 2: Amendments to the design of existing Waste Rock Dumps in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints	Village Pit North Waste Rock Dump (VP1): Current area approximate 70ha, to be increased with approximately 26ha (final area 96ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance of about 25ha) – this will also remove the required Storm Water Dam, which was a recommendation in its associated EMPr for the Village WRD EMPr, but has as yet not been constructed, due to the low run-off in this area and subsequent storm water management studies - The decommissioning of the SWD will not trigger a listed activity as the "active activity" does not entail an "operational component"). Planned operational height is 111m (upon rehabilitation 112m). GF Waste Rock Dump: Current area approximately 48ha, to be increased by about 6ha (final area about 54ha) to allow for final slope and footprint upon rehabilitation (area pending designs). Based on the location of this WRD between the Discard Dump and the existing Slimes Dam it is unlikely that any	Village Pit North WRD: Footprint – 96ha Height – 111m, upon rehabilitation 112m GF WRD: Footprint – 54ha Height – 82m, upon	Village Pit North WRD: Centre Coordinate: 28°18'38.34"S; 22°59'32.55"E GF WRD: Centre Coordinate: 28°17'0.37"S; 23° 0'33.46"E	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 1, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
	clearance will be triggered. Planned operational height is 82m (upon rehabilitation 84m). • East Pit Waste Rock Dump: Current area approximately 144ha, to be increased by about 26ha (final area about 170ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will involve clearance in excess of 25ha). Planned operational height is 94m (upon rehabilitation 94m). • West Pit Waste Rock Dump (now referred to as the Village South WRD): Current area approximately 80ha, to be increased with about 55ha (final area 135ha) to allow for final slope and footprint upon rehabilitation (area pending designs, but will likely involve clearance of about 35ha). Planned operational height is 98m (upon rehabilitation 106m). • HF Waste Rock Dump (new dump on historic dump footprint): Current area approximately 20ha and used for BIS stockpiling, to be reused to allow for HF Pit waste rock disposal, as well as final slope and footprint upon rehabilitation (area pending designs). This area is located on an existing WRD footprint (no additional clearance therefore required). Planned operational height is 39m (upon rehabilitation 63m). • Discard Dump: Current area approximately 28ha, to be increased to about 60ha. This area is located within the mining area, between WRDs, Slimes Dam and Opencast Pits, no clearance will be required. The heigh of the facility is planned to be up to 60m. Current WUL allows for the following deposition – note that the deposition of material will not increase in annual throughput, however the life of mine and total capacity/footprint will increase: • Village Pit North WRD: 31 500 000t/a • West Pit Waste Rock Dump (now referred to as the Village South WRD): 21 413 403t/a • GF WRD: 7 721 766/a • HL Waste Rock Dump: 10 983 334t/a • BIS ROM North 1 – 2 +50 000t/a (on historic HF WRD) • East Pit Waste Rock Dump: 68 850 000t/a • Discard Dump: 9 000 000t/a	rehabilitation 84m East Pit WRD: Footprint – 170ha Height – 94m, upon rehabilitation 94m West Pit Waste Rock Dump (now referred to as the Village Pit South WRD): Footprint – 135ha Height – 98m, upon rehabilitation 106m HF WRD: Footprint – 20ha Height – 39m, upon rehabilitation 63m Discard Dump: Footprint – 60ha Height – 60m	East Pit WRD: Centre Coordinate: 28°20'21.91"S; 22°59'59.19"E West Pit WRD (now referred to as the Village Pit South WRD): Centre Coordinate: 28°19'27.99"S; 22°59'46.23"E HF WRD: Centre Coordinate: 28°17'42.05"S; 23° 0'50.71"E Discard Dump: Centre Coordinate: 28°17'6.65"S; 23° 0'51.98"E	indigenous vegetation is required for—the undertaking of a linear activity. **The specific height of the Village Pit WRD and the Product Stockpiles as stipulated in their respective EMPs will be increased as part of this EIA Application – this will be considered as included in a Regulation 29 Part 2 amendment which replace the height stipulations as presented in the prior EMPs. The increases in heights do not trigger specific listing notices, however the associated footprints to achieve final closure slope will trigger a Waste Management Licence Activity.** It is assumed that Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right In terms of the MPRDA is <u>not relevant as no additional mining rights are required and the activities entail the expansion of approved facilities</u>. For that reason: **Category A waste activities, #13**: The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule is more relevant. **<u>Water Uses</u>**: Section 21(g) and potential Section 21 (c)&(i) for the presence of various dry pans in the area. GN704 Exemption requirements for the operation of unlined Mine Residue Deposits.
Temporary Access Roads	N/A			

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Permanent linear infrastructure (roads or pipelines)	N/A			
Clearance	N/A; will be located within the existing cleared area associated with the existing ROM Stockpile Areas and West Pit WRD West Pit Waste Rock Dump (now referred to as the Village Pit South WRD) to the west of the ROM Stockpile.			

2.b.iv Project 3: Increase of Opencast Footprint Areas, as well as the undertaking of detrital mining

2.b.iv.1 Current Status

Opencast Pits

The iron ore is exploited by means of conventional opencast mining techniques (drilling-blasting-load-haul). The drill-blast activities are contracted out, whereas load-haul is done by a combination of owner and contractors' fleets.

The vegetated soil overlying the planned mining area is stripped prior to mining and stockpiled on a dedicated dump to be used for rehabilitation purposes at a later stage. Then bench blocks of 10m height are drilled using drill rigs, which drill 165mm diameter blast holes. Drill patterns can be a staggered or square pattern, with burden and spacing varying from 4m x 5m in waste to 3m x 3m in difficult ore. Blast holes are charged with emulsion explosives and different down-hole charge configurations are used depending on the different rock types to be blasted. This, together with the necessary blasting accessories will achieve optimal fragmentation.

The blasted rock is loaded with front-end loaders and excavators into rigid haul trucks and Articulated Dump Trucks (ADTs). Ore is hauled to the primary crusher and ore stockpiles. Based on the Fe-grade and destined metallurgical processes numerous ore stockpiles exist on Beeshoek.

As an integral part of the mining processes, backfilling of numerous existing pits is employed, where possible, in order to minimise both the final voids left at the end of mining as well as the size of waste dumps. Waste with a potential future use is stockpiled separately in order to be accessible and ready to be processed by the future user.

Beeshoek has scaled down to 3.5 million t/a until 2028 supplying the local market. In order to maintain production over this period, existing reserves are being exploited from the Village Pit. The opencast pits on site comprise of the following:

- North Mine:
  - BN Opencast Pit (active);
  - HL Opencast Pit;
  - HH Opencast Pit;
  - GF Opencast Pit; and
  - HF Opencast Pit (active).
- South Mine:
  - GK Opencast Pit;
  - Village Opencast Pit (active);
  - BF Opencast Pit (active);
  - West Opencast Pit; and
  - East Opencast Pit (active).

It should be noted that the capacities provided is according to current Geographic Information System (GIS) data. The depth of the opencast pits may increase based on available reserves.

The current active Opencast Pits include:

- Village Opencast Pit;
- East Opencast Pit;
- BN Opencast Pit;
- BF Opencast Pit; and
- HF Opencast Pit.

The Mining Work Programme is updated annually to ensure that the DMRE is aware of the annual plans.

Although other opencast pits, these are continuously assessed in terms of their economic value for intended remaining. The current resources of the Mine are approximately 87 million tonnes with a reserve of about 26 million tonnes (Neveling, 2020).

Detrital Mining

Another mining method utilised on the Mine is the mining of detrital ore, where the deposits of ore are shallow enough to be scooped out of the ground for processing as opposed to employing more extensive opencast mining methods. There are a few of these detrital zones on the mine area which still need to be exploited. According to the 2009 EMP Alignment Report, the Mine will mine detrital ore that are available in small pockets that are easy to mine. Detrital mining entails the excavating of loose sedimentary deposited iron ore gravel material with other rock types present due to the sedimentary deposition process within dolomite karsts. The loose material is excavated and loaded and hauled and tipped into a feed bin and the separated into sizing to be fed as contaminated material to the Jig Beneficiation Plant. The fine material on the Screening Plant is used as rehabilitation material back into the detrital mining area.

Backfilling of Opencast Pits

The 2004 EMP clearly states that mine waste produced in the northern mining area will be used for the in-filling of available opencast pits areas. The Mine will backfill as far as practically possible as part of the ongoing development of the annual and long term rehabilitation plans, but voids may remain where enviroberms will be established for safety. The Mine has obtained a WUL following for backfilling in terms of the following:

Table 15: Backfilling of Opencast Pits

Name	Disposal Volume (m^3)	Farm Name	Farm Portion	South	East
HH Pit Backfill	459860 tons	BEESTHOEK 448	1	28° 16' 43.7" S	23° 1' 20.2" E
HL pit area Backfill	2212010 tons	BEESTHOEK 448	1	28° 17' 21.6" S	23° 00' 55.6" E
BN N Pit Backfill	1625221 tons	BEESTHOEK 448	1	28° 16' 13.9" S	23° 0' 17.2" E
East Pit Backfill	2119897tons	OLYNFONTEIN 475	4	28° 20' 31.2" S	22° 59' 37.7" E
GK Pit Backfill	1468839 tons	BEESTHOEK 448	1	28° 18' 23.4" S	23° 1' 9.6" E
Detrital Area	1224840 tons	OLYNFONTEIN 475	4	28° 19' 40.3" S	23° 1' 9.6" E
West Pit Backfilling	10536114 tons	OLYNFONTEIN 475	4	28° 19' 18.6" S	22° 59' 30.8" E

2.b.iv.2 Proposed Project

The mine would like to make use of the opportunity to increase the approved footprints of active pits, which will include:

- BN Pit;
- Village North Pit;
- Village East Pit;
- Village South Pit;
- BF Pit Expansion;
- East Pit Expansion, including Future Pit;
- Detrital area

The earlier approved EMPr's of the Mine did not demarcate the required detrital mining areas, or stipulated required management measures. For this reason, the dolomite karst areas will be explored and where possible mined. The depth can vary from 4m to 25m deep. The detrital mining strategy and the depth is only determined once excavation start and the quality of iron ore is inspected within a karst deposition area.

One additional haul road will be required:

- Village Haul Road: 1,100m (about 3.3ha)

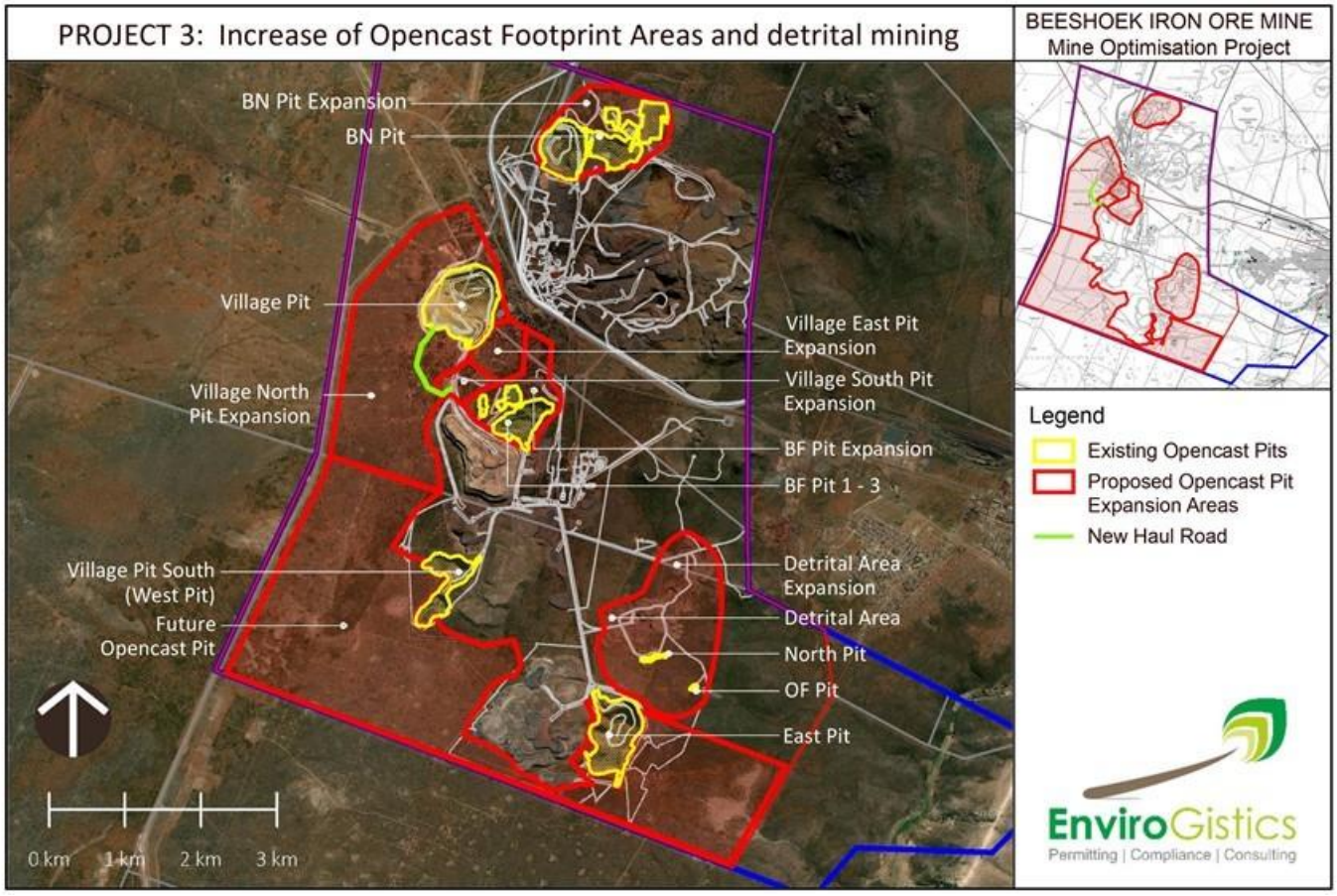


Figure 7: Opencast Pits (red: current; yellow: new footprint proposed; purple: new roads)

The following table summarises this part of the project.

Table 16: Opencast Project

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Project 3: Increase of Opencast Footprint Areas, as well as the undertaking of detrital mining for shallow iron ore reserves, including transportation routes (Haul roads)	• Village North Pit (VP North), will be expanded by 375ha in the future to 436ha and will further include two satellite pits: Pit East and Pit South, each with and area of about 37ha and 22ha respectively. Clearance of vegetation will be required. The depth of the VP North is planned at 180m, with VP East and VP South 160m and 60m respectively. • BN Pit area is planned to be expanded by 66ha to approximately 137ha. The depth of the opencast pit will be 162m from surface. Approximately 25ha will require vegetation clearance. • EP Opencast Pit, will entail a substantial increase from about 50ha to about 1026ha. The Future Pit, linked to the East Pit is a planned new pit which will comprise of an area of an additional 976ha. This area will likely be a result of various smaller satellite pits. However for the purposes of the EIA process the	Village North Pit: Depth – 180m Area – 436ha New Village Pit East: Depth – 160m Area – 37ha New Village Pit South: Depth – 60m Area – 22ha BN Pit: Depth – 162m Area – 137ha East Pit: Depth – 200-220m Area – 976ha	Village North Pit: 28°17'36.05"S; 22°58'49.05"E New Village Pit East: 28°17'48.18"S; 22°59'36.79"E New Village Pit South: 28°18'4.44"S; 22°59'24.86"E BN Pit: 28°16'9.03"S; 23° 0'21.67"E East Pit: 28°20'36.27"S; 23° 0'29.94"E	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing Notice 1, Activity 19**: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than cubic metres from watercourse. **Listing Notice 1, Activity 24**: The development of a road—with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter.

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
	overall area is considered. Clearance of vegetation will be required. For this activity it is important to note that the future pit is in its planning phase, further exploration will be required in this area. Once the final designs for the mining schedule is available this will be submitted to the DMRE for approval. It will also be at this time that a detailed waste management strategy will be developed for the management of waste rock and overburden in this area. Once this information is available the necessary Waste Management License and Water Use License will be applied for from the DMRE and DWS respectively. The depth of East Pit is planned at approximately 220m.			**Listing Notice 1, Activity 31**: The decommissioning of existing facilities, structures or infrastructure for— (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014; (ii) any expansion and related operation activity or activities listed in this Notice. **Listing Notice 2, Activity 15**: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— the undertaking of a linear activity.
	• The BF Pit will be expanded from about 30ha (comprising of 3 pits) to about 86ha. Approximately 25ha may require clearance. The dept of the BF Pit is planned at 180m.	BF Pit: Depth – 180m Area – 86ha	BF Pit: 28°18'17.10"S; 22°59'37.99"E	**Water Uses:** In terms of the NWA, Section 21(c)&(i) may be triggered as a result of various dry pans in the area. In addition to this, Section 21(j) will be triggered for dewatering activities to ensure safe mining conditions.
	• A Detrital Mining area of about 238ha will be established – it should be noted that entire area will not be utilised, only where minerals are found economically viable. Clearance of vegetation will be required. Mining in the detrital area is planned between 20-40m in depth.	Detrital Area: Depth – 20-40m Area – 238ha	Detrital Area: 28°19'44.55"S; 23° 0'30.61"E	**Water Uses**: Section 21 (c)&(i) for the presence of various dry pans in the area. Section 21 (j) for the abstraction of water for safe mining conditions, and the use thereof as Section 21(a) water uses.
	One new haul road is proposed: • Village Haul Road: 1,100m at a width of 30m (about 3.3ha) The road will be located in areas mostly disturbed with exiting mining activities or along exiting roads.	Village Haul Road: 1,100m at width of 30m (about 3.3ha)	Village Haul Road: Start - 28°17'40.18"S 22°59'14.08"E End - 28°18'3.84"S 22°59'21.98"E	

Note in terms of the Future pit: For this activity it is important to note that the future pit is in its planning phase, further exploration will be required in this area. Once the final designs for the mining schedule is available this will be submitted to the DMRE for approval. It will also be at this time that a detailed waste management strategy will be developed for the management of waste rock and overburden in this area. Once this information is available the necessary Waste Management License and Water Use License will be applied for from the DMRE and DWS respectively.

2.b.v Project 4: Optimisation of Beneficiation and implementation of the Waste Management Hierarchy

2.b.v.1 Current Status

Current Beneficiation Plant

The facility to process iron ore is designed to process ROM ores from opencast pits located on South and North Mines. The Plant is located on the North Mine. See Figure 8 for a diagram of the iron ore beneficiation process at Beeshoek.

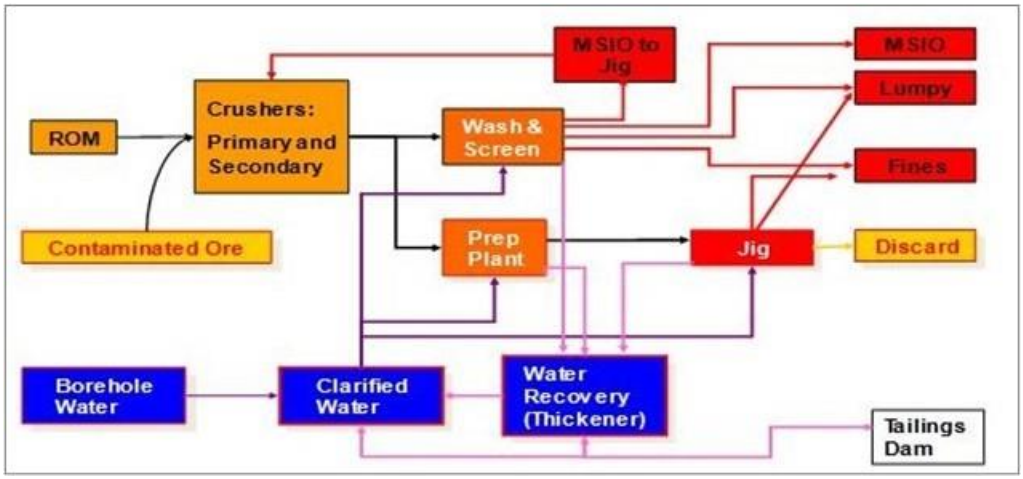


Figure 8: Iron Ore Beneficiation Process

The process is described in the sections below.

ROM Stockpiles

Iron ore rich material removed from the opencast operations are stored on ROM Stockpiles (both on-grade and off-grade) on site. ROM Stockpiles (please refer to the following table for a list of these) are processed through the Plant process. The on-grade and off-grade material are blended when required to meet the specific market requirements.

Table 17: ROM Stockpiles

Name	Description	Farm Name	Farm Portion	South	East
Off-grade Waste Dump 1, 2 and 3	South Contaminated ROM 1	Olynfontein 475	4	28° 19' 1.487" S	22° 59' 57.711" E
	South Contaminated ROM 2 (including BIS)	Olynfontein 475	4	28° 19' 17.636" S	23° 0' 8.749" E
	South Off-grade ROM 1	Beesthoek 448	RE 0	28° 18' 54.499" S	23° 0' 19.721" E
ROM Stockpile	South ROM Stockpile 1	Beesthoek 448	RE 0	28° 18' 55.383" S	23° 0' 2.324" E
South ROM Stockpile 2	Village ROM Stockpile	Beesthoek 448	RE 0	28° 18' 54.90" S	22° 59' 25.88" E
South Off-grade ROM 2	Village ROM Stockpile	Beesthoek 448	RE 0	28° 18' 40.23" S	22° 59' 48.08" E
North Off-grade ROM 1	ROM Stockpiles	Beesthoek 448	1	28° 17' 33.46" S	23° 0'22.67" E
BIS ROM North 1	ROM Stockpiles	Beesthoek 448	1	28° 17' 40.35" S	23° 0' 53.51" E
BIS ROM North 2	ROM Stockpiles	Beesthoek 448	1	28° 16' 57.23" S	23° 1' 5.97" E
North ROM Stockpile	Stockpiles	Beesthoek 448	1	28° 16' 39.3" S	23° 0' 11.6" E

Primary Crushing

At Beeshoek, there are two primary processing areas, consisting of one primary and one secondary crusher, namely South Mine Crushing and North Mine Crushing, where two stages of crushing take place.

At the Primary Crusher ore is crushed down to -200mm and at the Secondary Crusher it is further reduced to -80mm. In case of on-grade (ROM) ore feed, the secondary product is fed to the Washing and Screening Plant and contaminated ore or off-grade ore feeds, where beneficiation is needed, to the Jig Plant.

From the South Mine Crushing, ore is conveyed via an overland conveyor system to stockpiles at the Plant area on North Mine.

Washing and Screening Plant

The ROM feed is washed and sized into a lumpy fraction (+6mm – 32mm), MS product (+6mm – 18mm) and a fines fraction (+0.5mm – 6mm). The primary screens oversize (+32mm) is conveyed to three tertiary crushers in closed circuit with the primary screens.

Preparation Plant

The contaminated/ off-grade ore feed is washed and sized into a lumpy fraction (+8mm – 25/32mm) and a fines fraction (+0.5mm – 8mm) prior to being conveyed to the Jig Plant. The screen oversize is conveyed to a tertiary crusher in closed circuit with the screens.

Current Jig Plant

The lumpy and fines fractions from the preparation plant are beneficiated in two separate streams by gravity separation utilising Jigs. The sinks products are recovered and de-watered via bucket elevators and conveyed to the lumpy (+8mm – 25/32mm) and fines (+0.5mm – 8mm) product stockpiles.

The floats products (discard/ rejects) are de-watered over vibrating screens and conveyed to the GF Opencast Pit for disposal by spreader conveyor.

Product Stockpiles

Once the ROM has been processed, the final product is stockpiled within a designated footprint around the Plant area. Please refer to the following table for a list of stockpiles.

Table 18: Product Stockpiles

Name	Definition	Centre Coordinate	Commencement of Reworking
North Mine			
In-Plant Stockpiles	Product – not a Waste Product	28° 17' 20.9" S; 22° 59' 58.6" E	Ongoing, part of process, not a waste
Plant Stockpiles	Product – not a Waste Product	28° 16' 51.18" S; 23° 0' 3.31" E	Ongoing, part of process, not a waste

Water Recovery/ Tailings Disposal

The water recovery consists of a Jig De-grit Cyclone Facility, a 90m diameter Traction Thickener, a plant water reticulation system, the existing Washing and Screening Plant de-grit circuit (upgraded) and the tailings disposal and water recovery facility.

Existing Washing and Screening Plant wash water and the Jig Plant wash water is de-gritted by their respective cyclone facilities. Cyclone underflow is pumped to the Thickener for water recovery and overflow is utilised in the process again.

The Thickener has been sized such that the clarified overflow water solids content shall not exceed 25g/L which is within the required specification for the Humboldt Jig Plant.

The underflow tailings slurry is pumped to the Slimes Dam where further water recovery will take place.

Tailings water is again pumped back to the Thickener. Provision has been made to dilute the underflow tailings slurry to the correct design density for pumping.

Clarified Water Dam

The Clarified Water Reservoir of 2 000m^3 provides surge capacity for all incoming make up water and the clarified water from the Thickener. This installation replaced the previous ground dam and therefore reduced the water loss attributed to the leaks from this facility. This reservoir is the source of all process wash water for the Pant area.

Legalities in terms of Mine Residue Remining

Additional iron ore is available in the contaminated dumps on the mine site and these will be reworked to meet the mine's remaining planned life of mine. The 2004 EMP states clearly that the mine residue present on site or produced by the mine can be categorised as follows:

- Waste material: products that cannot be sold and which are deposited separately as such or used as backfill;
- Non-saleable material: Product which cannot be marketed in its present form but which through treatment could become saleable;
- Contaminated material: "impure" product stockpiled separate for beneficiation to render it marketable; and
- Discard: Waste material from the on-site iron ore beneficiation plant is discarded on a designated Discard Dump for reuse.

The 2004 EMP further explained the mines intention to rework all contaminated iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation. Reworking relates to the following dumps: - Dumps labelled on Drawings 5540-001 and 5540-002 as CD-N1 (this is the current Waste Rock Dump North Area) and CD-S1 (this is the current Contaminated ROM Dump on south mine) respectively (see attached).

In Section 1.7.3 of the new order (aligned) EIA/EMP, 2009 the Estimated Reserves are discussed. It states that: Additional iron ore is available in the contaminated dumps on the mine site and these will be reworked to meet the mine's remaining planned life of mine. The specific contaminated dumps are not stipulated in this EMP, and therefore when referring to the definition of contaminated material in the 2004 EMP as presented above, this will depend on the nature of the material and grade which will render it marketable. The EMP further commits in Section 7.3.2 to "Rework all the contaminated iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation."

In terms of the NEMWA, and associated regulations which came into effect on 24 July 2015, which included Mine Residue Stockpiles as listed Waste Management Activities, all such activities that commenced prior to 24 July 2015, may be regarded as lawful and need not be authorised (regulation 7(1) of GN 921 contains the relevant transitional requirements). Prior to the NEM:WA Regulations of 2015, the reclamation of residue for re-use did not require EMP amendments, as it fell within the definition of mining (as defined in the MPRDA), especially in this instance where no separate infrastructure (e.g. crushing plants) was constructed that had to be reflected in the EMPs.

The Mine Residue Stockpiles directly listed in the EMPs (2004) for reworking includes:

- Waste Rock Dump North Area; and
- Contaminated ROM Dump South Mine.

The Mine Residue Stockpiles which have been earmarked for rework as Contaminated Stockpiles (when considering the 2009 EMP Definition) are:

- Contaminated ROM Dump North Mine; and
- All off-grade ROM Stockpiles.

The Mine Residue Stockpiles, which have been reworked prior to the inclusion of Mine Residue Stockpiles into the NEM:WA on 24 July 2015, include:

- Discard Dump, North Mine (need information on commencement of reworking) – commenced during 2005 at which time the reworking started at 2106 tons/annum. In 2013, this volume increased to 69 107tons per annum. As of 30 May 2017, 12 769 tons has been reworked; and
- Slimes Dam, North Mine – reworking of this material commenced during 2012 (please refer to figures provided by the Licence Holder).

Figure 9: Mining of the Slimes Dam

According to a legal enquiry submitted to the DMRE on 26 July 2017 the following is noted:

> Firstly, regarding the remining of residue deposits and stockpiles, the following must be noted. Section 1 of NEM:WA defines residue deposits and stockpiles in relation to the definition provided for in the MPRDA.
>
> The MPRDA defines residue stockpile as ***"any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, beneficiation plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated for potential re-use, or which is disposed of, by the holder of a mining right, mining permit, production right or an old order right"***.
>
> (own emphasis)
>
> In addition to the above, please note that Schedule 3 of the NEM:WA expanded the definition of residue stockpile to – ***"any… discard… waste rock,… including historic mines and dumps created before the implementation of this Act"***.
>
> (own emphasis)
>
> It is also paramount to note the applicable transitional arrangements. Regulation 4 of the *NEM:WA: Amendments to the List of Waste Management Activities that Have, or are Likely to Have, a Detrimental Effect on the Environment* (GN R633 in GG 39020 of 24 July 2015) states that ***"an environmental management programme or plan approved in terms of the Mineral and Petroleum Resources Development Act, 2002 shall be deemed to have been approved and issued in terms of this Act."***
>
> Furthermore, Regulation 7(1) of the new NEM:WA Listing Notice states that ***"a person who lawfully conducts a waste management activity listed in this Schedule on the date of the coming into effect of this Notice may continue with the waste management activity…"***.
>
> Accordingly, activities which were/are approved in terms of the EMP must be deemed to be approved in terms of the NEM:WA.

The response by the DMRE was positive in this regard and the activities are considered lawful (please refer to Annexure 2) for the correspondence in this regard.

The following table presents the Mine Residue Stockpiles being reworked which are considered lawful:

Table 19: Reworking of Mine Residue Deposits

Name	Centre Coordinate
Waste Rock Dump North Area (including BIS)	28° 17' 34.2" S; 23° 0' 32.7" E
South Contaminated ROM 1	28° 19' 1.48" S; 22° 59' 57.711" E

Name	Centre Coordinate
South Contaminated ROM 2 (including BIS)	28° 19' 17.63" S; 23° 0' 8.74" E
South Off-Grade ROM 1	28° 18' 54.49" S; 23° 0' 19.72" E
Contaminated ROM Dump North Mine	28°17'33.46"S; 23° 0'22.67"E
Village Off-Grade ROM 2	28°18'40.23"S; 22°59'48.08"E
Discard Dump, North Mine	28° 17' 12.7" S; 23° 0' 21.5" E

Depending on the economies of scale the tests on mine residue may proof viable for the reworking of such activities. In order to determine the lawfulness for the reworking of Mine Residue on site, especially considering the NEM:WA' regulation of the reworking of Mine Waste. It should be made clear that any reclamation of residue stockpiles (as defined in the MPRDA), after 24 July 2015 must be licensed in terms of the NEM:WA Regulations.

2.b.v.2 Proposed Project

Beeshoek Mine has identified the opportunity to recover and economically beneficiate existing and arising low-grade resources.

The intent being the construction, commissioning and bringing into production two additional beneficiation sections capable of processing ≈ 520tph of material to produce ≈ 1Mtpa of export quality sinter fines product.

The proposed Beeshoek Low-Grade Beneficiation Optimisation Project is to allow Beeshoek Mine to optimise the mining process and reduce mineral waste on site (in line with the National Waste Management Hierarchy), by implementing two additional Beneficiation Projects, namely a new WHIMS Plant to rework the existing slimes from the Slimes Dam and a new Jig Plant to rework the existing low-grade stockpile (Discard Dump). This project will have numerous economic and environmental benefits.

The Mine Residue Stockpiles directly listed in the EMP (2004) for reworking includes:

- WRD North Area; and
- Contaminated ROM Dump South Mine.

The Mine Residue Stockpiles which have been earmarked for rework as Contaminated Stockpiles (when considering the 2009 EMP definition) are:

- Contaminated ROM Dump North Mine; and
- All off-grade ROM Stockpiles.

The Mine Residue Stockpiles which have been reworked prior to the inclusion of Mine Residue Stockpiles into the NEM:WA on 24 July 2015 include:

- Discard Dump, North Mine – commenced during 2005; and
- Slimes Dam, North Mine – reworking of this material commenced during 2012.

It is important to reiterate that according to a legal enquiry submitted to the DMRE (now DMRE) on 26 July 2017 the following is noted: The response by the DMRE, Kimberley was positive in this regard and the activities are considered lawful (please refer to Annexure 2 for the correspondence in this regard). This also is in line with the transitional arrangements associated with the MPRDA, NEMA and NEM:WA.

The primary objective is to reclaim the low grade ore from the existing Discard Dump and Slimes Dam through a dry mining process and haul the material to the allocated beneficiation plant's staging areas.

The beneficiation plants will then process the material to produce a fines product at ≥ 63.5%Fe quality within the fine product requirements.

The aim is to liberate (crush), wash, screen, and beneficiate the available -32mm +1mm and -1mm LG size fractions from the LGSP and TSF as well as similar material arising from the existing processing plant to produce a ≥ 63.5%Fe, thus maximising the available resource utilisation and recovery.

The product will be blended with the current fines product (-8mm +1mm) from the existing jig plant and on-grade washing screening sections.

The project is for two (2) new processing plants that will support maximizing the life of mine (LOM) for Beeshoek within current product contract specifications thereby keeping operations at a sustainable 2,8 Mtpa total product with the new low grade beneficiation sections contributing 1 Mtpa of product to the 2.8 Mtpa total product stream.

The project includes making use of known beneficiation solutions and technologies. The recommended process flow sheet developed by Beeshoek includes jigging technology, high pressure grinding rolls (HPGR) for crushing lumpy material, wet high

intensity magnetic separation (WHIMS) for the recovery of the super fines product, and making use of optimal in-process water recovery technology to maximise the existing TSF operational life.

There is a high level of confidence in the technologies being considered to beneficiate the LG resources identified at Beeshoek. Test work using these technologies has confirmed a yield expectation of ≥ 40%.

Combined, the sections can process LG feed at 520tph with a minimum yield of 40% and 62% effective operating utilisation; i.e. operating up to 5400 hours per annum, providing an annual production output of 1Mtpa.

- WHIMS Plant
  - WHIMS Plant which will beneficiate slimes from the Slimes Dam and arising material from the existing Beeshoek Plant;
  - WHIMS Construction Laydown Area: approx. 1.5ha.
  - Within the laydown area, a 2 500m^2 Staging Stockpile comprising low grade feed material will be located. This will be a designed facility which will feed the WHIMS Plant. This material will be processed material (i.e. raw material) derived from the Tailings Storage Facility (Slimes Dam, a mineral waste) All waste (oversize from the Oversize Discard Bunker and slimes) will be disposed of onto the existing Slimes Dam and no new mine residue Stockpile will be developed.
  - WHIMS Plant footprint, including access road of 160m, no wider than 30m: approximately. 4ha.
  - WHIMS Plant Central Process Water Dam: 0.4ha, capacity planned at 5 000m^3.
  - WHIMS Plant Clarifier: tank diameter 56m, capacity 9 700m^3.
  - WHIMS Plant Emergency Product Stockpile: 21m^2 within WHIMS Plant footprint area.
  - WHIMS 1mm Product Stockpile: 300m^2 within the WHIMS Plant footprint area.
  - Tailings Pipeline HDPE: 315mm diameter at 750m^3/hr (208.3l/s):
    - 1.1km (new WHIMS Plant clarifier to northern perimeter of Slimes Dam;
    - 1.4km (new WHIMS Plant clarifier to southern perimeter of Slimes Dam; and
    - existing pipeline of 1.3km to be rerouted from existing thickener directly to the new WHIMS Plant.
  - Return Water Pipeline HDPE, 280mm diameter at 400m^3/hr (111l/s): - 1.1km (re-routing of existing pipeline from Tailings Storage Facility (Slimes Dam) to Whims Plant clarifier).
  - Process Water Pipelines: 350mm diameter - 1.3km (replacement of existing pipeline with new pipeline from Central Water Dam to new Process Water Tank (2 000m^3) adjacent to existing Clarifier).
  - Water from Central Process Dam to Existing Beeshoek Plant: 200mm mild steel – 1.3km at 400m^3/hr (111l/s).
  - New potable water pipeline 140mm diameter - 1.6km 100 m^3/hr (28l/s) from steel potable water tank (100m^3) at the new Jigs Plant to combined steel potable water/fire water tank (approximately 1 000m^3, still to be confirmed pending final designs) at WHIMS Plant.
  - Process water tank (1000m^3) adjacent to new WHIMS Plant Clarifier. and
  - Overland Powerline: 22kV powerline approx. 700m in length.
- Jig Plant
  - New Jig Plant footprint: approx. 2.6ha.
  - New Jig Plant Construction Laydown Area: 2ha on existing Discard Stockpile footprint.
  - Feed from the existing Discard Dump (low-grade material fed into a loading bin by means of front end loaders and conveyed to the Washing and Screening Plant);
  - Washing and Screening Plant;
  - Crusher building containing a high pressure grind roll (HPGR) crusher;
  - Jig located in the Jig building;
  - MCC and transformer bay;
  - Re-routed existing water pipelines (buried, internal diameter 450mm);
  - Slurry from the new Jig Plant will be pumped to the existing Plant Thickener;
  - New process water tank (located near existing Plant Thickener) – 2,000m^3 (this forms part of project 5).
  - Stockpiles [comprising of both material from the Discard Dump (also referred to as a Low Grade Stockpile] and arising low grade material from the existing Jig Beneficiation Plant). The stockpiles created from material reclaimed from the existing Low Grade Stockpile (Discard Dump) and the stockpile created with the arising material (low grade) from the existing Jig Beneficiation Plant are intermediate stockpiles created within the footprint of the existing Discard Dump (the Low Grade Intermediate Stockpile and the Arising Stockpile). Material from these intermediate stockpiles is transported to and fed into the new Jig Plant loading bin located south of the existing Low Grade Stockpile. Low low grade material from the new Jig

Plant is then conveyed back to the Low Grade Stockpile footprint, deposited onto the ground and then moved back towards the existing Discard Dump. The three (3) stockpiles associated with the new Jig Plant includes the following:

- Low Grade -32+1mm Stockpile (Intermediate) (0,5ha) located between the existing Low Grade Stockpile (Discard Dump) and the new Jig Plant loading bin on the existing Low Grade Stockpile foot print. Low grade material transported to and from the intermediate stockpile by means of front end loaders.
- Arising -32+1mm Stockpile (Intermediate) (0.6ha) located between the to be constructed arisings conveyor discharge position and the new Jig Plant loading bin and within the existing Low Grade Stockpile footprint. Low grade material transported from the Arising -32+1mm Stockpile by means of front end loaders.
- Low low grade material from the new Jig Plant will be conveyed by means of earth moving equipment to positions adjoining the existing Discard Dump within the existing footprint (i.e. waste from the new Jig Plant to return to the approved Discard Dump footprint). No new stockpiles will be constructed outside of the demarcated Discard Dump or other Type 3 Stockpile footprints, these will however be demarcated as part of the EMPr and WUL processes. The area of the Low low Grade Dump (stockpile) (115m^2).

- New Jig Plant Conveyors:
  - Approx. 25m conveyor from existing plant conveyor system to feed Jig Plant with low grade arising material;
  - Approx. 330m conveyer to feed the new Jig Plant from Discard Dump to feed Discard feed bin.
- New Jig Plant Roads, which are all connected:
  - Road 1: 240m with a width of 30m.
  - New Jig Plant Road 2: 700m with a width of 30m.
  - Road 3: 280m with a width of 30m.
  - Road 4: 135m with a width of about 30m
  - Decommissioning of existing plant haul road: approximately 1000m in length and 30m wide.
- Overhead Powerline: 22kV powerline of approx. 620m;
- Rerouting of underground electrical cable: 22kV of approx. 380m.

Table 20: Beneficiation Project

Description	Footprint Size	Dimensions	Coordinates of activities triggering listing notices or WMLs	Listed Activities triggered
Project 4: Development of the Beneficiation Project which will comprise of a WHIMS Plant and Jig Plant at Beeshoek	WHIMS Plant o WHIMS Construction Laydown Area: approximately 1.5ha. o Within the laydown area, a 2 500m^2 Staging Stockpile comprising low grade feed material will be located. This material will be processed material (i.e. raw material) derived from the Slimes Dam. All waste (oversize and slimes) will be disposed of onto the existing Slimes Dam and no new Mine Residue Stockpile will be developed. o WHIMS Plant Clarifier with a capacity of 9 700m^3. o WHIMS Plant footprint, including access road of 160m in length (approximately 4ha). o WHIMS Plant Central Process Dam: 0.4ha, with capacity of 5 000m^3. o WHIMS Plant Emergency Product Stockpile: 21m^2 within WHIMS Plant footprint area. o WHIMS 1mm Product stockpile: 300m^2 within the WHIMS Plant footprint area.	WHIMS Plant: 13.2ha 1000m^3 Process Water Tank 9 700m^3 Clarifier 5000m^3 Central Process Water Dam 1000m^3 Potable/fire Water Tank Emergency Plant Stockpile (20m3 at any given time)	WHIMS Plant: 28°16'44.91"S; 23° 0'28.04"E Process Water Tank 28°16'41.88"S; 23° 0'24.32"E Clarifier 28°16'42.41"S; 23° 0'23.05"E Central Water Dam 28°16'37.00"S; 23° 0'23.00"E Potable/Fire Water Tank 28°16'41.50"S 23° 0'24.67"E Emergency Plant Stockpile 28°16'40.96"S; 23° 0'26.54"E	**Listing 1, Activity 10:** The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, 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—such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve. **Listing 1, Activity 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. **Listing 1, Activity 24**: The development of a road—with a reserve

Description	Footprint Size	Dimensions	Coordinates of activities triggering listing notices or WMLs	Listed Activities triggered
	○ Tailings Pipeline HDPE: 315mm diameter at 750m³/hr (208.3l/s): ▪ 1.1km pipeline from the WHIMS Plant Clarifier to the northern perimeter of Slimes Dam; ▪ 1.4km from the WHIMS Plant Clarifier to the southern perimeter of the Slimes Dam; and ▪ existing pipeline of 1.3km to be rerouted from the existing Beneficiation Plant Thickener directly to the WHIMS Plant. ○ Return Water Pipeline HDPE, 280mm diameter at 400m³/hr (111l/s): 1.1km (rerouting of existing pipeline from Slimes Dam to WHIMS Plant Clarifier). ○ Process Water Pipelines (throughput below 120l/s): 350mm diameter - 1.3km [replacement of existing pipeline with new pipeline from Central Water Dam to new Process Water Tank (2 000m³ – see project 5 below) adjacent to exiting Beneficiation Plant Clarifier]. ○ Water from Central Water Dam to existing Beeshoek Plant: 200mm mild steel – 1.3km at 400m³/hr (111l/s). ○ New potable water pipeline 140mm diameter – 1.6km in length with a throughput of 28l/s from the steel potable water tank (100m³) at the new Jig Plant to combined steel potable water/fire water tanks (approximately 1000m³) at the WHIMS Plant. ○ Overland Powerline: 22kV powerline of approximately 700m in length.	Staging Stockpile (capacity 6 000m³) 1mm Product Stockpile (capacity 1 000m³) Sewage Conservancy Tank of 6m³ Tailings Pipeline HDPE: 315mm diameter at 750m³/hr (208.3l/s): ▪ 1.1km northern perimeter to Slimes Dam; ▪ 1.4km southern perimeter to Slimes Dam; and ▪ existing pipeline of 1.3km to be rerouted directly to the WHIMS Plant.	Staging Stockpile: 28°16'38.53"S; 23° 0'26.85"E 1mm Product Stockpile 28°16'43.40"S; 23° 0'21.04"E Sewage Conservancy Tank 28°16'45.69"S; 23° 0'25.11"E Tailings Pipeline: 28°17'16.91"S; 23° 0'6.77"E 28°16'44.52"S; 23° 0'21.25"E 28°17'2.28"S; 23° 1'4.94"E	wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—which is 1 kilometre or shorter. **Listing 1, Activity 27**: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous **vegetation** is required for— except for the undertaking of a linear activity. **Listing Notice 1, Activity 34**: The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding— (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day.
	New Jig Plant ○ New Jig Plant footprint: approximately 2.6ha on already disturbed areas. ○ New Jig Plant Construction Laydown Area: 2ha on existing Discard Dump footprint. ○ Feed from the existing Discard Dump (low-grade material fed into a loading bin by means of front end loaders and conveyed to the Washing and Screening Plant); ○ Washing and Screening Plant; ○ Crusher building containing a high pressure grind roll (HPGR) crusher; ○ Jig located in the Jig building;	New JIG Plant: 20.6ha Plant Potable Water Tank 100m3 New Jig Plant Intermediate Low Grade Stockpile 0.4ha (5 500m³) Jig Plant Arising Stockpile	New JIG Plant: 28°17'25.89"S; 23° 0'25.15"E Potable Water Tank 28°17'23.76"S 23° 0'17.57"E New Jig Plant Intermediate Low Grade stockpile 28°17'18.70"S; 23° 0'35.48"E Jig Plant Arising Stockpile	**Listing 1, Activity 56**: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre—where the existing reserve is wider than 13,5 meters; or where no reserve exists, where the existing road is wider than 8 metres. **Listing 2, Activity 6**: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent. This will be specific to new dirty water tanks and new Process Water Dam.

Description	Footprint Size	Dimensions	Coordinates of activities triggering listing notices or WMLs	Listed Activities triggered
	○ MCC and transformer bay; ○ Re-routed existing water pipelines (buried, internal diameter 450mm); ○ Slurry from the new Jig Plant will be pumped to the existing Plant Thickener (no new activities triggered); ○ New process water tank (located near existing Plant Thickener) – 2,000m³ (this forms part of Project 5). ○ Stockpiles [comprising of both material from the Discard Dump (also referred to as a Low Grade Stockpile] and arising low grade material from the existing Jig Beneficiation Plant). The stockpiles created from material reclaimed from the existing Low Grade Stockpile (Discard Dump) and the stockpile created with the arising material (low grade) from the existing Jig Beneficiation Plant are intermediate stockpiles created within the footprint of the existing Discard Dump (the Low Grade Intermediate Stockpile and the Arising Stockpile). Material from these intermediate stockpiles is transported to and fed into the new Jig Plant loading bin located south of the existing Low Grade Stockpile. Low low grade material from the new Jig Plant is then conveyed back to the Low Grade Stockpile footprint, deposited onto the ground and then moved back towards the existing Discard Dump. The three (3) stockpiles associated with the new Jig Plant includes the following: ▪ Low Grade -32+1mm Stockpile (Intermediate) (0,5ha) located between the existing Low Grade Stockpile (Discard Dump) and the new Jig Plant loading bin on the existing Low Grade Stockpile foot print. Low grade material transported to and from the intermediate stockpile by means of front end loaders. ▪ Arising -32+1mm Stockpile (Intermediate) (0.6ha) located between the to be constructed arisings conveyor discharge position and the new Jig Plant loading bin and	0.3ha (6 000m³) Jig Plant Low Low Grade Stockpile 2ha (38m³) Sewage Conservancy Tank of 6m³ Jig Plant Road System: ▪ Road 1: 240m with a width of approx. 30m. ▪ Jig Plant Road 2: 700m with a width of approx. 30m. ▪ Road 3: 280m with a width of 30m. ▪ Road 4: 135m with a width of about 30m	28°17'17.17"S; 23° 0'31.32"E Jig Plant Low Low Grade Stockpile 28°17'20.21"S; 23° 0'18.30"E Sewage Conservancy Tank 28°17'24.69"S; 23° 0'17.49"E Road 1: 28°17'34.48"S; 23° 0'14.63"E 28°17'30.73"S; 23° 0'20.79"E Road 2: 28°17'26.71"S; 23° 0'17.52"E 28°17'37.24"S; 23° 0'37.02"E Road 3: 28°17'29.92"S; 23° 0'28.81"E 28°17'26.47"S; 23° 0'29.18"E Road 4: 28°17'31.76"S; 23° 0'34.55"E 28°17'24.44"S 23° 0'39.12"E	**Category B, Activity 15**: Category B, Activity 15: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which requires a prospecting right or mining right in terms of the MPRDA. This will be applicable at the WHIMS Plant for the new transfer and feed stockpiles (specifically the Staging Stockpile, which will be a designed facility), this will also be applicable to the Jig Arising and Low Low Grade Stockpile. The reworking of the discard, low grade material and slimes are existing approved activities on site in terms of the approved EMPr, 2009. However for the purposes of the application, these activities will be clearly described and listed. Note that the Jig Feed Stockpile (intermediate stockpile) will not trigger new WMLs as these will be placed on existing approved WRD footprints and are regarded as ROM feed stockpiles. All final discard will be deposited back onto the Discard Dump. However the Arising Stockpile and Low low grade stockpile will be regarded as new WMLs as these will be derived from the current Discard Dump. All final discard will be deposited back onto the Discard Dump. **Water Uses:** Section 21 (g) and (b) water uses WHIMS: 1000m³ Process Water Tank; 9 700m³ Clarifier; 5000m³ Central Process Water Dam; 1000m³ Potable/fire Water Tank; Emergency Plant Stockpile (20m3 at any given time), Staging Stockpile (capacity 6 000m³) and 1mm Product Stockpile (capacity 1 000m³), Sewage Conservancy Tank of 6m³. Jig: 100m³ Potable Water Tank, Intermediate Stockpile (capacity 5 500m³), Arising Stockpile (capacity 6 000m³) and Low low grade Stockpile (capacity 118m³), Sewage Conservancy Tank of 6m³.

Description	Footprint Size	Dimensions	Coordinates of activities triggering listing notices or WMLs	Listed Activities triggered
	within the existing Low Grade Stockpile footprint. Low grade material transported from the Arising -32+1mm Stockpile by means of front end loaders. ▪ Low low grade material from the new Jig Plant will be conveyed by means of earth moving equipment to positions adjoining the existing Discard Dump within the existing footprint (i.e. waste from the new Jig Plant to return to the approved Discard Dump footprint). No new stockpiles will be constructed outside of the demarcated Discard Dump or other Type 3 Stockpile footprints, these will however be demarcated as part of the EMPr and WUL processes. The area of the Low low Grade Dump (stockpile) (115m^2). o Jig Plant Conveyors: ▪ Approximately 25m conveyor from existing plant conveyor system to feed Jig Plant to transport arising low grade material and discard (not considered dangerous goods); ▪ Approx. 330m conveyer to feed the new Jig Plant from Discard Dump feed bin. ▪ This excludes in plant conveyors). o New Jig Plant Roads interlinked: ▪ Road 1: 240m with a width of 30m. ▪ New Jig Plant Road 2: 700m with a width of 30m. ▪ Road 3: 280m with a width of 30m. ▪ Road 4: 135m with a width of about 30m ▪ Decommissioning of existing haul road: approximately 1000m in length and 30m wide. ▪ (this excludes roads to be constructed on the Plant terraces). o Overhead Powerline: 22kV powerline of approx. 620m. o Rerouting of underground electrical cable: 22kV of approx. 380m. Power supply will comprise of 22kV powerlines. Electricity will be sourced from the existing Beeshoek Substation. Minor upgrades will be undertaken within the footprint area of this substation and the feeding Eskom Substation, but no listed activities will be triggered in this regard. ▪ Clearance (potentially 5.6ha), note that the clearance associated with the road does not contribute to the listing activity for clearance.:			

Description	Footprint Size	Dimensions	Coordinates of activities triggering listing notices or WMLs	Listed Activities triggered
	○ Road 1 – potential clearance of 0.1ha (considered disturbed area). ○ WHIMS Laydown Area: approximately 1.5ha. ○ WHIMS Plant footprint, including access road of 160m: approximately 4ha. WHIMS Plant Central Process Water Dam: 0.4ha, capacity less than 50 000m^3.			

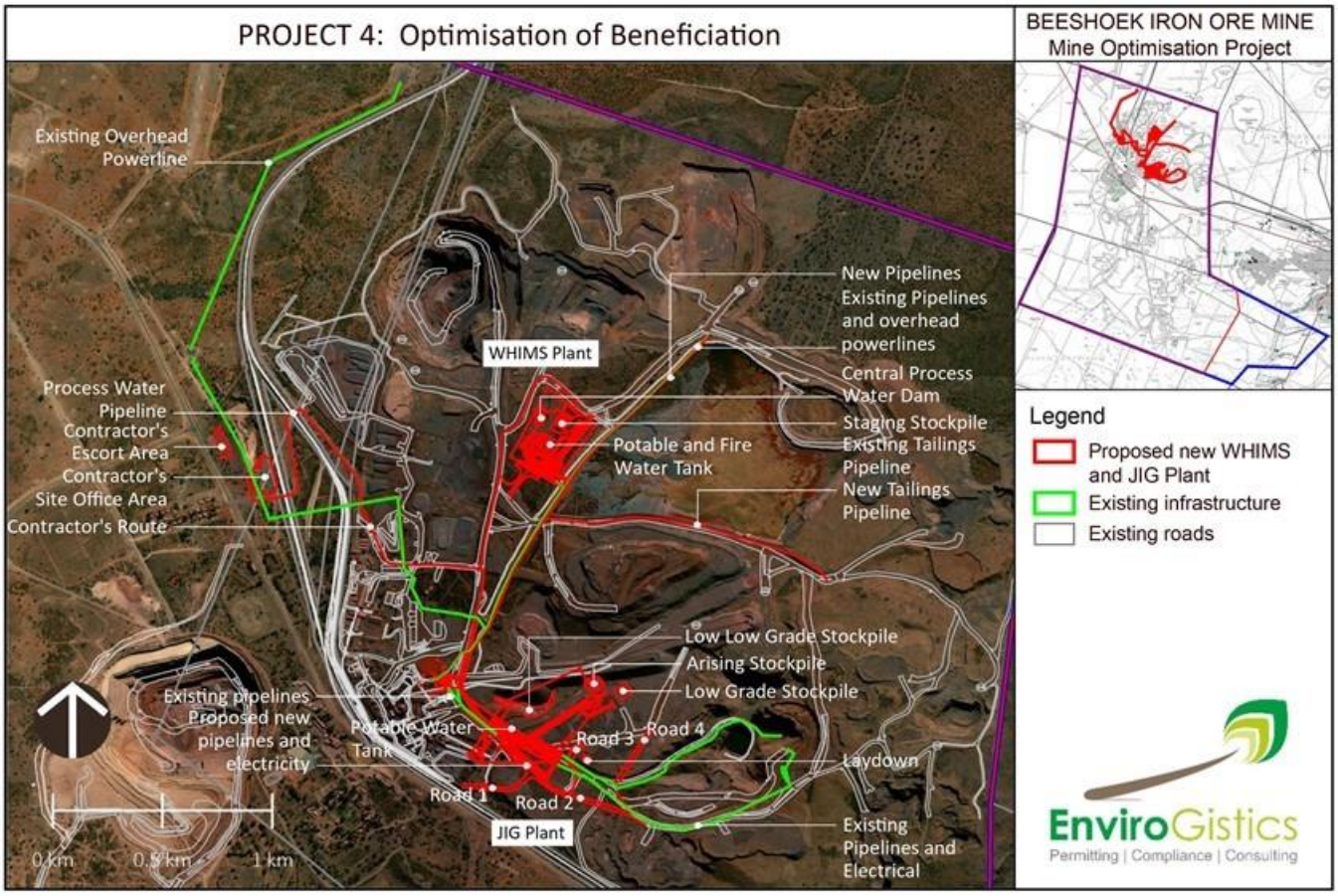


Figure 10: WHIMS and JIG Plant

2.b.vi Project 5: Water Management

2.b.vi.1 Current Status

2.b.vi.1.a Potable and Process Water

Potable water for use by the mine is obtained from various boreholes on site. Boreholes are licensed for domestic supply and others for both domestic and process water supply, as well as for the purposes of dewatering for safe mining conditions.

Twelve boreholes are licensed in the WUL, 2018 to abstract a total volume of 5 655 371m^3/a. Of these boreholes, five are licensed for dewatering specifically (of which two are in-pit dewatering). The mine plans to add the HF Pit Borehole (WG74) currently licensed for potable water supply as a dewatering borehole for the HF Opencast Pit in the near future. This intercepted groundwater forms part of the mine's clean water circuit.

The potable water is collected in two concrete reservoirs at the entrance to the southern mining area where the water is disinfected for further distribution on the mine site. With the addition of the new water balance components, there are 11 clean water dams included in the WUL (this excludes the two fire water tanks). Most of these dams are not used to store water on a daily basis, but only to transfer water from where groundwater is abstracted to where it is required for use.

2.b.vi.1.b Water Storage Areas

Clean Water Storage

Clean water resources at the mine include:

- Water dewatered directly from groundwater; and
- Water obtained from the Vaal Gamagara Water Supply Scheme (only utilised when the need arises).

The mine is operating within an internal closed water circuit.

Beeshoek is authorised to store water in various tanks (steel and plastic) on site. The water is sourced from the main water supply systems (either the supply boreholes or the pipeline scheme). Dams currently approved for clean water storage include the:

- Airfield Tank;
- Dam D94 and Dam D92 (previously known as the Golf course dam)
- Dam D96 (also known as the Tommy's Field Tank),
- Dam 301A and 301B (also known as Midsouth 3 Tanks);
- Dam D300 (also known as Mid-South 1 Tanks);
- Dam D90 (also known as Main Reservoir);
- Dam D91 (also known as Main Reservoir);
- Dam D97 (also known as the Uitsig Tank); and
- Tank 25KT02A &B.

Dirty Water Storage

Dirty water on site includes:

- Water runoff from Plant and workshop areas;
- Water circulated through the Plant, Thickener, Clarifier and Slimes Dam process; and
- In-pit water dewatering.

Limited dams are used to manage water on the mine and include:

- Blou Dam (Dam D86);
- South Evaporation Ponds;
- Tank 26TK01A & B (also known as the BN Dam);
- Clarifier and Thickener System; and
- Storm Water Dam North.

Beeshoek operates on the strategy of maximising the utilisation of "dirty water" in the mining area and has a policy of zero discharge of contaminated water to the environment.

2.b.vi.2 Proposed Project

The mine will establish additional water storage tanks on site which will include:

- A new storage tank near the exiting BN Tank of 500m^3. The purpose is to provide sufficient storage space for water from the approved in-pit dewatering activities;
- 4x 10m^3 plastic tanks at the current Beneficiation Plant, to assist with day to day operational water transfer and use;
- 1 x 2000m^3 process water tank adjacent to the existing Clarifier connected with a "balancing pipe". To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay;
- Existing Dam: Steel Dam 250m^3 capacity to store process water and allow for the storage of top-up water;
- Existing Dam: Zinc Dam: 90m^3 capacity to store input water where required;
- A new dewatering tank at the Village Opencast Pit.

Table 21: Water Management Project

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Project 5: Water Management	A new storage tank near the existing BN Tank of 500m³ . The purpose is to provide sufficient storage space for water from the approved in-pit dewatering activities.	Steel or Cement above ground tank of 500m³ .	BN Storage Dam: 28°16'45.25"S; 22°59'56.60"E	**Listing 1,** Activity 9: The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—with an internal diameter of 0,36 metres or more; or with a peak throughput of 120 litres per second or more.
	4x 10m³ plastic tanks at the existing clarifier, thickener area. To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay;	4x 10m³ plastic tanks at the current Beneficiation Plant	4x 10m³ plastic tanks: 28°17'17.67"S 23° 0'7.22"E	**Listing Notice 1,** Activity 10: The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, 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.
	1 x 2000m³ process water tank adjacent to the existing Clarifier connected with a "balancing pipe". To allow for the storage of water in the water balance system of the mine to capacitate the plant process to start up without delay.	1 x 2000 m³ at the existing clarifier, thickener area.	2000m³ Process Water Tank: 28°17'17.34"S 23° 0'9.11"E	
	Existing Dam: Steel Dam with 250m³ capacity to store process water and allow for the storage of top-up water.	Existing Dam: Steel Dam 250m³ capacity.	Steel Dam: 28°17'42.61"S; 23° 0'15.78"E	**Listing Notice 2**, Activity 6: The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.
	Existing Dam: Zinc Dam: with 90m³ capacity to store input water where required.	Existing Dam: Zinc Dam: 90m³ capacity to store input water where required.	Zinc Dam: 28°17'22.94"S; 23° 0'5.33"E	**Water Uses:** Section 21g for the storage tanks and 2000m³ Process Water Tank.
	A new dewatering tank at the Village Opencast Pit.	Tank to contain the dewatering from Village Opencast Pit for reuse in the mining processes: capacity 250m3.	Village Dewatering Tank: 28°17'32"S; 22° 59'46"E	

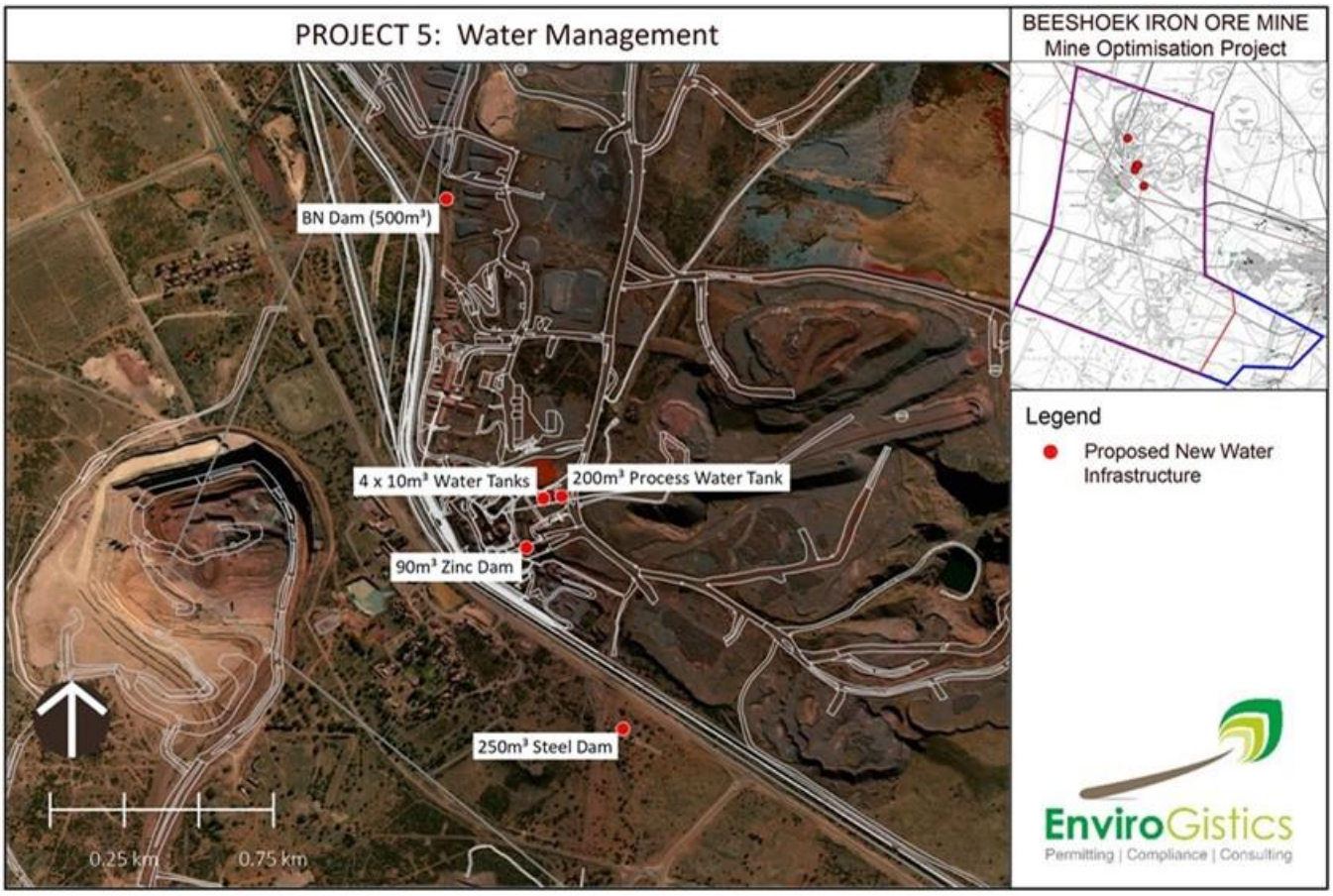


Figure 11: New Water Infrastructure

2.b.vii Project 6: Railway Line Link (TFR and Beeshoek Siding)

2.b.vii.1 Current Status

Beeshoek currently provides to external and internal markets via their rail load out facilities at Beeshoek. There are two rail load-out facilities at Beeshoek, with one handling Lumpy and DR, and one handling Fines. The railway siding is operated at a 24 hour, seven day a week process.

The Lumpy and DR stockpiles are reclaimed using feeders situated below the stockpile bed, which place the product on a reclaim conveyor, which then feeds the Lumpy/DR load-out conveyor system. Front-end loaders are utilized to draw material from the fines product stockpile and feed a hopper for the conveyance system feeding the Fines load-out.

The current siding allows for the following:

- 11 – 13 local trains per week, consisting out of 105 wagons loaded on average 63.5 tons per wagon
- 1 export train per week, consisting out of 114 wagons loaded on average 68.5 tons per wagon.

In 2010 / 2011 the rail facilities for Kolomela Mine and the corresponding direct link to the TFR Ore line were designed and constructed. The line was constructed to 30t axle load standards with an operational design allowing 342 wagon trains (3 rakes of 114 wagons) to be operated by Kolomela Mine via the use of a swingset rake (114 wagons).

The swingset principle allowed for a 4th rake to be preloaded and staged prior to the arrival of a train. With the arrival of an empty 342 wagon (3 rake) train, this meant that only 2 rakes (of 114 wagons) would have to be loaded before a recompiled 342 wagon (3 rake) train could depart thereby shortening the turnaround time of the train within the siding.

An option within the operational design was an allowance for Beeshoek Mine to make use of the swingset concept within the consist makeup. This would mean that Beeshoek could load one rake while Kolomela was loading the other 2 rakes and the required turnaround time could be met. It would also give Beeshoek mine direct access to the TFR Ore Line and export customers via Saldanha.

2.b.vii.2 Proposed Project

The Beeshoek Link Line Feasibility Study aims to realise the above option and therefore the mine has investigated the options of linking Beeshoek to the TFR Ore line, via the existing Kolomela Direct Link. This in turn would allow Beeshoek Mie greater flexibility to also export ore through Saldanha port.

Negotiations with Transnet have not as of yet been concluded in terms of allocations, and for this reason the project is presented in this application as the best practical outcome.

The line will comprise a 2.8km main link line from the existing TFR Postmasburg line, crossing under the R385 regional tar road before linking to the existing TFR Yard that services Kolomela Mine. A gravel service road will be constructed within the planned link line servitude to allow for access where required.

The revised approach of TFR is to run trains with 3 rakes of 116 wagons, giving trains a total length of 348 wagons. For this reason the current operational concept is for Beeshoek to load a single train rake (116 wagons) to form part of a 3 rake train (348 wagons) which would be transported to Saldanha. The other 2 rakes of the train will be loaded by Kolomela. This concept is to be explored further as part of the study.

The project requirements will include:

- Overall Design:
  - Railway formation – 5.5m
  - Bulk fill – 5m
  - One service road – 4m
  - Buffer – 8m on each side
- TFR train design
  - 348 wagons (3 x 116 rakes)
  - 30t axle load
- Beeshoek Traffic
  - 1 x 116 rake (Saldanha traffic)
  - 30t axle loads

Table 22: Railway Line Project

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
Project 6: Development of a railway line and associated service road.	9ha (85 400m^2).	The line will comprise a 2.8km main link line of approximately 5.5m in width with a 5m bulk fill (varies along the alignment). The line will tie from the existing TFR Postmasburg line at the Beeshoek Iron Ore Mine, crossing over the road accessing Tommysfield Airport and thereafter under the R385 regional tar road before linking to the existing	Start: 28°16'19.94"S 22°59'39.38"E Middle: 28°16'1.50"S 22°59'14.44"E End: 28°16'20.22"S 22°58'46.92"E	**Listing Notice 1, Activity 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— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. **Listing 1, Activity 27**: The clearance of an area of 1 hectares 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 (likely only around the area of the bridge construction – although this could also be regarded infrastructure as part of the railway line system however in the event that it is required, this will not change the project scope).

Description	Footprint Size	Dimensions	Coordinates	Listed Activities triggered
		TFR Yard that services Kolomela Mine. Considering that one 4m access road will be constructed along the alignment with an 8m buffer on either side of the railway line, the approximate extent of the development is 9ha (85 400m^2).		**Listing 2: Activity 12**: The development of railway lines, stations or shunting yards excluding — (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in a mining area; or (iii) additional railway lines within the railway line reserve.

2.c Policy and Legislative Context

South Africa has a comprehensive environmental governance framework underpinned by an extensive array of environmental laws. The past years have evidenced the wholesale reform of South Africa's environmental legal framework under the guidance of the Constitution.

Historically, the mining industry in South Africa has not been subjected to comprehensive environmental regulation. However, in recent years, this has changed significantly and the industry is now required to comply with a multifaceted network of mining and environmental legislation. There are no shortages of policy and legal frameworks to ensure "responsible" mining in South Africa. The Minerals and Mining Policy for South Africa, 1998 affirmed that the State, as custodian of the nation's natural resources, will support mining development while maintaining and enhancing environmental awareness of the mining industry in accordance with national environmental policy, norms and standards.

The following table presents the key policy and legislative considerations as part of this application.

Table 23: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT
1. Constitution of the Republic of South Africa (Act No. 108 of 1996) Environmental legislation is shaped by the Bill of Rights of the Constitution of the Republic of South Africa ("**Constitution**"). Section 24 of the Constitution, known as the '**Environmental Right**', guarantees every person the right to an environment that is not harmful to their health or well-being; provides for the protection of the environment against pollution; and degradation and centres sustainable development as the cornerstone of South Africa's environmental law regime. This right is binding on the State and people, both natural and juristic. In fulfilment of its constitutional mandate to take reasonable legislative measures that gives effect to section 24 of the Constitution, the government has promulgated several environmental laws. These laws provide a legal framework that embodies internationally recognised legal principles. The principal act governing activities that affect the environment is NEMA. ***Applicability to the EIA Process*** The proposed project will allow for the optimisation of the mining activities and associated provision of economic injections into the local economic in terms of the multiplier effect, and job creation. However with the expansion of mining activities comes the obligation by the Licence Holder to ensure that it will not result in pollution and/or ecological degradation, and the activity is ecologically sustainable while promoting justifiable economic and social development.
2. National Environmental Management Act (Act No. 107 of 1998) (NEMA) In terms of sections 24(2) and 24D of NEMA the Minister of Environmental Affairs (now the Department of Environment, Forestry and Fisheries (DEFF)) promulgated certain activities that may not commence without an Environmental Authorisation. Activities promulgated in terms of GN 983 and GN 985 require a Basic Assessment process, while activities promulgated in terms of GN 984 require that a full Scoping and EIA process be conducted [GN 983, 984 and 985 promulgated under NEMA in Government Gazette (GG) 38282 of 4 December 2014 (as amended in 2017). The requirements for an EIA and EMPr are specified in Appendix 3 and Appendix 4 of GN 982 promulgated under NEMA in GG 38282 of 4 December 2014 (as amended in 2017) ("**2014 EIA Regulations**")]. Section 24C(2A) of NEMA indicates that where listed activities are directly related to the extraction and primary processing of a mineral or petroleum resource the Minister of Mineral Resources (now DMRE) is the Competent Authority or officials at the DMRE to whom he has delegated his authority, being the Regional Managers. ***Applicability to the EIA Process*** Various listed activities are triggered by the expansion activities planned as part of this project. For this reason an Environmental Authorisation in terms of the NEMA is required. A financial provision plan will also be developed as part of the EIA process and submitted with the EIAR and EMP. Section 28 of the NEMA places a duty of care on all persons to prevent, limit or remediate any pollution or degradation of the environment. This duty of care should be adhered to at all times during construction, operation and decommissioning of a project. Section 28 applies to all activities taking place, and not solely focused on the listed activities being applied for.
3. EIA Regulations (2014 EIA Regulations) Chapter 6 of the 2014 EIA Regulations provides for the requirements for Public Participation Processes (PPP), which must be carried out as part of the DMRE Application process. In terms of Regulations 21 and 23, the outcome of the PPP must be reported in this report submitted to the Competent Authorities. The PPP "*must give all potential or registered interested and affected parties, including the competent authority a period of at least 30 days to submit comments on each of the EMPr, scoping report and environmental impact assessment report, and where applicable the closure plan, as well as the report contemplated in regulation 32, if such reports or plans are submitted at different times*" (Regulation 40 (1)).

The PPP must also:

- provide access to all information that reasonably has or may have the potential to influence any decision regarding an application;
- involve consultation with the Competent Authorities, every state department that administers a law relating to the environment relevant to the application, all relevant organs of state and all potential, or where relevant, and registered Interested & Affected Parties (I&APs); and
- provide opportunity for I&APs to comment on reports and plans prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the Competent Authorities.

The process must include:

"*(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land.*

(2) Sub regulation (1) does not apply in respect of—

(a) linear activities;

(b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and

(c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014."

Applicability to the EIA Process

An integrated PPP will be undertaken for this process to make provision for the consultation process during the Application process.

4. NEMA Listed Activities (GN 983 and GN 984) 2014 as amended 2017

Regulation 54 (2) of the NEMA provides that "An application submitted after the commencement of these Regulations for an amendment of an Environmental Management Programme, issued in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), must be dealt with in terms of Part 1 or Part 2 of Chapter 5 of these Regulations".

Chapter 5 presents two avenues for amendment:

Part 1, Regulation 29: "An environmental authorisation may be amended by following the process prescribed in this Part if the amendment;

Will not change the scope of a valid environmental authorisation nor increase the level or nature of the impact, which impact was initially assessed and considered when the application was made for an environmental authorisation; or

Relates to the change of ownership or transfer of rights and obligations."

Part 2, Regulation 31 is applicable for the amendments where a change in scope occurs.

As presented in this report and the meeting held with the Department of Mineral Resources (DMRE, now DMRE) in June 2019, the mine has a number of EMPr's in place and would like to consolidate these to allow for one document which would result in an effective management programme on site.

Applicability to the EIA Process

Various listed activities are triggered by the expansion activities planned as part of this project. For this reason an Environmental Authorisation in terms of the NEMA is required.

A financial provision plan will be developed as part of the EIA process and submitted with the EIA Report and EMP.

Section 28 of the NEMA places a duty of care on all persons to prevent, limit or remediate any pollution or degradation of the environment. This duty of care should be adhered to at all times during construction, operation and decommissioning of a project. Section 28 applies to all activities taking place.

5. National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEMAQA)

The National Environmental Management: Air Quality Act (Act No. 39 of 2004) NEMAQA was promulgated to ensure the protection and regulation of air quality and provide measures that will prevent pollution and sustainability. Under NEMAQA, the Minister of Environmental Affairs (now DEFF) must identify substances in ambient air which present a threat to health, well-being or the environment and establish national standards for ambient air quality, including the permissible quantity or concentration of each substance in ambient air.

The following regulations promulgated under NEMAQA were considered for the project:

- Listed Activities and Associated Minimum Emission Standards, published under GN 893 in GG 37054 of 22 November 2013, which lists activities that could result in atmospheric emissions requiring an Atmospheric Emissions Licence before being undertaken. Examples of such activities include:
    - the use of combustion installations;
    - storage of petroleum products;
    - slag processes;
    - carbonisation and coal gasification;
    - mineral processing and
    - disposal of hazardous and general waste by way of incineration.
- National Dust Control Regulations published under GN827 in GG 36974 of 1 November 2013, which provide that an acceptable dust fallout rate for a non-residential area is considered more than 600mg/m^2/day but less than 1 200mg/m^2/day (30-day average), with maximum allowable two exceedances per year, provided these exceedances do not take place in consecutive months. Where the dust fallout rate is exceeded, a dust fall monitoring programme, as prescribed in terms of the Regulations, must include:
    - the establishment of a network of dust monitoring points using method ASTM D1739:1970 (or an equivalent standard), sufficient in number to establish the contribution to dust fallout in residential and non-residential areas near the premises, monitor identified or likely sensitive receptor locations, and establish the baseline dust fall for the district; and
- a schedule for submitting to the air quality officer dust fallout monitoring reports annually or at more frequent intervals if so, requested by the air quality officer.

Applicability to the EIA Process

The priority pollutants, as defined by the NEMAQA, are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), PM10 and PM2.5, carbon monoxide (CO), benzene (C_6H_6), lead (Pb) and ozone (O_3). On 01 November 2013 the legislated standards for dust fallout were promulgated in the form of the NEMAQA National Dust Control Regulations (GN 827, November 20133). These newly promulgated regulations are based on the SANS guidelines and present acceptable/allowable dust fallout rates for both residential and non-residential areas. Within the National Dust Control Regulations, conditions are provided for Dust Management Plans, as follows:

- Any person who has exceeded the standards must, within 3 months after submission of the monitoring report, develop and submit a dust management plan, as contemplated in the National Dust Control regulations, to the Air Quality Officer (AQO) for approval;
- The dust management plan must be implemented within a month of the date of approval; and
- An implementation progress report must be submitted to the AQO at agreed time intervals.

Importantly, Draft National Dust Control Regulations have been released for public comment in GN 517 of 2018. These regulations stipulate that the latest ASTM method (2010) must be applied to dust fallout monitoring in South Africa. This requirement has a number of implications, with key items including:

- Permission to exclude exceedances caused by non-anthropogenic sources;
- The latest ASTM requires samplers be installed with a wind shield, which has been proven to increase the accuracy of capturing dust fallout;
- All mining operations must implement a Dust Fallout (DFO) programme;
- Sample analysis must now also include soluble content of samples, no longer only limited to the insoluble content of samples, as is the case with the current regulations;
- Submission of dust fallout monitoring reports on a monthly basis to the relevant AQO;

- Current fallout levels compared to historic results for at least the previous four years (where available);
- All mining operations must implement a dust management plan; and
- Provide proof of the implementation of the dust management plan in the monthly monitoring reports.

6. National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) and related Legislation

In line with the Convention on Biological Diversity, the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) aims to legally provide for biodiversity conservation, sustainable use and equitable access and benefit sharing. NEMBA creates a basic legal framework for the formation of a national biodiversity strategy and action plan and identification of biodiversity hotspots and bio-regions, which may then be given legal recognition. It imposes obligations on landowners (state or private) regarding alien invasive species. It requires that provision is made by a site developer to remove any aliens which have been introduced to the site or are present on the site.

The NEMBA also provides for listing of threatened or protected ecosystems, in one of four categories: 'Critically Endangered (CR)', 'Endangered (EN)', 'Vulnerable (VU)' and 'Protected'. Threatened ecosystems are listed to reduce the rate of ecosystem and species extinction, by preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to conserve sites of exceptionally high conservation value.

National List of Ecosystems that are Threatened and in need of Protection (2011)

The NEMBA provides for the listing of threatened or protected ecosystems in one of four categories: 'Critically Endangered (CR)', 'Endangered (EN)', 'Vulnerable (VU)' and 'Protected'. Threatened ecosystems are listed in order to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems.

According to the National List of Threatened Terrestrial Ecosystems database (2011), the project area is not situated within any listed Threatened Ecosystems.

Threatened or Protected Species Regulations (2015)

The NEMBA provides for listing of Threatened or Protected Species (TOPS). If a species is listed as threatened, it must be further classified as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). In addition to these categories, protected species are defined as "any species which is of such high conservation value or national importance that it requires national protection". Species listed in this category may include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It should be noted that currently the 2007 Regulations are still in effect. The 2016 Regs (notice 255 of 2015) have to date not been promulgated. As such, below is listed species from both the 2007 (promulgated) and the 2015 (still draft) regs for TOPS.

From a floral perspective there are some species that were either on site or have the potential to occur on site.

From the 2007 ToPS:

- *Harpagophytum procumbens* – recorded within the mine
- *Hoodia gordinii* (unlikely but added as a precautionary measure)

From the 2015 ToPS:

- *Drimia sanguinea*

From a faunal perspective:

From the 2007 ToPS:

- *Opistophthalmus sp (*Burrowing Scorpion)
- *Ardeotis kori (*Kori Bustard)
- *Neotis ludwigii (*Ludwig's Bustard)
- *Harpactira sp (*Common Baboon Spiders)

- *Felis nigripes (*Black-footed Cat),
- *Vulpus chama (*Cape Fox)

From the 2015 ToPS:

- *Vulpus chama (*Cape Fox)
- *Neotis ludwigii (*Ludwig's Bustard)
- *Ardeotis kori (*Kori Bustard)
- *Felis nigripes (*Black-footed Cat),
- *Orycteropus afer (*Aardvark)
- *Otocyon megalotis (*Bat-eared Fox)

The initial site investigations have also via the screening report listed the following species for the Beeshoek Mine:

- *Neotis ludwigii (*Ludwig's Bustard)
- *Sagittarius serpentarius* (Secretarybird)

National Forests Act (Act No. 84 of 1998)

An updated list of protected tree species was published under section 12(1) (d) of the National Forests Act (Act No. 84 of 1998) on 6 December 2019. In terms of section 15(1) of this Act, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. No indigenous forests occur in the project area. Although it is true that there is no indigenous forest, the Act also *affords protection to a list of tree species, of which there were several. Notice of the list of protected tree species under the NFA (Government Gazette No. 41887). Species recorded on site:*

- *Boscia albitrunca*
- *Vachellia erioloba*

Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) (NCNCA)

This act provides a list of Specially Protected Species (Schedule 1) (Section 49[1] of the NCNCA) and Protected Species (Schedule 2) (Section 50[1] of the NCNCA) for the Northern Cape Province. These species are protected and always form part of the SCC assessment.

Species recorded on site:

- *Oxalis sp*
- *Boophone disticha*
- *Anacampseros filamentosa*
- *Babiana sp.*
- *Orbea lutea*
- *Aloe grandidentata*
- *Harpagophytum procumbens*

Permits from Department of Environment and Nature Conservation (DENC) and Department of Environment, Forestry and Fisheries (DEFF) should be obtained to remove, cut or destroy the above-mentioned protected species before any vegetation clearing may take place.

The mine is within the Griqualand West Centre (GWC) of plant endemism and has high potential to harbour endemic flora.

National Environmental Management: Protected Areas Act (NEMPAA; Act No. 57 of 2003)

The NEMPAA was promulgated in order to provide for (among other things) the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national Register of Protected Areas, and for the management of those areas in accordance with national norms and standards.

South African Protected Areas Database (SAPAD, 2020) and South African Conservation Areas Database (SACAD, 2020)

The primary function of protected areas is to ensure the conservation of habitats, environmental processes and species occurring within these ecosystems. The SAPAD and SACAD are Geographic Information System (GIS) inventories of all Protected and Conservation areas in South Africa. The Protected and Conservation Areas (PACA) database also includes data on privately owned protected areas. This Register comprises of all data required for the Register of Protected Areas (legally declared) as well as data on Conservation Areas (areas responsibly managed for biodiversity conservation but not legally declared as Protected Areas). None of these areas have been identified.

The National Protected Areas Expansion Strategy (NPAES; 2010)

Focus areas for land-based protected area expansion are large, intact and unfragmented areas of high importance for biodiversity representation and ecological persistence, suitable for the creation or expansion of large, protected areas. The focus areas were identified through a systematic biodiversity planning process undertaken as part of the development of the National Protected Area Expansion Strategy (NPAES, 2008). None of these areas have been identified.

Important Bird and Biodiversity Areas (IBA; 2015)

Various sites within the country have been identified as important for maintaining viable populations of endemic, range restricted and threatened bird species. The primary aim of the IBA programme is to ensure the long-term conservation of important avifaunal habitats. They also provide essential benefits to people, such as food, materials, water, climate regulation and flood attenuation, as well as opportunities for recreation and spiritual fulfilment. According to BirdLife South Africa, one-third of the 112 IBAs located within South Africa are under threat by invasive alien vegetation, habitat modification/ degradation and agricultural expansion (Marnewick et al., 2015). Further to this, 52% of IBAs fall outside formally Protected Areas, further complicating avian habitat conservation.

None of these areas have been identified.

Applicability to the EIA Process

Alien and Invasive Species Regulations (2020)

These regulations only come into force on 1 March 2021 (see GN 1100: National Environmental Management: Biodiversity Act (10/2004): Extension of commencement date of the Alien and Invasive Species Lists, 2020 and the Alien and Invasive Species Regulations, 2020)

The NEMBA Alien and Invasive Species Regulations (2020) aim to:

- Prevent the unauthorised introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur;
- Manage and control alien and invasive species, to prevent or minimise harm to the environment and biodiversity; and
- Eradicate alien and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien and invasive species categories according to the Alien and Invasive Species Regulations (2014) are as follows:

- Category 1a: Invasive species requiring compulsory control. Plants are to be removed and destroyed. Any Category 1a listed plants must be combatted or eradicated.
- Category 1b: Invasive species that require control by means of an invasive species management programme.
- Category 2: Invasive species that require a permit to carry out a restricted activity within an area, as specified in the permit. If an invasive species management programme has been developed, a person must control the listed invasive species in accordance with such a programme.
- Category 3: Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purpose of the regulation be considered to be a Category 1b Listed Invasive Species. If an invasive species management programme has been developed, a person must control the listed invasive species in accordance with such a programme.

The NEMBA Alien and Invasive Species Lists (2016) include national lists of invasive species to be read together with the Alien and Invasive Species Regulations (2020) A list of alien floral species recorded in the project area, including the applicable alien and invasive species categories will be included into the EIA Reporting and management measures are stipulated. Alien and Invasive Species Lists, 2020, to come into force on 1st March 2021.

There were several listed and non-listed alien species on site. These would need to be controlled as per the regulations. Some noteworthy (Category 1b) aliens included:

- *Pennisetum setaceum*
- *Opuntia ficus-indica*
- *Opuntia imbricata*
- *Argemone ochroleuca subsp. ochroleuca*

National Biodiversity Assessment (NBA; 2018)

The most recent National Biodiversity Assessment (NBA), dated 2018, is a collaborative effort to synthesise the best available science on South Africa's biodiversity. The NBA is used to inform policy in the biodiversity sector and other sectors that rely on or impact on natural resources, such as water, agriculture, mining and human settlements. The NBA provides information to help prioritise resources for managing and conserving biodiversity and provides context and information that underpins biodiversity inputs to land use planning processes (Skowno et al., 2019).

The three vegetation types associated with the Beeshoek mine all have a Least Concern conservation status and are currently Not Protected; however, all three are endemic vegetation types.

- Postmasburg Thornveld
- Kuruman Thornveld
- Kuruman Mountain Bushveld.

Mining and Biodiversity Guidelines (2012)

The Mining and Biodiversity Guidelines (2012) enables regulators, industry and practitioners to minimise the impact of mining on biodiversity and ecosystem services by promoting the sustainable development of mineral resources. Biodiversity priority areas (as per the guidelines), are likely to be sensitive to the impacts of mining and as such, should inform and influence spatial land use policies and plans for mining activities (DEA et al., 2013).

None of these areas have been identified.

2016 Northern Cape Critical Biodiversity Areas (NCDENC, 2016) dataset

Northern Cape Department of Environment and Nature Conservation. 2016 Northern Cape Critical Biodiversity Areas [Vector] 0. Available from the Biodiversity GIS website.

- Only two categories picked up in the database, ESAs and Other Natural Areas. No CBAs associated with the Beeshoek Mine area.

7. National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA)

The purpose of the NEMWA is to: assist in regulating waste management; ensure the protection of human health; and prevent pollution and environmental degradation through sound waste management principles and guidelines. It furthermore provides for:

- national norms and standards for regulating the management of waste by all spheres of government;
- licensing and control of waste management activities;
- remediation of contaminated land;
- a national waste information system; and
- provision for compliance and enforcement.

The NEM:WA defines waste broadly as "*any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be reused, recycled or recovered.*" It also regulates processing of mining residue deposits or stockpiles.

The NEM:WA imposes a general duty upon waste holders to take reasonable measures to avoid waste generation and, where this is impossible, to: minimise the toxicity and quantities of waste generated; reuse, reduce, recycle and recover waste; and ensure that it is treated and disposed of in an environmentally-sound way. Failure to do so is a criminal offence, with a maximum fine of R10 million or imprisonment of up to 10 years, or both.

It is necessary to hold a Waste Management Licence (WML) for defined waste management activities.

The Department of Environmental Affairs (DEA, now DEFF) promulgated the 2013 Waste Management Regulations, which provides that a WML is required for undertaking certain waste management activities ("**Waste Listed Activities**"). The Waste Listed Activities are separated into three categories, namely Category A, Category B and Category C. Category A and B Waste Listed Activities require a WML, for which either a Basic Assessment or an EIA process needs to be undertaken that complies with the 2014 EIA Regulations. The procedures for licensing Waste Listed Activities are stipulated in Chapter 5 of NEM:WA and are not applicable to this project.

Classification of certain waste streams is required in terms of the Waste Classification and Management Regulations, published in GN 634 of GG 36784 on 23 August 2013, to ensure that the correct waste management standards and disposal methods are implemented.

The National Norms and Standards for the Assessment of Waste for Landfill Disposal and the National Norms and Standards for the Disposal of Waste to Landfill (published under GN 635 and GN 636, respectively in GG 36784 of 23 August 2013) provide the norms and standards for disposal of waste to landfill. This includes liner requirements and design specifications.

In 2014 the National Environmental Management: Waste Amendment Act (Act No 25 of 2014) was promulgated to include residue deposits and residue stockpiles from:

- Mineral excavation;
- Physical and chemical processing of metalliferous minerals;
- Physical and chemical processing of non-metalliferous minerals; and
- Drilling operations.

Residue deposits are defined in the MPRDA as "*any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right*". Residue stockpiles, in turn, are defined in the MPRDA as "*any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, beneficiation plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated for potential re-use, or which is disposed of, by the holder of a mining right, mining permit, production right or an old order right*."

The Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits ("**Residue Regulations**"), published under GN 632 in GG 39020 of 24 July 2015, provide for the planning, management and reporting of residue stockpiles and residue deposits, which obligations include:

- The assessment of impacts and analyses of risks relating to the management of residue stockpiles;
- Residue deposits; characterisation of residue stockpiles and residue deposits;
- Classification of residue stockpiles and residue deposits;
- Investigation and the selection of site for residue stockpiling;
- Design of the residue stockpiles and residue deposits;
- Impact management;
- Duties of the holder of right or permit;
- Monitoring and reporting systems;
- Dust management and control; and
- Decommissioning, closure and post closure management requirements.

The Residue Regulations provide the tools for and correspond to the statutory provision relating to managing residue stockpiles and residue deposits in the manner prescribed in section 43A of the NEMWA.

Applicability to the EIA Process:

In terms of the existing WRD and reworking activities it should be noted that on 24 July 2015, GN 633 introduced transitional provisions that seek to regulate the transition of waste management at mines from an EMPr approved in terms of the MPRDA to a WML in terms of the NEMWA. In this regard the transitional provisions state that:

"An environmental management programme or plan approved in terms of the Mineral and Petroleum Resources Development Act, 2002 shall be deemed to have been approved and issued in terms of the NEMWA." (WML).

"The Minister responsible for mineral resources may direct any holder of a prospecting right, mining permit, mining right, exploration right, or production right, if he or she is of the opinion that the residue stockpile or residue deposit in question is likely to result in significant pollution, degradation or damage to the environment, to take such action to upgrade the environmental management programme or plan to address any deficiency in the environmental management programme or plan.

An environmental management programme or plan submitted in terms of the Mineral and Petroleum Resources Regulations, 2004 and which is pending when the Notice took effect, must despite the repeal of the Mineral and Petroleum Resources Regulations, 2004 be dispensed with in terms of the Mineral and Petroleum Resources Regulations, 2004 as if those regulations were not repealed."

In terms of the transitional arrangement the EMPr issued prior to the notice is deemed as a WML for Residue Stockpile and Deposits. The current reworking and concurrent backfilling, as well as the intended reworking thereof is therefore a lawful activity. The expansion of the various Waste Rock Dumps will necessitate the need for a Waste Management Licence

8. National Heritage Resources Act (Act No. 25 of 1999) (NHRA)

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999) ("**NHRA**"). The national enforcing authority for the NHRA is the South African Heritage Resources Agency ("**SAHRA**"). In terms of the NHRA, historically important features such as graves, archaeology and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection. In terms of section 38 of the NHRA, SAHRA can call for a heritage impact assessment ("**HIA**") for certain categories of development. The activities identified in the NHRA requiring notification to SAHRA include:

Section 38 states:

"(1) (a): The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;

(c): Any development or other activity which will change the character of a site

i. exceeding 5 000 m² in extent; or

ii. involving three or more existing erven or subdivisions thereof; or

iii. involving three or more erven or divisions thereof which have been consolidated within the past 5 years; or

iv. the costs of which will exceed a sum in terms of regulations by SAHRA or a provincial heritage resource authority."

The NHRA however makes provision for the assessment of heritage impacts as part of an EIA process and, if such an assessment is deemed adequate by SAHRA, a separate application for consent under the NHRA is not required.

Applicability to the EIA Process:

The project area is regarded as a high sensitivity for palaeontological themes and medium sensitivity for archaeological themes. For this reason specific specialist studies in this regard are conducted.

9. National Water Act (Act No. 36 of 1998) ("NWA")

The National Water Act (Act No. 36 of 1998) (NWA) is the primary regulatory legislation controlling and managing the use of water resources and pollution thereof. It provides for fundamental reformation of legislation relating to water resource use. The preamble to the NWA recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that water resources quality protection is necessary to ensure sustainability of the nation's water resources in the interests of all water users. The NWA's purpose is stated in section 2 and enforced by the DWS. Section 2 of the NWA relates to the following:

- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources; and

- Meeting international obligations.

The NWA presents strategies to facilitate sound management of water resources; provides for the protection of water resources; and regulates use of water by means of Catchment Management Agencies (CMAs), Water User Associations (WUAs), Advisory Committees and International Water Management. As the NWA is founded on the principle of trusteeship, the government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and industry (including mines) can only be entitled to use water if the use is permissible under the NWA.

In terms of section 21 of the NWA, certain consumptive and non-consumptive water uses are identified and can only commence once authorised. Where a water use constitutes a Scheduled 1 Use (permissible use without an authorization requirement); permissible water uses in terms of section 22 of the NWA; or is authorised in terms of a General Authorisation, a WUL is not required.

The NWA further requires that:

- a motivation in terms of section 27 be submitted as part of a Water Use Licence Application ("**WULA**").
- the necessary water uses application forms be compiled and submitted in support of the WULA;
- the requirements of GN 704 and detail surrounding these activities will be considered in the WULA; and
- an integrated waste and water management plan be submitted in support of the IWULA.

Applicability to the EIA Process:

- Various water uses are triggered by this project, which includes the construction of new Process Water Tanks, Central Dams, expansion of Waste Rock Dumps, potential increase in dewatering from Opencast Pits and the various ephemeral depression wetlands ('pans') present in this area.

<u>GN704 Exemption:</u>

GN 704 was promulgated in terms of section 26(1) of the NWA and specifically aimed at the protection of water resources associated with mining related activities. It provides minimum requirements which need to be adhered to for the protection of the water resources on a mine. GN 704 regulates the use of water, management of dirty and clean water infrastructure and related activities at mines. This includes minimum requirements for infrastructure that hold dirty water. A mine can apply for exemptions from these requirements and could be granted approval should sufficient management measures be put in place to ensure the protection of the environment. Regulation 4 of GN 704 places some restrictions in terms of the locality of certain infrastructure which could have an impact on water resources.

In terms of GN704 exemptions, the GN 704 Regulations relate to both existing and new water use activities and each section should be read and interpreted individually. It is recommended that exemption be applied for in terms of the GN 704 Regulations based on the nature of the activities.

<u>WULA Amendment Requirement:</u>

Various new water uses will be triggered which include:

- Expansion of WRD (Section 21(g));
- Dewatering for safe mining conditions (Section 21(j));
- Use of water on site (Section 21(a));
- Storage of clean water (Section 21(b));
- Storage of dirty water (Section 21(g));
- Impact on dry pans (Section 2 (c)&(i)).

Table 24: Current approved Water Uses and potential new Water uses (grey to be amended; green new uses) – this will be updated based on the pending Water Balance and Groundwater Specialist Studies

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Section 21(a) Uses												
BN Pit Dewatering	In pit dewatering for use in Mine processing and associated activities.	a&j		432 000m3/a	-	432 000	Beesthoek 448	1	~~28° 16' 14.231" S~~	~~23° 0' 9.816" E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**1**
WG28: Supply Borehole	WG28: Supply Borehole	a		97 474m3/a	-	97 474	Beesthoek 448	RE 0	28° 16' 22.155" S	22° 59' 43.749" E	No amendment required	**2**
~~WG66: Dewatering Borehole~~	~~WG66: Dewatering Borehole~~	~~a&j~~	~~-~~	~~19 4948m3/a~~	~~-~~	~~194948~~	~~Beesthoek 448~~	~~1~~	~~28° 16' 11.519" S~~	~~23° 0' 3.795" E~~	This borehole is no longer in use, and has been replaced by OW022 (BN Borehole	~~**3**~~
OW022 (BN Borehole)	Dewatering Borehole	a&j		-		135000	Beesthoek 448	1	-	-	Additional borehole requested to assist with dewatering of BN Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**3**
~~WG34: Supply Borehole~~	~~WG34: Supply Borehole~~	~~a~~	~~-~~	~~130 000m3/a~~	~~-~~	~~130 000~~	~~Olynfontein 475~~	~~4~~	~~28° 19' 4.781" S~~	~~22° 59' 20.095" E~~	This borehole is longer in use, and has been replaced by OW024)	**4**
~~WG35: Supply Borehole~~	~~West Pit Boreholes (WG34, WG35 & WG37) (replaced WG53 and 56)~~	~~a~~	~~-~~	~~260 000m3/a~~	~~-~~	~~260 000~~	~~Olynfontein 475~~	~~4~~	~~28° 19' 8.494" S~~	~~22° 59' 23.027" E~~	This borehole is longer in use, and has been replaced by OW023)	~~**5**~~
OW024 (WG 34 Replacement)	Supply borehole	a		-		130 000	Olynfontein 476	4	-	-	WG 34 is currently not pumping, should this borehole not be retrieved the mine will have to source alternative water which will result in the relocation of WG34. Abstraction volumes and Farm Portion to remain the same.	**4**
OW023 (WG 35 Replacement)	Supply borehole	a		-		260 000	Olynfontein 476	4	-	-	WG 35 is currently not pumping, should this borehole not be retrieved the mine will have to source alternative water which will result in the relocation of WG35. Abstraction volumes and Farm Portion to remain the same.	**5**
WG37: Supply Borehole	West Pit Boreholes (WG34, WG35 & WG37) (replaced WG53 and 56)	a		600 000m3/a	-	600 000	Olynfontein 475	4	28° 19' 12.560" S	22° 59' 23.724" E	No amendment required	**6**
WG 62: Supply Borehole	Supply Boreholes	a		759 339m3/a	-	600 000	Beesthoek 448	RE 0	28° 18' 3.851" S	23° 0' 3.393" E	Abstraction volume has been reduced.	**7**
Village Pit Dewatering	In pit dewatering for safe mining conditions and the use in mine processing and associated activities.	a&j		420 000m3/a	-	420 000	Beesthoek 448	RE 0	~~28° 17' 29.13" S~~	~~22° 59' 21.88" E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**8**
~~WG 12 (Village Dewatering)~~ WG75 (Village Dewatering)	Dewatering for safe mining conditions and use in mine processing and associated activities.	a&j		343 360m3/a	-	540 000	Beesthoek 448	RE 0	~~28°17'42.449"S~~	~~22°59'30.702"E~~	Name change requested and increased in dewatering volumes required. Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**9**
WG73: Dewatering Borehole	Village Pit Dewatering	a&j		1 900 000m3/a	-	600 000	Beesthoek 448	RE 0	~~28°17'58.41"S~~ ~~28°17'57.7" S~~	~~22°59'32.17"E~~ ~~22°59'32.4"E~~	Reduction in water abstraction volumes.	**10**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
											Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	
OW025 (Village Dewatering, West of Pit)	Dewatering borehole	a&j		-	-	160000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**11**
OW026 (Village Dewatering, East of Pit 1)	Dewatering borehole	a&j		-	-	50000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**12**
OW027 (Village Dewatering, East of Pit 2)	Dewatering borehole	a&j		-	-	50000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**13**
OW028 In-Pit borehole (Village Dewatering)	Dewatering borehole	a&j		-	-	160000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**14**
WG 70 Dewatering borehole	Village Pit Dewatering	a&j		-	-	200000	Beesthoek 448	RE 0	-	-	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**15**
WG27: Supply Borehole	Supply Boreholes	a		18 250m3/a	-	18250	Beesthoek 448	RE 0	28°16'1.06"S	22°59'19.60"E	No amendment required	**16**
WG74 (near HF Pit) - replace WG51 A&B and WG63	Supply Borehole	a&j		500 000m3/a	-	500000	Beesthoek 448	1	~~28°17'26.21"S~~	~~23°00'51.41"E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**17**
HF Pit Boreholes Additional borehole (OW029)	Pit dewatering	a		-	-	200000	BEESTHOEK 448	1	-	-	Additional borehole requested to assist with dewatering of HF Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**18**
HF Pit dewatering	In pit dewatering for safe mining conditions and the use in mine processing and associated activities	a&j		-	-	500000	BEESTHOEK 449	1	-	-	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**19**
Total (S21a)				**5 655 371m3**		**5 652 724**	No additional water abstraction required					

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Section 21(b)												

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Airfield Tank	Clean Water Storage Dams	b	5m³	63 764m3/a	5m³	63 764m3/a	Beesthoek 448	RE 0	28° 15' 59.118" S	22° 59' 26.310" E	No amendment required	1
Dam D 94	Clean Water Storage Dams	b	100m³	131 982m3/a	100m³	131 982m3/a	Beesthoek 448	Re 0	28° 18' 50.962" S	22° 59' 32.475" E	No amendment required	2
Dam D 96	Clean Water Storage Dams	b	16m³	97 474m3/a	16m³	97 474m3/a	Beesthoek 448	Re 0	28° 16' 26.291" S	22° 59' 43.561" E	No amendment required	3
Dam D 301 A	Clean Water Storage Dams (Sedibeng Water)	b	537m³	4 093 939m3/a	537m³	4 093 939m3/a	Beesthoek 448	Re 0	28° 18' 40.770" S	23° 0' 4.824" E	No amendment required	4
Dam 301 B	Clean Water Storage Dams (Sedibeng Water)	b	537m³	386 079m3/a	537m³	386 079m3/a	Beesthoek 448	Re 0	28° 18' 41.689" S	23° 0' 3.822" E	No amendment required	5
Dam D 300	Clean Water Storage Dams (East Pit Dewatering, as well as W34, W35 and W37)	b	454m³	1 088 600m3/a	454m³	1 088 600m3/a	Olynfontein 475	4	28° 19' 11.216" S	22° 59' 1.885" E	No amendment required	6
Dam D 90	Clean Water Storage Reservoirs	b	1 062m³	759 339m3/a	1 062m³	759 339m3/a	Beesthoek 448	Re 0	28° 17' 59.868" S	23° 0' 8.740" E	No amendment required	7
Dam D 91	Clean Water Storage Reservoirs	b	1 062m³	759 339m3/a	1 062m³	759 339m3/a	Beesthoek 448	Re 0	28° 18' 0.489" S	23° 0' 9.607" E	No amendment required	8
Dam D 97	Clean Water Storage Dams (Uitsig Tank)	b	28m³	97 474m3/a	28m³	97 474m3/a	Beesthoek 448	Re 0	28° 16' 50.593" S	22° 59' 29.297" E	No amendment required	9
Dam D 92	Clean Water Storage Dams	b	100m³	267 894m3/a	100m³	267 894m3/a	Beesthoek 448	Re 0	28° 17' 54.349" S	22° 59' 46.384" E	No amendment required	10
Tank 25TK02 a & b	Clean Water Storage Dams (HF and BN Pits Dewatering)	b	100m³	1 518 590m3/a	100m³	1 518 590m3/a	Beesthoek 448	1	28° 17' 32.469" S	23° 0' 35.663" E	No amendment required	11
			100m³	1 518 590m3/a	100m³	1 518 590m3/a					No amendment required	
Fire Water Tanks A	Water in the event of a fire.	b	-	-	2 579m3	Emergency use (throughput regarded as 0m3)	Beesthoek 448	1	28° 17' 20.19" S	23° 00' 06.1" E	New water use	12
Fire Water Tanks B	Water in the event of a fire.	b	-	-	2 579m3	Emergency use (throughput regarded as 0m3)	Beesthoek 448	1	28° 17' 20.0" S	23° 00' 06.54" E	New water use	13
WHIMS Potable/Fire Water Tank	Potable and Emergency Fire Water				1000m3	154 500m³/a (excluding fire water)	Beesthoek 448	1	28°16'41.50"S	23° 0'24.67"E	New water use	14
New Jig Plant Potable Water Tank	Potable Water				100m3	190 230m³/a	Beesthoek 448	1	28°17'23.76"S	23° 0'17.57"E	New water use	15

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	Throughput (m3/a or tonnes)						
Section 21(g)												

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Dam D 86 (Blou Dam)	Dirty Water Storage Dams	g	269m³	7 421 078m3/a	269m³	7 421 078m3/a	Beesthoek 448	1	28° 17' 8.068" S	23° 0' 15.131" E	No amendment required	**1**
Tank 26TK01 a&b	Dirty Water Storage Dams	g	100m³	225 418m3/a	100m³	225 418m3/a	Beesthoek 448	1	28° 16' 45.775" S	22° 59' 56.844" E	No amendment required	**2A**
			100m³	225 418m3/a	100m³	225 418m3/a	Beesthoek 448	1	28° 16' 45.775" S	22° 59' 56.844" E	No amendment required	**2B**
Thickener TH01	Dirty Water Storage Dams	g	23 000m³	7 522 316m3/a	23 000m³	7 522 316m3/a	Beesthoek 448	1	28° 17' 14.947" S	23° 0' 6.662" E	No amendment required	**3**
Clarifier Dam DD01	Dirty Water Storage Dams	g	2000m³	6 657 912m3/a	2000m³	6 657 912m3/a	Beesthoek 448	1	28° 17' 17.194" S	23° 0' 7.841" E	No amendment required	**4**
Storm Water Dam North	Dirty Water Storage Dams	g	15000m3	76 700m3/a	15000m3	76 700m3/a	Beesthoek 448	1	~~28°17'30.63"S~~ 28°17'28.83"S	~~22°59'46.48"E~~ 22°59'48.22"E	Minor coordinate adjustment to indicate centre point (as built)	**5**
South Evaporation Ponds	Dirty Water Storage Dams	g	1600m³	1 221m3/a	1600m³	1 221m3/a	Beesthoek 448	RE 0	28° 18' 48.5" S	23° 0' 11.0" E	No amendment required	**6**
Sewerage Sumps Portion 1 (North Crusher Workshop)	Disposal of domestic effluent into sewage sumps	g	10m³	662,5m3/a	10m³	684,50m3/a	Beesthoek 448	1	28° 17' 21.900" S	23° 0' 8.200" E	Name Specifications given to be included into the WUL.	**7**
Sewerage Sumps Portion 1 (North Crusher Workshop) (near Thickener Workshop)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 15.200" S	23° 0' 2.800" E		**8**
Sewerage Sumps Portion 1 (near Jig Plant)	Disposal of domestic effluent into sewage sumps	g	5m³		5m³		Beesthoek 448	1	28° 17' 18.382" S	23° 0' 1.296" E		**9**
Sewerage Sumps Portion 1 (near W&S Plant)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 25.900" S	23° 0' 2.500" E		**10**
Sewerage Sumps Portion 1 (near W&S Plant)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 25.200" S	23° 0' 1.800" E		**11**
Sewerage Sumps Portion 1 (near Plant Workshops)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 17.000" S	22° 59' 56.900" E		**12**
Sewerage Sumps Portion 1 (near Plant Workshops)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 13.400" S	22° 59' 56.900" E		**13**
Sewerage Sumps Portion 1 (near Plant Workshops)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 14.100" S	22° 59' 54.800" E		**14**
Sewerage Sumps Portion 1 (Stores)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 9.100" S	22° 59' 56.100" E		**15**
Sewerage Sumps Portion 1 (Stores)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 6.700" S	22° 59' 54.700" E		**16**
Sewerage Sumps Portion 1 (North Workshop)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 4.000" S	22° 59' 56.100" E		**17**
Sewerage Sumps Portion 1 (North Main Entrance)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 16' 57.800" S	22° 59' 57.100" E		**18**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
~~Sewerage Sumps Portion 1 (South Engineering Offices)~~	~~Disposal of domestic effluent into sewage sumps~~	~~g~~	~~20m³~~				~~Beesthoek 448~~	~~1~~	~~28° 18' 30.800" S~~	~~23° 0' 22.000" E~~	Sewerage Sumps Portion 1 (South Engineering Offices) incorrect portion - moved to portion RE (0)	
Sewerage Sumps Portion 1 (Wellness)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 31.100" S	22° 59' 57.400" E		19
Sewerage Sumps Portion 1 (Clinic)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 30.879" S	22° 59' 59.288" E		20
Sewerage Sumps Portion 1 (Main Security Office)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 32.025" S	22° 59' 59.401" E		21
Sewerage Sumps Portion 1 (Carwash)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	1	28° 17' 34.400" S	23° 0' 2.000" E		22
Sewerage Sumps Portion 1 (Oppikoppi Restaurant)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 47.925" S	23° 0' 6.115" E		23
Sewerage Sumps Portion 1 (Training Offices)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 25.800" S	22° 59' 48.600" E		24
Sewerage Sumps Portion 1 (Loadout)	Disposal of domestic effluent into sewage sumps	g	40m³		40m³		Beesthoek 448	1	28° 17' 17.200" S	22° 59' 45.600" E		25
Sewerage Sumps Portion 1 (Training Offices)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 16.800" S	22° 59' 46.600" E		26
Sewerage Sumps Portion 1 (Training Offices)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 16.600" S	22° 59' 46.800" E	Name Specifications given to be included into the WUL.	27
Sewerage Sumps Portion 1 (Stadium)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 28.600" S	22° 59' 54.900" E		28
Sewerage Sumps Portion 1 (Ammosal Rec Club)	Disposal of domestic effluent into sewage sumps	g	40m³		40m³		Beesthoek 448	1	28° 17' 26.200" S	22° 59' 53.600" E		29
Sewerage Sumps Portion 1 (Laboratory)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 32.400" S	22° 59' 52.800" E		30
Sewerage Sumps Portion 1 (School)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 16' 59.500" S	22° 59' 40.100" E		31
Sewerage Sumps (Main Office Security Entrance)	Disposal of domestic effluent into sewage sumps	g	26m3		26m³		Beesthoek 448	1	28°17’29” S	22°59’52” E		32
Sewerage Sumps (Road Transport 2)	Disposal of domestic effluent into sewage sumps	g	1,5m3		1,5m³		Beesthoek 448	1	28°16’36.50”S	22°59’48.43”E		33
Sewerage Sumps (North Crusher Workshop)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	1	28° 17' 20.659" S	23° 0' 6.814" E		34

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Sewerage Sumps (WHIMS Plant)	Disposal of domestic effluent into sewage sumps	g	-		6m³		Beesthoek 448	1	28°16'45.69"S	23° 0'25.11"E	New Water Use	**35**
Sewerage Sumps (new Jig Plant)	Disposal of domestic effluent into sewage sumps	g	-		6m³		Beesthoek 448	1	28°17'24.69"S	23° 0'17.49"E	New Water Use	**36**
Sewerage Sumps (North Mine Security Entrance)	Disposal of domestic effluent into sewage sumps	g	150m3		150m3		Beesthoek 448	1	28°16'59.53"S	22°59'56.35"E	Name Specifications given to be included into the WUL.	**37**
Sewerage Sumps Portion Re (South Engineering Offices)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	RE 0	28° 18' 30.800" S	23° 0' 22.000" E	Sewerage Sumps Portion 1 (South Engineering Offices) incorrect portion - moved to portion RE (0)	**38**
Sewerage Sumps Portion Re (North Mine Security Entrance)	Disposal of domestic effluent into sewage sumps	g	80m³		80m³		Beesthoek 448	RE 0	28° 18' 29.716" S	23° 0' 14.846" E	Name Specifications given to be included into the WUL.	**39**
Sewerage Sumps Portion Re (South TMM Workshop)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	RE 0	28° 18' 34.000" S	23° 0' 18.500" E	Name Specifications given to be included into the WUL.	**40**
Sewerage Sumps Portion Re (South TMM Workshop)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	RE 0	28° 18' 39.600" S	23° 0' 17.400" E	Name Specifications given to be included into the WUL.	**41**
Sewerage Sumps Portion Re (South Bulk Diesel Storage Area)	Disposal of domestic effluent into sewage sumps	g	15m³		15m³		Beesthoek 448	RE 0	28° 18' 42.900" S	23° 0' 16.500" E	Name Specifications given to be included into the WUL.	**42**
Sewerage Sumps Portion Re (South Mine Crusher Workshop)	Disposal of domestic effluent into sewage sumps	g	20m³		20m³		Beesthoek 448	RE 0	28° 18' 46.200" S	22° 59' 59.300" E	Name Specifications given to be included into the WUL.	**43**
Sewerage Sumps Portion Re (Airport)	Disposal of domestic effluent into sewage sumps	g	15m³	498,5m3/a	15m³	518,50m3/a	Beesthoek 448	RE 0	28° 15' 59.800" S	22° 59' 25.800" E	Name Specifications given to be included into the WUL.	**44**
Sewerage Sumps Portion Re (Airport)	Disposal of domestic effluent into sewage sumps	g	10m³		10m³		Beesthoek 448	RE 0	28° 15' 58.800" S	22° 59' 26.800" E	Name Specifications given to be included into the WUL.	**45**
Sewerage Sumps Portion Re (Landfill)	Disposal of domestic effluent into sewage sumps	g	10m³		10m³		Beesthoek 448	RE 0	28° 16' 46.700" S	22° 59' 40.100" E	Name Specifications given to be included into the WUL.	**46**
Sewerage Sumps Portion Re (Road Transport 1)	Disposal of domestic effluent into sewage sumps	g	26m3		26m3		Beesthoek 448	RE 0	~~28°16'34.61"S~~ 28°16'28.12"S	~~22°59'44"E~~ 22°59'45.20"E	Name Specifications given to be included into the WUL. Coordinate amendment	**47**
Sewerage Sumps Portion Re (Road Transport 3)	Disposal of domestic effluent into sewage sumps	g	1.5m3		1.5m3		Beesthoek 448	RE 0	~~28°16'36.06"S~~ 28°16'31.94"S	~~22°59'46.43"E~~ 22°59'49.92"	Name Specifications given to be included into the WUL. Coordinate amendment	**48**
Sewerage Sumps Portion Re (Long distance parking)	Disposal of domestic effluent into sewage sumps	g	26m3		26m3		Beesthoek 448	RE 0	28°16'46" S	22°59'39" E	Name Specifications given to be included into the WUL.	**49**
Sewerage Sumps Portion Re (Conservancy tank at South Change house)	Disposal of domestic effluent into sewage sumps	g	240m3		240m3		Beesthoek 448	RE 0	28°18'34" S	23°00'15" E	Name Specifications given to be included into the WUL.	**50**
Sewerage Sumps Portion Re (Uitsig)	Disposal of domestic effluent into sewage sumps	g	-		20m3		Beesthoek 448	RE 0	28°16'50.90"S	22°59'29.40"E	New Water Use	**51**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
HH Pit Backfill	Backfilling of opencast pits	g	-	459 860t/a	-	459 860t/a	Beesthoek 448	1	28° 16' 43.7" S	23° 1' 20.2" E	No amendment required	**52**
HL pit area Backfill	Backfilling of opencast pits	g	-	2 212 010t/a	-	2 212 010t/a	Beesthoek 448	1	28° 17' 21.6" S	23° 00' 55.6" E	No amendment required	**53**
BN Pit Backfill	Backfilling of opencast pits	g	-	1 625 221t/a	-	1 625 221t/a	Beesthoek 448	1	28° 16' 13.9" S	23° 0' 17.2" E	Existing Water Use Name change from BN N Pit Backfill to BN Pit Backfill.	**54**
East Pit Backfill	Backfilling of opencast pits	g	-	2 119 897t/a	-	2 119 897t/a	Olynfontein 475	4	~~28° 20' 31.2" S~~ 28°20'32.62"S	~~22° 59' 37.7" E~~ 23° 0'29.03"E	Minor Coordinate adjustment to indicate centre point	**55**
GK Pit Backfill	Backfilling of opencast pits	g	-	1 468 839t/a	-	1 468 839t/a	Beesthoek 448	1	28° 18' 23.4" S	23° 1' 9.6" E	No amendment required	**56**
Detrital Area	Backfilling of opencast pits	g	-	1 224 840t/a	-	1 224 840t/a	Olynfontein 475	4	28° 19' 40.3" S	23° 1' 9.6" E	No amendment required	**57**
West Pit Backfilling	Backfilling of opencast pits	g	-	10 536 114t/a	-	10 536 114t/a	Olynfontein 475	4	28° 19' 18.6" S	22° 59' 30.8" E	No amendment required	**58**
Product Stockpile Area	Product Stockpile Area 1&2	g	-	5 998 500t/a	-	5 998 500t/a	Beesthoek 448	1	28°16'51.18"S	23° 0'3.31"E	No amendment required	**59**
Plant Stockpiles	Stockpiles	g	-	300 000t/a	-	1 500 000t/a	Beesthoek 448	1	28° 17' 20.9" S	22° 59' 58.6" E	Increase in volumes required.	**60**
South Combined Off Grade Stockpiles	Off Grade Stockpiles	g	-	4 450 000t/a	-	7 090 000t/a	Olynfontein 475 Beeshoek 448	4 RE 0	~~28° 19' 1.487" S~~ 28°19'16.70"S	~~22° 59' 57.711" E~~ 23° 0'10.72"E	Existing Water Use. Combination of ROM Stockpile area (South Contaminated ROM 1, South Contaminated ROM 2 - including BIS and South ROM Stockpile 1), no change in throughput. Centre Coordinate provided.	**61**
		g	-	1 920 000t/a	-				~~28° 19' 17.636" S~~	~~23° 0' 8.749" E~~		
		g	-	720 000t/a	-				~~28° 18' 55.383" S~~	~~23° 0' 2.324" E~~		
South Off Grade ROM 1	Off-grade Waste Dump 3 (ROM South)	g	-	2 508 000t/a	-	2 508 000t/a	Beesthoek 448	RE 0	28° 18' 54.499" S	23° 0' 19.721" E	No amendment required	**62**
South ROM Stockpile 1	Stockpiles	g	-	720 000t/a	-	720 000t/a	Beesthoek 448	RE 0	28° 18' 55.383" S	23° 0' 2.324" E	No amendment required	**63**
South ROM Stockpile 2	Stockpiles	g	-	1 000 000t/a	-	1 000 000t/a	Olynfontein 475	4	28°18'54.90"S	22°59'25.88"E	No amendment required	**64**
S Offgrade ROM 2	Stockpiles	g	-	1 000 000t/a	-	1 000 000t/a	Beesthoek 448	RE 0	28°18'40.23"S	22°59'48.08"E	No amendment required	**65**
N Offgrade ROM 1	Offgrade ROM stockpiles	g	-	1 000 000t/a	-	1 000 000t/a	Beesthoek 448	1	28°17'33.46"S	23° 0'22.67"E	No amendment required	**66**
~~BIS ROM North 1~~	~~Stockpiles being reworked - no further deposition~~	~~g~~	~~-~~	~~2 950 000 tons (current capacity stored, no further deposition)~~	~~-~~	~~2 950 000 tons (current capacity stored, no further deposition)~~	~~Beesthoek 448~~	~~1~~	~~28° 17' 40.35" S~~	~~23° 0' 53.51" E~~	Existing Water Use This use is replaced by reinstating the HF WRD which was previously rehabilitated.	~~-~~
BIS ROM North 2	Stockpiles	g	-	3 150 000t/a	-	3 150 000t/a	Beesthoek 448	1	~~28° 16' 57.23" S~~ 28°16'47.85"S	~~23° 1'5.97" E~~ 23° 1'13.21"E	Minor Coordinate adjustment to indicate centre point	**67**
Shale Stockpile	Stockpiles being reworked - no further deposition	g	-	361 633 tons (current capacity stored, no further deposition)	-	361 633 tons (current capacity stored, no further deposition)	Beesthoek 448	1	28° 16' 34.66" S	23° 0'4.95" E	No amendment required	**68**
Quartzite Stockpile	Stockpiles being reworked - no further deposition	g	-	1 668 163 tons (current capacity	-	1 668 163 tons (current	Beesthoek 448	1	28°16'46.03"S	23° 0'12.39"E	No amendment required	**69**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
				stored, no further deposition)		capacity stored, no further deposition)						
Jig Discard Dump	Stockpiles (will include the feed stockpiles into the Jig Plant namely intermediate transfer stockpile)	g	-	9 000 000t/a	-	9 000 000t/a 60ha	Beesthoek 448	1	28°17'16.38"S	23° 0'23.44"E	Existing Water Use This facility will increase in footprint towards the north, to allow for reworking practices to continue from the southern periphery of the facility through the new Jig Plant. No change in approved throughput.	**70**
Fine Residue Dam (Slimes Dam)	Disposal of contaminated water and slimes into fine residue dam	g	-	4 864 520m3/a	-	4 864 520m3/a	Beesthoek 448	1	28° 16' 27.0" S	23° 0' 48.0" E	No amendment required	**71**
North ROM Stockpile	Stockpiles	g	-	1 400 000t/a	-	1 400 000t/a	Beesthoek 448	1	28° 16' 39.3" S	23° 0' 11.6" E	No amendment required	**72**
South Detrital Stockpile Area	Stockpiles	g	-	2 240 000t/a	-	2 240 000t/a	Olynfontein 475	4	28° 19' 40.540" S	23° 0' 50.227" E	No amendment required	**73**
East Pit WRD	Stockpiles	g	-	68 850 000t/a	-	68 850 000t/a 170ha	Olynfontein 475	4	28° 20' 17.916" S	23° 0' 10.965" E	Existing Water Use The operational design of this facility will change, which will change the footprints. No change in approved throughput.	**74**
Village North WRD (VP1)	Stockpiles	g	-	31 500 000t/a	-	31 500 000t/a 96ha	Beesthoek 448	RE 0	28° 18' 21.630" S	22° 59' 26.890" E	Existing Water Use Name Change from Village WRD to Village North WRD (VP 1). The operational design of this facility will change, which will change the footprints. No change in approved throughput.	**75**
WRD North	Stockpiles	g	-	7 000 000t/a	-	7 000 000t/a	Beesthoek 448	1	28°17'43.93"S	23° 0'36.85"E	No amendment required	**76**
HH Pit WRD	Stockpiles	g	-	6 800 000t/a	-	6 800 000t/a	Beesthoek 448	1	28°16'47.08"S	23° 1'21.81"E	No amendment required	**77**
West Pit WRD (VP2) (now to be referred to as Village South WRD)	Stockpiles	g	-	21 413 403t/a	-	21 413 403t/a 135ha	Olynfontein 475	4	28°19'25.69"S	22°59'46.02"E	Existing Water Use Name Change from West Pit WRD to Village South WRD. The operational design of this facility will change, which will change the footprints. No change in approved throughput.	**78**
HL WRD	Stockpiles	g	-	10 983 334t/a	-	10 983 334t/a	Beesthoek 448	1	28°17'7.01"S	23° 1'8.32"E	No amendment required	**79**
HF WRD	Stockpiles	g	-	-	-	6 000 000t/a	Beesthoek 448	1	28°17'42.05"S	23° 0'50.71"E	New Water Use This was the original WRD Footprint. HF WRD is a previously reworked WRD. The mine applied for this Section 21g to be reused as the North BIS ROM 1 Stockpile	**80**
GF WRD	Stockpiles	g	-	7 721 766t/a	-	7 721 766t/a 54ha	Beesthoek 448	1	28° 17' 3.12" S	23° 0' 38.58" E	Existing Water Use The operational design of this facility will change, which will change the footprints. No change in approved throughput.	**81**
Dust Suppression North	Dust Suppression (BN Truck filling point)	g	-	257 518m3/a	-	257 518m3/a	Beesthoek 448	1	28° 16' 12.559" S	23° 0' 10.784" E	No amendment required	**82**
Dust Suppression South	Dust Suppression (SM Filling Point)	g	-	211 660m3/a	-	211 660m3/a	Beesthoek 448	RE 0	28° 18' 49.821" S	22° 59' 54.705" E	No amendment required	**83**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
Village dewatering dam	Additional dam to transfer/store pit dewatering influx of water when needed.	g			250 m3	350 000 m3/a	Beesthoek 448	1	28°17'32"S	22° 59'46"E	New water use	84
Land-fill Site	Land Fill Site	g	-	500 000t/a	-	500 000t/a	Beesthoek 448	RE 0	28° 16' 39.725" S	22° 59' 40.088" E	No amendment required	85
WHIMS Staging Stockpile x 2	Feed to the WHIMS Plant	g			6 000m3 (2 x 3000m3)	1 147 330t/a	Beesthoek 448	1	28°16'38.53"S	23° 0'26.85"E	New Water Use	86
WHIMS Plant Clarifier	Fines Processing Water Tank	g			9 700m3	6 737 686m³/a	Beesthoek 448	1	28°16'42.41"S	23° 0'23.05"E	New Water Use	87
Process Water Tank (WHIMS Plant)	Process Water Tank at WHIMS Plant	g			1 000m³	1 544 783m³/a	Beesthoek 449	1	28°16'41.88"S	23° 0'24.32"E	New Water Use	88
WHIMS Plant Central Water Dam	Process Water Tank at WHIMS Plant	g			5 000m3	1 544 783m³/a	Beesthoek 448	1	28°16'37.00"S	23° 0'23.00"E	New Water Use	89
WHIMS Plant Emergency Product Stockpile	Emergency Feed	g			20 m³	-	Beesthoek 448	1	28°16'40.96"S	23° 0'26.54"E	New Water Use	90
WHIMS 1mm Product Stockpile	Product Stockpile	g			1000 m³	360 436t/a	Beesthoek 448	1	28°16'43.40"S	23° 0'21.04"E	New Water Use	91
Process Water Tank	Balancing Tank for existing Clarifier	g			2000m3	8 631 851m³/a	Beesthoek 448	1	28°17'17.40"S	23° 0'9.14"E	New Water Use	92
BN Tank	Providing storage for in pit dewatering water	g			500m3	TBD	Beesthoek 448	1	28°16'45.26"S	22°59'56.60"E	New Water Use	93
Plastic Tanks	4x10m3 plastic tanks to allow for the efficient storage and transfer of process water within the existing Beneficiation Plant circuit	g			40m3 4x10m3	TBD	Beesthoek 448	1	28°17'17.70"S	23° 0'7.22"E	New Water Use	94
Zinc Dam	To store process water where required.	g			90 m3	TBD	Beesthoek 448	1	28°17'23.04"S	23° 0'5.48"E	Existing dams on site, which will be reinstated as part of internal transfer dams. New Water Use	95
Steel Dam	To store process water and allow for the storage of top-up water	g			250 m3	TBD	Beesthoek 448	RE 0	28°17'42.61"S	23° 0'16.02"E	Existing dams on site, which will be reinstated as part of internal transfer dams. New Water Use	96
New Jig Plant Arising - 32+1mm Stockpile	New Low Grade Stockpile from existing Jig Plant feed into new Jig Plant	g			6000m³	992 500t/a	Beesthoek 448	1	28°17'17.17"S	23° 0'31.32"E	New Water Use	97
New Jig Plant Low Grade - 32+1mm Intermediate Stockpile	New Low Grade Stockpile from existing Low Grade Stockpile feed into new Jig Plant	g			5500m³	1 500 660t/a	Beesthoek 448	1	28°17'18.70"S	23° 0'35.48"E	New Water Use	98
New Jig Plant Low Low Grade Stockpile	New ROM Stockpile feed into new Jig Plant	g			118m³	594 468t/a	Beesthoek 448	1	28°17'20.21"S	23° 0'18.30"E	New Water Use	99

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	Throughput (m3/a or tonnes)						

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
BN In Pit Dewatering	In pit dewatering	a&j	-	432000	-	432 000	Beesthoek 448	1	~~28° 16' 14.231" S~~	~~23° 0' 9.816" E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**1**
~~BN In Pit Dewatering~~	~~WG66: Dewatering Borehole~~	~~a&j~~	~~-~~	~~194948~~	~~-~~	~~-~~	~~Beesthoek 448~~	~~1~~	~~28° 16' 11.519" S~~	~~23° 0' 3.795" E~~	Borehole no longer in use	~~2~~
OW022 (BN Borehole)	Dewatering Borehole	a&j	-		-	135000	Beesthoek 448	1	-	-	Additional borehole requested to assist with dewatering of BN Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**2**
Village Pit Dewatering	In pit dewatering	a&j	-	420000	-	420 000	Beesthoek 448	RE 0	~~28° 17' 29.13" S~~	~~22° 59' 21.88" E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**3**
	~~WG 12 (Village Dewatering)~~ WG75 (Village Dewatering)	a&j	-	343360	-	540 000	Beesthoek 448	RE 0	~~28°17'42.449"S~~	~~22°59'30.702"E~~	Name change requested and increase in dewatering volumes required. Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**4**
WG73: Dewatering Borehole	Village Pit Dewatering	a&j	-	1 900 000	-	600 000	Beesthoek 448	RE 0	~~28°17'58.41"S~~ ~~28°17'57.7" S~~	~~22°59'32.17"E~~ ~~22°59'32.4"E~~	Reduction in water abstraction volumes. Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**5**
OW025 (Village Dewatering, West of Pit)	Dewatering borehole	a&j	-	-	-	160000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**6**
OW026 (Village Dewatering, East of Pit 1)	Dewatering borehole	a&j	-	-	-	50000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**7**
OW027 (Village Dewatering, East of Pit 2)	Dewatering borehole	a&j	-	-	-	50000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**8**
OW028 In-Pit borehole (Village Dewatering)	Dewatering borehole	a&j	-	-	-	160000	Beesthoek 448	RE 0	-	-	Additional borehole requested to assist with dewatering of Village Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**9**
WG 70 Dewatering borehole	Village Pit Dewatering	a&j	-	-	-	200000	Beesthoek 448	RE 0	-	-	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**10**

Water Use Name	Description	Water Use	2018 WUL (2019 amendment)		2021 WUL		Farm Name	Farm Portion	South	East	Comment on Application Form	WUL Map Referencing
			Capacity (m3)	m3/a	Capacity (m3)	m3/a						
WG74 (near HF Pit) - replace WG51 A&B and WG63	Supply Borehole	a&j	-	500000	-	500000	Beesthoek 448	1	~~28°17'26.21"S~~	~~23°00'51.41"E~~	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**11**
HF Pit Boreholes Additional borehole (OW029)	Pit dewatering	a	-	-	-	200000	Beesthoek 448	1	-	-	Additional borehole requested to assist with dewatering of HF Pit. Request that location not be fixed with a coordinate but rather the Farm Portion. Borehole not yet in place therefore no name or location is available.	**12**
HF Pit dewatering	In pit dewatering for safe mining conditions and the use in mine processing and associated activities	a&j	-	-	-	500000	Beesthoek 448	1	-	-	Request to remove specific coordinates for dewatering and only refer to the Farm Portion - same aquifer. This is required as the dewatering areas may change a water plumes migrate due to on site and regional mining activities	**13**
Total (S21j)				**3 595 360**		**2 987 000**						

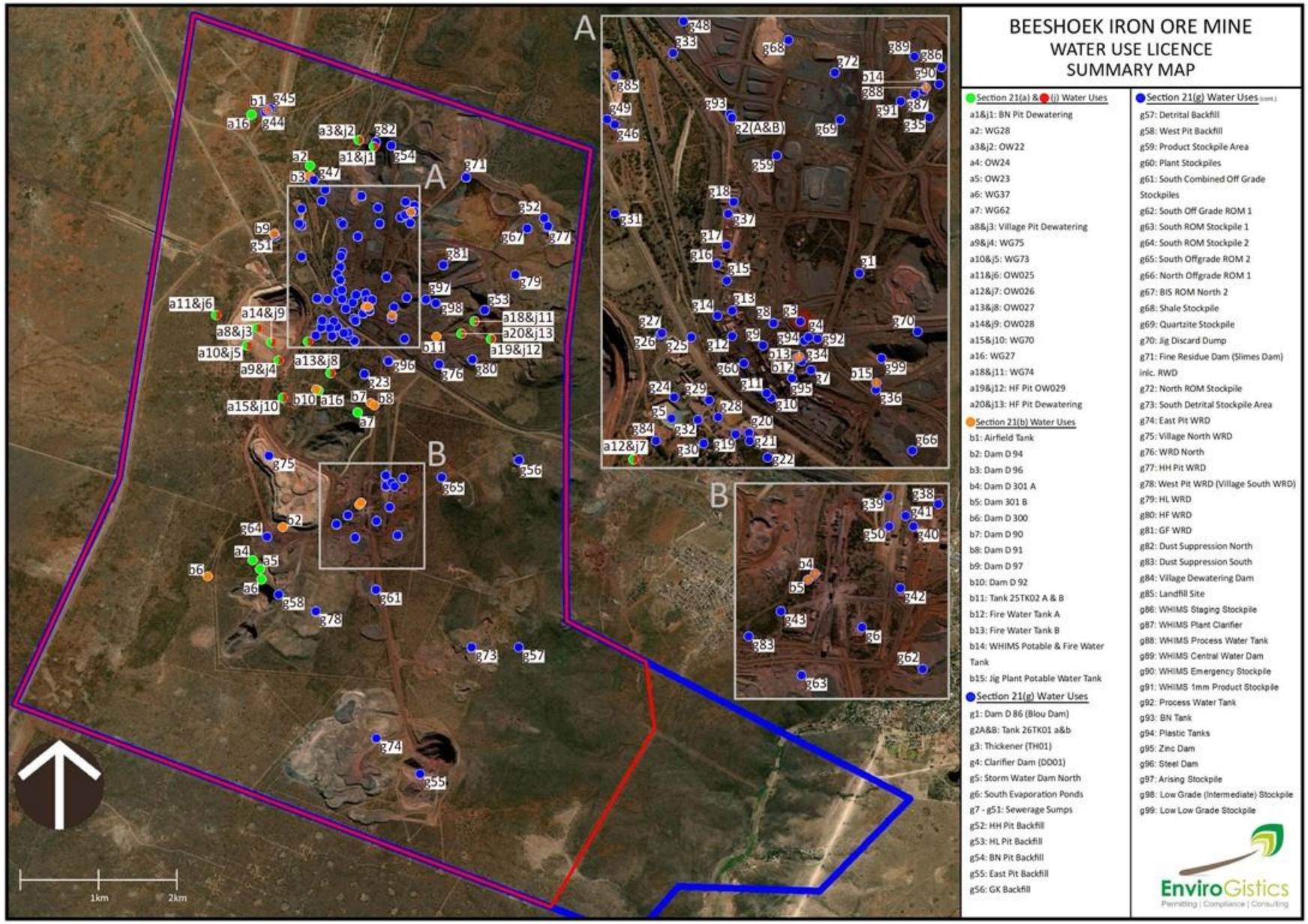


Figure 12: Preliminary Water Use Map

2.d Need and Desirability of the Proposed Activities

To allow Beeshoek to optimise the mining process and reduce mineral waste on site (in line with the National Waste Management Hierarchy), the mine wishes to implement two additional Beneficiation Projects, namely a new WHIMS Plant to rework the existing slimes from the Slimes Dam and Jig Plant to rework the low-grade material from the mining operations, as well as from the existing Low-Grade Stockpile (Discard Dump). This project will have numerous economic and environmental benefits.

Economic Benefit:

Section 23(1)(a) of the MPRDA states in Section 1(a), that subject to subsection (4), the Minister must grant a mining right if the mineral can be mined optimally in accordance with the mining work programme. The Mine has been awarded a Mining Right by the DMRE (now DMRE) and therefore has an obligation to give effect to the following:

- The ongoing development and improvement of the Mining Work Programme which details the planned mining activities to be followed in order to mine the mineral resource optimally; and
- Optimal mining of minerals must be undertaken, as the Minerals and Petroleum Board may recommend to the Minister to direct the holder of a mining right to take corrective measures if the Board establishes that the minerals are not being mined optimally in accordance with the Mining Work Programme. The Minister may, on the recommendation of the Board, suspend or cancel a mining right if the Minister is convinced that any act or omission by the holder justifies the suspension or cancellation of the right.

The project will ensure that low-grade minerals in the existing Low-Grade Residue Stockpiles (Slimes Dam and Discard Dump) can be reworked, thereby also reducing the volumes of waste stored on site, and reducing the associated financial rehabilitation requirements and potential, although found limited, potential environmental impacts.

Giving effect to Waste Reduction:

The reworking of the mineral waste gives effect to the Waste Management Hierarchy as presented in the National Waste Management Strategy, November 2011 and also the draft Strategy of 2020. This 2011 Strategy states the following:

- A challenge experienced is the lack of a policy and regulatory environment that does not actively promote the Waste Management Hierarchy.
- The report states that while the elimination of waste in its entirety may not be feasible, it is possible through the systematic application of the Waste Management Hierarchy to reach a point within the next few decades where re-use, recycling, recovery and treatment overtake landfills as preferred options for waste management.
- The first goal presented in this strategy as a strategic goal is to “promote waste minimisation, reuse, recycling and the recovering of waste” by focusing on implementing the Waste Management Hierarchy, and with the ultimate aim of diverting waste from landfill.

The following is an abstract of Section 2.3 of the National Waste Management Strategy:

The Waste Management Hierarchy in the National Waste Management Strategy is summarised as follows:

- Waste avoidance and reduction;
- Re-use;
- Recycling;
- Recovery; and
- Treatment and disposal.

The foundation of the hierarchy, and the first choice of measures in waste management, is avoidance and reduction. This step aims for goods to be designed in a manner that minimises their waste components. Also, the reduction of the quantity and toxicity of waste generated during the production process is important.

The next stage of the hierarchy is re-using waste. Re-using an article removes it from the waste stream for use in a similar or different purpose without changing its form or properties.

After re-use comes the recycling of waste, which involves separating articles from the waste stream and processing them as products or raw materials.

These first four stages of the Waste Management Hierarchy are the foundation of cradle-to-cradle waste management. This approach seeks to re-use or recycle a product when it reaches the end of its life span. In this way, it becomes input for new products and materials. This cycle repeats itself until as small a portion as possible of the original product eventually enters the next level of the Waste Management Hierarchy: recovery.

As a last resort, waste enters the lowest level of the hierarchy to be treated and/or disposed of, depending on the safest manner for its final disposal.

Taking this strategy further, is the current draft National Waste Management Strategy of 2020, which has as yet not been promulgated. This strategy also focusses on the Circular Economy. A circular economy redefines economic growth by moving away from a take-make-waste industrial model to one that decouples economic activity from the environment and supports a just transition to renewable energy sources. The three key principles of a circular economy are: design out waste and pollution, keep products and materials in use and regenerate natural systems. The two (2) strategic entry points of the waste sector into waste minimisation and the circular economy is waste prevention and waste as a resource, as briefly explained below.

- Waste Prevention (as highlighted in the 2011 National Waste Management Strategy) – this emphasises avoiding and reducing waste before substances, materials and products are discarded.
- Waste as a Resource (key focus in the draft Strategy) – this focuses on stimulating a secondary resources economy based on recycling and recovery of materials and energy from waste i.e. interventions that take place after a product or material has become waste. Circularity can deliver substantial material savings throughout value chains and production processes, generate extra value, transformation of industry towards climate-neutrality, long-term competitiveness and unlock economic opportunities. In terms of the waste management hierarchy practices, recycling of waste for reuse and recovery of materials is prioritised over recovery of energy from waste. The main economic driver lies in exploiting the full potential value of waste.

As a last resort, waste enters the lowest level of the hierarchy to be treated and/or disposed of, depending on the safest manner for its final disposal.

Giving effect to an approved Environmental Activity as part of Environmental Management and Impact Reduction:

The 2004 Beeshoek EMP clearly states that the mine residue present on site or produced by the mine can be categorised as follows:

- Waste material: products that cannot be sold and which are deposited separately as such or used as backfill;
- Non-saleable material: product which cannot be marketed in its present form but which through treatment could become saleable;
- Contaminated material: "impure" product stockpiled separate for beneficiation to render it marketable; and
- Discard: waste material from the on-site iron ore beneficiation plant is discarded on a designated Discard Dump for reuse (i.e. reworking).

The 2004 EMP further explains the Mine's intention to rework all contaminated (as from the EMPr – which refers to low grade) iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation. Reworking relates to the following dumps: Dumps labelled on Drawings 5540-001 and 5540-002 as CD-N1 (this is the current WRD North Area) and CD-S1 (this is the current Contaminated ROM Dump on South Mine), respectively.

In Section 1.7.3 of the new order (aligned) EIA/EMP, 2009 the Estimated Reserves are discussed. It states that: "Additional iron ore is available in the contaminated dumps on the mine site and these will be reworked to meet the mine's remaining planned life of mine." The specific contaminated dumps are not stipulated in this EMP, and therefore when referring to the definition of contaminated material in the 2004 EMP as presented above, this will depend on the nature of the material and grade which will render it marketable. The EMP further commits in Section 7.3.2 to "Rework all the contaminated iron ore stockpiles present on the mine site in order to optimise iron ore resource utilisation."

In terms of the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA), and associated regulations which came into effect on 24 July 2015, which included Mine Residue Stockpiles as listed Waste Management Activities, all such activities that commenced prior to 24 July 2015, may be regarded as lawful and need not be authorised (regulation 7(1) of GN 921 contains the relevant transitional requirements). Prior to the NEM:WA Regulations of 2015, the reclamation of residue for re-use did not require EMP amendments, as it fell within the definition of mining (as defined in the MPRDA), especially in this instance where no separate infrastructure (e.g. crushing plants) was constructed that had to be reflected in the EMPs.

Logistics to Improve infrastructure to supply Export Market demands

For the purposes of the railway line link, the project will allow Beeshoek greater flexibility to also export ore through Saldanha port. In order to realize this, additional infrastructure links are required, as there is no rail connection between Beeshoek and the Kolomela Direct Link Line.

2.e Period for which the Environmental Authorisation is required

The Environmental Authorisation is required for the life of mine, which is in excess of 30 years.

2.f Description of the process followed to identify Alternatives for the Overall Preferred Site, Activities and Technology Alternative

2.f.i Details of the Development Footprint Alternatives Considered

2.f.i.1 Details of all alternatives considered

2.f.i.1.a The property on which or location where it is proposed to undertake the activity

The projects presented are all located within the existing Mining Area. The activities considered in this application are linked to approved and established sites and therefore no property alternatives or location alternatives are relevant.

With regards to the selection of the Option for the railway line project, two main options were considered. Please refer to the following figure.

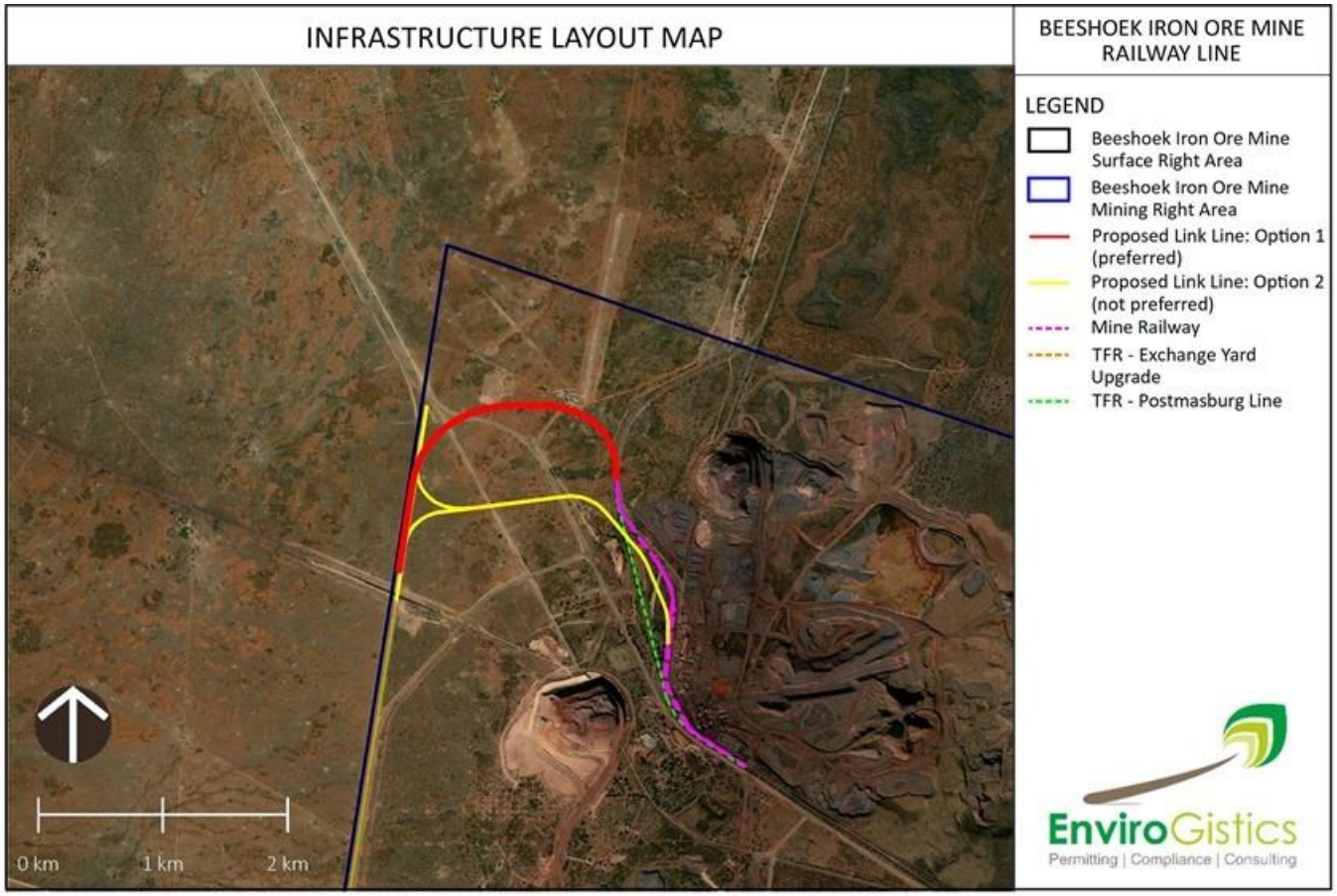


Figure 13: Railway Line Options

The two (2) options were primarily developed around operational considerations for handling TFR trains. The initial process included a requirement to reverse the orientation of the wagons for each train which required a triangle layout within the track plan.

In the early Option 1, this is shown in the northern link from the Kolomela Line to the Postmasburg Line and a staging siding to the north of the site on the Kolomela line. The gradient requirements of the staging siding resulted in significant earthworks and may have exceeded the servitude boundaries of the existing line.

In the initial Option 2, the wagon reversal was achieved via a smaller triangle and a different link alignment into Beeshoek Yard. Option 2 would have been operated by Beeshoek in multiple shunt movements.

Following the initial discussions between the mine and the TFR of the two (2) options, TFR indicated that they would do the shunting and that the requirement to reverse the orientation of the wagon could be waived. This resulted in the removal of the northern leg of Option 1 as well as the staging siding – a significant cost and material saving to the project, as well as a far lesser footprint of disturbance required.

2.f.i.1.b The design or layout of the activity

Activities are planned within the existing mining footprint. Limited design and layout opportunities are present.

For the purpose of the railway line, please refer to the section before (Section 2.f.i.1.a).

2.f.i.1.c The technology to be used in the activity

No technological alternatives are relevant to this project. The WHIMS and Jig Plant projects will make use of proven technologies utilised within the Assmang mining system.

2.f.i.1.d The operational aspects of the activity

The alternatives in terms of the operational aspects are merely operating in terms of status quo, or optimising the mining opportunities for both mineral resources and mineral waste resources. The location and extent of the mineral resources only allows for opencast operations at this time. Whereas with the beneficiation process, the WHIMS and Jig Plant projects will make use of proven technologies utilised within the Assmang mining system.

2.f.i.1.e The option of not implementing the activity

Various optimisation activities are planned for the mine as previously discussed. By not allowing this project to proceed, the mine will lose the opportunity to rework current waste streams and thereby reducing the dirty water footprint.

In addition to this, this project plans to optimise the exploration of mineral resources to which the mine has the Mineral Rights to. By not allowing the expansion of opencast operations, the mine will not be in a position to optimally work within its allocated Mineral Resource boundaries.

The opportunity to effectively and efficiently export iron ore resources via the Saldanha port will further be lost should the allowance for the railway line link not realise.

2.f.ii Details of the Public Participation Process Followed

Public participation is understood to be a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the Scoping and Environmental Impact Reporting (S&EIR) process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts and opportunities of the proposed project.

The objectives of the public participation process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed projects;
- Clearly outline the scope of the proposed projects, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues and solutions.

In accordance with the NEMA GNR 982, Chapter 6, the activities as stipulated in the sections hereafter, have taken place or are proposed to take place as part of the Environmental Authorisation Process.

2.f.ii.1 Stakeholder Identification

The public participation process must include consultation with (1) the competent authority; (2) every state department that administers a law relating to the matter; (3) all organs of state which have jurisdiction in respect of the activity to which the application relates; (4) all potential, or, where relevant, registered Interested and Affected Parties (I&APs). In order to satisfy this requirement, the EAP includes the following consultations in the process:

- Competent Authority - The DMRE is the competent authority related to this application. This application forms the first of the consultations with the DMRE. The EAP undertakes to engage in on-going communications with the DMRE (preferably directly with the allocated case officer).
- Departments that administer a law relating to the matter - The Department of Water Affairs and Sanitation (DWS): Northern Cape Province will be directly informed of the proposed projects via email and telephonic conversations.

Various water use activities will be triggered and a separate WULA will be submitted in to DWS in terms of section 40 of the NWA. The DWS will be a competent authority for the WUL application that needs to be submitted for the proposed project.

- All organs of state which have jurisdiction in respect of the activity to which the application relate -
  - National Level: National Department of Environment Forestry and Fisheries (DEFF) - Under the "One Environmental System" rolled out by Government on 8 December 2014, licensing processes for mining, environmental authorisations and water use have been streamlined. Under the One Environmental System, the Minister of Mineral Resources Energy (DMRE) will issue environmental authorisations and waste management licences in terms of the NEMA, and the NEM:WA respectively, for mining and related activities. However, note that in the new system, the Minister of Environmental Forestry and Fisheries will be the appeal authority for these authorisations to ensure complete independency to the competent authority.
  - Provincial Level: Given that the activity is located within the Northern Cape Province, the Northern Cape Department of Environment and Nature Conservation (NCDENC) will form a primary commenting authority during the process. The provincial Heritage Resource authority will be informed of the project, and the draft scoping report will be submitted to the online portal system for the South African Heritage Resource Agency (SAHRA). The Department of Fisheries and Forestry now fall within the mandate of the DAFF. The regional office and representatives for forestry within the Northern Cape will form part of the stakeholder database. The Northern Cape Department of Agriculture will also be informed of the said new EIA application.
  - District and Local Level: The Tsantsabane Local Municipality (NC085), which forms part of the ZF Mgcawu District Municipality (formerly known as the Siyanda District Municipality).
- All potentially registered I&APs - The existing Beeshoek stakeholder database was used as a base starting point. The database was updated following any stakeholder requests to be registered. The use of site notices, notification letters, Short Messaging Systems (SMS), telephonic conversations, email and fax were used as methods in which to reach potential I&APs.
- Affected Adjacent Landowners and Land Owners –
  - As far as possible, all affected adjacent property owners were contacted and informed of the proposed projects at the mine.
  - Property Owners: Beeshoek holds the mining rights and surface rights.

The latest stakeholder database is included within this report as Annexure 3.

All registered I&APs, which have a direct affect/effect on the proposed project or are directly or indirectly impacted by the proposed project, have the right to lodge a comment/question on the project (until such time that the appeals process comes to a close).

2.f.ii.2 DMRE Project Application Meeting

A project application meeting was held with the DMRE on 19 March 2019 at 10h00 via teams.

The attendees included:

Ms. T Bekker (EnviroGistics);

Mr. I Caldwell (ARM – railway line project engineer);

Ms. C Vries (Beeshoek – SHEQ Department);

Mr. K Harding (Beeshoek – Technical Manager);

Mr. J Nematatani (DMRE);

Mr. M Ramaboea (DMRE – Project Official).

Apologies:

Adv. L van der Westhuizen (ARM Legal Advisor);

Mr. J Schoeman (ARM – Environmental);

Ms. M Burger (Beeshoek – General Manager).

Purpose of the Meeting:

Pre-application meeting for the proposed Beeshoek TFR Link Line Project. Determination of the Environmental Authorisation Process to be followed.

Beeshoek requested the opportunity to in line with Regulation 8 and 15 of the National Environmental Management Act, EIA Regulations, 2014 (as amendment), submit a Basic Assessment Application, although the project triggers Listing Notice 2, Activity 12 according to consultation with the Department of Environment, Forestry and Fisheries (DEFF).

Outcomes of the Meeting

Lack of resources therefore one application

Mr. Nematatani informed the project team that the DMRE is experiencing staff shortages and therefore requires that the railway line project be included into the existing EIA Process (application submitted in February, and uploaded onto the DMRE system 25 February 2021).

Process required to ensure best application option

Ms. Bekker informed the DMRE that the Scoping Report has been submitted to all stakeholders on 22 February with the consultation phase to be concluded on 26 March 2021. The project team informed the DMRE of the importance of both projects and that delays must be avoided.

The DMRE explained that with the number of applications, should Beeshoek submit more applications, the mine may face further delays as the officials cannot process the volumes of applications.

Ms. Bekker requested whether the project team can continue with the project and include the railway line into the final Scoping Report, planned for submission 30 March 2021 and also conduct as second round of public participation in the form of advertisements and site notifications.

The DMRE stated that to avoid appeals the project must be included into the Scoping Report and stakeholders must be awarded a period of 30 days to comment.

Request for the EMPr to supersede the previous approved EMPr

The DMRE instructed that any reference to the amendment of change of conditions approved in the previous EMPRs must be excluded from this application as this must be a stand alone letter submitted to the DMRE for consideration.

Ms. Bekker informed the DMRE that this was the process conducted for Black Rock and that the new EMPr superceded the previous EMPrs.

Mr. Nematatani informed the team that that process was wrong and will not be allowed.

Way forward

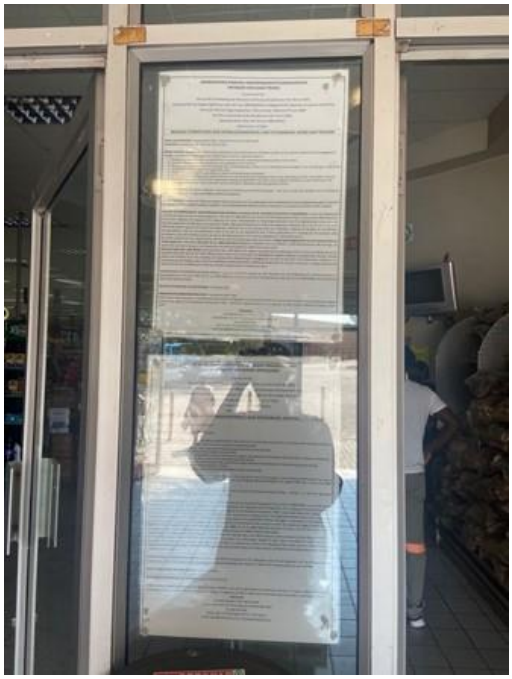
- Agreement
  - Mr. Caldwell informed the DMRE that the mines are operating in a changing environment and there will be times where new projects are identified. However, commented that the strain on resources at the DMRE are understood.
- Way Forward
  - Ms. Bekker stated that the amendments to the EMPr as identified in the Regulation 34 audit, will be excluded from this application and that this will be submitted by the mine separately. Ms Bekker will assist the mine in this aspect, but the application will be submitted by the mine.
  - Ms. Bekker stated that to avoid confusion for stakeholders the current Scoping Report review period will be concluded (up until 26 March 2021)
  - After the current review period has lapsed, the consultant will provide the commenting authorities with an updated report – at this time to avoid confusion, the consultant will compile a short addendum report which will be submitted to all registered stakeholders, with an electronic copy of a full updated Scoping Report. Two (2) hard copies of the Scoping Report will still be submitted to the DMRE.
  - Ms Bekker will readvertise the project in the Kathu Gazette (English advert) on 26 March 2021.
  - Ms Bekker will update the information document to the stakeholders and issue this to all registered parties on 26 March 2021.
  - Site notices will be re-erected at the six sites previously placed on 26 March 2021.

2.f.ii.3 Stakeholder Identification and Notification

Please refer to Annexure 3 for copies of these notifications. Proof of email submissions can be requested from the EAP.

2.f.ii.4 Site Notices

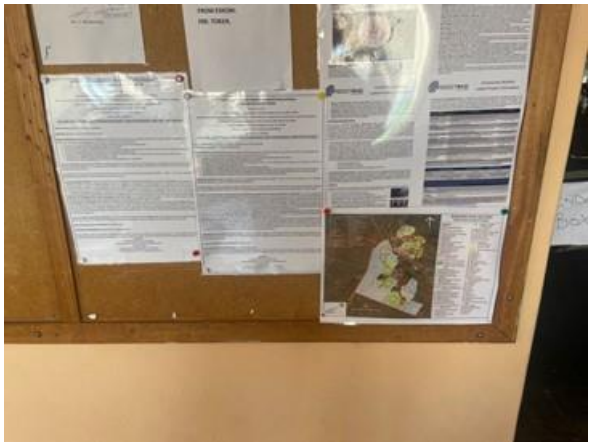
In accordance with GNR 982 Section 41(2)(a-b) a site notice was developed in Tswana, Afrikaans and English and placed at the following locations (see proof of placement below), in order to inform surrounding communities and adjacent landowners of the proposed project. The site notices were placed on 12 February 2021 and at visible locations close to the site. Site Notices were placed at the following locations:



Shoprite Postmasburg

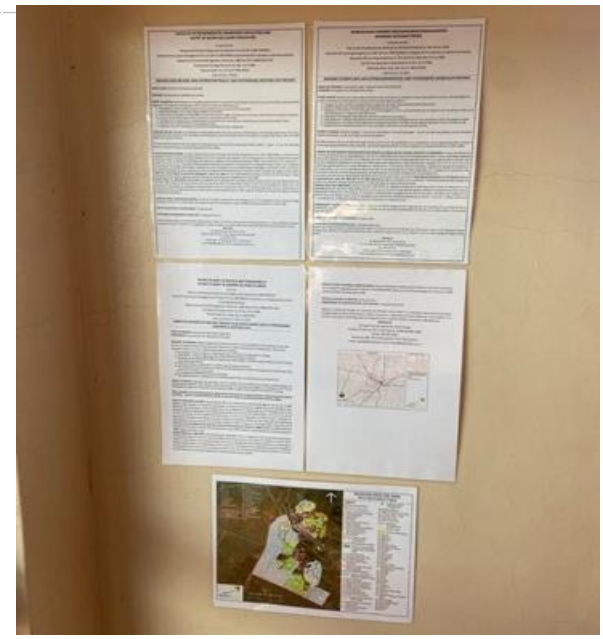
Municipality Postmasburg

Spar



North Mine Entrance

Main Offices Security Entrance

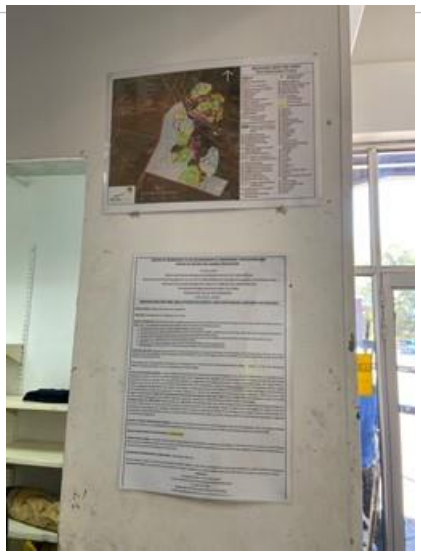


South Mine Entrance

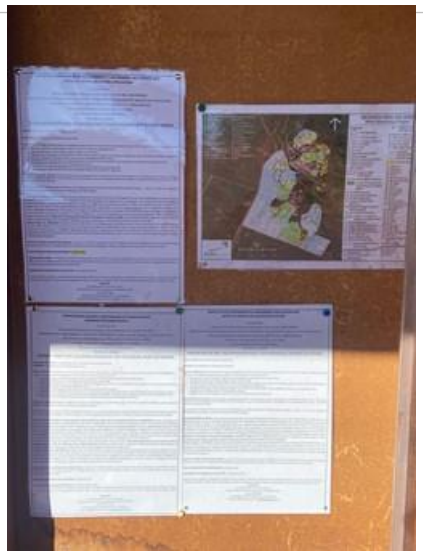
As a result of the Addendum Application and Addendum ESR, a second round of notices were placed, English, in the same areas as before. These notices were placed on 26 March 2021.

Shoprite Postmasburg

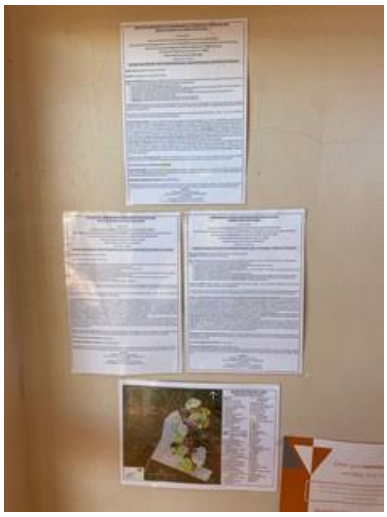
Municipality Postmasburg



Spar



Village Security Entrance



North Mine Security Entrance

South Mine Entrance

2.f.ii.5 Background Information Documents

Key stakeholders, that included the following sectors, were directly informed of the proposed development by e-mail, telephone and SMS/WhatsApp through the submission of the Background Information Document and Registration Sheet:

- Authorities;
- Municipalities;
- Community Representatives;
- Non-Governmental Organisations;
- General Public;
- Parastatals/ Service providers, and
- Adjacent Landowners.

Please refer to for a copy of the Background Information Document, which was made available to all stakeholders on 12 February 2021, when the notification of the project was emailed to all stakeholders. As a result of the Addendum Application and Addendum ESR, a second round of information documents were distributed to all stakeholders on the database. These notifications were sent on 26 March 2021.

2.f.ii.6 Advertisements

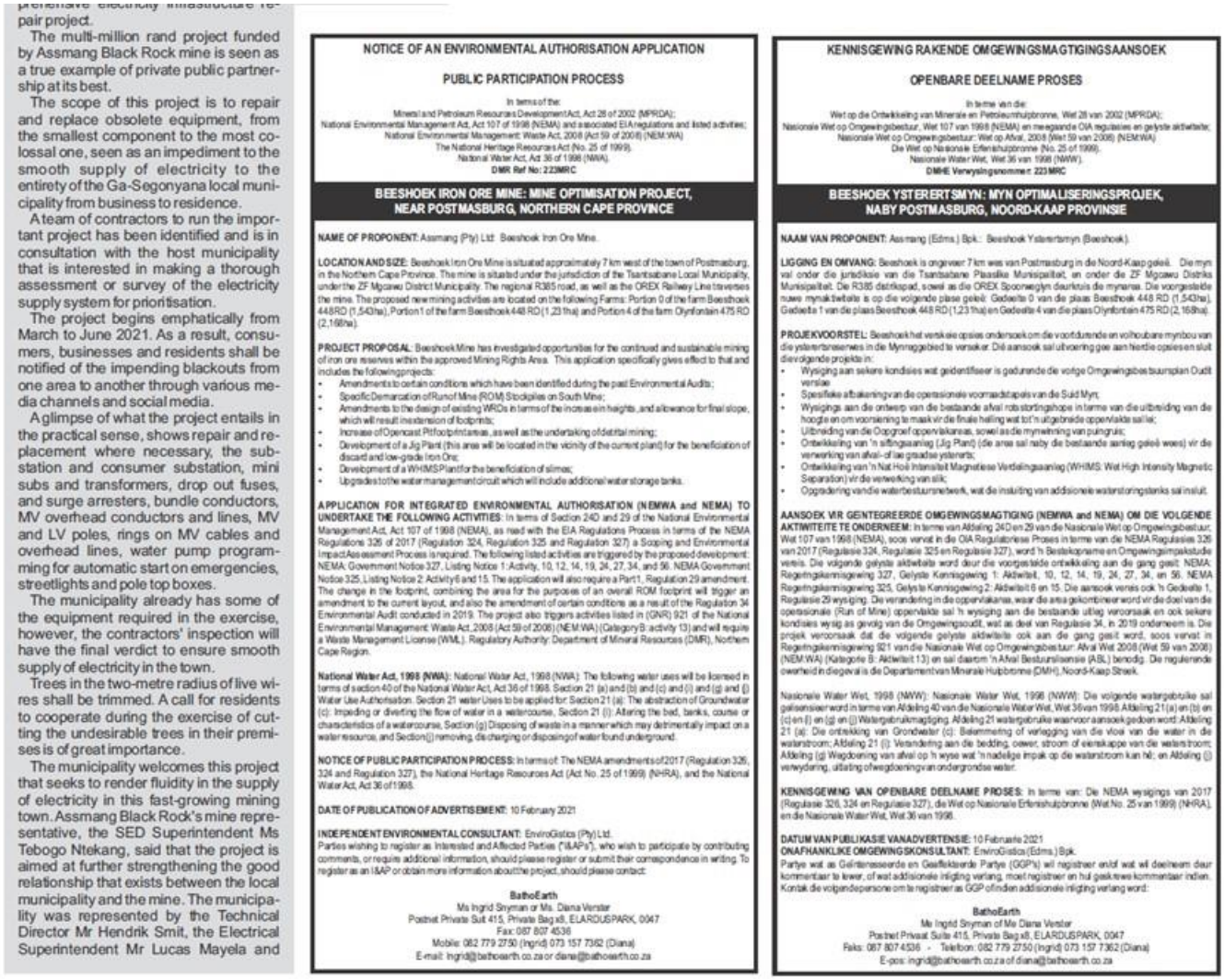
In accordance with NEMA GNR 982, 41(2)(c) of Chapter 6 an advert was placed in:

- The Kathu Gazette.

The advert was place in both Afrikaans and English in the above newspaper on 13 February 2021 (see proof of newspaper adverts hereafter).

Should the EAP note an affected stakeholder and be made aware of his/ her existence by the ward councillor, or traditional leader, efforts will be made to ensure his/ her participation in the stakeholder engagement process (as required by NEMA GNR 982, Section 41(2)(e) of Chapter 6).

Any stakeholder who submits a comment during the course of the process will automatically be registered on the project-specific stakeholder database.



pensive electricity infrastructure re-
pair project.
The multi-million rand project funded by Assmang Black Rock mine is seen as a true example of private public partnership at its best.
The scope of this project is to repair and replace obsolete equipment, from the smallest component to the most colossal one, seen as an impediment to the smooth supply of electricity to the entirety of the Ga-Segonyana local municipality from business to residence.
A team of contractors to run the important project has been identified and is in consultation with the host municipality that is interested in making a thorough assessment or survey of the electricity supply system for prioritisation.
The project begins emphatically from March to June 2021. As a result, consumers, businesses and residents shall be notified of the impending blackouts from one area to another through various media channels and social media.
A glimpse of what the project entails in the practical sense, shows repair and replacement where necessary, the substation and consumer substation, mini subs and transformers, drop out fuses, and surge arresters, bundle conductors, MV overhead conductors and lines, MV and LV poles, rings on MV cables and overhead lines, water pump programming for automatic start on emergencies, streetlights and pole top boxes.
The municipality already has some of the equipment required in the exercise, however, the contractors' inspection will have the final verdict to ensure smooth supply of electricity in the town.
Trees in the two-metre radius of live wires shall be trimmed. A call for residents to cooperate during the exercise of cutting the undesirable trees in their premises is of great importance.
The municipality welcomes this project that seeks to render fluidity in the supply of electricity in this fast-growing mining town. Assmang Black Rock's mine representative, the SED Superintendent Ms Tebogo Ntekang, said that the project is aimed at further strengthening the good relationship that exists between the local municipality and the mine. The municipality was represented by the Technical Director Mr Hendrik Smit, the Electrical Superintendent Mr Lucas Mayela and

NOTICE OF AN ENVIRONMENTAL AUTHORISATION APPLICATION

PUBLIC PARTICIPATION PROCESS

In terms of the:
Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA);
National Environmental Management Act, Act 107 of 1998 (NEMA) and associated EIA regulations and listed activities;
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA)
The National Heritage Resources Act (No. 25 of 1999).
National Water Act, Act 36 of 1998 (NWA).
DMR Ref No: 223MRC

BEESHOEK IRON ORE MINE: MINE OPTIMISATION PROJECT, NEAR POSTMASBURG, NORTHERN CAPE PROVINCE

NAME OF PROPONENT: Assmang (Pty) Ltd: Beeshoek Iron Ore Mine.

LOCATION AND SIZE: Beeshoek Iron Ore Mine is situated approximately 7 km west of the town of Postmasburg, in the Northern Cape Province. The mine is situated under the jurisdiction of the Tsantsabane Local Municipality, under the ZF Mgcawu District Municipality. The regional R385 road, as well as the OREX Railway Line traverses the mine. The proposed new mining activities are located on the following Farms: Portion 0 of the farm Beeshoek 448 RD (1,543ha), Portion 1 of the farm Beeshoek 448 RD (1,23 1ha) and Portion 4 of the farm Olynfontein 475 RD (2,168ha).

PROJECT PROPOSAL: Beeshoek Mine has investigated opportunities for the continued and sustainable mining of iron ore reserves within the approved Mining Rights Area. This application specifically gives effect to that and includes the following projects:

- Amendments to certain conditions which have been identified during the past Environmental Audits;
- Specific Demarcation of Run of Mine (ROM) Stockpiles on South Mine;
- Amendments to the design of existing WRDs in terms of the increase in heights ,and allowance for final slope, which will result in extension of footprints;
- Increase of Opencast Pit footprint areas ,as well as the undertaking of detrital mining;
- Development of a Jig Plant (this area will be located in the vicinity of the current plant) for the beneficiation of discard and low-grade Iron Ore;
- Development of a WHIMS Plant for the beneficiation of slimes;
- Upgrades to the water management circuit which will include additional water storage tanks.

APPLICATION FOR INTEGRATED ENVIRONMENTAL AUTHORISATION (NEMWA and NEMA) TO UNDERTAKE THE FOLLOWING ACTIVITIES: In terms of Section 24D and 29 of the National Environmental Management Act, Act 107 of 1998 (NEMA), as read with the EIA Regulations Process in terms of the NEMA Regulations 326 of 2017 (Regulation 324, Regulation 325 and Regulation 327) a Scoping and Environmental Impact Assessment Process is required. The following listed activities are triggered by the proposed development: NEMA: Government Notice 327, Listing Notice 1: Activity, 10, 12, 14, 19, 24, 27, 34, and 56. NEMA Government Notice 325, Listing Notice 2: Activity 6 and 15. The application will also require a Part 1, Regulation 29 amendment. The change in the footprint, combining the area for the purposes of an overall ROM footprint will trigger an amendment to the current layout, and also the amendment of certain conditions as a result of the Regulation 34 Environmental Audit conducted in 2019. The project also triggers activities listed in (GNR) 921 of the National Environmental Management: Waste Act ,2008 (Act 59 of 2008) (NEM:WA) (Category B: activity 13) and will require a Waste Management License (WML). Regulatory Authority: Department of Mineral Resources (DMR), Northern Cape Region.

National Water Act, 1998 (NWA): National Water Act, 1998 (NWA): The following water uses will be licensed in terms of section 40 of the National Water Act, Act 36 of 1998. Section 21 (a) and (b) and (c) and (i) and (g) and (j) Water Use Authorisation. Section 21 water Users to be applied for: Section 21 (a): The abstraction of Groundwater (c): Impeding or diverting the flow of water in a watercourse, Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse, Section (g) Disposing of waste in a manner which may detrimentally impact on a water resource, and Section (j) removing, discharging or disposing of water found underground.

NOTICE OF PUBLIC PARTICIPATION PROCESS: In terms of: The NEMA amendments of 2017 (Regulation 326, 324 and Regulation 327), the National Heritage Resources Act (Act No. 25 of 1999) (NHRA), and the National Water Act, Act 36 of 1998.

DATE OF PUBLICATION OF ADVERTISEMENT: 10 February 2021

INDEPENDENT ENVIRONMENTAL CONSULTANT: EnviroGistics (Pty) Ltd.
Parties wishing to register as Interested and Affected Parties ("I&APs"), who wish to participate by contributing comments, or require additional information, should please register or submit their correspondence in writing. To register as an I&AP or obtain more information about the project, should please contact:

BathoEarth
Ms Ingrid Snyman or Ms. Diana Verster
Postnet Private Suit 415, Private Bag x8, ELARDUSPARK, 0047
Fax: 087 807 4536
Mobile: 082 779 2750 (Ingrid) 073 157 7362 (Diana)
E-mail: ingrid@bathoearth.co.za or diana@bathoearth.co.za

KENNISGEWING RAKENDE OMGEWINGSMAGTIGINGSAANSOEK

OPENBARE DEELNAME PROSES

In terme van die:
Wet op die Ontwikkeling van Minerale en Petroleumhulpbronne, Wet 28 van 2002 (MPRDA);
Nasionale Wet op Omgewingsbestuur, Wet 107 van 1998 (NEMA) en meegaande OIA regulasies en gelyste aktiwiteite;
Nasionale Wet op Omgewingsbestuur: Wet op Afval, 2008 (Wet 59 van 2008) (NEM:WA)
Die Wet op Nasionale Erfenishulpbronne (No. 25 of 1999).
Nasionale Water Wet, Wet 36 van 1998 (NWW).
DMRE Verwysingsnommer: 223MRC

BEESHOEK YSTERERTSMYN: MYN OPTIMALISERINGSPROJEK, NABY POSTMASBURG, NOORD-KAAP PROVINSIE

NAAM VAN PROPONENT: Assmang (Edms.) Bpk.: Beeshoek Ysterertsmyn (Beeshoek).

LIGGING EN OMVANG: Beeshoek is ongeveer 7 km wes van Postmasburg in die Noord-Kaap gelee. Die myn val onder die jurisdiksie van die Tsantsabane Plaaslike Munisipaliteit, en onder die ZF Mgcawu Distriks Munisipaliteit. Die R385 distrikspad, sowel as die OREX Spoorweglyn daurkruis die myneraal. Die voorgestelde nuwe mynaktiwiteite is op die volgende plase gelee: Gedeelte 0 van die plaas Beeshoek 448 RD (1,543ha), Gedeelte 1 van die plaas Beeshoek 448 RD (1,231ha) en Gedeelte 4 van die plaas Olynfontein 475 RD (2,168ha).

PROJEKVOORSTEL: Beeshoek het verskeie opsies ondersoek om die voortdurende en volhoubare mynbou van die ysterertsreserwes in die Mynreggebied te verseker. Dié aansoek sal uitvoering gee aan hierdie opsies en sluit die volgende projekte in:

- Wysiging aan sekere kondisies wat geidentifiseer is gedurende die vorige Omgewingsbestuursplan Oudit verslae
- Spesifieke afbakening van die operasionele voorraadstapels van die Suid Myn;
- Wysigings aan die ontwerp van die bestaande afval rots stortingshope in terme van die uitbreiding van die hoogte en om voorsiening te maak vir die finale helling wat tot 'n uitgebreide oppervlakte sal lei;
- Uitbreiding van die Oopgroef oppervlakareas, sowel as die mynwinning van puingruis;
- Ontwikkeling van 'n siftingsaanleg (Jig Plant) (die area sal naby die bestaande aanleg gelee wees) vir die verwerking van afval- of lae graadse ysterertse;
- Ontwikkeling van 'n Nat Hoë Intensiteit Magnetiese Verdelingsaanleg (WHIMS: Wet High Intensity Magnetic Separation) vir die verwerking van slik;
- Opgradering van die waterbestuurs netwerk, wat die insluiting van addisionele waterstoringstanks sal insluit.

AANSOEK VIR GEINTEGREERDE OMGEWINGSMAGTIGING (NEMWA and NEMA) OM DIE VOLGENDE AKTIWITEITE TE ONDERNEEM: In terme van Afdeling 24D en 29 van die Nasionale Wet op Omgewingsbestuur, Wet 107 van 1998 (NEMA), soos vervat in die OIA Regulasiereise Proses in terme van die NEMA Regulasies 326 van 2017 (Regulasie 324, Regulasie 325 en Regulasie 327), word 'n Bestekopname en Omgewingsimpakstudie vereis. Die volgende gelyste aktiwiteite word deur die voorgestelde ontwikkeling aan die gang gesit: NEMA: Regeringskennisgewing 327, Gelyste Kennisgewing 1: Aktiwiteit, 10, 12, 14, 19, 24, 27, 34, en 56. NEMA Regeringskennisgewing 325, Gelyste Kennisgewing 2: Aktiwiteit 6 en 15. Die aansoek vereis ook 'n Gedeelte 1, Regulasie 29 wysiging. Die verandering in die oppervlakareas, waar die area gekombineer word vir die doel van die operasionele (Run of Mine) oppervlakte sal 'n wysiging aan die bestaande uitleg veroorsaak en ook sekere kondisies wysig as gevolg van die Omgewingsoudit, wat as deel van Regulasie 34, in 2019 onderneem is. Die projek veroorsaak dat die volgende gelyste aktiwiteite ook aan die gang gesit word, soos vervat in Regeringskennisgewing 921 van die Nasionale Wet op Omgewingsbestuur: Afval Wet 2008 (Wet 59 van 2008) (NEM:WA) (Kategorie B: Aktiwiteit 13) en sal daarom 'n Afval Bestuurslisensie (ABL) benodig. Die regulerende owerheid in die geval is die Departement van Minerale Hulpbronne (DMH), Noord-Kaap Streek.

Nasionale Water Wet, 1998 (NWW): Nasionale Water Wet, 1998 (NWW): Die volgende watergebruike sal gelisensieer word in terme van Afdeling 40 van die Nasionale Water Wet, Wet 36 van 1998. Afdeling 21 (a) en (b) en (c) en (i) en (g) en (j) Watergebruiksmagtiging. Afdeling 21 watergebruike waarvoor aansoek gedoen word: Afdeling 21 (a): Die ontrekking van Grondwater (c): Belemmering of verlegging van die vloei van die water in die waterstroom; Afdeling 21 (i): Verandering aan die bedding, oewer, stroom of eienskappe van die waterstroom; Afdeling (g) Wegdoening van afval op 'n wyse wat 'n nadelige impak op die waterstroom kan hê; en Afdeling (j) verwydering, uitlating of wegdoening van ondergrondse water.

KENNISGEWING VAN OPENBARE DEELNAME PROSES: In terme van: Die NEMA wysigings van 2017 (Regulasie 326, 324 en Regulasie 327), die Wet op Nasionale Erfenishulpbronne (Wet No. 25 van 1999) (NHRA), en die Nasionale Water Wet, Wet 36 van 1998.

DATUM VAN PUBLIKASIE VANADVERTENSIE: 10 Februarie 2021
ONAFHANKLIKE OMGEWINGSKONSULTANT: EnviroGistics (Edms.) Bpk.
Partye wat as Geïnteresseerde en Geaffekteerde Partye (GGP's) wil registreer en/of wat wil deelneem deur kommentaar te lewer, of wat addisionele inligting verlang, moet registreer en hul geskrewe kommentaar indien. Kontak die volgende persone om te registreer as GGP of indien addisionele inligting verlang word:

BathoEarth
Me Ingrid Snyman of Me Diana Verster
Postnet Privaat Suite 415, Private Bag x8, ELARDUSPARK, 0047
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Figure 14: Abstract of Advert Proof (placed on 13 February 2021 in the Kathu Gazette)

As a result of the Addendum Application and Addendum ESR, a second round of advertisements was place in English, in the same Newspaper as before. This advert was placed on 26 March 2021.

NOTICE OF ADDENDUM TO AN ENVIRONMENTAL AMENDMENT APPLICATION AND NOTICE OF WATER USE LICENSE APPLICATION

In terms of the:
Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA);
National Environmental Management Act, Act 107 of 1998 (NEMA) and associated EIA regulations and listed activities;
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA)
The National Heritage Resources Act (No. 25 of 1999).
National Water Act, Act 36 of 1998 (NWA).
DMR Ref No: 223MRC

BEESHOEK IRON ORE MINE: MINE OPTIMISATION PROJECT, NEAR POSTMASBURG, NORTHERN CAPE PROVINCE

PROJECT NAME: Beeshoek EIA Optimisation Application

APPLICANT: Assmang (Pty) Ltd: Beeshoek Iron Ore Mine.

PROJECT DESCRIPTION: Beeshoek Mine has investigated opportunities for the continued and sustainable mining of iron ore reserves within the approved Mining Rights Area. This application specifically gives effect to that and includes the following projects:

- Specific Demarcation of Run of Mine (ROM) Stockpiles on South Mine;
- Amendments to the design of existing WRDs in terms of the increase in heights, and allowance for final slope, which will result in extension of footprints;
- Increase of Opencast Pit footprint areas, as well as the undertaking of detrital mining;
- Development of a Jig Plant (this area will be located in the vicinity of the current plant) for the beneficiation of discard and low-grade Iron Ore;
- Development of a WHIMS Plant for the beneficiation of slimes;
- Upgrades to the water management circuit which will include additional water storage tanks;
- New inclusion of a Railway Line TFR Link from Beeshoek Siding to the existing TFR railway line.

LOCATION AND SIZE: Beeshoek Iron Ore Mine is situated approximately 7 km west of the town of Postmasburg, in the Northern Cape Province. The mine is situated under the jurisdiction of the Tsantsabane Local Municipality, under the ZF Mgcawu District Municipality. The regional R385 road, as well as the OREX Railway Line traverses the mine.

The proposed new mining activities are located on the following Farms: Portion 0 of the farm Beesthoek 448 RD (1,543ha), Portion 1 of the farm Beesthoek 448 RD (1,231ha) and Portion 4 of the farm Olynfontein 475 RD (2,168ha).

APPLICATION BASED ON NEMA: In terms of Section 24D and 29 of the National Environmental Management Act, Act 107 of 1998 (NEMA), as read with the EIA Regulations Process in terms of the NEMA Regulations 326 of 2017 (Regulation 324, Regulation 325 and Regulation 327) a Scoping and Environmental Impact Assessment Process is required. The following listed activities are triggered by the proposed development: NEMA: Government Notice 327, Listing Notice 1: Activity, 10, 12, 14, 19, 24, 27, 34, and 56. NEMA Government Notice 325, Listing Notice 2: Activity 6, 12 (new inclusion) and 15. The application will also require a Part 1, Regulation 29 amendment. The change in the footprint, combining the area for the purposes of an overall ROM footprint will trigger an amendment to the current layout, and also the amendment of certain conditions as a result of the Regulation 34 Environmental Audit conducted in 2019. The project also triggers activities listed in **(GNR) 921 of the National Environmental Management: Waste Act, 2008** (Act 59 of 2008) (NEM:WA) (Category B: activity 13) and will require a Waste Management License (WML). Regulatory Authority: Department of Mineral Resources (DMR), Northern Cape Region. **National Water Act, 1998** (NWA): National Water Act, 1998 (NWA): The following water uses will be licensed in terms of section 40 of the National Water Act, Act 36 of 1998. Section 21 (a) and (b) and (c) and (i) and (g) and (j) Water Use Authorisation. Section 21 water Uses to be applied for: Section 21 (a): The abstraction of Groundwater (c): Impeding or diverting the flow of water in a watercourse, Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse, Section (g) Disposing of waste in a manner which may detrimentally impact on a water resource, and Section (j) removing, discharging or disposing of water found underground.

NOTICE OF PUBLIC PARTICIPATION PROCESS: In terms of: The NEMA amendments of 2017 (Regulation 326, 324 and Regulation 327), the National Heritage Resources Act (Act No. 25 of 1999) (NHRA), the National Environmental Management: Waste Act, 2008 and the National Water Act, Act 36 of 1998.

DATE OF PUBLICATION OF ADVERTISEMENT: 26 March 2021

CONSULTATION PERIOD: The draft Environmental Scoping Report was submitted to registered stakeholders on 24 March 2021 for review up until 26 March 2021. Due to the additional activity of the railway line being included information regarding this project will be made available to all registered stakeholders for a 30 day review period from 30 March to 29 April 2021.

INDEPENDENT ENVIRONMENTAL CONSULTANT: EnviroGistics (Pty) Ltd.
Parties wishing to register as Interested and Affected Parties ("I&APs"), who wish to participate by contributing comments, or require additional information, should please register or submit their correspondence in writing. To register as an I&AP or obtain more information about the project, should please contact:

BathoEarth
Ms Ingrid Snyman or Ms. Diana Verster
Postnet Private Suit 415, Private Bag x8, ELARDUSPARK, 0047
Fax: 087 807 4536
Mobile: 082 779 2750 (Ingrid) 073 157 7362 (Diana)
E-mail: **Ingrid@bathoearth.co.za** or **diana@bathoearth.co.za**

Figure 15: Addendum Advert placed 26 March 2021

2.f.ii.7 Document Review

The Scoping Report was made available on public review for a period of 30 days from **22 February 2021 to 24 March 2021**. Note, that any comments received up until the EIA Phase will be considered for inclusion into the Final EIA Report.

Electronic Copies of the report were made available from:

- Public Participation Office via Dropbox link and via email.

Hard copies of the Draft Scoping Report were couriered to the following authorities:

- Department of Environment, Forestry and Fisheries (DEFF) northern Cape Division;
- Department of Mineral Resources and Energy (DMRE) – Registry
- Northern Cape Department of Environment and Nature Conservation – Ms. Doreen Werth
- Department of Water and Sanitation (Kimberley) – Mr. Gawie van Dyk (Mr. Philani who was the initial official for Beeshoek is no longer with the DWS. For this reason a new official will be allocated once the WUL process is initiated.)
- SAHRA – Online system (although no site clearance will take place)
- Tsantsabane Local Municipality – Municipal Manager
- ZF Mgcawu District Municipality – Municipal Manager

As a result of the Addendum Application and Addendum ESR, a second round of ESR review was provided from **30 March 2021 to 29 April 2021**. Hard copies and electronic copies of the report was issued similar than the previous review period.

2.f.ii.8 Stakeholder Meetings

Stakeholder meetings is at this time not foreseen due to the COVID restrictions facing South Africa at this moment. All registered stakeholders will be contacted individually to discuss the project and obtain their input. Where specific meetings are required, in terms of potentially directly affected individuals, these will be scheduled accordingly.

2.f.ii.9 Summary of Issues raised by the I&APs

The Issues and Responses Register will include the comments as received during the Stakeholder Consultation Process undertaken for the proposed project. This includes responses to the advertisements, response sheets, individual discussions with key stakeholders, and any other comments received during the project timeframe up to 24 March 2021 for to the Draft Scoping Report, will be included into the final report. Thereafter a second commenting period will be allowed as part of the draft EIA process. All comments received during this process will be included into the final EIA Report for the DMRE consideration.

Comments reported within this Issues and Response Register will be updated during the project. This document can therefore be considered as an active document up until the final reports are submitted. No comments have been received to date.

Table 25: Stakeholder Comments received

No.	Theme: General Comments / Issues			
	Issue Raised	**Date and How Issue Was Raised**	**Commentator**	**Response**
1	The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit notes the pending assessment of the impact to heritage resources and requests the following: Assessment of the impact to heritage resources must comply with section 38(3) of the NHRA, as required by section 38(8) of the NHRA; The archaeological component of the assessment must include a field-based assessment conducted by a qualified archaeologist, and the report must comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological	Letter sent via email. Letter dated 12 March 2021	SAHRA	Based on the SAHRA Paleontological map the area (see figure hereafter) is of moderate to high paleontological sensitivity and a separate study was conducted for this aspect (Bamford 2021). This study concluded that it is extremely unlikely that any fossils would be preserved in the Campbell Rand Subgroup stromatolites or in the loose sands of the Quaternary. There is a very small chance that fossil may occur in palaeopans in the ancient rocks and therefore recommended that a Fossil Chance Find Protocol should be added to the EMPr. Please refer to Section 2.f.iii.12.

No.	Theme: General Comments / Issues			
	Issue Raised	**Date and How Issue Was Raised**	**Commentator**	**Response**
	Components of impact Assessments; As the project footprint is located in areas of moderate to very sensitive as per the SAHRIS PalaeoSensitivity map, a field-based Palaeontological Impact Assessment must be conducted as part of the EIA phase of the EA application. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessment s and must be compiled by a qualitied palaeontologist.			
2	Impact & influence on neighbour farm (Aucampsrus) which is close to Beeshoek's current mining activities.	26 February 2021 Completion of BID Registration form and submitted via email.	Surrounding Landowner: Altus Viljoen Aucampsrus farm	A detailed groundwater study, including a numerical model will be undertaken as part of the EIA studies to assess the impact of mine dewatering (for safe mining conditions). Other studies will include Socio-Economic Assessment and Air Quality Assessment. For a detailed list of the specialist studies which will form part of the EIA phase please refer to Section 2.g.ii.
3	We confirm that as at the date of this letter (23-02-2021) no land claims appear on our database in respect of the property.	23 February 2021 Provision of official letter via email.	Commission on the Restitution of Land Rights	None
4	This serves to acknowledge the receipt of your documents on the above matter. We request your availability to present to the Council Committee on Technical and Community Services the contents of the application and implications for the municipal area.	25 February 2021 Submission of an email request.	Municipal Manager, Mr. Mathobela – Tsantsabane Local Municipality	The Stakeholder Consultation Specialist is in engagement with the municipality to arrange a date a time for the requested meeting.

Please refer to Annexure 3 for the copies of the received comments and requests.

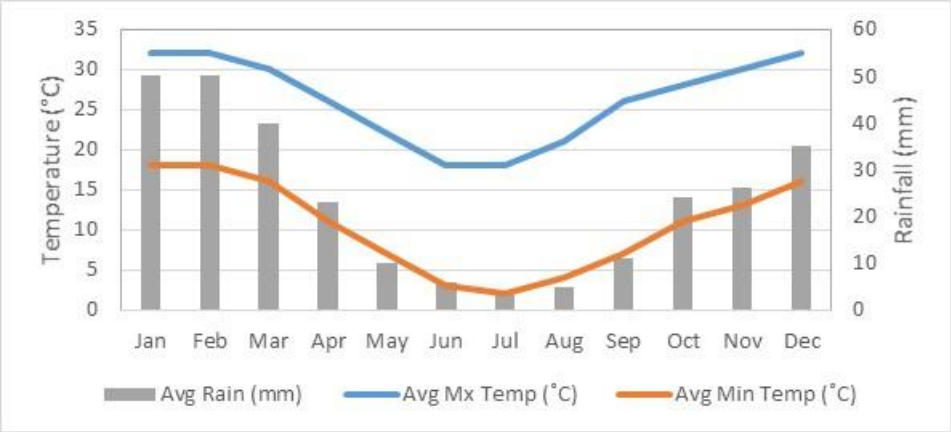
2.f.iii The Environmental Attributes associated with the Alternatives

2.f.iii.1 Climate

Postmasburg is the closest town to Beeshoek, situated at approximately 28˚33' S and 23˚07' E, at an elevation of 1 305m. According to the Köppen-Geiger climate classification system it experiences a hot desert climate. The climate at Postmasburg is well described by the 30-year historical data record from the Meteoblue archived weather model data. Meteoblue weather models historical data from 1985 onwards and generated a continuous 30-year global history with hourly weather data at a grid resolution of 30 km.

The average summer maximum temperatures are hot and exceed 30˚C from November to March (please see figure below). The winter temperatures are mild and the average minimum temperature drops below 10˚C from May through to September.

Postmasburg receives an annual average rainfall of only 283 mm with most of the rain falling between December and March (please see figure below).



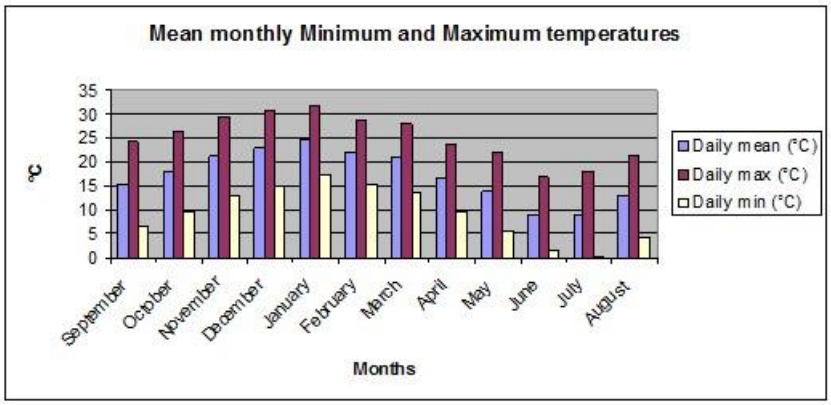
Graph 1: Average monthly maximum and minimum temperatures at Postmasburg and the average monthly rainfall (https://www.meteoblue.com)

Temperature

The highest summer day temperatures in South Africa occur in this area – temperatures of more than 40^{0}C are measured during November, December, January and February.

On the other hand, the winters are extreme with temperatures often below 0°C experienced during June, July and August.

See the following graph for the mean monthly minimum and maximum temperatures.

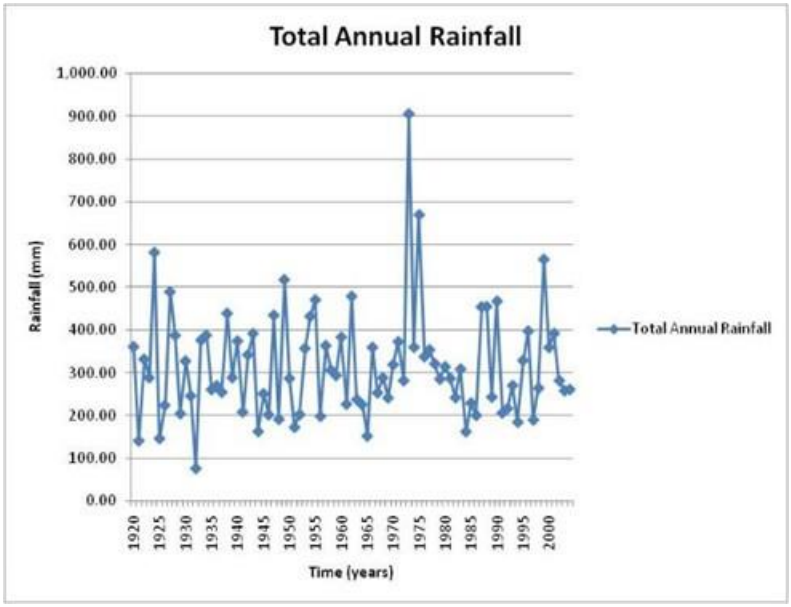


Graph 2: Mean monthly minimum and maximum temperatures

Rainfall

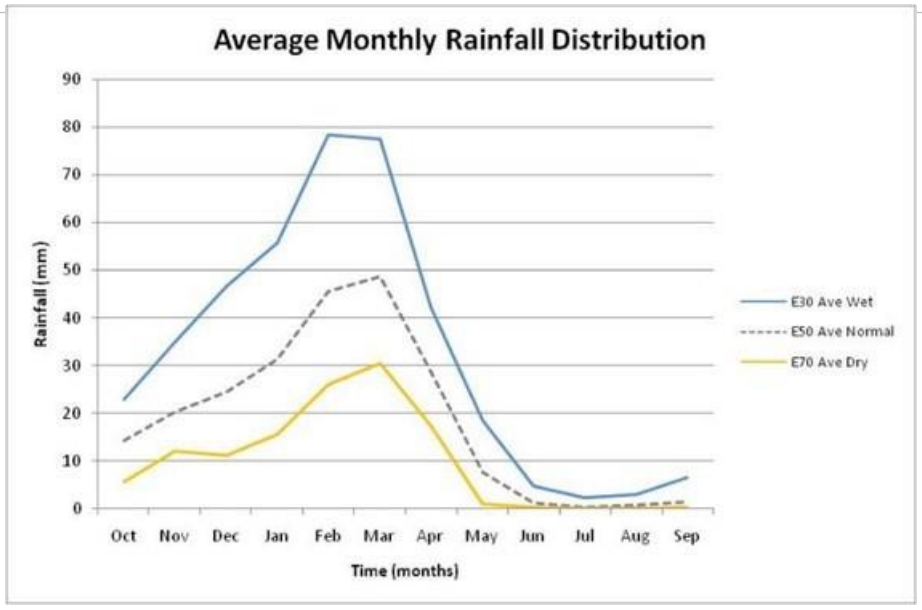
According to statistics from the Weather Bureau Station No. 0321110 (Latitude 28°20' Longitude 23°04', at a height of 1311 metres above mean sea level (mamsl)) at Postmasburg, located approximately 7km from Beeshoek, the mine is within an area of Mean Annual Precipitation (MAP) that ranges from 315 - 400 mm.

The graph below shows the total annual rainfall (mm) over a period of 85 years for the area.



Graph 3: Total Annual Rainfall

The graph below shows the average monthly wet and dry rainfall periods of the area, together with the normal average (50%) rainfall period as a reference (all in mm).



Graph 4: Average Monthly Rainfall Distribution

The table below summarises all the different rainfall parameters as described and displayed in the graphs above.

Table 26: Rainfall Summary

Type of Rainfall	Amount *(mm)*
MAP	319
Ave Normal Annual	224
Ave Wet Monthly	33
Ave Dry Monthly	10
24 hour 1:50	123.1
24 hour 1:100	139.4

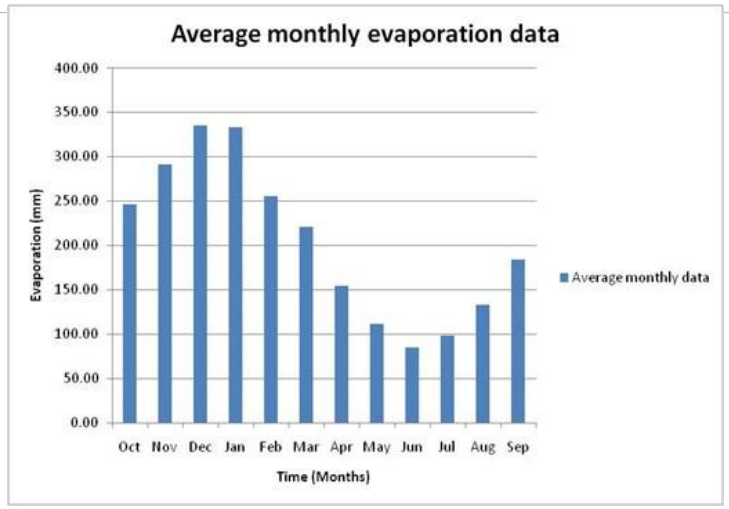
Evaporation

As in the case of rainfall, it is also necessary to analyse evaporation over the following periods:

- Average annual normal evaporation; and
- Average monthly wet and dry evaporation.

Much less evaporation data than data for rainfall exists. Evaporation is measured at dams and mostly stations that are operated by DWS provide such data. As in the case with rainfall, much effort has been placed to incorporate evaporation data into the Pitman model and consequently the WR2005 dataset (WRC, 2008). A previous version of WR2005 is also available with evaporation data; this dataset is called the WR90 dataset (WRC, 1990).

WR2005 evaporation data only gives Mean Annual Evaporation (MAE) in millimetres (mm) and average monthly percentage (%) figures. Because limited data is available only very basic statistics are performed on the data in order to obtain required figures. Percentage values of 50%, 40%, and 60% of the MAE respectively are assumed and adopted for normal, wet, and dry averages. The table below summarises the analysed evaporation data. The average annual evaporation is 3 400mm per annum for the Lower Vaal Water Management Area (WMA). The monthly average annual evaporation for this area is indicted in the graph below which indicates the monthly average evaporation taken over an 85-year record period for the area.



Graph 5: Average Monthly Evaporation

The table overleaf summarises all the evaporation parameters that are considered for the analyses at hand.

Table 27: Average Evaporation Summary

Type of Evaporation	Amount (mm)
MAE	2,450
Ave Normal Annual	1,225
Ave Wet Monthly	81.67
Ave Dry Monthly	122.5

2.f.iii.1.a Wind

The hourly wind speed and direction at Postmasburg are presented in the annual windrose in the following figure. A windrose illustrates the frequency of hourly wind from the 16 cardinal wind directions, with wind indicated from the direction it blows, i.e. easterly winds blow from the east. It also illustrates the frequency of average hourly wind speed in six wind speed classes in m/s.

The predominant wind direction is northwest to north-northeast with winds from other sectors less frequent. Winds are generally light with most of hourly winds less than 3.4 m/s. Stronger winds reaching more than 8 m/s are infrequent and mostly occur from the west-northwest to north-northwest sector.

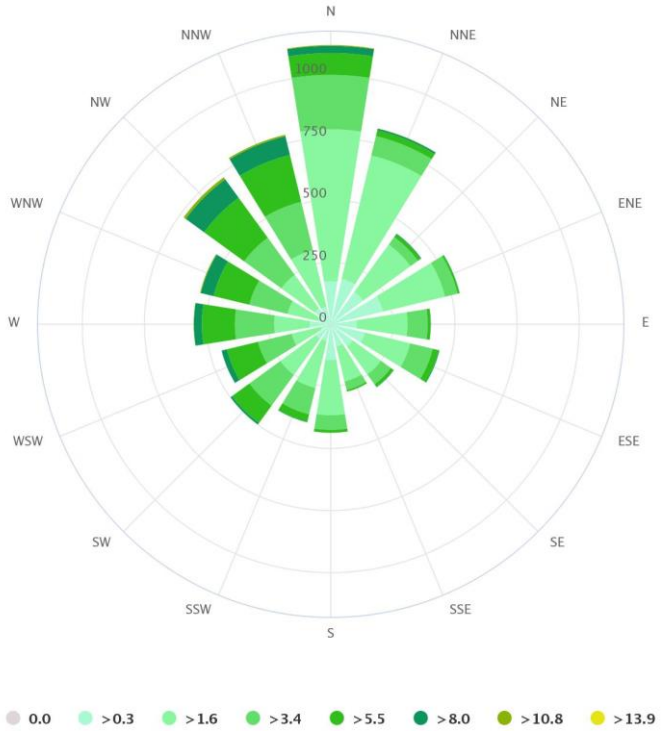


Figure 16: Annual windrose at Postmasburg with wind speed in m/s and frequency bands of 250 hours (https://www.meteoblue.com)

2.f.iii.2 Topography

The topography of the project area is characterised by relatively flat terrain, with no steep inclines. The greatest altitudes are characterised by the various WRDs and also three (3) specific natural koppies. At the koppies, altitudes range from approximately 1,370 metres above mean sea level (mamsl) around the elevation on the South Mine (koppie south of the R385, and the koppie on the south-eastern portion of the mine) and 1385mams on the north easterly periphery of the mine. The lowest points at the mine are located on the western boundary at 1,302 to 1,306mamsl. There is an overall north south slope from 1,340 to 1,302mamsl.

2.f.iii.3 Geology

The Beeshoek-Olynfontein iron ore deposits are situated along the contact between the Gamagara Formation and the underlying Manganore Iron Formation. The Manganore Iron Formation, being a distorted iron formation, wedged uncomfortably between the Gamagara Formation and the Campbellrand Carbonate Sequence.

According to the approved EMP, four different types of ore are found in the Beeshoek opencast mine namely “Thaba” ore, laminated ore, “detrital” ore and Conglomeritic ore. The biggest portion of the Beeshoek ore is the Conglomeritic type, which forms the basis of the Gamagara formation. The Conglomerate was deposited in, which seems to be, erosion channels or sinkholes in the North Eastern direction.

The sediments of the Gamagara Formation dip at 10° to the West, with a strike that swings from North to North-East.

The underlying Asbestoshills Formation comprises of laminated iron, banded ironstone and a basal manganiferous chert breccia (Wolhaarkop breccia). The dolomites of the Campbellrand Formation underlie the entire sequence, but nonetheless outcrop in the lower lying ground in the East of Beeshoek area and over extensive areas of the Doornfontein area to the North.

The contact between the breccia and the underlying dolomite is irregular - sinkholes and solutions cavities are reported to be associated with it. The irregular contact has resulted in considerable thickness variation occurring in the overlying Wolhaarkop breccia.

The entire sequence is fully represented in the Western portions of the Beeshoek area only, where the dolomite is present at depths of up to and in excess of 150m.

2.f.iii.4 Soils

The regional soil environment in the Postmasburg area is typified by shallow Mispah and Coega soils on gentle to flat mid slopes. Both soil forms have medium clay content and a low agricultural potential. The arid climate restricts the growth of vegetation, which usually contributes organic matter to soils further reducing the agricultural potential of the soil.

Typically the pH levels in the soils range between 7, 1 and 8, 4. Electrical conductivity, which gives an indication of salinity within the soil, ranges between 31 and 61 mS/m and indicates that the soils do not show any signs of salinisation. Low sodium levels indicate that there is no risk of erosion due to dispersion of clay particles by sodium ions. No determinants are present at levels that would inhibit plant growth.

The baseline chemical status of the soils is typical for soils under normal field conditions with no evidence of mining related contamination. The soils are thus chemically and physically suitable for rehabilitation. However, due to the shallow effective soil depth generally encountered in this area, limited topsoil is available for stripping and stockpiling for rehabilitation purposes.

The area is zoned as a mining area, with large scale mining taking place within the region. The mining area was most likely used for livestock grazing before mining commenced, based on surrounding land use of grazing taking place.

From a land capability point of view, the Beeshoek Mine Area is dominated by soils with low agricultural potential. At best, the soils within the Beeshoek Mine Area are suitable for supporting wildlife and grazing to a degree. Although small patches of arable soils occur within the area, given the climatic constraints of the area (Rainfall less than 400 mm) and lack of irrigation options, these soils are not likely to contribute substantially to national food production grid. The very low rainfall in the area infers that the only means of cultivation would be by irrigation. However, based on observation of the area there are no signs of irrigation infrastructure. In addition to that, high temperatures occurring in this area are also likely to cause crop permanent wilting, thus affecting crop yield. Given these constraints the extent of the high productivity soils is not considered sufficient for viable cultivated commercial farming.

2.f.iii.5 Ecological Footprint

The area around Beeshoek forms part of the Savanna Biome in the Eastern Kalahari Bushveld Bioregion (refer to the figure hereafter). Although a number of endemic or near-endemic plant species occur in the area it is not regarded as veld types needing protection. Van Wyk & Smith (2001) regard the Ghaap plateau, of which Beeshoek forms a part, as a unique area where many near-endemic succulent plant species may still be found.

The Kuruman Mountain Bushveld is characterized by banded iron formations with jaspilite, chert and riebeckite-asbestos of the Asbestos Hills subgroup of the Griqualand West Supergroup. Soils are shallow sandy soils of the Hutton form (Mucina & Rutherford 2006).

Figure 17: Beeshoek lies in the southern tip of the Kuruman Thornveld (veld type SVk 9), touching on the Postmasburg Thornveld (SVk 14) as described in Musina & Rutherford, 2006 (abstract from the 2013 Plant Study).

Two species (i.e., the Aardwolf (*Protelis cristatus*) and the Small Spotted Cat (*Felis nigripes*)) are regarded as rare and two are regarded as vulnerable i.e. the Aardvark (*Orycteropus afer*) and the African Wild Cat (*Felis lybica*). Two red data bird species are known to occur on the area (i.e., the Kori Bustard (*Ardeotis kori*)), which is vulnerable, and the Lanner Falcon (*Falco biarmicus*), which is classified as near-threatened.

2.f.iii.6 Sensitive Setting

Several ephemeral depression wetlands ('pans') were identified throughout the mining area.

The pans are considered to be in a moderately modified ecological condition, although the degree to which modifiers have affected the ecological integrity varies. Similarly, the Ecological Importance and Sensitivity (EIS) is likely to be of moderate levels, whilst the goods and services provision is likely to be of low to intermediate levels.

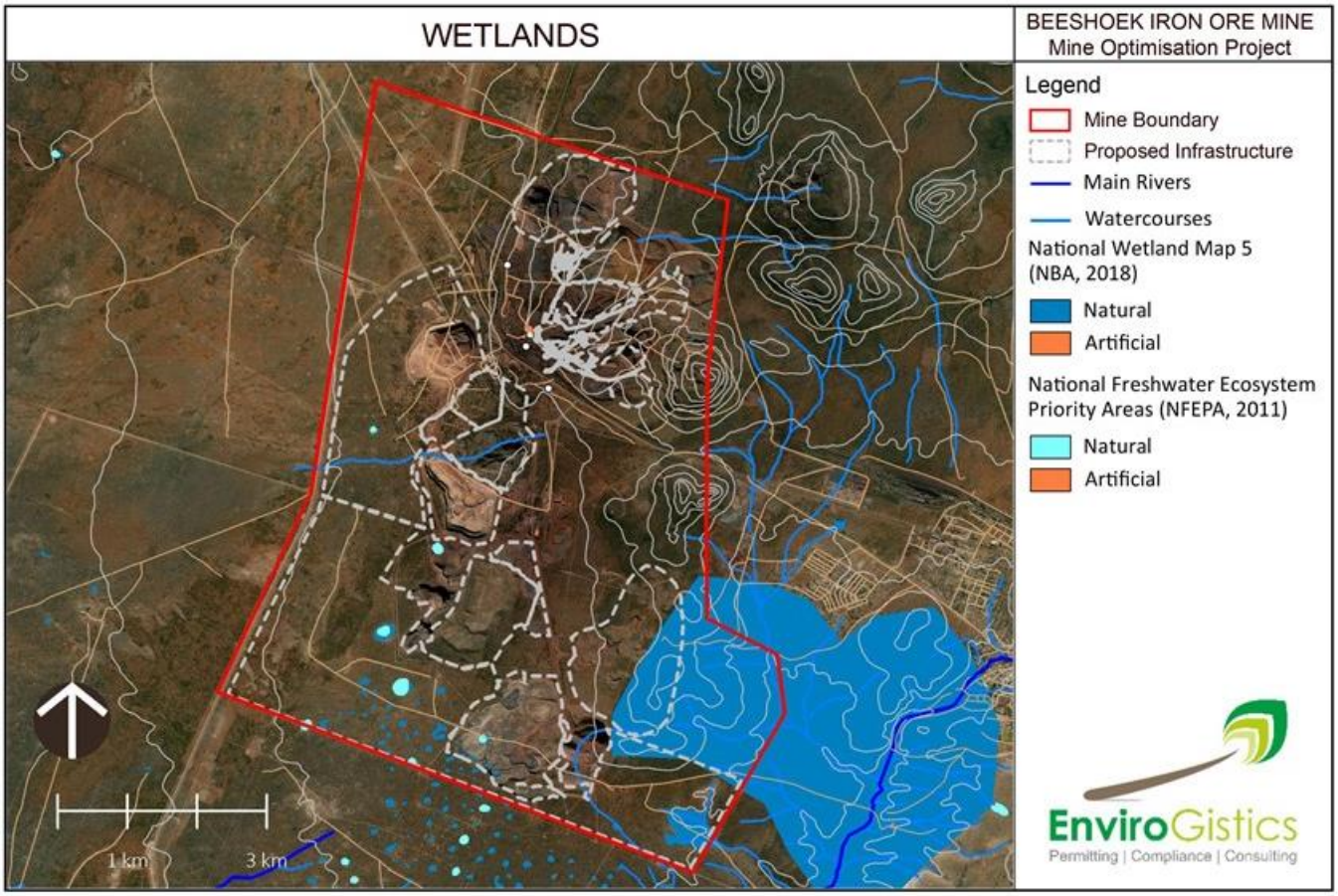


Figure 18: NFEPA Wetlands and Rivers – Project 1 to 5

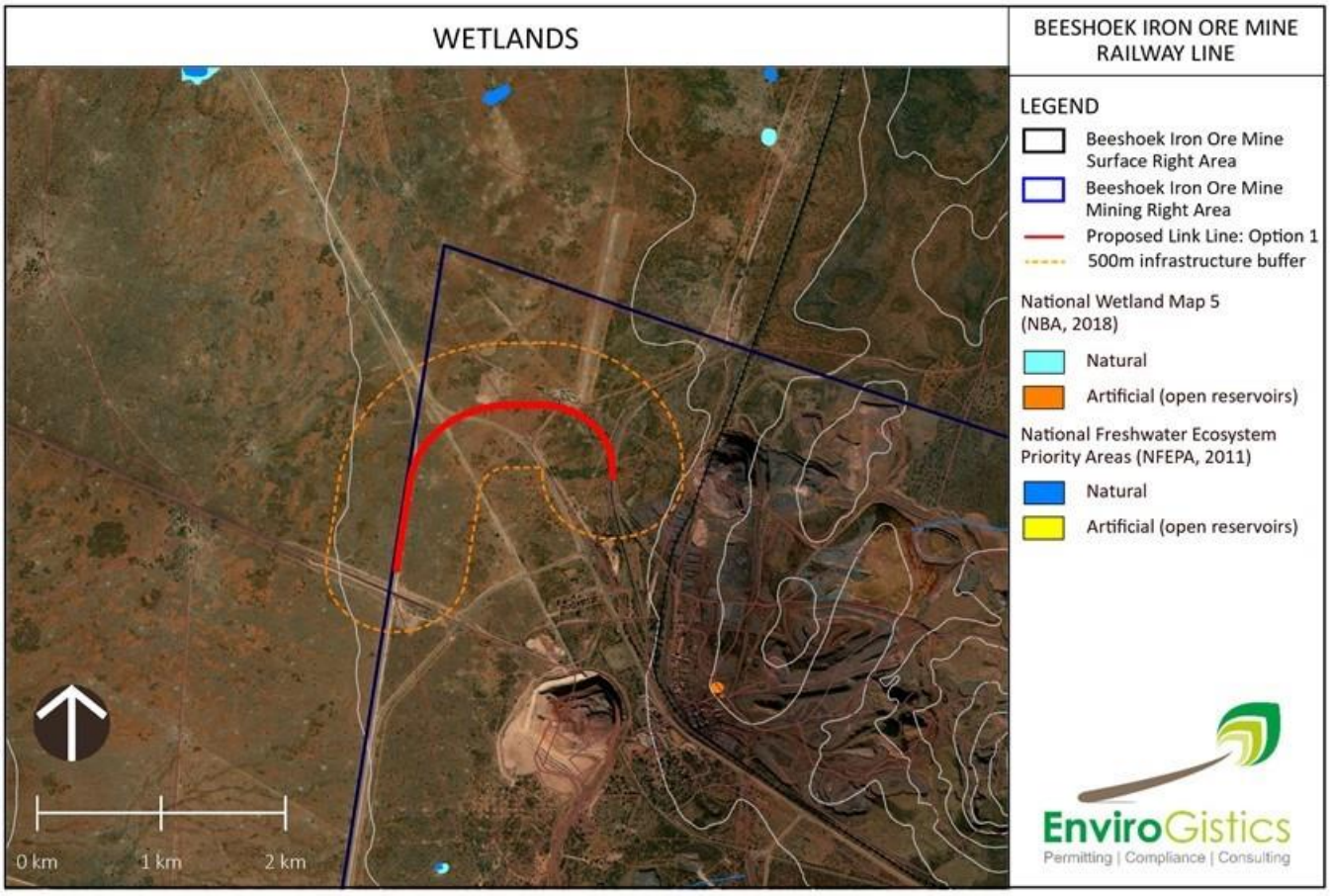


Figure 19: NFEPA Wetlands and Rivers – Project 6

2.f.iii.7 Hydrological Setting

The most important river in the region is the Orange River. The Orange River is perennial with a flow which varies between 50 and 1 800 cubic meter per second (m^3/s) depending on the season. The flow of the river is largely controlled by the releases of the dams upstream, like the Bloemhof, Gariep and Van der Kloof dams.

The Hartebees River runs past Kenhardt and flows into the Orange River. This is a river which only flows after heavy rainfall. The Molopo River and its tributary, the Kuruman, which previously used to flow into the Orange River is situated in the north of the area. A sand dune cut the river off and it can no longer flow through. After a flood a large swamp forms near the junction of the two rivers.

There are also other small rivers which only flow after heavy rains and are therefore rather inconsistent.

The nearest watercourse to Beeshoek is the Groenwater Spruit, which drains the Beeshoek area and is located approximately 5km to the south of the mine.

Beeshoek is located in Water Management Area (WMA) 10: Lower Vaal. The Lower Vaal WMA borders Botswana in the north of the Northern Cape Province and lies in the North West Province as well. The major rivers associated with this WMA are listed as Molopo, Harts, Dry Harts, Kuruman and Vaal Rivers. A particular characteristic of the Orange/Vaal WMAs is the extensive inter-catchment transfer of water within WMAs as well as interbasin transfers between these and other adjoining WMAs.

The Lower Vaal WMA is dependent on water releases from the Middle Vaal WMA for meeting the bulk of the water requirements by the urban, mining and industrial sectors within its area of jurisdiction, with local resources mainly used for irrigation and smaller towns.

Water quality in the Lower Vaal is strongly influenced by usage and management practices in the Upper and Middle Vaal WMA.

The Lower Vaal WMA in divided up into three sub-areas:

- **Molopo (where Beeshoek Mine is situated);**
- Harts; and
- Vaal River downstream of Bloemhof.

The mine is located in the Quaternary Catchment D73A. This area is surrounded by escarpments on the eastern side and much more flat topography to the west. Most of the water drains towards the south and southwest.

The main Natural Catchment area is delineated in a holistic manner from a large to a small scale. A specific Discharge Point (DP) is identified from which the upstream catchment is delineated. No defined watercourses occur on Beeshoek from which a specific DP could be identified, and the DP is limited to the closest discharge point of a given watercourse nearest to the DPs of the mine boundary. Details are given in the following table.

Table 28: Natural Catchment Summary

Catchment	Surface Area Size (km^2)	Discharge Points (DPs)
WMA 10: Lower Vaal	83,788	n/a
Quaternary Catchment D73A	3,238	n/a
Natural Catchment 1	250	DP1

The 1:50 000 topographical maps indicate a number of drainage lines along the eastern and south-eastern mine boundary.

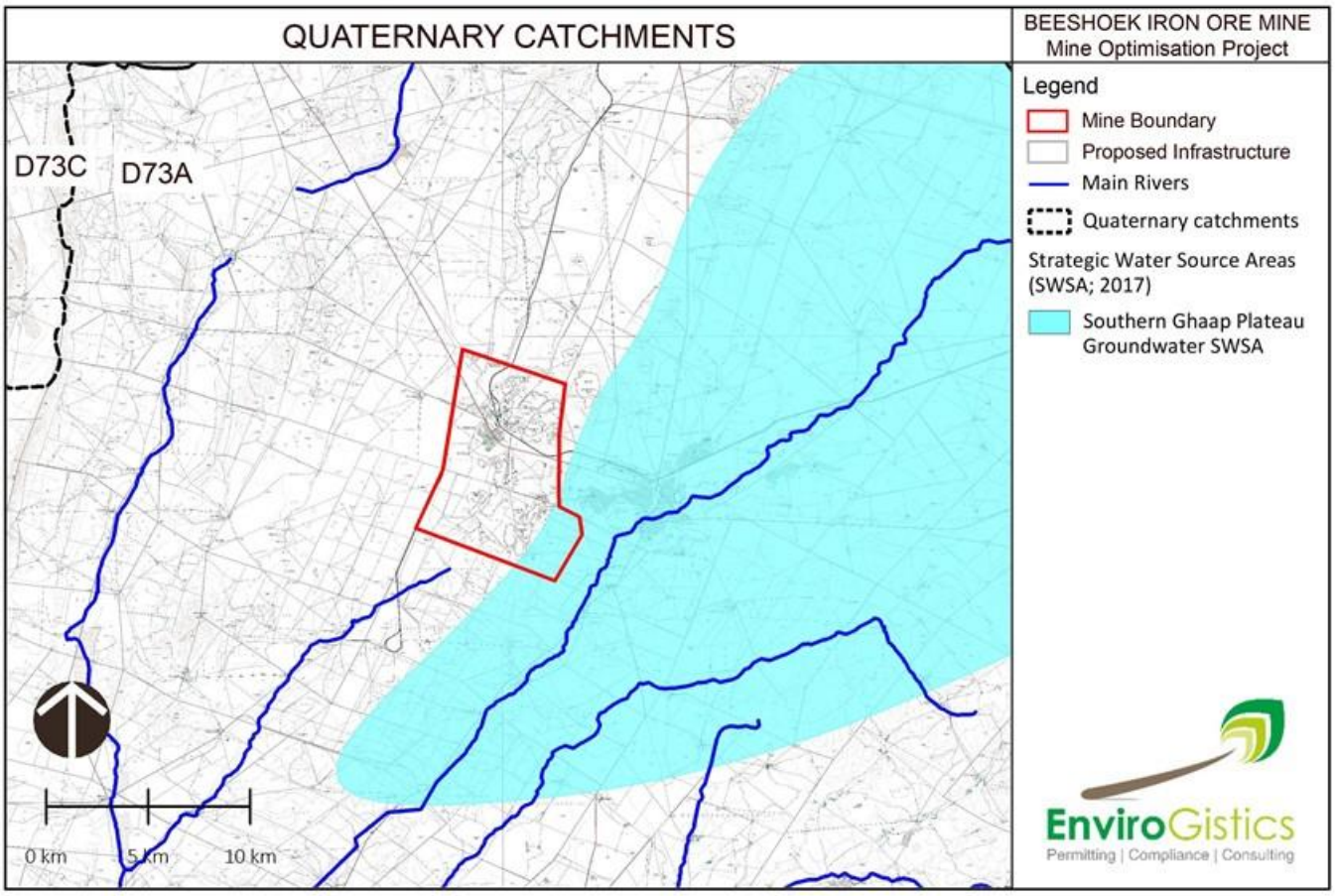


Figure 20: Quaternary Catchment

During the site visit, these areas were assessed. Evidence of two shallow drainage lines were found along the south-eastern mine boundary.

No evidence of recent flows was noted at any of the above-mentioned drainage lines. It is likely that these drainage lines would only flow very briefly in response to significant rainfall, which is very rare for this region.

Figure 21: Drainage line near the south-eastern mine boundary

When considering the railway line area, the nearest defined watercourse to the Mine is the Groenwaterspruit (EnviroGistics, 2018), which is located approximately 1.5 km east of the south-eastern MRA boundary. As previously mentioned, Beeshoek falls within an endoreic quaternary catchment, and therefore, very little to no surface water is expected to be generated.

Groundwater levels in the vicinity of the railway link vary from 1 290 mamsl to 1 310 mamsl (GPT, 2021), which is approximately 10 m to 30 m below ground level.

The desktop assessment of contours and site investigation findings revealed the following:

- A number of man-made excavated areas that appear to be old borrow pits occur within the vicinity of the proposed railway;
- An artificial drainage channel, that begins at a culvert where the proposed railway link ties into the existing Beeshoek Railway, and flows in a westerly direction, has been created due to what appears to be a leaking pipe. Should the leak be fixed, then this drainage channel would cease to exist; and
- A seasonal / ephemeral depression is located approximately 125 m east of the point where the proposed railway link ties into the existing TFR railway line. According to the Wetland Specialist, although one floral species associated with wetlands was found, the soils did not show any morphological characteristics consistent with wetland conditions, and therefore, the depression was classified as a seasonal / ephemeral depression and not a wetland. More details can be found in the wetland assessment.

Based on the above, it can be concluded that there are no natural watercourses within the vicinity of the proposed railway link.

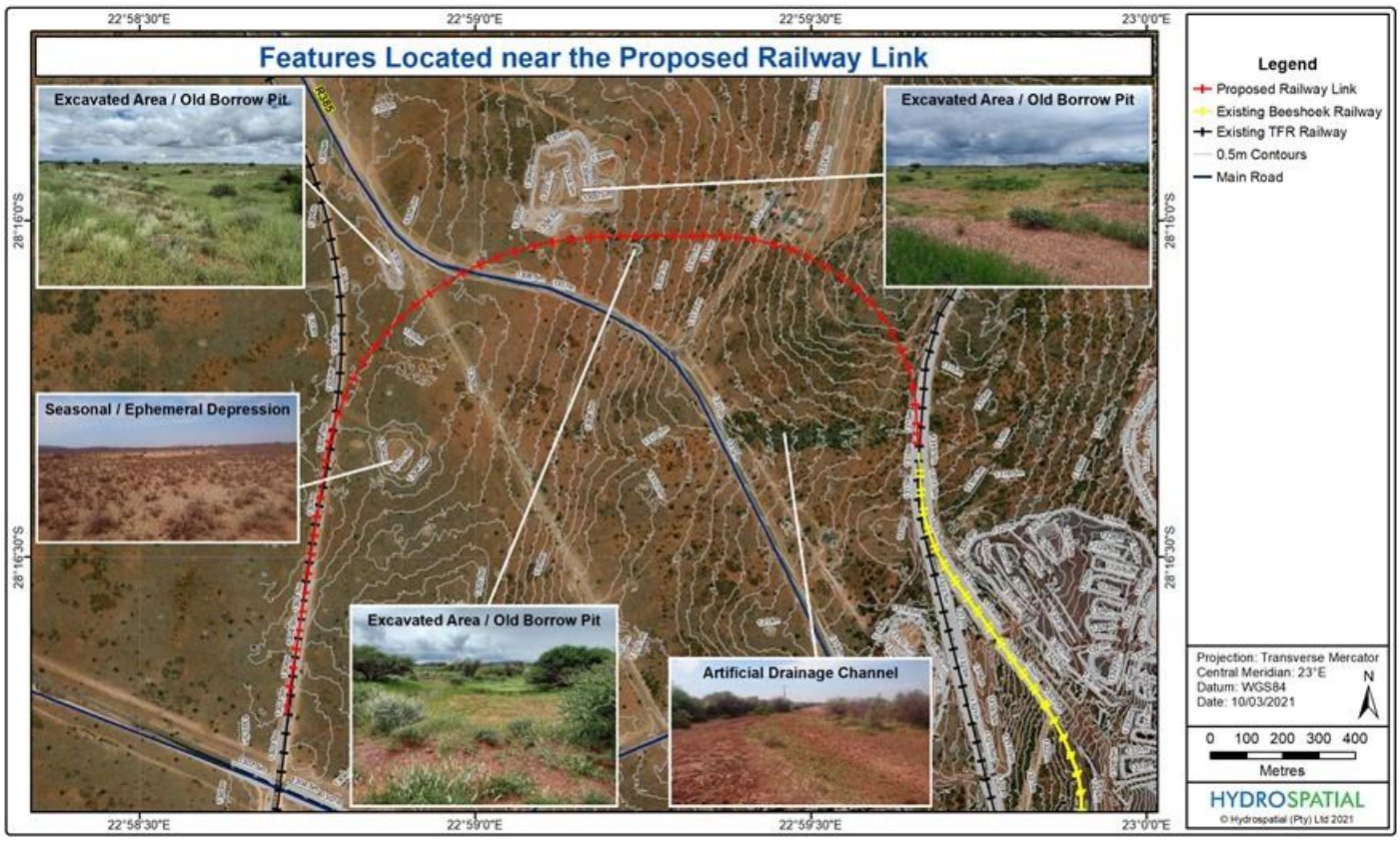


Figure 22: Features located near the proposed railway link

2.f.iii.7.a Water Supply

A bulk water supply scheme (the Vaal Gamagara Water Supply Scheme) from the Vaal River to the arid areas of the Gamagara valley near Postmasburg and north thereof was implemented by the then DWA (now DWS) to supply potable water to these areas and thus to enable the development of the large scale mining operations in areas such as Beeshoek, Lime Acres, Sishen, Mamatwane, Hotazel and Black Rock.

Potable water for use by the mine is obtained from various boreholes on site. Boreholes are licensed for domestic supply and others for both domestic and process water supply, as well as for the purposes of dewatering for safe mining conditions.

Twelve boreholes are licensed in the WUL, 2018 to abstract a total volume of 5 655 371m^3/a. Of these boreholes, five are licensed for dewatering specifically (of which two are in-pit dewatering). The mine plans to add the HF Pit Borehole (WG74) currently licensed for potable water supply as a dewatering borehole for the HF Opencast Pit in the near future. This intercepted groundwater forms part of the mine's clean water circuit.

The potable water is collected in two concrete reservoirs at the entrance to the southern mining area where the water is disinfected for further distribution on the mine site. With the addition of the new water balance components, there are 11 clean water dams included in the WUL (this excludes the two fire water tanks). Most of these dams are not used to store water on a daily basis, but only to transfer water from where groundwater is abstracted to where it is required for use.

2.f.iii.7.b Surface Water Quality

The quality of the water from the Orange River has systematically been degrading. Reasons for this are the increasing agricultural and industrial activities located upstream of Upington, as well as the lessening of the inflow of high-quality water from Lesotho. At present, the analysis of the water is as follows:

- pH: 7.5;
- Conductivity: 34ms/m;
- Total hardness (as $CaCO_3$): 152mg/L;
- Chlorides: 120mg/L.

The quality of the water varies with the seasons, as well as depending on which river feeds the main inflow. If it is the Orange River, the turbidity, sand and salt content is usually high. If the inflow comes mainly from the Vaal River, one finds a light nutrient

content which leads to algae growth. Blue-green algae are typically present. The removal of large concentrations of both silt/sand and algae is problematic at times.

2.f.iii.8 Hydrogeological Setting

The following section is derived from the 2010 Integrated Water and Waste Management Plan (IWWMP) and the 2016 Numerical Model Studies and has been updated further with the Consolidated Monitoring Report, 2019 (dated May 2020), compiled by GPT.

Groundwater is not very commonly found in this area. Various farms in the area are uninhabitable because of the absence of good quality underground water. The underground water usually lies very deep beneath the surface and is often too brackish for use, even by animals.

The water table becomes deeper the further you move from the Groenwater Spruit. The water levels of the underground water in many places often subside rapidly because of over-pumping, and rainfall is too low to refill the underground sources.

The "Report on Hydrogeological Investigations undertaken at Beeshoek Iron Ore Mine, Postmasburg, Volume 1" dated November 1994 and the "Geohydrological evaluation for a licence application for the management of the surface and groundwater resources at Beeshoek Iron Ore Mine, Postmasburg" dated October 2002 contain detail pertaining to the background groundwater information.

This information includes, amongst others, the status of the groundwater in the area, detailed descriptions of the test pumping result, the aquifer type and the piezometric surface as well as the water chemistry, and includes recommendations regarding the required pumping rates and period as well as a proposed monitoring programme.

2.f.iii.8.a Groundwater Flow

In general, groundwater flow is expected to occur from high relief areas to lower relief areas towards a hydraulic discharge point, subsurface or on the surface. Due to the heterogeneity of the subsurface and disturbances like pumping for water abstraction, these relationships should not be expected to hold everywhere under all circumstances, and deviations can thus be expected. The direction of groundwater flow is south to south easterly from the mining area. A cone of depression has developed within the active mining area with flow directed towards the mining excavation due to mine dewatering. Please refer to the figure overleaf.

2.f.iii.8.b Water levels

A total of 652 water level measurements were obtained from the National Groundwater Database. The measurements were made between 1920 until 2000.

An excellent correlation was found between the measured water levels and the topography as indicated in the report "Geohydrological evaluation for a licence application for the management of the surface and groundwater resources at Beeshoek Iron Ore Mine, Postmasburg" dated October 2002. This suggests that groundwater is locally recharged and that an unconfined aquifer is present.

GPT measured 30 water levels in boreholes other than the mine's during 2002. The area is already subject to existing mining activities, with the associated lowering of the water table.

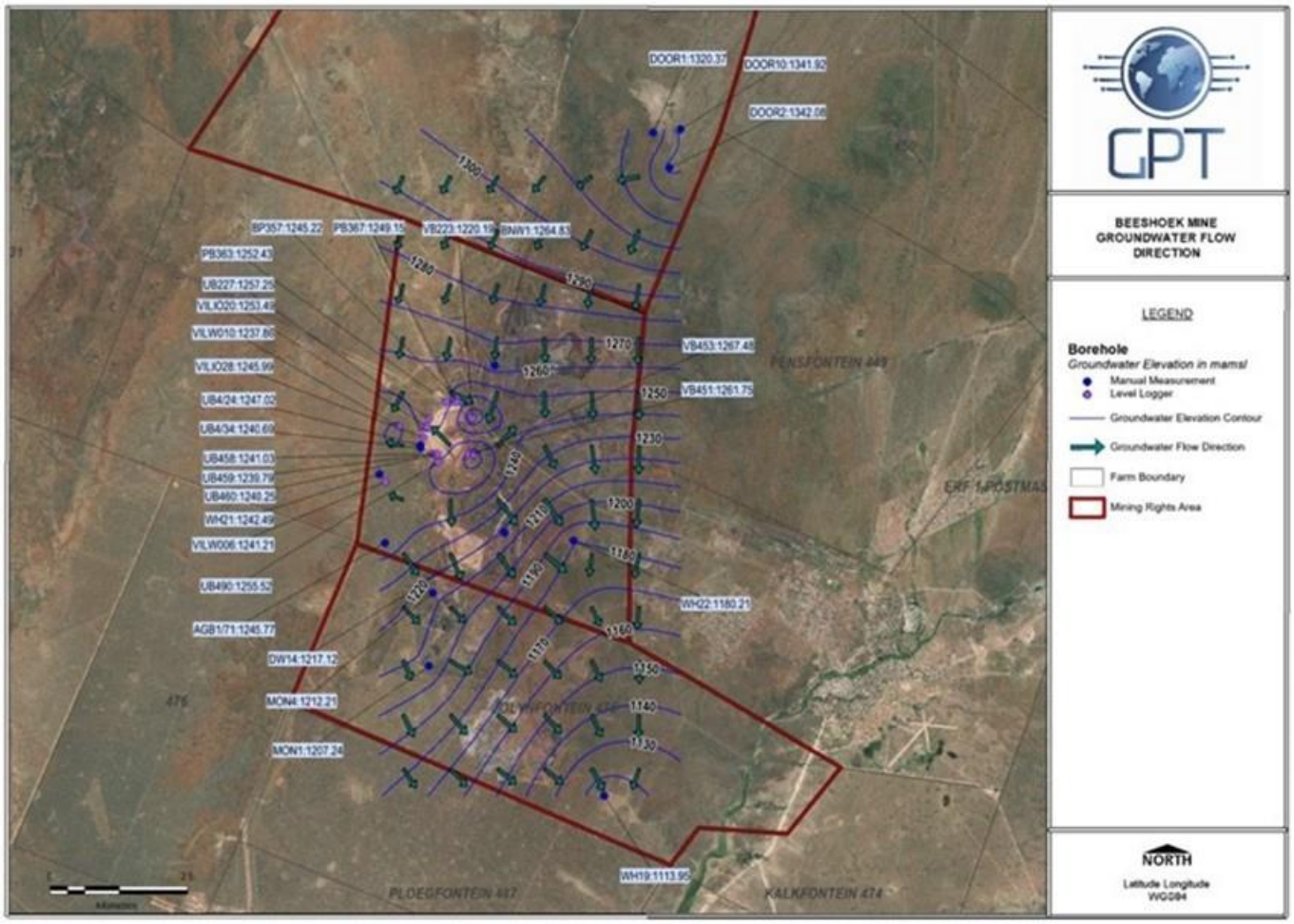


Figure 23: Groundwater flow direction (GPT, 2020)

The groundwater levels at Beeshoek are subjected to dewatering and is more pronounced to the south of the mine with little evidence of dewatering caused by Beeshoek to the north of the mine in the area of Doornfontein. According to the Annual Consolidated Monitoring Report, 2020, it becomes difficult if not impossible to distinguish dewatered areas caused by the different mines due to other mines in the area, for example Kolomela Mine. The average water level within the Beeshoek Mining Area is about 58 metres below ground level (mbgl).

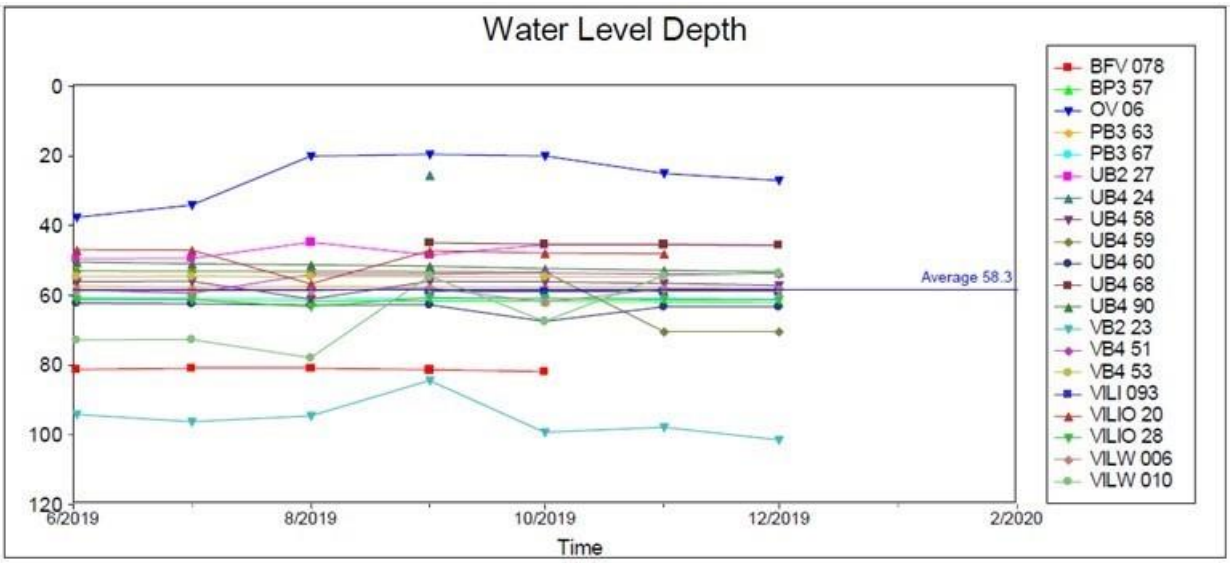


Figure 24: Static water level map of all logger boreholes measures (June 2019 until December 2019) (GPT, 2020)

The Numerical Groundwater Model undertaken by GPT in 2016 and 2017, stated that:

- The drawdown cone will radiate mostly on a south-westerly direction, due to the calibrated higher hydraulic conductivity in that area.
- The predicted affected drawdown zone will extend to a distance of about 20km from the Village Pit in the southwest, but only a few hundred meters to the north and east.
- The drawdown directly south of Village Pit is the remnants of extraction at East Opencast Pit, spreading west with time even after pumping have ceased at this pit. An easterly remnant can also be seen spreading east.
- Residual drawdown from East Opencast Pit dewatering could still deepen the groundwater levels in the area by as much as 20 meters in some places.
- Drawdown due to Village Pit dewatering could be as much as 100 meters at the pit and immediate surroundings.
- At a distance of about 1km southwest of the pit, water levels will be only about 20 to 40 meters, where the cone of depression will merge with residual East Opencast Pit dewatering.

The predicted drawdown cone of groundwater depression in 2025 was also compared to the existing monitoring network. It was concluded that:

- There are various monitoring boreholes to delineate the cone of depression; specifically KH03, KH06, WV116, WHO19 and Kameelhoek.

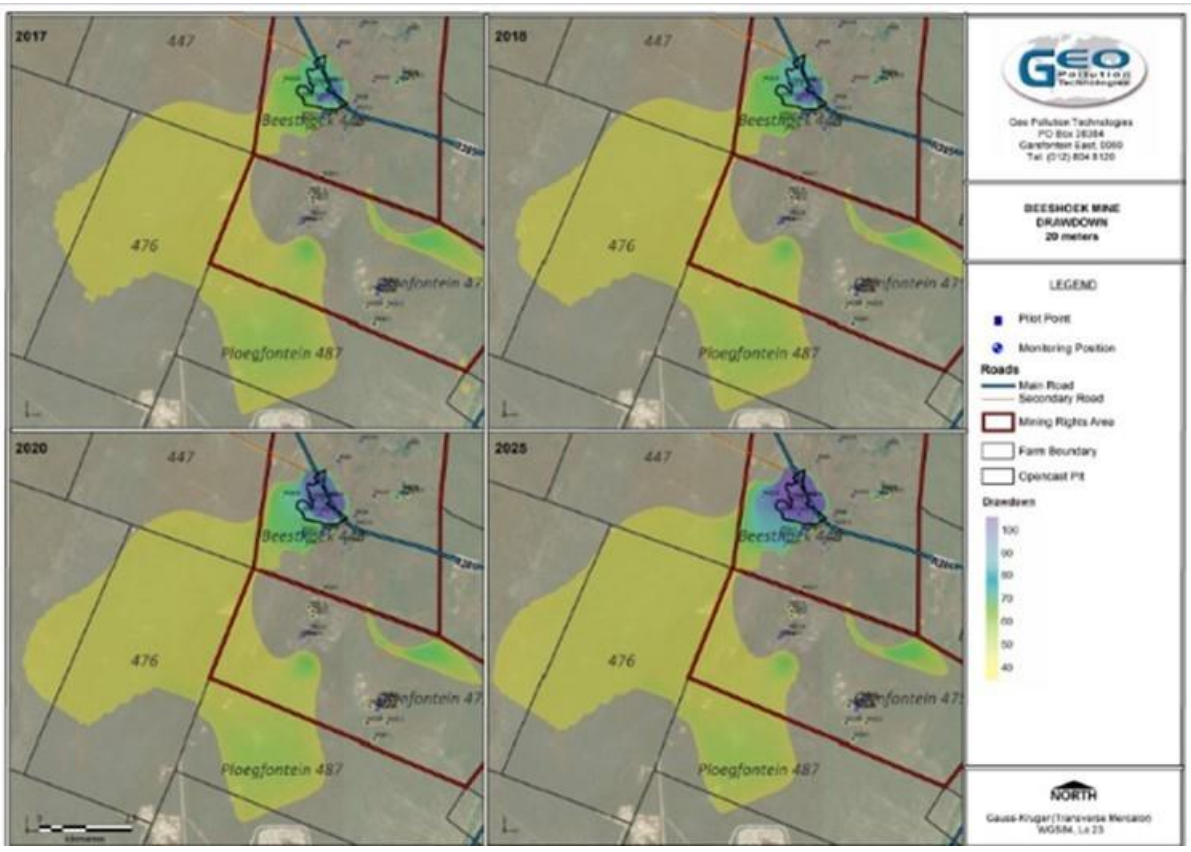


Figure 25: Predicted Groundwater Levels (starting at 20m drawdown) from the present to 2025

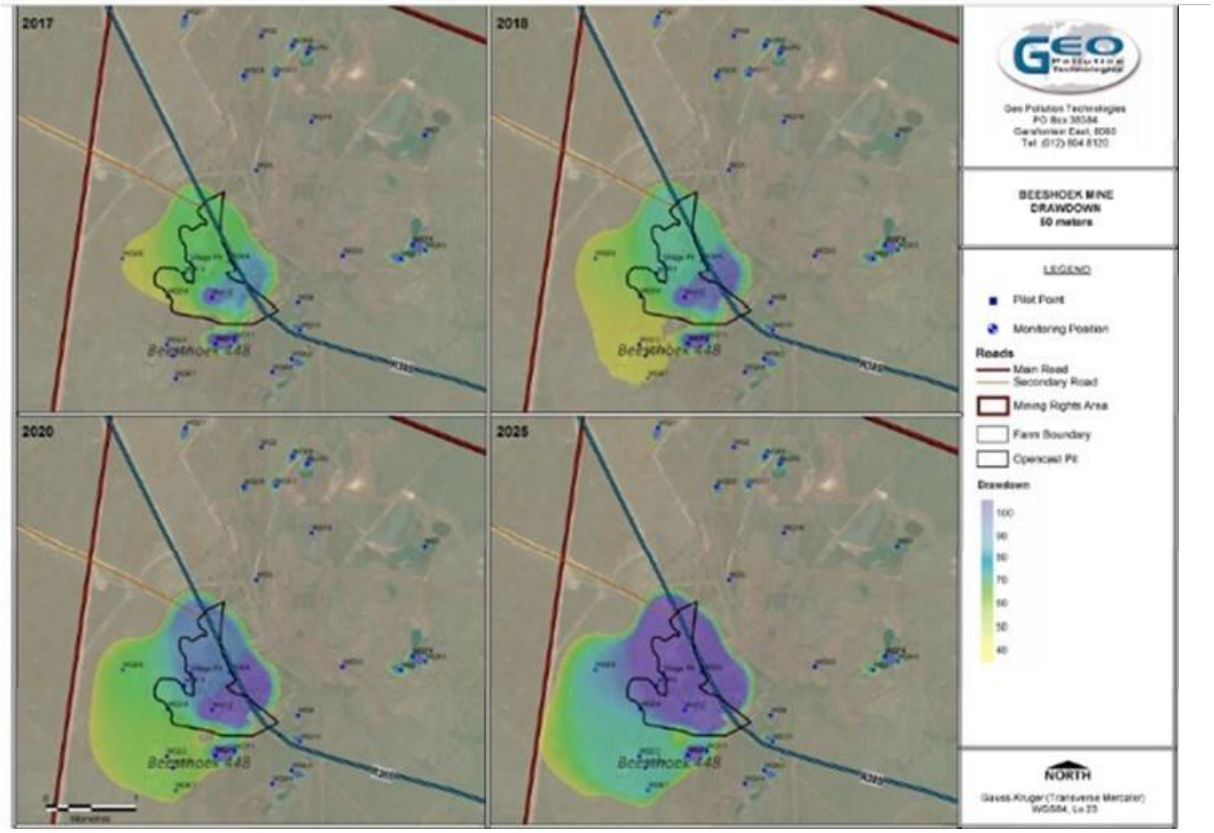


Figure 26: Predicted Groundwater Levels (starting at 40m drawdown) from the present to 2025

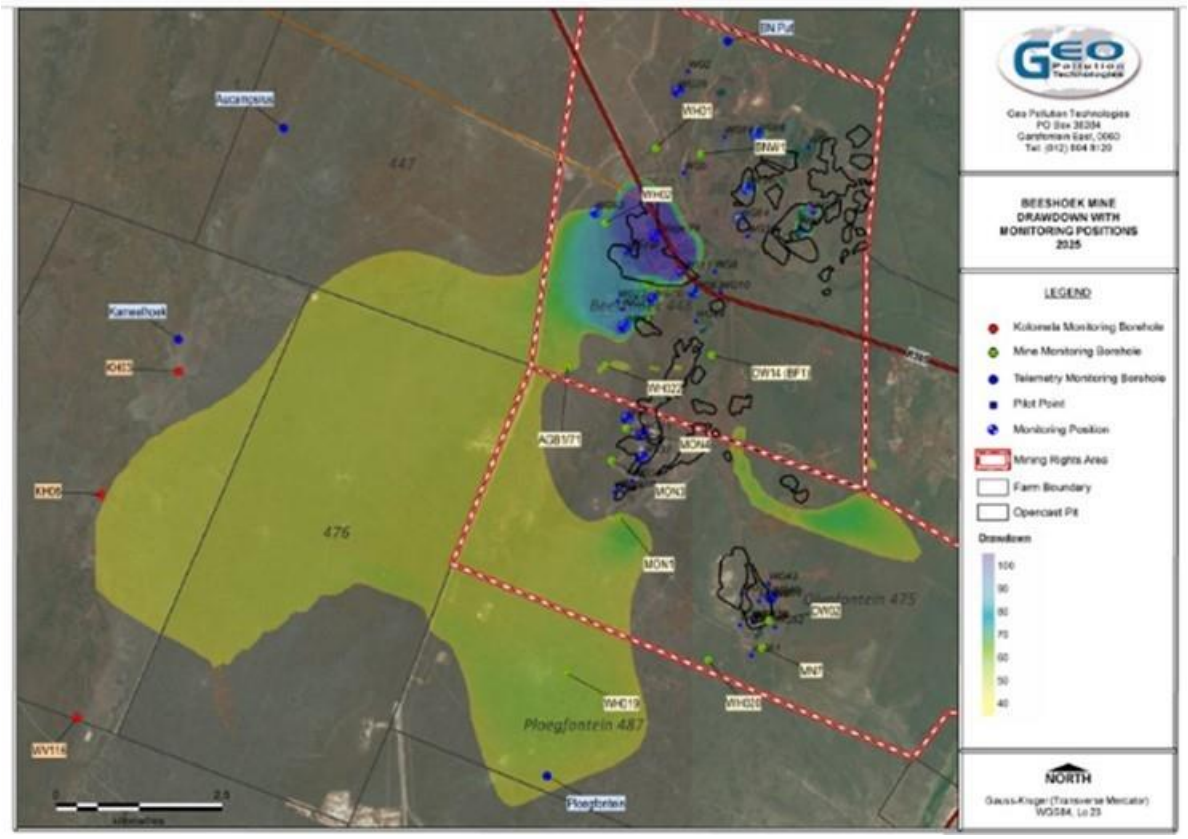


Figure 27: Predicted Groundwater Drawdown in 2025 in relation to monitoring boreholes

In order to assess the impact of mining on the groundwater levels, a Hydrocensus was conducted by GPT, 2020. Water levels were measured during similar studies in 2002, 2005, 2010, 2013 and 2017. One of the aims of this study to revisit the boreholes visited

during 2017 and to compare the water levels. Comparisons are made where data is available. The changes in water level show a regional trend of declining water levels. The following observations were made:

- The majority of boreholes show a decline in water levels except 480-4 (Vogelwater), AU15 (Aucampsrus), AU3 (Aucampsrus), DHL4 (Dunhill), KBF02 (Klipbankfontein), LCD2 (Lacasdam), MOOI1 (Mooidraai), and PE01 (Pensfontein), which show an increase in water level or remained the same. Significantly, the water level increased by more than 10m in boreholes LCD2 (Lacasdam) and PE01 (Pensfontein).
- Water level decline in excess of 10 m was observed in boreholes BH1 (Klipbankfontein), DHL3 (Dunhill), and KAM2 (Kameelfontein).
- No spatial pattern was observed with water level increase or decline.

2.f.iii.8.c Groundwater Quality

2.f.iii.8.d Background Water Quality

In the following table the background water qualities of 2013 are compared to the water resource quality objectives contained within the WUL as well as the SANS 241:2015, Drinking water Part 1: Microbiological, Physical, Aesthetic and Chemical Determinants.

In order to derive the conversion from N to NO_3, past studies were referred to. A study undertaken by Future Flow, March 2015 stated that the chemical conversion ratio between nitrate as NO_3 and nitrate as N is 4.4268. As shown in the following table, the fluoride and Nitrate as N background water qualities exceed the water resource quality objectives prior to any mining activity taking place.

Table 29: Background Water Qualities (2013) vs. Water Quality Objectives and SANS 241:2015 (GPT, 2016)

Parameter		Unit	SANS 241: 2015 Recommended Limits	Risk	2018 WUL Limits	Results						
						DP1	BH1	KAR1	Au11	KB2	KAM2	Kalkfontein
Physical & Aesthetic determinants												
Electrical conductivity at 25^{0}C	EC	mS/m	≤ 170	Aesthetic	150-370	137	86.8	156	145	114	114	104
Total Dissolved Solids	TDS	mg/litre	≤ 1200	Aesthetic	1000-2450	958	608	1090	1010	795	801	729
pH at 25^{0}C		pH units	≥ 5 to ≤9.7	Aesthetic	4-5 & 9.5-10	7.82	7.78	7.61	7.76	7.67	7.5	7.79
Chemical Determinants - Macro determinants												
Nitrate as N	NO_3	mg/litre	≤ 11	Acute Health	10-20	408	13.1	678	0	4540	4810	873
Sulphate	SO_4	mg/litre	Acute Health ≤500; Aesthetic ≤250	Acute Health/Aesthetic	400-600	221	87.6	315	24.9	828	1340	251
Fluoride	F	µg/litre	≤1500	Chronic Health	1.5-3.5	319	237	310	223	271	218	241
Chloride	Cl	mg/litre	≤ 300	Aesthetic	200-600	187	43.7	174	252	85.2	87.6	255
Sodium	Na	mg/litre	≤ 200	Aesthetic	200-400	104	19.7	54.3	82.7	21.7	42.8	61.2
Zinc	Zn	µg/litre	≤5000	Aesthetic		60	80	70	240	90	60	100
Concentration deemed to present an acceptable health risk for lifetime consumption.												

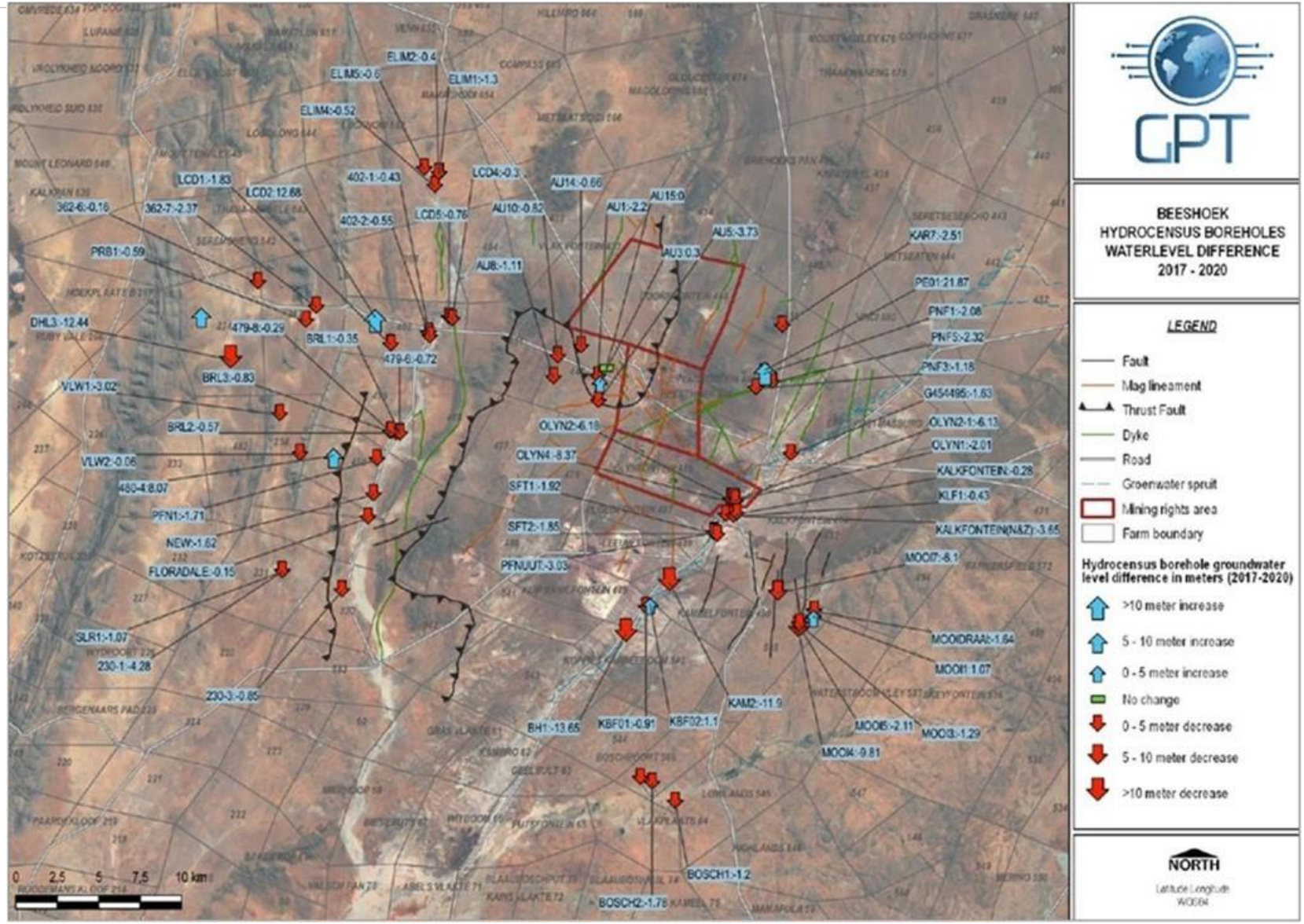


Figure 28: Groundwater Levels (Hydrocensus, 2020)

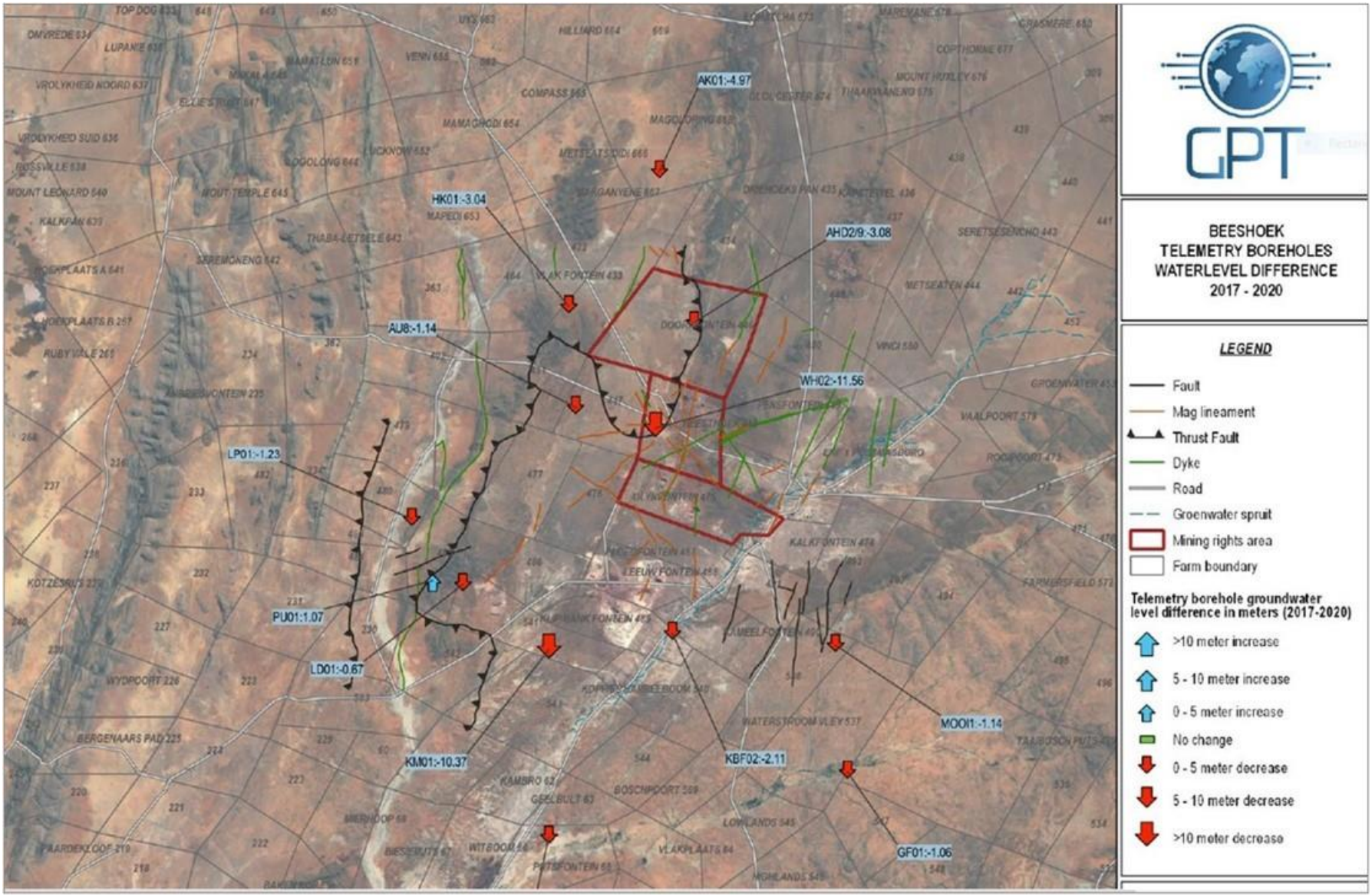


Figure 29: Groundwater Levels (Telemetry Boreholes) (Hydrocensus, 2020)

2.f.iii.9 Mine Borehole Quality

The mine has been monitoring groundwater quality extensively for the longer than 15 years and the results are sent to Tshiping Water Users Association (WUA) on a monthly basis for capturing on their database. Water monitoring at Beeshoek Mine are conducted on a quarterly basis. According to the GPT, 2020 Annual Consolidated Monitoring Report, the groundwater resources at all the sampling localities are described as being neutral to alkaline (pH levels between 7.8 and 8.0), non-saline to saline (Total Dissolved Solids (TDS) between 445.5mg/l and 563.8mg/l), and the hardness can be classified as very hard (> 300mg $CaCo_3$/L). Hardness concentration at Beeshoek Mine is not unlike most other boreholes in the area, resulting from the calcareous/dolomitic underlying geology characteristic of many parts of the Northern Cape Province. Metal concentrations were below detection limit or low at all the monitoring boreholes during 2019. When the boreholes were compared against limits set out in the WUL, the following can be seen:

- Electrical Conductivity (EC) concentrations in all samples are within Class 1.
- TDS concentrations in all samples with the exception of Landfill are within Class 1.
- NO_3 as N concentrations of WG34, WG62 and WG 74 are within the Class 2 limits, and WG37 and WG70 are within Class 1.
- Calcium (Ca) concentrations in all samples with the exception of WG74 are within Class 1.
- All samples complied with the Class 2 limits set put in the WUL.

The results from the chemical analyses were plotted on pie diagrams (see figure overleaf). The pie diagrams show the individual ions present in a water sample as a presentation of the total ion concentrations. The scale for the radius of the circle represents the total ion concentrations, while the subdivisions represent the individual ions. It is useful in making comparisons between waters from different sources and presents the data in a convenient manner for visual inspection.

Pie diagrams for surface water and groundwater: It can be deduced from the pie diagrams (see the following figure) that the water chemistry in the majority of the boreholes and surface water monitoring points are dominated by Ca, Magnesium (Mg), Chlorine (Cl) and Bicarbonate (HCO_3) represents fresh, clean, relatively young groundwater that has started to undergo Mg ion-exchange, often found in dolomitic terrain.

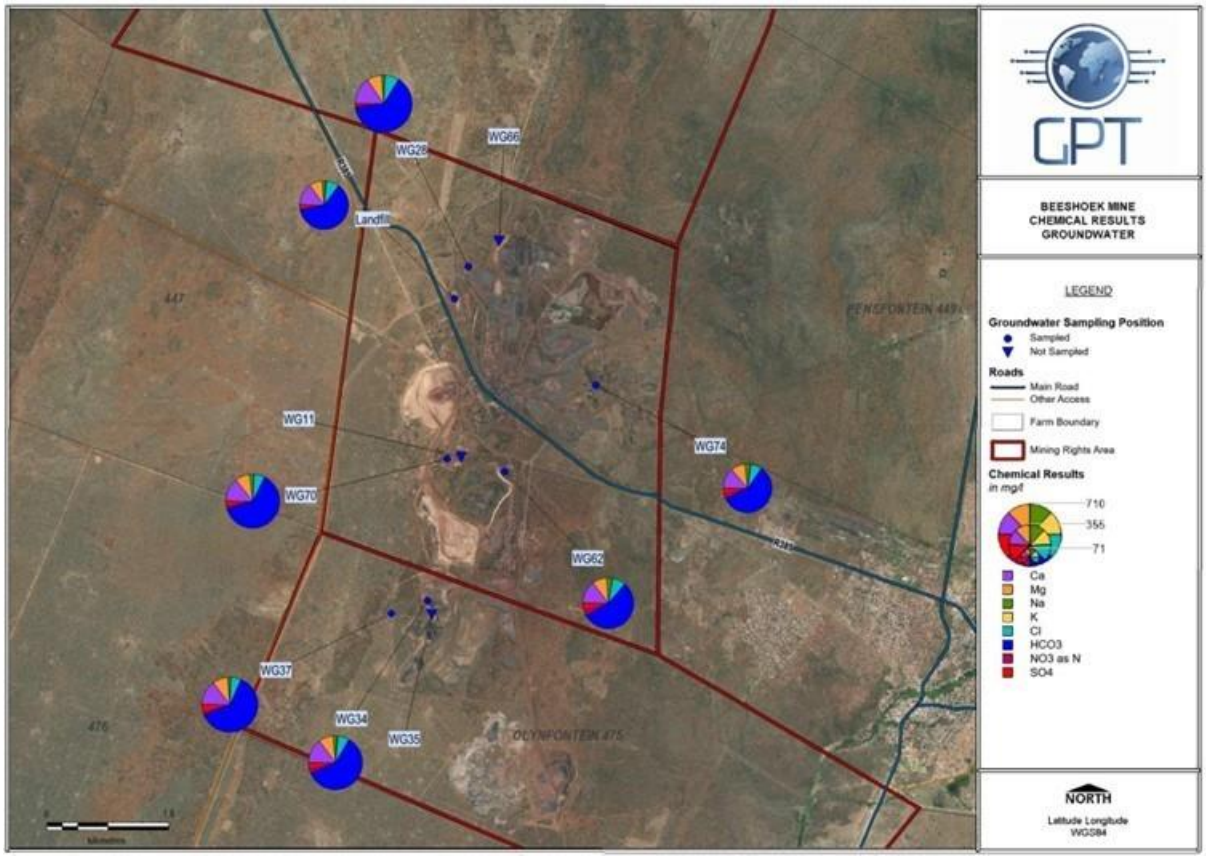


Figure 30: Pie diagrams of major cations and anions (groundwater) for the year 2019

During the Consolidated Monitoring Report, 2020, all available historical data was used to do a temporal trend analysis of the pH, EC, TDS, Ca, Mg, Sodium (Na), Cl, Sulphate (SO_4), Nitrate (NO_3) as N and Fluorine (F). The constituents were chosen to be represented as they are water resource protection measures in the WUL. The following was derived for groundwater quality:

- pH, EC, TDS, Ca, Mg, Na, Cl, SO_4 and F: It can be seen on the temporal trends that all parameters mentioned did not fluctuate significantly and all parameters fall below the Class II limits set out in the WUL for all groundwater samples.
- Nitrate as N: WG28, WG37, WG70 and Landfill fall below the Class II limits set out in the WUL. The remaining groundwater localities all fall within the Class II limits.

The ongoing water monitoring programme, conducted by Aquatico Scientific (Pty) Ltd (Aquatico), entails hydrochemical monitoring of surface water localities (monthly) and hydrochemical monitoring of groundwater resources on a quarterly basis.

Based on the July 2020 monitoring report, a total of eleven (11) boreholes at Beeshoek are monitored on a quarterly basis. This report concluded the following:

- The total hardness at the monitoring boreholes varied between 410mg/l and 469mg/l indicating very hard water conditions. Although no standard for total hardness is available in the IWUL, the tolerated guideline for total hardness, with regards to domestic use, is stipulated by the Department of Water Affairs and Forestry (DWAF; now DWS) as being less than 300mg/l. However, hardness concentration at Beeshoek Mine is not unlike most other boreholes in the area, resulting from the calcareous/dolomitic underlying geology characteristic of many parts of the Northern Cape Province.
- Although none of the boreholes exceeded the IWUL limits for Nitrate (NO_3-N) it must be noted the nitrate levels in WG62 (12.6mg/l) and WG66 (10.6mg/l) exceeded the permissible limit of 10mg/l set out by the DWAF Quality of Domestic Water Supplies.
- All of the sampling localities were classified as marginal quality (Class 02) during July 2020 due to hardness, turbidity and / or nitrate exceeding the guideline limits (DWAF Quality of Domestic Water Supplies).
- Metal concentrations and nutrient concentrations remains below detection limit or low at all the monitoring boreholes during the current reporting period.
- Although there were microbial content present in all the sampled boreholes, no pathogenic indicator organisms in the form of *E. coli,* total coliforms or Faecal coliforms were detected at any of the sampled boreholes.
- Furthermore, there were no hydrocarbons present at any of the sampled boreholes as the results indicate that concentrations were all below the detection limits.

The Expanded Durov Diagram for the mine monitoring boreholes plotted in Field 2 and represents fresh, clean, relatively young groundwater that has started to undergo Mg ion-exchange, often found in dolomitic terrain (see Figure 31).

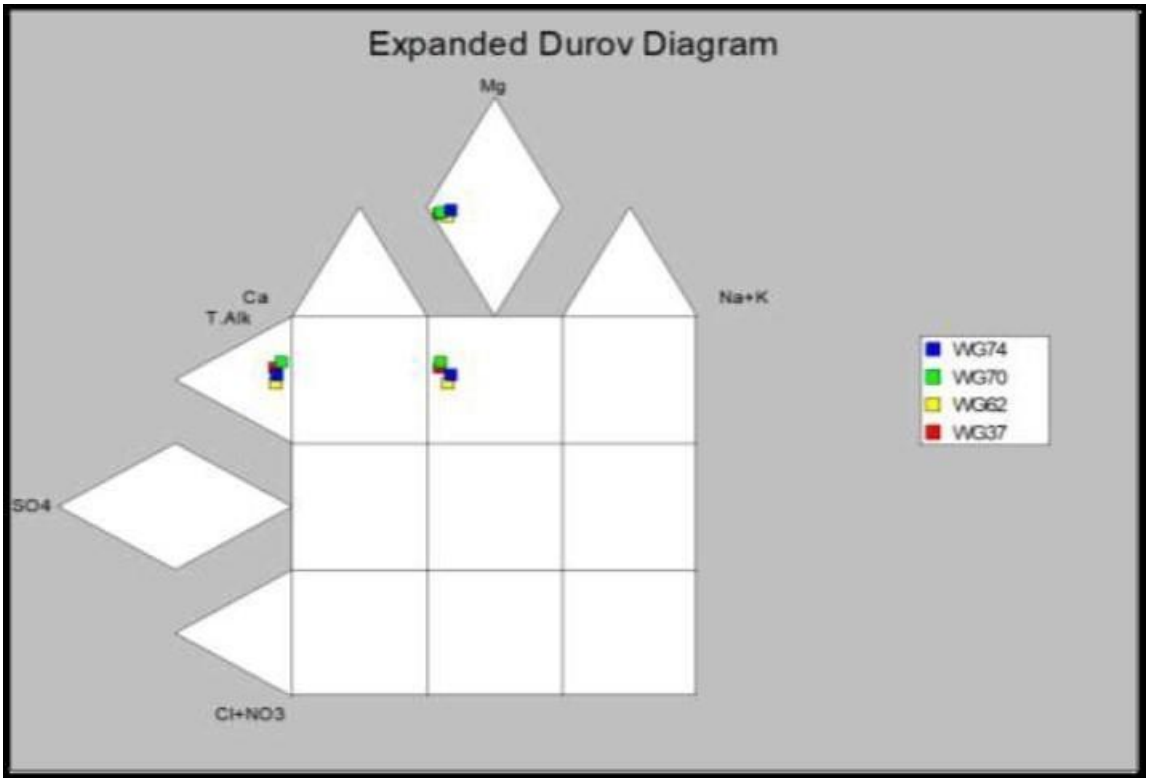


Figure 31: Expanded Durov diagram representing the water quality of the groundwater monitoring boreholes at Beeshoek sampled in July 2020.

The stiff diagrams indicate that Calcium (Ca) and Magnesium (Mg) dominate the cation side, while bicarbonate (HCO_3) alkalinity dominates the anion content of the groundwater. This combination of cations and anions is the direct result of interaction between groundwater and the overlying calcrete and deeper dolomite.

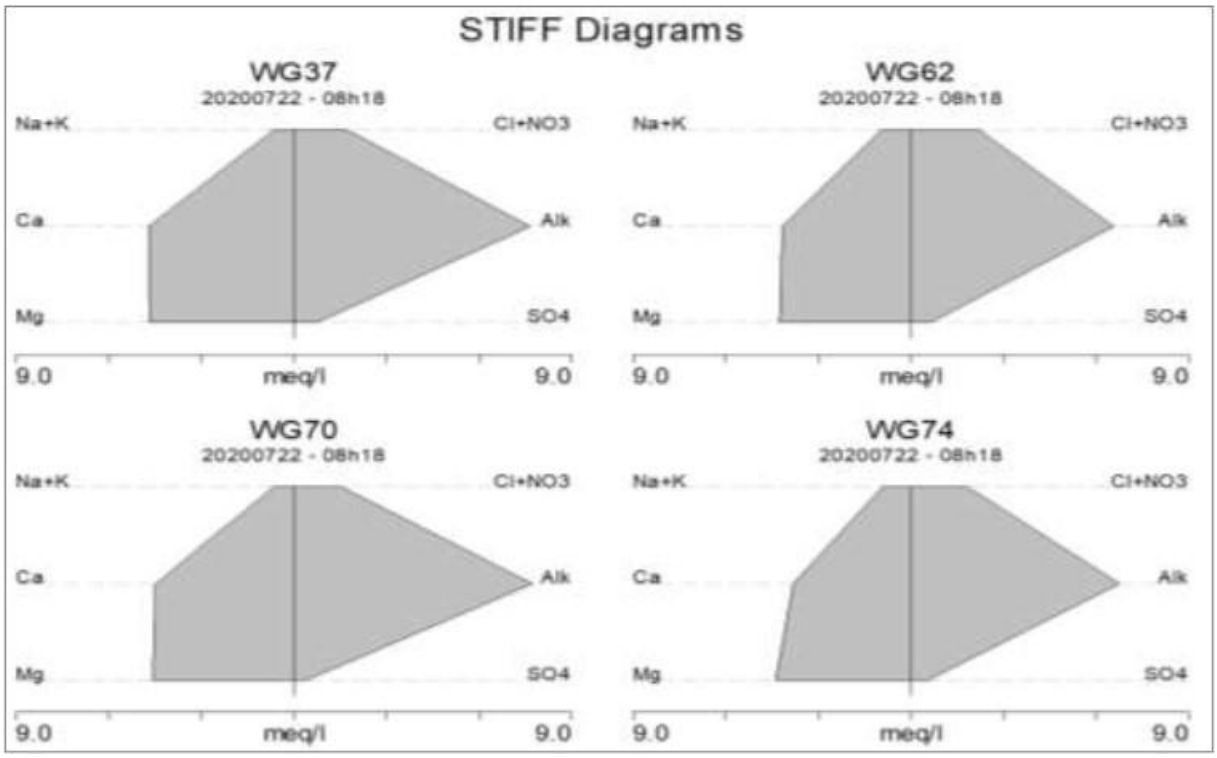


Figure 32: Stiff diagrams (in mq/l) of the groundwater monitoring boreholes at Beeshoek sampled in July 2020

2.f.iii.10 Air Quality

Beeshoek Mine has been measuring dust fallout since 2005. Monitoring is currently done at nine sites using the SANS 1929:2005 and ASTM Standard, D1739-98: Standard Test Method for the Collection and Measurement of Dust fall (Settleable Particulate Matter). The location of the monitoring sites is shown in the following figure.

Figure 33: Location of the dust fallout buckets

2.f.iii.11 Noise

The area in which the proposed the proposed infrastructure are to be established is characterised by the following environments:

- A rural farming community where the farmsteads are located at large distances apart;
- The existing large opencast operation at Kolomela;
- The existing opencast operation at Beeshoek; and
- The R385 and the railway lines that cross the area.

Areas in the proximity of mining activities will already be subjected to the noise emissions from diesel-powered equipment and other mining processes as a result of existing mining infrastructure.

The major sources of noise from the current mining operations are:

- The diesel powered equipment, such as bulldozers, FELs, construction and haul trucks used during both the construction and operational periods of the mine;
- The drilling of rock inside the open pit;
- The handling of material inside the pit, e.g. the loading of haul trucks;
- The hauling of ore and waste rock from the open pit to the surface;
- The dumping of ore and waste rock at the crushing plant and on the waste rock dumps respectively. During this process the use of reverse warning hooters may be audible over long distances, particularly during the night; and
- The crushing and screening of ore in the plant area.

Limited noise may result from the proposed infrastructure, although this may be considered to be insignificant as the proposed location is already surrounded by mining activities.

2.f.iii.12 Cultural and Heritage Setting

2.f.iii.12.a Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago.
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The larger study area has a wealth of pre-colonial archaeological sites (Morris & Beaumont 2004). Famous sites in the region include the world renowned Wonderwerk Cave to the north of the study area. Closer to Kuruman two shelters on the northern and southern faces of GaMohaan (in the Kuruman Hills north west of the town) contain Later Stone Age remains and rock paintings. Rock art is known to occur at Danielskuil to the north east and on Carter Block (Morris 2008). Middle Stone Age material is on record around the study area where archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks and confluences to be prime localities for archaeological finds and specifically Stone Age sites, as these areas were utilized for settlement of base camps close to water and hunting ranges.

According to Morris (2005) in the immediate area to the north of the study area, the Earlier Stone Age is represented by 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 sites (one on King, one at Mashwening and eight at Kathu) Rock engravings have been identified from Sishen and Bruce (the Bruce site was salvaged and recorded by Fock & Fock 1984), as well as Beeshoek, to the south (Fock & Fock 1984; Morris 1992; Beaumont 1998). Specularite sources are known on Demaneng and Lylyveld, and were mined in Stone Age times at a site on Doornfontein to the south (Beaumont 1973; Beaumont & Boshier 1974) and at Tsantsabane to the east of Postmasburg (Beaumont 1973; Thackeray et al. 1983): numerous other specularite workings have also been recorded (Beaumont 1973).

Stone Age artefacts are often recorded at industrial sites similar to the Beeshoek mine operations and the effects of heavy-duty earth moving machinery on the formation of lithic debitáge at open-air Stone Age/Palaeolithic sites was examined by Bradfield and Van der Walt (2018) at a site close to Kathu. The experiment with heavy-duty machinery produced only one pseudo-formal tool, most of the debitáge produced mimics that occasioned by knapping and this could attribute to some of the debitage/ artefacts identified on industrial sites.

2.f.iii.12.b Iron Age

Iron Age expansion southwards past Kuruman into the Ghaap plato and towards Postmasburg dates to the 1600's (Humphreys, 1976 and Thackeray, 1983). Definite dates for Tswana presence in the Postmasburg area are around 1805 when Lichtenstein visited the area and noted the mining activities of the Tswana (probably the Thlaping) tribes in the area. The Thlaro and Thlaping settled the area from Campbell in the east to Postmasburg and towards the Langeberg close to Olifantshoek in the north west before 1770 (Snyman, 1988). The Korana expansion after 1770 started to drive the Thlaro and Thlaping further north towards Kuruman (Shillington, 1985).); Morris (2005) indicated that 3 Iron Age sites close to the study area are on record (Demaneng, Lylyveld and Kathu).

2.f.iii.12.c Historical information

Postmasburg

Postmasburg is situated on the Cape Plateau, 1300 meters above sea level. An average of 325 millimeters of rain is usually recorded in the autumn and summer seasons. This area is semi-arid and forms part of the Kalahari thornveld biome. Farming practices include livestock cultivation and, to a much lesser degree, crop farming. It could not yet be determined with certainty what group of people had lived in the Postmasburg area before the Bushmen. However, a large number of stone tools, as well as glass beads, have been found in the Blinkklipkop ("Shiny Stone Hill"), which testifies to early human activity. (Snyman 1983: 1)

Rock paintings in the area serve as evidence that the hunter gatherer Bushmen had inhabited Griqualand West for centuries. In the 1770s, the Korana (people of Nama ancestry) moved into the Postmasburg area and disrupted the Bushmen's way of life. The Korana regularly visited a primitive mine in the Blinkklipkop, which today forms part of the town of Postmasburg, to exploit shimmering substances, namely hematite and specularite, which were mixed with fat and applied to the skin to give a sought-after shiny red appearance. With the later arrival of the Tswana, Korana, Griqua and Europeans the Bushmen gradually emigrated to the Kalahari, Botswana and Namibia. (Snyman 1983: Foreword, 1-3)

Figure 34: 1929 photograph of Blinkklipkop, with a cave in the right middle distance. Hematite and specularite were mined here. (NARSSA SAB, MNW: 976 MM1204/29)

The Tswana (Western Sotho) invaded the Northern Cape about 500 years ago, but the later Hay district in which Postmasburg was located was only occupied in the early 1800s. Long before settling in this area the Tswana also undertook journeys to Blinkklipkop

to mine for the cosmetic substance that they called *sibilo*. In 1813 the missionary John Campbell came across a group of Bushmen near the mine and commented the following: "Blink Mountain is a kind of Mecca to the nations around, who are constantly making pilgrimages to it, to obtain fresh supplies of the blue shining powder and the red stone." (Snyman 1983: 3-4)

In the 1820s the Griqua leader Andries Waterboer was able to expel his enemies, the Bergenaars of the Langeberge, from Blinkklip, as the area was called at the time. This became a permanent outpost of the Griqua tribe. The remaining Tswana and Bushmen either moved away or were assimilated by Waterboer's people. By the 1830s the Blinkklip population had grown to the extent that missionary of the London Mission Society, John Baillie, was stationed there for a time. Nikolaas Waterboer succeeded his father in 1853, and after this the tribe's authority in the area started to wane. Waterboer and his tribe became British subjects in 1871 after the British annexed Griqualand West. The discovery of diamonds further paved the way for white settlement in this district. (Snyman 1983: 4-5; Breutz 1963: 8)

The reason that the settlement of Europeans in Postmasburg took so long was that the country was so bare, waterless and stony that it was almost impossible to make a living there. Tribes that lived in the area occupied large parts of the country because it was so difficult to find water for their stock. It was only the later prosperity that came from mining that sparked agricultural development, the sinking of thousands of boreholes and the construction of roads. (Breutz 1963: 21)

Farms were surveyed by the British in the Griekwastad district in the 1870s, and between 1876 and 1878 the first farms owned by Europeans were purchased in this area. There were still a number of Griqua landowners in the area as well. The Griqualand West Rebellion disrupted life in the region in 1878, causing some to move away. In 1880 the Griqualand West district was incorporated into the Cape Colony, and brought under formal administration. As of the early 1880s a much larger area surrounding Blinkklip was surveyed and more white settlers moved into the area. It was however only in 1882 with the establishment of a Reformed Church five kilometers south of Blinkklip that this settlement started to gain prominence. Between 1884 the Magistrate of the Hay district, J. J. Christie, lobbied for the establishment of a town at Blinkklip. This was already the most populous part of the Hay district. By the late 1880s the Reformed Church and its members were also campaigning for the establishment of the town, and on 30 November 1889 it was finally decided that the church would move to Blinkklip. The church was consecrated in Blinkklip on 28 February 1891, and a new Reformed Church building was completed in 1908. (Snyman 1983: 5-10, 43)

Figure 35: 1891 consecration of the Reformed Church. (Snyman 1983: 43)

Figure 36: Reformed Church building that was completed in 1908. (Snyman 1983: 43)

It was only in 1891 that 82 town plots were surveyed around the existing police station at Blinkklip. In the same year members of the church petitioned the Commissioner of Crown Lands to rename this town Postmasburg, in remembrance of Professor Dirk Postma, a minister of the Dutch Reformed Church in South Africa. This name change was affected in April 1892. (Snyman 1983: 10).

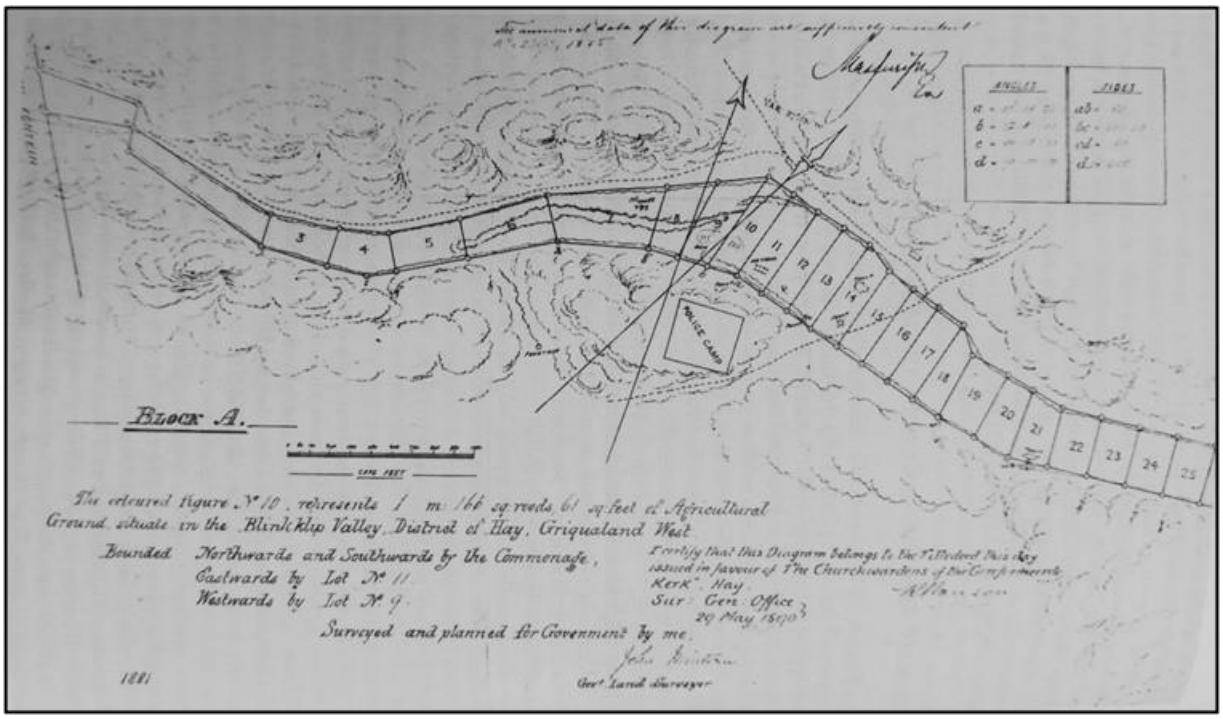


Figure 37: Portion of the first agricultural plots that were surveyed by John Minters in 1881 in the Blinkklip Valley. (Snyman 1983: 6)

By June 1892 there were only three buildings in the town of Postmasburg: a police station, a church building and a small house belonging to a policeman. This soon changed, and by March 1893 the little settlement that was established around a church had a post office, two shops, a partially completed school building and twenty dwelling houses. The town's first town management council was elected in May of that year. (Snyman 1983: 10-11)

The manganese fields in the Postmasburg area were opened for prospecting in 1922, and this greatly boosted the development of the town and caused an influx of new residents. The economic depression of the 1930 adversely affected mining in the area, but the town economy could still rely on the agricultural sector. Postmasburg became a municipality in 1936. (Snyman 1983: 12)

Manganese and Beeshoek:

Manganese was discovered on the farm Doornfontein in 1922. By that time it was already known that manganese deposits could be found in the area, but it was Mr T. L. H. Shone that started seriously mining this mineral and who alerted others to its importance. Today he is known as an important figure in the establishment of the manganese trade in South Africa. In 1924 Shone established the Union Manganese Mines and Minerals Limited and applied to prospect for manganese on a number of farms. Dr. A. L. Hall published a geological report on South Africa in 1925, which also helped to get the attention of mining companies. In December 1926 Niels Langkilde and A. J. Bester established a second company, the South African Manganese Limited. The Union Government started showing interest in the manganese mining industry in the years to come, especially after the establishment of YSKOR was approved and when a detailed geological report on the area was published by Dr. L. T. Nel in 1929. Since then the manganese fields of Postmasburg have been exploited, and the most important deposits were found on Beeshoek, Doornfontein, Paling, Glosam, Lohatla and Bishop. (Snyman 1983: 29; NARSSA *SAB, MNW: 976 MM1204/29*)

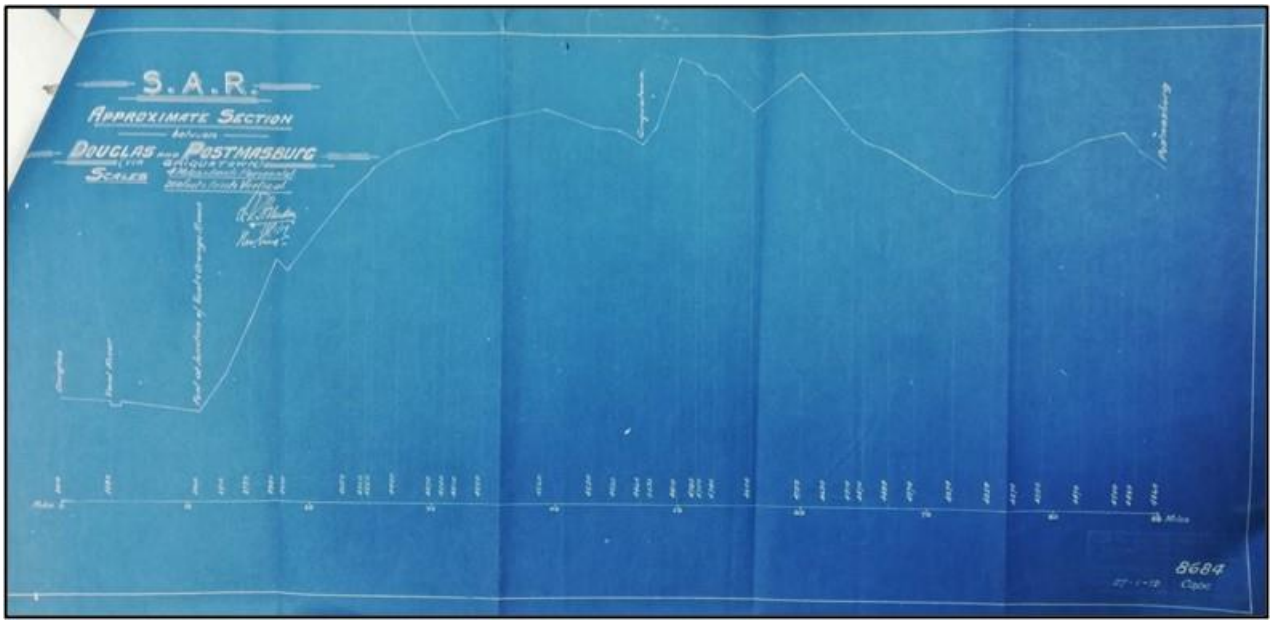


Figure 38: 1919 diagram showing the section of the railway between Douglas and Postmasburg. (NARSSA SAB, SAS: 834 P4/7/41)

In 1929 the British Swiss International Corporation Limited founded the Manganese Corporation Limited (or Mancorp) to mine for manganese to the north west of Postmasburg on its Beeshoek property. The corporation negotiated with the Minister of Railways to extend the railway from Koopmansfontein to Postmasburg, and this was a great boost for manganese mining in the area. A side line to Beeshoek and Lohatla was constructed in 1930, for the transport of manganese. In 1917, even before major mining operations had started in the Postmasburg area, planning for the construction of a railway from Douglas to Postmasburg had already begun. The productiveness of the soil and production of agricultural produce served as extra motivation. (Snyman 1983: 29-30; NARSSA *SAB, SAS: 834 P4/7/41;* NARSSA *SAB, MNW: 976 MM1204/29*)

By 1930 about 200 Europeans and 1500 black workers were employed by the Manganese Corporation Limited on Beeshoek. In February of the same year there was a disturbance at this mine when a white overseer and a black worker got into a scuffle and drew a crowd of onlookers. A white worker indiscreetly fired a shot in the neighborhood of the white quarters some distance from the compound with the intention of proving that he was not unarmed. Later that day a group of about 60 black workers went to the compound manager's house to complain about the events of the day. The matter was investigated and the overseer was reprimanded. This was written off as a regrettable but minor event. (NARSSA *SAB, MNW: 1025 MM1245/30;* (NARSSA *TAB, GNLB: 410 73/17*)

Figure 39: 1930 photograph of Beeshoek. (Snyman 1983: 28)

The international Depression stopped Mancorp's operation in its tracks between 1931 and 1933. Several small mining companies were amalgamated during this time and became the South African Manganese Limited (SAM) and Associated Manganese Mines of South Africa Limited (AMMOSAL). With the influx of mine workers the mining towns of Manganore and Lohatla, as well as Mancorp Mine on Beeshoek, were established between 1935 and 1937. The Second World War (1939-1945) caused another dip in the manganese market, as the mineral could not be exported during this time. After the war the international demand for manganese intensified. The production of iron ore in the area also gained importance after 1948. Assmang (previously known as AMMOSAL) mined iron ore at Beeshoek, and SAMANGAN at Manganore. (Snyman 1983: 29-30; Snyman 1993: 43; Assmang 2016; Breutz 1963: 12)

The Kalahari manganese field was opened for prospecting in the 1950s, causing most of the larger mining companies to withdraw from the Postmasburg area. Smaller companies however continued operations. By 1966 manganese and iron ore mining in the area started to fizzle out, due to a declining market, high production costs and shrinking reserves. By the late 1970s most of the smaller mines had been closed. (Snyman 1983: 22, 29-30)

By 1961 Associated Manganese owned a mine on Beeshoek, which by then formed part of the Postmasburg district. On 11 November 1962 there was a brawl between a number of Xhosa workers and Zulu and Bechuana workers that were all employed at the Palyn Mine. The Xhosa workers felt that the mining company had given the other groups preferential treatment, and this is what had caused the friction. Sentences were imposed on 22 of the 86 accused for instigating public violence. (NARSSA *SAB, BAO: 2370 C31/3/71/2*)

In 1966, Associated Manganese Mines employed 1915 black women and 1761 men on its Beeshoek mine. These employees were housed in single and family quarters on Beeshoek. It was reported by the Inspector of Bantu Labourers that the living conditions at the mine were good. (NARSSA *SAB, BAO: 2370 C31/3/71/2*)

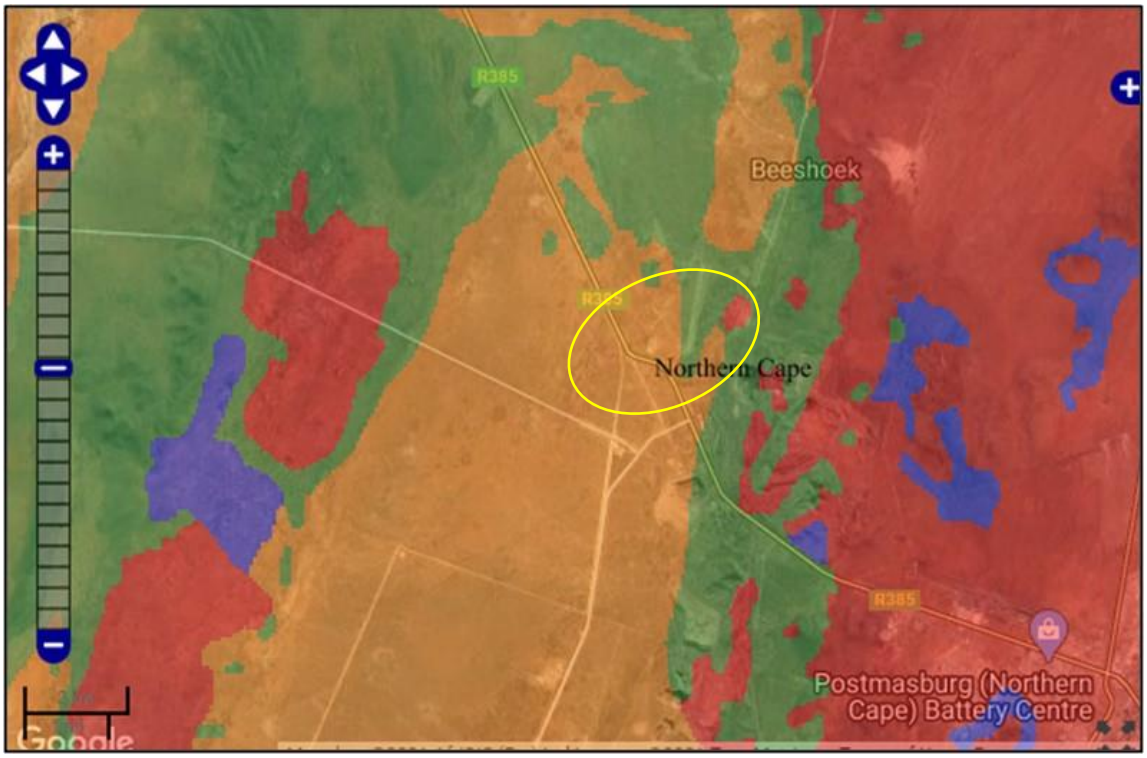
By 1962 Eskom power reached Beeshoek, and primitive mining methods gave way to industrial machinery. By 1964 the first iron ore was exported by Assmang, and in 1970 this company became the biggest individual exporter of iron ore in South Africa. During the 1970s Assmang struck a deal with US Steel, who agreed to buy iron ore for at least 15 years. Beeshoek was consequently upgraded and the scattered quarries on the property were consolidated into open-cast pits. In 1975 the Beeshoek iron ore facilities were enlarged – this included the commissioning of a full washing and screening plant and a jig plant. During the 1980s Assmang reached an agreement with Iscor Ltd, the owner of Sishen Iron Ore Mine, for cooperation on mining and railing to the port of Saldanha bay. Two recessions and the aftermath of the Soweto uprising disrupted Assmang's operations in the early 1980s, but by 1988 the company's performance had once again improved. In 1999 a new southern extension at Beeshoek Mine, known as Beeshoek South, was commissioned. A new jig plant and an iron recovery plant were built at Beeshoek in 2001, but the mine was nearing the end of its productive life. It was projected that the remaining reserves would not last far beyond 2010. Assmang continued mining iron ore, manganese and chromes at various mines. In 2015 the company started production on Village Pit at Beeshoek Mine. (Assmang 2016)

2.f.iii.12.d Outcomes

The detailed heritage and paleontological study have not as yet been undertaken for project 1-5.

For project 6, the Railway line link, the following was found by the specialist when conducting the site visit:

- The larger study area is industrial in character with various mining operations. The proposed railway link is located in areas that has been fallow in recent years and characterised by roads, an airfield and derelict farming infrastructure like fences etc. dating from the 1960's. The proposed railway link is in line with current land use.
- No known graves are indicated on databases consulted but graves and cemeteries are widely distributed across the landscape and can be expected anywhere.
- It is important to note that only the development footprint of the project was surveyed, and was conducted over 2 days. The study area is flat without focal points like natural pans or rocky outcrops that would have attracted human occupation in antiquity and a paucity of sites was immediately noted during the survey, although sparse Stone Age material is known to occur in the wider area. The disturbed character of the study area (quarries, road and railway developments) and high vegetation cover in the study area could have masked isolated finds but no sites of significance were recorded or expected to occur in the study area. All the known sites of significance are located along watercourses or hills of which none occur in the study area.
- Based on the SAHRA Paleontological map the area (see figure hereafter) is of moderate to high paleontological sensitivity and a separate study was conducted for this aspect (Bamford 2021). This study concluded that it is extremely unlikely that any fossils would be preserved in the Campbell Rand Subgroup stromatolites or in the loose sands of the Quaternary. There is a very small chance that fossil may occur in palaeopans in the ancient rocks and therefore recommended that a Fossil Chance Find Protocol should be added to the EMPr.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No paleontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 40: Paleontological Sensitivity of the approximate area of the railway line (yellow polygon) is indicated as moderate to high.

2.f.iii.13 Socio-Economic Setting

The following information is sources from the Social Impact Assessment, draft Scoping Report compiled by Batho Earth, June 2019.

2.f.iv ZF Mgcawu Districts Municipality

The study area falls within the boundaries of the ZF Mgcawu District Municipality and under the jurisdiction of the Tsantsabane Local Municipality.

The ZF Mgcawu District Municipality[1] was formerly known as the Siyanda District Municipality. It lies within the mid-northern section of the Northern Cape Province, bordering with Botswana in the north and Namibia in the west and covers an area of 102 484 km^2.

The ZF Mgcawu District comprises five Local Municipalities namely:

- Dawid Kruiper Local Municipality;
- Kai !Garib Local Municipality;
- !Kheis Local Municipality; and
- **Tsantsabane Local Municipality (within which the mine is situated)**; and
- Kgatelopele Local Municipality.

The main towns that are scattered through the area are Beeshoek, Brandboom, Danielskuil, Eksteenskuil, Groblershoop, Kakamas, Keimoes, Kenhardt, Lime Acres, Mier, Postmasburg, Rietfontein, and Upington. The latter serves as the district municipal capital where the municipal government is located.

Agriculture, mining, and tourism form the key economic drivers in this area. The spatial vision of the ZF Mgcawu District Municipality thus include[2]:

- Tourism: Cultural, wilderness, floristic, river tourism ranging from the Kgalagadi international trans frontier park to the culture of the Riemvasmaak community to river tourism on the Orange River;
- Mining and mining beneficiation;
- Agriculture: riverbank vineyards and expansive stock and game farming in the Kalahari; and
- Renewable energy technology opportunities.

2.f.v Tsantsabane Local Municipality and Municipal Wards

The Tsantsabane Local Municipality falls under the jurisdiction of the ZF Mgcawu District Municipality formerly known as the Siyanda District Municipality. The extent of the geographical area of the municipality is 18 317 km^2. It is bordered by the John Taolo Gaetsewe and the Pixley-ka-Seme District Municipalities. Furthermore, Tsantsabane Local Municipality is bordered by Siyancuma Local Municipality, //Khara Hais Local Municipality, !Kheis Local Municipality, Gamagara LM and Kgatelopele Local Municipality.

The municipal area falls in the Gamagara Corridor. The Northern Cape Province Spatial Development Plan (NCPSDF (2012: 68)) defines the Gamagara Corridor as comprising the mining belt of the John Taolo Gaetsewe and ZF Mgcawu districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese.

Postmasburg is the main town within the Tsantsabane Local Municipality, with various other small rural settlements such as Jenn-Haven, Groenwater and Skeyfontein. Beeshoek is now seen as a mining residential satellite town of Postmasburg. The main routes include the R385 and R31 from Kimberley that runs through Beeshoek, the R309 and the R325 to Kathu.

Economically, Tsantsabane Local Municipality is known for being rich in minerals, and for its mining, agriculture, manufacturing and farming sectors. The municipality has become one of the leading investment areas in the Northern Cape.

The municipality is divided into seven wards, as listed in the table below[3].

[1] www.localgovernment.co.za

[2] Tsantsabane Local Municipality. Integrated Development Plan

[3] Tsantsabane Local Municipality. Integrated Development Plan

The study area falls within Ward 6 and a section of Ward 7 with Wards 1, 2, 3, 4 and 5 in very close proximity.

Table 30: Wards and settlements in the study area

Wards	Affected Settlements in Ward
Ward 1	Part of Postdene and Carnation
Ward 2	Newtown
Ward 3	Groenwater, Jenn Haven, part of Postdene and Kolomela houses
Ward 4	Boichoko
Ward 5	Skeifontein, Soetfontein, Strathmore, Part of Boichoko and Postmasburg Town
Ward 6	**White City, Glossom, Maremane, Beeshoek, Stasie**
Ward 7	**Maranteng, Kanonbult**

2.f.vi Strategic Development Framework

The key Municipal priorities as set out in the Tsantsabane Local Municipality Integrated Development Plan (IDP) include:

- Bulk Infrastructure services;
- Revenue Collection and Enhancement;
- Provision of Sustainable Basic Services (Water, Electricity & Sanitation);
- Local Economic Development and Job Creation;
- Education: access to land for educational purposes;
- Access to land for residential and business erven;
- Library services for rural areas;
- Refurbishment of community halls; and
- Access to health services.

2.f.vii Population Figures

The total population of the Tsantsabane Local Municipality is 39 344 individuals based on the Community Survey of 2016. There is an average 2.1 person population density per km^2 and the number of households totals 11 820. The average household size is 3.5.

2.f.viii Age Groups and Gender

The Tsantsabane Local Municipality population indicates a predominantly young age structure with 34% of the population under 18 years and 62% between 18 and 64 years. The median age is 26 years with the highest percentage (23%) of people falling between 20 and 29 years of age. Those within the working age category (18-64 years) are approximately 10% higher than the rate in the Northern Cape and also slightly higher than the district rate[4]. These figures indicate the critical need for employment opportunities within the area.

The male population (21 086 individuals) within the municipality are at 54%. The main reason for this situation in the area is attributed to the influx of various workers from outside the province in search of work at the different mining developments and mining being a more male dominant employment industry. The number of males within the study area is thus again approximately 10% higher than the rate within the province and slightly higher than the district rate[5].

2.f.ix Population Stability

Approximately 11% of the population within the Tsantsabane Local Municipality area are from outside the province[6]. The population stability is thus influenced by the in-migration of outsiders to the area, mainly due to the presence of various mining activities and sources of employment within this sector. These outsiders consist of foreigners, as well as individuals from other areas within South Africa.

This in-migration, which is thus mostly attributed to people in search of employment, has further socio-economic consequences such as additional pressure on the Tsantsabane Local Municipality and the business sector to provide employment opportunities,

[4] StatsSA: Community survey 2016

[5] StatsSA: Community survey 2016

[6] StatsSA: Community survey 2016

as well as the provision of social infrastructure and services. Residents have further indicated that small businesses are mainly owned by foreigners limiting opportunities for locals in this regard[7].

2.f.x Education and Skills Levels

The proportion of the adult population with no schooling amounts to 7%, with only 2% having obtained a tertiary level of education. Approximately 36%, however has a matric certificate, which is about 20% higher than the rate in the district and 10% higher than the provincial rate.

The statistics indicate that although a high number of students enroll for primary school, a very low number of students complete Grade 12. Furthermore, only 5% of those who enrolled for Grade 1 endure it into a tertiary level.

With the low number of the population having a tertiary qualification or having completed Grade 12, it can be assumed that the skills levels are also low. This results in a very low probability for employment. Unemployment and low skills remain a major concern within the Tsantsabane Local Municipality area.

Within the municipality, the educational profile of those of 20 years and older is as follows[8]:

Table 31: Educational Profile of Population in Tsantsabane Local Municipality

Educational Profile: Tsantsabane Local Municipality					
No Schooling	**Some primary**	**Completed primary**	**Some secondary**	**Completed secondary**	**Higher**
1 853	2 326	1 500	9 185	9 165	262
(7.3%)	(9.1%)	(5.9%)	(36%)	(36%)	(2.2%)

It must, however, be noted that the education level is further being negatively affected by the urbanisation process, with a lack of sufficient schools for the increase in people coming to Postmasburg and surrounds in search of employment[9]. Learners from all over the TLM area are transported to attend school in Postmasburg. Overcrowding in the classrooms is a serious challenge which hampers the learning experience. There is thus an urgent need for additional school facilities. The challenges in this regard relate to:

- An urgent need for additional school facilities in Newtown (Postmasburg) and Groenwater/Skeyfontein;
- Lack of a Setswana medium school/s;
- Lack of specialised schools focusing on specialized traits i.e. technical or agricultural;
- Lack of proper water and sanitation services at schools;
- Not enough classrooms and high learners and teacher ratio; and
- A need for an additional technical high school that will respond/address for the needs of the mining sector.

2.f.xi Employment and Income

Although various mines operate in the Tsantsabane Local Municipality area, these mines cannot accommodate all the jobseekers. According to the Census of 2011, the employment rate in the municipality is slightly less compared to the district rate, but significantly higher than the provincial rate. The non-economically active people are still of concern as they would thus be dependent on the employed. These figures could have also changed since 2011.

The mining sector, followed by the agricultural sector is the main employment sectors within the local study area. Job creation among the youth remains a challenge with limited sectors available.

The employment profile of persons 15 years and older is as follows:

Table 32: Employment Profile[10]

[7] Tsantsabane Local Municipality. Integrated Development Plan

[8] StatsSA: Community survey 2016

[9] Tsantsabane Local Municipality. Integrated Development Plan

[10] StatsSA: Census 2011

Employment Profile				
Area	**Employed**	**Unemployed**	**Discouraged work-seeker**	**Other non-economically active**
Tsantsabane Local Municipality	10 760 (45.3%)	3 795 (16%)	419 (1.8%)	8 764 (36.9%)
ZF Mgcawu District	74 449 (47.3%)	17 696 (11.3%)	4 961 (3.2%)	60 210 (38.3%)
Northern Cape Province	282 791 (38.4%)	106 723 (14.5%)	39 913 (5.4%)	306 291 (41.6%)

Although the median average income in the Tsantsabane Local Municipality is calculated at R29 400 per annum, approximately 34.1% of the households within the Tsantsabane Local Municipality fall within the lower bound income brackets of below R20 000 per year. This figure is lower than that of the Northern Cape Province (41.6%) and the municipal figures (37.2%).

Poverty levels in the study area thus remain high.

2.f.xii Internal Strategic Perspective (ISP)

According to the Lower Vaal Water Management Area: Overview of Water Resources Availability and Utilisation Report (DWAF; 2003), the Gross Geographic Product (GGP) of the Lower Vaal WMA was R9.8bn in 1997. The most important magisterial districts in terms of contribution to GGP in this WMA are shown below:

- Kimberley: 29.6%
- Postmasburg: 14.8%
- Lichtenburg: 9.6%
- Kuruman: 8.9%
- Vryburg: 8.3%.

The most important economic activities taking place within the WMA are:

- Mining: 23%
- Government: 16%
- Trade: 15%
- Agriculture: 14%

The main agricultural activities identified include livestock and dryland cropping. Livestock includes beef and dairy cattle, goats, non-wooled sheep, pigs and ostriches. Crops grown are mainly maize, but also sunflower, cotton, groundnuts and vegetables. The mining activities in this WMA include mining for diamonds, iron ore, manganese and other minerals such as limestone, dolomite and amphibole asbestos. Kimberlite diamonds are mined at the Finch Mine at Lime Acres, one of the most important diamond producing mines of the De Beers Company. Kimberley is also an important diamond mining area, which is known for its high-quality diamonds. The Sishen Mine, currently the major supplier of iron ore in the country, is also located in the Lower Vaal WMA. This mine has a mineable depth of 30 metres and was opened in 1953 as part of Iscor's expansion strategy. In 1997, it produced approximately 2 400-million-ton iron ore per year. Other important mining areas includes Kudumane (iron, manganese and asbestos etc.), Ganyesa (diamonds, mica group clay and salt) and Taung (diamonds, limestone, dolomite and salt). Since manufacturing production is far less than mining production, it can be deduced that only a small percentage of beneficiation is done locally. This implies that a large percentage of raw mining products are exported to other areas for beneficiation. Lichtenburg is the largest manufacturing town in the WMA, where manufacturing includes cement and cheese factories. Kimberley is the second largest manufacturing town, but its output is half that of Lichtenburg.

The trade sector is concentrated in wholesale of primary products and related services to the community. Main products of trade in this WMA are:

- diamonds (for export);
- food retail related products; and
- ostrich-related products.

2.f.xii.1 Description of the Current Land Uses

The area is zoned as a mining area, with large scale mining taking place within the region. The mining area was most likely used for livestock grazing before mining commenced, based on surrounding land use of grazing taking place.

From a land capability point of view, the Beeshoek Mine Area is dominated by soils with low agricultural potential. At best, the soils within the Beeshoek Mine Area are suitable for supporting wildlife and grazing to a degree. Although small patches of arable soils occur within the area, given the climatic constraints of the area (Rainfall less than 400 mm) and lack of irrigation options, these soils are not likely to contribute substantially to national food production grid. The very low rainfall in the area infers that the only means of cultivation would be by irrigation. However, based on observation of the area there are no signs of irrigation infrastructure. In addition to that, high temperatures occurring in this area are also likely to cause crop permanent wilting, thus affecting crop yield. Given these constraints the extent of the high productivity soils is not considered sufficient for viable cultivated commercial farming.

2.f.xii.2 Description of Specific Environmental Features and Infrastructure on Site

There are a number of specific environmental features which requires further investigation in the subsequent EIA stages:

- The mine site is located on the western edge of the Ghaap Plateau that has been identified by the Northern Cape Nature Conservation Services as a priority for conservation in the Northern Cape and is regarded as an ecologically sensitive habitat. Endoreic pans occur on the Ghaap Plateau and are prevalent within the Sishen/Postmasburg area. Various of these pans are present within the project area;
- Non-perennial drainage channel observed on the south eastern boundary of the mine;
- Increased dewatering activities, especially on the southern and south-eastern boundary of the mine and the potential impact thereof on surrounding farmers;
- Loss in habitat and ecological resources due to large scale clearance required as part of this project.

2.f.xii.3 Environmental and Current Land Use Map

Please refer to the following figure for the landcover map.

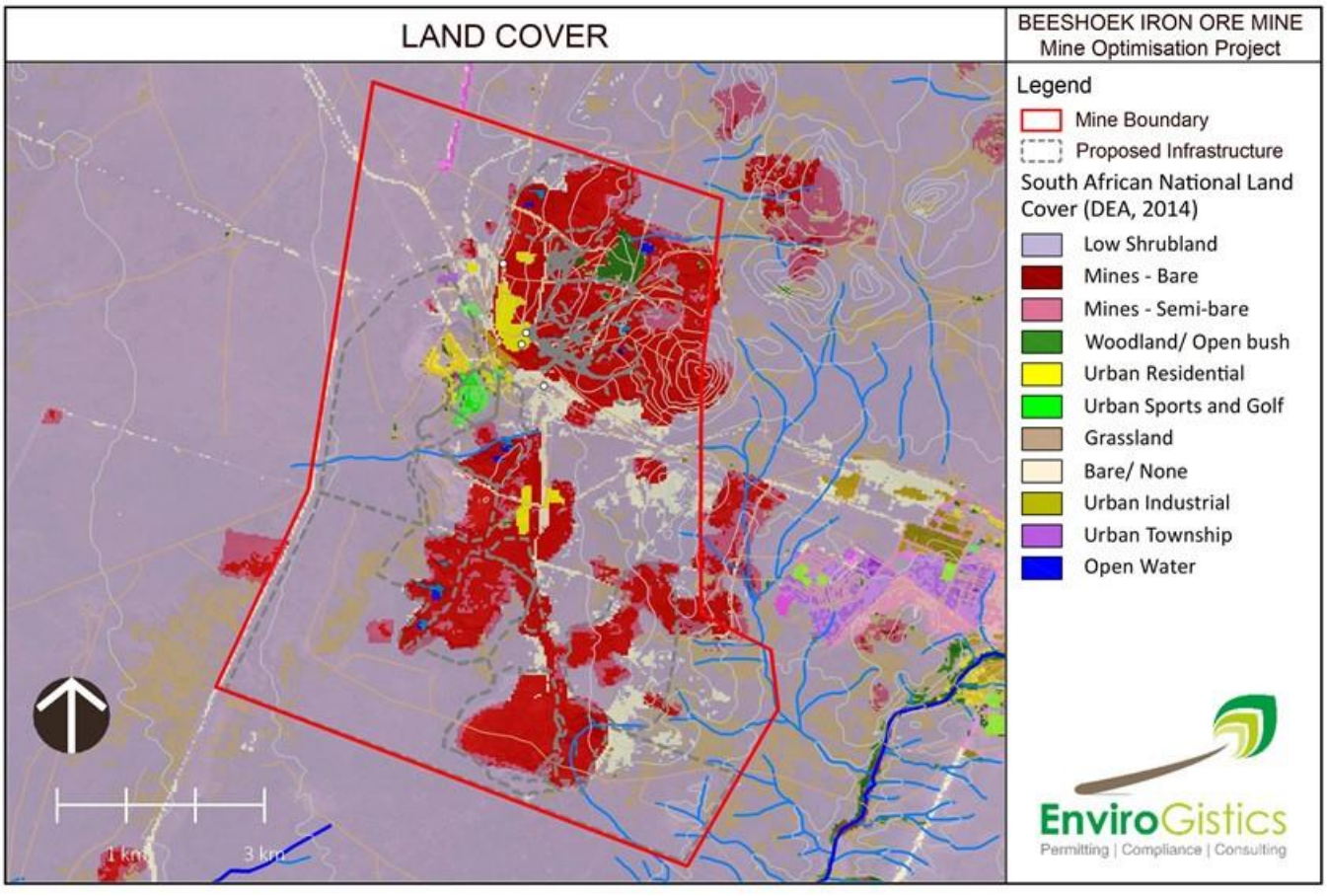


Figure 41: Land Cover map

2.f.xiii Impacts Identified

2.f.xiii.1 Methodology used in determining and ranking the Nature, Significance, Consequences, Extent, Duration and Probability of potential Environmental Impacts and Risks

In order to adequately assess and evaluate the impacts and benefits associated with the project it is necessary to use a methodology that could scientifically achieve this and to reduce the subjectivity involved in making such evaluations. For proper decision making it is necessary to assess all legal requirements and clearly defined criteria in order to accurately determine the significance of the predicted impacts or benefits on the surrounding natural and social environment.

This section will aim to discuss the methodology to be followed to determine, assess and describe possible impacts as a result of project implementation. Impacts will be discussed in terms of the construction, operational and decommissioning/closure phases of the project. The evaluation of impacts is conducted in terms of the criteria discussed below. The various environmental impacts and benefits of this project will be discussed in terms of the nature of the impact, as well as the status, certainty, duration, magnitude, extent, intensity, frequency and significance. The significance rating of each impact will determine whether or not mitigation will be required.

The EIA will also aim to achieve the following:

- Provide an overall assessment of the social and biophysical environments affected by the proposed project;
- Assess the study area in terms of environmental criteria;
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts;
- Successfully analyse all public issues raised to date in order to recommend appropriate mitigation measures for all social and environmental related concerns; and
- Assess impacts and benefits before and after the application of mitigation measures.

The following section presents the criteria used to assess the potential impacts presented in the previous section.

2.f.xiii.1.a Criteria of assigning significance to potential impacts

The evaluation of impacts is conducted in terms of the criteria detailed in Table 33 to Table 38. The various environmental impacts and benefits of this project are discussed in terms of impact status, extent, duration, probability, and intensity. Impact significance is regarded as the sum of the impact extent, duration, probability and intensity and a numerical rating system has been applied to evaluate impact significance. Therefore, an impact magnitude and significance rating are applied to rate each identified impact in terms of its overall magnitude and significance (Table 38).

In order to adequately assess and evaluate the impacts and benefits associated with the project, it was necessary to develop a methodology that would scientifically achieve this and to reduce the subjectivity involved in making such evaluations. To enable informed decision-making it is necessary to assess all legal requirements and clearly defined criteria in order to accurately determine the significance of the predicted impact or benefit on the surrounding natural and social environment.

2.f.xiii.1.b Impact Status

The nature or status of the impact is determined by the conditions of the environment prior to construction and operation. A discussion on the nature of the impact will include a description of what causes the effect, what will be affected and how it will be affected. The nature of the impact can be described as negative, positive or neutral.

Table 33: Status of Impact

Rating	Description	Quantitative rating
Positive	A benefit to the receiving environment.	P
Neutral	No cost or benefit to the receiving environment.	-
Negative	A cost to the receiving environment.	N

2.f.xiii.1.c Impact Extent

The extent of an impact is considered as to whether impacts are either limited in extent or if it affects a wide area or group of people. Impact extent can be site specific (within the boundaries of the development area), local, regional or national and/or international.

Table 34: Extent of Impact

Rating	Description	Quantitative rating
Low	Site Specific; Occurs within the site boundary.	1
Medium	Local; Extends beyond the site boundary; Affects the immediate surrounding environment (i.e. up to 5 km from the Project Site boundary).	2
High	Regional; Extends far beyond the site boundary; Widespread effect (i.e. 5 km and more from the Project Site boundary).	3
Very High	National and/or international; Extends far beyond the site boundary; Widespread effect.	4

2.f.xiii.1.d Impact Duration

The duration of the impact refers to the time scale of the impact or benefit.

Table 35: Duration of Impact

Rating	Description	Quantitative rating
Low	Short term; Quickly reversible; Less than the project lifespan; 0 – 5 years.	1
Medium	Medium term; Reversible over time; Approximate lifespan of the project; 5 – 17 years.	2
High	Long term; Permanent; Extends beyond the decommissioning phase; >17 years.	3

2.f.xiii.1.e Impact Probability

The probability of the impact describes the likelihood of the impact actually occurring.

Table 36: Probability of Impact

Rating	Description	Quantitative rating
Improbable	Possibility of the impact materialising is negligible; Chance of occurrence <10%.	1
Probable	Possibility that the impact will materialise is likely; Chance of occurrence 10 – 49.9%.	2
Highly Probable	It is expected that the impact will occur; Chance of occurrence 50 – 90%.	3
Definite	Impact will occur regardless of any prevention measures; Chance of occurrence >90%.	4
Definite and Cumulative	Impact will occur regardless of any prevention measures; Chance of occurrence >90% and is likely to result in in cumulative impacts	5

2.f.xiii.1.f Impact Intensity

The intensity of the impact is determined to quantify the magnitude of the impacts and benefits associated with the proposed projects.

Table 37: Intensity of Impact

Rating	Description	Quantitative rating
Maximum Benefit	Where natural, cultural and / or social functions or processes are positively affected resulting in the maximum possible and permanent benefit.	+ 5
Significant Benefit	Where natural, cultural and / or social functions or processes are altered to the extent that it will result in temporary but significant benefit.	+ 4
Beneficial	Where the affected environment is altered but natural, cultural and / or social functions or processes continue, albeit in a modified, beneficial way.	+ 3
Minor Benefit	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are only marginally benefited.	+ 2
Negligible Benefit	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are negligibly benefited.	+ 1
Neutral	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are not affected.	0
Negligible	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are negligibly affected	- 1
Minor	Where the impact affects the environment in such a way that natural, cultural and / or social functions or processes are only marginally affected.	- 2
Average	Where the affected environment is altered but natural, cultural and / or social functions or processes continue, albeit in a modified way.	- 3
Severe	Where natural, cultural and / or social functions or processes are altered to the extent that it will temporarily cease.	- 4
Very Severe	Where natural, cultural and / or social functions or processes are altered to the extent that it will permanently cease.	- 5

2.f.xiii.1.g Impact Significance

The impact magnitude and significance rating are utilised to rate each identified impact in terms of its overall magnitude and significance.

Table 38: Impact Magnitude and Significance Rating

Impact	Rating	Description	Quantitative rating
Positive	High	Of the highest positive order possible within the bounds of impacts that could occur.	+ 12 – 16
	Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. Other means of achieving this benefit are approximately equal in time, cost and effort.	+ 6 – 11
	Low	Impacts is of a low order and therefore likely to have a limited effect. Alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.	+ 1 – 5
No Impact	No Impact	Zero impact.	0
Negative	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged.	- 1 – 5
	Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly possible. Social cultural and economic activities of communities are changed but can be continued (albeit in a different form). Modification of the project design or alternative action may be required.	- 6 – 11
	High	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or a combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt.	- 12 - 16

2.f.xiii.2 Impacts and Risks identified

The following table presents the potential list of impacts, which will be assessed as part of the specialist studies during the EIA Phase.

Table 39: Potential Impacts – Planning Phase (CbA – Can be Avoided; R – Reversible; Ir – Irreversible; SbM – Significance before Mitigation; SaM – Significance after Mitigation)

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
Planning Phase (and throughout LOM to ensure Legal Compliance)																	
Legal Requirements (Environmental Permits)	South Africa Enviro-Legal Requirements	Unlawful water and waste (mine residue) activities, which could lead to NWA Directives and Section 24G Rectification fines.	N	-4	-3	-2	-5	-14	CbA	A legal assessment of all Water Uses must be undertaken every second year to ensure that all Water Uses are licensed.	Storm Water Dam Basic Assessment Report (BAR) EMP [EMP (2016)]	P	4	3	5	5	17
										The mine must familiarise themselves with the NEM:WA Regulations for the management of Mine Residue Deposits. Those included in previous approved EMPs are considered lawful under the NEM:WA, however where reworking, rehabilitation, stockpiling is taking place, not included into the previous EMP, these activities are unlawful and may require a Waste Management Licence.	EMP (2016)						
										All legally appointed personnel responsible or involved in water use activities on site must receive training on the requirements of the WUL.	EMP (2016)						
										The requirement to invest in an Offset Area must be investigated due to the extensive clearance activities being undertaken. This will be dependent on the outcomes of the specialist studies.	New						
										No clearance of activities may be initiated without the necessary tree removal permits.	New						
										Should artefacts be identified as part of the Heritage Study, these should be managed and handled in line with the approval by the SAHRA.	New						
										Regular internal audits must be undertaken on the lawful implementation of the WUL.	EMP (2016)						
										Ensure that all parties are aware of the conditions of the Environmental Authorisation and approved EMPr.	New						
										Agreements between the TFR and the Mine for the tie into the TFR line must be obtained prior to construction.	New						
										Agreements must be in place between the Mine and the roads agency prior to the construction of the rail under road system.	New						

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Geotechnical studies must be completed and final designs approved by the various role players (such as the mine, roads agency, TFR) prior to the construction of the railway line. Water Use Licence must be available on site at all times. The legal register must be updated to indicate all updated water uses. Specific to the required approval of the Future Pit, at the current South Mine operations: For this activity it is important to note that the future pit is in its planning phase, further exploration will be required in this area. Once the final designs for the mining schedule is available this will be submitted to the DMRE for approval. It will also be at this time that a detailed waste management strategy will be developed for the management of waste rock and overburden in this area. Once this information is available the necessary Waste Management License and Water Use License will be applied for from the DMRE and DWS respectively.	New EMP (2016) EMP (2016)						

Table 40: Potential Impacts –Construction Phase

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
Construction Phase																	
Land and Footprint Clearance	Geology	No direct impact - Activities will not be constructed over future planned mining areas.	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Topsoil Stripping and Stockpiling and Vegetation Removal	Topography	Direct impact: Alteration of topography. Removal of vegetation and the associated shaping of the area will lead to	N	-1	-3	-3	-2	-9	R	The footprint areas of all surface infrastructure must remain as small as possible within the parameters of operational and engineering requirements. Construction areas must be clearly demarcated to control movement of personnel and vehicles, providing clear boundaries for construction sites in order to limit	New	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		change in topographical characteristics of the area. The impact is not considered significant due to the fairly flat nature of the topography and the location of the activities in the immediate vicinity of the existing plant area.								the spread of impacts. Markers and pegs will be erected and maintained along the boundaries of the working areas, access roads, haul roads and paths before commencing any work. If proved insufficient for control, these shall be replaced by fencing. Designs of the facilities (Stockpiles and landscaping) must be undertaken by a registered Engineer. Draw up a procedure clearly reflecting the method and phases of clearance of vegetation only in areas where construction will take place. Removal of vegetation must be undertaken in a phased approach to limit surface exposure. Temporary erosion control measures may be used to protect the disturbed soils during the construction phase until adequate vegetation has established. Clean and dirty water separation must be implemented early in the construction phase, especially down-gradient of construction areas to ensure that the natural runoff patterns are impacted as little as possible. Clearance and activities around identified pan areas must be limited and must be approved in terms of a WUL. Linear infrastructure must follow as far as practically possible the natural contours of the area.							
	Soil, Land Use and Land Capability	Direct impact: The removal and stockpiling of "topsoil" (a mixture of soil and small rock material)may lead to a loss of soil resource and land capability through erosion of the stockpiles and chemical and physical degradation. This impact is considered important due to the	N	-1	-3	-5	-4	-13	R	Adhere to Soil Stripping, Soil Stockpiling and Soil Management Plan, which will be developed as part of the EIA and EMP. Prior to construction of the roads and other infrastructure the soil will be stripped and placed on a soil stockpile. Topsoil should be stockpiled on designated topsoil stockpiles, unless around linear infrastructure, where the topsoil could be stockpiled next to the linear structure. Where possible separate stockpiling of different soil type groups (to obtain the highest post-mining land capability.	New	N	-1	-1	-2	-1	-5

Name of Activity	Impact Area	Potential Impacts							Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		fact that the mine may be operating on a negative topsoil balance and therefore the retaining of suitable topsoil is important for successful rehabilitation.								Any new topsoil stockpiles should not exceed the recommended height of 2-4m. Should three (3) meters be exceeded, erosion control measures should be implemented. Stockpiles should be managed to encourage self-succession of vegetation as an erosion control measure. These stockpiles should also be kept alien vegetation free at all times to prevent loss of soil quality							
		Direct impact: Soil compaction	N	-1	-4	-2	-2	-9	R	The contractor will ensure that all activities, material and equipment storage and personnel movement take place within the designated area. As far as possible construction areas should be accessed through the existing road network. A site plan must be developed, indicating the following: • Location of all approved activities; • Buffers around pans; • 1:100 year buffer around all watercourses, where applicable; • Location of the buffer zones and other no-go zone's. Laydown areas should be located within disturbed soils (anthrosols) to avoid compaction of natural soils. All contractors must receive induction. The induction should be updated on site, to make provision for the site plan and a detailed explanation on the purpose of the no-go zones, presence of protected species, presence heritage artefacts and the meeting of management measures. The management of topsoil stockpiles should be undertaken in terms of the Topsoil Management Plan, 2016 to ensure that the topsoil stockpiles maintain its integrity and are not subjected to compaction. A system must be implemented on site to address all significant or recurring environmental non-compliances. This could include the department infringing to supply new endemic tree species or plants to be planted in areas earmarked for rehabilitation.	New	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Site clearance and activities should be restricted to the approved footprint. Contractors areas should be established on already disturbed footprints.							
		Direct impact: Clearing vegetation will result in the exposure of soil, which may in turn lead to soil erosion. This impact is considered important due to the fact that the mine may be operating on a negative topsoil balance and therefore the retaining of suitable topsoil is important for successful rehabilitation.	N	-1	-3	-5	-4	-13	R	Adhere to Stormwater Management Plan, developed by SWS, 2016 or any approved update thereafter. Ensure that all design drawings include effective erosion control measures. This will specifically be important around the discharge point of fissure water (energy dissipaters must be included into the design). Ensure the required erosion protection measures are monitored and corrected where necessary. Natural vegetation establishment (self-succession) will be encouraged on cleared areas, and topsoil stockpiles. If natural succession of vegetation is not established within one rainy season, after rehabilitation, trails must be initiated to determine the best rehabilitation procedure for the establishment of vegetation on these disturbed areas. The mine will investigate an appropriate seed mix for the rehabilitation purposes should self-succession not establish on rehabilitated sites. If possible, vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive stormwater and wind are anticipated to be low. The footprint of the proposed opencast pits, WRD expansions and infrastructure areas should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible. No construction or project related activities may be undertaken outside of the demarcated areas. Clean and dirty water systems must be established prior to construction.	New	R	-1	-2	-2	-1	-6
			N	-3	-3	-3	-4	-13	CbA	Adhere to the measures presented under soil impacts.	New	N	-1	-1	-1	-2	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
	Terrestrial Ecology (Fauna & Flora)	Loss of Habitat and Ecosystem Characteristics								Adhere to the measures presented under hydrological impacts (especially by implementing storm water management measures). Adhere to the management measures presented for air quality management. Vegetation clearance and commencement of construction activities should either be scheduled to coincide with low rainfall conditions when erosive stormwater is anticipated to be limited or alternatively stormwater controls must be established at the start of construction and dust suppression implemented. As far as construction areas should be accessed through the existing road network During the surveying and site-pegging phase of the proposed mining activities, all floral SCC that will be affected must be marked and where possible, relocated to suitable habitat surrounding the disturbance footprint. The relevant permits must be applied for within the relevant province as indicated in the baseline floral assessment, prior to the construction phase Clearing of vegetation should take place in a phased manner as to keep bare soil areas as small as possible to limit the erosion potential. Should any protected floral species be encountered within the proposed development footprint areas, permits should be obtained from NCDENC and DAFF to remove, cut or destroy any protected tree species before construction of infrastructure takes place Prior to the removal of plant species, the mine should appoint an ecologist to monitor and oversee the removal of all identified protected species, which should be removed under tree removal permits. All such species should be demarcated by signage or tape. Natural vegetation establishment (self-succession) will be encouraged on cleared areas, and topsoil stockpiles. If natural succession of vegetation is not established within one rainy season, after rehabilitation, the							

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										disturbed areas and areas adjacent to the infrastructural areas must be re-vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust emission. No collection of firewood, floral SCC or medicinal floral species must be allowed by construction or mining personnel. A fine system/disciplinary system must be implemented on site for all significant or recurring environmental non-compliances. This could include the department infringing to supply new endemic tree species or plants to be planted in areas earmarked for rehabilitation. Any department wishes to clear new areas or construction new infrastructure should supply new endemic tree species or plants to the Environmental Department to be planted in areas earmarked for rehabilitation.							
	Hydrology	Direct impact: The removal of vegetation can lead to increased surface runoff, which may in turn alter natural surface water flows and increase siltation of watercourses as well as pollution control facilities.	N	-3	-2	-2	-3	-10	CbA	The storm water management plans should be implemented in and around the facilities to ensure that dirty water runoff or water with high sediment loads do not enter the existing watercourses. Limit the areas to be cleared to the demarcated sites.	New	N	-1	-1	-1	-2	-5
	Geohydrology	No direct impact during the construction phase.	-	-	-	-	-	-	-		-	-	-	-	-	-	-
	Heritage	The study area is known for the presence of graves and heritage artefacts. The Screening assessment also indicated the importance of paleontological themes.	N	-3	-3	-3	-4	-13	CbA	In the event that any other heritage artefacts or graves are encountered during the excavation activities, all activities must cease and the SAHRA should be contacted to determine the way forward before construction may continue. The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is	New	N	-1	-1	-2	-3	-7

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										discussed below. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below. • If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. • The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP.							
	Visual	Direct impact: soil stripping and footprint clearance	N	-1	-2	-1	0	-4	R	Stripping of vegetation and soils should be undertaken within the demarcated areas.	New	N	-1	-1	-1	0	-3
	Air Quality	Direct impact: Dust-fallout	N	-2	-2	-3	-2	-9	CbA	Utilised the existing monitoring network to monitor dust fall out in and around the construction area, or adjust the monitoring network in line with the recommendations by the Air Quality Specialist. Strictly enforced speed limits on all roads All areas, especially with the exploration activities, should be rehabilitated once construction has been	New	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										compiled, and in the case with the drilling pads, once the drilling activities at that pad had been concluded. Bare soils can be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast Limit site clearance to designated areas.							
	Noise	The area is located within the mining area. Noise impacts are not considered to be significant but can occur during excavation and construction activities.	N	-1	-2	-1	-1	-5	CbA	Equipment will be well maintained to reduce excessive noise creation. Activities will be restricted to the day time.	New	N	-1	-1	-1	-1	-4
	Social	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Geology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Topography	During the site clearance activity, the required storm water management systems and shaping of land would have been completed. Therefore no further impact on the topography is expected	-	-1	-3	-3	-2	-9	R	Activities should be constructed and developed within the approved design concepts. Note that laydown areas will only be constructed in areas which are demarcated for permanent activity construction to ensure that no additional areas are disturbed.	New	N	-1	-1	-2	-1	-5
Establishment of Infrastructure	Soil, Land Use and Land Capability	Direct impact: Construction activities with surrounding exposed soil may in turn lead to soil erosion.	N	-1	-2	-3	-4	-10	CbA	Ensure that all design drawings include effective erosion control measures and that these are implemented during the establishment of the infrastructure. Vegetation established as part of the site clearance activities, will be monitored and assessed to ensure that these remain well established. Areas of construction must be clearly demarcated. No construction or project related activities may be undertaken outside of the demarcated areas. Clean and dirty water systems must be established prior to construction and must be maintained throughout the life of mine.	New	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Where vegetation cannot be established during the life of construction and operations, appropriate measure will be taken to control erosion. These will include grading of surfaces to prevent rapid run-off of storm water and / or the use of energy dissipaters. Provision should be to protect the soils from hydrocarbon spills/drips by the vehicles and refuelling trucks entering and existing the site (i.e. grid system or permanently manned personnel to treat soils during periods of refuelling). Where erosion gulley is formed, these will be recorded on an integrated electronic incident/action system (such as Isometrics) for immediate action.								
	Terrestrial Ecology (Fauna & Flora)	All impacts are assessed under Footprint Clearance.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wetlands (Pans)	The establishment of activities in close proximately to riparian systems could lead to encroachment of activities.	N	-3	-2	-2	-3	-10	CbA	Activities should be constructed and developed within the approved design concepts. All infrastructure must be constructed in accordance with the approved designs. The new Central Process Dam at the proposed WHIMS Plant should be constructed with a Class C liner. Flow meters must be implemented on all pipelines and water tanks to ensure that water use and management can be recorded. Limit vehicle/machinery activity within the active channel as well as in the riparian zone to what is absolutely essential. Disturbances to the pan systems should be limited as far as possible. Re-fuelling of vehicles to take place outside of the riparian zone & associated buffer zones, on sealed surfaces. Activities should not obstruct flow during the rainy season.	New	N	-1	-1	-1	-2	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Where possible, existing access roads should be used for monitoring purposes so as to minimise the compaction of soils and loss of both riparian and instream habitat. Hot spots for build-up of debris must be identified and debris must be regularly removed to prevent flooding and damage of infrastructure. In this regard, special mention is made of periods following high rainfall and subsequent high instream water volumes. The pan systems must be monitored for alien vegetation encroachment and all alien vegetation/weeds must be removed according to a suitable alien vegetation control plan. Any erosion or gully formation must be identified on an ongoing basis and re-profiled and revegetated accordingly.							
	Hydrology	Construction activities could impact on the hydrology of the runoff system in storm events.	N	-2	-2	-2	-2	-8	CbA	For the access roads, it is proposed that berms are constructed across the width of the road, at a 30° to 40° angle. Material for the berms can be sourced from the road cuts, depending on the soil type. The berms should extend well beyond the width of the road, particularly on the downslope side, and it should be ensured that runoff is discharged into a well vegetated or stony area, to prevent erosion. The berms should be constructed to be gradual, in order to allow vehicles to easily pass over them, but should not be overtopped by runoff. Berms should be prioritised at the top of steep transitions in the road slope, as well as above drainage line crossings. The storm water management plan provided for the project should be implemented. No drilling activities may take place within buffer areas identified by the specialists as part of the EIA studies. No drilling may take place in the 1:100 year flood line unless approved by the DWS. Activities should not obstruct flow. The necessary culverts must be constructed as part of the railway line design to ensure that no ponding of water takes place.	New	N	-2	-1	-1	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Vehicles and activities will be well maintained and operated.							
	Geohydrology	Direct impact. The use of waste rock in the compaction of the roads and surface footprints should not lead to an impact on the groundwater resources as the material is not considered a pollutant.	-	-2	-3	-1	-2	-8	CbA	Groundwater monitoring should be undertaken to ensure that the facilities are operated in manner as not contributed to the current and historic pollution plumes.	New	N	-1	-2	-1	-1	-5
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Air Quality	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Noise	All impacts are assessed under Footprint Clearance.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Social	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Placement of Enviroberms and Safety berms and preparation of WRD footprints	Geology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Topography	During the site clearance activity, the required storm water management systems and shaping of land would have been completed. Therefore no further impact on the topography is expected	-	-1	-3	-3	-2	-9	R	Activities should be constructed and developed within the approved design concepts. Note that laydown areas will only be constructed in areas which are demarcated for permanent activity construction to ensure that no additional areas are disturbed.	New	N	-1	-1	-2	-1	-5
	Soil and Land Use	No impact, berms are implemented within haul road boundaries, or along the opencast perimeter. No additional soils are removed other than that for the roads and opencast pits.	-	-	-	-	-	-	R	Management measures for the establishment of roads and opencast pits should be adhered to (this should include erosion management of berms).	New	-	-	-	-	-	-

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		Erosion on the side walls of enviro-berms.	N	-1	-2	-4	-2	-9	CbA	Enviro-berms should only be placed in demarcated areas around the opencast pits. Berm heights will be restricted to 5m. Erosion control measures will be implemented on all stockpiles and self-succession will be encouraged (latter required on enviroberms).	New New EMP (2009)	N	-1	-1	-1	-1	-4
	Ecology	No impact is foreseen, berms are implemented within haul road boundaries, or along the opencast perimeter. No vegetation clearance will take place as part of these activities.	N	-2	-3	-1	-3	-9	R	Management measures for the establishment of roads and opencast pits should be adhered to. No activities may take place within 100m of any watercourse or pans unless authorised in the WUL.	New	N	-1	-1	-1	-1	-4
		Presence of invader species could impact on the natural succession of vegetation on backfilled opencast pits.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme must be implemented on site and enforced (this should include all berms as well). This programme must stipulate the monitoring plan, which should include capturing of areas where invader species are present; action plan to remove these; % successful removal).	EMP (2016)	N	-1	-1	-3	-2	-7
	Surface Water	Contamination of surface water resources. There are no surface water resources in the area, however, the natural runoff, which must be managed internally on site could become impacted.	N	-1	-2	-1	-2	-6	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or as amended and approved. Surface water monitoring must continue in accordance with the approved WUL. Maintenance of all Storm Water Management systems must be undertaken regularly on site.	EMP (2016) EMP (2016) EMP (2016) EMP (2016)	N	-1	-1	-1	-2	-5
	Groundwater	Contamination of groundwater due to the seepage of water from Mine Residue Deposits used in the construction of berms. The 2017 Groundwater Risk Assessment	N	-1	-1	-1	-2	-5	CbA	The current groundwater chemistry monitoring must be maintained with annual additional analyses of sewage and hydrocarbon related contamination. Expansion of the existing groundwater level monitoring network is recommended purely with regards to water level measurement to monitor the expansion of the dewatered area.	GPT Groundwater Risk Report, 2016	N	-1	-1	-1	-1	-4

Name of Activity	Impact Area	Potential Impacts							Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		conducted by GPT, states that: "Based on the groundwater quality analyses, solid waste analyses and liquid waste analyses, as well as the statistical analysis of the data, it can be deduced that the chemical signatures of the 3 mediums (groundwater, solid waste and liquid waste) are quite similar. It was found that the constituents found to exceed the relevant screening levels for each of the three mediums are also similar. Also, most of the sources are located within the dewatered area, directing any contaminants towards the active mining areas." It should also be noted that according to the GPT Monitoring Network Evaluation, 2016 the Nitrates are elevated in the groundwater naturally, based on background monitoring data. The nitrate concentrations found exceeded the SANS 241:2015 limits. However, it is proposed that this constituent be added								No additional groundwater monitoring is required for the identified source areas on site with regards to inorganic parameters.							
										Vehicles must be well maintained.	EMP (2016)						
										All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site	EMP (2016)						
										Any spills occurring during the collection process must be cleaned up immediately.	EMP (2016)						
										Any significant spills must be captured in the incident reports and must be reported to the relevant department (NCDENC, WUA, CMA, DWS).	EMP (2016)						
										A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2016)						
			N	-1	-3	-1	-1	-6	CbA	Any new WRDs (Mine Residue Deposits) must be subjected to the requirements of the NEM:WA and regulations pertaining to the management of Mine Residue Deposits and the Classification of Waste, as well as the disposal to landfill requirements.	EMP (2016)	N	-1	-2	-1	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures						
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		to the monitored parameters in the WUL. The source of the naturally elevated nitrate in the groundwater is currently unknown and is presumed to be a by-product of the vegetation in the area.															
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Air Quality	No further impacts are foreseen.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noise	All impacts are assessed under Footprint Clearance.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Social	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Management and Handling Hydrocarbon spills within the Mining Area and the management of Domestic and Hazardous Waste	Geology	No direct impact.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Topography	No direct impact.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Soils	Contamination of soil resources due to hydrocarbon spills.	N	-1	-2	-4	-4	-11	CbA	Storage of fuels and oils, the refuelling of vehicles and equipment maintenance must be limited to designated, bunded (bunds to be 110% of volume of the materials stored) areas. All contaminated material at the Exploration Activities, where applicable, must be contained in mobile sumps. The mobile sumps must maintain a suitable freeboard, to ensure when these are moved/transported, that no spillage will occur. All fuels and soils must be stored in appropriate containers. Chemicals and hazardous material must be stored in suitable containers, fit for purpose and in line with SDS requirements. Where drip trays are too small, specially prepared, non-pervious bunds with solution trenches must be used to capture spillages.	New New New New New New	N	-1	-2	-1	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Oils and potentially hazardous materials must be disposed of at a licensed facility and waste certificates obtained.							
										A spill kit must be provided to be used in the event of a spill.	New						
										If a spill occurs, the contaminated soil must be removed immediately. Contaminated soil must be stored according to best practices until it can be disposed of at a suitably licensed facility.	New						
										Safety signage must be used at designated storage areas.	New						
										All workers must undergo an induction which includes environmental awareness training to make them aware of the environmental incident management procedures as well as the importance of complying with management measures.	New						
		Contamination of soils as a result of a lack of sanitary services	N	-1	-2	-4	-4	-11	CbA	Chemical toilets must be readily available to employees where permanent infrastructure is not available.	New	N	-1	-2	-1	-1	-5
										Licensed companies must be appointed to remove any contaminated material and or wastes to licensed landfill sites.							
		Handling of building Rubble	N	-2	-2	-1	-2	-7	CbA	Building rubble must be disposed of in line with the requirements of the NEM:WA.	New	N	-1	-1	-1	-2	-5
										Waste management training must be implemented on site.	New						
										Clear signs informing staff of waste management practices must be implemented on site.	New						
										All waste must be removed by licensed contractors and disposed of at a licensed landfill site or be disposed of at a licensed landfill site.	New						
										As a duty of care and the cradle to grave principles, the mine should regularly inspect disposal site to ensure that best practices are implemented.	New						
										Recycling practices must be investigated and implemented on site where practical.	New						
	Ecology	The unmanaged disposal of waste, could result in the spread of invader	N	-2	-3	-3	-4	-12	CbA	Develop dedicated waste handling areas; prevent access to rodents and opportunistic species; prevent the spread of waste.	New	N	-1	-1	-2	-1	-5
											New						

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
		species, as well as the influx of opportunistic species.								The landfill site at Beeshoek must be operated in line with the ECA license requirements and conditions.							
										Develop dedicated waste handling areas, fit for purpose and prevent the spread of waste.	New						
	Surface Water	Handling of Hazardous Waste within workshops, water containment facilities and general mine area could contaminate the dirty water storage areas. The water is then reused in the system and could have impacts on the integrity of the storm water system and also the production.	N	-3	-2	-2	-4	-11	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or any approved update thereafter.	New	N	-1	-1	-2	-2	-6
										A detailed waste management strategy will be established and implemented, which will clearly demarcate the containments for different waste streams.	New						
										Waste management training must be implemented on site.	New						
										Clear signs informing staff of waste management practices must be implemented on site.	New						
										All contaminated material at the Exploration Activities must be contained in mobile sumps. The mobile sumps must maintain a suitable freeboard, to ensure when these are moved/transported, that no spillage will occur.	New						
										Hazardous waste handling should only take place within bunded and/or lined areas.	New						
										Hazardous waste should be removed by a licenced removal company and taken to a suitable and licenced landfill site.	New						
										Clean spills, if occur within 24 hours.	New						
										Documentation of removal and safe disposal must be available on site.	New						
										The mine will adopt a cradle-to grave approach to ensure that the waste is removed and disposed of in a legally compliant manner.	New						
										Notify the relevant regulatory authorities in the event of the occurrence of a reportable incident.	New						
										Weekly inspections of Storm Water Management Systems must be undertaken. Any blockages or	New						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										maintenance requirements must be documented and an action plan developed.								
		Handling and Storing of Domestic Waste should have no impact on the surface water resources due to the location of the facility. However, incorrect disposal of waste could hamper the integrity of the storm water system.	N/A	-1	-2	-3	-3	-9	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or any approved update thereafter. Waste management training must be implemented on site. Weekly inspections of Storm Water Management Systems must be undertaken. Any blockages or maintenance requirements must be documented and an action plan developed. Clear signs informing staff of waste management practices must be implemented on site. Access control must be strictly enforced. The landfill site at Beeshoek must be operated in line with the ECA license requirements and conditions. Recycling practices must be investigated and implemented on site.	New New New New New New	N	-1	-1	-2	-1	-5
	Groundwater	Large scale hydrocarbon spills could be present at the mining area	N	-3	-1	-4	-4	-12	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. No activities associated with hydrocarbons and/or chemicals may be undertaken outside of an effectively designed and contained area. All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site. Any spills occurring during the collection process must be cleaned up immediately. Any significant spills must be captured in the incident reports and must be reported to the relevant department (NCDENC, Catchment Management Agency/DWS). All equipment and machinery should be kept in good working order.	New New New New New New New	N	-2	-1	-2	-1	-6

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										A clean up procedure (i.e. Works Instruction) must be in place. Clean spills, if occur within 24 hours.							
		Handling or Hazardous Waste within workshops and general mine area.	N	-2	-2	-2	-4	-10	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or any approved update thereafter.	New	N	-1	-1	-2	-2	-6
										The workshop should be designed with the suitable waste containment measures (berms, sumps, oil separators).	New						
										Waste management training must be implemented on site.	New						
										Clear signs informing staff of waste management practices must be implemented on site.	New						
										Hazardous waste handling should only take place within bunded and/or lined areas, with a capacity of at least 110% of the volume stored.	New						
										Hazardous waste should be removed by a licenced removal company and taken to a suitable and licenced landfill site.	New						
										Documentation of removal and safe disposal must be available on site.	New						
		Handling and Storing of Domestic Waste	N	-2	-2	-1	-2	-7	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or any approved update thereafter.	New	N	-1	-1	-1	-2	-5
										Waste management training must be implemented on site.	New						
										Clear signs informing staff of waste management practices must be implemented on site.	New						
										All waste must be removed by licensed contractors and disposed of at a licensed landfill site.	New						
										As a duty of care and the cradle to grave principles, the mine should regularly inspect disposal site to ensure that best practices are implemented.	New						
										Recycling practices must be investigated and implemented on site where practical.	New						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Potential Impacts	Status	Status	Extent	Duration	Probability	Intensity	SaM
										Groundwater monitoring must be undertaken in such a manner as to ensure that any potential impacts from the landfill site can be detected.	New						
	Air Quality	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Noise	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-

Table 41: Potential Impacts – Operational Phase

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
Operational Phase																	
Opencast Mining Operations (blasting, topsoil removal, water abstraction)	Geology	The removal of iron ore via the opencast pits is a permanent impact on the geology as the mineral resource will not be able to be replaced.	N	-4	-4	-4	-3	-15	I	To ensure that the Mining Works Programme is continuously optimised to mine the minerals optimally.	EMP (2009)	P	4	4	4	3	15
										Ongoing research and exploration should be undertaken to ensure the optimal mining practices. These activities should take place within the stipulations of the EMP. Environmental Gap Assessments should be undertaken prior to the initiation of exploration activities or amendment to infrastructure design to ensure that such activities are undertaken in an environmentally lawful manner.	New						
	Topography	Excavations in the landscape to the mining activities.	N	-3	-4	-4	-3	-14	R	Ongoing rehabilitation during opencast mining of the opencast pits, as well as detrital mining on the south mine should be undertaken, via the use of infill of the pits with excess mine residue. These areas should be shaped to be free draining, resembling the natural surface topography.	EMP (2009)	N	-2	-2	-4	-2	-10
										In-fill the pits with excess mine residue. Shaping of the in-filled pits to be free draining, resembling the natural surface topography.	EMP (2016)						
	Dolomite impact on pits	The presence of cavities below the base of Wolhaarkop	N	-3	-3	-3	-3	-14	CbA	There is evidence that dewatering has had some effect on surface instability on the property. It is recommended that a study be conducted to explore	New management measures Beeshoek	N	-2	-2	-4	-2	-10

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		Formation breccia has been shown to occur on the site. One such large cavern is present as exposed in the BN Pit annex. While this may be a once off occurrence, this cannot be assumed to be the case with any certainty. The occurrence of these is difficult to predict as they occur within the bedrock at the base of the Wolhaarkop chert breccia where solution cavities may be present. Although they are likely to be rare occurrences, they do pose a significant risk to mining activities.								techniques that will aid the identification of potential problems area. Such techniques include inter alia geophysical methods such as a gravity survey to identify low gravity anomalies that will aid identifying voids in bedrock. There is a suggestion from a dewatering borehole near the western pit that a similar cavity may exist at depth in this area too. Investigation of known or suspected features will give a good opportunity to test if such geophysical methods will indicate cavernous conditions and can be used in future to identify these ground conditions in advance so they can be mitigated. The eastern doline can be investigated in a similar fashion to confirm ground conditions that lead to these surface deformation events.	Deep Dolomite Study (2020)						
										The development of a Dolomite Risk Management Plan (DRMP) is recommended to mitigate the risks posed by dolomite related instability and involves devising an appropriate monitoring programme and reaction plan to incidents to mitigate against the risks. Specific recommendations are: • Surface mapping of outcrops and ancillary (potential) geological aspects (surface risk mapping) • Remote sensing/gravity surveys for near-surface and deep risk issues	New management measures Beeshoek Deep Dolomite Study (2020)						
	Dolomite impacts on infrastructure	The impact of dolomite related instability on infrastructure is likely to be the highest risk where dolomite bedrock is shallow or underlies a blanketing layer or layers of unconsolidated soils and deposits. This is particularly relevant where water-bearing services are involved and the risk of leakage is always possible. Concentrations of surface water such as from stormwater or from unlined impoundments such as tailings storage	N	-2	-4	-4	-4	-14	CbA	Wet services, such as water supply and slurry pipelines delivering waste to the Slimes Dam and stormwater accumulation and ponding, should be monitored especially where they traverse ground where dolomite bedrock dolomite outcrops or occurs beneath a blanketing horizon of recent soils or deposits. Small scale surface mapping of which areas of the mine site are underlain or have inferred underlying dolomite will be necessary, if these are not already available, to characterise risk.	New management measures Beeshoek Deep Dolomite Study (2020)	N	-2	-3	-3	-4	-14

Name of Activity	Impact Area	Potential Impacts										Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		facilities that are unlined pose a risk. Infrastructure such as roads bridges and pipelines will be at risk due to the presence of a blanketing layer of recent soils which overlie buried karst ground at depth. Leaking services and other concentration of water in the vicinity of infrastructure such as stormwater ponding result in water ingress into the ground causing subsurface erosion into receiving cavities in the dolomite bedrock. A geotechnical investigation of the Beeshoek TSF embankment wall in a report titled "Beeshoek Iron Ore Mine Tailings Storage Facility - Geotechnical Investigation – SRK Report no. 547755" shows seepage to be occurring through the wall of the embankment. The CSIR InSAR deformation reports show two instances of subsidence within the basin of the TSF, which is underlain by dolomite at a shallow depth. The relationship between these observations																

Name of Activity	Impact Area	Potential Impacts										Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		and the risk to stability of the basin and embankments must be established by further investigation.															
	Soils	No additional impact from construction phase	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Ecology	Presence of invader species could impact on the natural succession of vegetation on backfilled opencast pits.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme must be implemented on site and enforced. This programme must stipulate the monitoring plan, which should include capturing of areas where invader species are present; action plan to remove these; % successful removal).	New	N	-1	-1	-3	-2	-7
	Surface Water	Contamination of surface water resources. There are no surface water resources in the area, however, the natural runoff, which must be managed internally on site could become impacted	N	-1	-2	-1	-2	-6	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. Excess water will be pumped out of the pit and stored as dirty water in the slimes dam. Surface water monitoring must continue in accordance with the approved WUL. The opencast operations should be undertaken in line with the approved Mining Works Programme and EMP. Enviroberms should be implemented along the perimeter of the Opencast Pits. Erosion Control should be implemented on the Enviroberms to ensure the maintenance of its integrity. Maintenance of all SWM systems must be undertaken regularly on site.	EMP (2016) EMP (2009) EMP (2016) EMP (2016) New New EMP (2016)	N	-1	-1	-1	-2	-5
	Groundwater	Impact on groundwater quality due to the presence of mining activities. It should be noted that as a measure to protect groundwater resources, the mine does not use ANFO, which according to	N	-3	-3	-3	-3	-12	CbA	The groundwater monitoring programme must be implemented and undertaken in accordance with the approved WUL. Establish the extent and nature of groundwater draw down zones with opencast mining over the remaining operational life of mine, to determine the possible adverse yield effects on the local groundwater users.	EMP (2016) EMP (2009)	N	-2	-3	-2	-2	-9

Name of Activity	Impact Area	Potential Impacts										Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		the production manager, results in nitrates. However, the nitrates in the groundwater are observed in boreholes not located near mining activities, and therefore the sources of nitrate should be investigated.															
		Substantial mining is undertaken at Sishen South on the farms Klipbankfontein, Leeuwfontein and Kapstevel and was predicted in the Village Pit Modelling – Geo Pollution Technologies. Mining at the farm Leeuwfontein is planned to a level of 1030 metres above sea level, the lowest of the anticipated mines. This is about 250 metres below the surface and some 40 metres lower than the lowest level planned for the Village Pit (Village Pit Modelling – Geo Pollution Technologies). It can therefore be thought that, since the cone of drawdown due to mining at Village Pit extends to the farm Leeuwfontein (mining area of Sishen Mine), the mining at Leeuwfontein could in turn lower	N	-3	-3	-5	-4	-15	CbA	The groundwater monitoring programme must be implemented and undertaken in accordance with the approved WUL. Establish the extent and nature of groundwater draw down zones with opencast mining over the remaining operational life of mine, to determine the possible adverse yield effects on the local groundwater users. Excess water will be pumped out of opencast pits and stored as dirty water in the slimes dam (or licensed water tanks for reuse). Dewatering of opencast pits should only be undertaken were absolutely necessity to ensure safe mining conditions. A detailed Water Balance and Water Conservation and Demand Management Plan must be developed and continuously assessed to ensure that water is used in the most effective and conservative manner. A communication forum must be established between Kolomela and Beeshoek to monitor the cumulative impact of dewatering on the region.	New EMP (2009) EMP (2009) New New New	N	-3	-3	-3	-3	-12

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		groundwater levels at the Village Pit area.															
	Air Quality	Blasting and mining activities may increase dust dispersion on site.	N	-2	-1	-3	-3	-9	R	Install air quality monitoring stations that determine fallout and respirable dust (PM10) concentrations that could arise from the mining activities. Dust suppression should be undertaken where and when dust is present.	EMP (2009) IWWMP (2016); EMP (2009)	N	-2	-1	-2	-2	-7
	Noise	The undertaking of mining activities, operation of vehicles and machinery may lead to increased noise levels in the area, even though the mine has been operational in this area.	N	-1	-2	-1	-2	-6	CbA	Machinery and vehicles will be well maintained to prevent excessive nose and to comply with national and provincial regulations. All employees working within the area will be issued with protective gear. Blasting arrangements and procedures must be in place to ensure that surrounding landowners are informed of blasting schedules.	EMP (2009)	N	-1	-1	-1	-2	-5
	Heritage	No direct impact	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No additional impact from those listed in air quality.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No additional impact from those listed in the groundwater section and air quality section.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Operation of WRD (including the reworking thereof)	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	Elevations in the landscape	N	-3	-4	-4	-3	-14	R	Ongoing rehabilitation during the mining operation should be undertaken by sloping and ensuring that vegetation can be established on these sies. These areas should be shaped to be free draining, resembling the natural surface topography. It is recommended that ongoing rehabilitation trials be undertaken to determine the most effective rehabilitation measure for the slopes of the WRDs.	EMP (2009) New	N	-2	-2	-4	-2	-10
	Soils	No additional impact from construction phase	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Ecology	Presence of invader species could impact on the natural succession of	N	-2	-3	-4	-4	-13	CbA	A search must be undertaken prior to clearance for indigenous plants that can be carefully removed and stored for rehabilitation.	EMP (2010) EMP (2010) (own emphasis)	N	-1	-1	-2	-1	-5

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		vegetation on the slopes of WRDs.								Where self-succession does not establish, harvested seeds and plants must be used in concurrent rehabilitation for any areas along the area which may be affected.							
										Compile list of protected and Red Data species, compile relocation programme.	New						
										No protected geophytic plant species were observed during the site visit and removal or destruction of the protected plants at Beeshoek will not have a significant or detrimental effect on the populations in the region. It is however important to ensure that should any species of importance be identified are relocated prior to clearing and permits to remove and/or destroy protected tree and plant species (Camel Thorn and Shepperd's Tree) will have to be obtained from the Department of Forestry, Northern Cape.	EMP (2013)						
										The plan for vegetation clearance, must be developed and implemented prior to site clearance.	EMP (2010)						
										Seeds of indigenous plants must also be collected.	EMP (2010)						
										All employees must undergo an induction prior to construction where they will be made aware of the footprint, prohibited areas and the importance of compliance with management measures, as well as potential penalties for noncompliance.	EMP (2010)						
										No open fires must be allowed.	EMP (2010)						
										Vegetation clearance must be limited to within the footprint area	EMP (2010)						
										A weed eradication programme must be implemented on site and enforced. This programme must stipulate the monitoring plan, which should include capturing of areas where invader species are present; action plan to remove these; % successful removal).	IWWMP (2016); EMP (2009)						
	Surface Water	Increase in siltation within the internal water circuit reducing dam storage capacities.	N	-1	-2	-4	-4	-11	CbA	Where possible, berms must be established around WRDs. If this is not possible in terms of the existing and approved sites, it must be undertaken with any potential expansions.	IWWMP (2016)	N	-1	-1	-2	-2	-6
											IWWMP (2016)						

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										The berm down gradient of the Village Dump must be maintained to prevent erosion.							
										The slopes of the active WRD should be formed with the placement of material to reduce the potential for erosion	IWWMP (2016)						
										Berms will be constructed upstream of the Mine Residue Deposits to ensure that clean water is kept separate from dirty water where required.	EMP (2009 - updated emphasis)						
										All berms will be sized so as to prevent spilling for up to a 1:50year storm event.	EMP (2009)						
										Any storm water runoff from the outer slopes will contain some eroded residue. In order to prevent this from discharging into the surrounding environment, the side slopes of the residue stockpiles will be dosed down to 1:3 gradient with approximately 150mm topsoil. Self succession will be promoted, however, where self succession fails, vegetation trails will be undertaken.	EMP (2009 - updated emphasis)						
										Adhere to approved Water Use License and conditions	EMP (2013)						
										In addition to the above, the mine should install storm water management and erosion control measures where necessary.	EMP (2010)						
										A rehabilitation plan for the decommissioned WRDs must be formulated to ensure that timeframes and actions are in place.	IWWMP (2016)						
										Surface water monitoring must continue in accordance with the approved WUL.	IWWMP (2016)						
										Maintenance of all SWM systems must be undertaken regularly on site.	IWWMP (2016)						
	Groundwater	Rehabilitated WRDs	N	-2	-3	-2	-2	-9		The groundwater monitoring programme must be implemented and undertaken in accordance with the approved WUL.	EMP (2016)	N	-1	-2	-2	-2	-7
										Vegetation establishment must be monitored to ensure self-succession takes place.	EMP (2016)						
										Any signs of erosion on rehabilitated WRDs must be rehabilitated immediately.	EMP (2016)						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		Decommissioned WRDs	N	-2	-3	-3	-2	-10		A rehabilitation plan for the decommissioned WRDs must be formulated to ensure that timeframes and actions are in place	EMP (2016)	N	-1	-2	-2	-2	-7
		Active WRDs	N	-2	-3	-3	-2	-10		The groundwater monitoring programme must be implemented and undertaken in accordance with the approved WUL. Concurrent rehabilitation must be implemented where possible. The slopes of the active WRD should be formed with the placement of material to reduce the potential for erosion Any new WRDs (Mine Residue Deposits) must be subjected to the requirements of the NEM:WA and regulations pertaining to the management of Mine Residue Deposits and the Classification of Waste, as well as the disposal to landfill requirements. All current WRDs must be subjected to the NEM:WA Regulations and must be classified in terms of SANS 10234.	EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016)	N	-1	-2	-2	-2	-7
	Air Quality	Wind erosion from Mine Residue Deposits will produce fugitive dust.	N	-2	-1	-3	-3	-9	R	Dust control measures in the form of slope stability and vegetation (self-succession will be encouraged) will be implemented. Should self-succession to take place the mine will commit to a vegetation strategy. Dust suppression spraying must be implemented to prevent dust outfall on flora where required.	EMP (2009) EMP (2010) (own emphasis)	N	-2	-1	-2	-2	-7
	Visual	Fugitive dust emissions during stockpiling on the dumps and the mere presence of the Mine Residue Stockpiles may have a negative impact on the visual characteristics of the area.	N	-2	-1	-3	-3	-9	R	Any signs of erosion must be rehabilitated immediately. A slope of 1:3 should be maintained. The heights of the Mine Residue Stockpiles must not exceed the approved heights as per the design drawings from ground level. Mine Residue Deposits will be subjected to natural vegetation re-establishment, where this is not successful the mine will commit to vegetation strategies. The slopes of the active WRD should be formed with the placement of material to reduce the potential for erosion	EMP (2009) EMP (2009) EMP (2015) EMP (2009) EMP (2009)	N	-2	-1	-2	-2	-7
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No additional impact from those listed in the air quality section.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Operation of the Slimes Dam and associated pipeline routes.	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	Ongoing operation of the mine residue deposits will impact the topography of the area.	N	-2	-3	-4	-3	-12	R	Slope the slimes dams where possible to blend into the surrounding topography and to make rehabilitation measure earlier. Natural vegetation re-establishment on the dam walls and in the area adjacent to the dams will be encouraged. Should natural vegetation re-establishment not take place, options for re-seeding of the embankments will be investigated. Re-vegetated areas will be maintained by means of regular watering, weed controls and cattle-grazing exclusion until the vegetation has settled to ensure that it is stable and that erosion does not occur Storm water management in terms of the latest approved Storm Water Management Plan (SWMP) to be developed as part of the EIA specialists studies of this project will be adhered to.	EMP (2009) EMP (2009) EMP (2009 - updated emphasis)	N	-1	-2	-2	-1	-6
	Soils	Impacts on soil resources due to pipeline spills along tailing pipeline routes	N	-1	-3	-4	-3	-11	CbA	Ongoing maintenance around transfer points and along the pipelines should be undertaken. Any spills of slimes along the pipeline systems should be collected and taken to designated areas. The areas contaminated should be rehabilitated.	New New	N	-1	-2	-1	-1	-5
	Surface Water	Poor management of the slimes dam could result in insufficient capacity and overflows, which may impact the general run off patterns on site.	N	-2	-2	-4	-4	-12	CbA	Clean and Dirty water separation systems should be incorporated in terms of the approved SWMP. Due to the shortage of water in the area, the mining operations will operate with a closed water circuit (reuse and recycling), to conserve water effectively, hence no water will be discharged into the surrounding environment. For that purpose, excess water will be pumped out of the pit and stored as dirty water in the slimes dam. This should however manage under the supervision of a registered engineer. The slimes dams must be able to handle the 1:100 year flood events.	New EMP (2009 - updated emphasis) EMP (2009) EMP (2009)	N	-1	-1	-2	-2	-6

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										The capacity and stability of the slimes dam will be inspected on a weekly basis.							
										No water may be released directly into the environment without the necessary GN704 and NWA approvals.	EMP (2009)						
										The deposition plan should be revised on an annual basis during the operation phase of the facility	New						
										Maintenance of all SWM systems must be undertaken regularly on site.	New						
										The slimes dams' water balance must be calibrated during the operation phase. In addition, the slimes dams' water management plan should be integrated into the overall mine water balance	New						
										A detailed closure plan should be developed during the life of the slimes dam	New						
										A site specific code of practice should be prepared for the slimes dam	New						
	Groundwater	Poor management of the slimes dam and improper monitoring of the geotechnical setting may result in contamination of groundwater	N	-1	-2	-2	-4	-9	CbA	A risk monitoring, surveillance and audit system (including boreholes for environmental monitoring) should be implemented for the life cycle of the slimes dam. The critical parameters should be monitored and analysed on a routine basis	New	N	-1	-2	-1	-2	-6
										Numerical Groundwater Model should be updated in line with the approved WUL.	New						
										Any new WRDs (Mine Residue Deposits) must be subjected to the requirements of the NEM:WA and regulations pertaining to the management of Mine Residue Deposits and the Classification of Waste, as well as the disposal to landfill requirements.	New						
										The Slimes Dam will be maintained to ensure that no leakages occur. Overflow pipes will be kept clean. Feed water piping and return water piping will be maintained.	EMP (2009)						
										The final rehabilitation strategy for the Slimes dam will be dependent on the rehabilitation practices, for this reason the mine will reassess the rehabilitation strategy	New						

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										for the Slimes Dam annually with the closure cost assessment.							
	Air Quality	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Operation of Dirty Water Dams (Storm Water Dam, Central Process Dam), Water Tanks (Clarifier, Process Water Tanks, Thickener, transfer tanks), and the return water dam)	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soils	Impacts on soil resources due to erosion caused by overflows and water runoff.	N	-1	-3	-4	-3	-11	CbA	Ongoing maintenance around transfer points and along the pipelines should be undertaken. Any presence of erosion should be rehabilitated.	New New	N	-1	-2	-1	-1	-5
	Surface Water and Riparian Habitat	Overflow of Dams resulting in contamination of surrounding water resources. No surface water resources are in close vicinity to the mining operations and therefore such impact unlikely of occurring.	N	-1	-2	-1	-2	-6	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. Clean and Dirty water separation systems should be maintained to give effect to GN704 Requirements. All dirty water collection dams should allow for the required storage capacity taking into account a 1:50 year flood and also a minimum freeboard of 0.8 above full capacity. All containment dams will be maintained to ensure that no leakages occur. A freeboard of 0.8m must be maintained. Overflow pipes will be kept clean. Sumps will be kept clean and all pumps will be maintained. Surface water monitoring must continue in accordance with the approved WUL. Level metres must be available at each of the dirty dams, to ensure that a proactive approach can be taken when the levels are reaching capacity. The water balance must be updated annually, or as stipulated within the WUL conditions, with a strong	EMP (2016) EMP (2016) EMP (2016) EMP (2009) EMP (2016) EMP (2016) EMP (2016)	N	-1	-1	-1	-1	-4

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										focus on improving the management of the internal water circuit on site.								
										The water circuit must be managed at one central location to ensure that there is integration between the plant, Slimes Dam, and general surface water needs and requirements.	EMP (2016)						
										Any dirty water spills/discharges beyond the mine boundary should be reported to the DWS and DMRE and measures to rectify the occurrence of these discharges should be implemented.	New						
										Silt traps must be implemented in accordance with the SWMP, and these must be managed regularly to ensure that the capacity of the dams is not compromised by silt built up.	EMP (2016)						
	Groundwater	Seepage from Dirty Water Dams resulting in groundwater contamination.	N	-3	-3	-4	-3	-13	CbA	All dirty water must be contained in fit for purpose designed tanks or in lined dams.	IWWMP (2016); EMP (2009)	N	-2	-2	-1	-1	-6
										Dam structures should be monitored to ensure the integrity of these facilities.	EMP (2016)						
										Where leaks or seepage is found, these must be inspected and fixed as soon as found.	EMP (2016)						
										The water balance must be updated annually, with a strong focus on improving the management of the internal water circuit on site.	IWWMP (2016); EMP (2009)						
										Record dam level readings at least weekly.	EMP (2016)						
										The water circuit must be managed at one central location to ensure that there is integration between the plant, Slimes Dam, and general surface water needs and requirements.	EMP (2016)						
										Upstream and downstream monitoring boreholes must be available to monitor groundwater quality and to detect potential leaks from these facilities.	EMP (2016)						
										The groundwater monitoring programme must be implemented and undertaken in accordance with the approved WUL.	EMP (2016)						
	Air Quality	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Operation of Conservancy Tanks	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soils	Impacts on soil resources due to spills during cleaning.	N	-1	-3	-4	-3	-11	CbA	The sludge from the sewage sumps must be removed by licensed contractors and should be disposed of at a licensed facility fit for such purpose. Records of removal and safe disposal certificates must be available at the mine at any given time. For the purposes of waste disposed of at the municipality, the mine should operate in accordance with a valid agreement between the municipality and the mine. Any spills occurring during the collection process must be cleaned up immediately. A clean up procedure (i.e. Works Instruction) must be in place.	New New New New	N	-1	-2	-1	-1	-5
	Surface Water	Contamination of surface water resources. There are no surface water resources in the area, however, the natural runoff, which must be managed internally on site could become impacted	N	-1	-2	-3	-3	-9	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. Conservancy Tanks should be contained and not discharge into the dirty water circuit. Any spills occurring during the collection process must be cleaned up immediately. A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2016) EMP (2016) EMP (2016) EMP (2016)	N	-1	-1	-2	-1	-5
	Groundwater	Contamination of Groundwater	N	-1	-1	-3	-1	-6	CbA	The impact of the Conservancy Tanks is minimal considering the size and that these fall within the General Authorisation Limits. These limits should not be exceeded and no additional sewage sumps to those stipulated in the WUL should be constructed.	New New	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										The sludge from the Conservancy Tanks must be removed by licensed contractors and should be disposed of at a licensed facility fit for such purpose. Sporadic monitoring must be undertaken to determine whether any bacteriological contamination is present in the boreholes in proximity to the Conservancy Tanks. Records of removal and safe disposal certificates must be available at the mine at any given time. Any spills occurring during the collection process must be cleaned up immediately. A clean up procedure (i.e. Works Instruction) must be in place.	 New EMP (2016) EMP (2016)						
	Air Quality	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Transportation (Conveyors, Rail, Haul Roads and Access Roads)	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soil	Contamination of Soil due to hydrocarbon spills	N	-1	-2	-4	-4	-11	CbA	Vehicles and Machinery will be regularly maintained. Maintenance programmes will be established and implemented. All refuelling of vehicles and equipment maintenance must be done within designated bunded areas. If necessary, the polluted soils will be remediated and affected areas rehabilitated.	EMP (2009) EMP (2010) EMP (2009)	N	-1	-1	-2	-1	-5
		Spills from conveyors.	N	-1	-2	-4	-4	-11	CbA	Ongoing maintenance around transfer points should be undertaken. Any spills of ROM around the conveyor systems should be collected and taken to designated ROM stockpile areas	EMP (2017) (EMP 2017)	N	-1	-1	-2	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		Spills from railway lines.	N	-1	-2	-3	-3	-9	CBA	Railway wagons should be filled according to the capacity of the intended design.	New	N	-1	-1	-2	-1	-5
										Where derailing occurs, immediate clean up measures must be initiated. This must be undertaken in line with an Emergency Preparedness and Response Plan specifically for the railway line system.	New						
										Where significant spills are encountered the relevant departments must be notified of such occurrence and action plans must be developed.	New						
	Ecology	The establishment of Weeds and Invader Species.	N	-2	-3	-4	-4	-13	CBA	A weed eradication programme will be developed and implemented to eradicate weeds and invader plants and to prevent new invasions during the ongoing mining operation.	EMP (2009)	N	-1	-1	-2	-1	-5
										Where self-succession does not establish, harvested seeds and plants must be used in concurrent rehabilitation for any areas along the area which may be affected.	EMP (2010) (own emphasis)						
		Accidental death of animals on the roads.	N	-2	-3	-2	-5	-13	CbA	Clearly marked signs will be erected along the transportation routes to create awareness of animal crossings.	EMP (2009)	N	-1	-3	-1	-5	-10
										A clearly marked and enforced vehicle speed will be implemented on the internal mine and transportation routes.	EMP (2009)						
										A detailed induction programme will be in place to ensure that all parties are aware of the rules and regulations on site in terms of the use of roads.	EMP (2009)						
										Vehicles may only travel on demarcated roads on site.	EMP (2009)						
	Surface Water	Contamination of surface water resources. There are no surface water resources in the area, however, the natural runoff, which must be managed internally on site could become impacted	N	-1	-2	-3	-3	-9	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or as amended and approved.	EMP (2016)	N	-1	-1	-2	-1	-5
										Manage storm water flow with temporary erosion control measures where possible (cut-off trenches or berms)	EMP (2014)						
										Railways and conveyors will be maintained and constructed with the appropriate culverts and drains, levelling and surfacing to ensure adequate drainage.	EMP (2009)						
										Vehicles/machinery will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EMP (2009)						

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site	EMP (2016)						
										Any spills occurring during the collection process must be cleaned up immediately.	EMP (2016)						
										Soil that has been contaminated by spillages, seepages and leachates will be sampled and analysed. If necessary, the soils will be treated, ameliorated or removed for safe disposal.	IWWMP (2016); EMP (2009)						
										Any significant spills must be captured in the incident reports and must be reported to the relevant department (NCDENC, WUA, CMA, DWS). In this event a remediation strategy should be developed and enforced.	IWWMP (2016); EMP (2009)						
										A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2017)						
	Groundwater	Contamination of groundwater.	N	-1	-1	-3	-1	-6	CbA	A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2016)	N	-1	-1	-2	-1	-5
	Air Quality	The use of unsurfaced roads, plant crushing equipment, presence of stockpiles and the transfer points at conveyors may lead to an increase of dust emissions in the area.	N	-2	-1	-3	-3	-9	CbA	Install air quality monitoring stations that determine fallout and respirable dust (PM10) concentrations that could arise from the mining activities.	EMP (2009)	N	-2	-1	-1	-1	-5
										Dust extraction systems comprising of wet scrubbers will be installed at the secondary and tertiary crushing and screening plants. For crushing and screening operations at metallic mineral processing plants, fugitive dust can be controlled with wet scrubbers or baghouses. Chemical dust suppression systems will be implemented at the primary crushing and screening plants.	IWWMP (2016); EMP (2009)						
										Tarpaulins will be placed over all vehicles transporting product of site.	EMP (2009)						
	Noise	Increase in noise levels in and around the plant areas.	N	-2	-1	-3	-3	-9	CbA	Machinery and vehicles will be well maintained to prevent excessive nose and to comply with national and provincial regulations.	EMP (2009)	N	-1	-1	-2	-1	-5
										Implemented operational controls on equipment used in the workshops, plant and buildings to reduce noise levels where required.	EMP (2009)						
										Where noise becomes a nuisance nose management measures will be investigated and implemented to address these concerns	EMP (2009)						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Noise monitoring will be undertaken (ambient conditions) according to the recommendations to be issued by the acoustic specialists as part of the EIA process conducted for this project.	EMP (2009)						
	Visual	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Plant Operation	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soils	Exposed soils will be susceptible to soil erosion.	N	-2	-3	-3	-4	-12	CbA	The Storm Water Management Plan as per the 2016 WULA will be implemented on site.	EMP (2017)	N	-1	-2	-2	-2	-7
	Surface Water	Discharge of contaminated water during maintenance and shutdown practices.	N	-2	-3	-4	-5	-14	CbA	The Storm Water Dam North should be utilised to contained water during maintenance and shutdown procedures to reduce the presence of dirty water ponding in during these times. A detailed water conservation and demand management plan should be developed to optimise water reuse in the plant circuit. The capacities of the water storage infrastructure should be maintained to ensure that a freeboard of 0.8m can be maintained. Ensure that fuels, lubricants and chemicals for use in the operational areas are stored in properly bunded and protected areas.	EMP (2017) IWWMP (2016), EMP (2017) EMP (2017) EMP (2009)	N	-1	-1	-2	-1	-5
	Groundwater	Contamination of groundwater due to product storage on site, ROM Stockpiles and other material storages.	N	-1	-1	-3	-1	-6	CbA	A clean up procedure (i.e. Works Instruction) must be in place. All material must be stockpiled in designated areas. New stockpile areas must be constructed in well designed infrastructure to ensure that surface water, soil and groundwater pollution will not occur.	EMP (2016) New	N	-1	-1	-2	-1	-5
	Ecology	The establishment of Weeds and Invader Species.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme will be developed and implemented to eradicate weeds and invader plants and to prevent new invasions during the ongoing mining operation.	EMP (2009)	N	-1	-1	-2	-1	-5

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Air Quality	The use of unsurfaced roads, plant crushing equipment, presence of stockpiles and the transfer points at conveyors may lead to an increase of dust emissions in the area.	N	-2	-1	-3	-3	-9	CbA	Install air quality monitoring stations that determine fallout and respirable dust (PM10) concentrations that could arise from the mining activities. Dust extraction systems comprising of wet scrubbers will be installed at the secondary and tertiary crushing and screening plants. For crushing and screening operations at metallic mineral processing plants, fugitive dust can be controlled with wet scrubbers or baghouses. Chemical dust suppression systems will be implemented at the primary crushing and screening plants. Tarpaulins will be placed over all vehicles transporting product of site.	EMP (2009) IWWMP (2016); EMP (2009) EMP (2009)						
	Noise	Increase in noise levels in and around the plant areas.	N	-2	-1	-3	-3	-9	CbA	Machinery and vehicles will be well maintained to prevent excessive nose and to comply with national and provincial regulations. Implemented operational controls on equipment used in the workshops, plant and buildings to reduce noise levels where required.	EMP (2009) EMP (2009)	N	-1	-1	-2	-1	-5
	Visual	No further impacts are foreseen other than those listed under air quality.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Hydrocarbon Management	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soils	Contamination of soil resources due to hydrocarbon spills.	N	-1	-2	-4	-4	-11	CBA	Storage of fuels and oils, the refuelling of vehicles and equipment maintenance must be limited to designated, bunded (bunds to be 110% of volume of the materials stored) areas. All fuels and soils must be stored in appropriate containers. Chemicals and hazardous material must be stored in suitable containers, fit for purpose and in line with SDS requirements.	EMP (2010) EMP (2010) EMP (2010) (own emphasis) EMP (2010)	N	-1	-2	-1	-1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Where drip trays are too small, specially prepared, non-pervious bunds with solution trenches must be used to capture spillages							
										Oils and potentially hazardous materials must be disposed of at a licensed facility and waste certificates obtained.	EMP (2010)						
										A spill kit must be provided to be used in the event of a spill.	EMP (2010)						
										If a spill occurs, the contaminated soil must be removed immediately. Contaminated soil must be stored according to best practices until it can be disposed of at a suitably licensed facility.	EMP (2010)						
										Safety signage must be used at designated storage areas.	EMP (2010)						
										All workers must undergo an induction which includes environmental awareness training to make them aware of the environmental incident management procedures as well as the importance of complying with management measures.	EMP (2010)						
	Ecology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Surface Water	Contamination of surface water resources. There are no surface water resources in the area, however, the natural runoff, which must be managed internally on site could become impacted	N	#	#	-3	#	-9	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP.	EMP (2016)	N	-1	-1	-2	-1	-5
										Vehicles/machinery will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EMP (2009)						
										All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site	EMP (2016)						
										Any spills occurring during the collection process must be cleaned up immediately.	EMP (2010), EMP (2016)						
										Soil that has been contaminated by spillages, seepages and leachates will be sampled and analysed. If necessary, the soils will be treated, ameliorated or removed for safe disposal.	IWWMP (2016); EMP (2009)						
										Any significant spills must be captured in the incident reports and must be reported to the relevant	IWWMP (2016); EMP (2009)						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										department (NCDENC, WUA, CMA, DWS). In this event a remediation strategy should be developed and enforced. A clean up procedure (i.e. Works Instruction) must be in place.	 EMP (2016)						
	Groundwater	Large scale hydrocarbon spills could be present at the mining area	N	-1	-1	-4	-4	-10	R	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. No activities associated with hydrocarbons and/or chemicals may be undertaken outside of an effectively designed and contained area. All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site. Any spills occurring during the collection process must be cleaned up immediately. Any significant spills must be captured in the incident reports and must be reported to the relevant department (NCDENC, WUA, CMA, DWS). A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2016) EMP (2009) EMP (2016) EMP (2016) IWWMP (2016); EMP (2009) EMP (2016)	N	-1	-1	-2	-1	-5
	Air Quality	The use of unsurfaced roads, plant crushing equipment, presence of stockpiles and the transfer points at conveyors may lead to an increase of dust emissions in the area.	N	-2	-1	-3	-3	-9	CbA	Install air quality monitoring stations that determine fallout and respirable dust (PM10) concentrations that could arise from the mining activities. Dust extraction systems comprising of wet scrubbers will be installed at the secondary and tertiary crushing and screening plants. For crushing and screening operations at metallic mineral processing plants, fugitive dust can be controlled with wet scrubbers or baghouses. Chemical dust suppression systems will be implemented at the primary crushing and screening plants. Tarpaulins will be placed over all vehicles transporting product of site.	EMP (2009) IWWMP (2016); EMP (2009) EMP (2009)						
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No further impacts are foreseen other than those listed under air quality.	-	-	-	-	-	-	-	-		-	-	-	-	-	-

Name of Activity		Potential Impacts										Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Waste Management	All	Please refer to Construction Phase measures	-	-	-	-	-	-	-	-		-	-	-	-	-	-
Dust Suppression	Geology	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Topography	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Soils	Exposed soils will be susceptible to soil erosion.	N	-2	-3	-3	-4	-12	CbA	Dust suppression should be planned and implemented in line with the Air Quality Impact Assessment, 2021.	EMP (2017)	N	-1	-2	-2	-2	-7
	Surface Water	Recycled and any excess water is used for dust suppression on unpaved roads on the mine property and in the crushing plant. There are no water resources in close proximity to the site and therefore no significant impact is foreseen.	N	-1	-2	-1	-2	-6	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. Dust suppression should only be undertaken when necessary. Clean water may not be used for dust suppression. Dust suppression may be undertaken in terms of the recommendations by the Air Quality Report to be undertaken as part of the EIA process of this project. Dust suppression may only take place at the approved locations. The volumes used for dust suppression should be recorded. The water quality used for dust suppression must be recorded. Groundwater monitoring must be undertaken. Small amounts of water should be used for dust suppression to ensure that water evaporates and do not seep into the groundwater resources.	EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016)	N	-1	-1	-1	-2	-5
	Groundwater	Recycled and any excess water is used for dust suppression on unpaved roads on the mine property and in the crushing plant.	N	-2	-2	-1	-2	-7	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP. Dust suppression should only be undertaken when necessary.	EMP (2016) EMP (2016) EMP (2016)	N	-2	-1	-1	-2	-6

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, IR, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Clean water may not be used for dust suppression.								
										Dust suppression may be undertaken in terms of the recommendations by the Air Quality Report to be undertaken as part of the EIA process of this project.	EMP (2016)						
										Dust suppression may only take place at the approved locations.	EMP (2016)						
										The volumes used for dust suppression should be recorded.	EMP (2016)						
										The water quality used for dust suppression must be recorded.	EMP (2016)						
										Small amounts of water should be used for dust suppression to ensure that water evaporates and do not seep into the groundwater resources.	EMP (2016)						
	Air Quality and Ecology	Dust suppression will result in the reduction of particulates in the air and will have a positive impact on air quality as well as the surrounding ecology.	N	-2	-3	-3	-4	-12	CbA	Dust suppression should be planned and implemented in line with the Air Quality Impact Assessment, 2021.	EMP (2016)	P	2	3	3	4	12
	Noise	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Visual	No further impacts are foreseen other than those listed under air quality.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Heritage	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-
	Social	No further impacts are foreseen.	-	-	-	-	-	-	-	-		-	-	-	-	-	-

Table 42: Potential Impacts – Decommissioning Phase

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
Decommissioning and Closure Phase																	
Legal Requirements (Environmental Permits)	Legal Compliance	Unlawful activities could lead to NWA Directives and Section 24G Rectification fines.	N	-4	-3	-2	-5	-14	CbA	A legal assessment of all activities must be undertaken annually to ensure that all are licensed are in place and the team responsible for rehabilitation is aware of the latest legal requirements. A detailed closure plan must be developed and submitted to the relevant departments for approval. All legally appointed personnel responsible or involved in activities on site must receive training on the requirements of the Environmental Authorisations and EMPs Quarterly decommissioning must be undertaken, on the lawful implementation of the Environmental Authorisation Environmental Authorisations must be available on site at all times. The legal register must be updated to indicate all updated activities.	New New New New New New	P	4	3	5	5	17
General Surface Rehabilitation	Geology	No direct impact	-	-	-	-	-	-		-		-	-	-	-	-	-
	Topography	Removal of infrastructure may impact on the topography.	N	-2	-3	-4	-4	-13	CbA	Linear Infrastructure constructed by the mine (roads, conveyors, railway lines, power lines) will be removed if it proves to inhibit land use at decommissioning. Where possible infrastructure will remain for social investment opportunities, this will be decided in conjunction with the Integrated Development Plan of the area ant eh local authorities. All haul roads and access roads will be rehabilitated by ripping these structures to a depth of 500mm or where hard rock is encountered. The overland conveyors and railway lines, if not used as a community initiative, will be dissembled and the components removed from the site. The material can either be sold as a unit or the components sold as scrap. The overland conveyors and railway lines, if not used as a community initiative, will be dissembled and the components removed from the site. The material can either be sold as a unit or the components sold as scrap.	EMP (2009) EMP (2009) EMP (2009) EMP (2009) New	P	3	3	4	4	14

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Ensure the entire site remains fenced for the duration of rehabilitation.							
										Retain security access control to the site for the duration of rehabilitation.	New						
										All fixed assets that can be profitably removed will be removed for salvage or resale (the salvage and resale value have however not been incorporated into the closure cost estimate as per the legislative requirements)	New						
										All surface structures, infrastructure and 'hard surfaces' (inter alia, redundant surfaced roads, parking and paved areas) are to be demolished and removed from the disturbed mine footprint; unless an alternative/continued use for any such items is agreed upon, in writing, with the DMRE.	New						
										All surface infrastructure (pipelines, roads, temporary foundations) would be demolished and removed to a depth of 1m. Any infrastructure below 500cm will be sealed, made safe and left in situ.	New						
										The Slimes Dam will be sloped to blend into the environment as far as practically possible							
										All fences erected around the infrastructure be dismantled and either disposed of at a permitted disposal site or sold off as scrap (provided that these structures will no longer be required by the post mining land owner).	New						
										Fences erected to cordon off dangerous excavations will remain in place and will be maintained as and when required.							
										Water pollution control structures will remain until the completion of all demolition and associated rehabilitation activities where after these will be rehabilitated.	New						
	Landscape character	Rehabilitation towards final land use may not be achieved without the necessary planning.	N	-3	-3	-2	-4	-12	R	All haul roads and access roads will be rehabilitated by ripping these structures to a depth of 500mm.	EMP (2009)	P	3	3	4	5	15
										All infrastructure will be removed and rehabilitated, should no alternative use be found for the structures.	EMP (2009)						
										Foundations will be removed to a depth of 500cm below surface or until hard rock is encountered.	EMP (2009)						
											EMP (2009)						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Compacted soils will be ripped and topsoil will be replaced. After the topsoil has been replaced the area should be ameliorated and seeded, should self succession of vegetation not take place. Only species indigenous to the area will be included. Drainage systems should subsequently be restored to reduce erosion and return flow patterns. Water diversion channels that have no further purpose will be backfilled and revegetated (where self succession does not take place). Mining areas could be rehabilitated to a wilderness final state with a final land capability of about 60% of the original land capability according to the 2009 EMP. The overland conveyors and railway lines, if not used as a community initiative, will be dissembled and the components removed from the site. The material can either be sold as a unit or the components sold as scrap.	 EMP (2009) EMP (2009) EMP (2009) EMP (2009)						
	Soil, Land Use and Land Capability	Spills in the area (hydrocarbons and tailings spills) may result in the contamination of soils.	N	-1	-2	-4	-4	-11	CbA	Any hydrocarbon, effluent or other contaminants should be collected and the soils remediated immediately.	New	-	-1	-2	-1	-1	-5
		Loss of soils due to decommissioning activities present on site.	N	-1	-2	-4	-4	-11	CbA	Draw up a plan clearly defining the area where the removal of infrastructure should take place. Implement the plan with sufficient measures in place not to compact new areas. Implement a strict penalty fine system for rule breaking with regard to vehicular movement. Maintain clean and dirty water systems and undertake regular monitoring and maintenance thereof.	New New New	N	-1	-2	-1	-1	-5
		The placement of topsoil as part of the rehabilitation programme must be undertaken a manner to protect the integrity of these resources. Incorrect placement and management could result in the loss of soil	N	-1	-3	-4	-3	-11	CbA	Topsoil must be place in line with an approved rehabilitation programme. The rehabilitated areas should be demarcated to prohibit access to these sites until vegetation establishment has succeeded. Chemical analysis must be imitated to determine the fertilisation and/or amelioration requirements if any.	EMP (2016) EMP (2016) EMP (2016) EMP (2016)	N	-1	-1	-2	-2	-6

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		resources for rehabilitation.								Any signs of erosion must be rehabilitated immediately.							
		The rehabilitation activities will ensure that the area be rehabilitated to its final land use.	N	-2	-3	-4	-3	-12	R	All compacted areas must be ripped. Topsoil must be place in line with an approved rehabilitation programme. The rehabilitated areas should be demarcated to prohibit access to these sites until vegetation establishment has succeeded. Monthly inspections of the rehabilitation activities must be undertaken. Storm Water Management Systems must remain in place up until rehabilitating in that area has succeeded. A detailed rehabilitation programme must be implemented and audited.	EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016)	P	2	3	4	5	14
	Ecology	The establishment of Weeds and Invader Species.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme must be implemented on site and enforced. This programme must stipulate the monitoring plan, which should include: capturing of areas where invader species are present; action plan to remove these; % successful removal). Where self-succession does not establish, harvested seeds and plants must be used in concurrent rehabilitation for any areas along the area which may be affected.	EMP (2016) New	N	-1	-1	-2	-1	-5
		Unplanned loss of floral and faunal species of conservation importance	N	-2	-4	-4	-4	-14	CbA	Prior to the removal of plant species, an ecologist should investigate the site (if not already done) to record all species of importance and which should be removed under tree removal permits. All such species should be demarcated by signage or tape. Obtain tree removal permit prior to the removal of any protected species. All employees, or contractors on site, involved in this project, should receive a detailed induction on the expectations for the protection of fauna and flora on site. No open fires must be allowed. Harvesting of plants and poaching of animals will be prohibited and a fine system will be developed for any person not complying.	New New New New New	N	-2	-1	-1	-2	-6

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Weed eradication should be implemented on site.	New						
		Accidental death of animals on the roads.	N	-2	-3	-2	-5	-13	CbA	Clearly marked signs will be erected along the transportation routes to create awareness of animal crossings. A clearly marked and enforced vehicle speed will be implemented on the internal mine and transportation routes. A detailed induction programme will be in place to ensure that all parties are aware of the rules and regulations on site in terms of the use of roads. Vehicles may only travel on demarcated roads on site.	New New New New	N	-1	-3	-1	-5	-10
	Surface Water	Erosion control over rehabilitated areas and the prevention of erosion gullies.	N	-1	-1	-4	-2	-8	CbA	The topography of all disturbed areas must be rehabilitated in such a manner that the surrounding natural area blends naturally with the rehabilitated areas well as to be free-draining. This will reduce soil erosion and improve natural re-vegetation.		N	-1	-1	-2	-2	-6
		Contamination of surface water as a result of removal of infrastructure.	N	-2	-2	-4	-3	-11	Cba	No water may be discharged into watercourses, if this water has not been treated to the correct quality OR if approval from the DWS for such activity has not been obtained. An alternative, would be to evaporate the water from these facilities. Once the dams are empty, any silt remaining in the dams should be disposed of on the approved Slimes Dam after chemical analysis proofs that the quality of the silt is in line with the disposal qualities in the approved WUL. If this is not the case the silt will either have to be treated, or disposed of at a licensed facility. The dams should be demolished, and the liner and rubble should be classified to determine the type of landfill site suitable to cater for this material. The containment dams will only be demolished should the area proof to be free draining with no pollution potential after rehabilitation.	EMP (2016) EMP (2016) EMP (2016) EMP (2009)	N	-1	-1	-2	-2	-6
		Natural runoff in the area must remain free flowing, which could be impacted if the opencast pits are not backfilled and compacted correctly. In the event that the opencast pits are not backfilled the runoff	N	-2	-3	-4	-3	-12	CbA	If opencast pits are not backfilled, enviroberms or a similar structure should be implemented to keep runoff from the opencast pits. Where backfilling is undertaken, only material as approved in the WU may be used for such purpose. Backfilled areas must be compacted and shaped to ensure that subsidence is avoided.	New New New New	P	2	3	4	5	14

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		from the surrounding area can accumulate in the pits reducing the run off in the area.								Backfilled areas must be demarcated to avoid any unauthorised access to these areas. Where self-succession does not establish, it is recommended that the mine investigate a seeding programme. Weekly inspection must be implemented to monitor and measure the progress of rehabilitation. Clean and dirty water systems must remain in the area until rehabilitation has been completed.	 New New New						
		Rubble and waste from site could pollute local water resources.	N	-1	-1	-4	-2	-8	CbA	Waste that is not removed from site should be spread, covered and suitably rehabilitated.	New	N	-1	-1	-2	-2	-6
	Geohydrology	No direct impact	-	0	0	0	0	0	-	-		-	0	0	0	0	0
	Heritage	Areas of the north mine can be demarcated as historical mining sites.	N	-3	-3	-3	-4	-13	R	Demarcate portions of the mining area which has a heritage value and preserve these in terms of a heritage plan, which includes the historical mining workings, and infrastructure associated with the North Mine.	EMP (2009)	P	3	3	4	4	14
	Visual	Fugitive dust emissions as a result of infrastructure removal and associated exposed/bare areas may have an impact in terms of air quality and visual characteristics.	N	-2	-2	-4	-3	-11	CbA	The dust monitoring network and dust suppression programme established during the construction phase of the project will be maintained throughout the closure phase of the mine. With respect to haul road dust levels, it is recommended to limit vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity. Establish and implement a dust suppression plan in consultation with the environmental control officer and an air quality specialist as part of the contractor's responsibility.	New New	N	-2	-1	-3	1	-5
	Air Quality	All activities associated with the removal of infrastructure and rehabilitation has the potential to release dust.	N	-2	-2	-4	1	-7	CbA	The dust monitoring network and dust suppression programme established during the construction phase of the project will be maintained throughout the closure phase of the mine. With respect to haul road dust levels, it is recommended to limit vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity.	New	N	-2	-1	-3	1	-5
	Noise	All activities associated with the removal of infrastructure and rehabilitation has the potential to generate noise.	N	-2	-2	-4	1	-7	CbA	The removal of all infrastructure is to take place during daytime periods only. Where noise becomes a nuisance, management measures will be investigated and implemented to address these.	New New	N	-2	-1	-3	1	-5

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Social	Disruption and nuisance factors associated with the actual decommissioning such as noise, visual and traffic related impacts.	N	-2	-2	-4	1	-7	CbA	Local residents, with the focus on the surrounding landowners, should receive accurate information with regards to the project status, timeframes for decommissioning and other relevant information about issues that could influence their daily living and movement patterns.	New	N	-2	-1	-3	1	-5
Earth Moving, shaping and ripping of ground	Geology	No direct impact	-	0	0	0	0	0	-	-		-	0	0	0	0	0
	Topography	The shaping of the site should be undertaken in such a manner that it improves the overall topography of the site.	P	1	3	4	5	13	CbA	Pre-mining topography should be reasonably restored through shaping and landscaping, such that the topography of rehabilitated areas will ultimately be commensurate with that of adjacent, non-disturbed areas.	New	-	1	3	5	5	14
		Soil erosion	N	-6	-3	-4	-3	-16	CbA	Re-vegetate as soon as possible	New	N	-2	-1	-3	1	-5
		Ripping and topsoil replacement will restore the soil physical characteristics prior to re-vegetation.	P	1	3	4	5	13	CbA	Compacted soils will be ripped and topsoil will be replaced. After the topsoil has been replaced the area should be ameliorated and seeded, should self-succession of vegetation not take place. Only species indigenous to the area will be included. Where sites have been alienated of vegetation or where soils have been compacted or covered with concretes, these sites will be ripped and ploughed. The topsoil and sub-soils with the appropriate seedbed as stripped during the construction and operational phases will be placed over these areas to a depth as specified by a qualified specialist. The topsoil shall be appropriately ameliorated to allow vegetation to grow rapidly if required – it should be noted that the mine will encourage self-succession of vegetation, if this does not take place effectively a re-vegetation project will be implemented	New New New	P	1	3	5	5	14
	Terrestrial Ecology (Fauna & Flora)	The rehabilitation of the site will allow reestablishment of natural vegetation.	P	1	2	3	4	10	CbA	Compacted soils will be ripped and topsoil will be replaced. After the topsoil has been replaced the area should be ameliorated and seeded, should self-succession of vegetation not take place. Only species indigenous to the area will be included. Remove alien vegetation post decommissioning, with long term follow-up afterwards. On-going alien and invasive floral species control are required through all phases of rehabilitation. If a reasonable assessment indicates that the re-establishment of vegetation is unacceptable slow, the soil needs to be analysed and any deleterious effects must be corrected and the area be seeded with a seed mix to specification	New New New New	P	3	3	3	4	13

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Access to rehabilitated areas should be restricted to vehicles/machinery specifically required for the implementation of the closure plan.							
	Hydrology	Runoff from rehabilitated areas will impact on sensitive pan systems especially during intensive rainstorms especially if the area is not free draining.	N	-2	-1	-3	1	-5		The areas will be landscaped to be free draining in line with the approved storm water management plan. Berms, should they be necessary, must remain upstream and downstream of the areas to ensure that clean water is kept separate from dirty water until the area is free draining and re-vegetation has occurred.	New New	P	3	3	3	4	13
	Geohydrology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heritage	No direct impact	-	-	-	-	-	-		-		-	-	-	-	-	-
	Visual	The rehabilitation (ripping, topsoil replacement and landscaping) will remove the visual incongruity.	P	2	4	4	1	11	CbA	An overall visual improvement will be noticed once all mining related infrastructure has been demolished and the area has been landscaped and re-vegetated. Demarcate the decommissioning area and limit the decommissioning activities as far as possible. Final shaping will be implemented such that the final profile of the rehabilitated areas is formed to emulate natural contours of the area. Any foundations will be removed to a depth of 1m below the surface and the area rehabilitated. All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, or made available to the local community as building materials (provided they are in a satisfactory condition following demolition). Linear infrastructure constructed by the mine (i.e. roads, conveyors and power lines) will be removed if it proves to inhibit land use at decommissioning. All fences erected around the TSF and RWD will be dismantled and disposed of at a permitted disposal site.	New New New New New New New	P	2	4	4	3	13
	Air Quality	All activities associated with the removal of infrastructure has the potential to release dust.	N	-2	-2	-4	1	-7	CbA	Dust sampling will be undertaken on a monthly basis. Monthly monitoring reports will be generated by the mine or through a suitably qualified air quality specialist. In the event that air quality or dust issues are identified based on the monitoring programme, an independent specialist should be appointed to determine the best course of action to ameliorate the situation.	New New New	N	-2	-1	-3	1	-5

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
	Noise	All activities associated with the removal of infrastructure and rehabilitation has the potential to generate noise.	N	-2	-1	-4	3	-4	CbA	The removal of all infrastructure is to take place during daytime periods only. Where noise becomes a nuisance, management measures will be investigated and implemented to address these. Machinery with low noise levels and maintained in a good order to be used and to comply with the IFC's Health and Safety Regulations. Speed control measures will be implemented by the mine through the placement of adequate signage. Implement a penalty system for non-compliance to speed control measures and ensure that all workers are made aware of the penalty systems. Gravel roads to be maintained in as good and smooth a condition as possible.	New New New New New	N	-2	-1	-3	1	-5
	Social	No direct impact	-	-	-	-	-	-		-		-	-	-	-	-	-
Specifics: Rehabilitation of Waste Rock Dumps and Slimes Dam	Topography	Reinstate the natural runoff to limit seepage from the closed slimes dam.	N	-3	-3	-2	-4	-12	R	Provide benches on the modified outer slop of the slimes dam at vertical spacing of 12m. Benches will be at least 5m wide. Provide suitable cover on the modified outer slope.	EMP (2016) EMP (2016)	p	3	3	4	5	15
	Ecology	Presence of invader species could impact on the natural succession of vegetation on the slopes of WRDs.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme must be implemented on site and enforced. This programme must stipulate the monitoring plan, which should include: capturing of areas where invader species are present; action plan to remove these; % successful removal).	New	N	-1	-1	-3	-2	-7
	Surface Water	Erosion of the side walls of the WRD could lead not only to instability, but also siltation of water resources.	N	-2	-3	-3	-3	-11	CbA	The side walls should be sloped to a degree which will allow stability and self succession of vegetation. The WRD must be shaped to be free draining and to blend in with the natural topography of the area. Where self-succession does not establish, it is recommended that the mine investigate a seeding programme. Clean and dirty water measures must be implemented around and on top of the facilities to manage water and runoff on and around the facility.	EMP (2016) EMP (2016) EMP (2016) EMP (2016)	P	2	3	4	5	14
	Groundwater	Long term seepage, although indicated in the Waste Classification that	N	-2	-3	-2	-2	-9	R	The side walls should be sloped to a degree which will allow stability and self succession of vegetation.	EMP (2016) EMP (2016)	P	2	3	4	5	14

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
		it should not have a significant impact, can be reduced to improve the groundwater quality in the area.								The WRD must be shaped to be free draining and to blend in with the natural topography of the area.							
										Where self-succession does not establish, it is recommended that the mine investigate a seeding programme.	EMP (2016)						
										Any signs of erosion must be rehabilitated immediately.	EMP (2016)						
										Clean and dirty water measures must be implemented around and on top of the facilities to manage water and runoff on and around the facility.	EMP (2016)						
										Groundwater monitoring must continue up until closure is obtained.	EMP (2016)						
		Decommissioning and removal of facilities could lead to the infiltration of dirty water to groundwater resources.	N	-2	-3	-2	-2	-9	CbA	No water may be discharged into watercourses, if this water has not been treated to the correct quality OR if approval from the DWS for such activity has not been obtained.	EMP (2016)	P	2	3	4	5	14
										Once the dams are empty, any silt remaining in the dams should be disposed of on the lined Slimes Dam.	EMP (2016)						
										The dams should be demolished, and the liner and rubble should be classified to determine the type of landfill site suitable to cater for this material.	EMP (2016)						
										Groundwater monitoring must continue up until closure is obtained.	EMP (2016)						
		Contamination of soil resources due to hydrocarbon spills.	N	-1	-1	-4	-2	-8	R	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP.	EMP (2016)	N	-1	-1	-2	-2	-6
										Vehicles must be well maintained.	IWWMP (2016); EMP (2009)						
										All used oils must be removed from site by a licensed company and disposed of at a suitably licensed site	EMP (2016)						
										Any spills occurring during the collection process must be cleaned up immediately.	EMP (2016)						
										Any significant spills must be captured in the incident reports and must be reported to the relevant department (NCDENC, WUA, CMA, DWS).	IWWMP (2016); EMP (2009)						
										A clean up procedure (i.e. Works Instruction) must be in place.	EMP (2016)						

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
Specifics: Rehabilitation of Opencast Pits	Surface Water	Natural runoff in the area must remain free flowing, which could be impacted if the opencast pits are not backfilled and compacted correctly. In the event that the opencast pits are not backfilled the runoff from the surrounding area can accumulate in the pits reducing the run off in the area.	N	-2	-3	-4	-3	-12	CbA	If opencast pits are not backfilled, enviroberms or a similar structure should be implemented to keep runoff from the opencast pits. The shape of the outer slopes of the opencast pits will be 16 degrees. Where backfilling is undertaken, only material as approved in the WUL may be used for such purpose. Backfilled areas must be compacted and shaped to ensure that subsidence is avoided and that the area is free draining, resembling the natural surface topography. Backfilled areas must be demarcated to avoid any unauthorised access to these areas. Where self-succession does not establish, it is recommended that the mine investigate a seeding programme. Weekly inspection must be implemented to monitor and measure the progress of rehabilitation. Clean and dirty water systems must remain in the area until rehabilitation has been completed.	EMP (2016) EMP (2009) IWWMP (2016); EMP (2009) IWWMP (2016); EMP (2009) EMP (2016) EMP (2016) EMP (2016) EMP (2016)	P	2	3	4	5	14
	Groundwater	Natural runoff in the area must remain free flowing, to avoid unnecessary ponding in the opencast pits. In the event that the opencast pits are not backfilled the runoff from the surrounding area can accumulate in the pits reducing the run off in the area.	N	-1	-3	-4	-3	-11	CbA	If opencast pits are not backfilled, enviroberms or a similar structure should be implemented to keep runoff from the opencast pits. Where backfilling is undertaken, only material as approved in the WU may be used for such purpose. Backfilled areas must be shaped to ensure that subsidence is avoided. Backfilled areas must be demarcated to avoid any unauthorised access to these areas. Where self-succession does not establish, it is recommended that the mine investigate a seeding programme. Weekly inspection must be implemented to monitor and measure the progress of rehabilitation.	EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016) EMP (2016)	P	2	3	4	5	14

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Clean and dirty water systems must remain in the area until rehabilitation has been completed. Groundwater monitoring should continue up until closure has been obtained.	 EMP (2016)						
	Ecology	Presence of invader species could impact on the natural succession of vegetation on the slopes of WRDs.	N	-2	-3	-4	-4	-13	CbA	A weed eradication programme must be implemented on site and enforced. This programme must stipulate the monitoring plan, which should include: capturing of areas where invader species are present; action plan to remove these; % successful removal).	EMP (2016)	N	-1	-1	-3	-2	-7
Cessation of Labour Contracts	Geology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Topography	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Soil, Land Use and Land Capability	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Terrestrial Ecology (Fauna & Flora)	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wetland	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hydrology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Geohydrology	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heritage	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Visual	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Air Quality	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noise	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Socio-Economic	Infrastructure areas could benefit the local community.	N	-3	-3	-4	-5	-15	CbA	Instead of demolition of certain areas, these areas could be sold off as commercial property for use in the local community. All surface structures, infrastructure and 'hard surfaces' (inter alia, redundant surfaced roads, parking and paved areas) are to be demolished and removed from the disturbed mine footprint; unless an alternative/continued use for any such items is agreed upon, in writing, with the Department of Mineral Resources (DMRE).	New	P	3	3	4	4	14
		Loss of Employment.	N	-3	-3	-4	-5	-15	CbA	The mine should continue with the skills development programme and Social and Labour Plan commitments to empower the workforce to undertake other economically viable activities.	New	P	2	3	3	3	11
Waste Management and decommissioning of hazardous (also fuels) substances	Geology	No direct impact	-	-	-	-	-	-		-	-	-	-	-	-	-	-
	Topography	No direct impact	-	-	-	-	-	-		-	-	-	-	-	-	-	-
	Soil, Land Use and Land Capability	Spills around the diesel storage areas and TSF may result in the contamination of soils.	N	-1	-2	-4	-4	-11	CbA	Any hydrocarbon, effluent or other contaminants should be collected and the soils remediated immediately.	New New	-	-1	-2	-1	-1	-5

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures					
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										A contaminated land assessment should be undertaken at all areas where diesel was stored, as well as where fuel pipelines were placed.							
	Terrestrial Ecology (Fauna & Flora)	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Wetland	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Groundwater	Handling or Hazardous Waste within workshops and general mine area.	N	-2	-2	-2	-4	-10	CbA	Clean and Dirty water separation systems should be incorporated in terms of the 2016 SWMP or any approved update thereafter. Waste management training must be implemented on site. Clear signs informing staff of waste management practices must be implemented on site. Hazardous waste handling should only take place within bunded and/or lined areas. Hazardous waste should be removed by a licenced removal company and taken to a suitable and licenced landfill site. Documentation of removal and safe disposal must be available on site.	New New New New New New	N	-1	-1	-2	-2	-6
		Handling of Building Rubble	N	-2	-2	-2	-3	-9	CbA	All infrastructure will be removed and rehabilitated, should no alternative use be found for the structures. Foundations will be removed to a depth of 1m below surface. All building rubble will follow the waste hierarchy and will therefore either be sold for reuse where possible and as a last option be disposed of at a licensed facility suitable for such waste.	New New New	N	-1	-1	-2	-2	-6
		Handling and Storing of Domestic Waste	N	-3	-3	-3	-3	-12	CbA	Clean and Dirty water separation systems should be maintained. Waste management training must be implemented on site. Clear signs informing staff of waste management practices must be implemented on site.	New New New New	N	-2	-3	-2	-2	-9

Name of Activity		Potential Impacts								Mitigation Type		Rating Post Measures					
Activities	Impact Area	Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Groundwater monitoring must be undertaken in such a manner as to ensure that any potential impacts from the site can be detected. Recycling practices must be investigated and implemented on site.	 New						
	Surface Water	Handling of Hazardous Waste within workshops and general mine area could contaminate the dirty water storage areas. The water is then reused in the system and could have impacts on the integrity of the storm water system and also the production.	N	-3	-2	-2	-4	-11	CbA	Clean and Dirty water separation systems should be maintained up until closure. Waste management training must be implemented on site. Clear signs informing staff of waste management practices must be implemented on site. Hazardous waste handling should only take place within bunded and/or lined areas. Hazardous waste and contaminated materials should be removed by a licenced removal company and taken to a suitable and licenced landfill site. Documentation of removal and safe disposal must be available on site. Weekly inspections of Storm Water Management Systems must be undertaken. Any blockages or maintenance requirements must be documented and an action plan developed.	New New New New New New New	N	-1	-1	-2	-2	-6
		Handling and Storing of Domestic Waste should have no impact on the surface water resources due to the location of the facility. However, incorrect disposal of waste could hamper the integrity of the storm water system.	N/A	-1	-2	-3	-3	-9	CbA	Clean and Dirty water separation systems should be maintained up until closure. Waste management training must be implemented on site. Weekly inspections of Storm Water Management Systems must be undertaken. Any blockages or maintenance requirements must be documented and an action plan developed. Clear signs informing staff of waste management practices must be implemented on site. Recycling practices must be investigated and implemented on site.	New New New New	N	-1	-1	-2	-1	-5

Name of Activity	Impact Area	Potential Impacts								Mitigation Type		Rating Post Measures						
Activities		Potential Impacts	Status	Extent	Duration	Probability	Intensity	SbM	R, Ir, CbA	Mitigation Measures	Approved EMP Condition	Status	Extent	Duration	Probability	Intensity	SaM
										Building rubble must be disposed of in line with the requirements of the NEM:WA. Access control must be strictly enforced.	New						
	Air Quality	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Heritage	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Visual	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Air Quality	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noise	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Social	No direct impact	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.f.xiii.3 The Positive and Negative Impacts that the Proposed Activity (in terms of the Initial Site Layout) and Alternatives will have on the Environment and the Community that may be affected

The proposed projects as part of this application are situated on the existing Beeshoek Mining Right Area. Mining activities have been present in this area since the 1935.

The mine has been investigating measures to optimise mining practices and ensure that a long term mining economy can be maintained.

The following key positive impacts are foreseen:

- The operation of the mine due to a lawful construction of the activities will allow the mine to operate within the legal realm of the Environmental Legislation;
- The implementation of the Jig Plant and WHIMS Plant will allow for the reduction in waste streams by reworking this material;
- It is pertinent for the mine to ensure that there is sufficient infrastructure on site to optimise water reuse within the process water circuit;
- The ongoing expansion of the opencast mining operations within the approved Mining Rights Area gives effect to the MPRDA and will ensure a long term industry for iron supply, as well as employment opportunities; and
- The undertaking of the detailed specialist studies will allow the mine to understand the current environmental conditions on site and will ensure that the most up to date and environmentally acceptable measures are implemented
-

The key potential negative impacts which may/ will arise and for which management measures have been recommended are, but still require confirmation by specialists are:

- Construction activities may lead to an increase in dust emissions if not managed.
- By not managing the water circuit effectively, excess dewatering may be required – i.e. should additional dewatering be required, other sources of water input could potentially be reduced to offset the potential impacts;
- The large expansion in mining operations will have an impact on the ecological characteristics of the area, and strict management measures will have to be considered;
- By not maintaining the areas around the facilities, alien and invasive plant species can established;
- The mine site is located on the western edge of the Ghaap Plateau that has been identified by the Northern Cape Nature Conservation Services as a priority for conservation in the Northern Cape and is regarded as an ecologically sensitive habitat. Endoreic pans occur on the Ghaap Plateau and are prevalent within the Sishen/Postmasburg area. Various of these pans are present within the project area; and
- Non-perennial drainage channel observed on the south eastern boundary of the mine, which may be impacted upon due to mine expansion.

When considering the above it is clear that with the implementation of management measures negative impacts can me managed, in depth specialist studies will however be required to confirm and address this.

2.f.xiii.4 The possible mitigation measures that could be applied and the level of risk

Please refer to Table 39 to Table 42 for potential management measures. Some of the key management measures currently foreseen include:

- A legal assessment of all activities and future planned activities must be undertaken annually to ensure that all activities are authorised.
- The EMP and associated Environmental Authorisation (EA) once issued by the DMRE, as well as the Water Use Licence (WUL), once issued by the Department of Water and Sanitation (DWS) must be available on site at all times.
- Construction areas must be clearly demarcated to control movement of personnel and vehicles, providing clear boundaries for construction sites in order to limit the spread of impacts. Markers and pegs will be erected and maintained along the boundaries of the working areas, access roads, haul roads and paths before commencing any work. If proved insufficient for control, these shall be replaced by fencing.
- Clean and dirty water separation as part of a Storm Water Management Plan must be implemented early in the construction phase, especially down-gradient of construction areas to ensure that the natural runoff patterns are impacted as little as possible.
- Ensure that all design drawings include effective erosion control measures.
- Alien and invasive plant species eradication should be implemented on site during all development phases.
- Equipment will be well maintained to reduce excessive noise creation.
- Ensure the required erosion protection measures are monitored and corrected where necessary.

- Storage of fuels and oils, the refuelling of vehicles and equipment maintenance must be limited to designated, bunded areas. Bunds to be 110% of volume of the materials stored).
- All workers must undergo an induction which includes environmental awareness training to make them aware of the environmental incident management procedures as well as the importance of complying with management measures.
- Any significant spills must be captured in the incident reports and must be reported to the relevant department (DMRE and DWS).
- Water Conservation and Demand Management must be an ongoing commitment by the mine.
- Pipelines flows should be recorded on mine recording system (active at any time) to determine when there may be a potential leak on a pipeline.
- All rehabilitated areas should be effectively fenced off to avoid access thereto by unauthorised parties up until full rehabilitation has been achieved.
- .

2.f.xiii.5 The outcome of the Site Selection Matrix, Final Site Layout Plan

All activities as currently presented in this report are located on the proposed sites. The projects proposed are required for the optimisation of existing infrastructure and/or facilities on site. Therefore the locations are based on existing infrastructure and existing cleared areas.

2.f.xiii.6 Motivation where no alternatives sites exist

Please refer to Section 2.f.i.1 of this report.

2.f.xiv Statement motivating the preferred site

Please refer to Section 2.f.i.1 of this report.

2.g Plan of Study for the Environmental Impact Assessment

2.g.i Description of alternatives to be considered including the option of not going ahead with the activity

Please refer to Section 2.f of this report which presents the views and options of relevant alternatives to the projects in question.

All activities as currently presented in this report are located on the proposed sites. The projects proposed are required for the optimisation of existing infrastructure and/or facilities on site. Therefore the locations are based on existing infrastructure and existing cleared areas.

No further alternative assessments will be undertaken.

2.g.ii Description of the aspects to be assessed as part of the environmental impact assessment process

The aspects of the project that will be assessed in the EIA phase are those considered by the EAP as having the potential to result in environmental and social impacts. They include:

- Impact on regional groundwater resources due to increased dewatering due to increase opencast operations in the area;
- Impact on dust emissions and air quality due to the increase in heights of WRDs;
- Loss of sensitive ecosystems relating to potential dry pans;
- Loss of threatened, endemic or protected plant species;
- Loss of habitat and impact on the natural fauna in the area;
- Loss of soils and land capability;
- Loss or impact to non-perennial watercourses;
- Establishment of alien and invasive plant species; and
- Impact on paleontological and heritage due to increase mining and clearance activities.

The following specialist studies are recommended:

- Ecology;
- Heritage and Palaeontological Assessment
- Soils and Land Use;
- Aquatic and Wetland;
- Air quality;

- Visual;
- Hydrological Assessment;
- Numerical Groundwater Assessment;
- Socio-Economic Investigation;
- Financial Rehabilitation will be based on the GlobeSight study undertaken

2.g.iii Description of aspects to be assessed by specialists

2.g.iii.1 Specialist Team

Tanja Bekker: Tanja Bekker has more than 18 years' working experience in environmental management. She will act as the **EAP** on this project. Her key focus is environmental management and compliance with extensive experience in the mining industry. Project Management and Coordination of projects form a critical component of her duties, which includes project planning, initiation of projects, client, authority and stakeholder consultation, specialist coordination, budget control, process control, quality control and timeframe management. Her interest lies in a client advisory capacity, being involved during pre-feasibility and feasibility phases of project development and assisting the client and engineering team in adding value to develop the project in an environmentally sustainable manner, considering client costs and liabilities, as well as considering the implication of environmental authorization requirements on project deliverables. Her involvement in projects has spanned over the project life cycle from Prospecting Applications, Mining Right Applications, Environmental Reporting and the implementation and auditing of the Environmental Management Plans and Record of Decisions. Tanja has significant experience in integrated environmental management processes such as Environmental Impact Assessments (EIAs) and Basic Assessment Reports (BARs), and the development of Environmental Management Plans (EMPs). Her experience further also spans into Water Use Licensing. She has comprehensive experience and a thorough understanding of the National Environmental Management Act and subsequent regulations, as well as the National Water Act and National Environmental Management Waste Act. She is a certified ISO 14001 Lead Auditor and has been involved in conducting environmental audits and site assessments, implementing of environmental management plans, as well as assessing environmental compliance for specifically mining clients in terms of the Mineral Resources Development Act. She has acted as the Large Account Manager for various mining companies including Total Coal South Africa (involved for 7 years), as well as for Assmang's Ferrous Division (involved for 11 years). Ms Bekker is registered as a Professional Natural Scientist with the South African Council for Natural Science Professional (SACNAPS) and is also a Registered Environmental Assessment Practitioner with the Environmental Assessment Practitioner Association of South Africa (EAPASA), a legal requirement stipulated by the National Environmental Management Act.

Geo Pollution Technologies (Pty) Ltd (GPT) will be responsible for the **geohydrological assessment**. This company has been involved with the Beeshoek operation for over 10 years and fully comprehend the groundwater conditions of the site and has the ability to proactively address various scenarios.

Heritage Contracts and Archaeological Consulting cc will be responsible for the **heritage and palaeontological** studies. Heritage Contracts and Archaeological Consultants was founded by Jaco van der Walt. Jaco has worked at various universities and in the private sector providing him with an excellent balance between academia and the challenges that development poses on our non-renewable heritage resources. Heritage Contracts and Archaeological Consultants offer a wide range of services and incorporate specialists from the entire spectrum of Heritage Management aspects to ensure the successful completion of project within time and budget constraints. Jaco excavated a World Heritage site amongst others and have extensive experience in dealing with indigenous communities required in negotiations during sensitive matters such as grave relocations and the heritage management of sites. Jaco has experience in managing surveys, permit applications and grave relocation projects on behalf of clients and adding data to the national heritage database.

The **Visual and Hydrological Impact Assessments** will be carried out by Andy Pirie who is a Hydrologist and owner of HydroSpatial (Pty) Ltd. Andy graduated with a Master of Science (M.Sc.) in Water Resource Management (cum laude) from the University of Pretoria. He is registered as a Professional Natural Scientist (Pr.Sci.Nat.) in Water Resources Science with the South African Council for Natural Scientific Professions (SACNASP). He has worked on projects (mostly mining) in South Africa, Cameroon, Senegal, Mali, Democratic Republic of the Congo (DRC), Botswana, Zambia and Namibia, for clients such as Anglo American, Randgold Resources, Sibanye-Stillwater, Birimian, Exxaro, Sasol, Eskom and Assore. He has more than 7 years' experience in hydrological assessments, auditing and Geographical Information Systems (GIS). His expertise includes the following: Flood line determinations; Water and salt balance modelling; GN704 legal compliance audits; Storm water management plans; Surface water quality monitoring and assessment; Rainfall - runoff modelling; Environmental flow requirement calculations; Surface water impact assessments; and GIS. Andy has been involved in GN704 compliance audits at the Beeshoek Iron Ore Mine in the past.

uMoya-NILU will be responsible or the **Air Emissions Model Update and Atmospheric Emissions Licence**. The company recently established a comprehensive emission inventory for current operations at Beeshoek Mine and used this to establish the impact footprint on the mine using dispersion modelling. We are therefore well positioned to amend the emission profile for the upgrade projects and to remodel to assess changes in the footprint as a result of the upgrades. All work will be conducted by Dr Mark

Zunckel and Atham Raghunandan who conducted the dispersion modelling for Beeshoek Mine in 2017 and who have extensive experience with air quality assessments for the mining industry in southern Africa.

Irene Lea Environmental and Hydrogeology cc (iLEH) has been involved at Beeshoek Mine for the past two years, developing the Water Balance, Salt Balance and Water and Demand Management Plan. Irene will be responsible to update the **Water Balance and Salt Balance** for this project.

Scientific Aquatic Services (cc) (SAS) is nationally and internationally known as an industry leader in aquatic ecological assessments in all freshwater environments including both lotic and lentic systems. This company will be responsible for the **aquatic, ecological and soils impact assessments**. Further services offered include screening and risk assessments, Biodiversity Action Plans, Biodiversity Management Plans, Biodiversity Offset Plans, Alien and Invasive Species Management Plans, site walk-downs, terrestrial ecological monitoring and rehabilitation plans.

2.g.iii.2 Fields of Study

2.g.iii.2.a Terrestrial Ecology Study

The assessment will take place as a baseline study which will include a comprehensive floral ecological investigation. The assessment will fulfil the ecological assessment requirements of the EIA as required in terms of the National Environmental Management Act (1998). The assessment will also be undertaken according to the relevant provincial guidelines. All relevant databases such as the provincial and national floral database inventories, the Northern Cape RDL species lists and the Northern Cape C-Plan will also be analysed.

The following sections provide the methodologies which will be applied during the assessments.

Floral Assessment

The proposed methodology includes both a desktop review and a field work component. A desktop review of distribution lists (including Red Data species and protected species listed for the Northern Cape Province), available literature and previous floral reports will be conducted to guide the field work component. The vegetation type for the study area will be defined according to sources such as Mucina and Rutherford (2012). Extensive consideration will also be given to determining the ecological importance and sensitivity (EISC) of the study area according to the Biodiversity GIS (BGIS) database. The SANBI and PRECIS databases for the QDS will also be consulted and will serve as the reference data to which the field survey will be compared to.

The assessment will include a detailed assessment of the proposed development site as well as the surrounding zone of influence. Results will be compared to a suitable reference site if the proposed areas are already significantly disturbed. The field assessment will identify:

- Various habitat types;
- A description of each habitat type based on conservation importance and present ecological state;
- Floral species associated with each habitat component
    - Focus on sensitive habitat types, the ecological importance of flora species and impacts associated to them in order to fulfil the requirements of the study;
    - Vegetation communities will be identified and mapped;
    - Species lists and dominant species associated with each vegetation community will be compiled;
    - Focus will also be given to identifying areas of severe alien and invader encroachment and Category 1, 2 and 3 species in terms of GNR 598: National Environmental Management Biodiversity Act: (Act No. 10 of 2014) will be identified and listed;
    - Veld condition will be assessed and will also be compared to the typical vegetation for the vegetation type of the area according to Mucina & Rutherford (2012);
    - Sensitive areas will be mapped where detail will be given of the ecological aspect of concern in each sensitivity zone; and
    - Specific focus will also be given to establishing the presence of RDL and protected plants as listed within the IUCN List, the Northern Cape Province and the TOPS list of NEMBA.
- Based on the findings a specialist statement and impact assessment on all identified significant risks will take place; and
- Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the construction and operation of the proposed activities in order to manage and mitigate impacts on the floral assemblage of the area.

Faunal Assessments

- The faunal assemblage will be determined using the following methods:
    - Extensive consideration will be given to determining the ecological importance and sensitivity of the study area according to the relevant conservation databases. The relevant databases for the QDS will also be consulted and will serve as the reference data to which field surveys will be compared to;
    - Visual observations of actually occurring species;
    - Identification of evidence of occurrence, e.g. call spoor, droppings etc.;
    - Nocturnal studies to identify nocturnal animals in the area will take place by means of Sherman Traps and Camera Traps if deemed suitable;
    - Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the construction and operation of the proposed activities in order to manage and mitigate impacts on the faunal assemblage of the area.
    - The reports produced will include sensitive habitat types (which will be mapped) and impacts from habitat disturbance, faunal assemblages at risk and an assessment of impacts on migratory routes;
    - An assessment of cumulative impacts on faunal assemblages in the region will also be made, with specific emphasis on avifauna;
    - A Probability of Occurrence (POC) assessment will also be considered in order to quantify the importance of the study area in terms of faunal SCC conservation;
    - Based on the findings a detailed baseline study and impact assessment on all identified significant risks will take place; and

The following field assessment methodologies will be followed as deemed necessary:

- Avifauna:
    - The Southern African Bird Atlas Project 2 species list for the quarter degree square will be compared with the database of birds identified on the study area during the field surveys. Field surveys will be undertaken utilising a pair of binoculars and birdcall identification techniques will also be utilised during the assessment in order to accurately identify avifaunal species at selected points within the study area where avifaunal habitat is optimal;
    - Potential biodiversity list;
    - Habitat evaluation for RDL species and areas of avifaunal importance.
    - Extensive consideration will be given to impacts on avifaunal ecology with specific mention of impacts on migratory species and migratory corridors.
- Mammals:
    - A potential biodiversity list will be compiled from available literature sources;
    - Short habitat descriptions of all habitat types pertaining to RDL species will be given;
    - The habitat types will be evaluated for potentially supporting RDL species;
    - Field assessments may employ Sherman and camera trapping techniques (aimed at determining the small mammal species community structure);
    - The field assessment will identify the presence of various mammalian species through direct (visual observations) and indirect (spoor, burrow and scat identifications);
    - A species list, detailing their specific conservation status will be compiled from the field observations;
    - If considered necessary, the survey will be extended to a nocturnal survey to potentially enable augmentation of the data. The use of surveillance techniques such as automated camera traps will then be used;
- Herpetofauna:
    - A complete potential biodiversity list will be provided;
    - The conservation status of each species listed will be determined;
    - The potential species list in accordance with the habitat availability will also be compiled;
    - The species recorded during the field survey will be listed;
    - Habitat evaluations will be undertaken for suitability for supporting various RDL species recorded from the region;
    - Identification through call identification and direct observation;
    - Thorough site searches within the various habitat type units will be employed for determining the species community structures for the proposed development site with special mention of searching of target areas including rocky outcrops and wetland areas;

- Invertebrate assessment:
    - Sweep netting;
    - Direct visual observations;
    - Sweeping for ground dwellers;

2.g.iii.2.b Heritage and Palaeontological Assessment

The scope of work comprises an HIA of the proposed impact area.

- The objectives for the cultural and archaeological study will be:
- To obtain a good understanding of the overall archaeological and cultural heritage conditions of the area through a brief desktop study;
- To locate, identify, record, photograph and describe sites of archaeological and cultural importance;
- Should any sites be identified to propose a study method forward;
- Ensure that all requirements of the local South African Heritage Resources Agency (SAHRA) are met; and
- Report on the results of the archaeological and cultural heritage survey adhering to minimum standards as prescribed by the SAHRA and approved by the Association for Southern African Professional Archaeologist (ASAPA)

In order to achieve the successful completion of the project the following methodology is proposed:

Background Study

The first phase will comprise a desktop study, gathering data to compile a background history of the area. The desktop study will utilise data for information gathering from various sources to extract data and information on the study area focussing on archaeological sites, historical sites and known graves of the area. This will help to contextualise the study area.

Physical Surveying

The field visit will aim to locate and identify sites of significance. These sites will then be recorded, photographed and described. GPS points of significant sites will be documented using the WGS 84 datum point.

Reporting and Impact Assessment

Should any sites be identified during the field visit a study method for the way forward will be proposed. This will include determining the levels of heritage significance of recorded heritage resources and the impact of the proposed development on these resources. Mitigation measures and management actions will be recommended should any significant sites be impacted upon.

2.g.iii.2.c Soils and Land Use

The proposed methodology includes desktop analysis and existing data review to support the field work component, as presented below.

Phase I: Desktop Review

- Undertake a desktop reconnaissance survey of the study area;
- Review and identify broad soil patterns and land capability data within the investigated project area on the Agricultural Geo-referenced Information System (AGIS) and/or Agricultural Research Council Institute for Soil Climate and Water (ARC-ISCW) databases; and
- Identify selected points of interests (POIs) within the study area for verification.

Phase II: Field Verification Assessment

- A soil classification survey will be conducted within the proposed options;
- Subsurface soil observations and sampling will be made by means of a manual bucket hand auger;
- Dominant soil types will be classified, and soil boundaries established according to the South African Soil Classification System (Soil Classification Working Group, 2018);
- The assessed survey and sampling points will be recorded on a Global Positioning System (GPS); and
- Field assessment data will include a detailed description of physical soil properties including the following parameters:
    - Terrain morphological unit (landscape position) description;
    - Diagnostic soil horizons and their respective sequence;
    - Depth of identified soil horizons;

- Soil form classification name(s);
- Observed land capability limitations of the identified soil forms; and
- Depth to saturation (water table), if encountered.

Phase III: Mapping, Data Analysis and Reporting:

- Group uniform soil patterns into map units, according to observed limitations;
- Evaluate land capability of the demarcated soil map units in terms of land capability;
- Evaluate land use impacts of the proposed land use development;
- Assess the significance of the anticipated impacts of the proposed development on the Agricultural Resources in terms of Land Capability;
- Provide recommended mitigation measures and management practices to be implemented in order to offset the identified impacts; and
- The findings of the assessment will be presented in the form of an electronic report which will include:
  - A Soil Type Map, indicating the delineated soil types within the project area;
  - Photos of current environmental conditions on site and adjacent land uses;
  - A Land Capability Map, illustrating the land capability and suitability of identified soil map units to alternative land uses including arable agriculture, forestry, grazing etc.
  - A matrix of potential impacts and their respective significance on land capability for various land use activities;
  - Integrated mitigation measures and recommended management practices to be implemented in order to reduce the significance of the identified impacts; and
  - Rehabilitation recommendations of WRD side slopes and the detrital areas.

2.g.iii.2.d Aquatic and Wetland

The Scope of Work includes a brief investigation of the watercourses within the study area, as well as the delineation of those watercourses within 500m thereof in fulfilment of Regulation 509 of 2016 as it relates to the NWA. The assessment will fulfil the ecological assessment requirements of the environmental authorisation process as required in terms of the NEMA and will provide the required information for water use licencing in terms of the NWA.

Desktop information will be gathered to obtain background information on the project. A field assessment will be undertaken to fulfil the watercourse ecological assessment requirements of the NEMA, the NW and the associated regulations as well as other legal requirements applicable on both a national and provincial level. Current industry 'best practice' assessment methods will be applied to characterise the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the freshwater ecological environment and to identify ecosystems and biological assemblages at risk.

A fact-presenting report will be generated for the environmental authorisation process, providing both qualitative and quantitative data on the PES of the watercourses associated with the study area. The studies will generate detailed site sensitivity maps and all results will be used to inform a detailed impact assessment, which will be undertaken according to a pre-defined impact assessment methodology, and key mitigatory measures in order to minimise impacts on both the local and regional wetlands and its water quality, and aquatic ecology will be highlighted.

The following sections provide the methods of assessment which will be applied during the study.

Desktop assessment

A detailed desktop assessment will be undertaken in which all available background information will be reviewed. All relevant national and provincial databases (such as NFEPA and BGIS) will be reviewed and searched as required, in order to further define the environmental sensitivities of the receiving environment. As part of the desktop studies all freshwater areas will be mapped based on desktop delineation methods. The findings of the desktop studies will then be used to refine and focus the field work assessment. Further detail on the assessment methods is presented in the sections below.

Freshwater ecological assessment procedure

Scoping Phase reporting:

A scoping phase assessment report will be provided, whereby the freshwater environment associated with the study area as provided by the client will be investigated as follows:

- A detailed desktop study will be undertaken highlighting the Ecological Importance and Sensitivity and Present Ecological State based on databases such as the NFEPA database (2011), the Gauteng Conservation Plan (2011) and the BGIS website;

- Delineation of watercourses within 500m of the study area will be undertaken utilising desktop methods;
- Applicable buffer zones and/or zones of regulation according to relevant legislation or provincial guidelines will then be delineated around the watercourses. The applicable buffer maps will be provided;
- A brief impact statement on the expected impacts on these watercourses by the proposed activities.

EIA Phase reporting:

A site visit will be undertaken whereby all watercourses associated with study area as provided by the client will be assessed, and the following will be undertaken:

- Delineation of the watercourses within the study area as provided by the client will be verified, according to "DWAF, 2008: A practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones". Aspects such as soil morphological characteristics, vegetation types and wetness will be used to verify the delineation of the wetland temporary zone according to the guidelines;
- All watercourses identified during the field assessment will be mapped using a handheld GPS and the use of ARC GIS 10.3 software;
- A watercourse classification assessment will be undertaken according to the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland systems (Ollis et al., 2013);
- Applicable buffer zones and/or zones of regulation according to relevant legislation or provincial guidelines will then be delineated around the filed verified watercourses. The applicable buffer maps will be provided;
- A statement of the findings of the site assessment will be provided, as well as all maps and data from national and provincial databases that have bearing on the wetland Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS). In this regard specific mention is made of the National Freshwater Ecosystem Priority Areas (NFEPA) databases and relevant Conservation datasets;
- The ecological services provided by the watercourses within the study area will be assessed according to the method of Kotze et al (2009) in which services to the ecology of the site will be defined and services to the people of the area will be defined;
- The watercourse Present Ecological State (PES) will be assessed according to indices such as the Wet-Health (Level 1) / Index of Habitat Integrity as advocated by Macfarlane et al., (2008) and DWA (2007), respectively as applicable;
- The watercourse EIS will be determined based on the method described by Rountree & Kotze, (2013);
- Aspects regarding watercourse drivers and receptors as required by the DWS Chief Directorate Instream Water Use will be reported on, including the following:
    - Watercourse drivers:
        - Hydrology;
        - Water quality; and
        - Sediment balance and the geomorphological regime.
    - Watercourse receptors:
        - Habitat; and
        - Biota.
- Based on the findings during the assessment, and based on the project plan and proposed layout plan as provided by the proponent, a detailed impact assessment on all identified significant risks will take place including cumulative impacts on watercourse assemblages in the region; and
- Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the development/operation or decommissioning of the proposed development in order to improve manage and mitigate impacts on the freshwater ecology of the area will be provided. All results will be compiled into a specialist impact assessment report.

2.g.iii.2.e Air Quality

uMoya-NILU recently established a comprehensive emission inventory for current operations at Beeshoek Mine and used this to establish the impact footprint on the mine using dispersion modelling.

The following approach is proposed to conduct the supporting atmospheric impact assessment:

1. The first task will be the revision of the baseline emission inventory for the Beeshoek Mine (i.e. developed in 2017) to include the proposed infrastructure and operational changes.

a. Emission estimates are based primarily on activity information and related emission factors. A questionnaire will be used to guide the information collection process and interviews with mine personnel.
b. Emission estimates will be done for each project, using emission factors recommended by the US-EPA.

2. The second task is dispersion modelling using the model set-up for the 2017 dispersion modelling for Beeshoek Mine. The US-EPA approved and DEA recommended CALPUFF dispersion model will be used.
    a. Modelling will be conducted for each of the projects. This approach will provide input on effect of the changes of the relative contribution of each project to ambient dust concentrations. Collectively the total contribution of the projects will be assessed and the impact to ambient concentrations.
3. An atmospheric impact report will be prepared that will include a description of the receiving environment, the modelling methodology and inputs, the model outputs per project showing the relative contribution and zone of impacts, as well as for the mine as a whole.

2.g.iii.3 Visual Assessment

The aim of the study will be to identify the visual impacts of the proposed project on the surrounding environment. The following are objectives of the Visual Impact Assessment (VIA):

- Examine aerial photography available for the project area and surrounds;
- Create and analyse topographical, slope intensity and slope aspect models in ArcGIS 3D Analyst Extension;
- Create and analyse viewshed models in ArcGIS 3D Analyst Extension for daytime and night-time scenarios;
- Visit the project area to verify these models;
- Describe the visual/aesthetic character of the receiving environment;
- Describe the current and post development visual aspects of the project area;
- Identify sensitive visual receptors and key public viewpoints that will be impacted on by the proposed project, taking into account visibility aspects;
- Identify the impacts, pre- and post-mitigation that the proposed infrastructure will have on the visual landscape, by rating the scale, duration, severity and probability of the impacts occurring; and
- Provide mitigation/management actions and recommendations in an attempt to reduce the potential visual impacts.

The following will be undertaken in order to complete the VIA:

Desktop assessment

A VIA is a specialist study performed to identify the visual impacts of a proposed project on the surrounding environment. The project will be investigated in terms of the visual characteristics of the receiving environment.

At a desktop level, aerial photography will be analysed to characterise the landscape. A Digital Elevation Model (DEM) will be created using ArcGIS 3D Analyst Extension, with contour and point relief data as input. The resultant DEM will be used to create slope and aspect models.

The DEM will then be used as an input to create a viewshed model using ArcGIS 3D Analyst Extension; this will be done to establish the degree of visibility that the proposed infrastructure is likely to have. Information gathered during the site visit will be used to determine the zone of influence and refine the viewshed model for daytime and night-time scenarios.

Site Visit and Baseline Data Collection

Photographs will be taken during a site visit and topographical features (natural and man-made), overall visual resources, the variety of landscape characters, and sense of place attributes will be assessed.

The “Guideline for involving visual and aesthetic specialists in EIA processes” document by Oberholzer (2005) will be used as a best practice guideline for the VIA. Although these guidelines were developed for the Western Cape province of South Africa, they are relevant for this VIA as “the guidelines promote the principles of EIA best practice without being tied to specific legislated national or provincial EIA terms and requirements” (Oberholzer, 2005).

Impact Assessment

The impact assessment will identify the impacts, pre- and post-mitigation that the proposed project will have on the visual landscape, by rating the scale, duration, severity and probability of the impacts occurring. The current and post development visual aspects of the project area will be described in a specialist report. Mitigation measures and recommendations will be provided in an attempt to reduce the potential visual impacts.

2.g.iii.3.a Hydrological Assessment

Site Visit

A site visit will be undertaken to:

- Assess the hydrological characteristics of the proposed activity areas; and
- Assess the proposed sites for the suitable placement of storm water infrastructure.

Baseline Hydrology

The baseline hydrology will provide a description of the current surface water environment of the proposed activities. The following will be undertaken:

- A desktop review of existing information and data on the area will be undertaken. This includes the Water Resources of South Africa Study (WR2012), Water Resources Commission (WRC) reports, Mine Atlas of South Africa, GIS data, water quality and quantity data from the Department of Water and Sanitation (DWS), amongst others;
- A description of the hydrological characteristics of the sites in terms of the watercourses, topography, land cover, soils and catchments;
- A description of the climate in terms of the rainfall, evaporation, temperature and wind;
- An analysis of surface water runoff; and
- An analysis of surface water quality data obtained from the Mine's monitoring network.

Conceptual Storm water Management Plan

A conceptual Storm Water Management Plan (SWMP) will be prepared for the activities concerning the WRDs and pits in accordance with the DWS Best Practice Guideline G1: Storm Water Management. Dirty water will need to be captured and contained, while clean water will need to be diverted around the proposed activities. This will be done in agreement with GN704 Regulations of the National Water Act (No. 36 of 1998), which provides conditions on the use of water for mining and related activities aimed at the protection of water resources. The SWMP will include the following:

- Storm rainfall depths for the 1:50 and 1:100 year storm events;
- Delineation of clean and dirty water catchments;
- Calculation of the 1:50 and 1:100 year peak flows originating from clean and dirty water catchments;
- Conceptual placement of clean and dirty water controls; and
- Conceptual sizing of controls to convey or contain the 1:50 year peak flows as required by GN704.

Flood line Determination

According to Regulation 4 of GN704, no person in control of a mine or activity may:

- Locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked; and
- Carry on any underground or opencast mining or prospecting or any other operation or activity under or within the 1:50 year flood line or within a horizontal distance of 100 m from any watercourse or estuary, whichever is the greatest.

Non-perennial drainage lines are present within the proposed Detrital Mining Area (South Mine), as well as on the Doornfontein farm to the north. The HEC-RAS model will be used to undertake hydraulic modelling in order to determine the flood water elevations for the 1:50 and 1:100 year peak flows. The following will be undertaken:

- Undertake a hydrological assessment to determine the 1:50 and 1:100 year peak flows. Catchments will be delineated and the land cover, soils and topography will be assessed. An appropriate flood estimation method will be applied to calculate the peaks;
- Preparation of geometric data (cross-sections, river centre lines, bank lines, flow paths, etc.) for input into the HEC-RAS model;
- Undertake a hydraulic analysis using HEC-RAS to determine the 1:50 and 1:100 surface water elevations; and
- Perform flood inundation delineations in HEC-GeoRAS to produce the 1:50 and 1:100 year flood extents.

The report will detail the methodology, assumptions, modelling and results. The flood lines will be indicated on plan in the report.

Surface Water Impact Assessment

A comprehensive surface water impact assessment will be prepared to identify potential impacts that the proposed mine may have, and to provide mitigation measures for the identified impacts. The impact assessment will make use of a well developed and tested numerical rating system, that takes into consideration the intensity, duration, spatial scale and probability of the impacts in order to determine the significance of the impact.

Cumulative impacts will also be assessed. Hydrological Study for Various Proposed Activities at the Beeshoek Iron Ore Mine Hydrospatial (Pty) Ltd

Monitoring Programmes

Monitoring programmes for surface water quality and storm water management will be developed.

2.g.iii.3.b Hydrogeological

The scope of work is to address the potential impacts of the consolidation of mining activities at Village Pit, BN and HF Pit. Previous calibrated numerical groundwater models will be consolidated to determine the groundwater dewatering impacts associated with the mining.

The potential contamination risk posed by the material on site after the proposed consolidation and tailings formalisation will be evaluated using existing analysis data and waste classifications. The contaminant sources will also be graphically plotted against the dewatered area at Beeshoek to determine the direction of contaminant transport which is presumed

Update of Existing Numerical Flow Model

A few models have been completed for the Beeshoek mine, concentrating on specific areas of interest at that time. The relevant models that have been constructed were for Oosput and Village Pit, and calibrated with available data. These models will be consolidated into one regional model with lateral variable values for hydraulic conductivity as calibrated. These lateral variable values for hydraulic conductivity will be consolidated into the regional model, and will be deemed adequate for the purpose without further calibration.

This consolidate model will then be used to calculate likely dewatering volumes at the proposed opencasts, as well as likely areas affected by groundwater drawdown.

The impact on increased dewatering will be done using the pilot point model constructed in 2012 and presented to Beeshoek on 20 April 2012. This model will not be recalibrated against existing abstraction volumes and water levels. Once acceptable consolidated, the combined model can then be used to simulate the volume of water to be dewatered to allow mining to take place.

Reporting

A short report will be compiled to address the potential for contamination from the material on site, the transport of contamination in the aquifer system as well as the area to be impacted upon by dewatering.

2.g.iii.3.c Water and Salt Balance

The latest water and salt balance conducted in 2020 will be updated based on the existing dataset. As part of this process, all flow components will be evaluated in terms of inflows and outflows. These will be compared to dam capacities to demonstrate that the mine is capable of containing all dirty water and the clean water is used efficiently. The DWS Best Practice Guidelines for Water and Salt Balances will be used to complete the work, taking the DWS's specific requirements for Beeshoek into consideration.

The following new project components will be included in the water and salt balance update:

- The slimes dam upgrade: the impacts of the deposition strategy and the development of new return water dams will be included in the assessment.
- Consolidation of the waste rock dumps and run of mine stockpiles in terms of footprint increases and decommissioning of dumps.
- Water requirements for mining the detrital area.
- Changes of water requirements and water use patterns at the beneficiation plant as a result of new activities planned for the mine.
- Inclusion of the Doornfontein mining development as a separate line item. Even though this is a replacement mining project, the specific water demand and use patterns for this area needs to be evaluated and incorporated into the water and salt balance.

2.g.iii.3.d Socio Economic Assessment

A detailed Social Impact Assessment will be undertaken to:

- Project and estimate potential positive and negative social impacts associated with the proposed project;
- Determine indirect and cumulative impacts;
- Rate the anticipated impacts based on rating criteria;
- Propose mitigation measures to limit the negative impacts and enhance the positive impacts.

The impacts will be assessed against the background of the following typical variables:

- Population impacts
- Community/institutional arrangements
- Conflicts between local residents and newcomers
- Individual and Family level impacts
- Perceptions on public health and safety
- Community infrastructure needs
- Economic considerations
- General concerns

The methodology will include the following:

Site Visit

The consultant will undertake a site visit to the development area and surrounding environment to familiarise themselves with the study area and to observe the socio-economic dynamics within the surrounding communities, as well as the general characteristics of the area. Proposal

Baseline Assessment

An initial investigation (baseline assessment) will be undertaken to determine the socio-economic characteristics of the receiving environment, which could include the following:

- Social structure of receiving environment (host community);
- Land use;
- Education and skills levels;
- Labour force composition (unemployed, informal, employed);
- Incidence of unemployment on youth, PDI's and women;
- Income poverty levels;
- Living standards and household assets, including water and sanitation;
- Health and welfare;
- Social and health infrastructure;
- Culture and history of the communities in the area;
- Changes in health and well-being including cultural, family, leisure, recreation and community health issues, needs of social groups, heritage and social amenity issues;
- Institutional arrangements and power structures;
- Skills levels of the labour force;
- Sector composition of the economy in terms of employment and output;
- Specific focus on the status of the tourism industry;
- Level of economic inequality in the local economy in the area; and
- Potential current and future resource constraints (e.g. water, electricity) of the local economy.

The above would assist to form a baseline profile of the social environment, as well as highlighting the core impact areas (hot spots) and the initial anticipated impacts that could result due to the proposed development.

It also serves to identify the potential for social mobilisation against the project, identifies social impacts that cannot be resolved and variables that will need to be addressed by avoidance or mitigation.

Data sources

As part of the data gathering process baseline information will be extracted from existing documentation (where available) containing information on the social environment (e.g. status quo analysis of the social environment, demographic profiles, planning documentation, land-use information, information regarding existing infrastructure, future planning by the relevant municipalities and other relevant structures etc.).

Information obtained will be verified with the relevant government departments, land owners and other relevant stakeholders.

Consultation and Additional Data Gathering

Consultation undertaken would link with and strongly rely on the public participation process. Information will further be obtained from those that live nearby, and those who have an interest in the proposed development. Therefore, interested and potentially affected groups will be consulted to determine their perceptions and attitudes regarding the proposed development and associated changes. Individual interviews with various key stakeholders will thus be conducted.

The consultation would thus include:

- Linking with the public participation process, and following up on issues received during the public participation process; and
- Interviewing of key stakeholders (e.g. property owners, community members, affected property owners, community leaders, government departments, local authority, land users, businesses and so forth).

Analysis of Data

The Social Impact Assessment team will study and analyse the information gathered by themselves as well as the biophysical studies (e.g. information related to technical, environmental, economic and demographic aspects and land-use changes, impact on other facilities, services, and so forth) done in parallel with the public participation process and social studies. This would assist the social team to assess the impact of the proposed development on the direct (surrounding communities) and indirect (regional) environment.

Social Impact Assessment Report

The purpose of the Social Impact Assessment Report is to identify and highlight anticipated socio-economic changes as a result of the proposed development. It would consider specific economic issues and the social impacts associated with the changes in the economic environment. The report thus deals with impacts associated with the construction and operational phases of the proposed project and how it could affect the day-to-day life of notably the communities living in the vicinity of the proposed development.

The report therefore aims to assist the project proponent, consultants and communities to identify social issues that have to be addressed during the planning and decision-making phases. The document will also strive to identify the perceptions and attitudes of the communities regarding the proposed development and the potential for social mobilisation against the project at that stage. Mitigation measures and recommendations on how to deal with these anticipated social impacts would be provided. Proposal

The Social Impact Assessment Report could include the following:

A background description of the socio-economic environment including demographic and socio-economic characteristics, land-use profile, infrastructure requirements etc.:

- An assessment of the anticipated social impacts (including core aspects needing attention);
- An exploration and verification of social impacts identified through the public participation process and other studies;
- Rating of impacts;
- Formulation of specific mitigating strategies to minimise negative impacts and enhance positive impacts of the proposed development in consultation with I&APs;
- Social Management Plan; and
- Conclusions and recommendations.

2.g.iii.3.e Financial Rehabilitation

The EnviroGistics (2020) document will be utilised to develop the required management measures and costings associated with this project. In the event that a later report is available, this will be incorporated into this EIA study.

2.g.iv The proposed method of assessing duration significance

Please refer to Section 2.f.xiii.1 presenting the methodology to be used in the determination of the significance of the impacts.

2.g.v Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

Please refer to Section 2.f.xiii.1 presenting the methodology to be used in the determination of the significance of the impacts.

2.g.vi The stages at which the competent authority will be consulted

The commenting authorities will be notified of the proposed project via notification letters. Once the stakeholder consultation phase has commenced, all commenting authorities will receive hard copies the Draft Scoping Report and will receive hard copies of the Draft EIA Report. All comments received from the authorities in the phases to follow, will be provided to the DMRE for considerations. All comments received from the authorities and Stakeholders will be provided to the DMRE for considerations.

The EAP have requested an authority meeting with the DMRE during the communication on 15 February 2021 (please refer to Annexure 1). A meeting in this regard was conducted on 19 March 2021 (please refer to Section 2.f.ii.2).

2.g.vii Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

2.g.vii.1 Steps to be undertaken to notify interested and affected parties

Please refer to 2.f.ii for more detail in this regard.

For the EIA phase, all stakeholders will be notified of the availability of the draft EIA and EMPr report. Stakeholders will also be notified of the outcomes of the authorisation process once the DMRE has made a decision.

Provision has further been made to undertake a stakeholder consultation meeting – this will either be undertaken on a forum level or engaging individually with surrounding landowners, depending on the COVID-19 restrictions and stakeholder preference.

2.g.vii.2 Details of the engagement process to be followed

Please refer to 2.f.ii for more detail in this regard.

2.g.vii.3 Description of the information to be provided to Interested and Affected Parties

During the initial stakeholder notification process, high level project detail will be provided including location of the project, boundary of the proposed project site, farm details, land use information, legal triggers and proposed way forward.

During the draft scoping report, public review period (22 February 2021 to 24 March 2021), the stakeholders have received an opportunity to comment on the reports. No comments on the report, with the exemption of SAHRA have been received. A second round of review will be given to stakeholders due to the inclusion of the railway line project into the overall project description. This review will be from 30 March 2021 to 29 April 2021. Comments received will be included in the final Scoping Report to be submitted to the DMRE for consideration. Comments will also be issued to all specialists appointed for this project to ensure that the comments are considered in the impact assessments.

During the scoping phase the stakeholders will obtain information regarding the:

- Site Plans;
- Alternatives;
- A description of activities and operations to be undertaken;
- Baseline information;
- Specialist studies to be undertaken; and
- Proposed impact assessment methods.

During the EIA Phase, the following information will be disclosed in the EIA Report:

- Impact assessment undertaken and results thereof;
- Management measures;
- Monitoring plans; and
- Closure objectives.

All registered stakeholders will receive an opportunity to review the draft EIA and EMPr for a period of 30 days. Comments received will be included in the final EIA and EMPr Report to be submitted to the DMRE for consideration.

2.g.viii Description of the tasks that will be undertaken during the environmental impacts assessment process

Once the commenting period for the Draft Scoping Report lapse, the Final Scoping Report (this report) will be presented to the DMRE, and once the Final Scoping Report review period by the DMRE has been completed the project will proceed into the detailed EIA Phase, which involves the detailed specialist investigations (as described in earlier sections of this report).

The EAP will produce a Draft EIA Report after the completion of the required specialist studies. The Draft EIA Report will provide an assessment of all the identified key issues and associated impacts from the Scoping phase. All requirements as contemplated in the 2014 EIA Regulations (as amended in 2017) will be included in the Draft EIA Report.

2.g.ix Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

Please refer to Sections 2.f.xiii.2, 2.f.xiii.3, and 2.f.xiii.4 for a detailed description of the potential impacts and management measures.

2.h Other Information required by the Competent Authority

A meeting has been requested with the DMRE. This date has not been finalised. Once the meeting has been completed, the outcomes of such meeting will be included into the final reports.

2.h.i Compliance with the provisions of sections 24(4) (a) and (b) red with section 24(3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

2.h.ii Impact on the socio-economic conditions of any directly affected person

The project will have a long term positive impact on the socio-economic environment, specifically due to an insurance of a long term mining plan. In addition to this, the project will allow for the improvement and formalisation of existing activities on site, which will enhance safety and environmental management on site.

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

A detailed Heritage and Paleontological Study will be undertaken to identify any potential impacts on the national estate.

2.i Other matter required in terms of sections 24(4) (a) and (b) of the Act.

None applicable. The motivation for lack of consideration of site alternatives is presented within this report.

3 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

The EAP herewith confirms:

3.a The correctness of the Information provided in the Reports

3.b The inclusion of Comments and Inputs from Stakeholders and I&APs

3.c The inclusion of Inputs and Recommendations from the Specialist Reports where relevant

3.d That the Information provided by the EAP to I&APs and any Responses by the EAP to Comments and Inputs made by I&AP are correctly reflected herein

Signature of the Environmental Assessment Practitioner

EnviroGistics (Pty) Ltd

Name of company

26 March 2021

Date

4 UNDERTAKING REGARDING LEVEL OF AGREEMENT (TO BE SIGNED ON FINAL REPORT)

Undertaking by the client:

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

Full Names and Surname

Identity Number

Designation

Signature

Date

Annexures

Annexure 1: DMRE Acknowledgment of Receipt

Annexure 2: DMRE Lawfulness Consideration

Annexure 3: Stakeholder Consultation

Annexure 1: DMRE Acknowledgement of Receipt

Annexure 2: DMRE Lawfulness Consideration

Annexure 3: Stakeholder Consultation Information

Adverts

Background Information Documents

Database

Comments received