



THE RECOMMISSIONING OF THE WITHOK TAILINGS STORAGE FACILITY, EKURHULENI, GAUTENG PROVINCE

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DMRE Reference Number: GP 30/5/1/2/2 (158) MR

27 May 2025



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE RECOMMISSIONING OF THE WITHOK TAILINGS STORAGE FACILITY, EKURHULENI, GAUTENG PROVINCE.

APPLICATION FOR ENVIRONMENTAL AUTHORISATION (EA):

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107, 1998) (AS AMENDED), THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (ACT 59, 2008) (AS AMENDED), AND THE NATIONAL WATER ACT (ACT 36, 1998) (AS AMENDED).

Name of Applicant: Ergo Mining (Pty) Limited

Tel No: +27 11 743 1003

Postal Address: PO Box 12442, Selcourt, Springs, 1567

Physical Address: Constantia Office Park, Cnr 14th Avenue and Hendrik Potgieter Road,
Cycad House, Building 17, Ground Floor.
Weltevreden Park 1709.

Document prepared by: Kongiwe Environmental (Pty) Ltd

Document Date: 27 May 2025

FINAL ENVIRONMENTAL IMPACT ASSESSMENT

Project	The Recommissioning of the Withok TSF
Report Title:	Recommissioning of the Withok Tailings Storage Facility (TSF) in Ekurhuleni, Gauteng Province
DMRE Reference No.	GP 30/5/1/2/2 (158) MR
Client:	Ergo Mining (Pty) Ltd
Project No:	DRDG#012
Compilation Date:	27 May 2025
Status of Report:	Final for Submission

Verification	Capacity	Name	Signature	Date
By Author	EAP	Phathutshedzo Munyai		22 May 2025
Reviewed by	Chief Environmental Process Officer	Gerlinde Wilreker		07 February 2025
Reviewed by:	Legal Consultant	Michael Hennessy		07 February 2025
Authorised by	Chief Executive	Bradly Thornton		22 May 2025

Copyright © 2025 Kongiwe Environmental (Pty) Ltd

All rights reserved. Absolutely no part of this report may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written consent of Kongiwe Environmental (Pty) Ltd. All content and methodologies remain the intellectual property of Kongiwe Environmental (Pty) Ltd. Where applicable, the contents of this document are confidential and protected by legal privilege and must not be distributed to other parties without prior written permission. This report is to be used for the sole purpose intended and should not be used for any other purpose without prior written permission.



PART 1

SECTION 1:

ENVIRONMENTAL IMPACT ASSESSMENT REPORT OVERVIEW

Important Notice

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act, 1998 (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 Regulation 16 (3) (b) of the Environmental Impact Assessment Regulations 2017, 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 Regulation 17 (1) (c) the Competent Authority must check whether the application has considered any minimum requirements applicable or instructions or guidance provided by the Competent Authority to the submission of applications.

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

It is furthermore an instruction that the Environmental Assessment Practitioner (EAP) 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 Environmental Impact Assessment Process

1) The objective of the Environmental Impact Assessment process is to, through a consultative process —

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

Public Review Period for the Draft EIA/EMPr Report

Members of the public, local communities, and stakeholders were invited to comment on the Draft Environmental Impact Assessment and Environmental Management Programme Report (EIA/EMPr) which was made available for public review and comment from **Thursday, 20 March 2025 to Tuesday, 22 April 2025**.

The Draft EIA/EMPr was submitted to the Department of Mineral Resources and Energy (DMRE) and was made available at the following locations.

Location	Physical Address	Contact person
Draft EIA/EMPr		
Brakpan Public Library	Escombe St, Brakpan, 1541	Mr Vincent Moabelo, Librarian (011) 999 7748 Mon – Thurs: 08h00 – 16h30/Fri: 08h30 – 16h30/Sat 08h00 – 13h00
Tsakane Public Library	3851 Xhosa St, Tsakane, Brakpan, 1548	Ms Lindiwe Shandu, Librarian (011) 999 8046 Mon – Fri: 09h00 – 16h00
Non-Technical Summary		
A non- technical summary of the Draft EIA/EMPr was compiled and was distributed through community representatives and also couriered to stakeholders who sent a request to the stakeholder engagement team. The hard copy was accessed at the following libraries:		
Katlehong Public Library	Civic Centre, 01 Masakhane Street, Katlehong	Ms Zanele Mpevu, Librarian (011) 999 1466 Mon – Thur: 08h00 – 16h30/Fri: 08h30 – 16h30/Sat 08h00 – 13h00
Vosloorus Public Library	6125 Mc Botha Dr, Vosloorus Ext 1, Vosloorus, 1475	Ms Jane, Librarian (011) 999 5937, Stated on the website. Mon – Thur: 08h00 – 16h30/Fri: 08h30 – 16h30/Sat 08h00 – 13h00
Zonkizizwe Public Library	4748, 4749 Ext 1 Zone 6, Zonkizizwe	Ms Thuli Mashego, Librarian (011) 999 1415 Mon – Thur: 08h00 – 16h30/Fri: 08h30 – 16h30/Sat 08h00 – 13h00
Randvaal Public Library	514 Houtkapper Street, Randvaal, 1873	Ms Mara Frost, Librarian (016) 365 5093 – (071) 207 7269 Mon-Fri: 9:00am – 5:00pm Sat: 9:00am- 12:00pm
Henley on Klip Public Library	45 Regatta Rd, Henley on Klip, Meyerton, 1961	Ms Mara Frost, Librarian (016) 365 5093 – (071) 207 7269 Mon-Fri: 9:00am – 5:00pm Sat: 9:00am- 12:00pm
Meyerton Public Library	Loch Str, Mayerton, 1960	Ms Prudence Matitwana (061) 360 7443

Location	Physical Address	Contact person
		Mon-Fri: 9:00am – 5:00pm / Sat: 9:00am- 12:00pm
Electronic copies		
Kongiwe Environmental website	https://kongiwe.com/projects/	Vanessa Viljoen / Thuli Phakathi
<p>An electronic copy of the Draft EIA/EMPr was made available upon a request directed to the stakeholder engagement team. Stakeholders are encouraged to contact the stakeholder engagement team (Vanessa Viljoen/Thuli Phakathi), Tel: (010) 140 1725 / (010) 140 1726, email: stakeholders@kongiwe.com should they require assistance with accessing the Final EIA/EMPr or have queries regarding the Proposed Project.</p>		

Comments received from the public throughout the 30-day public review of the Draft EIA/EMPr phase of the project were included in **Appendix C9** of the Comments and Responses Report (CRR) and are incorporated into the Final EIA/EMPr reports.

Executive Summary

Kongiwe Environmental (Pty) Ltd has been appointed by Ergo Mining (Pty) Limited (Ergo), as the Independent Environmental Assessment Practitioner (EAP) tasked with conducting the Scoping and Environmental Impact Assessment (S&EIA) process which is aimed at critically evaluating the potential environmental and social impacts of the proposed **Recommissioning of the Withok Tailings Storage Facility (TSF)** (hereafter the Proposed Project).

The Application for Environmental Authorisation (EA) was submitted to the Department of Mineral Resources and Energy (DMRE), which is the Competent Authority (CA) for the Proposed Project, on **18 October 2024**. The DMRE accepted the Application on **24 October 2024**. The Final Scoping Report (FSR) was submitted on **02 December 2024**. The Final Scoping Report was accepted by the DMRE on **06 May 2025**.

Introduction and Project Background

Ergo, a wholly owned subsidiary of DRDGOLD Ltd, within which the group's eastern surface retreatment assets are consolidated, is a major surface gold tailings retreatment operation that focuses on historic and abandoned TSFs. Ergo holds various Mining Rights (MR) in respect of slimes dams and sand dumps extending 65 km from western Johannesburg to eastern Ekurhuleni, with most activities occurring on the central and eastern sections of the Witwatersrand mining belt.

At present, reprocessed tailings are deposited on the Brakpan TSF. The Brakpan TSF will in future reach its designed capacity and height, and Ergo is investigating other viable deposition sites in the area, which will enable it to continue with its reclamation operations.

Ergo has identified the Withok TSF footprint as a potential deposition site. The Withok TSF footprint, which is situated immediately adjacent and directly south of the Brakpan TSF, is a historic TSF footprint (approximately 550 hectares), which has been previously reclaimed.

The Withok TSF is essential for the continued Life of Mine of Ergo. The increased deposition capacity created by Withok will allow Ergo the opportunity to continue the reprocessing of numerous large historic tailings facilities. The reclamation projects are in line with the objectives of the Gauteng Mine Residue Area Strategy (2012), which are to reclaim and/or rehabilitate TSFs to the point where they become safe for adjacent communities and land can be made available for other purposes.

Project Description

The following facility components are currently present on site:

- ❖ Access roads;
- ❖ Previously disturbed Withok TSF footprint;
- ❖ Withok pump station; and
- ❖ Attenuation dam, sump and diversion pipeline.

The recommissioning of the Withok TSF entails the following: Upgrading of the current footprint to allow for the redevelopment of the Withok TSF. This will involve the following civil work:

- ❖ A sump and stormwater diversion trench;
- ❖ A toe embankment which acts as an access road and slurry distribution pipeline servitude;
- ❖ A starter embankment;
- ❖ An HDPE liner;
- ❖ Toe drain, intermediate drain, main drain, radial drain, and interface drain platforms;
- ❖ Drainage outlet pipe platforms (cross walls);
- ❖ Toe drain, intermediate drain, main drain, radial, basin drain, interface blanket drain, as well as below liner seepage cutoff/collector drains;
- ❖ A decant berm and pool wall;
- ❖ Drainage collector pipes;
- ❖ A return water dam (approved DWS liner system) and return water pumping system;
- ❖ A floating decant barge pumping system, as well as a decant pipeline;
- ❖ Slurry feed pipelines;
- ❖ Slurry distribution pipelines;
- ❖ An HDPE pipe ring main;
- ❖ 250mm diameter cyclones, complete with feed pipes, valves, overflow pipes;
- ❖ Deposition of tailings;
- ❖ Water management;
- ❖ Temporary construction camp; and
- ❖ Borrow pits for material required during civil works and concurrent rehabilitation of the side slopes of the Withok TSF.

The proposed recommissioned Withok TSF will buttress the southern flank of the Brakpan TSF. The footprint required for the new Withok TSF is approximately 400ha, which is less than the original design footprint of approximately 550ha. The maximum vertical height at the end of the facility life is planned to be 103m, which is lower than the current height of the existing Brakpan TSF.

The intended recommissioning of the Withok TSF is to utilize centre-line followed by upstream cyclone deposition with a floating decant pumping system. The principle of cyclone upstream development is to create a sufficiently robust underflow perimeter wall to contain the overflow with adequate freeboard and inherent stability to avoid overtopping and to prevent side slope failure.

Project Alternatives

The Proposed Project is the recommissioning of a TSF on a previously disturbed footprint. This location is preferred because it is an existing historical deposition site adjacent to the operational Brakpan TSF and its associated and existing infrastructure.

Recommissioning the Withok TSF reduces the need to find an alternative “Greenfields” site for a new TSF which would result in land sterilisation for any future use, as well as generating a new source of pollution.

The current layout plan for the Proposed Project is considered as the preferred layout plan. The layout plan is dictated by the previously impacted TSF footprint and the adjacent Brakpan TSF, existing paddocks, associated infrastructure and the routes of the existing pipelines. There will be no expansion of the TSF footprint. The footprint will be smaller than the original footprint.

Need and Desirability

In South Africa, DRDGOLD is a proven leader in the retreatment of historic gold TSFs located along the Witwatersrand Gold Fields. During the last 24 years DRDGOLD through its subsidiary Ergo has demonstrated that they are able to reprocess historic mine dumps, extract remnant gold and reintegrate previously large areas of unusable sterilized land into economically viable land uses. The Ergo methodology removes significant pollution point sources, reduces illegal and criminal activities on these facilities and ultimately contributes to the fiscus and sustained employment of over three thousand people in the central and eastern areas of Gauteng. Ergo through its partnerships has transformed numerous historic tailings facility footprints to industrial, light industrial, domestic, and agricultural land uses.

Ergo's primary deposition facility, Brakpan TSF will in the future reach its design capacity. Due to this Ergo is undertaking the licencing for the recommissioning of the Withok TSF which is a historic mine tailings dam footprint located directly adjacent to the Brakpan TSF.

Successfully recommissioning the Withok TSF will allow Ergo to continue reclaiming other TSF's, making vast portions of currently sterilized land available for redevelopment in an economically beneficial manner aligning with the Gauteng Mine Residue Area Strategy (2012), Ekurhuleni Metropolitan Spatial Development Framework (2011), City of Johannesburg (CoJ) Metropolitan Spatial Development Framework (MSDF), the CoJ Integrated Public Transport Network (IPTN), and the Ekurhuleni Environmental Management Framework's (2014) objectives to remove historic TSFs scattered throughout the Gauteng landscape.

Economic value attributed to the continuation of Ergo Mining, represents a significant investment into the East of Gauteng over an expected 20-year period, the associated job creation and multiplier effect are unquestionably aligned with Government's objective to accelerate sustainable job creation and supporting local business.

Ergo's objective is to reprocess the remaining large historical TSFs located in Gauteng. Through this process Ergo will clear and rehabilitate approximately 1800 ha of sterilized mine land, into that of wilderness or industrial land uses. Not only are there great economic benefits in terms of the immediate land use, but the retreatment and tailings removal make lives easier for communities living next to these facilities by reducing dust, runoff, and fine sediment siltation.

The design of Withok TSF through its design engineer and specialist team has used a systematic, scientifically sound methodology to develop a design which meets the stringent requirements of the regulators as well as aligning to international guidelines, norms and standards. This ensures that the final deposition of the reclaimed TSF's will be onto a facility which ensures it significantly reduces overall environmental impacts, is

structurally safe and very well managed to the final rehabilitation at the end of its life. This situation is preferable to having historic TSFs scattered amongst the Witwatersrand landscape.

Environmental Impacts of the Withok TSF Recommissioning Project

The table overleaf represents a summary of the significance of impacts identified during the project lifetime for each environmental aspect. Impacts are expected to occur predominantly during the construction and operation phases, and to a lesser extent during decommissioning and closure.

Most negative impacts can be mitigated and reduced to a medium to low impact. This includes impacts on:

- ❖ Air quality
- ❖ Wetlands
- ❖ Surface water Quality
- ❖ Groundwater Quality
- ❖ Noise
- ❖ Visual
- ❖ Safety
- ❖ Health

Positive impacts are economic in nature, as well as a regional reduction in point source pollution from the removal of TSFs across the region.

Risk Matrix of Assessed Project Impacts

Impact	Rating Pre-Mitigation	Construction	Operation	Decommissioning	Post closure	Rating Post Mitigation	Construction	Operation	Decommissioning	Post closure
Positive (+)	Major (high)		❖ Enabling continued Ergo recommissioning activities			Major (high)		❖ Enabling continued Ergo recommissioning activities		
Positive (+)	Moderate (medium)					Moderate (medium)		❖ Continued Social funds		
Positive (+)	Minor (low)	❖ Job creation	❖ Continued Social funds			Minor (low)	❖ Job creation			
No Impact	No Impact		❖ Heritage	❖ Heritage	❖ Heritage	No Impact		❖ Heritage	❖ Heritage	❖ Heritage
Negative (-)	Minor (low)	❖ Operations near Wetlands ❖ Heritage ❖ Groundwater quality	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Noise	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna)	❖ Air quality	Minor (low)	❖ Biodiversity (vegetation and habitats) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Operations near Wetlands ❖ Surface water pollution ❖ Groundwater quality ❖ Heritage ❖ Informal influx and security	❖ Informal influx and security ❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetlands ❖ Groundwater quantity ❖ Noise	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Erosion ❖ Groundwater	❖ Groundwater quality ❖ Groundwater quantity
Negative (-)	Moderate (medium)	❖ Air Quality ❖ Biodiversity (vegetation and habitats) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Surface water pollution ❖ Informal influx and security	❖ Air Quality ❖ Biodiversity (alien species) ❖ Informal influx and security ❖ Impact of adjacent economic activities ❖ Wetlands ❖ Groundwater quantity	❖ Air quality ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Erosion		Moderate (medium)	❖ Air Quality	❖ Air quality ❖ Community health and safety ❖ Impact of adjacent economic activities ❖ Surface water ❖ Groundwater quality ❖ Health ❖ Dam failure	❖ Air quality ❖ Dam failure ❖ Social-Economic	❖ Surface Water ❖ Dam failure
Negative (-)	Major (high)	❖	❖ Surface Water ❖ Groundwater quality ❖ Health ❖ Dam failure	❖ Community health and safety ❖ Groundwater ❖ Dam failure	❖ Surface Water ❖ Groundwater quality ❖ Dam failure	Major (high)				

Project Rehabilitation and Future Land use

The primary aim of rehabilitation, in the context of this document, is to:

- ❖ Reduce the actual or potential environmental threat.
- ❖ Reduce the potential risks so that unacceptable risks identified in this EIA are reduced to acceptable levels.
- ❖ Protect the future liability of the land by re-establishing a sustainable land use as close to, or similar, to its pre-mining condition.

Once deposition is completed, the Withok TSF will require final rehabilitation.

The side slopes will be progressively cladded and vegetated. The cladding serves an environmental purpose, providing a natural growing medium for the vegetation, but must also fulfil other crucial requirements, as well. Firstly, the cladding must contain sufficient gravel to impart “armouring” for erosion resistance (water and wind) and, secondly, the clay content must not be so high that moisture is prevented from evapotranspiration from the surface. Consequently, material stockpiled for cladding also needs to be selective.

The side slope will require vegetating once the cladding material has been placed. The vegetation is to consist of a mix of trees, shrubs, and grasses of suitable indigenous vegetation.

Stormwater from the final rehabilitated side slopes will be tested to ensure it meets the discharge standards and then released into the environment utilising the existing chutes.

The recommended closure concept is to paddock and grass the top surface, while treating drain flows. The drain water can be treated to discharge quality and released into the receiving environment. Alternatively, this water can be treated to higher water quality standards. The brine from the treatment process would have to be pumped to designated paddocks on the top surface where it will be evaporated. There will be significant periods where the paddocks are dry so no long-term brine ponds will form.

The applicable parts of the operating infrastructure, i.e., power supply, seepage recycling and water storage dams and pump stations will be used and/or re-purposed to suit the post-closure requirements.

Conclusions

Based on the information contained in this report, it is the opinion of the EAP that the negative environmental impacts resulting from the Recommissioning of the Withok TSF Project can be mitigated to within acceptable limits and the positive impacts outweigh the negative impacts, thus the project should be authorised. On a balance of risk, the recommissioning of the Withok TSF to enable the removal of unmanaged and historic TSFs on the Witwatersrand landscape is a preferable outcome.

This opinion holds provided all the recommendations proposed in the specialist studies, the EIA and EMPr as well as legislative requirements are implemented and adhered to. An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested

and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to better mitigate and manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed.

The findings of the impact assessment have shown that the Recommissioning of the Withok TSF Project would result in certain negative impacts to the environment during the construction and operational phases, however, none of the specialist studies noted any fatal flaws the project. Scientific specialist mitigations measures have been included into this EIA and EMPr to reduce the severity and significance of all the identified negative impacts.

Most negative impacts can be reduced through the implementation of mitigation measures.

Table of Contents

1	Introduction	1
1.1	Structure of this Environmental Impact Assessment Report.....	1
1.2	Details of the Independent Environmental Assessment Practitioner (EAP).....	4
1.2.1	<i>Contact Person and Corresponding Address</i>	<i>4</i>
1.2.2	<i>Expertise of the EAP</i>	<i>4</i>
1.2.3	<i>Additional Project Team Members</i>	<i>5</i>
1.2.4	<i>Independent Specialist Team Members</i>	<i>5</i>
1.3	The History of Gold Mining in South Africa	6
1.4	The Origin of Mine Dumps.....	8
1.5	Origins of the Brakpan/Withok TSF	9
1.6	Trends in The Current Gold Industry	10
1.7	Project Introduction	11
1.8	Description of the Project Location.....	12
1.9	Known Mining Rights held in the Area	16
2	Project Details	17
2.1	Requirements for Environmental Authorisation.....	17
2.2	Overview of the Environmental Impact Assessment Process.....	17
2.2.1	<i>Overview of the Environmental Impact Assessment Process</i>	<i>17</i>
2.2.2	<i>Methodology applied to conducting the Environmental Authorisation Process</i>	<i>18</i>
2.3	S&EIA Timeframes.....	19
2.4	Public Participation Process.....	20
2.5	The Period required for Environmental Authorisation	20
2.6	Listed and Specified Activities.....	20
3	Description of Project Activities	30

3.1	Project Description	30
3.2	Deposition Method	32
3.3	Water Management Plan.....	33
3.4	Pipelines.....	34
3.5	Access	34
3.6	Rehabilitation.....	36
3.7	Works Schedule and Life-Cycle of the Project	36
3.8	Conclusions from the Scoping Phase.....	37
3.8.1	<i>Potential Impacts Identified in the Scoping Phase.....</i>	38
3.8.2	<i>Scoping Phase Conclusions and Recommendations</i>	41
4	Consideration of Alternatives.....	42
4.1	The Property on which or Location where it is proposed to undertake the Activity	42
4.1	The Type of Activity to be Undertaken.....	43
4.2	The Design and Layout of the Activity	43
4.3	The Technology to be Used in the Activity	44
4.3.1	<i>Recycling, Potable Water Use and Electricity Reliance</i>	44
4.4	The Operational Aspects of the Activity	44
4.4.1	<i>Cyclone Deposition.....</i>	44
4.4.2	<i>Pipelines</i>	46
4.5	The “No-Go” Option	46
5	Policy and Legislative Context	48
6	The Need and Desirability of this Project	66
6.1	Environmental Pollution	66
6.2	Safety and Security	67
6.3	The Limitation of Spatial Development	67

6.4	The Gold Industry of South Africa	67
6.5	Need and Desirability Guideline.....	68
6.6	Conclusion: Need and Desirability	83
7	Public Participation Process	84
7.1	Applicable Legislation	84
7.2	Objectives of the Public Participation Process.....	84
7.3	Summary of Issues raised by Stakeholders.....	86
7.4	Public Participation Undertaken	86
7.4.1	<i>Scoping Phase Public Participation</i>	<i>86</i>
7.4.2	<i>EIA Phase Public Participation</i>	<i>90</i>
7.4.3	<i>Consultation during the Decision-Making Phase.....</i>	<i>93</i>
8	The Baseline Environment and Specialist Findings	94
8.1	Climate.....	94
8.1.1	<i>Rainfall</i>	<i>94</i>
8.1.2	<i>Peak 24-hr Rainfall Data</i>	<i>95</i>
8.1.3	<i>Evaporation</i>	<i>96</i>
8.1.4	<i>Temperature.....</i>	<i>97</i>
8.1.5	<i>Wind Direction.....</i>	<i>97</i>
8.2	Topography.....	100
8.3	Geology.....	102
8.3.1	<i>Ventersdorp Supergroup</i>	<i>102</i>
8.3.2	<i>Transvaal and Witwatersrand Supergroup</i>	<i>102</i>
8.4	Soils, Land Capability and Land Use	104
8.4.1	<i>Soils.....</i>	<i>104</i>
8.4.2	<i>Land Capability</i>	<i>104</i>
8.4.3	<i>Land Use.....</i>	<i>105</i>
8.5	Biodiversity	108
8.5.1	<i>Habitat Assessment</i>	<i>108</i>

8.5.2	<i>National Web- based Environmental Screening Tool</i>	111
8.5.3	<i>Wetlands</i>	113
8.6	<i>Surface Water</i>	119
8.6.1	<i>Catchment</i>	119
8.6.2	<i>Surface Water Runoff</i>	119
8.6.3	<i>DWS Classes and Resource Quality Objectives</i>	120
8.6.4	<i>Water Quality</i>	121
8.7	<i>Groundwater</i>	126
8.7.1	<i>Conceptual Hydrogeological Model</i>	126
8.7.2	<i>Groundwater Levels</i>	126
8.7.3	<i>Aquifer Characteristics</i>	126
8.7.4	<i>Groundwater Quality</i>	127
8.7.5	<i>Groundwater Contaminant Modelling</i>	131
8.8	<i>Air Quality</i>	133
8.8.1	<i>Ambient Air Quality</i>	134
8.8.2	<i>Modelling Results</i>	134
8.9	<i>Heritage</i>	139
8.10	<i>Social</i>	139
8.10.1	<i>Baseline Description</i>	140
8.10.2	<i>Demographic Baseline</i>	141
8.11	<i>Noise</i>	145
8.11.1	<i>Potential Noise Generation</i>	145
8.11.2	<i>Potential Sensitive Receptors</i>	146
8.12	<i>Visual</i>	148
8.12.1	<i>Baseline Description</i>	148
8.12.2	<i>Viewshed Analysis</i>	148
8.12.3	<i>Sensitive Receptors</i>	150
8.12.4	<i>Visual Absorption Capacity</i>	150
8.12.5	<i>Impact Significance</i>	150
8.13	<i>Health</i>	151

9	IMPACT ASSESSMENT.....	152
9.1	Methodology for assessing the significance of Environmental Impacts	152
9.2	Part A: Defining Consequence in Terms of Magnitude, Duration and Spatial Scale	152
9.3	Part B: Determining Consequence Rating	153
9.4	Part C: Determining Significance Rating	154
9.5	Impacts and Cumulative Impacts Identified	154
9.5.1	<i>Construction Phase</i>	<i>154</i>
9.5.2	<i>Operational Phase</i>	<i>172</i>
9.5.3	<i>Decommissioning Phase.....</i>	<i>190</i>
9.5.4	<i>Post-Decommissioning Impacts.....</i>	<i>203</i>
9.5.5	<i>Emergency Incidents.....</i>	<i>207</i>
9.5.6	<i>Specialist Studies Conclusions and Recommendations.....</i>	<i>208</i>
9.5.7	<i>Summarised Environmental Risk Matrix.....</i>	<i>212</i>
10	Information for Consideration.....	215
10.1	Assumptions, Uncertainties and Gaps in Knowledge.....	215
10.1.1	<i>Biodiversity and Wetlands.....</i>	<i>215</i>
10.1.2	<i>Surface Water.....</i>	<i>215</i>
10.1.3	<i>Groundwater</i>	<i>215</i>
10.1.4	<i>Air Quality.</i>	<i>216</i>
10.1.5	<i>Heritage and Palaeontology.....</i>	<i>217</i>
10.1.6	<i>Social Impact</i>	<i>217</i>
10.1.7	<i>Noise</i>	<i>218</i>
10.2	Aspects for Inclusions as Considerations of the Environmental Authorisation	218
10.3	Proposed Management Objectives and Outcomes for Inclusion in the EMPr	219
10.4	Rehabilitation Requirements	220
10.5	A Reasoned Opinion: Should the Withok TSF Recommissioning Project be Approved?.....	220
10.5.1	<i>Conclusions of the Report.....</i>	<i>220</i>
11	Financial Provisions.....	222
11.1	Annual Rehabilitation Costs.....	224
11.2	Summary of Closure Costs	224

12 Oath Undertaking.....	226
13 References.....	227

Figures

Figure 1-1: Historic mining activities within the Johannesburg area.....	7
Figure 1-2: Mine worker at Comet Gold Mine 1093 (Left) and Simmer and Jack Mine 1939 (Right)	8
Figure 1-3: Price of Gold per ounce January 2005-January 2025, showing the trend since 2014 (Macrotrends.net, 2025).....	11
Figure 1-4: Locality map of the Proposed Project	15
Figure 2-1: Methodology applied to conducting a S&EIA process	19
Figure 3-1: Engineering design layout plan for the proposed site	31
Figure 3-2: Final Layout.....	32
Figure 3-3: Project Infrastructure Map	35
Figure 4-1: The operation of an advancing cyclone (GeoTail, 2024)	45
Figure 4-2: Illustration of "overflow" and "underflow" (Gold Fields Limited, 2024).....	45
Figure 7-1: Photos from the Open Day held on Saturday, 9 November 2024	89
Figure 7-2: Photos from the Open Day held on Saturday, 29 March 2025.....	93
Figure 8-1: Climate based on the Soweto Highveld Grassland (left) and the Tsakane Clay Grassland (right) vegetation types (TBC, 2024).	94
Figure 8-2: Average monthly rainfall totals for the project area (iLanda, 2025).....	95
Figure 8-3: Simulated historical temperature for Brakpan, South Africa (meteoblue.com) (Bioswitch, 2025).97	
Figure 8-4: Wind rose of the average winds produced by the WRF model for the Withok TSF for the years 2021-2023 (Gondwana, 2024).....	98
Figure 8-5: Diurnal wind roses predicted by the WRF model for the Withok TSF for the years 2021-2023 (Gondwana, 2024).	99
Figure 8-6: Seasonal wind roses produced by the WRF model for the Withok TSF for the years 2021-2023. 100	
Figure 8-7: Project area topography.....	101
Figure 8-8: Regional geology.....	103
Figure 8-9: illustration of the land type terrain unit (Land type Survey staff. 1972-2006).....	104
Figure 8-10: Soil map of the project area	106
Figure 8-11: Land uses of the Proposed Project site and surrounding area	107
Figure 8-12: Identified habitat types	110
Figure 8-13: Map illustrating the site ecological importance for the PAOI	112
Figure 8-14: Representative photographs of the different wet areas within the project area. A) Unchannelled valley-bottom; B) Dam within unchannelled valley-bottom; C) Artificial seep; D) Excavated area; E) Drainage trench; & F) Disturbed areas resulting in artificial wetland conditions	114
Figure 8-15: Wetlands identified	115
Figure 8-16: Sensitivity classification of the project area of influence and respective freshwater resources 118	
Figure 8-17: Catchment Delineation.....	122
Figure 8-18: Surface Water Monitoring Points	123
Figure 8-19: Locality map of current and proposed monitoring boreholes.....	130

Figure 8-20: Simulated 2023 sulphate plume and observed concentrations for the Brakpan TSF (Water Hunters, 2024).....	131
Figure 8-21: Simulated sulphate concentrations in the shallow aquifer at the end of active deposition onto the Brakpan-Withok TSF complex (2049) for the mitigated scenario (unmitigated 2049 concentrations indicated by yellow contour lines) (Water Hunters, 2024).	132
Figure 8-22: Simulated sulphate concentrations in the shallow aquifer 50 years post closure for the mitigated scenario (unmitigated concentrations indicated by yellow contour lines) (Water Hunters, 2024).	133
Figure 8-23: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>status quo</u> Brakpan TSF and Withok TSF.	137
Figure 8-24: Modelled prediction of highest 24-hour average PM _{2.5} concentrations resulting from emissions from <u>the status quo</u> Brakpan TSF and Withok TSF.	137
Figure 8-25: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>worst-case Brakpan TSF scenario</u>	137
Figure 8-26: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>worst-case Brakpan TSF and operational Withok TSF scenario</u>	138
Figure 8-27: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>mitigated Brakpan TSF and operational Withok TSF scenario</u>	138
Figure 8-28: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>mitigated Brakpan TSF and worst-case Withok TSF scenario</u>	138
Figure 8-29: Modelled prediction of highest 24-hour average PM ₁₀ concentrations resulting from emissions from the <u>mitigated Brakpan TSF and mitigated Withok TSF scenario</u>	138
Figure 8-30: Withok TSF recommissioning project and closest noise-sensitive receptors.....	147
Figure 8-31: Withok Viewshed	149
Figure 9-1: Impact prediction model.	152
Figure 9-2: Preferred Layout and Sensitivities	214

Tables

Table 1-1: Structure of the Final EIA Report in line with the Appendix 2 of the EIA 2014 Regulations	1
Table 1-2: Details of the EAP.....	4
Table 1-3: Details of EAP’s Experience	5
Table 1-4: Details of the Kongiwe Project Team.	5
Table 1-5: Details of the Specialist Team	6
Table 1-6: Property Details	13
Table 1-7: Description of the Directly and Indirectly Affected Properties.....	13
Table 2-1: Listed Activities Triggered by the Proposed Project.....	22
Table 3-1: Estimated timeframes and deadlines of the different phases associated with the Project.....	37
Table 3-2: Summary table of the Activities associated with the different phases of the Proposed Project	37
Table 3-3: Potential identified impact because of the Proposed Project.	39
Table 4-1: The advantages and disadvantages of recommissioning and reprocessing of the TSF – Preferred.	43
Table 4-2: The advantages and disadvantages of the operational alternative considered.....	46
Table 4-3: The advantages and disadvantages of the No-Go Option	46

Table 5-1:Applicable National Legislation and Guidelines	49
Table 5-2:Applicable Provincial and Local Policies, Guidelines and By-Laws.....	61
Table 6-1: Need and Desirability Assessment	69
Table 7-1: Stakeholder Engagement activities	85
Table 7-2:Summary of activities undertaken as part of the Scoping Phase.....	86
Table 7-3:PPP activities undertaken during the Final Scoping Phase.....	90
Table 7-4: Summary of PPP activities - Final Environmental Impact Assessment Phase.....	90
Table 7-5: Summary of the PPP activities - Final EIA phase	93
Table 8-1: Peak 24-hr Rainfall Depths for the TSF Complex (iLanda, 2025).....	95
Table 8-2:Symons Pan and open water evaporation for the project (iLanda, 2025)	96
Table 8-3: Descriptions of the habitat types delineated for the PAOI.....	108
Table 8-4: Summary of the screening tool vs specialist assigned sensitivities	111
Table 8-5:Summary of the Screening Tool Sensitivity versus the Specialist assigned Site Ecological Importance (SEI) for the Field Survey Area of the Project Area.....	116
Table 8-6: Mean annual Runoff (iLanda, 2025)	120
Table 8-7: Normal Dry Weather Flows in M ³ /Months (Highlighted in Bold Text) (iLanda, 2025).....	120
Table 8-8: Water Quality upstream at BT4 (iLanda, 2025)	124
Table 8-9: Water Quality on site at PH21 (iLanda, 2025).....	125
Table 8-10 : Aquifer classification scheme after Parsons and Conrad (1998).....	127
Table 8-11: Median groundwater quality of background boreholes monitored between 2018 to 2023 (in mg/L).	128
Table 8-12: Socio-economic baseline information: Gauteng at a glance	139
Table 8-13: Basic Demographic of the Area,2011 and 2022	141
Table 8-14: Backlogs in Basic Household, Basic Services. 2011 and 2022	142
Table 8-15: Education levels: percentage of the adult population above 21 years, 2022.....	142
Table 8-16: Education Facilities, 2022	143
Table 8-17: Crime Statistics, 2022	143
Table 9-1:Consequence rating definitions.	152
Table 9-2: Consequence rating methodology.	153
Table 9-3: Significance rating methodology.....	154
Table 9-4: Assessment of significance of potential construction impacts on vegetation and habitat.	154
Table 9-5: Assessment of the significance of potential construction impacts on fauna.	156
Table 9-6: Assessment of significance of potential construction impacts of alien plant species	157
Table 9-7: Assessment of significance of potential construction impacts of waste management.	158
Table 9-8: Assessment of significance of potential construction impacts of erosion.	159
Table 9-9: Assessment of significance of potential construction impacts of pipeline leaks or spills	159
Table 9-10: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.	161
Table 9-11: Summary of activities and impacts for the construction phase.....	162
Table 9-12: significance rating for the construction phase.....	162
Table 9-13: Construction Phase water quality impacts	163
Table 9-14: All project phase- Air Quality impacts not mitigated	164
Table 9-15: All project phase- Air Quality impacts mitigated	165
Table 9-16: impact Assessment Table for Heritage Resources	166

Table 9-17: Summary of Socio-Economic Impacts	167
Table 9-18: Rating of impact on local employment and income	168
Table 9-19: Rating of impact on informal influx.....	168
Table 9-20: Rating of Impact on Nuisance factors (noise, dust and traffic).....	170
Table 9-21: Noise Impact Rating.....	171
Table 9-22: Assessment of significance of potential operational impacts on vegetation and habitat.	172
Table 9-23: Assessment of significance of potential operational impacts on fauna	173
Table 9-24: Assessment of significance of potential operational impacts of alien plant species.	174
Table 9-25: Assessment of significance of potential operational impacts of erosion.	175
Table 9-26: Assessment of significance of potential operational impacts of waste management	176
Table 9-27: Assessment of significance of potential operational impacts of pipeline leaks or spills.....	177
Table 9-28: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.	177
Table 9-29: Summary of activities and impacts for the operational phase	178
Table 9-30:Significance rating of operational impact 1	178
Table 9-31: Significance rating of operational impact2	179
Table 9-32: Operational Phase Water quality impacts	180
Table 9-33: Operational Phase Water quantity impacts.....	181
Table 9-34:Rating of Impact on Enabling of Continued Ergo Activity.....	182
Table 9-35: Rating of Impact on Social Funds	183
Table 9-36: Rating of Impact on Nuisance factors (noise, dust and traffic).....	184
Table 9-37:Rating of Impact on Community Health and Safety.....	184
Table 9-38: Rating of Impact on Informal Influx.....	185
Table 9-39: Rating of Negative Impact on Adjacent Economic Activities	186
Table 9-40: Health Impacts from PM.....	187
Table 9-41: Impact of Bioaccumulation.	188
Table 9-42: Impact analysis of stormwater drainage.	188
Table 9-43: Impact analysis of socio-economic health determinants.	189
Table 9-44:Impact analysis of site utilizing public healthcare facilities	189
Table 9-45: Impact analysis of employment.....	190
Table 9-46: Assessment of significance of potential impacts on vegetation and habitat	190
Table 9-47: Assessment of significance of potential impacts on fauna.....	192
Table 9-48: Assessment of significance of potential impacts on alien plant species.	193
Table 9-49: Assessment of significance of potential impacts of waste management	193
Table 9-50: Assessment of significance of potential impacts of erosion.	194
Table 9-51:Assessment of significance of potential impacts of pipeline leaks or spills.	195
Table 9-52: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.	196
Table 9-53: Summary of activities and impacts for the closure and rehabilitation phase	197
Table 9-54: Significance rating of closure impact 1	197
Table 9-55: Decommissioning and Closure Phase Water quality impacts.....	198
Table 9-56:Rating of impact on loss of agricultural land	199
Table 9-57: Rating of Negative Impact on Adjacent Economic Activities	200
Table 9-58: Rating of Cessation of Employment and Income	201
Table 9-59: Rating of Cessation of Social Funds	201

Table 9-60: Rating of Impact on Community Safety.....	202
Table 9-61: Impact Assessment summary for surface water on Post closure	204
Table 9-62: Impact Assessment summary for surface water on Post closure	204
Table 9-63: Groundwater quality impacts during the post closure phase.....	205
Table 9-64: Ground water quality impacts during the post closure phase.....	205
Table 9-65: Dam Break Impacts.....	207
Table 9-66: Key Findings	213
Table 11-1: Closure Cost Assumptions	223
Table 11-2: Closure costs	224
Table 11-3: Detailed Closure Costing.....	225

Appendices

Appendix A: EIA Project Team CV's

Appendix B1: Maps & Photos

- ❖ Appendix B1 – Maps
- ❖ Appendix B2 – Site Photos

Appendix C: Public Participation Information

- ❖ **Appendix C1** – I&AP Database
- ❖ **Appendix C2** – Land Claims Letters
- ❖ **Appendix C3** – Background Information Document
- ❖ **Appendix C4** – Newspaper Advert
- ❖ **Appendix C5** – Site Notice Report and Map
- ❖ **Appendix C6** – Announcement Notifications
- ❖ **Appendix C7** – Organs of State Correspondence
- ❖ **Appendix C8** – Minutes of Meetings and Presentations
- ❖ **Appendix C9** – Comments and Responses Report

Appendix D: Specialist Studies

- ❖ **Appendix D1** – Biodiversity: Terrestrial Ecology and Wetlands
- ❖ **Appendix D2** – Surface Water
- ❖ **Appendix D3** – Groundwater
- ❖ **Appendix D4** – Air Quality
- ❖ **Appendix D5** – Heritage and Palaeontology
- ❖ **Appendix D6** – Social-Economic
- ❖ **Appendix D7** – Closure and Rehabilitation Report
- ❖ **Appendix D8** – Noise Report

- ❖ **Appendix D9** – Visual Impact assessment
- ❖ **Appendix D10** – Health Impact Assessment
- ❖ **Appendix D11** – Screening Report

Appendix E: The Environmental Management Plan report (EMPr)

Abbreviations

ABBREVIATION/ SYMBOL	DESCRIPTION
AGA	Anglo Gold Ashanti
AMD	Acid Mine Drainage
AOI	Area of Interest
BAR	Basic Assessment Report
BID	Background Information Document
CA	Competent Authority/Authorities
CARA	Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983)
CBA	Critical Biodiversity area
CIP	Carbon in Pulp
CIL	Carbon in Leach
CoE	City of Ekurhuleni Metropolitan Municipality
CoJ	City of Johannesburg
CoP	Code of Practice
CR	Critical Endangered
CRR	Comments and Response Report
CWF	Central Water Facility
DFFE	Department of, Forestry and Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DoH	Department of Health
DSR	Draft Scoping Report
DPWI	Department of Public Works and Infrastructure
DWS	Department of Human Settlements, Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EHA	Environmental Health Aspect
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EMS	Emergency Management Services
EN	Endangered
ER	Emergency Room
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Areas
FSR	Final Scoping Report
GDARD	Gauteng Department of Agriculture and Rural Development
GISTM	Global Industry Standard on Tailings Management
GGDA	Gauteng Growth and Development Agency Strategic Plan
GSDF	Gauteng Spatial Development Framework
Ha	Hectare
HIA	Heritage Impact Assessment
HIV	Human Immunodeficiency Virus

ABBREVIATION/ SYMBOL	DESCRIPTION
HPA	High Priority Area
HGM1	Channelled valley bottoms
HGM2	Hillslope seeps
I&AP	Interested and Affected Party
IAP2	International Association for Public Participation
IDP	Integrated Development Plan
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
LC	Least Concerned
mamsl	metres above mean sea level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MAT	Mean Annual Temperature
MHSA	Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right
MSDF	Metropolitan Spatial Development Framework (MSDF),
Mt	Million tonnes
µg/m ³	Microgram per cubic metre
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NAAQS	National Ambient Air Quality Standards
NBSAP	National Biodiversity Strategy and Action Plan
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)
NEMLAA	National Environmental Laws Amendment Act, 2014 (Act No. 25 of 2014)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEPAD	New Partnership of Africa's Development (
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-Governmental Organisations
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NNR	National Nuclear Regulator
NPAES	National Protected Areas Expansion Strategy
NP	Not Protected
NSR	Noise Sensitive Receptors
NT	Near Threatened
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PA	Protected Area
PAIA	Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
PAOI	Project Area of Interest
PFA	Project Focus Area
PM	Particulate Matter

ABBREVIATION/ SYMBOL	DESCRIPTION
PM	Particulate Matter
PPP	Public participation process
PV	Photovoltaic
RLE	Red List Ecosystems
RoD	Record of Decision
RWD	Return Water Dam
SACAD	South African Conservation Areas Database
SANS	South African National Standards
S&EIA	Scoping and Environmental Impact Assessment
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
sDOH	Social Determinants of Health
SLP	Social and Labour Plan
SOP	Standard Operating Procedure
SMME	Small, Medium and Micro Enterprises
SPLUMA	Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)
SSRP	Regulations on Safety Standards and Regulatory Practices
STR	Screening Tool Report
TDS	Total Dissolved Solids
TE	Toxic Elements
TLB	Tip Load Bucket
TSF	Tailings storage facility
VU	Vulnerable
WML	Waste Management Licence
WRF	Weather and Research Forecasting
WP	Well Protected
WULA	Water Use Licence Application
ZOI	Zone of Influence

SECTION 2: ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 Introduction

1.1 Structure of this Environmental Impact Assessment Report

The nature and extent of the **Withok Tailings Storage Facility (TSF) Recommissioning Project** (the Proposed Project), as well as the potential environmental impacts associated with the construction, operation and decommissioning is assessed and presented in this Environmental Impact assessment / Environmental Management Programme (EIA/EMPr). This EIA has been compiled in terms of the provisions of Appendix 3 and Appendix 4 of the EIA Regulations 2014, as amended, and the Directive set out in the template prescribed by the Department of Mineral Resources and Energy (DMRE). Table 1-1 cross-references the various sections in this report with these requirements.

Table 1-1: Structure of the Final EIA Report in line with the Appendix 2 of the EIA 2014 Regulations

NEMA Regulation Requirement		Report Section
(a)	Details of -	
(iii)	The EAP who prepared the report and;	Section 1.2
(iv)	The expertise of the EAP, including a CV	Appendix A
(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:	
(i)	The 21-digit Surveyor General code of each cadastral land parcel	Section 1.8
(ii)	Where available, the physical address and farm name	
(iii)	Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties	
(c)	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is –	
(i)	A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken	Section 3 Appendix B
(ii)	On land where the property has not been defined, the coordinates within which the activity is to be undertaken	
(d)	A description of the scope of the proposed activity, including –	
(i)	All listed and specified activities triggered and being applied for	Section 2.6
(ii)	A description of the associated structures and infrastructure related to the development	Section 3
(e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context	Section 5
(f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report	Section 6
(g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report	Section 4

NEMA Regulation Requirement	Report Section
(h) A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including -	Section
(i) Details of the development footprint alternatives considered	Section 4
(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 7 Appendix C
(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Section 7.3 Appendix C9
(iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 8
(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated	Section 9
(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks	Section 9.1
(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community, that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 9.5
(viii) The possible mitigation measures that could be applied and level of residual risk	Section 9.5
(ix) If no alternative development footprints for the activity were investigated, the motivation for not considering such	Section 4.5
(x) A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report.	Section 4
(i) A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-	Section 9.1
(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process	Section 9
(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	Section 9
(j) An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	Section 9
(k) Where applicable, a summary of the findings and recommendations of any specialist	Section 9.5.6

NEMA Regulation Requirement	Report Section
<p>report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report</p>	
<p>(l) an environmental impact statement which contains-</p> <p>(i) a summary of the key findings of the environmental impact assessment;</p> <p>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</p> <p>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</p>	<p>Section 9.5.7</p> <p>Section 9.5.7 Appendix B</p> <p>Section 9.5.7</p>
<p>(m) Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation</p>	<p>Section 10.2</p>
<p>(n) The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;</p>	<p>Section 3</p>
<p>(o) Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation</p>	<p>Section 10.2</p>
<p>(p) A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed</p>	<p>Section 10.1</p>
<p>(q) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation</p>	<p>Section 10.5</p>
<p>(r) Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised</p>	<p>Section 2.5</p>
<p>(s) an undertaking under oath or affirmation by the EAP in relation to-</p> <p>(i) the correctness of the information provided in the reports</p> <p>(ii) the inclusion of comments and inputs from stakeholders and I&APs</p> <p>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant</p> <p>(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties</p>	<p>Section 12</p>
<p>(t) Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;</p>	<p>Section 11</p>
<p>(u) an indication of any deviation from the approved scoping report, including the plan of study, including-</p> <p>(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and</p> <p>(ii) a motivation for the deviation;</p>	<p>N/A</p>
<p>(v) Any specific information that may be required by the competent authority</p>	<p>Section 10.2</p>
<p>(w) Any other matters required in terms of section 24(4)(a) and (b) of the Act</p>	<p>N/A</p>

1.2 Details of the Independent Environmental Assessment Practitioner (EAP)

Founded in 2016, Kongiwe is a contemporary problem-solving consultancy specialising in solving real world environmental challenges. We pride ourselves on using the latest technology available to realise pragmatic solutions for our clients. The company’s purpose is: *‘To solve environmental and social challenges by providing expert bespoke solutions that promote current and future sustainability globally’.*

Based in Johannesburg with offices in the mining and finance hubs of the United Kingdom and Canada, our team of professional Environmental and Social Scientists are highly trained in various environmental disciplines and have significant, hands-on experience in an array of projects across various industries. The company has extensive environmental and project management experience in multiple sectors, with significant experience in South Africa, as well as internationally.

1.2.1 Contact Person and Corresponding Address

Details of the Environmental Assessment Practitioners (EAPs) who prepared the report are presented below:

Table 1-2:Details of the EAP

Name of Practitioner	Phathutshedzo Nelson Munyai
EAP registration No.	2021/4297
Tel No.	+27 (10) 140 6508
E-mail Address	pmunyai@kongiwe.com

1.2.2 Expertise of the EAP

Phathutshedzo Nelson Munyai is an Environmental Consultant at Kongiwe Environmental. He is a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and International Association for Public Participation (IAP2). He possesses over three years of experience in environmental management, holding a Bachelor of Arts degree in Environmental Management at UNISA.

Phathutshedzo is a seasoned EAP and consultant with extensive experience in conducting EIA studies. His expertise spans various projects, including mining prospecting rights, mining permits, audits, mining rights, infrastructure and non-infrastructure developments.

Phathutshedzo worked under direct supervision of Gerlinde Wilreker. The Report was co-written and Peer Reviewed and approved by Gerlinde Wilreker who is also registered with the EAPASA as a Professional EAP.

Table 1-3:Details of EAP’s Experience

Name of Practitioner	Gerlinde Wilreker
EAP registration No.	2019/1589
Tel No	+27 (10) 140 6508
e-mail address	info@kongiwe.com

Gerlinde Wilreker has a M.Sc. in Environmental Management degree from the previous Rand Afrikaans University (RAU), now the University of Johannesburg (UJ), and is a registered Environmental Assessment Practitioner (EAP) (2019-1589) and Professional Natural Scientist (Environmental Management) (Registration No:400261/09). Qualifications in Appendix A.

Gerlinde Wilreker has over 18 years’ work experience as an Environmental Consultant, predominantly in the mining industry. Her practical experience in the mining and construction industry has given her a depth of knowledge regarding project processes from pre-feasibility phase through to implementation. She is adept at working in different contexts, and problem-solving with her team to meet client needs. She has particular expertise in relation to Environmental Authorisation Processes in terms of the South African legal regime.

1.2.3 Additional Project Team Members

Team members that have been integral in the successful production of this Environmental Impact Assessment and Environmental Management Programme (EIA/EMPr) are represented below.

Table 1-4:Details of the Kongiwe Project Team.

Team Member	Position in the Company	Role and Responsibilities
Bradly Thornton	Chief Executive	Client Liaison and Project Responsibility
Michael Hennessy	Legal Consultant	Legal review
Hilton Sparks	Engineering Manager	Quality Management and Engineering
Phumla Mngwengwe	Environmental Consultant	IWULA
Vanessa Viljoen	Stakeholder Consultant and social Consultants	Stakeholder engagement.
Thuli Phakathi		
Anela Fixi		
Zubher Omar	Geospatial Consultants	GIS mapping
Chelsea Strooh		
Benjamin Dunn	Intern Environmental Consultant	EIA and Public Participation
Iviwe Walaza	Intern Environmental Consultant	GIS Mapping
Lubabalo Zongolo	Intern Environmental Consultant	IWULA

1.2.4 Independent Specialist Team Members

Independent specialist consultants have been appointed as part of the S&EIA team to adequately identify and assess potential impacts associated with the Proposed Project. The specialist consultants have provided input into this EIA as well as EMPr (Refer to Appendix D).

Table 1-5: Details of the Specialist Team

Specialist Study	Specialist Company	Specialist Name	Peer Reviewer
Air Quality	Gondwana Environmental Solutions	Anja van Basten	Dr Martin van Nierop (<i>Pr.Sci.Nat</i>)
Biodiversity (Terrestrial and Aquatic)	The Biodiversity Company	Namitha Singh (<i>Pr. Sci. Nat</i>)	Andrew Husted (<i>Pr.Sci.Nat</i>)
Groundwater	Water Hunters cc	KT Witthüser (<i>Pr.Sci.Nat</i>)	M Holland (<i>Pr.Sci.Nat</i>)
Health	BioSwitch Africa	Mrs Eija Searle Dr Thamar Harder-Pretorius	Dr Magretha Pierce
Heritage	PGS Heritage	T Hopf (<i>Accredited Professional Heritage Practitioner</i>)	W Fourie (<i>Accredited Professional Heritage Practitioner, Accredited Professional Archeologist</i>)
Palaeontology	Banzai Environmental	Elize Butler	W Fourie (<i>Accredited Professional Heritage Practitioner, Accredited Professional Archeologist</i>)
Noise	EARES Enviro Acoustic Research	M. de Jager (); <i>Pr.Sci.Nat</i>)	Johan Maré (<i>Pr.Sci.Nat</i>)
Socio-Economic	Southern Economic Development	A S Kritzinger	Gerlinde Wilreker (<i>Pr.Sci.Nat</i>)
Surface Water	iLanda Water Services	Bruce Randell PhD (Eng), (<i>Pr Eng</i>)	Hilton Sparks (<i>P.Eng.</i>)
Visual	Kongiwe Environmental (Pty) Ltd	Chelsea Strooh	Gerlinde Wilreker (<i>Pr.Sci.Nat</i>)

1.3 The History of Gold Mining in South Africa

The first official gold prospector of the Transvaal Republic was Pieter Jacob Marais who discovered alluvial gold in 1853 in the Jukskei and Crocodile Rivers in the Western Transvaal. This gave rise to an influx of prospectors looking for gold. Following this, Australian prospector Henry Lewis discovered gold-bearing rock at Blaauwbank in the western parts of the Transvaal Republic in 1874 (now known as the North West Province) (Durand, 2012). Thereafter, George Harrison discovered a gold-bearing conglomerate on the farm Langlaagte in 1886. This conglomerate turned out to be the richest and most extensive gold deposit in the world.

Durand (2012) further explains that in September 1886, nine farms were proclaimed as public diggings. These public digging sites formed the focus of the initial gold development which would later become known as the Central Rand. The development of the Central Rand and the outlying goldfields along the Witwatersrand were instrumental in the formation of today's City of Johannesburg and the surrounding areas (Harrison and Zack, 2012).

After the discovery of the Main Reef, by George Harrison in February 1886, the Gold Rush ensued in the Transvaal and several gold mining endeavours began in the Central Rand (Viljoen and Reimold, 2002). The

Central Rand extends approximately 46 km, east to west, from the Roodepoort Fault in the west, through Johannesburg, to Boksburg in the east. From west to east, the outcrop of auriferous conglomerates was located on the farms Witpoortje 245 in Krugersdorp; Roodepoort 237, Vogelstruisfontein 231 and Paardekraal 226, in Roodepoort; Langlaagte 224, Turffontein 96, and Doornfontein 92 in Johannesburg; Elandsfontein 90 and Driefontein 87 in Germiston; Driefontein 85, Vogelfontein 84 and Leewpoort 113 in Boksburg (Pretorius, 1963).



Figure 1-1: Historic mining activities within the Johannesburg area.

In Ekurhuleni, then called the East Rand, the major gold mines that were still in operation in the 1960s included: Simmer and Jack Mines Ltd, located on the farms Doornfontein 92, Elandsfontein 90, Elandsfontein 107 and Elandsfontein 108; Rose Deep Ltd, located on the farms Elandsfontein 90 and Driefontein 87; and East Rand Proprietary Mines Ltd, located on the farms Driefontein 87, Driefontein 85, Vogelfontein 84, Klippoortje 110 and Leeuwpoort 113 (Pretorius, 1963). In addition to the major producers mentioned above, there were several small mines working along the outcrop, reopening, and reclaiming old mines which had previously ceased production. See Figure 1-2 for an example of some of the gold mines in the East Rand area in the 1900s.

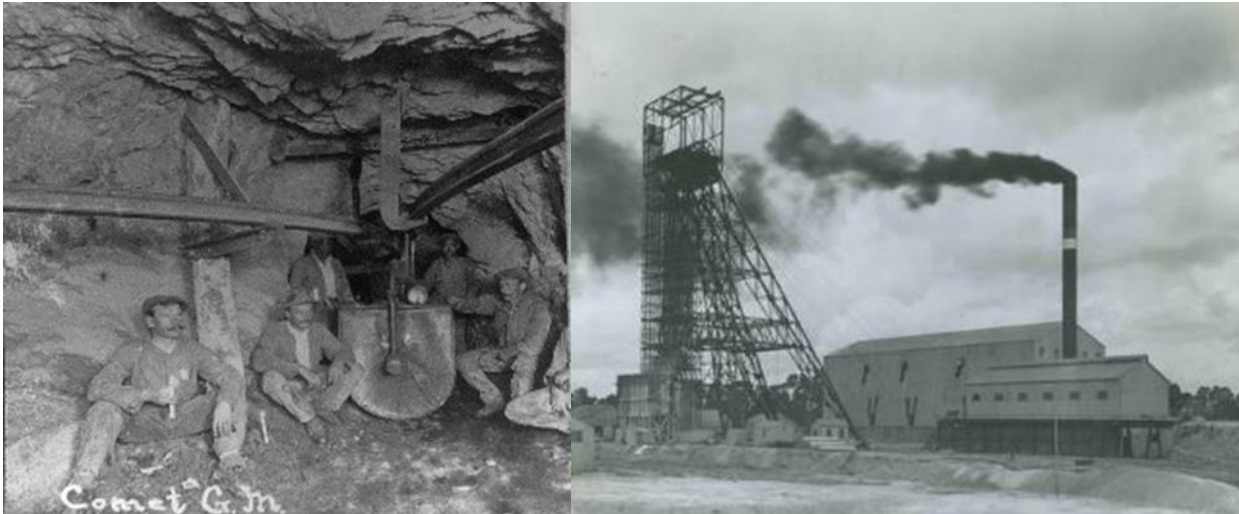


Figure 1-2: Mine worker at Comet Gold Mine 1093 (Left) and Simmer and Jack Mine 1939 (Right)

1.4 The Origin of Mine Dumps

The Gauteng landscape is littered with mine dumps bearing testament to South Africa's rich mining heritage. The rising demand for minerals, and the need to exploit larger and lower-grade deposits to help satisfy demand, led to mining operations increasing in scale and size. The East Rand Gold Basin which extended for approximately 770 km² was historically mined and produced an estimated 10 000 tonnes of gold, resulting in numerous tailing storage facilities. These remaining historical facilities contain low concentrations of gold and other minerals, due to the inefficiencies of the historical mining processes.

During this time, mining and gold recovery were left largely unregulated. A number of mine dumps began to define the landscape, a result of mining operations where large volumes of ore were mined and brought to the surface where it was crushed and gold extracted.

In laymen's terms the phrase 'mine dump' refers to an area where excess material, containing forms of mineral(s) that are either valuable or not, is left by the person who has won the minerals from the earth in accordance with his/her right or entitlement to mine. Prior to the enacting of legislative controls such as the Mines and Works Act, 1956 and its Regulations and later still the Minerals Act, 1991 and finally, the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), which came into effect on 1 May 2004, mine dumps were placed in convenient positions adjacent to mining operations. This was often along fault lines, or within wetland areas. It is the legacy of these mine dumps within sensitive areas that has caused the environmental and health effects that are still felt today.

After the discovery of the Main Reef at Witwatersrand in 1886, various mines were established. The mining method during these early years was labour intensive, while only the surface areas of the gold-bearing reefs were exploited. Lionel Phillips was one of the first mining entrepreneurs to realise the potential of deep-level mining. As part of the company of Hermann Eckstein, Phillips managed to acquire large numbers of claims which were considered of low value as they were located some distance away from the Main Reef. As a result, he bought these claims for very reasonable prices, and started implementing the concept of deep level mining

on some of these claims (PGS Heritage, 2018). These steps resulted in the proclamation of various deep-level mines, including Nourse Deep, Jumpers Deep, Glen Deep, Crown Deep, Rose Deep, Village Deep, Geldenhuis Deep as well as Ferreira Deep. In 1893 the company of H. Eckstein formed the company Rand Mines Ltd, which took over the administration of these and other mines (PGS Heritage, 2018). Rand Mines was established with start-up capital of £400,000 and was one of the earliest companies formed specifically for mining deep levels. The company quickly acquired 1,729 deep level claims. Lionel Phillips' foresightedness earned him the respect of his peers, as well as the position of chairman for Rand Mines, a company that soon became the "...biggest mining finance company in the world." (PGS Heritage, 2018).

As the mines in the Witwatersrand area began to close during the 1970's, technological advances enabled the extraction of valuable gold resources and other minerals from the dumps. In 1978 the East Rand Gold and Uranium Company, then a subsidiary of Anglo American Limited, began to reclaim some of these dumps to gain access to the residues of gold, uranium and pyrite. Over the last two decades there have been further advances in mining and metallurgical technologies and an evolution in the country's environmental policy and legislation. This, as well as increasing gold prices, has further incentivised the reclamation of Tailings Storage Facilities (TSFs). Today, Gauteng's physical landscape is once again in a state of transition due to the demand for the reclamation of historical mine dumps.

Through the process of reclamation, gold recovered from historical mine dumps is made available for domestic and international markets. This means that the continual reclamation of mine residue material (from historical mine dumps) results in additional gold supply onto the gold market – which has been experiencing a downward trend over the last few years in South Africa. The removal of these dumps also leads to the increased availability of useable land after the required rehabilitation has been conducted and clearance certificates are issued. The aim of rehabilitation would be to return the land to a functional topography and clear of any pollution sources. Typically, end-use of the land would be aligned to the zoning of the area where the dumps were situated i.e. urban, industrial and agricultural.

1.5 Origins of the Brakpan/Withok TSF

The re-processing of gold tailings was introduced on a large scale by Anglo American Gold Division in the late 1970s, this operation was centred south of Brakpan on the East Rand (Environmental Law Group, 2022). The Brakpan Plant was commissioned by Anglo Gold Ashanti Limited (AGA) in 1977 to recover residual gold and uranium, as well as pyrite to produce sulphuric acid from gold mine tailings/slimes dams attached to old mine workings on the East Rand (Environmental Law Group, 2022).

The Brakpan Plant was originally planned to operate for 15 years but its life was extended to 25 years in 1985 with the introduction of new technology. However, over time the profitability of the project gradually decreased, and the operation reached its closure phase in March 2005.

Ergo originally operated two processing plants, one at Vulcania in Brakpan and the other at Daggafontein near Springs (which was subsequently decommissioned). The Brakpan plant had a depositional rate of 2.5 million tonnes of slurry per month. The plant received material for beneficiation from various reclamation stations on the East Rand.

The initial TSF established for the Ergo Brakpan plant in 1977, was the Withok TSF (Withok compartment). This compartment deviated from past disposal practices and was the first fourth generation cyclone TSF, introduced and designed by Watermeyer, Legge, Piesold and Uhlmann (WPLU), now Knight Piesold Consulting (The Environmental Law Group, 2022). The TSF was successfully used for approximately eight years, receiving approximately 100 Mt of tailing material, during which time carbon in pulp (CIP) and Carbon in Leach (CIL) metallurgical processes were developed and introduced, making it economically viable to reprocess the tailings already deposited on the Withok compartment (Environmental Law Group, 2022).

Therafter, the new Brakpan TSF (Brakpan compartment), north of but partially overlapping the Withok compartment, was developed. The Brakpan TSF was used to house the waste material generated from the Brakpan plant. The plant residue was pumped in a slurry form to the TSF. The solids were allowed to settle on the beach area whilst water was drawn off through a decanting tower to the return water dams (RWDs).

The slimes dam construction was different to the conventional daywall and night pool deposition of the time. The walls were constructed using numerous cyclones around the perimeter wall, arranged at approximately 30m intervals. These were moved periodically to build up the walls. Slime was delivered into the dam and the solid content settles along the beach area to allow the water to drain towards the centrally located floating penstock tower. The philosophy behind this method of slimes dam construction is not the rapid removal of water from the dam, but instead the dam acts more as a storage reservoir. The penstock drainage was delivered to an intermediate RWD, which acts more as a pumping sump than storage dam. The flow into the return water transfer dam was monitored by a continuous level meter. The Brakpan TSF was commissioned in 1985 and is still operational, receiving some 560 Mt of tailings material, including 100 Mt from the remining of the Withok compartment. The reclamation of the Withok compartment occurred between 1996 and 2004 (Environmental Law Group, 2022). The Withok compartment was mostly cleared down to natural ground, with some tailings material remaining on site in the lower western part of the basin.

AGA discontinued reclamation activities on the East Rand Gold dumps in 2004. In 2007, Ergo approached AGA with the intention of purchasing certain assets including the Brakpan/Ergo and Daggafontein plants and recommissioning a reclamation or retreatment operation. Ergo concluded an agreement with AGA in terms of which the AGA mining licence and other assets would be ceded to Ergo, allowing Ergo to undertake reclamation activities (Environmental Law Group, 2022). This Old Order Mining Right was converted into a New Order Mining Right in terms of Item 7, Schedule II of the MPRDA, and subsequently ceding the Converted Mining Right to Ergo. The Brakpan Compartment is currently being used to deposit waste material from Ergo's other active reclamation sites which is treated at the Ergo Plant (Environmental Law Group, 2022)

1.6 Trends in The Current Gold Industry

Total world production of gold was estimated to be about 3.4 billion troy ounces, of which more than two-thirds have been mined in the past 50 years. The Witwatersrand reef was responsible for about 45% of the world's total gold production (USGS, 2001). Up until 2014, the Republic of South Africa remained one of the world's leading mining and mineral-processing countries and contributed to 9% of the world's refined gold and 5% of the mined gold.

The country has however been undergoing a long-term decline in gold output, the share of South Africa’s world gold production decreased from 14% to about 5% and this decrease in gold mine production continued in South Africa in 2018 (USGS, 2001). Today, South Africa is no longer even the largest gold producer in Africa, having lost that position to Ghana. South African gold production decreased by 20.42% to around 84 tonnes in 2022.

The price of gold per ounce underwent a steady increase from 2011 until it reached a high point in 2020 (US \$ 2 000/ounce). Figure 1-3 below indicates how, from August 2011, the price of gold per ounce continually fluctuated in an increasing trend reaching a peak in 2020 and then continuing to rise to 2025. This indicates that although the gold price remains a volatile market with an ever-fluctuating commodity price, it continues to be very lucrative. The gold price hit a record high in April 2025 of \$3500 per troy ounce on the London Bullion Market.



Figure 1-3: Price of Gold per ounce January 2005-January 2025, showing the trend since 2014 (Macrotrends.net, 2025)

1.7 Project Introduction

Ergo Mining (Pty) Ltd (Ergo) intends to recommission the Withok TSF for the purpose of depositing retreated tailings, hence the proposed Recommissioning of the Withok TSF proposed project. Ergo reprocesses historical gold mine dumps and TSFs throughout the Central Eastern areas of Gauteng. At present, reprocessed tailings are deposited on the Brakpan TSF. The Brakpan TSF will in future reach its designed capacity and height and

Ergo is investigating other viable deposition sites in the area, which will enable it to continue with its reclamation operations.

Ergo has identified the Withok TSF footprint as a potential deposition site. The Withok TSF footprint, which is situated immediately adjacent and directly south of the Brakpan TSF, is a historic TSF footprint (approximately 550 hectares (ha)), which has been previously reclaimed.

The following infrastructure will be installed and utilised on site:

- ❖ Access roads;
- ❖ Withok TSF;
- ❖ Slurry deposition pipelines;
- ❖ Return water pipelines;
- ❖ Return water dam;
- ❖ Catchment paddocks;
- ❖ Sump and stormwater diversion trench; and
- ❖ Temporary construction camp which will include: site office, vehicle service area, hydrocarbon storage, diesel storage, and ablution facilities.

1.8 Description of the Project Location

The Withok TSF area and proposed project infrastructure are located on portions 77, 78, 79 and 80 of the farms Withok 131 IR, portions 14, 15 and 20 of Vlakfontein 161 IR and Portion 11 of Rooikraal 156 IR, in the magisterial sub-district of Brakpan, within the City of Ekurhuleni Metropolitan Municipality (CoE). The TSF is situated 7km south of Brakpan. Tsakane is situated directly east across the R23 from the TSF. The Rooikraal TSF, which is currently being reclaimed, is located directly west of the Withok TSF.

The area is predominantly surrounded by agricultural holdings, the Rooikraal TSF, the Brakpan TSF and the residential area of Tsakane. Refer to **Appendix B2** for more images of the Proposed Project site.

The following infrastructure is currently encountered in the surrounding area:

- ❖ National and provincial roads (N17);
- ❖ Agricultural holdings;
- ❖ Power lines;
- ❖ Slurry and water pipelines; and
- ❖ Other TSFs (Brakpan TSF and Rooikraal TSF).

This is a "Brownfield Project" as it entails the recommissioning of an existing historical, reclaimed TSF with some existing infrastructure. The potential negative and positive impacts of the Proposed Project on the environmental and social aspects were objectively considered through studies undertaken by specialist professionals during the EIA phase.

Refer to Table 1-7 for the directly affected properties.

Table 1-6: Property Details

Application Area (ha)	The Proposed Project site covers an area of approximately 550 ha . The Withok TSF will cover an area of 400ha.
Magisterial District	Ward 99 of the City of Ekurhuleni Metropolitan Municipality (CoE).
Distance and Direction from Nearest Town	The Withok TSF is located directly (approximately 1km) west of Tsakane and 7 km east of Vosloorus.

Table 1-7: Description of the Directly and Indirectly Affected Properties

Farm Name	Farm ID	Portion	SG Code	Landowner
Directly Affected Properties				
Withok 131	IR	77	TOIR00000000013100077	Ergo Mining Pty Ltd
Withok 131	IR	78	TOIR00000000013100078	Ergo Mining Pty Ltd
Withok 131	IR	79	TOIR00000000013100079	Ergo Mining Pty Ltd
Withok 131	IR	80	TOIR00000000013100080	Ergo Mining Pty Ltd
Vlakfontein 161	IR	14	TOIR00000000016100014	Ergo Mining Pty Ltd
Vlakfontein 161	IR	15	TOIR00000000016100015	Ergo Mining Pty Ltd
Vlakfontein 161	IR	20	TOIR00000000016100020	Ergo Mining Pty Ltd
Rooikraal 156	IR	11	TOIR00000000015600011	Ergo Mining Pty Ltd
Indirectly Affected Properties				
Withok 131	IR	Holding 398	TOIR07370000039800000	TBC
Withok 131	IR	Holding 376	TOIR07370000037600000	City of Ekurhuleni Metropolitan Municipality
Withok 131	IR	Holding 375	TOIR07370000037500000	Department of Public Works and Infrastructure
Withok 131	IR	Portion 1 of Holding 397	TOIR07370000039700001	Ergo Mining (Pty) Ltd
Withok 131	IR	Portion 0 of Holding 397	TOIR07370000039700000	Mr Ronald Erol Hirschowitz
Withok 131	IR	76	TOIR00000000013100076	Ergo Mining Pty Ltd
Glen Roy 132	IR	0 (RE)	TOIR00000000013200000	Ergo Mining Pty Ltd
Rooikraal 156	IR	10	TOIR00000000015600010	Ergo Mining Pty Ltd
Rooikraal 156	IR	11	TOIR00000000015600011	Ergo Mining Pty Ltd
Vlakfontein 161	IR	5	TOIR00000000016100005	City of Ekurhuleni Metropolitan Municipality
Vlakfontein 161	IR	8 (RE)	TOIR00000000016100008	City of Ekurhuleni Metropolitan Municipality
Vlakfontein 161	IR	9	TOIR00000000016100009	Heidi & Tsakane Eiendomme Pty Ltd
Vlakfontein 161	IR	12	TOIR00000000016100012	Nkomo Prop CC
Vlakfontein 161	IR	18	TOIR00000000016100018	Multi-Waste (Jet Park) (Pty)
Witklip 172	IR	10	TOIR00000000017200010	Department of Public Works and Infrastructure (DPWI)

The area is predominantly surrounded by mining infrastructure, disturbed land and open land. Refer to

Appendix B2 for more images of the Proposed Project site.

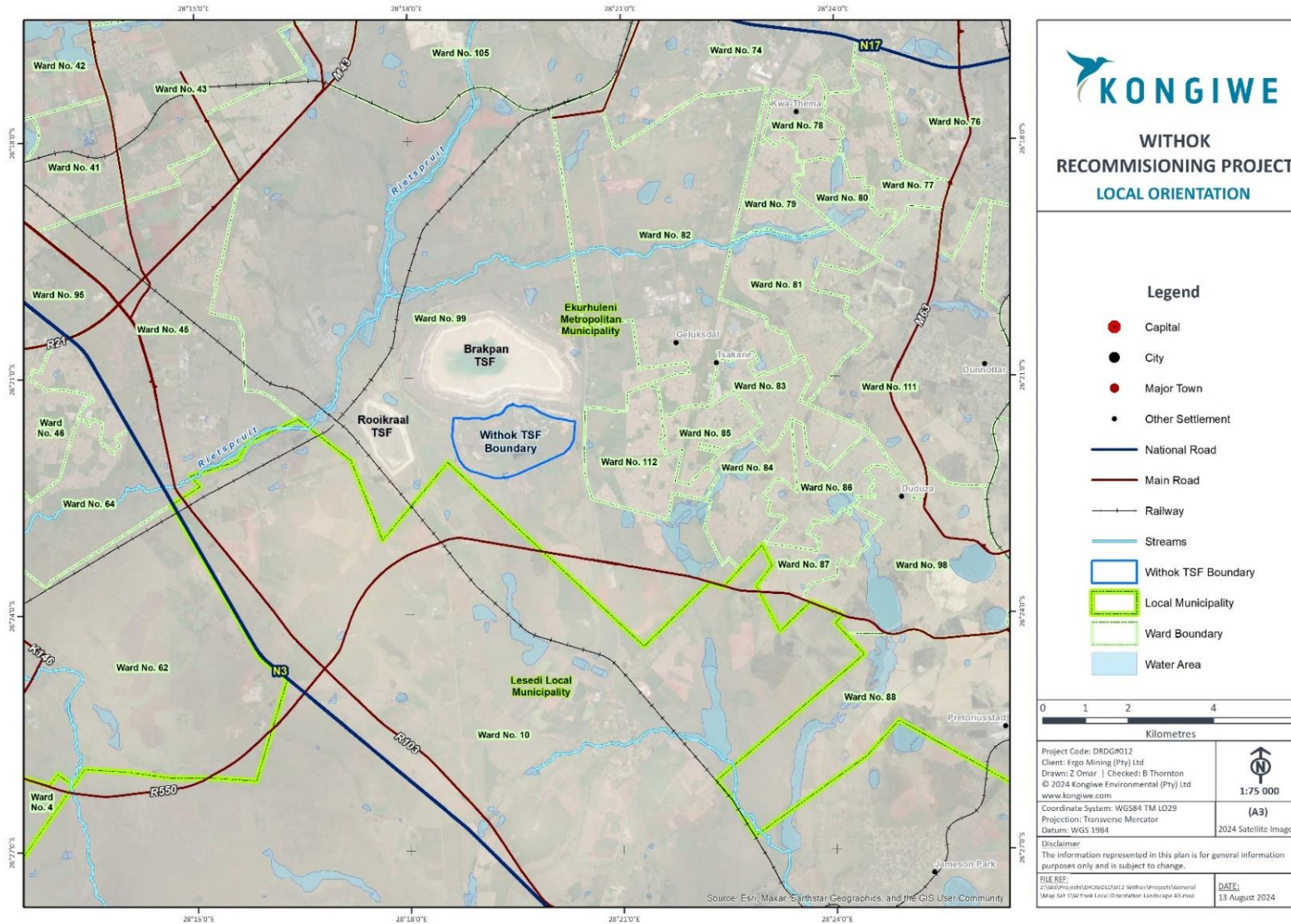


Figure 1-4: Locality map of the Proposed Project

1.9 Known Mining Rights held in the Area

The assessment of cumulative impacts is required under the EIA Regulations 2014, as amended, promulgated in accordance with Section 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). In support of the above, Kongiwe has assessed the impact of the Proposed Project in context of other similar activities in the local area.

The Proposed Project area is located directly south of the Brakpan TSF which is an active TSF used by Ergo to deposit and store tailings emanating from its active reclamation operations, and directly east of the Rooikraal TSF which is currently being reclaimed. There are several other Mining Rights (MR) held within the region. Known Mining Rights adjacent to the Proposed Project area include: Ergo Mining Right (GP158MR) and ERPM Mining Right (GP150/151MR).

2 Project Details

This chapter of the EIA provides a description of the requirements for authorisation, the EIA process, project methodologies, infrastructure, life cycle, layout selection of the Project.

2.1 Requirements for Environmental Authorisation

The Department of Environmental Affairs Forestry and Fisheries (DEFF), in consultation with the Department of Mineral Resources and Energy (DMRE) identified the need for the alignment of Environmental Authorisations (EAs) and promulgated a single environmental system under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). This has resulted in simultaneous decisions in terms of NEMA, the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) and other specific environmental management Acts.

As from 2 September 2014 the statutory dispensation regarding environmental management on mines changed with the implementation of the One Environmental System and the commencement of the National Environmental Management Laws Amendment Act, 2014 (Act No. 25 of 2014) (NEMLAA). In line with the One Environmental System the Environmental Impact Assessment Regulations (EIA 2014 Regulations) were promulgated and came into force on 8 December 2014. The EIA 2014 Regulations have subsequently been amended on the 7th of April 2017 and 21 June 2021. With reference to the aforementioned, this S&EIA, prepared in support of the EA application, complies with the requirements of the EIA 2014 Regulations, as amended.

The Proposed Project requires an EA in terms of the NEMA has followed a S&EIA process in terms of the EIA 2014 Regulations, as amended. The aforesaid regulations enforce a strict timeframe and require a decision by the competent authority, the DMRE, within 300 days from submission of the EA application.

The nature and extent of the Proposed Project, as well as the potential environmental impacts associated with the construction, operation, decommissioning and rehabilitation of a facility of this nature is assessed and presented in this EIA.

2.2 Overview of the Environmental Impact Assessment Process

2.2.1 Overview of the Environmental Impact Assessment Process

Kongiwe has been appointed by Ergo to undertake a Scoping and Environmental Impact Assessment (S&EIA) process which evaluates the environmental impacts associated with the Proposed Project as part of an application for Environmental Authorisation (EA). The S&EIA and specialist studies were undertaken to support the applications for the required approvals.

The following applications have been made to the DMRE for the Proposed Project:

- ❖ **Application for EA** for listed activities triggered in Listing Notices GN R983, GN R984 and GN R985¹ published pursuant to the EIA 2014 Regulations (as amended), promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).
- ❖ **Application for a Waste Management Licence (WML)** authorising waste management activities listed in GN 921 of 29 November 2013 published in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (as amended) (NEM:WA).

In addition, the following application has been made to the relevant Competent Authority:

- ❖ **An Integrated Water Use Licence Application (IWULA)** in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) was submitted to the Department of Water and Sanitation (DWS) for any potential impact to water resources by the Proposed Project.

The DMRE is acting as the CA on the project. The Commenting Authorities for the Project are:

- ❖ Gauteng Department of Agriculture and Rural Development (GDARD);
- ❖ Department of Water and Sanitation (DWS);
- ❖ Department of Forestry and Fisheries and Environment (DFFE);
- ❖ Department of Public Works and Infrastructure (DPWI);
- ❖ National Nuclear Regulator (NNR);
- ❖ Department of Health (DoH);
- ❖ South African Heritage Resource Agency (SAHRA); and
- ❖ City of Ekurhuleni (CoE) Metropolitan Municipality.

The EIA findings, including specialist findings, are used by the EAP, Applicant and Authorities to obtain an objective view of the potential environmental and social impacts that could arise during recommissioning and operation of the Project. Measures for the avoidance or mitigation of negative impacts and enhancement of positive impacts are proposed.

The EIA findings, including specialist findings, are used by the applicant and authorities to obtain an objective view of the potential environmental, social and cultural impacts that could arise from the Proposed Project activities.

2.2.2 Methodology applied to conducting the Environmental Authorisation Process

According to Regulation 16(1)(b)(v) of the EIA 2014 Regulations (as amended), it is a requirement for an EA application to be submitted with a screening report generated by the National Web Based Environmental Screening Tool (Screening Tool). This requirement took effect from October 2019.

¹ These Listing Notices have been amended by GN R327, GN R325 and GN R324 of 7 April 2017 and GN R 517 of 11 June 2021

The Screening Tool allows the EAP to screen the proposed project site for any environmental sensitivities. It serves as a guide to identify related exclusions and/or specialist studies that may be a requirement for a proposed project.

The Screening Tool Report (STR) for the Proposed Project, acquired through the Screening Tool, has been undertaken as part of this project. This has been included in **Appendix D11**. The site sensitivity has been evaluated as part of the specialist assessments included in **Appendix D** and in Section 8 below.

The figure below indicates the methodology that is applied in conducting the S&EIA process.

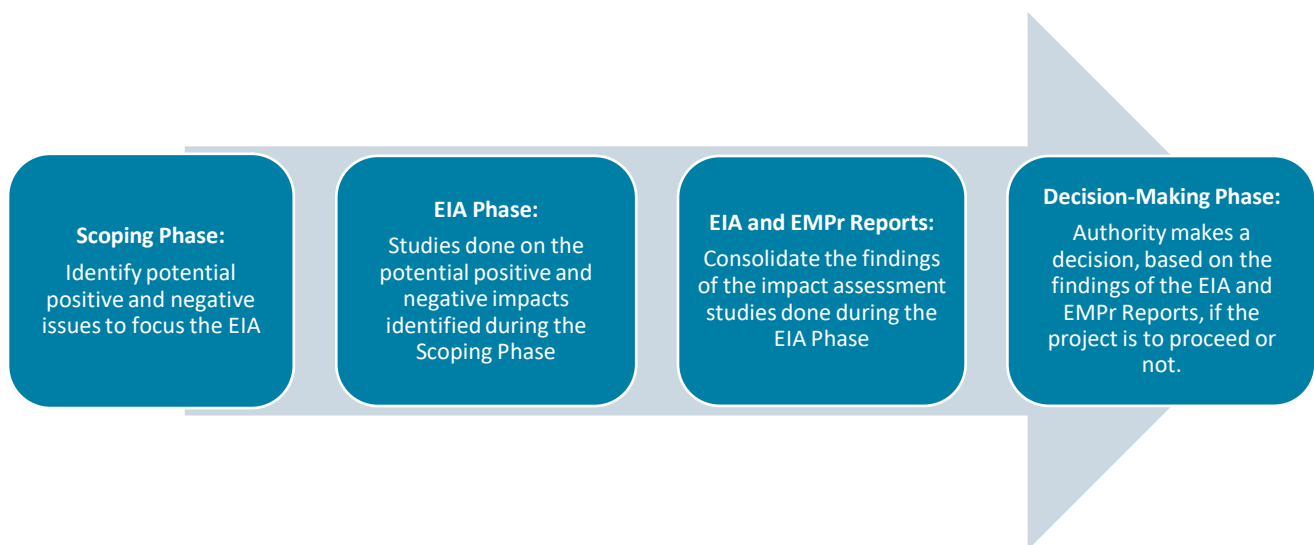


Figure 2-1: Methodology applied to conducting a S&EIA process

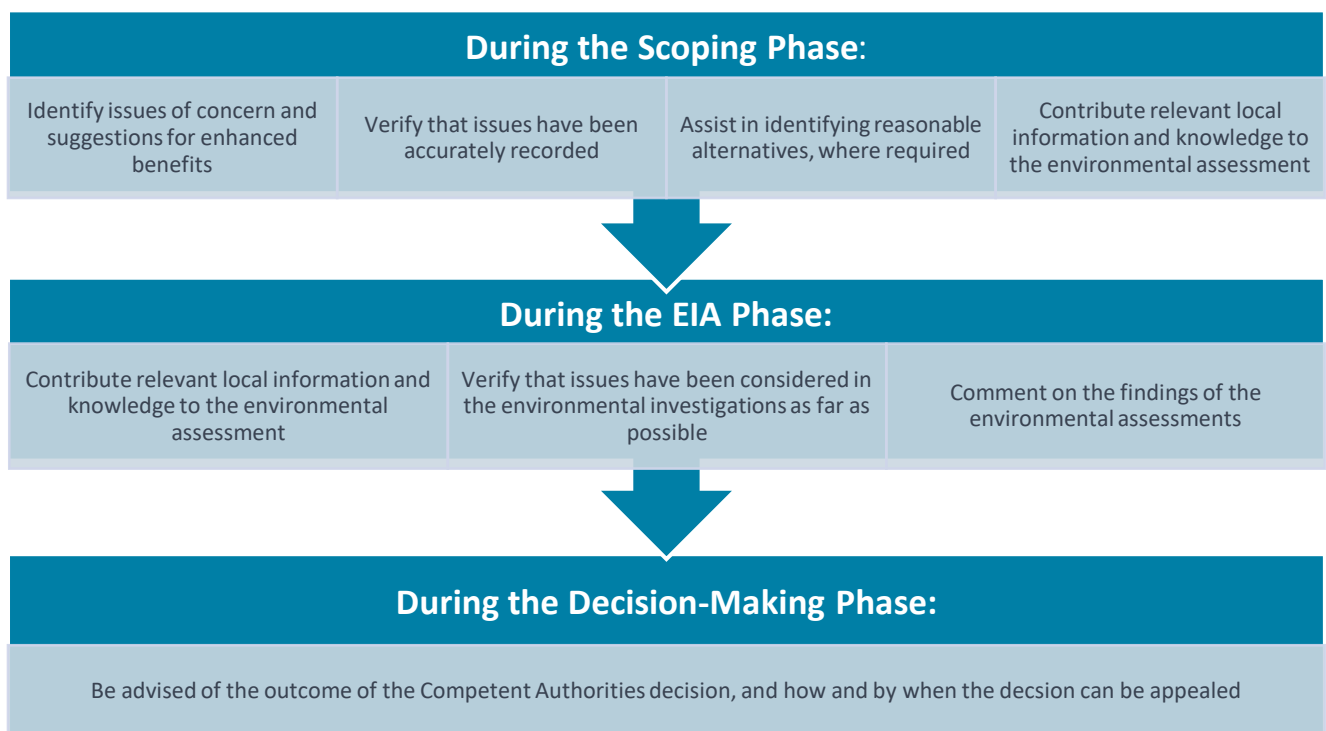
2.3 S&EIA Timeframes

- ❖ The **Draft Scoping Report (DSR)** is submitted and made available for a 30-day public review period. The comments received during this period are captured in a Comments and Responses Report (CRR) that is submitted with the Final Scoping Report. (Completed)
- ❖ The **Final Scoping Report (FSR)** is submitted to the CA. The CA must either accept or reject the Scoping Report within 43 days. Once confirmation of acceptance has been received from the CA, the EIA Phase commences and will run for a period of 106 days, in which time stakeholders will be afforded a 30-day period in which to review and comment on the S&EIR documentation. (Completed)
- ❖ Upon submission of the **Environmental Impact Assessment / Environmental Management Programme (EIA/EMPr)** document, the CA will have 107 days to reach a decision on the project (Record of Decision (RoD)). The RoD is otherwise referred to as the EA which authorises the activities to proceed. The decision to grant the EA may be appealed (within 20 days) by any party, including the Applicant, following the process outlined in the National Appeal Regulations (GNR 993 of 8 December 2014) published in terms of the NEMA.

2.4 Public Participation Process

The Public Participation Process (PPP) has been designed to comply with the regulatory requirements set out in the EIA Regulations of 2014 (as amended). The PPP provides the opportunity for communication between agencies making decisions and the public. This communication can be an early warning system for public concerns, a means through which accurate and timely information can be disseminated, and can contribute to sustainable decision-making.

Kongiwe encourages stakeholders to provide input into the S&EIA. The sharing of information forms the basis of PPP, with an aim to encourage the public to have meaningful input into the decision-making process from the onset of the project. Stakeholders can become involved in the project in the following ways:



Refer to Section 7 and **Appendix C** for the details of the PPP undertaken.

2.5 The Period required for Environmental Authorisation

Based on an average deposition rate of 1.3 million dry tons per month (tpm), the design life (excluding construction and decommissioning) of the facility is approximately **20 years**.

2.6 Listed and Specified Activities

Listed activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, which may not commence without an EA from the CA. An EA is required for any listed activity and is subject to the completion of an environmental process, either a Basic Assessment (BA) or a S&EIA.

Table 2-1 below contains all the listed activities identified in terms of NEMA, NEM:WA Category B activities, and the EIA Regulations of 2014 (GN R982 of December 2014, as amended by GNR 326 of April 2017 GNR 517 of 11 June 2021) and Listing Notices 1, 2 and 3 (GN R983, GN R984 and GN R985 of December 2014, as amended by GNR 327, GNR 325 and GNR 324 of April 2017, respectively, as well as GN R517 of 11 June 2021) which may be triggered by the Proposed Project, and for which an application for an EA has been submitted. The table also includes a description of those project activities which relate to the applicable listed activities.

Table 2-1: Listed Activities Triggered by the Proposed Project.

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
The collector pipe will exceed the length of 1000m and will have an internal diameter 0.8m. The Withok TSF is outside the urban edge.	Pipeline length: approximately 4.5km long Pipeline internal diameter: 0.8m Pipeline throughput: 126 litres/second	GNR 983 – Activity 9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.		21 (c) & (i)
The development of pipelines for the transportation of reprocessed slurry. The Withok TSF is outside the urban edge.	Pipeline length: 1000m Pipeline internal diameter: 0.5m Pipeline throughput: 247 litres/second	GNR 983 – Activity 10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial		21 (c) & (i)

² Water use licences in terms of Section 21 of that National Water Act, 1998, will be required for various of the Listed Activities. These have not been specifically listed in this Application, but the necessary application has been submitted to the DWS

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.		
The development of pipelines for the transportation of reprocessed slurry.	Pipeline length: 1000m Pipeline internal diameter: 0.5m Pipeline throughput: 247 litres/second	GNR 984 – Activity 7	The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods— (i) in gas form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 700 tons per day; (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons per day.		21 (c) & (i)
Construction and operation of the Withok return water dam	Dam Size: 101 000 m ³ Area: 0.56ha	GNR 983 – Activity 12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) 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; —		21 (g) 21(c) & (i)

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.		
		GNR 983 – Activity 13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2.		21 (g) 21(c) & (i)

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
The construction and operation of the RWD	Dam Size: 101 000 m ³ Area: 0.56ha	GNR 984 – 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, excluding— (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.		Section 21(g) Section 21(c) and (i)
The upgrading of the Withok attenuation dam wall.		GNR 983 – Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;		Section 21(c) and (i)

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			<p>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>		
<p>Re-establishment of the Withok TSF and associated infrastructure</p>	<p>TSF size: 400ha</p>	<p>GNR 983 – Activity 19</p>	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving-</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p>	<p>Category B – 11</p> <p>The establishment or recommissioning of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	<p>Section 21(c) and (i)</p>

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			<p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>		
		<p>GNR 984 – Activity 6</p>	<p>The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding—</p> <p>(i) activities which are identified and included in Listing Notice 1 of 2014;</p> <p>(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;</p>	<p>Category B – 10 The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).</p> <p>Category B – 11 The establishment or recommissioning of a residue stockpile or residue deposit resulting from activities which require a mining</p>	<p>Section 21(g) Section 21(c) and (i)</p>

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			<p>(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or</p> <p>(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.</p>	<p>right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	
Temporary hydrocarbon and diesel storage at the construction camp	To be determined	GNR 984 – Activity 15	<p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for:</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>		Section 21(c) and (i)
Borrow pits		GNR 984 – Activity 15	<p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding</p>		

Name of Activity	Aerial Extent of the Activity (ha)	Applicable listing notice	Listed Activity	Waste Management Authorisation	Water Use Licence Authorisation ²
			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.		
		GNR 983 – Activity 21D	Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014, required for such amendment.		Section 21(c) and (i)

3 Description of Project Activities

3.1 Project Description

Ergo is reprocessing TSFs in the East Rand of Gauteng. At present, reprocessed tailings are deposited on the Brakpan TSF. It is anticipated that in the future the Brakpan TSF will eventually reach its maximum capacity and Ergo is investigating other viable deposition sites in the area, which will enable it to continue with its reclamation operations.

Ergo has identified the Withok TSF footprint as a potential deposition site. The Withok TSF footprint, which is situated immediately south of the Brakpan TSF, is a historic TSF footprint (approximately 550 hectares), with the original Withok TSF having been reclaimed over several years ending 2006.

The following components are currently present on site:

- ❖ Access roads;
- ❖ Withok TSF footprint;
- ❖ Brakpan TSF and associated stormwater management infrastructure.

The Withok TSF footprint is currently used to collect drainage water and stormwater runoff from the Brakpan TSF. This water is collected at the lowest point and pumped back to Ergo Plant via the Withok pump station for reuse in Ergo's processes.

The recommissioning of the Withok TSF entails the following: Upgrading of the current footprint to allow for the redevelopment of the Withok TSF. This will involve the following civil work:

- ❖ A sump and stormwater diversion trench;
- ❖ A toe embankment which acts as an access road and slurry distribution pipeline servitude;
- ❖ A starter embankment;
- ❖ An HDPE liner;
- ❖ Drainage outlet pipe platforms (cross walls);
- ❖ Toe drain, intermediate drain, main drain, radial, basin drain, interface blanket drain, as well as below liner seepage cutoff/collector drains;
- ❖ A decant berm and pool wall;
- ❖ Drainage collector pipes;
- ❖ A return water dam (approved DWS liner system) and return water pumping system;
- ❖ A floating decant barge pumping system, as well as a decant pipeline;
- ❖ Slurry feed pipelines;
- ❖ Slurry distribution pipelines;
- ❖ An HDPE pipe ring main;
- ❖ 250mm diameter cyclones, complete with feed pipes, valves, overflow pipes;
- ❖ Deposition of tailings;

- ❖ Water management;
- ❖ Temporary construction camp; and
- ❖ Borrow pits for material required during civil works and concurrent rehabilitation of the side slopes of the Withok TSF.

The proposed recommissioned Withok TSF will buttress the southern flank of the Brakpan TSF. The footprint required for the new Withok TSF is approximately 400ha, which is less than the original design footprint of approximately 550ha. The maximum vertical height at the end of the facility life is planned to be 103m, which is lower than the Brakpan TSF height.

The intended recommissioning of the Withok TSF is to utilize the same methodology as previously deployed, i.e. upstream cyclone deposition with a floating decant pumping system. The principle of cyclone upstream development is to create a sufficiently robust underflow perimeter wall to contain the overflow with adequate freeboard and inherent stability to avoid overtopping and to prevent side slope failure.

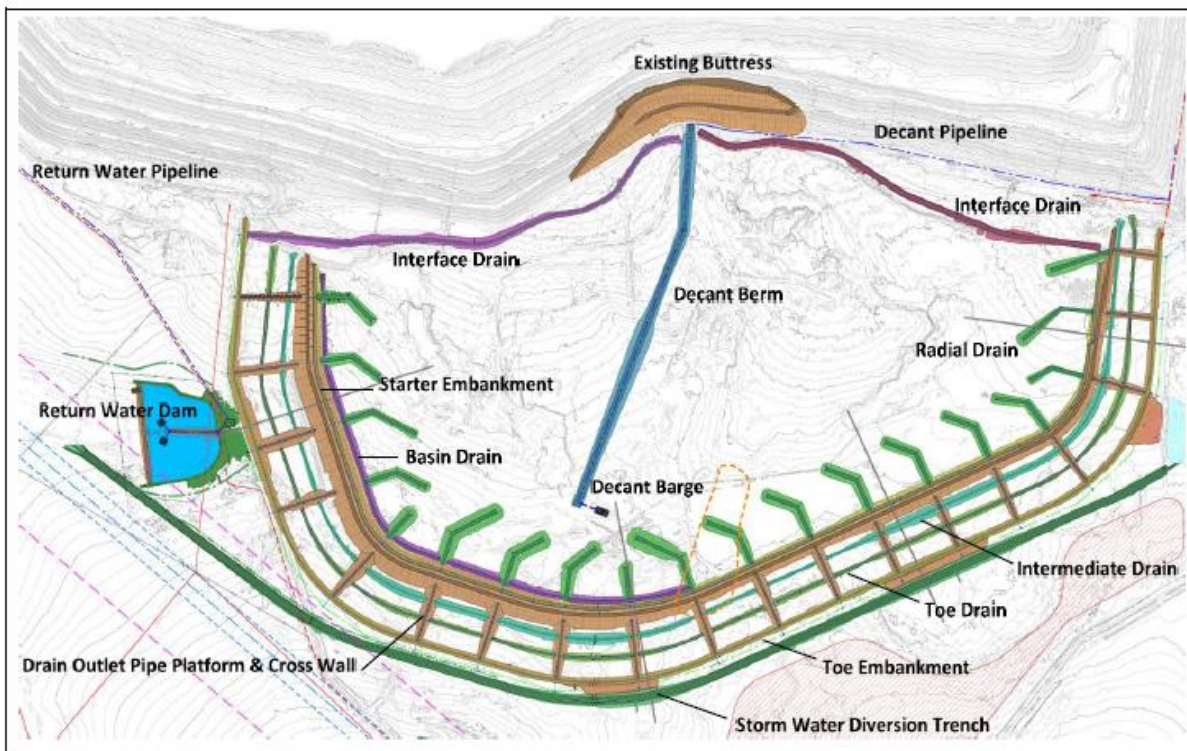


Figure 3-1: Engineering design layout plan for the proposed site

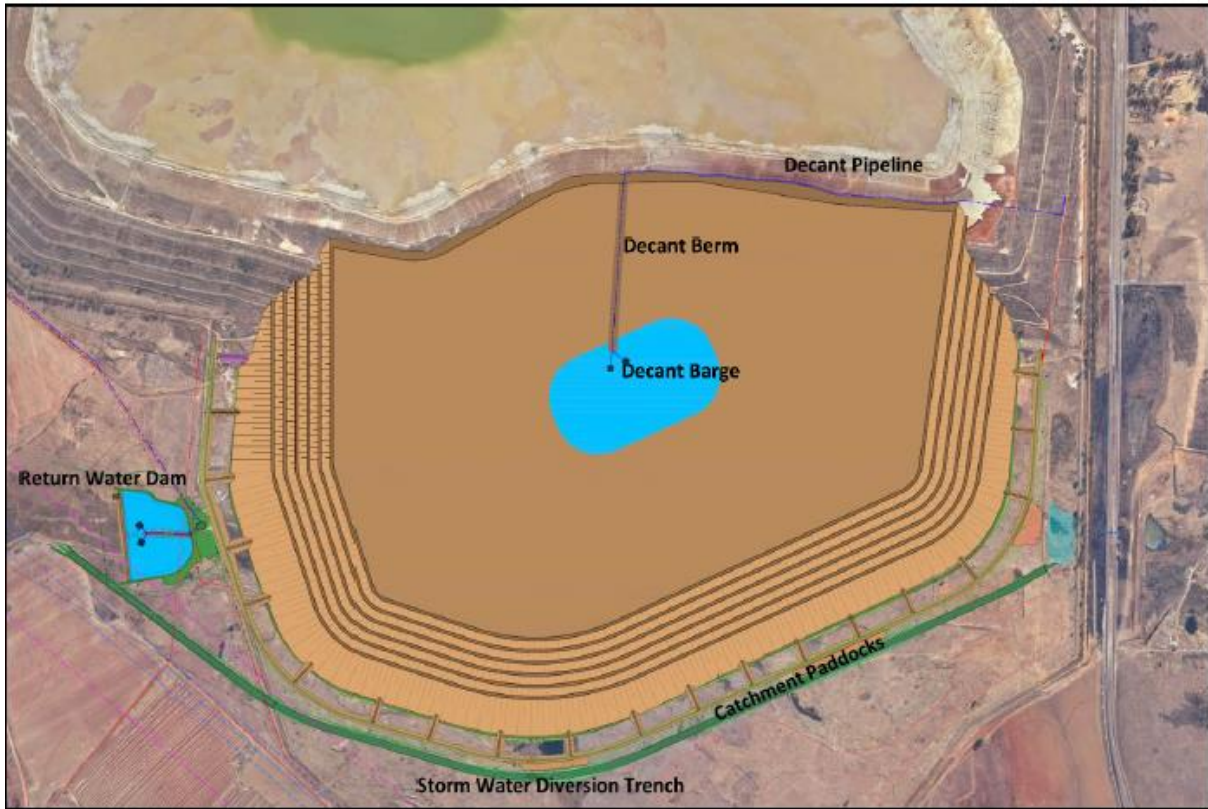


Figure 3-2: Final Layout

3.2 Deposition Method

The intended recommissioning of the Withok TSF is to utilize similar methodology as previously deployed, i.e. cyclone deposition with a floating decant pumping system. However, the first phases (lower portion) of development will be on a centreline basis to provide a much wider underflow prism, improving geotechnical characteristics and drainage. The principle of cyclone development is to create a sufficiently robust underflow perimeter wall to contain the overflow with adequate freeboard and inherent stability to avoid overtopping and to prevent side slope failure.

Initially, the ring main and the 250mm cyclones will be placed on the Starter Embankment crest on “wheelchair” stands. The cyclones will be orientated parallel to the crest of the embankment. The feed pipes will approach the cyclone from the rear, well clear of the underflow deposition area. The overflow pipes will also be laid clear of the underflow deposition area and will extend to the head of the beach. The overflow pipes should always be “open” to avoid back pressure in the cyclones. The cyclones will either advanced or retreat (Geo Tail, 2024).

Throughout the operation phase, the slurry distribution piping and cyclones will be dismantled and moved onto the new crest elevations or step-ins for deposition to recommence (Geo Tail, 2024).

The cyclone overflow material will be placed in the basin of the Withok TSF. The beach profile will slope downwards away from the perimeter underflow embankments. This will create a top surface geometry (beach freeboard) that will result in a supernatant pool that is maintained in the immediate vicinity of the decant system and away from the perimeter embankment. An average beach angle of approximately 0.5% is expected for the cyclone overflow material (Geo Tail, 2024).

The consolidation of the tailings is important in enhancing stability and reducing the probability of a flow failure should structural instability occur. It also ensures the best utilisation of the volume capacity by increasing the stored tonnes of tailings per cubic metre. The expected low permeability of the cyclone overflow material implies that there will be limited drainage of entrained water by normal consolidation processes during the life of the facility (Geo Tail, 2024).

3.3 Water Management Plan

The water management plan details during the life of operation are:

- ❖ Dirty side slope storm water management on the TSF will be achieved through chutes discharging into catchment paddocks, some of which decant into a collector pipe. This water will be piped to the return water dam (RWD) and pumped to the Brakpan RWD for recycling. The remainder is attenuated in the catchment paddocks where it evaporates.
- ❖ Drain flows will also be collected in the same collector pipe.
- ❖ Decant return is pumped directly to the Brakpan RWD for re-use in the process. Most dirty side slope storm water and all drain water is routed to the Withok RWD. The remaining dirty side slope storm water is evaporated in the catchment paddocks. Because decant water is not pumped to the Withok RWD, a silt trap at the Withok RWD is not required. Desilting is proposed to take place in the catchment paddocks. Water is then pumped to the Brakpan RWD for re-use in the process.
- ❖ The Withok RWD must have a capacity of at least 65 000m³ to comply with the DWS' Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (Regulation GN 704). Additional capacity will provide operational flexibility and reduce the risk of discharge during high rainfall periods. Currently, the design capacity of the Withok RWD is approximately 100,000m³.
- ❖ Water must be returned to process, from the Withok RWD, at a rate of up to 9 800m³/day.
- ❖ There is an existing attenuation dam located to the east of Heidelberg Road. Drainage from the Tsakane township collects in the attenuation dam. From there, overflow is released into a culvert which crosses below Heidelberg Road and into a sump. From there an underground pipe diverts the stormwater under the site and releases the water into a tributary to the Rietspruit, a short distance west of the site. The new design, however, includes a storm water diversion trench, which will divert the stormwater water from the sump, east to west along the southern flank of the optimised Withok TSF footprint. Upgrades to the attenuation dam will be undertaken as part of the proposed project.

The Withok TSF will be designed, constructed and managed as per the Code of Practice for Mine Residue Deposits (SANS 10286) and the Dam Safety Regulations (GNR. 139 of 24 February 2012). Ergo is cognisant of the Global Industry Standard on Tailings Management (GISTM).

The flood design criteria for the GISTM requires the use of the 10 000-year event (GISTM, 2020). The GISTM further states that the Probable Maximum Precipitation (PMP) may also be used, provided that the storm depth meets or exceeds the 10 000-year depth. The PMP is often regarded as being equal to the 10 000-year recurrence interval storm depth (iLanda, 2024). Therefore, the freeboard targets for the Proposed Project are guided by the GISTM 10 000-year (PMP) storm design.

3.4 Pipelines

The Proposed Project will convey the deposition of slurry onto the Withok TSF from the Ergo plant pumpstation via existing pipelines. Pipelines from the TSF will be joining already existing pipelines network to the Ergo plant in Brakpan. The pipeline route is within rights owned by Ergo. HDPE lined steel pipelines have high reliability and all the pipelines leading to and from the Ergo plant are existing and currently operational.

3.5 Access

Access to the Brakpan/Withok TSF is via existing access roads. Haul roads are present on site. The toe drain will further serve as an access road around the TSF.

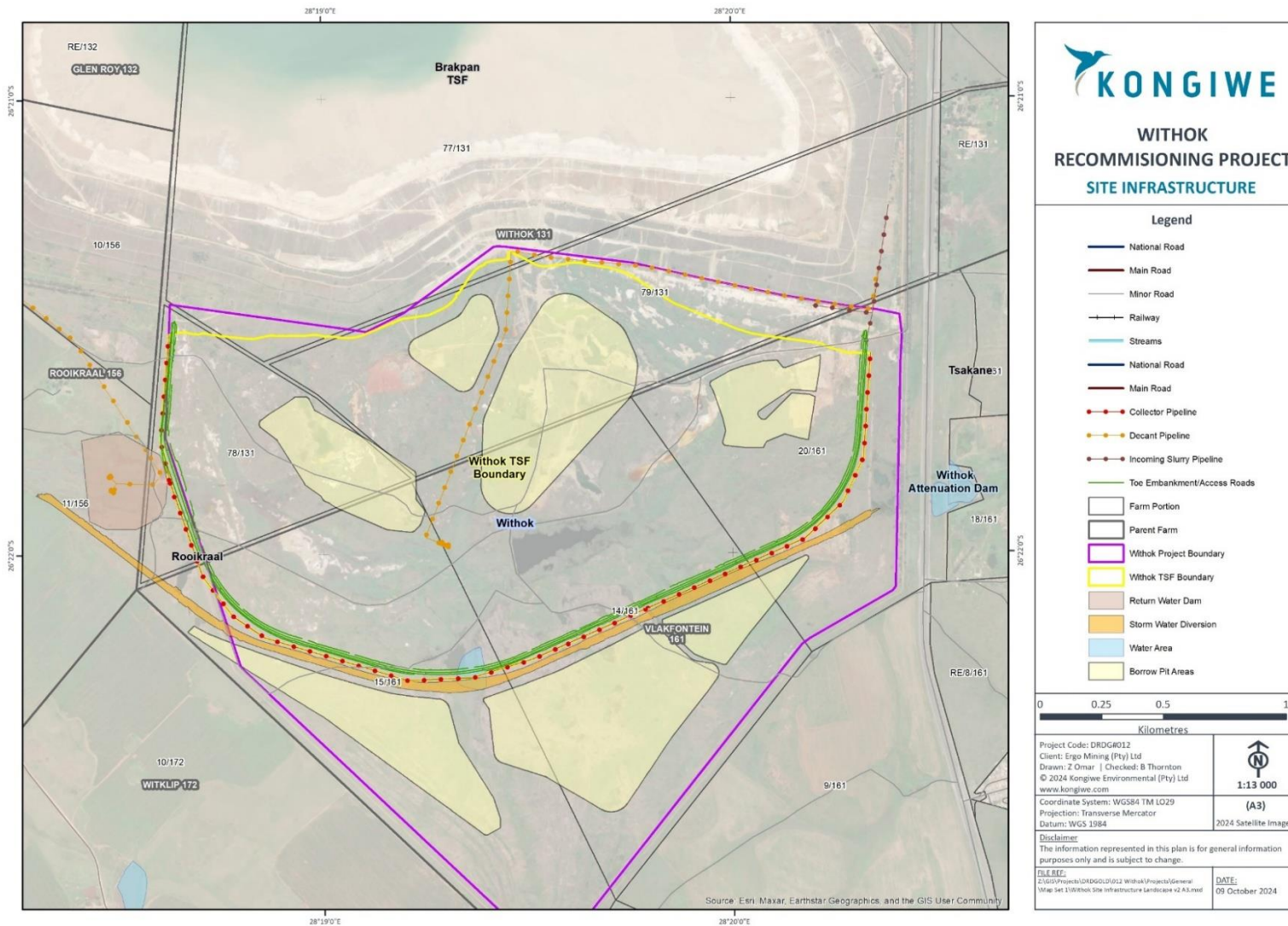


Figure 3-3: Project Infrastructure Map

3.6 Rehabilitation

The property on which the Withok TSF is situated belongs to Ergo. As such, the rehabilitation will be in line with Ergo's closure plans.

Once deposition is completed, the Withok TSF will need to be rehabilitated.

- ❖ The side slopes will be progressively cladded and vegetated through the life of the facility. The cladding serves an environmental purpose, providing a natural growing medium for the vegetation, which results in the significant reduction of air quality impact from the TSF. Cladding must contain sufficient gravel to impart "armouring" for erosion resistance (water and wind) and, secondly, the clay content and must not be too high that moisture is prevented from moving to the surface. Material stockpiled for cladding needs to be well selected.
- ❖ The side slope will require vegetating once the cladding material has been placed. The vegetation is to consist of a mix of trees, shrubs, and grasses of suitable indigenous vegetation.
- ❖ Storm water from the final rehabilitated side slopes will be tested and if it meets the discharge stand will be released to the environment utilising the existing stormwater infrastructure.
- ❖ The recommended closure concept is to paddock and grass the top surface, while treating drain flows. The drain water can be treated to discharge quality and released into the receiving environment. Alternatively, this water can be treated to higher water quality standards for appropriate reuse. The brine from the treatment process would have to be pumped to designated paddocks on the top surface where it will be evaporated. There will be significant periods where the paddocks are dry so no long-term brine ponds will form.
- ❖ The applicable parts of the operating infrastructure, i.e. power supply, seepage re-cycling and water storage dams and pump stations will be used and/or re-purposed to suit the post-closure requirements.

3.7 Works Schedule and Life-Cycle of the Project

The anticipated life span of the TSF is approximately **24 years**. It is expected that there would be a 2 year construction and ramp-up period which would include the placement of infrastructure and site preparation and earthworks, followed by a 20 year Life of Operation (LOO) where active deposition would take place with concurrent rehabilitation of the side slopes, ending with 2 years to rehabilitate the site.

Table 3-1 gives an indication of the estimated timeframes in relation to the implementation of the actions, activities or processes of the mining phases (construction, operation and decommissioning) for the Proposed Project.

Table 3-1: Estimated timeframes and deadlines of the different phases associated with the Project

Phase	Timeframe
Pre-Construction and Construction for the site	2 years
Deposition starting at Withok TSF	20 years
Decommissioning and rehabilitation of Withok TSF	2 years

The following table is summary of the activities that will occur at the different phases of this project.

Table 3-2: Summary table of the Activities associated with the different phases of the Proposed Project

Activity	Description
Pre-Construction	
1	Removal of vegetation and site clearance
2	Preparation of access roads should this be required
3	Initiation of a community forum for engagement throughout the project life cycle
4	Start implementing monitoring plans, Authorisation, Licensing and EMPr condition.
5	Employment of workers
Construction phase	
6	Operation of construction machinery and vehicles
7	Earth works for foundations of TSF, RWD and stormwater infrastructure
8	Borrow pit establishment for construction and cladding materials
9	Construction of pipelines and electricity reticulation and power line
10	Instatement of waste management and dust control measures on site
Operational Phase	
11	Deposition Activities (including concurrent rehabilitation)
12	Operation of pipes
13	Operation of RWD and pump station and the associated infrastructure
14	Continued community engagement
Decommissioning	
15	Decommissioning and rehabilitation activities
16	Closure forum to be established with key stakeholders.
Post-Closure	
17	Post- Closure Monitoring.
18	Rehabilitation activities

3.8 Conclusions from the Scoping Phase

The Scoping study for the Project, which commenced in July 2024, was undertaken in accordance with the EIA Regulations of 2014 (as amended), promulgated in terms of Section 24 (5) of the NEMA. The Scoping report was aimed at detailing the nature and extent of the project, detailing the possible project risks and mitigation measures as well as the plan going forward into the EIA phase.

The baseline environmental information provided in the Scoping report was compiled as a high-level desktop investigation, and the project information is sourced from existing background information, relevant to the

Proposed Project. A site visit was undertaken by Kongiwe on the 11th July 2024 and photographs were taken by the project team to illustrate the current site conditions. Refer to **Appendix B2** for photographic evidence of the site visit.

3.8.1 Potential Impacts Identified in the Scoping Phase

Preliminary environmental impacts were determined and have been populated in Table 3-3. As part of the Plan of Study for the EIA phase, these impacts have been further refined, calculated and assessed for all the feasible alternatives identified. Mitigation and management measures have been suggested by the specialists for all impacts identified.

Table 3-3: Potential identified impact because of the Proposed Project.

Environmental Component	Component Type	Potential Impact	Specialist Study Planned for EIA
Physical Environment (non-living)	Hydrology (including wetlands, surface water and ground water)	<ul style="list-style-type: none"> ❖ Potential for further acid mine drainage (AMD), increased heavy metal concentrations and increased sulphate concentrations in local surface and groundwater if runoff from operations is not adequately managed through efficient storm water management structures or adequate liners; ❖ Potential contamination of shallow groundwater resources due to accidental hydrocarbon or other chemical spillages from vehicles and operational activities might occur; ❖ Continuing deposition of tailings on the Brakpan TSF will potentially maintain higher seepage rates over the TSF footprint area with a subsequent local mounding of the water table; ❖ Deposition of tailings on the lined Withok TSF will potentially reduce the currently prevailing recharge rate with a subsequent local, insignificant lowering of the water table; ❖ Poor quality seepage water infiltrating into the underlying shallow weathered aquifer; ❖ Potential water and ground contamination due to pipeline leaks/spillages if adequate preventative measures are not implemented; ❖ Potential pollution of the Rietspruit and further downstream watercourses in the event of a TSF failure. 	<p>Surface Water Impact Assessment</p> <p>Groundwater Impact Assessment</p> <p>Wetland Impact Assessment</p>
Biological Environment (living)	Ecology and Biodiversity (including fauna and flora)	<ul style="list-style-type: none"> ❖ Disturbance of site and species of ecological importance; ❖ Loss of migration corridors, and access to nesting and refuge areas, watering points, food supplies for faunal species; ❖ Displacement of animal habitat due to the recommissioning of the TSF. 	Biodiversity Impact Assessment
Cultural Environment	Heritage Resources	<ul style="list-style-type: none"> ❖ Since the footprint was a TSF previously, it is unlikely for there to be any heritage resources on site. 	Heritage Impact Assessment

Environmental Component	Component Type	Potential Impact	Specialist Study Planned for EIA
Social and Economic Environment	Employment	<ul style="list-style-type: none"> ❖ Continued employment and job security; ❖ Continued investment in local economy; ❖ Possible health and economic impacts due to the recommissioning of the TSF. 	Socio-Economic Impact Assessment
	Land-use	<ul style="list-style-type: none"> ❖ Land use impacts in the area due to the recommissioning of the TSF. 	Socio-Economic Impact Assessment
	Air Quality	<ul style="list-style-type: none"> ❖ Increase in dust levels because of increased size of the TSF; ❖ Health impacts on livestock and people in proximity to the project site due to fine particulate emissions during operational phase. 	Air Quality Impact Assessment Health Impact Assessment

3.8.2 Scoping Phase Conclusions and Recommendations

The scoping phase identified potential negative and positive environmental impacts that could arise from the project which would require further refinement, calculation and assessment.

According to the Way Forward and the Plan of Study, impacts associated with the Proposed Project needed to be considered further during the EIA Phase. It is important to take note of the current conditions of the Proposed Project area and the environment around it. The proposed location for the TSF recommissioning was the site of a historical TSF that was reclaimed.

4 Consideration of Alternatives

In accordance with the requirements outlined in Appendix 2 of the EIA 2014 Regulations, as amended, a consideration of reasonable and feasible alternatives, including site and technology alternatives and the “do-nothing” alternative must be undertaken. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. When no feasible and/or reasonable alternatives can be identified and investigated in terms of a comparative assessment during the Scoping Phase, the EIA Report will then not contain a section with alternatives.

The EIA 2014 Regulations, as amended, define alternatives as the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- ❖ The property on which or location where it is proposed to undertake the activity;
- ❖ The type of activity to be undertaken;
- ❖ The design or layout of the activity;
- ❖ The technology to be used in the activity;
- ❖ The operational aspects of the activity; and
- ❖ The option of not implementing the activity.

Although a collection of alternatives may exist for the Proposed Project, only feasible alternatives have been considered for this DEIA and are discussed in greater detail below. Kongiwe strives to seek alternatives that maximise efficient and sustainable resource utilisation and minimise environmental impacts.

For applications submitted to the DMRE for environmental authorisation in terms of the NEMA and NEM:WA, in respect of listed activities that have been triggered, the project is expected to assess alternative properties, the type of activity, the design and layout of the activity, technologies, operational aspects and the “do-nothing” alternative.

When assessing alternatives, they should be “practical”, “feasible”, “relevant”, “reasonable” and “viable”. In this instance, this chapter provides a detailed explanation, including the advantages and disadvantages of the alternatives considered in this EIA.

4.1 The Property on which or Location where it is proposed to undertake the Activity

The Proposed Project is the recommissioning of a TSF on a previously disturbed footprint. This location is preferred because it is an existing historical deposition site adjacent to the operational Brakpan TSF and its associated and existing infrastructure. Therefore, there can be **no practical alternative sites** in terms of the Project location. From an environmental impact perspective, recommissioning the Withok TSF reduces the need to find an alternative “Greenfields” site for a new TSF which would result in land sterilisation for any future use, destruction of natural habitats, loss of economic income for landowners on whose property the TSF would be located, and another source of potential pollution.

Table 4-1: The advantages and disadvantages of recommissioning and reprocessing of the TSF – Preferred

Option	Advantage	Disadvantage
Recommissioning of the TSF (Preferred)	<ul style="list-style-type: none"> ❖ Enables the continued operation of tailings retreatment leading to contribution to local economy. ❖ Enables the continued removal of other TSF's which are pollution sources and opens land after rehabilitation and cessation of project. ❖ Using an existing footprint reduces need to disrupt ecosystems for the construction of a new TSF. ❖ Upgrade and improvement of surface water and groundwater management infrastructure. ❖ Linked to existing infrastructure. ❖ The recommissioning of the TSF will allow Ergo to implement new construction and pollution prevention mechanisms on a previously disturbed footprint. ❖ Job creation during construction. ❖ Possible pollution will be earmarked to a previously impacted but re-commissioned to new best practice area. 	<ul style="list-style-type: none"> ❖ Cumulative surface water, groundwater and air pollution if not managed properly. ❖ Failure risk if not engineered and operated correctly.
Establishing an alternative TSF	<ul style="list-style-type: none"> ❖ Enables the continued removal of a pollution source after rehabilitation and cessation of project. ❖ Lining of TSF to prevent groundwater pollution. ❖ Job creation during construction. 	<ul style="list-style-type: none"> ❖ Surface water, groundwater and air pollution if not managed properly. ❖ Land sterilisation. ❖ Loss of agricultural land. ❖ Loss of source of income for landowners ❖ Destruction of fauna and flora habitat. ❖ Failure risk if not engineered and operated correctly.

4.1 The Type of Activity to be Undertaken

The only option is for Ergo is to deposit reprocessed tailings onto the recommissioned TSF.

4.2 The Design and Layout of the Activity

The current layout plan for the Proposed Project is considered as the preferred layout plan. The layout plan is dictated by the previously impacted TSF footprint and the adjacent Brakpan TSF, existing paddocks, associated infrastructure and the routes of the existing pipelines. There will be no expansion of the TSF footprint. The footprint will be smaller than the original footprint.

4.3 The Technology to be Used in the Activity

Process alternatives imply the investigation of alternative processes or technologies that can be used to achieve the same goal. This includes using environmentally friendly designs or materials and re-using scarce resources like water and non-renewable energy sources. Valid alternative technologies are continually investigated and will be implemented where applicable.

Ergo believes that it will implement the best available technology in the best possible combination, in a way which is cost effective for this specific project. Best practices (as utilised in the industry) have been selected and, where applicable, SANS standards and legislative requirements will be followed in design, construction and management of infrastructure and activities on site.

4.3.1 Recycling, Potable Water Use and Electricity Reliance

The recommissioning of the Withok TSF will, in its operational phase, implement recycling policies and measures for optimal utilisation of resources and minimisation of waste generation. Potable water will be purchased from the municipality or another service provider depending on the availability, with a contingency for portable JoJo tanks or connection to existing water pipeline infrastructure. In terms of process water reticulation, the water cycle operates as a closed circuit, meaning that limited make-up water will be required for the recommissioning of the TSF.

Water which is collected from the drains and sideslopes of the TSF will collect in the RWD. From the RWD, it will be pumped into the Ergo process water circuit. This water is used in Ergo's reclamation projects as well as during gold processing.

Ergo is commissioning its solar project. This will be able to provide an alternative source of electricity to Ergo's operations.

Fuel types will be investigated, and energy conserving measures will be implemented where necessary.

4.4 The Operational Aspects of the Activity

The Proposed Project will convey the deposition of slurry onto the Withok TSF from the Ergo plant pumpstation via existing pipelines. Cyclone deposition will be used for the deposition of slurry.

4.4.1 Cyclone Deposition

The cyclone method of deposition is the preferred deposition technique. The principle of cyclone development is to create a sufficiently robust underflow perimeter wall to contain the overflow with adequate freeboard and inherent stability to avoid overtopping and to prevent side slope failure. Figure 4-1 shows the basis of the operation of a cyclone.

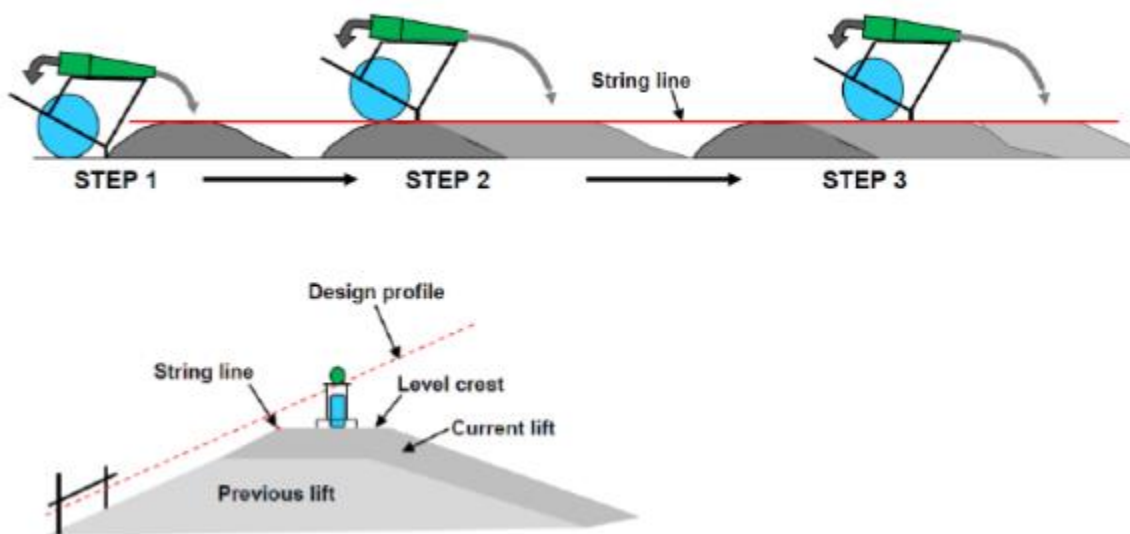


Figure 4-1: The operation of an advancing cyclone (GeoTail, 2024)

The net effect is that the finer particles and most of the water leave the cyclone to form the “overflow”, while the dewatered larger particles leave the cyclone to form a coarser “underflow” (Goldfields, 2024) as shown in Figure 4-2.



Figure 4-2: Illustration of "overflow" and "underflow" (Gold Fields Limited, 2024)

4.4.2 Pipelines

The Proposed Project will convey the deposition of slurry onto the Withok TSF from the Ergo plant pumpstation via existing pipelines. Pipelines from the TSF will be joining already existing pipelines network to the Ergo plant in Brakpan. The pipeline route is within properties owned by Ergo. HDPE lined steel pipelines have high reliability and all the pipelines leading to and from the Ergo plant are existing and operational.

Table 4-2: The advantages and disadvantages of the operational alternative considered

Option	Advantage	Disadvantage
Recommissioning of the Withok TSF and operation of associated slurry and water pipeline (s)	<ul style="list-style-type: none"> ❖ Deposition method is considered best practice ❖ Re-establishing a TSF where one was reclaimed ❖ The pipeline route is within properties owned by Ergo. ❖ HDPE lined steel pipelines have higher reliability. ❖ All of the pipelines leading from the Ergo plant are existing and operational. 	<ul style="list-style-type: none"> ❖ Spillages from pipelines ❖ Dam failure should the TSF not be designed and managed in accordance with local and international standards ❖ Dust generation as tailings dry out

4.5 The “No-Go” Option

The option of the project not proceeding would mean that the environmental and social status would remain the same as current. This implies that both negative and positive impacts would not take place. As such, the long-term negative impacts on the environment would not transpire; equally so, the long-term positive impacts such as environmental pollution source removal, economic development, skills development, retention of <1800 permanent jobs, and the availability of land for re-development at other TSFs being reclaimed by Ergo would not occur.

The only alternative land use is to leave the Withok TSF footprint as it stands.

The “No-Go” Option would reduce the life of Ergo’s operations as no further TSF recommissioning could take place once the Brakpan TSF reaches full capacity. This would mean that pollution caused by other abandoned TSFs would continue, rather than being removed by recommissioning activities. This as a result would lead to continued land sterilisation, instead of making land available for much needed development.

Furthermore, this means that the attraction of the gold reserves located within the dumps could potentially enhance illegal mining, and if left as is, population settlement on or around the dumps could occur.

Table 4-3: The advantages and disadvantages of the No-Go Option

Option	Advantage	Disadvantage
No-Go Option	<ul style="list-style-type: none"> ❖ No increased air quality impact. ❖ No improved Health impacts 	<ul style="list-style-type: none"> ❖ Environmental pollution in Johannesburg and Ekurhuleni persists.

Option	Advantage	Disadvantage
		<ul style="list-style-type: none"> ❖ TSFs not removed and therefore no land not made available for u other uses. ❖ Loss of jobs. ❖ Illegal mining at TSFs not removed.

The 'No Project' alternative is not preferred due to the anticipated benefits of the proposed project. The expected indirect benefits resulting from the recommissioning of the TSF include the ability of Ergo to continue with its recommissioning and processing activities. These will result in:

- ❖ The removal of sources of pollution and potential radiation in the East Rand area.
- ❖ Centralised deposition site which can be managed and controlled efficiently to reduce negative environmental impacts caused by abandoned and unrehabilitated TSFs across the area.
- ❖ The potential to unlock land for redevelopment, as read in the Metropolitan Spatial Development Vision.
- ❖ Continued supply of gold to the local and national markets, and therefore contribution to local, provincial and international economy.

5 Policy and Legislative Context

This chapter provides an overview of the policy and legislative context relevant to the recommissioning of the Withok TSF. It identifies all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to the planned activities and are to be considered in the assessment process which may be applicable or have relevance to the Proposed Project.

The foundation for Environmental Preservation is entrenched in the Constitution of South Africa, 1996. Following the birth of democracy in South Africa, legislative and environmental policies and regulations have undergone a large transformation, and various laws and policies were promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution provides environmental rights (contained in the Bill of Rights, Chapter 2 (Section 24)) and includes implications for environmental management. The environmental rights are guaranteed in Section 24 of the Constitution, and state that:

“Everyone has the right –

- ❖ To an environment that is not harmful to their health or well-being and*
- ❖ To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that*
 - Prevent pollution and ecological degradation;*
 - Promote conservation; and*
 - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”*

To ensure that the various spheres of the social and natural environmental resources are not overlooked, other legislation and regulations have been promulgated in addition to those contained within the Constitution. The additional legislation and regulations ensure that there remains a key focus on various industries or components of the environment, and to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.

Table 5-1:Applicable National Legislation and Guidelines

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p><u>The Constitution of South Africa, 1996</u></p> <p>Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being; to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development.</p> <p>Section 32 of the Constitution states that every person has a right to information held by the State and to information held by other people that is required in the exercise or protection of a right.</p> <p>Section 33 of the Constitution states that everyone has a right to just and procedurally fair administrative action.</p>	<p>As per the Requirements of NEMA and the NEMA EIA Regulations, alternative activities that are less taxing on the environment and resources must be investigated where possible.</p> <p>The DSR & Draft EIA Report were made available for public review (as per the PPP section of this report). The Appeal Process will be described to all stakeholders through the EA notification described in the PPP section of this report.</p> <p>The TSF will assist with the further processing of other TSFs in the area, thereby assisting with the removal of multiple pollution sources. This is in line with the Constitution of South Africa in removing a pollution source that will result in an improved environment for present and future generations.</p>
<p><u>The One Environmental System</u></p> <p>In terms of the One Environmental System established by the NEMLAA, an EA in respect of a Listed Activity must be issued within 300 days of the application being submitted. This system aims to streamline the licensing processes for environmental authorisations and water use.</p>	<p>Ergo proposes to recommission the Withok TSF and submit the required documents within the prescribed timeframes.</p>
<p><u>Mine Health and Safety Act (MHSA), Act 29 of 1996 (as amended):</u></p> <p>Ergo operates in accordance with the MHSA and associated regulations. This includes creating a safe and healthy work environment and providing the necessary protection and training to staff to ensure their health and safety is not compromised.</p>	<p>Although not strictly addressed in the Scoping Report or EIA/EMPr, protecting the environment contributes to a safe working environment. MHSA regulations will be worked into the operations' Code of Practice (COP) and Standard</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>Hazardous substances will be adequately stored and labelled. All regulations pertaining to safe use, handling, processing, storage, transport and disposal of hazardous substances; protection of equipment, structures and water sources and the surface of land; dumps and structures connected to recommissioning operations; the monitoring and control of those environmental aspects which may affect the health and safety of persons will be applied on site. Regulations pertaining to provision of water, ablution facilities and staff health and safety will be applied on site.</p>	<p>Operating Procedures (SOPs).</p>
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</u></p> <p>The overarching principle of the NEMA is sustainable development. It defines sustainability as meaning the integration of social, economic and environmental factors into planning, implementation and decision making to ensure the development serves present and future generations. Section 2 of NEMA provides for the NEMA principle which apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and in conjunction with other appropriate and relevant considerations. The NEMA principles serve as the general framework within which environmental management and implementation plans must be formulated and serve as a guideline by reference to which any organ of state must exercise any function when taking any decision in terms of the NEMA or any statutory provision concerning the protection of the environment.</p> <p>NEMA authorises the Minister of the DFFE to make Regulations relating to the administration of the Act³, which has been done with the publication of the EIA 2014 Regulations, as amended. Section 24(2) allows the Minister to identify activities which may not commence without environmental authorisation from the competent authority. This identification has been done in accordance with listing notices referred to as Listing Notice 1, Listing Notice 2 and Listing Notice 3. The NEMA also allows the Minister to determine which authority will be the competent authority to receive and evaluate applications for EAs.</p> <p>Listing Notice 1 identifies activities of limited scale and effect, which need to be assessed by a fairly simple process referred to as a BA, where after a Basic Assessment Report (BAR) is submitted to the competent authority. Listing Notice 2 identifies activities of significantly greater magnitude, which require evaluation through an initial Scoping Phase followed by an EIA and</p>	<p>It is the objective of this application to align to NEMA.</p> <p>The NEMA is the overarching Act governing sustainable development and the NEMA principles apply to all prospecting and mining operations (which included recommissioning activities) and any matter or activity relating to such operation.</p> <p>Listed activities as per the EIA 2014 Regulations, as amended, have been identified (refer to Chapter 2, subsection 2.6).</p>

³ Sections 24(5) and Section 44

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>an EMPr. This process is generally referred to as the S&EIA process. Listing Notice 3 relates to activities limited to specified geographical areas and matters of concern to the various provinces which require a BAR process to be dealt with by the provincial authority concerned.</p> <p>Regulation 16 (1) prescribes the general application requirements and states that an application for an EA must be made on the official application form obtainable from the CA and must, amongst others, include proof of payment of the prescribed application fee.</p> <p>Regulation 21 provides for the submission of the Scoping Report to the CA for consideration and states that the scoping report must contain all the information set out in Appendix 2 to the EIA 2014 Regulations, as amended. In terms of regulation 22, the CA must, after considering the Scoping Report, either accept the report, with or without conditions and advise the applicant to proceed with the plan of study for EIA or refuse the EA. Once the Scoping Report is accepted by the CA, the applicant must submit the EIA Report inclusive of specialist reports and an EMPr which have been subjected to a PPP. The timeframes for submission of the Scoping Report and the EIA Report inclusive of the timeframes within which the CA must consider the reports and approve the EA are prescribed in regulations 21 to 24 of the EIA 2014 Regulations.</p> <p>Once a decision on the EA application has been reached, the CA must notify the applicant in writing of the decision and give reasons for the decision.</p>	
<p><u>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA)</u></p> <p>As part of the waste management matters dealt with in the NEM: WA, waste activities have been identified in GN 921 of 29 November 2013 List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment. GN R921 provides that the waste management activities listed in Category A and B thereof may not commence, be undertaken, or conducted without a WML. Activities listed in Category C of GN 921 may only be commenced with, undertaken, or conducted in accordance with the National Norms and Standards published in terms of the NEM: WA.</p> <p>Category A activities require a Basic Assessment (BA) process while Category B Activities require a S&EIA process. It should be noted that although previously residue deposits and residue stockpiles were regulated in terms of the MPRDA Regulations and in particular Regulation 73, the National Environmental Laws Amendments Act 25 of 2014 (NEMLAA) deleted section 4(b) from</p>	<p>Listed activities as per the NEM:WA regulations have been identified (refer to Chapter 2, subsection 2.6).</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>the NEM: WA and residue stockpiles and residue deposits therefore fall within the ambit of the NEM: WA and its various regulations.</p> <p>NEM:WA and NEMA will be amended by the National Environmental Laws Amendment Act, 2022 (Act No 1 of 2022) (NEMLAA4)so that residue stockpiles and residue deposits will no longer be regulated under NEM:WA but under NEMA itself, although certain of the provisions of NEMLAA4 are not yet applicable.</p> <p>The Proposed Project is likely to trigger the following waste activities, all of which require a Category B WML:</p> <ol style="list-style-type: none"> 1. Activity 10: The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity). 2. Activity 11: The establishment or recommissioning of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). <p>The EA and WML are being dealt with as an integrated application.</p>	
<p><u>National Water Act, 1998 (Act No. 36 of 1998) (NWA)</u></p> <p>In terms of the NWA, the national government, acting through the Minister of Water and Sanitation, is the public trustee of South Africa’s water resources, and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)).</p> <p>In terms of the NWA a person may only use water without a licence if such water use is permissible under Schedule 1 (generally domestic type use), if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section 21 uses provided that the criteria and thresholds described in the general authorisation is met). Permissible water use furthermore includes water use authorised by a license issued in terms of the NWA.</p> <p>Section 21 of the NWA defines water uses which are governed in terms of the Act and for which a WUL is required. In terms of</p>	<p>An IWUL will be required for the recommissioning of the TSF and associated infrastructure and an application will be submitted to the DWS. The required specialist studies were undertaken as part of the impact identification and mitigation phase.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>section 40 (1) of the NWA “a person who is required or wishes to obtain a licence to use water must apply to the relevant responsible authority for a licence.” These water uses, in terms of Section 21, are as follows:</p> <ul style="list-style-type: none"> (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (d) engaging in a stream flow reduction activity contemplated in Section 36; (e) engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1); (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process; (i) altering the bed, banks, course or characteristic of a watercourse; (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and (k) using water for recreational purposes. <p>It is not likely that sub-sections (b), (d), (e), (f), (h), (j) or (k) will apply to the Proposed Project.</p> <p>Water uses associated with the recommissioning activities, will include the actual recommissioning of the Withok TSF within 500m of a wetland and the construction and operation of pipelines within 100 m of a river bank. These water uses will require an IWULA and will be reassessed once final placement and conceptual designs have been completed. As well as the dust suppression implemented on roads on site.</p>	

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>The IWULA must be prepared and submitted in accordance with the Water Use Licence Application and Appeals Regulations 2017 published in GNR 267 on 24 March 2017 and must generally be supported by a Technical Report, as well as conceptual design drawings of all water related infrastructure.</p>	
<p><u>National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA)</u></p> <p>The NEM:BA provides for the management and conservation of South Africa’s biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The South African National Biodiversity Institute (SANBI) website and GIS tools were utilised to determine whether any nationally protected and threatened ecosystems occur on site.</p> <p>The Proposed Project falls within the Gauteng Province, which has a provincial Biodiversity Assessment Protected Area Expansion Strategy. This strategy has been incorporated and considered throughout the compilation of this report.</p>	<p>NEM:BA was used to inform whether activities triggered Listing Notice 3 (refer to Chapter 2, subsection 2.5). The required specialist studies were undertaken as part of the impact identification and mitigation identification phase.</p>
<p><u>National Environmental Management: Protected Areas Act (NEM:PAA), Act 57 of 2003 as amended</u></p> <p>The National Environmental Management Protected Areas Act (Act No. 57 of 2003) (NEM:PAA) concerns the protection and conservation of ecologically viable areas representative of South Africa’s diversity and its natural landscapes and seascapes, and includes <i>inter alia</i>:</p> <ul style="list-style-type: none"> ❖ The establishment of a national register of all national, provincial and local protected areas; ❖ The management of those areas in accordance with national standards; and ❖ Inter-governmental co-operation and public consultation in matters concerning protected areas. <p>Sections 48 to 53 of the NEM:PAA lists restricted activities that may not be conducted in a protected area. Section 48 states that no person may conduct commercial prospecting or mining activities in a:</p> <ul style="list-style-type: none"> ❖ Special nature reserve or nature reserve; ❖ Protected environment without the written permission of the Minister and the Cabinet member responsible for minerals 	<p>SANBI website and GIS tools were utilised to determine if the project area overlaps with CBAs.</p> <p>The Regulations were utilised to determine the need for any additional listed scheduled activities under GNR 985.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>and energy affairs; and</p> <p>Protected area referred to in Section 9:</p> <ul style="list-style-type: none"> ❖ world heritage sites; and ❖ specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act (No. 84 of 1998); 	
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p> <p>The NHRA aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations.</p> <p>The Act requires all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 ha. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities.</p> <ul style="list-style-type: none"> ❖ The South African Heritage Resources Agency (SAHRA) will need to approve the heritage assessment undertaken as part of the impact assessment process. 	<p>A Heritage Impact Assessment was undertaken as part of the EIA Phase. No heritage resources were identified.</p>
<p><u>Conservation of Agricultural Resources Act (No. 43 of 1983)</u></p> <p>The Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA) includes the use and protection of land, soil, wetlands and vegetation and the control of weeds and invader plants. This is the only legislation that is directly aimed at conservation of wetlands in agriculture. The Act contains a comprehensive list of species that are declared weeds and invader plants dividing them into three categories. These categories are as follows:</p> <ul style="list-style-type: none"> ❖ Category 1: Declared weeds that are prohibited on any land or water surface in South Africa. These species must be controlled, or eradicated where possible; ❖ Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited 	<p>The protection of land, soil, wetlands and vegetation and the control of weeds and invader plants are contained within the EIA Report.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>within 30m of the 1:50 year floodline of any watercourse or wetland; and</p> <ul style="list-style-type: none"> ❖ Category 3: Declared invader species that may remain but must be prevented from spreading. No further planting of these species is allowed. <p>In terms of the Act, landowners are legally responsible for the control of alien species on their properties. Failure to comply with the Act may result in various infringement consequences and in some instances imprisonment and other penalties for contravening the law.</p>	
<p><u>The South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998)</u></p> <p>The National Road Traffic Regulations, 2000 places specific duties on the consignor and consignee of dangerous goods. A consignor means the person who offers dangerous goods for transport (i.e. hazardous waste) and a consignee is the person who accepts dangerous goods, which have been transported in a vehicle. Both consignor and consignee must comply with the requirements of several SANS standard specifications and codes of practice relevant to dangerous goods which have been incorporated into the regulations.</p> <p>The mine owner is responsible for:</p> <ul style="list-style-type: none"> ❖ Offloading of the dangerous goods; ❖ Providing the dangerous goods offloading supervisor; and ❖ Ensuring that the loading and offloading are carried out by qualified employees trained in the relevant procedures. <p>Ergo must, in line with Section 54 of the Act and GN R225, provide evidence that the company has appointed responsible personnel to oversee the off-loading of dangerous goods at its operations. A driver of a vehicle transporting dangerous goods is required to undergo training at an approved training body.</p>	<p>The requirements of the Act and Regulations were considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase.</p>
<p><u>Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (SPLUMA)</u></p> <p>The SPLUMA was promulgated in May 2015. SPLUMA is a framework act for all spatial planning and land use management legislation in South Africa. It seeks to promote consistency and uniformity in procedures and decision-making in this field.</p>	<p>The footprint of the Withok TSF is already in existence and falls within a High control zone (outside the urban development zone) (Zone 3).</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>SPLUMA will also assist municipalities to address historical spatial imbalances and the integration of the principles of sustainable development into land use and planning regulatory tools and legislative instruments.</p>	
<p><u>Hazardous Substances Act, 1973 (Act No. 15 of 1973)</u></p> <p>The Regulations for Hazardous Chemical Substances apply to an employer or a self-employed person who carries out work at a workplace which may expose any person to the intake of hazardous chemical substances at that workplace. Regulations 14 and 15 provide for the labelling, packaging, transportation and storage and the disposal of hazardous chemical substances respectively. These regulations set out specific requirements which form part of an employer’s duty to provide and maintain, as far as reasonably practicable, a working environment that is safe and without risk to the health of his or her employees.</p>	<p>The requirements of the Act and Regulations were considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase.</p>
<p><u>National Development Plan, 2030</u></p> <p>The National Development Plan (NDP) offers a long-term perspective. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal.</p> <p>As a long-term strategic plan, it serves four broad objectives:</p> <ol style="list-style-type: none"> 1. Providing overarching goals for what we want to achieve by 2030. 2. Building consensus on the key obstacles to us achieving these goals and what needs to be done to overcome those obstacles. 3. Providing a shared long-term strategic framework within which more detailed planning can take place to advance the long-term goals set out in the NDP. 4. Creating a basis for making choices about how best to use limited resources. <p>The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. The core elements of a decent standard of living identified in the Plan are:</p> <ul style="list-style-type: none"> ❖ Housing, water, electricity and sanitation; 	<p>The requirements of this Plan were considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase. The proposed project is in line with the NDP and will address its requirements by assisting with the continuation of removal of a pollution source and availing land for the landowners to use.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<ul style="list-style-type: none"> ❖ Safe and reliable public transport; ❖ Quality education and skills development; ❖ Safety and security; ❖ Quality health care; ❖ Social protection; ❖ Employment; ❖ Recreation and leisure; ❖ Clean environment; and ❖ Adequate nutrition <p>The Proposed Project falls in line with the goals of the NDP in creating a decent standard of living for all South Africans by removing a pollution source to the surrounding conservation and protected areas adjacent to the project site.</p>	
<p><u>Action Plan of the Environmental Initiative of the New Partnership of Africa’s Development, 2003.</u></p> <p>This Action Plan was established with the aim of encouraging sustainable development, conservation and acceptable use of biodiversity in Africa. It has been recognised that a healthy and productive environment is a prerequisite for the success of New Partnership of Africa’s Development (NEPAD), together with the need to systematically address and sustain ecosystems, biodiversity and wildlife. Six areas have been identified:</p> <ul style="list-style-type: none"> ❖ Combating land degradation, drought and desertification; ❖ Conserving Africa’s wetlands; ❖ Preventing and controlling invasive alien species; ❖ Conservation and sustainable use of coastal and marine resources; 	<p>The Proposed Project may result in the decrease of pollution sources across the East Rand, the objectives of the NEPAD to systematically address and sustain ecosystems, biodiversity and wildlife were considered during the EIA Phase of the project.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<ul style="list-style-type: none"> ❖ Combating climate change in Africa; and ❖ Cross-border conservation and management of natural resources. 	
<p><u>South Africa’s National Biodiversity Strategy and Action Plan</u></p> <p>The National Biodiversity Strategy and Action Plan (NBSAP) sets out a framework and a plan of action for the conservation and sustainable use of South Africa’s biological diversity and the equitable sharing of benefits derived from this use. The NBSAP was prepared by the former Department of Environmental Affairs and Tourism (DEAT), during the period May 2003 to May 2005. The goal of the NBSAP is to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future. This document was revised and updated for the period of 2015-2025. In support of this goal, six key strategic objectives (SOs) have been identified, each with a number of outcomes and activities. The table below illustrates the objectives in achieving the NBSAP “Goal”, although the project is related to recommissioning of TSF, the following would still apply:</p>	<p>The Proposed Project is cognisant of the obligation to protect and preserve the integrity of the environment as well as its biodiversity. Principles of this plan were taken into consideration during the EIA Phase.</p> <p>The required biological specialist studies were undertaken during the impact identification and mitigation phase. This helped identify the current environment and helped determine and mitigate any possible impacts that might arise due to the proposed project.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p>Vision of the NBSAP:</p> <p>Conserve, manage and sustainably use biodiversity to ensure equitable benefits to the people of South Africa, now and in the future.</p> <p>Strategic objectives:</p> <ol style="list-style-type: none"> 1. Management of biodiversity assets and their contribution to the economy, rural development, job creation and social wellbeing is enhanced. 2. Investments in ecological infrastructure enhance resilience and ensure benefits to society 3. Biodiversity considerations are mainstreamed into policies, strategies and practices of a range of sectors. 4. People are mobilized to adopt practices that sustain the long-term benefits of biodiversity. 5. Conservation and management of biodiversity is improved through the development of an equitable and suitably skilled workforce. 6. Effective knowledge foundations, including indigenous knowledge and citizen science, support the management, conservation and sustainable use of biodiversity. <p>Through the NSBA, it is recognised that biodiversity cannot be conserved through protected area networks only. All stakeholders, from private landowners and communities to business and industry must get involved in biodiversity management.</p> <p>The Proposed Project would need to incorporate operational systems that minimise the impacts of threatening processes on biodiversity during the operational phase of the project, and by streamlining specialist recommendations during the implementation of all phases of this project.</p>	
<p><u>Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)</u></p> <p>The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.</p>	<p>The requirements of the Act were considered when assessing and involving the public and registered interested and affected parties.</p>

Applicable Legislation and Guidelines used to compile the report.	Reference where applied
<p><u>National Environmental Management Act; National Appeal Regulations, 2014</u></p> <p>The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National Environmental Management Act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.</p>	<p>The requirements of the Act were considered if an appeal may need to be or is lodged for the project.</p>
<p><u>Nuclear Energy Act 1999, (Act 46 of 1999) (NEA), the National Nuclear Regulator Act 1999, (Act No. 47 of 1999) (NNRA) and the Regulations on Safety Standards and Regulatory Practices (SSRP) (GN R388 of 28 April 2006).</u></p> <p>The NEA established a framework for the management of nuclear material and the NNRA was enacted to provide for the establishment of the National Nuclear Regulator to regulate nuclear activities and safety standards. These Acts and the SSRP will be considered and their requirements implemented where applicable</p>	<p>The requirements of the Act and Regulations were considered when assessing the project impacts and developing the associated mitigation measures in this EIA Phase.</p>

Table 5-2:Applicable Provincial and Local Policies, Guidelines and By-Laws

Policies, Guidelines and By-Laws	
<p><u>Gauteng Mine Residue Areas Strategy, 2012</u></p> <p>The aim of the project as a whole is to make more land available from the mine dumps in Gauteng to be used for other purposes, in line with government priorities. The objectives for the project are as follows:</p> <ul style="list-style-type: none"> ❖ To evaluate current pollution problems caused by mining activities and suggest how they should be addressed; ❖ To quantify the amount of land under mining activities and classify them in terms of impacts and potential for recommissioning; ❖ To investigate which mining areas could be made available to be used for other purposes; and ❖ To provide preliminary and conceptual recommendations on the short-term priorities for the recommissioning of the mining site which could be economically sustainable. 	<p>The Proposed Project is in line with the objectives of the Strategy as it will assist with the continued removal of TSFs across the East Rand. The guidelines of the Strategy were considered throughout the S&EIA process and reporting.</p>
<p><u>Gauteng Nature Conservation Bill, 2014</u></p> <p>The Bill was established in 2014, and contains the following objectives:</p> <ul style="list-style-type: none"> ❖ To provide for the sustainable utilization and protection of biodiversity within Gauteng; 	<p>Aspects of this Bill are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and are included within the reporting documents.</p>

Policies, Guidelines and By-Laws	
<ul style="list-style-type: none"> ❖ to provide for the protection of wild and the management of alien animals; protected plants; aquatic biota and aquatic systems; ❖ To provide for the protection of invertebrates and the management of alien invertebrates; ❖ To provide for professional hunters, hunting outfitters and trainers; ❖ To provide for the preservation of caves, cave formations, cave biota and karst systems; ❖ To provide for the establishment of zoos ❖ To provide for the powers and establishment of Nature Conservators; ❖ To provide for administrative matters and general powers; and to provide for matters connected therewith. 	
<p><u>Gauteng Conservation Plan Version 3.3</u></p> <p>The main purposes of C-Plan 3.3 are:</p> <ul style="list-style-type: none"> ❖ To serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process; ❖ To inform protected area expansion and biodiversity stewardship programmes in the province; ❖ To serve as a basis for development of Bioregional Plans in municipalities within the province. <p>C-Plan 3.3 is a valuable tool to ensure adequate, timely and fair service delivery to clients of GDARD, and is critical in ensuring adequate protection of biodiversity and the environment in Gauteng Province.</p>	<p>Aspects of this Plan are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and are included within the reporting documents.</p>
<p><u>Gauteng Environmental Implementation Plan, 2016</u></p> <p>The purpose of the EIP is to:</p> <ul style="list-style-type: none"> ❖ Coordinate and harmonise environmental policies, plans and programmes and decisions to (i) minimise the duplication of procedures and functions; and (ii) promote consistency in the exercise of functions that may affect the environment; ❖ Give effect to the principle of cooperative governance in Chapter 3 of the Constitution; ❖ Secure the protection of the environment across the country as a whole; ❖ Prevent unreasonable actions in respect of the environment that is prejudicial to the economic or health interests of other provinces or the country as a whole; and ❖ Enable monitoring of the achievement, promotion and protection of a sustainable environment. 	<p>Aspects of this Plan are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and were included within the reporting documents.</p>

Policies, Guidelines and By-Laws	
<p><u>Gauteng Growth and Development Agency Strategic Plan 2014-2019</u></p> <p>The main purpose of the GGDA Strategic Plan is:</p> <ul style="list-style-type: none"> ❖ Addressing the persistent racial imbalances regarding ownership and general configuration of Gauteng’s economy; ❖ Addressing the spatially distorted economic development legacy of apartheid rule; ❖ Broadening the base of economic development beyond the Province’s dominant metropolitan municipal areas; ❖ The socio-economic transformation envisaged for the second phase of transition to a national democratic society; and ❖ Achieving the outcomes of creating decent work, economic inclusion and equality. 	<p>The Proposed Project will contribute towards employment creation within the Province and will also contribute positively towards economic growth within the region through both its development and operation.</p>
<p><u>Ekurhuleni Regional Spatial Development Framework,2015</u></p> <p>The Ekurhuleni Spatial Development Framework (SDF) provides a framework for making resource-effective decisions that can help mitigate the following identified issues in the municipal zone:</p> <ul style="list-style-type: none"> ❖ Increasing pressure on the natural environment and green infrastructure; ❖ Urban sprawl and fragmentation; ❖ Spatial inequalities and the job-housing mismatch; ❖ Exclusion and disconnection emanating from high potential underused areas; ❖ Lack of securitisation and gated developments, and disconnected street networks (high cul-de-sac ratios and low intersection densities); ❖ Inefficient residential densities and land use diversity. <p>The Proposed Project is anticipated to contribute in decreasing the pressure on the natural environment by removing a pollution source to conservation and protected areas.</p>	<p>Aspects of this SDF are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and were included within the reporting documents.</p>
<p><u>Ekurhuleni Environmental Management Framework (EMF), 2007</u></p> <p>The aim of the EMF for the CoE is to provide a framework that identifies and illustrates the general environmental characteristics of the municipality:</p> <p>The critical issues within the EMF are the identification of constraint zones and geographical areas. The development constraint zones within the EMF refer to the environmental suitability of land parcels for various types of land uses or activities. The types</p>	<p>Aspects of this EMF are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and were included within the reporting documents.</p>

Policies, Guidelines and By-Laws	
<p>of development constraint zones identified in the EMF include:</p> <ul style="list-style-type: none"> ❖ low to no constraint zone; ❖ agricultural constraint zone; ❖ geotechnical constraint zone; ❖ hydrological constraint zone; and ❖ ecological constraint zone. 	
<p><u>Ekurhuleni Bioregional Plan (BRP), 2014</u></p> <p>Subsequent to the approval of the Ekurhuleni BRP, the Guidelines for the compilation of the bioregional plans were set in terms of the National Environmental Management: Biodiversity Act. CoE, together with the South African Biodiversity Institute (SANBI) and the Gauteng Department of Agriculture and Rural Development (GDARD), developed the CoE Bioregional Plan. The purpose of the bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing biodiversity priority areas, referred to as ‘critical biodiversity areas and ecological support areas’, with accompanying land use planning and decision-making guidelines.</p> <p>Critical biodiversity areas within the bioregion are the portfolio of sites that are required to meet the region's biodiversity targets and need to be maintained in the appropriate condition for their category. The Ekurhuleni Metropolitan Municipality Bioregional Plan identified the following categories:</p> <ul style="list-style-type: none"> ❖ Critical Biodiversity Area One; ❖ Critical Biodiversity Area Two; ❖ Ecological Support Area One; ❖ Ecological Support Area Two; ❖ Protected areas; ❖ Important areas ❖ Other natural areas 	<p>Aspects of this BRP are applicable to the Proposed Project. Where applicable, these were considered throughout the S&EIA process and were included within the reporting documents.</p>
<p><u>The Gauteng Province Environmental Management Framework, 2018</u></p>	<p>Aspects of this management framework are applicable to the Proposed Project. Where</p>

Policies, Guidelines and By-Laws	
<p>The GDARD decided to produce an Environmental Management Framework for the whole of Gauteng. The objective of the GPEMF is to guide sustainable land use management within the Gauteng Province. The GPEMF, inter alia, serves the following purposes:</p> <ul style="list-style-type: none"> ❖ To provide a strategic and overall framework for environmental management in Gauteng; ❖ Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng; ❖ Determine geographical areas where certain activities can be excluded from an EIA process; and ❖ Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making. 	<p>applicable, these were considered throughout the S&EIA process and were included within the reporting documents.</p>
<p><u>The Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations, 2017</u></p> <p>This document aims to assist with the participation process of all interested and affected parties regarding any Proposed Project. This guideline provides information and guidance for proponents or applicants, interested and affected parties, competent authorities and environmental assessment practitioners on the public participation requirements of the act, as well as provides information on the characteristics of a vigorous and inclusive public participation process.</p>	<p>This guideline was used to ensure that all the required steps are followed to ensure that a complete and successful public participation process is conducted.</p>
<p><u>Integrated Environmental Management Guideline on Need and Desirability, 2017</u></p> <p>This document assists Environmental assessment practitioners on the best practice as well as how to meet the peremptory requirements prescribed by the legislation as well as sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities. This document further sets out a list of questions which should be addressed when considering need and desirability of a proposed development.</p>	<p>This guideline was used to ensure that the need and desirability of the project was correctly considered and that the need and desirability of the project was thoroughly considered.</p>

6 The Need and Desirability of this Project

The “need and desirability” during an environmental authorisation application process must be addressed throughout all stages of the EIA process.

6.1 Environmental Pollution

TSFs are known to cause air and water pollution, as well as soil contamination. The impacts on soil are typically localised to the confines of the TSF. However, the particulate matter associated with these areas can travel for kilometres and pollution caused by decant can also be far reaching.

According to the Gauteng Department of Agriculture and Rural Development (GDARD, 2012), water pollution from abandoned mines is commonly associated with the problem of Acid Mine Drainage (AMD), which usually refers to the ‘point source’ of pollution produced by the decant of contaminated water from shafts or inclines connecting the mine void to the surface. Some TSFs, especially slimes dams, are closely associated with these underground mine voids, so the issue of water ingress into those voids, via fissures arising from the geotechnically unstable surface, is of great importance. Unfortunately, many older TSFs were placed in riverbeds or over dolomites which allowed seepage directly into groundwater. The decanting of AMD is a high-profile media issue, which is now driving investment decisions by a range of local and international investors, and which has been raised to the level of a national priority by the released AMD report. Possibly more important, however, is the broader issue of ‘diffuse sources’ of pollution represented by the TSFs and their possible interactions with precipitation, seepage, surface-water runoff and shallow groundwater. The long-term sustainable solution is needed for both the AMD and TSF problems. This project would contribute to finding a solution to these problems by removing various TSFs and consolidating them into one managed facility.

Soil contamination, including the mere presence of TSFs in the surface environment, constitutes a pollution hazard through the direct access pathway. This occurs where people are contaminated by or externally exposed to elevated levels of pollution after unauthorized entry to a mine site, by living in settlements directly adjacent to mines or in some cases, living in settlements on the contaminated TSFs of abandoned mines. Direct access to mine sites may also expose the public to risk due to direct external gamma radiation, radon exposure, inhalation and ingestion of radionuclides and chemo toxic metals, as well as the physical dangers inherent to mining sites (GDARD, 2012).

Winde et al. (2019) conducted a study on *Human Exposure to Uranium in South African Gold Mining Areas Using Barber-Based Hair Sampling*. The study investigated hair samples from customers at barber shops across Gauteng and found that residents living in and around gold mining areas are exposed to elevated environmental levels of uranium which eventually finds its way into their bodies. Although the findings of this study were inconclusive, Winde et al. (2019) state that the Uranium (U) measurements in water, soil, and food that is in proximity to gold mining activities, in populated areas of Gauteng Province, suggest the possibility of exposure levels that may lead to adverse health consequences, including cancer.

The Proposed Project would play a significant role in eliminating pollution sources and reducing the extent of exposure to surrounding communities.

6.2 Safety and Security

According to GDARD (2012), most TSFs have an element of lawlessness to them and should be considered as Badlands where state penetration is minimal. The absence of security results in theft of equipment and the damage of infrastructure required to mitigate the negative impacts of TSFs. Dust control equipment such as sprayers and pumps are often stolen, which reverts to environmental issues; while copper theft in the TSFs has also been known to create, amongst other outcomes, the surge of voltage across the electric reticulation system, causing substantial damage to refrigerators, air conditioners, microwave ovens, TV sets, computers and other electronic equipment to surrounding communities.

Apart from theft, other issues that are commonly associated with TSFs include illegal mining and illegal settlements near the unsupervised properties. These issues pose safety risks for law enforcement, affected landowners and adjacent communities.

6.3 The Limitation of Spatial Development

Gauteng is South Africa's smallest but most densely populated province, housing 24% of the country's population. 97% of the province's population is urbanised, which has resulted in an increased requirement for land in urban spaces (GSDf, 2016).

Significant areas of land in Gauteng are devoted to and/or impacted upon by current and historical mining activities. The main 'gold mining belt' stretches from east to west across the centre of the province. However, gold mining has declined over the past few decades, leaving behind a legacy of TSFs. According to the Gauteng Strategic Development Framework (GSDf) (2016), one of the solutions to an ever-growing demand for spaces in the province is by unlocking the mining belt and using these areas for their development potential.

6.4 The Gold Industry of South Africa

South Africa has undergone a long-term decline in gold output, the share of South Africa's world gold production decreased from 14% to about 5%. The overall decrease of gold production may be as a result of unreliable electricity-supply constraints, rising administered prices, labour issues, as well as waning productivity rates impeding its operational performance.

Employment in the gold sector has been declining since the 1980s with around 95,130 workers currently employed. At the same time, productivity has declined, and wages have risen. Despite this, gold mining activities remain a mainstay of employment in many communities around the country, and every employee in the gold sector supports between five and 10 other dependants. On the upside, every direct job in the mining sector results in two indirect jobs being created elsewhere.

6.5 Need and Desirability Guideline

During the Scoping phase the Need and Desirability Guideline (GN891 of 2014) questions was used to identify key issues and alternatives and helped to determine which areas required further investigation in the EIA phase, and which areas did not require further information. Following the undertaking of the specialist studies, the needs and desirability table was updated.

Table 6-1 overleaf addressed the Need and Desirability Guideline questions.

Table 6-1: Need and Desirability Assessment

Question	Response and Reference in The Report
Securing ecological sustainable development and use of natural resources	
<p>How will this development (and its separate elements / aspects) impact on the ecological integrity of the area?</p> <p>1.1. How were the following ecological integrity considerations taken into account?</p> <p>1.1.1. Threatened Ecosystems</p> <p>1.1.2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure</p> <p>1.1.3. Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”),</p> <p>1.1.4. Conservation targets,</p> <p>1.1.5. Ecological drivers of the ecosystem,</p> <p>1.1.6. Environmental Management Framework,</p> <p>1.1.7. Spatial Development Framework, and</p> <p>1.1.8. Global and international responsibilities relating to the environment (e.g., RAMSAR sites, Climate Change, etc.).</p>	<p>The recommissioning of the Withok TSF will occur on the footprint of the old Withok TSF that was previously reclaimed. This is a disturbed footprint, and the environment has been heavily impacted by anthropogenic influences and historical mining activities. The project area is drained in a north-westerly direction towards the Rietspruit stream. The project is also located adjacent to the operational Brakpan TSF. The provincial and international frameworks and guidelines considered for the proposed project are detailed in above.</p> <p>The Biodiversity Impact Study assessed the impacts that the recommissioning would have on the receiving environment, as well as the impacts that would occur should there be a failure.</p> <p>Section 8.5 of this report provides ecological background information.</p>
<p>1.2. How will this development disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The recommissioning of the Withok TSF will occur on the footprint of the old Withok TSF that was previously reclaimed. This is a disturbed footprint, and the environment has been heavily impacted on by anthropogenic influences and historical mining activities. The project area is drained in a north-westerly direction towards the Rietspruit stream. The project is also located adjacent to the operational Brakpan TSF.</p> <p>The biodiversity impact assessment investigated the impacts that could occur from the recommissioning of the facility as well as the risks that would occur should there be a failure.</p>
<p>1.3. How will this development pollute and / or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were</p>	<p>The recommissioning of the Withok TSF will occur on the footprint of the old Withok TSF that was previously reclaimed. This is a disturbed footprint, and the environment has been heavily impacted on by anthropogenic influences and</p>

Question	Response and Reference in The Report
<p>explored to enhance positive impacts?</p>	<p>historical mining activities.</p> <p>Updated groundwater and surface water impact assessments were undertaken to identify the extent of the impact and to propose mitigation measures. Additionally, to this, required designs were undertaken in alignment with the requirements of the various Competent Authorities. This ensured that additional mitigation measures and pollution prevention measures are implemented.</p> <p>An air quality impact assessment was undertaken to identify the current impacts and the impacts of the recommissioning.</p> <p>Stormwater management and pollution plume management options were investigated.</p>
<p>1.4. What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimize, reuse and / or recycle the waste? What measures have been explored to safely treat and / or dispose of unavoidable waste?</p>	<p>The activity is in itself a waste activity as it is the establishment of a TSF by the deposition of reprocessed tailings.</p> <p>A Waste Management License (WML) is being applied for as part of the EA application.</p> <p>The project might also generate a minimal amount of general (domestic) waste. Ergo has a waste management procedure for all its activities and this will be implemented at the TSF.</p> <p>Mitigation measures to manage waste are included in the EMPr.</p>
<p>1.5. How will this development disturb or enhance landscapes and / or sites that constitute the nation’s cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The Withok TSF will be situated on the historical footprint of the old Withok TSF that was reclaimed. The Proposed recommissioning will also be placed just south of the existing and operational Brakpan TSF, the visual landscape of the area has already been impacted by the historical impact of mining in the area.</p> <p>Recommissioning the facility is not anticipated to further change the visual characteristic of the area. The project does not constitute an irreplicable loss of</p>

Question	Response and Reference in The Report
	<p>visual resources. Following closure, it is advised that the TSF be vegetated and rehabilitated to represent an artificial mountainous / hill feature. Mitigation measures to reduce the visual intrusion of the TSF will be included in the EMPr.</p> <p>The project is not expected to disturb or impact on the nation’s cultural heritage. However, a heritage impact assessment was undertaken to identify whether or not the recommissioning or a potential failure would have any impacts on cultural heritage downstream of the project site. No heritage resources were identified.</p>
<p>1.6. How will this development use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimize and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>Resources which will be utilized for the project include water and electricity.</p> <p>Electricity is currently sourced from Eskom. However Ergo has built a 60MW Photovoltaic (PV) Plant and 180MW Battery Energy Storage System (BESS). This will be able to provide an alternative source of electricity to Ergo’s operations.</p> <p>Process water from the TSFs or RWD from Brakpan will be pumped to the Ergo Plant and or Central Water Facility (CWF) in Germiston for re-use at all reclamation operations and will be used in the recommissioning of the Withok TSF. This reduces the need for potable water for recommissioning and processing activities. .</p> <p>Approximately 60% of the water used in the recommissioning activities is recycled.</p>
<p>1.7. How will this development use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impact on the ecosystem jeopardize the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimize the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</p>	<p>This development will result in impacts to the local environment. The required specialists have been mobilized to identify the possible impacts that might occur to the local environment as well as proposed possible mitigation measures to minimize these.</p> <p>The proposed project will house waste material from the re-establishment of the TSF to be undertaken by Ergo.</p> <p>Electricity is currently sourced from Eskom. However Ergo has built a 60MW PV</p>

Question	Response and Reference in The Report
<p>1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialized growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)</p> <p>1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</p> <p>1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?</p>	<p>Plant and 180MW BESS. This will be able to provide an alternative source of electricity to Ergo’s operations.</p> <p>Process water from the TSFs or RWD from Brakpan will be pumped to the Ergo Central Water Facility (CWF) in Germiston for re-use at all Ergo operations. This reduces the need for potable water for recommissioning and processing activities.</p>
<p>1.8. How were a risk-averse and cautious approach applied in terms of ecological impacts?</p> <p>1.8.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>1.8.2. What is the level of risk associated with the limits of current knowledge?</p> <p>1.8.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>The list of gaps and uncertainties are listed in the EIA (Section 10.1).</p> <p>The potential for Acid Mine Drainage (AMD) formation was determined by means of a geochemical model in the groundwater impact assessment. It must be understood that this does not represent the actual impacts as they are realized.</p> <p>The potential impacts of air quality and noise were determined by modelling simulations. This is as accurate as can be predicted but may not represent the actual impacts as they are realized. To validate modelled predictions, dust fallout monitoring, surface- and groundwater, and radiological monitoring must be undertaken throughout the project life.</p>
<p>1.9. How will the ecological impacts be resulting from this development impact on people’s environmental right in terms following:</p> <p>1.9.1. Negative impacts: e.g., access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour,</p>	<p>The ecological impacts were assessed during the EIA phase.</p> <p>Section 9.5 of this report lists potential impacts identified.</p>

Question	Response and Reference in The Report
<p>etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimize, manage and remedy negative impacts?</p> <p>1.9.2. Positive impacts: e.g., improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</p>	
<p>1.10. Describe the linkages and dependencies between human wellbeing, livelihoods, and ecosystem services applicable to the area in question and how the development’s ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?</p>	<p>The Withok TSF will be situated on the historical footprint of the old Withok TSF that was reclaimed. The Proposed recommissioning will also be placed just south of the existing and operational Brakpan TSF. The potential socio-economic impacts were investigated during the EIA via specialist studies.</p> <p>There is an impact risk should there be a failure and this impact was assessed by a zone of influence analysis, which fed into the specialist studies.</p>
<p>1.11. Based on all the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?</p>	<p>Section 9.5 of the Environmental Impact Report lists potential impacts identified.</p>
<p>1.12. Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?</p>	<p>The Withok TSF will be situated on the historical footprint of the old Withok TSF that was reclaimed (Brownfields). The Proposed recommissioning will also be placed just south of the existing and operational Brakpan TSF. No location alternative was assessed. The location of the site and associated infrastructure are limited and therefore this site is considered the best practicable environmental option rather than a new Greenfields location.</p> <p>The environmental and social impacts resulting from an unlikely failure were assessed.</p>
<p>1.13. Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope, and nature of the project in relation to its location and existing and other planned developments in the area?</p>	<p>Section 9.5 of the Environmental Impact Report list potential impacts identified. Potential cumulative impacts could include:</p> <ul style="list-style-type: none"> • Contamination of soils and groundwater resources through improper vegetating / sealing of the TSF at decommissioning. • Soil erosion due to ineffective re-vegetation / rehabilitation at disturbed areas and excessive surface water runoff from the TSF (at

Question	Response and Reference in The Report
	<p>decommissioning).</p> <ul style="list-style-type: none"> • Dust generation and subsequent decrease in air quality affecting human health, nearby agricultural fields and nearby businesses and dwellings and due to ineffective vegetating of the TSF / sealing and rehabilitation. • Potential TSF failure and associated damage to the environment.
Promoting justifiable economic and social development	
<p>2.1. What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:</p> <p>2.1.1. The IDP (and its sector plans’ vision, objectives, strategies, indicators, and targets) and any other strategic plans, frameworks of policies applicable to the area,</p> <p>2.1.2. Spatial priorities and desired spatial patterns (e.g., need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</p> <p>2.1.3. Spatial characteristics (e.g., existing land uses, planned land uses, cultural landscapes, etc.), and</p> <p>2.1.4. Municipal Economic Development Strategy (“LED Strategy”).</p>	<p>A socio-economic impact assessment was undertaken. The socio-economic context of the region and the area around the Withok TSF is described in Section 8.10.</p> <p>Table 5-1 in Section 5 details the applicable provincial and local policies, guidelines and by-laws considered during the EIA process.</p>
<p>2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements / aspects), and specifically also on the socio-economic objectives of the area?</p> <p>2.2.1. Will the development complement the local socioeconomic initiatives (such as local economic development (LED) initiatives), or skills development programs?</p>	<p>The proposed project is the recommissioning of a TSF that will not result in any further economic benefits for the employees or nearby communities. However, there will be temporary jobs created during the construction phase. If the project is authorized, it will provide continuous employment for a portion of the current Ergo employees.</p> <p>Ergo has a Social and Labour Plan (SLP) in place which considers LED initiatives. The SLP will be applicable to this project. Ergo contributes millions per year to the SLP and will continue to do so for the next 20 years.</p>
<p>2.3 How will this development address the specific physical, psychological, developmental, cultural, and social needs and interests of the relevant</p>	<p>The development will contribute to the ongoing operation of Ergo’s processing</p>

Question	Response and Reference in The Report
<p>communities?</p>	<p>plant and recommissioning activities.</p> <p>Although this will not create permanent additional employment opportunities, it will allow for continued employment for Ergo’s employees. This will be beneficial to the existing employees of Ergo and will allow Ergo to continue to positively contribute to the regional economy and GDP. The project will create temporary employment opportunities during the construction period.</p>
<p>2.4 Will the development result in equitable (intra- and intergenerational) impact distribution, in the short and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</p>	<p>The development will contribute to the ongoing operation of Ergo’s processing plant and recommissioning activities. This will promote the continued employment of Ergo employees.</p> <p>The project will enable the continued removal of TSFs across the region. The removal of TSFs will make land available for redevelopment which will benefit communities and businesses.</p>
<p>2.5. In terms of location, describe how the placement of the proposed development will:</p> <p>2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</p> <p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable nonmotorized and pedestrian transport (e.g., will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available</p>	<p>Ergo’s employment policies indicate that where feasible, employment should be offered to local residents. Residential opportunities will not be generated by the project. The recommissioned TSF will enable the continuation of recommissioning activities and allow for the continued employment of employees at Ergo.</p> <p>The project will not reduce the need for transport of people and goods or result in changes to public transport. The proposed project will not improve access to public transport or enable non-motorized and pedestrian transport.</p> <p>The TSF will be recommissioned on the previously disturbed land which previously housed the TSF. This will be located on land owned by Ergo next to it existing and operational Brakpan TSF.</p> <p>The project is not related to urban development and will not result in the construction of bulk infrastructure for public use. Most of the infrastructure will be removed from site at closure. The TSF will be vegetated and rehabilitated to</p>

Question	Response and Reference in The Report
<p>with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g., not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p> <p>2.5.11. encourage environmentally sustainable land development practices and processes, 2.5.12. take into account special locational factors that might favour the specific location (e.g., the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.12. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e., an area with high economic potential),</p> <p>2.5.13. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural historic characteristics and sensitivities of the area, and</p> <p>2.5.14. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	<p>an artificial mountainous / hill feature.</p> <p>The recommissioning activities will enable land previously sterilized by TSFs to be made available for development. This is in line with the Gauteng Mine Residue Area Strategy (2012).</p> <p>The project is unlikely to result in urban sprawl.</p> <p>Electricity is currently sourced from Eskom. However Ergo has built a 60MW PV Plant and 180MW BESS. This will be able to provide an alternative source of electricity to Ergo's operations.</p> <p>Process water will be pumped to the Ergo Central Water Facility in Germiston for re-use at all Ergo's operations. This reduces the need for potable water for recommissioning and processing activities.</p> <p>The recommissioning of TSF is not expected to result in any changes to existing and planned settlements in the area. No resettlement of surrounding communities is required.</p> <p>The proposed project will make use of the existing road networks and will not include the construction of any additional residential settlements.</p>
<p>2.6. How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</p> <p>2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and</p>	<p>A socio-economic impact assessment was undertaken, and the gaps and limitations have included in the EIA. This can be seen in Section 10 and within the specialist assessment in Appendix D.</p>

Question	Response and Reference in The Report
<p>assumptions must be clearly stated)?</p> <p>2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability, and sustainability) associated with the limits of current knowledge?</p> <p>2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	
<p>2.7. How will the socio-economic impacts resulting from this development impact on people’s environmental right in terms following:</p> <p>2.7.1. Negative impacts: e.g., health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>2.7.2. Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>The impacts have identified in the socio-economic impact assessment and are presented in the EIA in chapter 8.10.</p> <p>Mitigation measures relating to the potential socio-economic impacts are included in the EMPr (Appendix E). Possible impacts are listed below:</p> <p>Negative impacts</p> <ul style="list-style-type: none"> • Loss of life, damages to infrastructure, and damage to the environment (soils, surface water, groundwater etc.) due to the potential of TSF failure. • Decrease in air quality as a result of dust generated. • Safety impacts on people (accidents; fire hazards; risk of theft; vandalism; damage to equipment). <p>Positive impacts</p> <ul style="list-style-type: none"> • If the proposed project gets authorized, Ergo will be able to continue its recommissioning activities, thereby extending the life of its operations and delaying the retrenchment of employees. • Investment into and development of LED initiatives. • Rehabilitation and improvement of an area significantly impacted by historical and current mining activities - this may result in a reduction of illegal mining activities and associated social ills.
<p>2.8 Considering the linkages and dependencies between human wellbeing,</p>	<p>Currently, the TSF does not provide any ecosystem services as the land has been</p>

Question	Response and Reference in The Report
<p>livelihoods, and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development’s socio-economic impacts will result in ecological impacts (e.g., over utilisation of natural resources, etc.)?</p>	<p>transformed by historic mining and agricultural activities.</p>
<p>2.9 What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socioeconomic considerations?</p>	<p>The Withok TSF will be situated on the historical footprint of the old Withok TSF that was reclaimed. The Proposed recommissioning will also be placed just south of the existing and operational Brakpan TSF. Therefore, no location alternatives are considered. No feasible alternatives are available for consideration, and the location of the project and associated impacts is not in favour of one group of people over another.</p>
<p>2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?</p>	<p>A comprehensive public participation process, guided by Chapter 6 of the EIA Regulations (GNR982 of 2014), was undertaken throughout the Scoping and EIA phases. The Public Participation Process followed is described in Section 7 of this Report.</p> <p>The TSF was designed using, among other things, best practice and the Code of Practice for Mine Residue (SABS 0286:1998) which will include stringent safety precautions to prevent TSF failure. The TSF will be managed as a high hazard facility in terms of the Code of Practice. The TSF design aligns with the GISTM requirements where appropriate.</p> <p>The EMPr provides mitigation measures for any expected impacts on all sectors of society and include grievance management measures.</p> <p>A Financial Provision for closure is included in the EIA/EMPr to ensure that rehabilitation and any potential long-term impacts of the recommissioned TSF are adequately provided for.</p>
<p>2.11 What measures were taken to pursue equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by</p>	<p>The proposed project area is not providing any ecosystem services as the land has been transformed by agricultural and historic mining activities. Therefore, should the project go ahead, it would not affect equitable access to environmental</p>

Question	Response and Reference in The Report
categories of persons disadvantaged by unfair discrimination?	resources, benefits, and services to meet basic human needs
<p>2.12. What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?</p>	<p>The EMPr provides mitigation measures for any expected impacts throughout the life cycle of the project – construction, operation, decommissioning, closure, and post-closure.</p> <p>A detailed zone of influence analysis was undertaken.</p> <p>The TSF is designed and will be operated using best practice and the Code of Practice for Mine Residue (SANS 10286) that include stringent safety precautions to prevent TSF failure.</p> <p>The proposed activities will be operated in strict accordance with the requirements of the Mine Health and Safety Act, No. 29 of 1996.</p> <p>The EIA includes a Financial Provision report for closure to ensure that the rehabilitation and any long-term impacts of the expanded TSF are adequately provided for.</p>
<p>2.13. What measures were taken to:</p> <p>2.13.1. ensure the participation of all interested and affected parties,</p> <p>2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</p> <p>2.13.3. ensure participation by vulnerable and disadvantaged persons,</p> <p>2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</p> <p>2.13.5. ensure openness and transparency, and access to information in terms of</p>	<p>A comprehensive public participation process has been undertaken as per the requirements of Chapter 6 of the EIA Regulations (GNR982 of 2014), detailed in Section 7 of this report.</p>

Question	Response and Reference in The Report
<p>the process,</p> <p>2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and</p> <p>2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?</p>	
<p>2.14. Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g., a mixture of low-, middle-, and high income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)</p>	<p>A comprehensive public participation process has been undertaken as per the requirements of Chapter 6 of the EIA Regulations (GNR982 of 2014), detailed in Section 7 of this report.</p>
<p>2.15. What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?</p>	<p>Ergo will comply with the requirements of the Mine Health and Safety Act, No. 29 of 1996 and will ensure that itself and the contractor/s employed will comply with the relevant legislation and company policies.</p>
<p>2.16. Describe how the development will impact on job creation in terms of, amongst other aspects:</p> <p>2.16.1. the number of temporary versus permanent jobs that will be created,</p> <p>2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e., do the required skills match the skills available in the area),</p> <p>2.16.3. the distance from where labourers will have to travel,</p> <p>2.16.4. the location of jobs opportunities versus the location of impacts (i.e.,</p>	<p>Ergo’s employment policies indicate that where feasible, employment should be offered to local labour.</p>

Question	Response and Reference in The Report
<p>equitable distribution of costs and benefits), and</p> <p>2.16.5. the opportunity costs in terms of job creation (e.g., a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</p>	
<p>2.17. What measures were taken to ensure:</p> <p>2.17.1. that there were intergovernmental coordination and harmonization of policies, legislation and actions relating to the environment, and</p> <p>2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</p>	<p>Section 5 of this report details all relevant national and local legislation, policies, and guidelines that have been reviewed and incorporated.</p> <p>During the Scoping and EIA phases, all relevant State Departments were provided with copies of environmental documentation for comment. Refer to Appendix C and the Comments and Response Report.</p>
<p>2.18. What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people’s common heritage?</p>	<p>The recommissioning of the current location of the Brakpan TSF and future location of the Withok TSF does not provide any ecosystem services and therefore, no ecosystem services will be lost if the proposed project is granted.</p> <p>All environmental impacts, including appropriate mitigation and management measures as well as monitoring measures, will be considered by the EAP and incorporated into the EIA / EMPr.</p> <p>The project area will be rehabilitated at decommissioning and closure to closely resemble an artificial hill / mountainous feature.</p> <p>The Financial Provision report for closure will ensure that environmental remedies and rehabilitation are incorporated, and sufficient budget has been allocated for these.</p>
<p>2.19. Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</p>	<p>The mitigation measures which will be set out in the EMPr aim to be realistic and practical.</p> <p>If the recommended closure measures are successfully implemented, it is anticipated that the project area will be of an improved condition after rehabilitation and closure.</p>

Question	Response and Reference in The Report
<p>2.20. What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</p>	<p>The proposed project is being implemented as a means of reducing pollution from other TSFs, by allowing those TSFs to be reclaimed and the reprocessed tailings to be deposited at a controlled facility.</p> <p>In accordance with the requirements of Regulations 5 and 6 of the NEMA Regulations on Financial Provision (GN940 of 2014) and the DMRE Guidelines on Financial Provision, the quantum for closure-related financial provision will be determined to ensure that adequate funds are made available upfront (prior to the commencement of the project) for the rehabilitation, management, and remediation of negative residual environmental impacts.</p> <p>The EMPr provides mitigation, management and monitoring measures to ensure that potential negative impacts are managed throughout the life of the TSF and post-closure.</p> <p>The Applicant will be legally bound to comply with the conditions of the EMPr.</p>
<p>2.21. Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</p>	<p>The best practice environmental option has been identified and discussed in the EIA Report, taking into consideration all of the specialists' findings.</p>
<p>2.22. Describe the positive and negative cumulative socioeconomic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</p>	<p>The cumulative socio-economic impacts have been identified by the Socio-Economic Impact Assessment, and have been included in the EIA report in chapter 9 and within Appendix D.</p>

6.6 Conclusion: Need and Desirability

Historical underground mining operations on the Witwatersrand have left the region littered with TSFs such as slimes dams, sand stockpiles and other accumulations of slimes. These TSFs have become pollution sources, safety risks to surrounding communities and a limitation to spatial development.

The overall objective of this project is to enable continued recovery of residual gold from tailings within region. The resultant residue from the reprocessing plant will be deposited at the Withok TSF facility. This will allow for the rehabilitation and clearance of land currently occupied by the existing TSFs.

The Proposed Project would also directly and indirectly contribute to the country's Growth Domestic Product (GDP), as well as provide continued employment to current employees of Ergo.

Overall, the Proposed Project is in line with the objectives of the Gauteng Mine Residue Area Strategy (2012), which are to reclaim and/or rehabilitate TSFs to the point where they become safe for adjacent communities and land can be made available for other purposes.

7 Public Participation Process

The Public Participation Process (PPP) offers stakeholders an opportunity to be informed about the Proposed Project, to raise issues and to make suggestions for enhanced project benefits. The PPP has been undertaken to ensure compliance with the relevant legal framework applicable to the proposed Withok TSF recommissioning project.

7.1 Applicable Legislation

The PPP as required by the environmental laws and regulations specified therein will be followed as best practice. The PPP has been undertaken in line with the statutory requirements for public participation. The following legislation has been considered when developing and implementing the PPP:

- ❖ National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- ❖ The Environmental Impact Assessment Regulations, 2014 (as amended) (EIA 2014 Regulations);
- ❖ Public Participation guideline in terms of NEMA;
- ❖ The National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- ❖ National Environmental Management: Waste Act 59 of 2008 (NEM:WA): List of Waste Management Activities;
- ❖ The Constitution of the Republic of South Africa, 1996;
- ❖ Protection of Personal Information Act, 2013 (Act No. 4 of 2013) (POPIA);
- ❖ Promotion of Access to Information Act, 2000 (Act No. 2 of 2000) (PAIA); and
- ❖ International good-practice guidelines for public participation and the Core Values of the International Association for Public Participation.

POPIA: Safeguarding registered person's personal information

In terms of section 19 of the Protection of Personal Information Act (POPIA), a responsible party must, subject to Sections 9 and 11 of the Act, ensure the integrity and confidentiality of personal information in its possession or under its control by taking appropriate, reasonable technical and organisational measures to prevent loss of, damage to or unauthorised destruction of personal information, unlawful access to or processing of personal information. POPIA requires that personal information should be adequately protected to avoid unauthorised access. Therefore, Kongiwe continuously reviews security controls and procedures to ensure that personal information is secured. It should be noted that in terms of Section 11, personal information may be processed to the extent that this is necessary for pursuing the legitimate interests of the responsible party to whom the information is supplied.

7.2 Objectives of the Public Participation Process

The PPP objectives for this project were to:

- ❖ Ensure that stakeholders are informed about the proposed Withok Recommissioning TSF Project.
- ❖ Provide stakeholders with the opportunity to participate in the environmental regulatory processes and provide comment.

- ❖ Involve stakeholders in identifying ways in which comments can be addressed.
- ❖ Work directly with stakeholders throughout the environmental regulatory processes to ensure that stakeholder comments are consistently understood and considered.
- ❖ Verify that stakeholder comments have been recorded and addressed.

The stakeholder engagement process has been undertaken in four phases as presented in Table 7-1 below:

Table 7-1: Stakeholder Engagement activities

Project Phase	Activities to be Undertaken
<p>Pre-scoping Phase <i><u>(Process complete)</u></i></p>	<ul style="list-style-type: none"> ❖ Stakeholder identification (WinDeed searches, compilation of stakeholder database); ❖ Landowner/ occupier consultation meetings; ❖ Consultation with the relevant Authorities (including ward councillors/ward committees) (Microsoft teams/One-on-one consultation meetings); ❖ Compilation of announcement documents (BID, Registration Sheet, Advert, site notice and Draft Scoping Report (DSR) notification letter) and providing project information to stakeholders; ❖ Obtaining initial comments, suggestions from stakeholders; and ❖ Land Claims enquiry.
<p>Scoping Phase <i><u>(Process complete)</u></i></p>	<ul style="list-style-type: none"> ❖ Consultations with Directly Affected Landowners (Microsoft teams / One-on-one consultation meetings); ❖ Distribution and placement of project announcement materials (site notices, newspaper advertisements); ❖ Updating of the stakeholder database; ❖ Making available the Scoping Report for public review and comment; ❖ Providing stakeholders with further details of the proposed project and associated specialist studies; ❖ Consultations with stakeholders (virtual meetings and in-person meetings); ❖ Obtaining further comments or suggestions from stakeholders; and ❖ Informing specialists and the applicant about comments received from stakeholders.
<p>EIA Phase <i><u>(Process complete)</u></i></p>	<ul style="list-style-type: none"> ❖ Provide feedback about the specialist studies conducted and mitigation measures proposed by means of consultation with stakeholders; ❖ Provide opportunity for I&APs to comment on specialist findings, impacts assessments and recommendations; ❖ Make the relevant environmental reports available for public review and comment; ❖ Consultations with stakeholders (virtual meetings and in-person meetings); ❖ Verify that comments raised by I&APs have been accurately recorded; and ❖ Inform specialists and the proponent of stakeholders' comments.
<p>Decision Making Phase</p>	<ul style="list-style-type: none"> ❖ Once the competent authorities have come to a decision regarding the authorisation of the project, all registered stakeholders will be notified of the decision made and the appeal process will be explained.

7.3 Summary of Issues raised by Stakeholders

The following key issues have been raised by I&APs thus far:

- ❖ Potential dust impacts emanating from the Withok TSF, that could lead to negative health impacts;
- ❖ End land use;
- ❖ Surface water management on site; and
- ❖ Economic aspects of the project and how the communities will benefit.

Comments raised by stakeholders during the scoping phase are included in the Comments and Responses Report (CRR) (**Appendix C9**).

7.4 Public Participation Undertaken

Refer to **Appendix C** for the full detailed Public Participation Report.

The following section is a summary of the Public Participation Process (PPP) undertaken.

7.4.1 Scoping Phase Public Participation

Table 7-2 below provides a summary of the stakeholder engagement activities that formed part of the Scoping Phase.

Table 7-2: Summary of activities undertaken as part of the Scoping Phase

Activity	Details	Reference in Draft Scoping Report
Stakeholder identification and analysis	Stakeholders were identified by means of WinDeed searches, stakeholder networking and research for the compilation of a stakeholder database. The database has been updated with new I&APs who formally registered and attended stakeholder meetings or submitted comments.	Appendix C1 Stakeholder database
Identification of land claims	A formal Letter of enquiry was compiled and sent to the Land Claims Commission, Mr Solomon Maruma from the Gauteng office of the Department of Agriculture, Land Reform and Rural Development (DALRRD), Office of the Regional Land Claims Commissioner: Gauteng Province on Friday, 18 October 2024. The letter contained a list of all the directly affected properties for the project (Appendix C2). Feedback was received from DALRRD by means of letters dated 25 October 2024 (Appendix C2) indicating that there are land claims, but they are not valid.	Appendix C2 Land claims enquiry letter and correspondence from the DALRRD.

Activity	Details	Reference in Draft Scoping Report
	<p>Ms Edith Mokgoko from DALRRD clarified that the letter references a challenge to the Amendment Act of 2014 and states that the land claims are considered invalid in view of the finding of the Constitutional Court. Accordingly, the claims were not investigated further to confirm their validity. The claimants listed in the letter are being kept on record until Parliament passes new legislation that allows for the re-opening of land claim submissions.</p>	
<p>Distribution of Background Information Document</p>	<p>The BID was compiled and distributed to all stakeholders on the database. The BID was available on the following website: Kongiwe’s website: https://kongiwe.com/projects/</p>	<p>Appendix C3 BIDs</p>
<p>Distribution of GISTM Fact Sheet</p>	<p>The fact sheet was emailed to all stakeholders on the database when the project was announced. The Fact Sheet was available on Kongiwe’s website: https://kongiwe.com/projects/</p>	<p>Appendix C3 GISTM Fact Sheet</p>
<p>Placement of newspaper advertisements</p>	<p>Newspaper adverts were placed in the Ekurhuleni News, on Thursday, 24 October 2024, and in The Star, on Tuesday, 22 October 2024.</p>	<p>Appendix C4 Newspaper advertisements</p>
<p>Placement of site notices</p>	<p>Site notices were placed at publicly accessible places within proximity of the project.</p> <p>Copies of the site notices were placed at the following public places:</p> <ul style="list-style-type: none"> ❖ Brakpan Public Library ❖ Tsakane Public Library ❖ Vosloruus Public Library ❖ Katlehong Public Library ❖ Zonkizizwe Public Library ❖ Randvaal Public Library ❖ Henley on Klip Public Library ❖ Meyerton Public Library <p>A site notice placement report and map have been developed, indicating the exact locations of where the site notices were placed, with photos and GPS co-ordinates.</p>	<p>Appendix C5 Site notice report and placement map</p>
<p>Announcement of the project and the availability of the Draft Scoping Report</p> <p>DSR Non-technical Summary</p>	<p>The announcement letter was distributed to stakeholders to:</p> <ul style="list-style-type: none"> ❖ Announce availability of the Draft Scoping Report; ❖ Invite stakeholders to the Open Day; ❖ Indicate where the Scoping Report was available for public review and comment. 	<p>Appendix C6 Announcement Correspondence</p> <p>Appendix C3 BID</p>

Activity	Details	Reference in Draft Scoping Report
	<p>The Draft Scoping Report was available on the following website: Kongiwe’s website: https://kongiwe.com/projects/</p> <p>A copy of the DSR and non-technical summaries were placed in the following public place:</p> <p>Public Libraries (Scoping Report):</p> <ul style="list-style-type: none"> ❖ Brakpan Public Library ❖ Tsakane Public Library <p>Public Libraries (non-technical summary):</p> <ul style="list-style-type: none"> ❖ Vosloruus Public Library ❖ Katlehong Public Library ❖ Zonkizizwe Public Library ❖ Randvaal Public Library ❖ Henley on Klip Public Library ❖ Meyerton Public Library 	
<p>Stakeholder meetings</p>	<p>Consultation meetings were aimed at engaging with key stakeholders regarding the proposed project to obtain initial comments which will inform specialist studies and project planning. The project team presented an overview of the proposed recommissioning of the Withok TSF project. Locality, infrastructure and land tenure maps were part of the meetings.</p> <p>Stakeholders were invited to participate through online and face-to-face engagements Consultation meetings with authorities, directly and indirectly affected landowners was held via online forums such as Microsoft Teams, or telephonically or face-to-face depending on preference.</p>	<p>Appendix C8</p> <p>List of meetings & Meeting Minutes</p> <p>Appendix C9</p> <p>Comment and Response Report</p>
<p>Broader Public Consulting meetings:</p> <p>Scoping Phase</p>	<p>Stakeholders were invited to participate through online and face-to-face engagements. Consultation meetings were held via online forums such as Microsoft Teams, and an Open day wase held with the broader public. The purpose of these meetings was to discuss the proposed project, contents of the DSR, and to provide stakeholders with an opportunity to raise their comments and to interact with the project team members.</p> <p>The following meetings were held:</p> <p>In-Person Meeting:</p>	<p>Appendix C8</p> <p>List of meetings & Meeting Minutes</p> <p>Appendix C9</p> <p>Comment and Response Report</p>

Activity	Details	Reference in Draft Scoping Report
	<ul style="list-style-type: none"> ❖ An <u>Open day</u> was held on Saturday, 9 November 2024 from 09H00 – 12H00 at Tsakane ext. 22 Mega Primary School, 19732 Mashimin St & Shiburi St, Tsakane, Brakpan, 1550 <p>Online Meeting:</p> <ul style="list-style-type: none"> ❖ Wednesday, 6 November 2024 from 10H00-11H00 on Microsoft Teams/scheduled Telephonic discussions. <p>Minutes of these meetings were compiled and distributed to everyone who attended these meetings. Comments raised from the meetings have been included in the CRR. Verified Images from the Open Day Meeting, as shown below:</p>	



Figure 7-1: Photos from the Open Day held on Saturday, 9 November 2024

7.4.1.1 Consultation Undertaken as part of the Final Scoping Phase

The aim of consultation during the Final Scoping Phase was to focus on the formal EIA process, specialist impact studies, Terms of Reference and addressing comments from stakeholders.

The Final Scoping Report was submitted to the DMRE on **02 December 2024**.

Stakeholders were notified of the availability of the Final Scoping Report for review. Stakeholders were provided with an opportunity to verify that their comments were captured during the draft Scoping phase, and to review responses provided by the project team. All comments received on the Final Scoping Report will be incorporated into the CRR.

Table 7-3:PPP activities undertaken during the Final Scoping Phase

Activity	Details
Update of stakeholder information	The stakeholder database was updated with new I&APs who formally registered, participated in stakeholder meetings or submitted comments.
Placement of Final Scoping Reports	The Final Scoping Report (FSR) was made available following website: ❖ Kongiwe’s website: https://kongiwe.com/projects/
Announcement of the Final Scoping Report	Notification letter notifying stakeholders about the availability of the Final Scoping Report for comment was emailed to the full stakeholder database. An SMS was sent to stakeholders who have no access to the internet, arrangements will be made to ensure that all stakeholders had full access to the reports - arrangements and requests were accessed on a case-by case basis.

7.4.2 EIA Phase Public Participation

Consultation with stakeholders during the Environmental Impact Assessment phase entailed providing stakeholders with comments on specialist study findings, recommendations and mitigation measures proposed. These studies and recommendations were included as part of the EIA/EMPr. Stakeholder meetings were also held to present the findings of the specialist studies and to get comments from stakeholders. The format of stakeholder meetings was similar to the Scoping phase, these were determined on a case-by-case basis depending on stakeholders’ preference.

Table 7-4: Summary of PPP activities - Final Environmental Impact Assessment Phase

Activity	Details	Reference in EIA/EMPr
Announcement of the availability of the Draft EIA/EMPr Reports	A Notification letter which provided details about the availability of the Draft EIA/EMPr for public review and comment and an invitation to online and face-to-face engagements was emailed to the full stakeholder database.	Appendix C6 Announcement Letter

Activity	Details	Reference in EIA/EMPr
Placement of media advertisement for the EIA Phase	<p>Newspaper adverts were placed in the Ekurhuleni News, on Thursday, 20 March 2025, and in The Star, on Tuesday, 18 March 2025.</p> <p>The advertisement provided details about the public review period for the Draft EIA/EMPr and how the public could access the draft reports for their review and comment. The advert also provided information about virtual and non-virtual engagements.</p>	<p>Appendix C4</p> <p>Advertisements</p>
Placement of Draft EIA/EMPr/IWWMP Reports for public review and comment	<p>The <u>Draft EIA/EMPr report</u> was compiled and was made available for a 30-day public review and comment period from Thursday, 20 March 2025 to Tuesday, 22 April 2025.</p> <p>Copies of the abovementioned report were available on the following website:</p> <ul style="list-style-type: none"> ❖ Kongiwe’s website: https://kongiwe.com/projects/ <p>A hard copy of the reports and copies of the non-technical summary in English were made available for public review and comment at the following public place:</p> <p>Public Libraries (Draft EIA/EMPr):</p> <ul style="list-style-type: none"> ❖ Brakpan Public Library ❖ Tsakane Public Library <p>Public Libraries (non-technical summary):</p> <ul style="list-style-type: none"> ❖ Vosloruus Public Library ❖ Katlehong Public Library ❖ Zonkizizwe Public Library ❖ Randvaal Public Library ❖ Henley on Klip Public Library ❖ Meyerton Public Library <p>A copy of the <u>Draft EIA/EMPr</u> were also be made available at the Stakeholder Meetings.</p> <p>Copies of the <u>Draft EIA/EMPr</u> were sent to the DMRE and various Commenting Authorities for review and comment.</p>	-
Open Day	Stakeholders were invited to participate through online and in-person engagements. Consultation meetings were held using platforms like Microsoft Teams, telephonic discussions, and an Open Day. Online engagements	<p>Appendix E8</p> <p>Minutes of this Meeting</p>

Activity	Details	Reference in EIA/EMPr
	<p>activities were available during the public review period, details of these meetings are indicated below. Minutes of the of these meetings and the presentation has been compiled and distributed to all stakeholders who attended.</p> <p>Additionally, an Open Day was held at the Tsakane ext. 22 Mega Primary School 19732 Mashimin St & Shiburi St, Tsakane, Brakpan, 1550 on Saturday, 29 March 2025 from 09H00 to 11H00. Attendance of this meeting was confirmed by stakeholders. The purpose of these Stakeholder Meetings was to discuss the Draft EIA/EMPr and the Draft IWWMP, present findings from the specialist studies, provide stakeholders with a platform to raise comments on the Draft EIA/EMPr and the Draft IWWMP reports and interact with the project team.</p> <p>Posters with information regarding the Proposed Project description, findings from the specialist studies, impacts and proposed mitigation measures were displayed, these posters included various maps of the affected areas. Copies of the non-technical summary was distributed to stakeholders who attended. The non-technical summaries were available in English. Minutes of the Open Day and the posters have been compiled and distributed to all stakeholders who attended. Verified Images from the Open Day Meeting, as shown below:</p>	<p>Appendix C9</p> <p>Comment and Response Report</p>





Figure 7-2: Photos from the Open Day held on Saturday, 29 March 2025

All comments raised by stakeholders during these meetings were captured into the CRR (Appendix C9). Responses to comments are provided in line with the overall project scope and available information.

7.4.2.1 Availability of the Final EIR/EMP

Stakeholders will be notified of the availability of the Final EIA/EMPr for review by the CA’s.

Table 7-5: Summary of the PPP activities - Final EIA phase

Activity	Details
Announcement of the Final EIA/EMPr	Notification letter notifying stakeholders about the availability of the of the Final EIA/ EMPr for comment will be emailed to the full stakeholder database. Stakeholders who have no access to the internet, arrangements will be made to ensure that all stakeholders have full access to the reports - arrangements and requests will be accessed on a case-by case basis.
Placement of of the Final EIA / EMPr /IWWMP	The Final EIA / EMPr will be available as follows: <ul style="list-style-type: none"> ❖ Copies of the Final EIA / EMPr will be available on the following website: <ul style="list-style-type: none"> ○ Kongiwe’s website: https://kongiwe.com/projects/
Submission to the Authorities	The Final EIA/EMPr will be submitted to the DMRE

7.4.3 Consultation during the Decision-Making Phase

Once the DMRE has come to a decision regarding the authorisation of the project, all registered stakeholders will be notified of the decision made and the appeal process to be followed. The decision from the DMRE will be communicated to stakeholders by means of a notification letter (electronic), SMS, local newspaper advertisement, and on Kongiwe’s website.

8 The Baseline Environment and Specialist Findings

This Chapter provides a description of the environment that may be affected by the Project. The information is provided to assist the reader in understanding the receiving environment within which the project is proposed, and features of the biophysical, social, and economic environment that could be directly or indirectly affected by, or alternatively could impact on, the proposed Project. This information has been sourced from existing available information and the on-site specialist investigations conducted as part of the EIA and aims to provide the context within which this EIA is being conducted. The full impact assessments undertaken by the independent specialists, including detailed descriptions of the affected environment, are attached as Appendices D of this EIA Report.

8.1 Climate

The proposed project falls within the Highveld climatic zone which is associated by warm, rainy summers and cold winters. The area’s wettest months occur from October through to March, with the driest months occurring over the period of June to August. The Proposed Project falls within the Soweto Highveld Grassland vegetation type. This is characterised by summer rainfall with a warm temperature with frequent occurrence of frost (in winter). This vegetation unit experiences thermic continentality, with high extremes between maximum and minimum winter temperature, along with large thermic diurnal differences (Mucina, 2006). The mean annual temperature (MAT) of 15°C indicates a transition between a cool-temperate and a warm-temperate climate. Frost is frequent during the winter months. The Mean Annual Precipitation (MAP) for the region in 662 mm (Mucina, 2006)

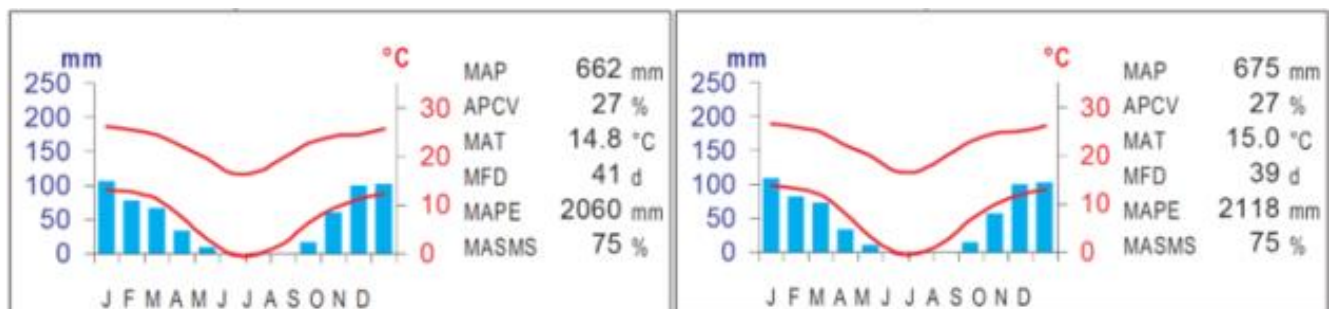


Figure 8-1: Climate based on the Soweto Highveld Grassland (left) and the Tsakane Clay Grassland (right) vegetation types (TBC, 2024).

8.1.1 Rainfall

Daily rainfall data for the area was obtained from the CCWR (Computing Centre for Water Research, University of Kwazulu-Natal) database. Gauge number 0476736 (Springs (RWB)) was used. The gauge is located 12 km northwest of the site. The data spans the period 1903 to 2000. South African Weather Services’ (SAWS) daily rainfall was also purchased for gauge 0476766 Springs Olympia Park and used to extend the rainfall record. This is the closest active/recently active SAWS rainfall station, located approximately 16 km northwest of the site.

The site has a MAP of 688 mm and the average monthly rainfall is indicated in Figure 8-2. The wettest months occur from October through to March, with the driest months occurring over the period of June to August. Rainfall is mostly in the form of convective thunderstorms, which are often brief, but regularly high in intensity. Tropical and frontal rainfall systems also occur in the region but are not as common.

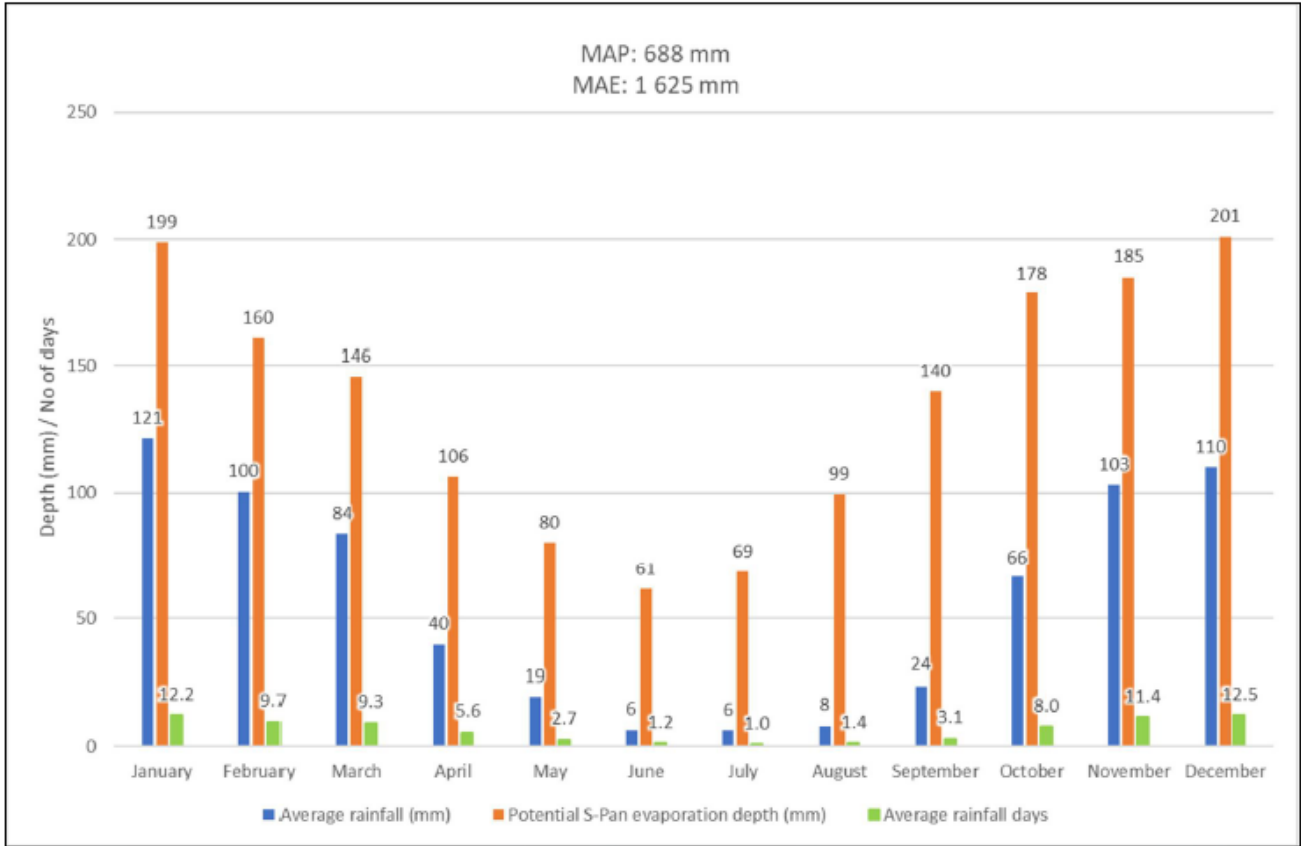


Figure 8-2: Average monthly rainfall totals for the project area (iLanda, 2025).

8.1.2 Peak 24-hr Rainfall Data

The peak 24-hr rainfall depths are presented in Table 3.

The daily rainfall record, discussed in section 6.3, was analysed and the annual maximum series was extracted from the data. This annual maximum series was statistically analysed to determine various T-year recurrence interval 24-hour storm depths. A Log Pearson Type 3 distribution was selected as the most appropriate statistical fit. The rainfall record is long, consists of good data, is representative of the TSF complex, and is suitable to be used to calculate peak rainfall.

Table 8-1: Peak 24-hr Rainfall Depths for the TSF Complex (iLanda, 2025)

Recurrence interval (year)	24-hour rainfall depth (mm)
2	52
10	85

Recurrence interval (year)	24-hour rainfall depth (mm)
20	99
50	119
100	136
200	153
1 000	199

8.1.3 Evaporation

Evaporation plays a crucial role in mining tailing operations, particularly in areas with high evaporation rates like Brakpan, Withok and Rooikraal area. Factors Influencing Evaporation:

- ❖ **Climate:** High temperatures, low humidity, and wind speeds contribute to increased evaporation rates.
- ❖ **Tailing characteristics:** The size, shape, and composition of tailing particles affect evaporation. Finer particles tend to have higher evaporation rates.
- ❖ **Water content:** The amount of water present in the tailings influences evaporation. Higher water content leads to increased evaporation.
- ❖ **Solar radiation:** Direct sunlight exposure enhances evaporation.

The Recommissioning of the Withok TSF proposed site is adopted monthly evaporation for indicated in Table 8-2. Evaporation is highest over the summer months, with December and January being the highest, and lowest over the winter months.

Table 8-2: Symons Pan and open water evaporation for the project (iLanda, 2025)

Month	Symons Pan Evaporation (mm)	Open Water Evaporation Factor	Open Water Evaporation (mm)
January	199	0.84	167
February	160	0.88	141
March	146	0.88	128
April	106	0.88	94
May	80	0.87	70
June	61	0.85	52
July	69	0.83	57
August	99	0.81	81
September	140	0.81	113
October	178	0.81	144
November	185	0.82	152
December	201	0.83	167
Total	1 625	N/A	1 366

8.1.4 Temperature

The average midday temperatures range from 26°C in June to 17°C in January (Figure 8-3). During winter, the temperature drops to 4°C on average during the night. The overall mean annual temperature is 15°C, with the climate transitioning between cool temperate and warm-temperate. Winters are dry with frequent frost that occurs from mid-April to September. Summers are mild with temperatures that are seldom above 26°C - 30°C.

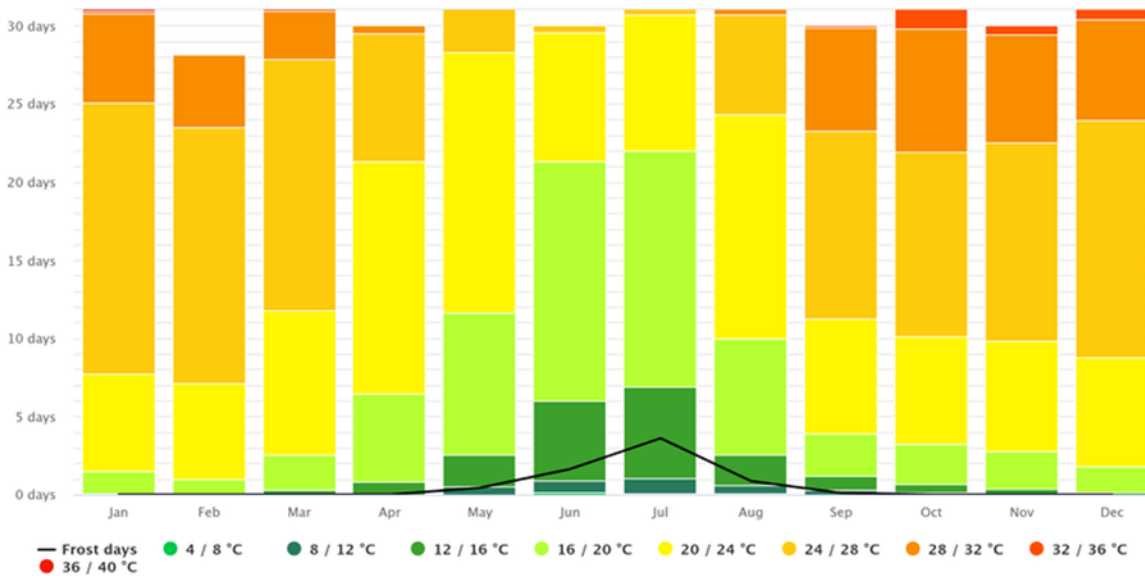


Figure 8-3: Simulated historical temperature for Brakpan, South Africa (meteoblue.com) (Bioswitch, 2025).

8.1.5 Wind Direction

Wind roses graphically present wind conditions over a period of time at a specific location. Wind roses for the project are presented in Figure 8-4 below. In the wind roses, the length of each spoke represents the percentage of time that the wind blew from that direction during the period. The percentage scale is presented on the concentric grey lines (the circle scale increment is indicated on each of the wind roses). Each spoke is divided by colour into wind speed ranges.

The predominant winds at the Withok TSF (as given by the WRF data for the period from 2021 to 2023) are from a west-south-westerly and east-south-easterly directions for almost 10% of the time (Figure 8-4). **The highest number of winds with speeds greater than 6 m/s are expected from the west.** The average hourly wind speed predicted by the WRF model is approximately 2.0 m/s. Calm conditions (wind speeds below 0.5 m/s) are predicted for approximately 3 % of the time.

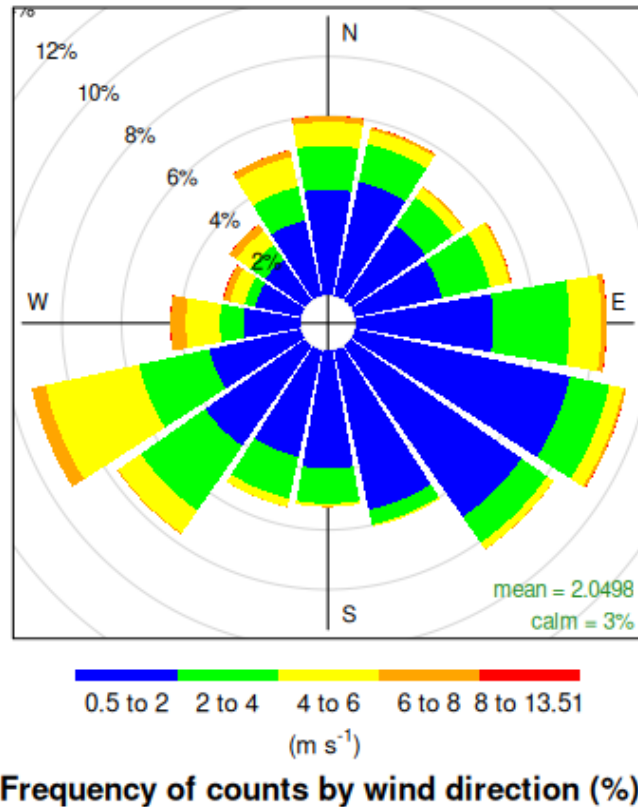


Figure 8-4: Wind rose of the average winds produced by the WRF model for the Withok TSF for the years 2021-2023 (Gondwana, 2024).

There is a clear diurnal variation in the predominant wind direction. During the day, most winds originate from a west-south-westerly direction. The prominent winds at night are from the east-south-easterly direction. However, winds with the highest speeds are not aligned with these predominant directions, neither during the day nor at night. During the day, most winds with speeds above 6 m/s are from the west. At night, most winds with speeds above 4 m/s originate from the east. On average, wind speeds are higher during the day, but there are also more incidences of calm conditions during the day than at night (Figure 8-5).

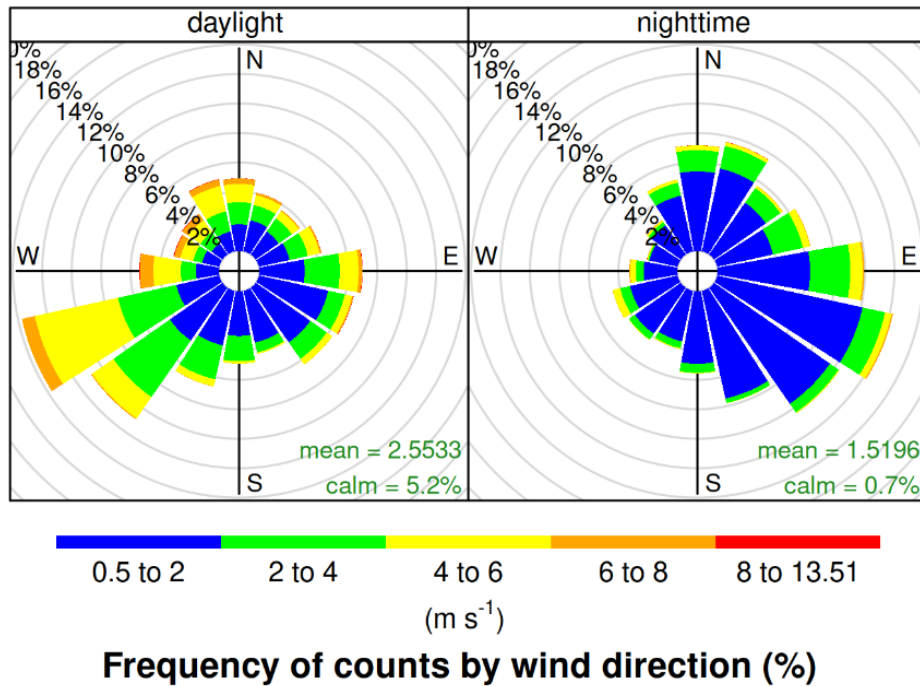


Figure 8-5: Diurnal wind roses predicted by the WRF model for the Withok TSF for the years 2021-2023 (Gondwana, 2024).

The seasonal variations in wind direction for the Withok TSF site are illustrated in (Figure 8-6). In spring, the highest number of winds originate from the west-south-westerly direction. The highest number of winds with speeds above 6 m/s originate from the west and west-south-westerly directions. In summer, the predominant wind is experienced from the east and the highest number of winds with speeds above 6 m/s originate from the westerly direction. In autumn, the predominant wind is experienced from the west-south-westerly direction and the highest number of winds with speeds above 6 m/s also originate from the west-south-westerly direction. In winter, the predominant wind is experienced from the south-westerly direction and the highest number of winds with speeds above 6 m/s originate from the west-north-westerly and westerly directions. In all the seasons, winds with the highest speeds tend to not coincide with the dominant wind directions and often originate from the west. Average wind speeds are highest in spring, and most of the calm conditions are experienced in autumn.

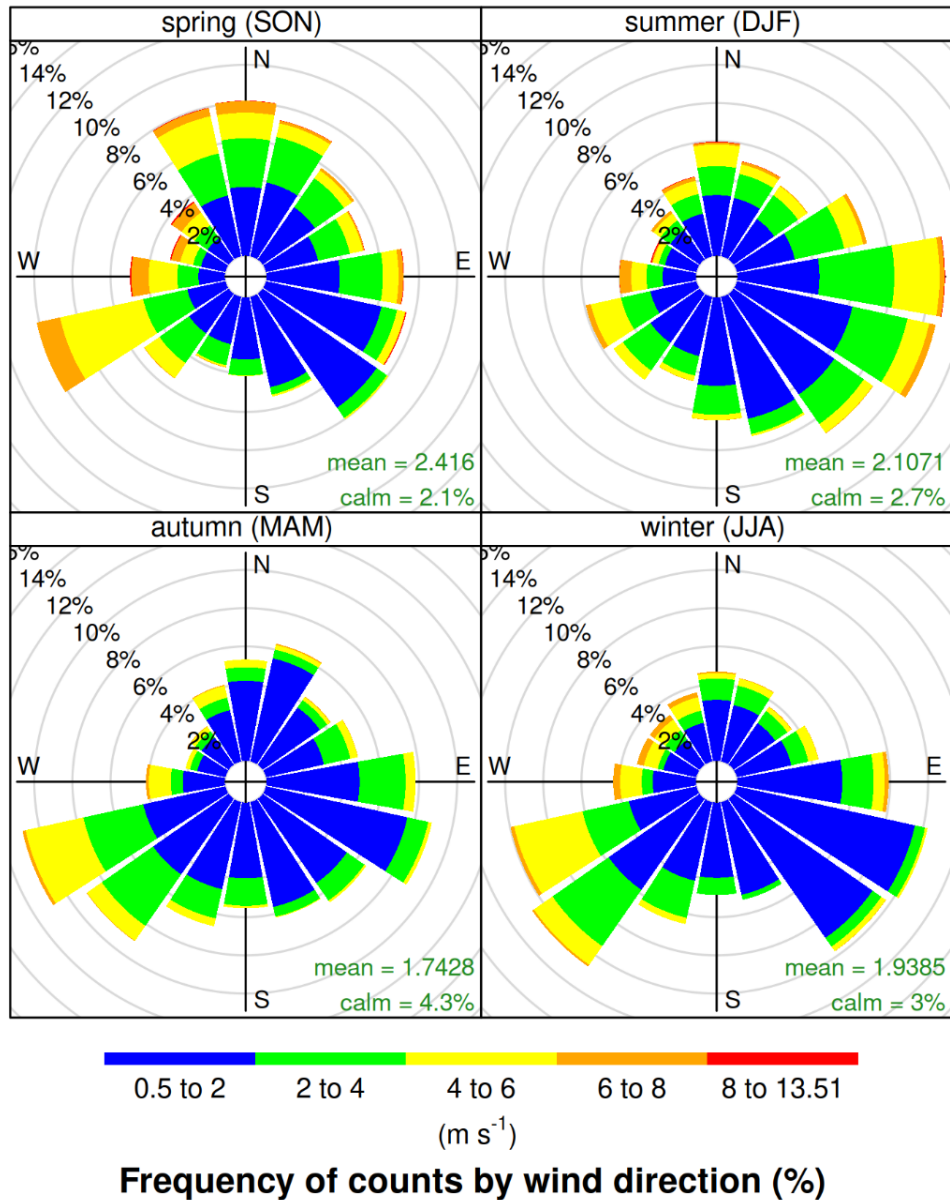


Figure 8-6: Seasonal wind roses produced by the WRF model for the Withok TSF for the years 2021-2023.

8.2 Topography

The topography describes the generally flat with a gentle slope of the earth surface and the site varies from 1 550 metres above mean sea level (mamsl) to 1 590 (mamsl) as shown on Figure 8-7. The proposed project site falls within Sub-district of Brakpan Ekurhuleni Metropolitan Municipality which is characterised by its distinct relatively flatness. The Withok TSF is situated on open and relatively flat land south of the confluence of the Rietspruit River and one of its tributaries. A series of prominent ridges runs from west to east to the south of the TSF. The elevation of the project area is approximately 1 575 m above mean sea level.

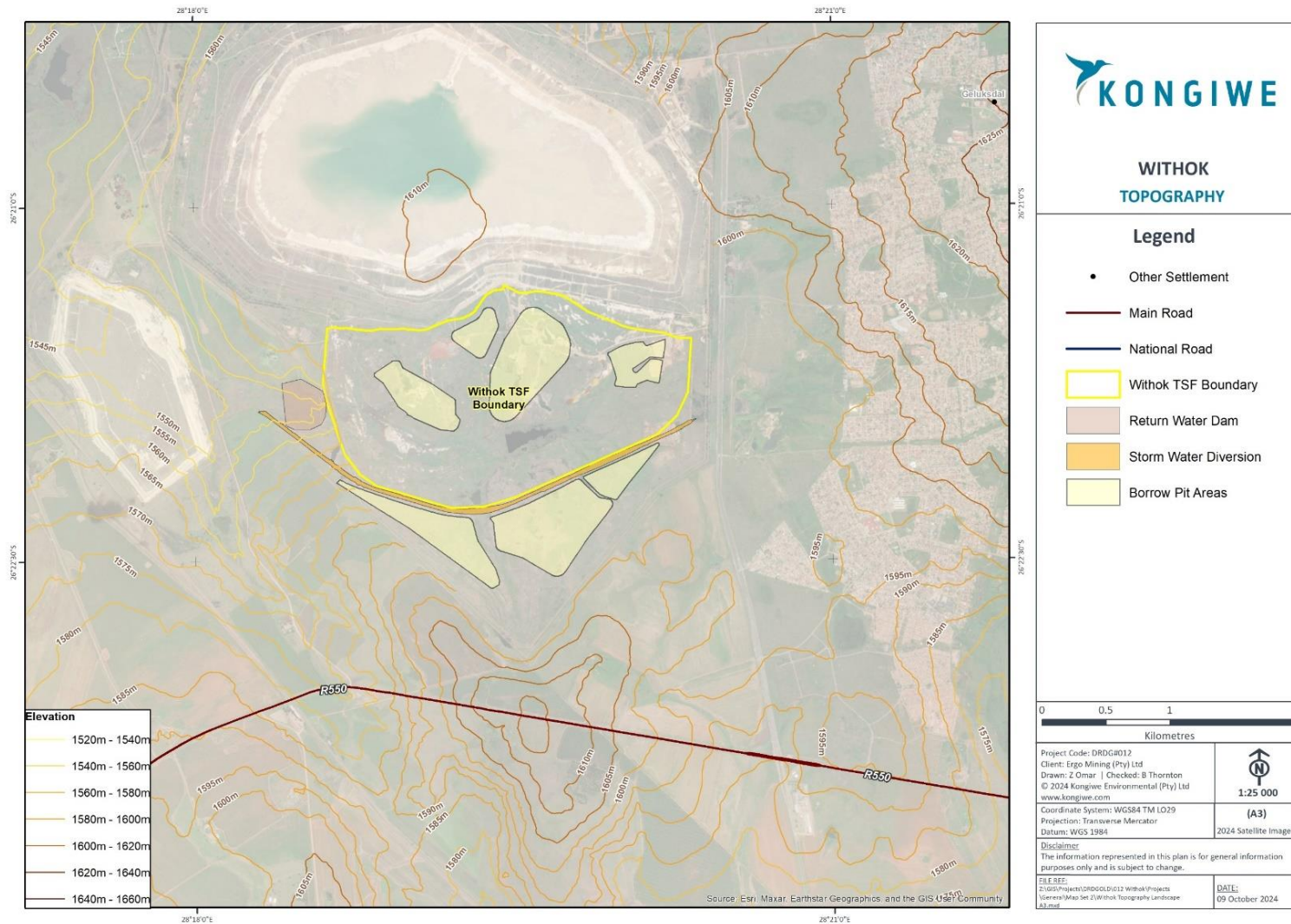


Figure 8-7: Project area topography

8.3 Geology

The existing Withok TSF footprint is underlain by the Ventersdorp and Transvaal Supergroup formations, which have been intruded by Post-Karoo dolerite. The Withok TSF site is adjacent the Malmani dolomite, in particular the Oaktree and Monte Christo formations. The dolomite becomes thinner towards the southeast where it extends beneath the Withok TSF footprint (Groundwater Abstract, 2018).

The geology of the project area is characterised by the Madzaringwe Formation shale, mudstone and sandstone from the Karoo Supergroup or the Karoo Suite dolerites which feature prominently in this area. To the west, the rocks of Ventersdorp, old Transvaal and Witwatersrand Supergroups are significant with the south being characterised by the Volksrust Formation from the Karoo Supergroup. Additionally, basaltic igneous rocks from the Ventersdorp Supergroup's Klipriviersberg Group can be found in the area (Mucina and Rutherford, 2006).

There are some patches of dolomitic rocks on the Withok TSF footprint which are being considered in terms of design and construction.

8.3.1 Ventersdorp Supergroup

The Ventersdorp Supergroup is a geological formation situated in the Brakpan-Withok area, within the Ekurhuleni Municipality of Gauteng Province, South Africa. The Ventersdorp Supergroup is of significant economic importance due to its rich mineral deposits. The supergroup is host to several gold and uranium deposits, which have been mined extensively in the Brakpan-Withok area. The Ventersdorp Contact Reef, in particular, is a significant gold-bearing reef that has been mined for many years.

This supergroup is a sequence of volcanic and sedimentary rocks that form part of the larger Witwatersrand Basin. The Ventersdorp Supergroup is a thick sequence of rocks that were deposited approximately 2.7 billion years ago during the Neoproterozoic era. The supergroup is divided into several groups, including the Ventersdorp Contact Reef, the Ventersdorp Lavas, and the Platberg Group. Strata in the Witwatersrand group generally dip at variable angles in a south or south-westerly direction. Geological faults are present in the area and orientated parallel to local streams. Figure 8-8 shows the geology of the project area.

8.3.2 Transvaal and Witwatersrand Supergroup

The Transvaal Supergroup and the Witwatersrand Supergroup are two distinct geological formations that are present in the Brakpan-Withok area. The Transvaal Supergroup is characterized by a series of volcanic and sedimentary rocks, while the Witwatersrand Supergroup is characterized by a series of sedimentary rocks. Both supergroups are host to several gold and uranium deposits, which have been mined extensively in the Brakpan-Withok area. The Transvaal Supergroup is older than the Witwatersrand Supergroup, and the two supergroups are separated by a series of faults and unconformities.

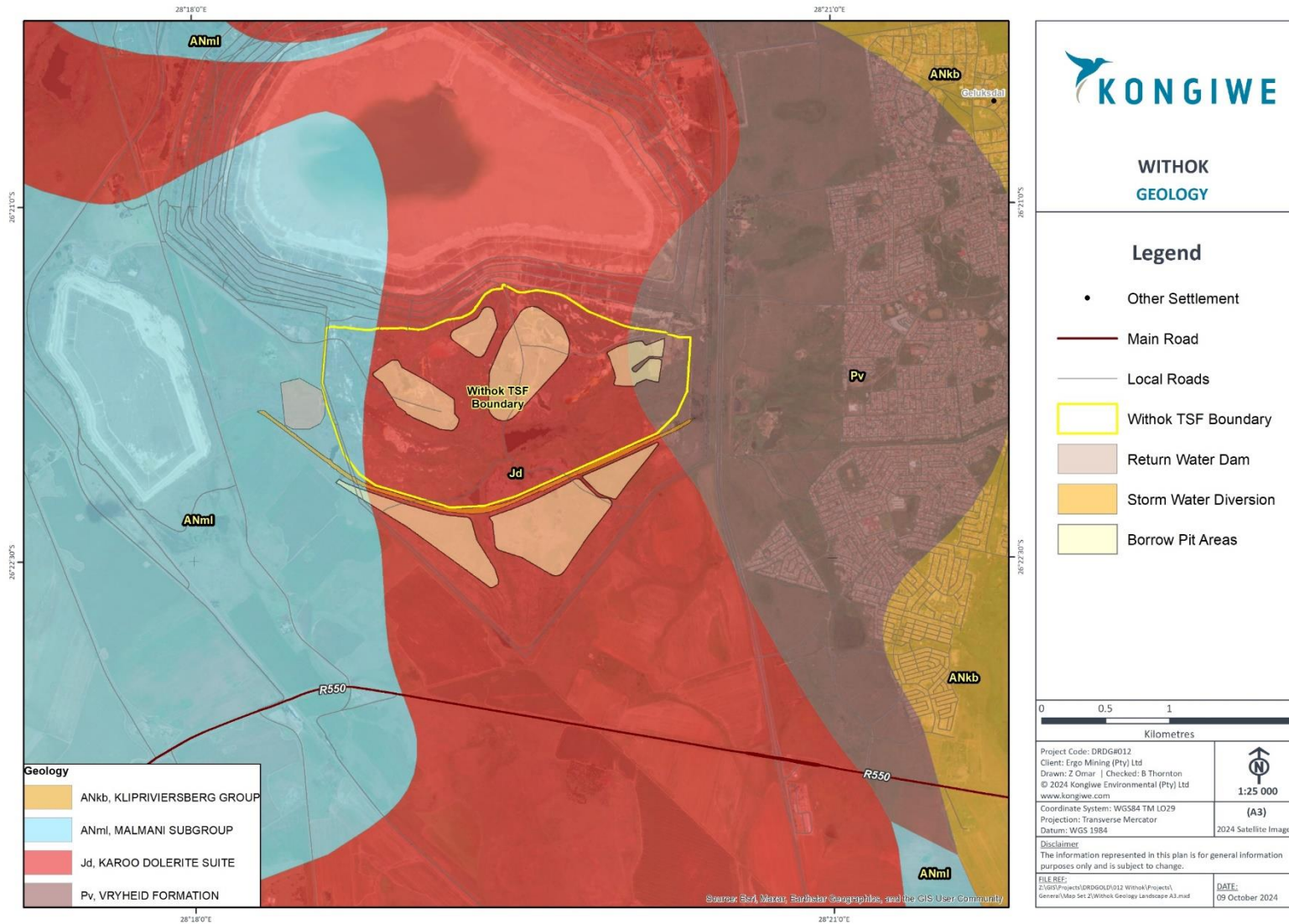


Figure 8-8: Regional geology.

8.4 Soils, Land Capability and Land Use

8.4.1 Soils

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by two different land types namely the Ea 20 and Da 1 land types. Ea land types consist of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated. The Ba land types consist of plinthic catena with upland duplex and marginalitic soils being rare and red soils being widespread. The Withok TSF area falls within the Ea20 land type with a small portion of the TSF area falling with the Ba1 land type (Figure 8-10). The land terrain units for the featured Ba 1 and Ea 20 land types of area illustrated in (Figure 8-9) with the expected soils list:

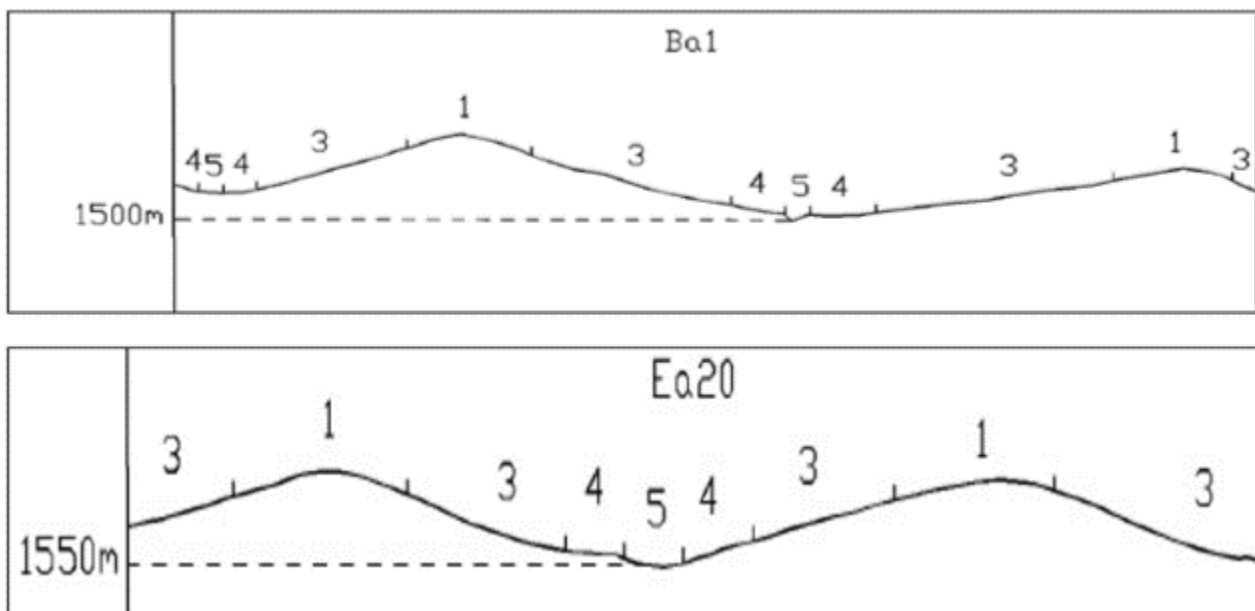


Figure 8-9: illustration of the land type terrain unit (Land type Survey staff. 1972-2006)

8.4.2 Land Capability

Land capability refers to the ability of land to support specific uses without causing damage. It takes into account physical factors such as soil type, slope, drainage, and climate to determine the best potential uses for a given area of land. The land capability of the area can be described as follows:

- ❖ Physical Characteristics
 - Topography: The area is generally flat, with some gentle slopes.
 - Soil: The soils in the area are predominantly sandy loams, with some clay loams.
- ❖ Land Capability Classification: Based on the physical characteristics, the land capability of the surrounding area can be classified as follows:

- Agricultural Capability: The area is suitable for dryland farming, with crops such as maize, soybeans, and wheat.
- Urban Development Capability: The area is suitable for urban development, with a high potential for residential, commercial, and industrial development.
- Conservation Capability: The area has limited conservation value, due to the presence of urban development and agricultural activities.

8.4.3 Land Use

The land use around the Withok TSF is a mixture of bare ground, agricultural land, grasslands, residential settlements, mines and water bodies traversing the site (Figure 8-11). The current land use patterns in the Brakpan-Withok area are:

- ❖ Urban Development: The area is characterized by a mix of residential, commercial, and industrial development.
- ❖ Agriculture: The area is used for dryland farming, with crops such as maize, soybeans, and wheat.
- ❖ Mining: The area has a history of mining, particularly for gold.

The following infrastructure is encountered in the area:

- ❖ Access roads;
- ❖ Withok TSF footprint;
- ❖ Withok pump station; and
- ❖ Attenuation dam, sump and diversion pipeline.
- ❖ National and provincial roads (N17);
- ❖ Agricultural holdings;
- ❖ Power lines;
- ❖ Slurry and water pipelines; and
- ❖ Other TSFs (Brakpan TSF and Rooikraal TSF).

According to the Region E Spatial Development Framework (SDF) (2015), the Withok TSF falls within the Zone 2: Agricultural 2b, which is a predominated moderate - high agricultural land potential land. The proposed location for the recommissioned TSF is on previously disturbed historic TSF footprint where the original Withok TSF was before it was reclaimed. Figure 8-11 summarises the land use in the area.

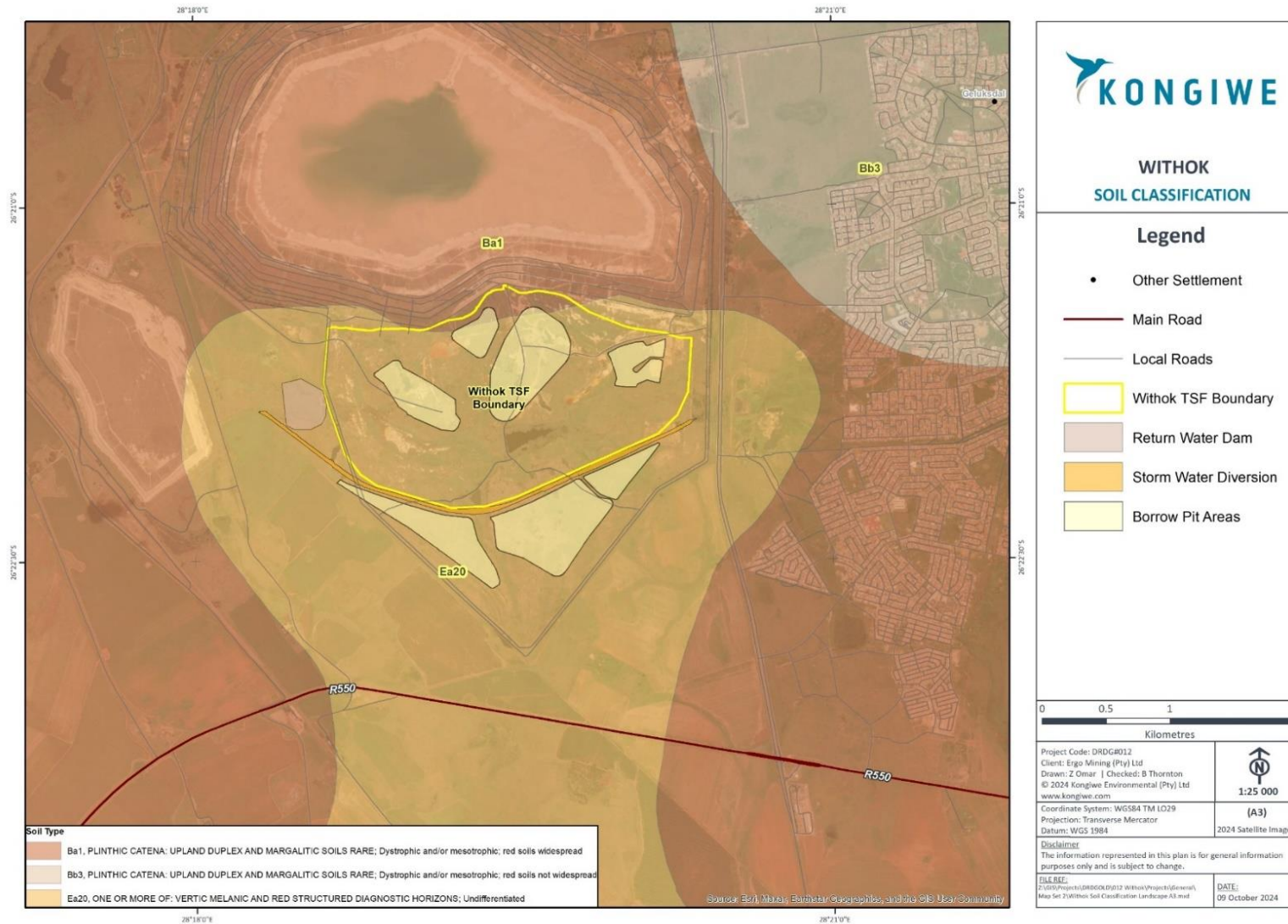


Figure 8-10: Soil map of the project area

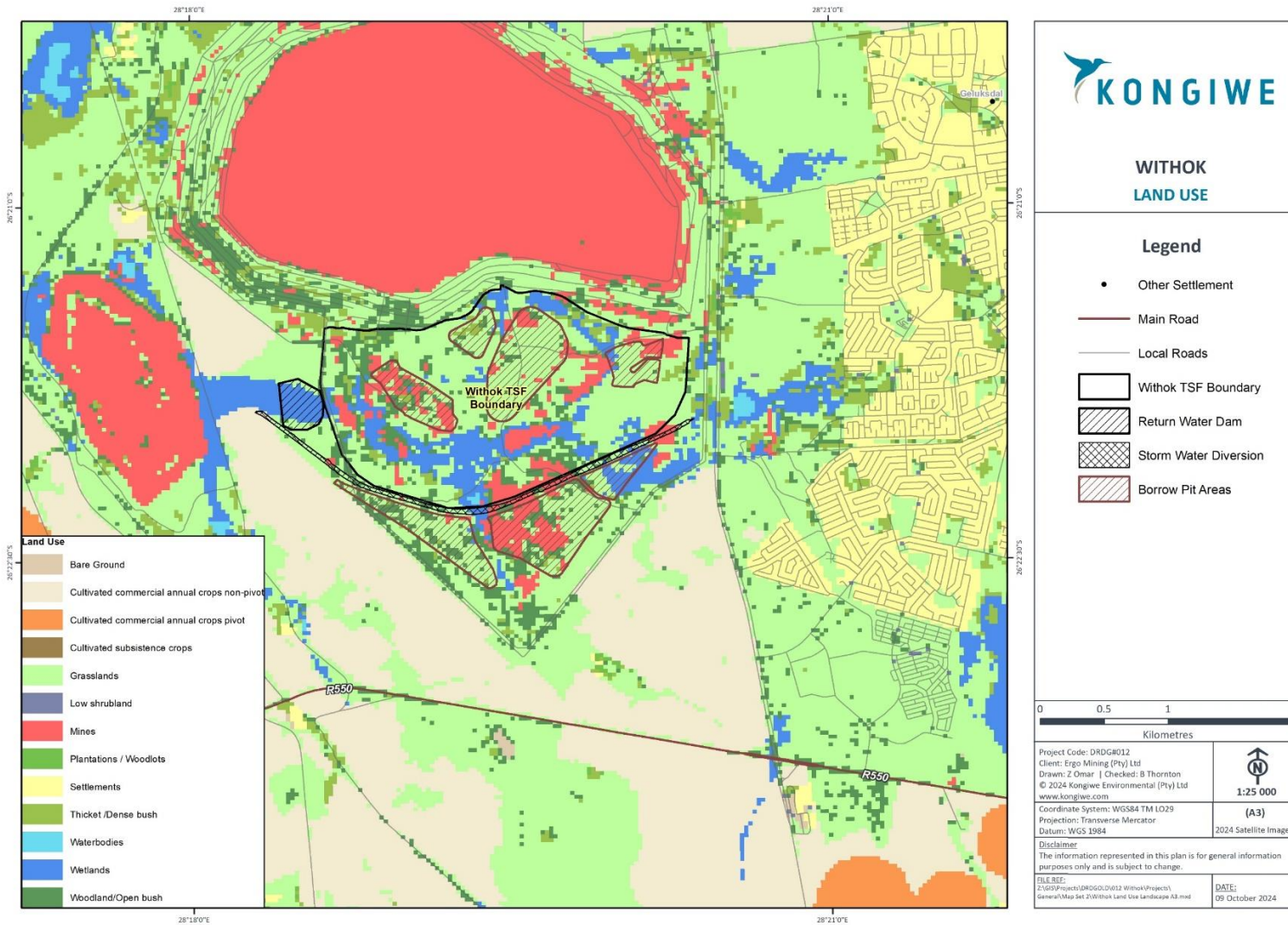


Figure 8-11: Land uses of the Proposed Project site and surrounding area

8.5 Biodiversity

Refer to Specialist Study: Appendix D1– Terrestrial Biodiversity Compliance Statement

8.5.1 Habitat Assessment

Four (4) main habitat types were identified across the PAOI and include:

- ❖ Degraded grassland;
- ❖ Transformed area;
- ❖ Wetlands and grassland habitat; and
- ❖ Wetlands habitat.

Table 8-3: Descriptions of the habitat types delineated for the PAOI

Habitat	Description and Condition
Degraded Grassland	<p>This habitat unit is characterised by secondary growth grassland habitat that has not fully recovered from historical clearing due to anthropogenic activities, such as human and vehicle ingress, invasions by alien and invasive plants, overgrazing by livestock and the edge effects associated with the nearby mining activities and the adjacent TSF, as well as inadequate rehabilitation procedures. Due to the high levels of disturbance, this habitat never regained full ecological function and is associated with high numbers of alien and invasive plants, such as, <i>Datura stramonium</i>, <i>Verbena bonariensis</i>, <i>V. brasiliensis</i>, <i>Bidens Pilosa</i>, <i>Tagetes minuta</i>, <i>Erigeron bonariensis</i>, <i>Acacia mearnsii</i> and <i>Eucalyptus camaldulensis</i>.</p> <p>Some sections of this habitat unit are in better condition than others, particularly those bordering on the water resource habitat, with good potential for rehabilitation back to an ecologically stable state. The areas of the site that overlap with the ESA are still representative as such and with active rehabilitation, have the potential to function as a valuable ecological corridor.</p> <p>Dominant indigenous species include, <i>Melinis repens</i>, <i>Themeda triandra</i>, <i>Cymbopogon pospischilii</i>, <i>Hyparrhenia hirta</i>, <i>Paspalum dilatatum</i>, <i>Cynodon dactylon</i>, <i>Aristida congesta</i> and <i>Seriphium plumosum</i>. Additional common grassland species associated with disturbance and secondary growth are expected, as well as some provincially protected species, particularly geophytes.</p> <p>No fauna or flora SCC were observed, and none are expected to be resident in the PAOI. Some fauna SCC may make use of the PAOI for foraging and as a movement corridor.</p>
Modified Grassland	<p>This habitat unit is characterised by secondary growth grassland habitat that has not recovered as well from historical clearing as the degraded grassland due to inadequate rehabilitation procedures, and still contains areas of visible tailings</p>

Habitat	Description and Condition
	<p>material from the previous land use as a TSF in 1996, as well as tailings material leaching from the adjacent TSF. Anthropogenic impacts are more severe here and include, human and vehicle ingress, invasions by alien and invasive plants, overgrazing by livestock and the edge effects associated with the nearby mining activities and the adjacent TSF.</p> <p>Due to the high levels of disturbance, this habitat never regained full ecological function and is associated with high numbers of alien and invasive plants, such as, <i>Datura stramonium</i>, <i>Verbena bonariensis</i>, <i>V. brasiliensis</i>, <i>Bidens Pilosa</i>, <i>Tagetes minuta</i>, <i>Erigeron bonariensis</i>, <i>Acacia mearnsii</i> and <i>Eucalyptus camaldulensis</i>, as well as areas of bare ground associated with tailings material. Anthropogenic activity has substantially modified this area’s primary ecological functions and species composition.</p> <p>Dominant indigenous species include, <i>Cymbopogon pospischilii</i>, <i>Hyparrhenia hirta</i>, <i>Paspalum dilatatum</i>, <i>Cynodon dactylon</i> and <i>Gomphocarpus fruticosus</i>. Additional common grassland species associated with disturbance and secondary growth are expected, as well as some provincially protected species, particularly geophytes.</p> <p>No fauna or flora SCC were observed, and none are expected to be resident in the PAOI. Some fauna SCC may make use of the PAOI for foraging and as a movement corridor.</p>
Water Resource	<p>This is a non-terrestrial habitat made up of wetlands and drainage features within the PAOI. This habitat unit is associated with hydrophytes, such as <i>Phragmites australis</i>, as well as high numbers of alien plant species, such as, <i>Arundo donax</i> and <i>Verbena brasiliensis</i>.</p> <p>No fauna or flora SCC were observed, and none are expected to be resident in the PAOI. Some fauna SCC may make use of the PAOI for foraging and as a movement corridor.</p> <p>Additional information regarding this habitat unit may be found in the accompanying freshwater assessment (TBC, 2024).</p>
Artificial Water Resource	<p>This is a non-terrestrial habitat made up of artificial wetlands and dams within the PAOI. This habitat unit is associated with hydrophytes, such as <i>Phragmites australis</i>, as well as high numbers of alien plant species, such as, <i>Arundo donax</i> and <i>Verbena brasiliensis</i>.</p> <p>No fauna or flora SCC were observed, and none are expected to be resident in the PAOI. Some fauna SCC may make use of the PAOI for foraging and as a movement corridor.</p> <p>Additional information regarding this habitat unit may be found in the accompanying freshwater assessment (TBC, 2024).</p>

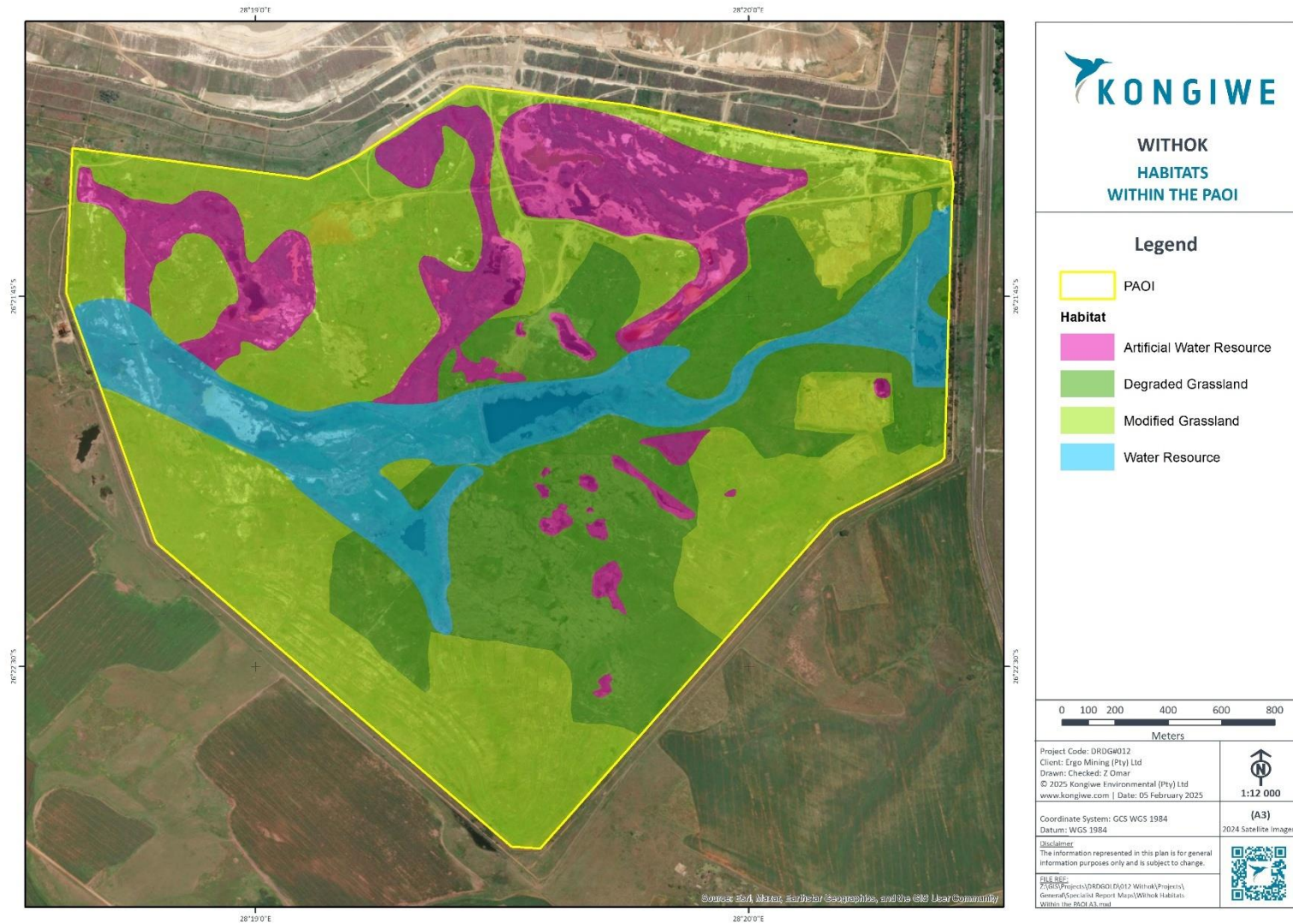


Figure 8-12: Identified habitat types

8.5.2 National Web-based Environmental Screening Tool

According to the National Web-based Environmental Screening Tool Report (Appendix D11) generated (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended), the PAOI presents with the following sensitivities (Table 8-4):

- ❖ **Terrestrial Biodiversity Theme** - as “Very High” attributed to the presence or possible presence of the Avalon Private Nature Reserve, Critical Biodiversity Areas 1 & 2, Ecological Support Areas 1 & 2, the National Protected Area Expansion Strategy, the Vulnerable Soweto Highveld Grassland, and the Endangered Tsakane Clay Grassland;
- ❖ **Plant Species Theme** - as “Medium” attributed to the presence or possible presence of numerous medium sensitivity plant species;
- ❖ **Animal Species theme** - as “High” attributed to the presence or possible presence of numerous “High” and “Medium” sensitivity animal species ; and
- ❖ **Aquatic Biodiversity Theme** - as “Very High” attributed to the presence or possible presence of Ecological Support Areas 1 & 2 and seep, depression and valley-bottom wetlands of the Mesic Highveld Grassland Bioregion.

The allocated sensitivities for each of the relevant themes are either disputed or validated for the overall PAOI in Table 8-4 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC species. A map illustrating the overall SEI allocations for the PAOI can be seen in Figure 8-13 .

Table 8-4: Summary of the screening tool vs specialist assigned sensitivities

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	High	Low	Disputed – Habitat exists in a largely degraded or modified state with high levels of anthropogenic disturbance, particularly those associated with the adjacent TSF, as well as historical land clearing. No SCC observed and unlikely to be resident, although some may use the habitats on site for foraging and as a movement corridor.
Plant Theme	Medium	Low	Disputed – Habitat exists in a largely degraded or modified state with high levels of anthropogenic disturbance, particularly those associated with the adjacent TSF. High numbers of alien and invasive plants. No SCC observed and unlikely to occur.
Terrestrial Theme	Very High	Low	Disputed – Habitat exists in a largely degraded or modified state with high levels of anthropogenic disturbance, particularly those associated with the adjacent TSF, and has therefore lost much of its ecosystem functionality. Habitat will not recover without human intervention and will continue to degrade over time without rehabilitation. Rehabilitation efforts thus far have been inadequate to return the ecosystem to a functional state.

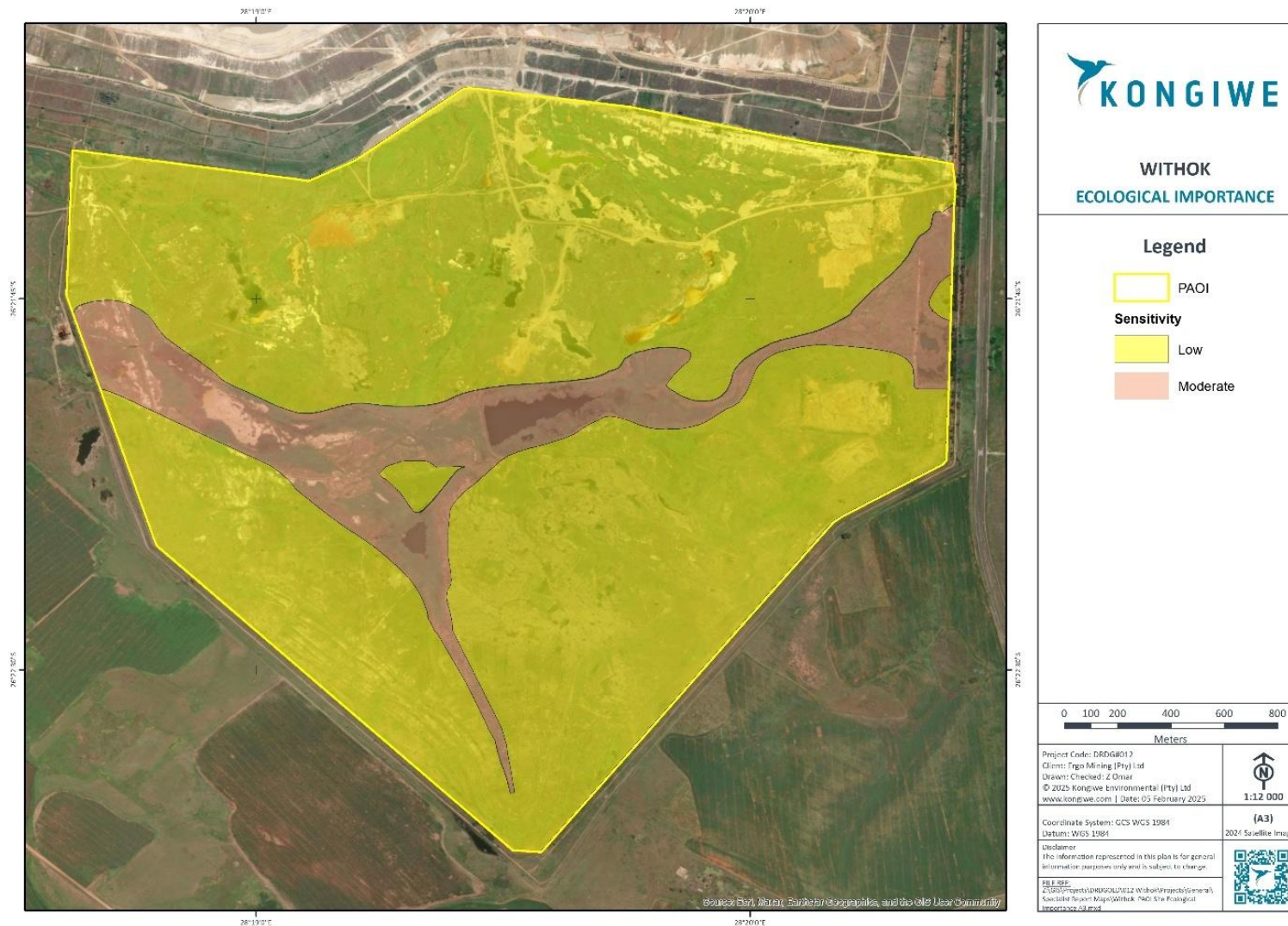


Figure 8-13: Map illustrating the site ecological importance for the PAOI

8.5.3 Wetlands

Refer to Specialist Study: Appendix D1– Aquatic Biodiversity Compliance Statement

A wetland is an area where water covers the soil, either seasonally or permanently. It can be saltwater, freshwater, or a mix of both. Wetlands function as distinct ecosystems and are characterized by vegetation adapted to wet soil.

8.5.3.1 Survey Results

During the site visit numerous artificial watercourses were identified within the project area of influence. These included unchannelled valley-bottom; Artificial depression within unchannelled valley bottom; Artificial seep; Excavated area; Drainage trench; Disturbed areas resulting in artificial wetland conditions (Figure 8-14)

Additionally, **several artificial features were observed which are attributed to the nature of the historical land use (a TSF) and owing to extensive reshaping of the topography during the site’s rehabilitation stages after decommissioning of the old TSF.** The artificial seep features are a result of hydrological inputs via trenched drains from the adjacent Brakpan TSF. Other artificial areas include depressions located within the unchannelled valley-bottom and throughout the site, that are assumed to be a result of reshaping during the rehabilitation stages of the old TSF and ongoing excavations, respectively. Due to the depth of excavation and reshaping activities within the unchannelled valley-bottom in conjunction with the surrounding topography, the artificial depressions display dam-like characteristics.

Wetland units were identified within the encompassing 500m PAOI. Importantly, the project components do not traverse any natural watercourses, ensuring minimal disruption to the natural hydrological environment. Due to the artificial characteristics of these systems, no further assessment has been undertaken.

It must also be noted that by implementing this project, clean surface water will be diverted around the southern part of the Withok TSF footprint which will enable the water to remain cleaner and not flow through an old TSF footprint. This in itself improves the water resource downstream.

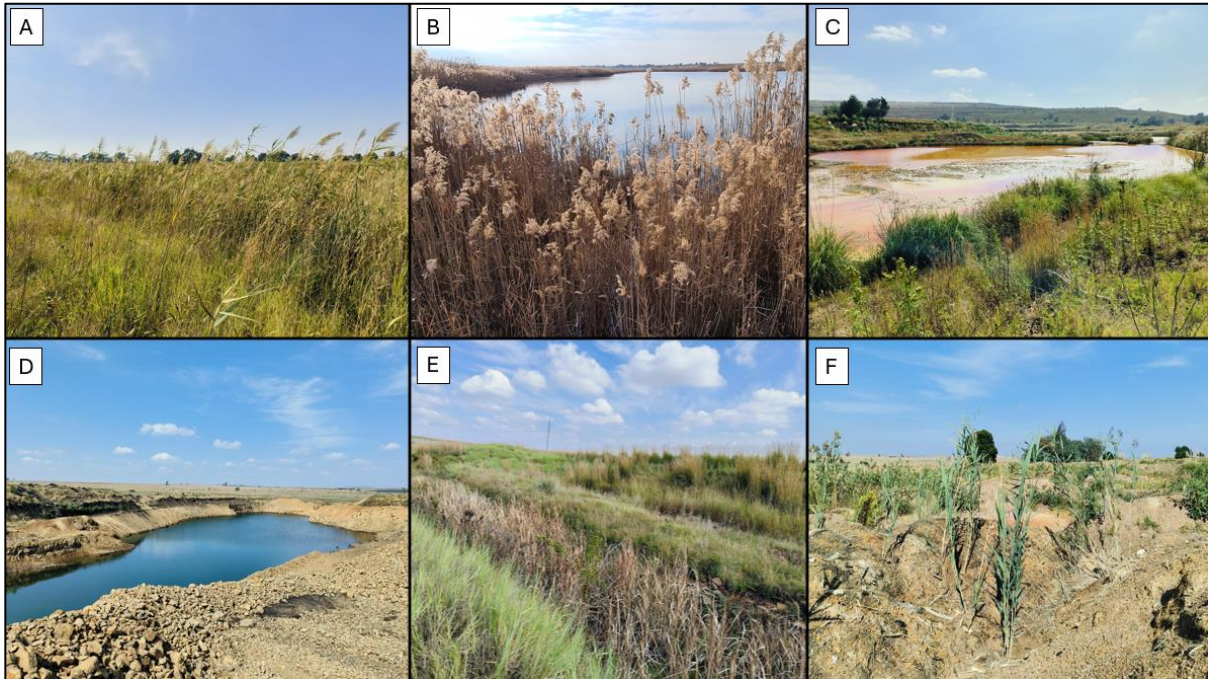


Figure 8-14: Representative photographs of the different wet areas within the project area. A) Unchannelled valley-bottom; B) Dam within unchannelled valley-bottom; C) Artificial seep; D) Excavated area; E) Drainage trench; & F) Disturbed areas resulting in artificial wetland conditions

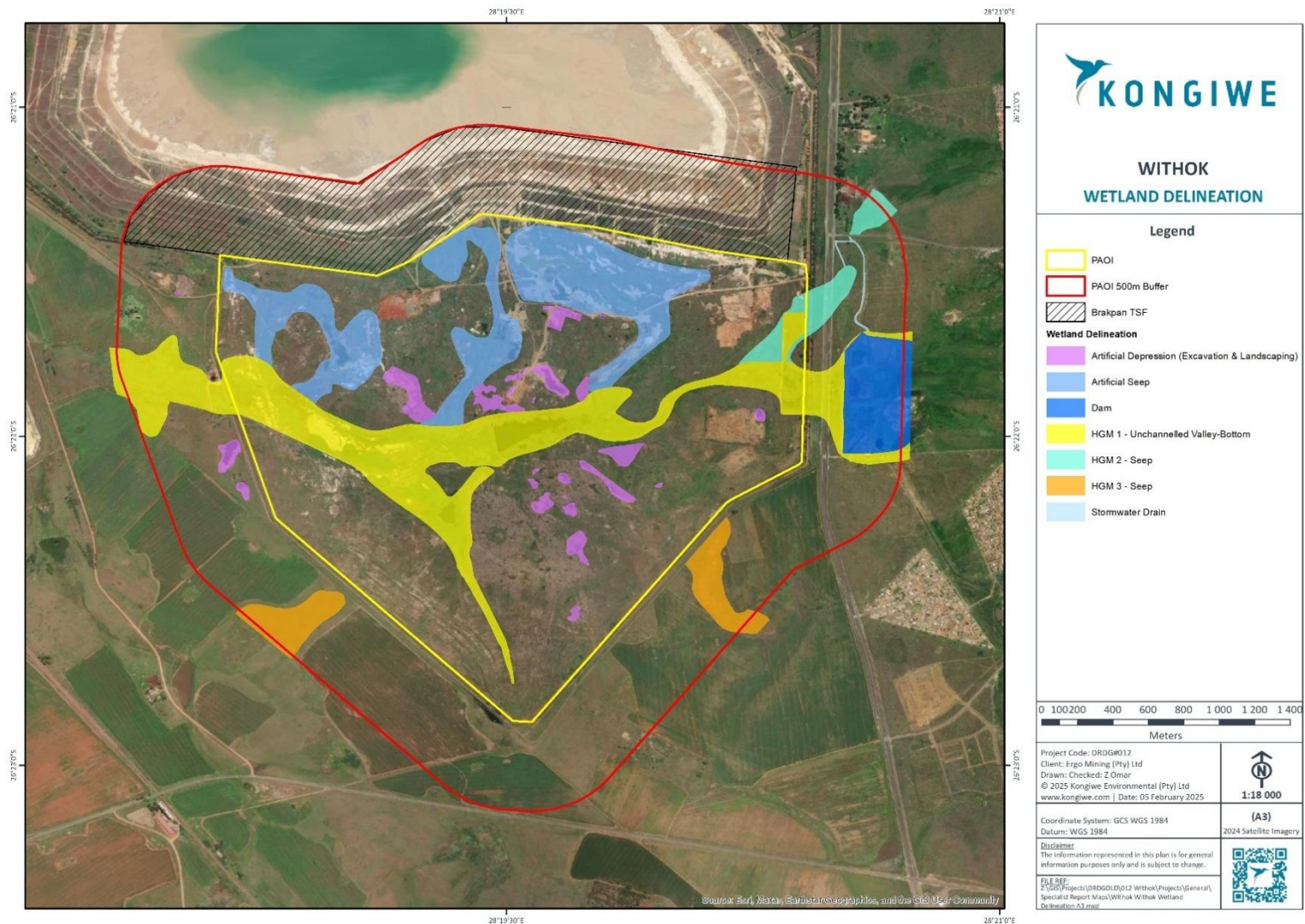


Figure 8-15: Wetlands identified

8.5.3.2 Ecological Sensitivity

Table 8-5 provides a comparison between the Environmental Screening Tool and the specialist determined Site Ecological Importance (SEI) of the project. The specialist-assigned sensitivity ratings are based largely on the SEI process.

Table 8-5: Summary of the Screening Tool Sensitivity versus the Specialist assigned Site Ecological Importance (SEI) for the Field Survey Area of the Project Area

Features	Screening Tool Theme	Environmental Screening Tool Sensitivity	Specialist Sensitivity	Tool Validated or Disputed by Specialist - Reasoning
Valley-bottoms	Aquatic Biodiversity Theme	Very High	Moderate	Screening Tool Sensitivity disputed. Rationale for the specialist assigned 'Moderate' rating: These wetland areas are relatively large in size, exhibiting surface saturation in some approaches with the presence of hydrophytes. They have connectivity to other systems within the local catchment and are considered to be hydrological drivers to those systems. Although these systems have suffered historical impacts from anthropogenic influences, they provide habitat and a water source in a disturbed environment. The potential for them to support freshwater biodiversity therefore remains. The size, hydrological nature of the system and the provision of aquatic and wetland habitat increases its importance in the maintenance of biodiversity.
Seeps	Aquatic Biodiversity Theme	Very High	Moderate	Screening Tool Sensitivity disputed. Rationale for the specialist assigned 'Moderate' rating: Although much smaller, this wetland has connectivity to the valley-bottom. Whilst exhibiting impact from the surrounding residential development, the wetlands do have importance as a biodiversity corridor and as a hydrological driver for downstream systems in a limited capacity.
		Low	Low	Screening Tool Sensitivity validated. Rationale for the specialist assigned 'Low' rating: A wetland feature was identified within this area, but it has been modified by the agricultural fields. It is not expected that there is surface water present and the vegetation within the unit is not anticipated to increase its importance as a fully functional habitat.
Artificial Drainage Features and Artificial Wetlands	Aquatic Biodiversity Theme	Low	Low	Screening Tool Sensitivity validated. Rationale for specialist assigned "Low" rating: The drainage features present as excavated trenches. These drainage features exhibit flows from the TSF, or when an exceptional amount of rainfall is experienced in a short period and. Whilst they do provide an exit point for attenuated surface runoff, the features are not perceived to contribute significantly to freshwater biodiversity and the water

				is directed to the return-water dams or artificially excavated areas. Most of the artificial seep wetlands are sustained by the artificial channeling mentioned above and are a result of human intervention which can be infilled; hence they are not considered to exhibit natural ecological sensitivity.
In-stream Dams	Aquatic Biodiversity Theme	Very High	Moderate	Screening Tool Sensitivity disputed. Rationale for the specialist assigned 'Moderate' rating: These features occur within the stream path of wetlands and therefore have connectivity to the systems. They are perceived to play an important role in provisioning benefits and hydrodynamics of the downstream wetlands. Attributed to connectivity, the features will display the same ecological sensitivity as the wetland they occur in and as such have the potential to impact on these systems.
Remaining Area	Aquatic Biodiversity Theme	High	Low	Screening Tool Sensitivity Disputed. Rationale for the specialist assigned 'Low' rating: A water feature was identified within this area, but it has been completely modified by the adjacent TSF and is now fully sustained by the hydrological inputs directed into the system. The vegetation of the system has also been extensively modified which has also led to an alteration of the type and quality of habitat that is provided.
		Low	Low	Screening Tool Sensitivity Validated. Rationale for the specialist assigned 'Low' rating: Much of the PAOI has been historically modified through agricultural and mining activity and is not perceived to contribute significantly to freshwater resources apart from providing hydrological inputs. No natural wetlands were identified in these areas.

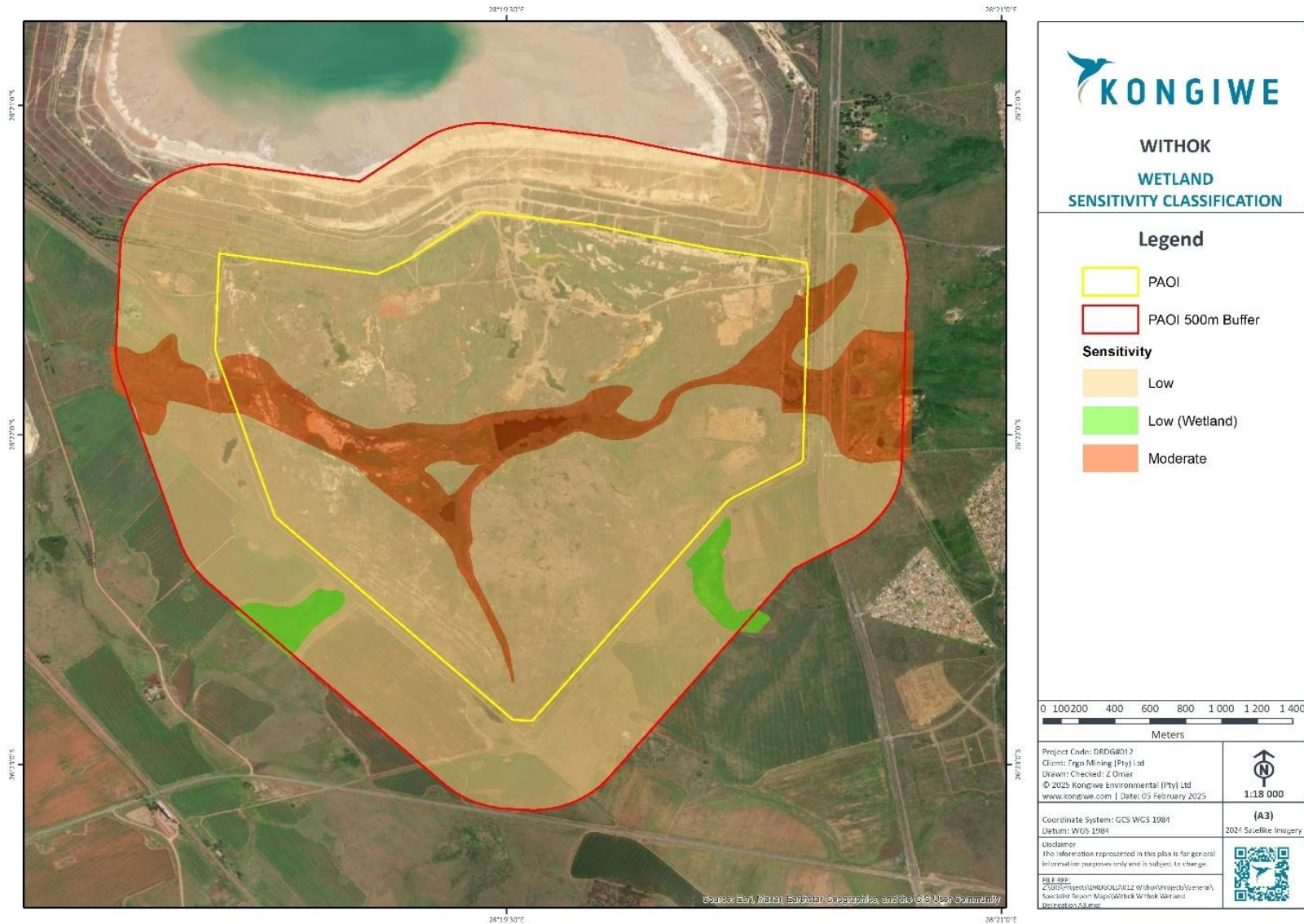


Figure 8-16: Sensitivity classification of the project area of influence and respective freshwater resources

8.6 Surface Water

Refer to Specialist Study: Appendix D2 – Surface water

8.6.1 Catchment

The DWS has divided South Africa into primary, secondary, tertiary and quaternary catchments. Primary catchments are the largest defined catchments for South Africa, of which there are 22, and are assigned a letter ranging from A – X (excluding O). Secondary catchments are subdivisions of the primary catchments, and are the second largest catchments in South Africa, and are assigned the primary catchment letter within which they are located, and a number e.g. A5 (secondary catchment 5 located within primary catchment A). Similarly, tertiary catchments are subdivisions of secondary catchments and are represented for example by A53 (tertiary catchment 3 located within secondary catchment A5). Lastly, quaternary catchments are the smallest defined catchments and are assigned the tertiary catchment number, along with a quaternary catchment letter e.g. A53D (quaternary catchment D located within tertiary catchment A53). Further divisions into sub-quaternary reaches have also been implemented.

Further to the above, the DWS have divided South Africa into 9 Water Management Areas (WMAs). The 9 WMAs include the Limpopo, Olifants, Inkomati-Usuthu, Pongola-Mtamvuna, Vaal, Orange, Mzimvubu-Tsitsikamma, Breede-Gouritz and Berg-Olifants. Not all of the WMAs have been formalised.

The proposed Withok TSF complex is located approximately 14 km southwest of Springs, in quaternary catchment C22C (Figure 8-17). The Rietspruit flows north to south past the western flank of the Brakpan TSF. The Rietspruit is a tributary of the Kliprivier, which flows into the Vaal River, upstream of the Vaal Barrage but downstream of the Vaal Dam.

An unnamed water course runs through the footprint of the proposed Withok TSF. The catchment of this water course is largely urbanised with the townships of Geluksdal and Tsakane. An attenuation dam has been constructed as part of the previous Withok TSF project to attenuate flood peaks from this unnamed stream so that they could be routed safely under the old facility through a “spinal culvert”. This attenuation dam is still operational.

The unnamed water course flows towards the Rooikraal TSF which diverts the stream around the Rooikraal TSF before it flows into the Rietspruit. The unnamed water course has an ill-defined channel throughout its length. The valley bottom is generally wide and well vegetated. The channel slope is gentle.

8.6.2 Surface Water Runoff

According to the WR2012 study, quaternary catchment C22B has a Mean Annual Runoff (MAR) of 23.12 million cubic metres (mcm).

8.6.2.1 Mean Annual Runoff

The mean annual runoff for the quaternary catchments C22C is 21.38 Mm³ (Middleton and Bailey, 2009). The mean annual runoff value in Table 8-6 was scaled from the quaternary catchment runoff, based on relative catchment size. The catchment boundaries and size are shown in Figure 8-17.

Table 8-6: Mean annual Runoff (iLanda, 2025)

Stream	Mean annual run-off (Mm ³ /a)
Unnamed water course	0.95

8.6.2.2 Normal Dry Weather Flows

The normal dry weather flows are based on the average monthly flows documented in the Water Resources of South Africa, 2005 Study (Middleton and Bailey, 2009) for quaternary catchment C22C. The flows were scaled based on relative catchment size. The dry weather flows are presented in Table 8-7. The dry weather flows have been highlighted in bold text. (iLanda , 2025).

Table 8-7: Normal Dry Weather Flows in M³/Months (Highlighted in Bold Text) (iLanda, 2025)

Months	Unnamed Water Course
Oct	38 681 m³
Nov	64 989 m ³
Dec	85 046 m ³
Jan	134 871 m ³
Feb	183 337 m ³
Mar	165 805 m ³
Apr	84 925 m ³
May	53 542 m³
Jun	40 469 m³
Jul	35 911 m³
Aug	32 100 m³
Sep	30 474 m³

8.6.3 DWS Classes and Resource Quality Objectives

The NWA specifies that water resources are to be protected and managed through the classification of water resources and Resource Quality Objectives (RQOs) and the setting of the reserve. The Classes and RQOs of Water Resources for Catchments of the Upper Vaal (Government Notice No. 468, 22 April 2016) (DWS, 2016), was consulted to obtain the classes and RQOs for the quaternary catchments within which the Recommissioning of the Withok TSF is located. Quaternary catchments C23C does not have any classes or RQOs set.

8.6.4 Water Quality

The water quality data was compared against the Klip River in-stream water quality objectives. The water quality data was also compared against the SANS 241 - 1:2015 drinking water standards. The operations measure water quality at many locations. Five of these are pertinent to the proposed Withok TSF, as shown in Figure 8-18. The water quality results from these locations were provided by the operations. Data from November 2023 to October 2024 (the latest 12 months on record) were analysed.

The results show the following:

- ❖ Withokspruit upstream of the Brakpan TSF complex (BT1)
 - The water quality is considered good and generally within the SANS 241:2015 drinking water limits. Turbidity is elevated but this is attributed to cattle and human activities within the channel upstream of the monitoring point.
 - Nitrates are slightly elevated. This is attributed to the urban activities upstream.
- ❖ Withokspruit tributary upstream of the Brakpan TSF complex (BT2)
 - The water quality is considered fair and generally within the SANS 241:2015 drinking water limits.
- ❖ The catchment is impacted by industrial and historical mining activities, which are the likely causes of the slight deterioration in water quality across many parameters, the most notable being chloride, sulphate, fluoride, sodium and magnesium.
 - Withokspruit downstream of the Rietspruit confluence (BT15 and BT4)
 - The water quality at these two locations is considered very poor but shows periods of good quality during the wet season. This could indicate poor quality baseflow that is diluted by cleaner storm flow.
 - Cyanide and antimony are elevated in BT15. This may be coming from the Rietspruit, but this assertion is not conclusive.
 - BT4 water quality is generally better than BT15 during the wet season, possibly due to the influence of the Withokspruit. Again, this assertion is not conclusive without a monitoring point in the Rietspruit just upstream of the Withokspruit confluence.
- ❖ Spinal culvert outfall (PH21). This is water that is routed from the attenuation dam upstream of the R23.
 - The water quality at PH21 is considered good overall.
 - The elevated manganese is considered background.

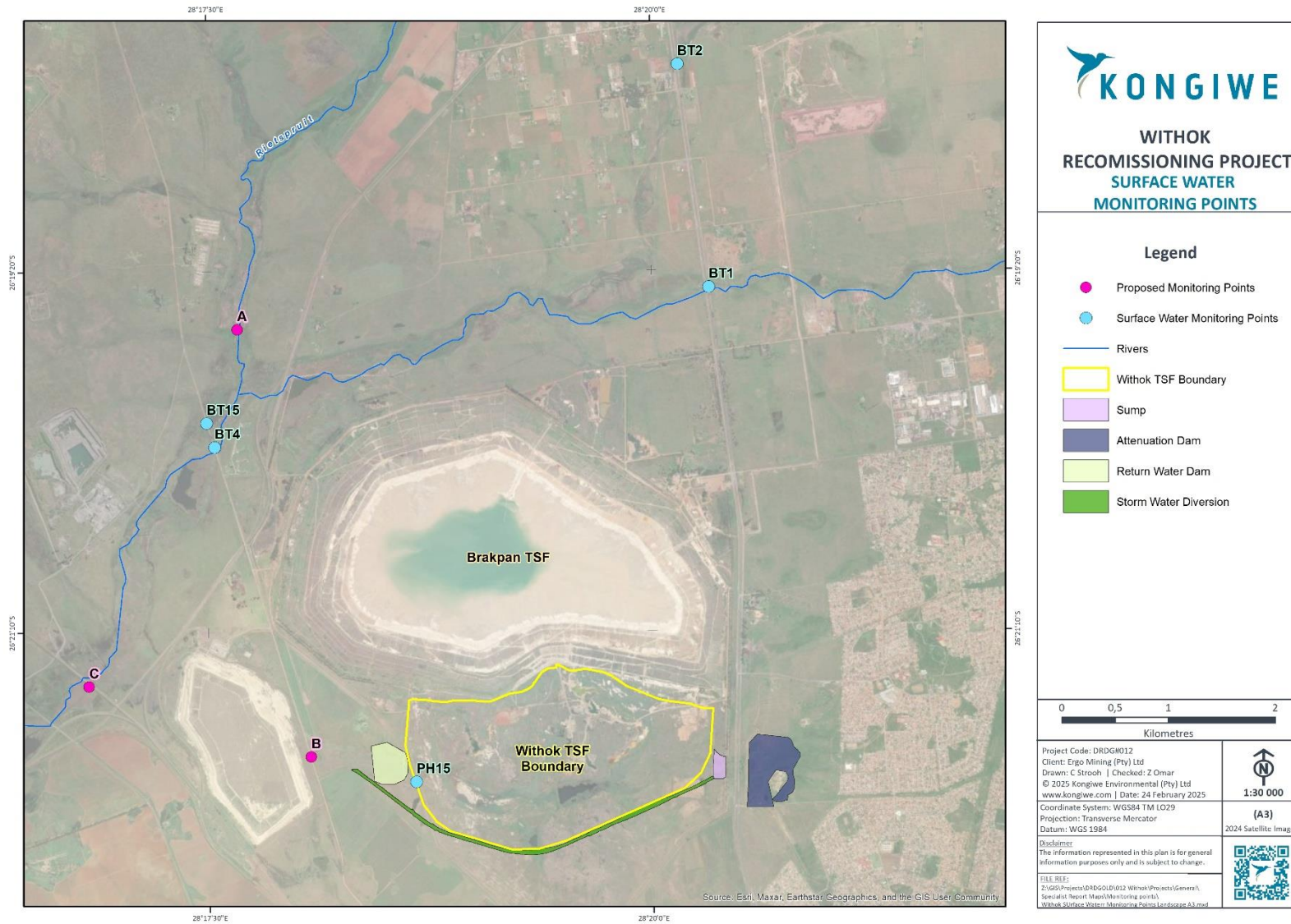


Figure 8-18: Surface Water Monitoring Points

Table 8-8: Water Quality upstream at BT4 (iLanda, 2025)

Parameter	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sept-24	Oct-24
pH - Value @ 25 °C		3.9	6.8	6.7	6.5			7.2	5	4.9	3	3.8
Electrical Conductivity in mS/m @ 25°C		197	83.1	155	124			107	285.0	290.0	500.0	343.0
Total Dissolved Solids @ 180°C mg/ℓ		1866	670	1156	932			720	2340	2506	4524	2904
Suspended Solids at 105°C									26	37	44	28
Turbidity in N.T.U									24	42	38	18
Chloride as Cl mg/ℓ		109	37	81	100			79	136	139	196	166
Sulphate as SO ₄ mg/ℓ		883	347	579	417			257	1,409	1,367	2,653	1,883
Fluoride as F mg/ℓ		0.2	0.4	0.7	0.5			0.5	0	0	1	0
Nitrate as N mg/ℓ		0.4	1.7	1.8	3.6			5.5	3	<0.1	<0.1	1
Nitrite as N mg/ℓ		<0.05	0.7	0.4	2.9			1.1	0	<0.05	<0.05	<0.05
Bromide as Br mg/ℓ		<0.1	0.4	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1	<0.1
Total Cyanide as CN mg/ℓ		<0.07	<0.07	<0.07	<0.07			<0.07	0.13	0.83	<0.07	<0.07
Free and Saline Ammonia as N mg/ℓ		18	0.9	12	2.0			1.1	23.00	24.00	47.00	35.00
Sodium as Na mg/ℓ		86	43	83	94			81	142	194	304	207
Potassium as K mg/ℓ		14.6	10.2	14.4	24			11.2	25.0	28.0	23.0	24.0
Magnesium as Mg mg/ℓ		59	27	50	47			37	110	134	278	162
Aluminium as Al (Dissolved) mg/ℓ		0.700	<0.100	<0.100	<0.100			0.107	0.5	0.4	25.0	4.1
Antimony as Sb (Dissolved) mg/ℓ		<0.001	<0.001	0.001	<0.001			0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As (Dissolved) mg/ℓ		0.001	<0.001	0.001	<0.001			<0.001	0.001	0.002	0.004	0.003
Barium as Ba (Dissolved) mg/ℓ		0.049	0.042	<0.025	0.036			0.026	0.05	0.06	<0.025	0.04
Boron as B (Dissolved) mg/ℓ		<0.025	0.051	0.047	0.036			0.033	0.09	<0.025	0.12	0.03
Cadmium as Cd (Dissolved) mg/ℓ		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	0.00	<0.001
Hexavalent Chromium as Cr mg/ℓ		<0.025	<0.025	<0.025	<0.025			<0.025	<0.025	<0.025	<0.025	<0.025
Total Chromium as Cr (Dissolved) mg/ℓ		<0.010	0.012	<0.010	0.021			0.012	<0.010	<0.010	0.027	<0.010
Copper as Cu (Dissolved) mg/ℓ		0.163	<0.010	<0.010	<0.010			0.030	<0.010	0.053	0.72	0.304
Iron as Fe (Dissolved) mg/ℓ		0.048	<0.025	<0.025	<0.025			<0.025	19	22	14	7
Lead as Pb (Dissolved) mg/ℓ		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	0.009	0.001
Manganese as Mn (Dissolved) mg/ℓ		9.38	2.89	5.31	3.53			1.77	12	17	16	17
Mercury as Hg (Dissolved) mg/ℓ		<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001
Uranium as U (Dissolved) mg/ℓ		0.019	<0.001	0.002	0.004			0.016	0.01	0.013	1.39	0.244
LEGEND												
KLIP RIVER IN STREAM WQO	Ideal	Accept.	Tolerable	Unaccept.								
SANS 241 DOMESTIC LIMIT EXCEEDANCES	Value											

Table 8-9: Water Quality on site at PH21 (iLanda, 2025)

Parameter	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sept-24	Oct-24
pH - Value @ 25 °C	7.2	7.2	7.0	7.2	7.0							
Electrical Conductivity in mS/m @ 25°C	90.2	84.3	27.5	60.4	24.2							
Total Dissolved Solids @ 180°C mg/ℓ	600	474	156	308	160							
Suspended Solids at 105°C												
Turbidity in N.T.U												
Chloride as Cl mg/ℓ	60	61	17	32	15							
Sulphate as SO ₄ mg/ℓ	146	131	43	79	42							
Fluoride as F mg/ℓ	0.2	0.2	0.5	0.3	0.3							
Nitrate as N mg/ℓ	0.1	<0.1	0.8	0.6	1.2							
Nitrite as N mg/ℓ	<0.05	<0.05	2.0	<0.05	0.8							
Bromide as Br mg/ℓ	<0.1	<0.1	0.5	<0.1	<0.1							
Total Cyanide as CN mg/ℓ	<0.07	<0.07	<0.07	<0.07	<0.07							
Free and Saline Ammonia as N mg/ℓ	32	27	0.9	15	1.7							
Sodium as Na mg/ℓ	60	70	16	38	13							
Potassium as K mg/ℓ	13.0	16.2	6.4	7.2	6.2							
Magnesium as Mg mg/ℓ	17	23	6	21	6							
Aluminium as Al (Dissolved) mg/ℓ	<0.100	<0.100	0.133	<0.100	0.146							
Antimony as Sb (Dissolved) mg/ℓ	<0.001	<0.001	<0.001	0.001	<0.001							
Arsenic as As (Dissolved) mg/ℓ	0.002	0.001	0.001	0.001	0.001							
Barium as Ba (Dissolved) mg/ℓ	0.094	0.096	0.062	<0.025	0.042							
Boron as B (Dissolved) mg/ℓ	<0.025	<0.025	<0.025	<0.025	<0.025							
Cadmium as Cd (Dissolved) mg/ℓ	<0.001	<0.001	<0.001	<0.001	<0.001							
Hexavalent Chromium as Cr mg/ℓ	<0.025	<0.025	<0.025	<0.025	<0.025							
Total Chromium as Cr (Dissolved) mg/ℓ	<0.010	0.011	0.017	<0.010	<0.010							
Copper as Cu (Dissolved) mg/ℓ	<0.010	0.020	<0.010	<0.010	<0.010							
Iron as Fe (Dissolved) mg/ℓ	0.218	0.253	0.076	0.043	0.160							
Lead as Pb (Dissolved) mg/ℓ	<0.001	<0.001	<0.001	<0.001	<0.001							
Manganese as Mn (Dissolved) mg/ℓ	4.37	6.46	<0.025	3.85	0.065							
Mercury as Hg (Dissolved) mg/ℓ	<0.001	<0.001	<0.001	<0.001	<0.001							
Uranium as U (Dissolved) mg/ℓ	<0.001	0.001	<0.001	0.002	<0.001							
LEGEND												
KLIP RIVER IN STREAM WQO	Ideal	Accept.	Tolerable	Unaccept.								
SANS 241 DOMESTIC LIMIT EXCEEDANCES	Value											

8.7 Groundwater

Refer to Specialist Study: Appendix D3 – Groundwater Model Report

8.7.1 Conceptual Hydrogeological Model

The Withok TSF project area is underlain by both Karoo and Transvaal Supergroup rocks. Sedimentary rocks from the Karoo Supergroup, together with Karoo dolerite intrusions and dolomites from the Malmani group, all underlie the TSF footprint area. (Delta H, 2024).

Based on the conceptual hydrogeological understanding of the site, the following hydro-stratigraphic units underlie the proposed Withok TSF footprint:

- ❖ Topsoil/gravel (average thickness of 2m). This acts as a shallow perched aquifer in areas where the impermeable dolerite sill is present.
- ❖ Shallow weathered aquifer (thickness between 3 m and 22 m).
- ❖ Fractured and Karst aquifer within both Karoo and Transvaal Supergroup rocks.
 - Fractured aquifer comprising the Klipriviersberg Group and Karoo Formations, Turffontein Subgroup and Black Reef quartzite.
 - Karst aquifer within the dolomites of the Chuniespoort Group of the Malmani Supergroup.

8.7.2 Groundwater Levels

As part of the geotechnical drilling conducted during 2016, five groundwater monitoring boreholes were drilled around the TSF footprint area. The depth to groundwater in the boreholes varied between 1.9 and 5.9 metres below ground level (m bgl). The groundwater levels obtained during the hydrocensus, conducted by iLEH during 2016, indicated groundwater levels ranging from surface to 21m bgl, with an average groundwater level of 4.8m bgl. Similarly, the newly drilled interception boreholes (excluding the TSF wells, Water Hunters 2020, 2021, 2024) showed groundwater levels between 2.15 and 5.24 m bgl, with an average of 3.28 m bgl.

The shallow groundwater levels are indicative of a perched or shallow aquifer system, with local mounding due to seepage from the TSF resulting in shallower water levels in its proximity.

8.7.3 Aquifer Characteristics

Aquifer characterisation is done based on existing information and guidelines and maps provided by the DWS. This system was created as it allows the grouping of aquifer areas into types according to their associated supply potential, water quality and local importance as a resource

8.7.3.1 Groundwater vulnerability

Groundwater vulnerability is a measure indicating how susceptible an aquifer is to contamination. Aquifer vulnerability is used to represent the intrinsic characteristics that determine the sensitivity of various parts of an aquifer to being adversely affected by a contaminant load imposed from the surface.

8.7.3.2 Aquifer Classification

According to the Hydrogeological Map (1:500 000) series, the regional hydrogeology is characterized as a ‘Karst aquifer’ with a typical potential water yield of more than 5.0 litres per second. Chemical weathering of karstic aquifers, such as the dolomites from the Malmani Group forming part of the Transvaal Supergroup, results in voids providing primary storage capacity with high transmissivity values, and with a micro-fractured matrix providing secondary storage capacity with limited groundwater movement. Secondary features such as fractures/ faults and bedding planes further enhance the groundwater flow.

A summary of the classification scheme is provided in Table 8-10. In this classification system, it is important to note that the concepts of Minor and Poor Aquifers are relative, and that yield is not quantified. Within any specific area, all classes of aquifer are likely, in theory, to be present.

Table 8-10 : Aquifer classification scheme after Parsons and Conrad (1998).

Aquifer	Description
Sole source aquifer	An aquifer used to supply 50% or more of urban domestic water for a given area, for which there are no reasonably available alternative sources, should this aquifer be impacted upon or depleted.
Major aquifer region	High-yielding aquifer of acceptable quality water.
Minor aquifer region	Moderately yielding aquifer of acceptable quality or high yielding aquifer of poor-quality water.
Poor aquifer region	Insignificantly yielding aquifer of good quality or moderately yielding aquifer of poor quality, or aquifer that will never be utilized for water supply and that will not contaminate other aquifers.
Special aquifer region	An aquifer designated as such by the Minister of Water

8.7.3.3 Aquifer Susceptibility

Aquifer susceptibility is a qualitative measure of the relative ease with which a groundwater body can potentially be contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification.

8.7.4 Groundwater Quality

The baseline groundwater quality for the site is based on the latest available monitoring results supplied by the client, applying median concentrations calculated over the monitoring period from January 2018 to November 2023 (Table 8-11). The groundwater quality results were compared to available standards, including the SANS 241:2015 Drinking Water Quality Standards and IFC Mining Effluent guidelines (2007). Positions of the various monitoring boreholes are depicted in Figure 8-19. The boreholes located on or adjacent to the Withok TSF footprint are: WitBH2, WitBH4, BT6, BT8 and B23. Sampling results are available for Wit BH2, Wit BH4 and BT8.

Overall, several water quality guideline exceedances were noted for the median concentrations calculated from 2018 to 2023:

- ❖ The electrical conductivity (EC), total dissolved solids (TDS) and SO₄ exceeded the SANS 241:2015 at BT8.
- ❖ pH limits are not exceeded.
- ❖ Chloride exceeded the SANS 241:2015 standards in borehole BT8.
- ❖ Cyanide exceeded the SANS 241:2015 standard in borehole BT8.
- ❖ Aluminium exceeded the SANS 241:2015 limit in borehole WitBH2.
- ❖ SANS 241:2015 limits for Cd were exceeded in borehole BT8.
- ❖ The SANS 241:2015 limit for Co was exceeded in boreholes WitBH4.
- ❖ Magnesium concentrations exceeded SANS 241:2015 limits in BT8.
- ❖ The Manganese limits of the SANS 241:2015 standards were exceeded in boreholes WitBH4 and BT8.
- ❖ Sodium concentrations exceeded SANS 241:2015 standards in borehole BT8.
- ❖ Lead concentrations exceeded SANS 241:2015 standards in boreholes WitBH2 and BT8.

Table 8-11: Median groundwater quality of background boreholes monitored between 2018 to 2023 (in mg/L).

Name	SANS (2015)	IFC Mining effluent (2007)	WitBH2	WitBH4	BT8
No. of samples			30	52	59
Date			Jan2018-Aug2021	Jan2018-Nov2023	Jan2018-Nov2023
pH	5-9.7	6-9.0	8.2	7.9	8.7
EC (mS/m)	170		74.95	87.85	545
TDS	1200		429	589	4340
Cl	300		43.5	61.5	743
SO ₄	500		70	211	1856
NO ₃ as N	11		0.3	0.3	0.4
NO ₂	0.9		1.6	0.2	0.3
NH ₃ as N	1.5		26	6.1	3.7
Orthophosphate as P			2.4	0.1	0.2
Cyanide as CN	0.2	1	<0.07	0.11	0.1
Al	0.3		0.697	<0.100	0.166
As	0.01	0.1	0.007	0.004	0.001
Ba	0.7		0.321	<0.025	0.276
B	2.4		0.368	0.045	0.083
Ca	150		15	39	22
Cd	0.003	0.05	<0.001	<0.001	0.006
Co	0.5		0.162	1.952	0.236
Cr	0.05		0.011	0.012	0.0245
Cu	2	0.3	0.031	0.028	0.041
F	1.5		0.3	0.2	0.4
Fe	2	2	0.037	0.09	0.0715
K	50		4	10	5
Mg	70		2	36	337
Mn	0.4		0.034	0.518	0.474
Hg	0.006	0.002	<0.001	0.001	0.002
Na	200		98	54	704

Name	SANS (2015)	IFC Mining effluent (2007)	WitBH2	WitBH4	BT8
No. of samples			30	52	59
Date			Jan2018- Aug2021	Jan2018- Nov2023	Jan2018- Nov2023
Ni	0.07	0.5	<0.025	<0.025	0.056
Pb	0.01	0.2	0.012	<0.001	0.017
Sb	0.02		0.001	0.001	<0.001
Se	0.04		0.002	<0.001	0.002
Si			32	1.2	1
U	0.03		<0.001	<0.001	0.002
Zn	0.5	0.5	0.026	<0.025	0.039

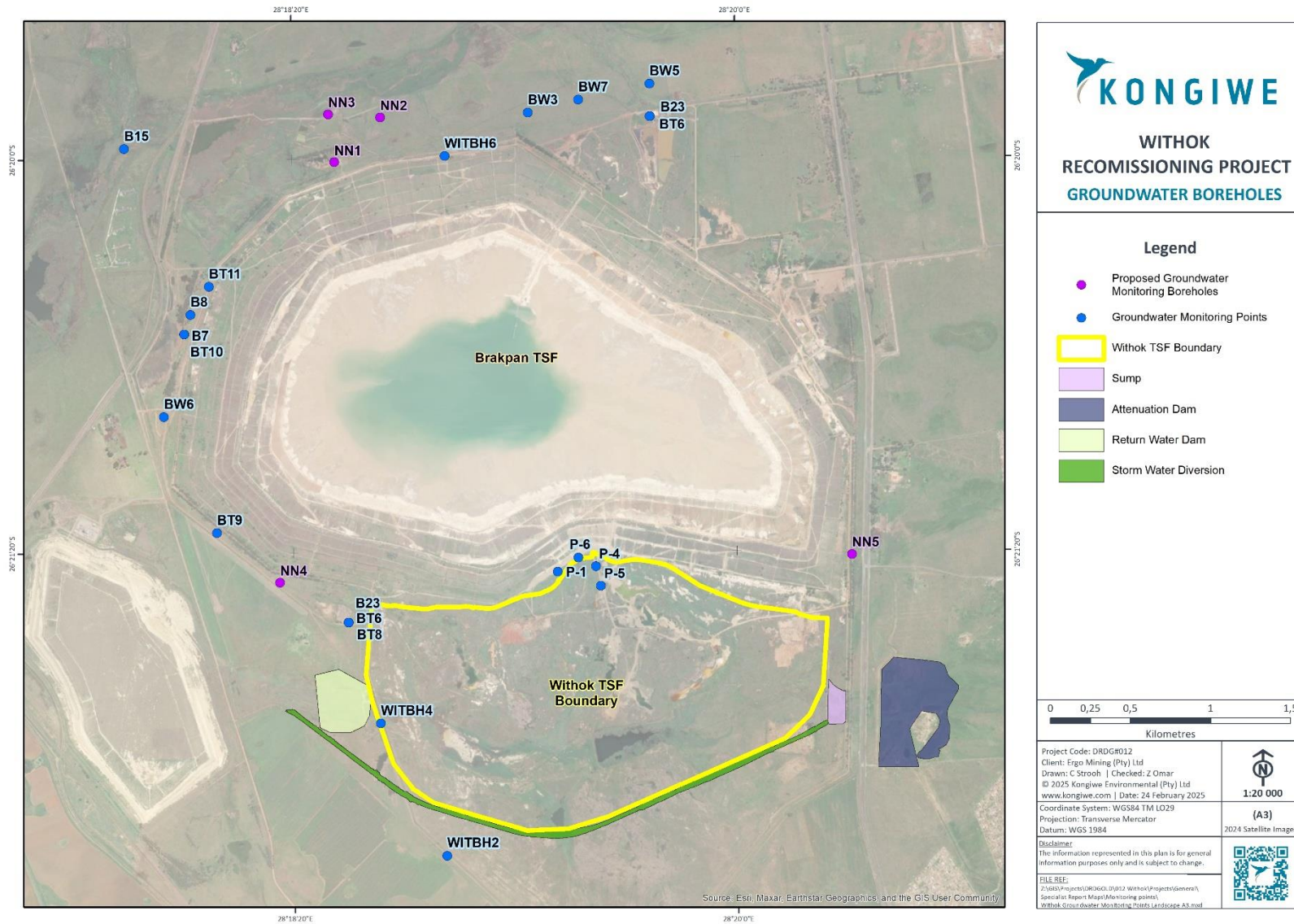


Figure 8-19: Locality map of current and proposed monitoring boreholes.

8.7.5 Groundwater Contaminant Modelling

The seepage plume emanating from the Brakpan-Withok TSF complex is primarily associated with the Brakpan TSF. The lined Withok expansion will essentially reduce the recharge over its footprint, which leads to less dilution of the existing Brakpan seepage plume and thereby an increase in its concentrations. The seepage contributions from the Withok TSF extension are on the other hand negligible. This is discussed further below.

The simulated 2023 sulphate plume from Brakpan TSF along with observed median sulphate concentrations are shown in Figure 8-20. Based on the model simulations, the seepage plume has reached the Withokspruit north of the TSF and is likely to contribute as groundwater baseflow to the discharge in the spruit with sulphate concentrations of up to 900 mg/L. The western lobe of the seepage plume extends for a cutoff value of 250 mg/L sulphate approximately 520m towards the Rietspruit.

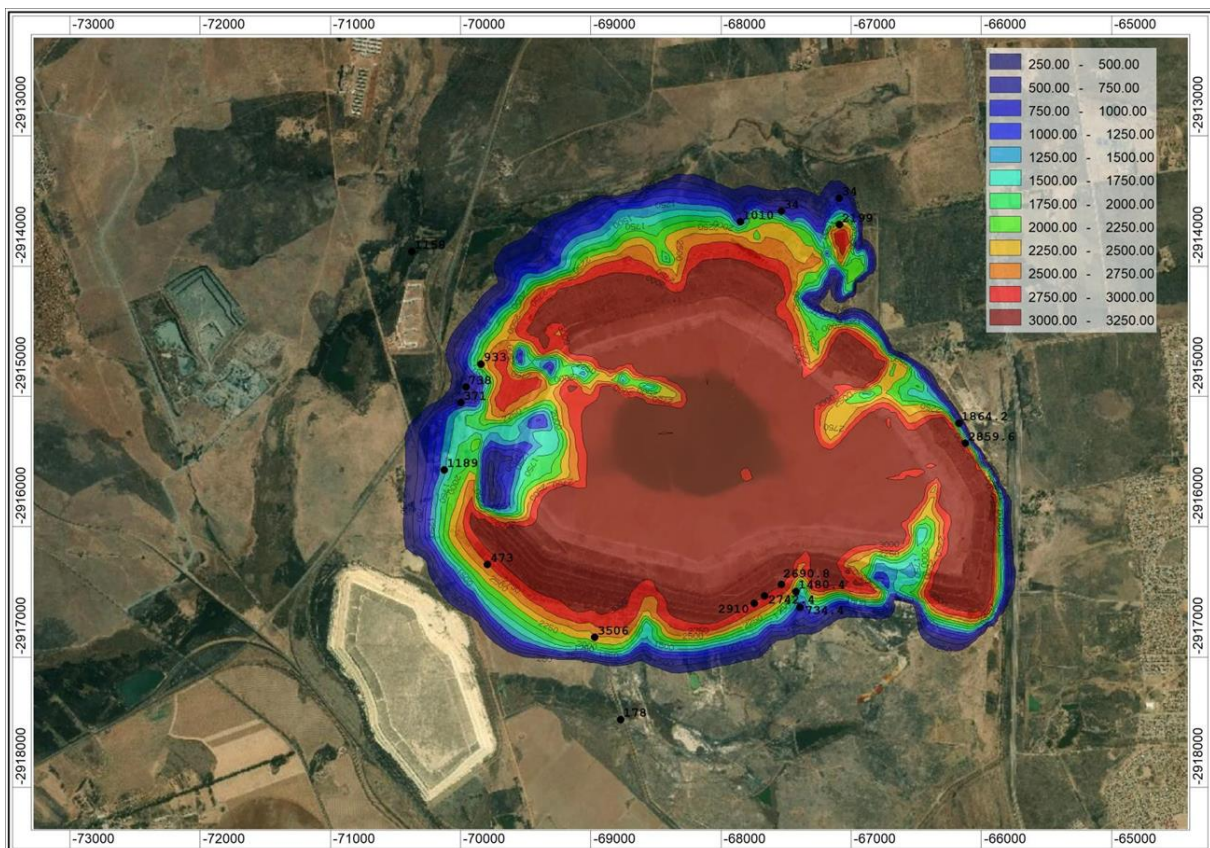


Figure 8-20: Simulated 2023 sulphate plume and observed concentrations for the Brakpan TSF (Water Hunters, 2024).

The simulated sulphate seepage plume at the end of active deposition onto the TSF complex is shown in Figure 8-21. The installed interception well system manages to contain the plume or “pull back” the 250 mg/L sulphate isoline by around 400m in the west and up to 275m in the north as well as bringing about a reduction in plume concentrations (beyond the Brakpan TSF footprint itself) in comparison to the unmitigated scenario. Furthermore, maximum sulphate concentrations within the baseflow towards the Withokspruit are predicted to reduce to 800 mg/L.

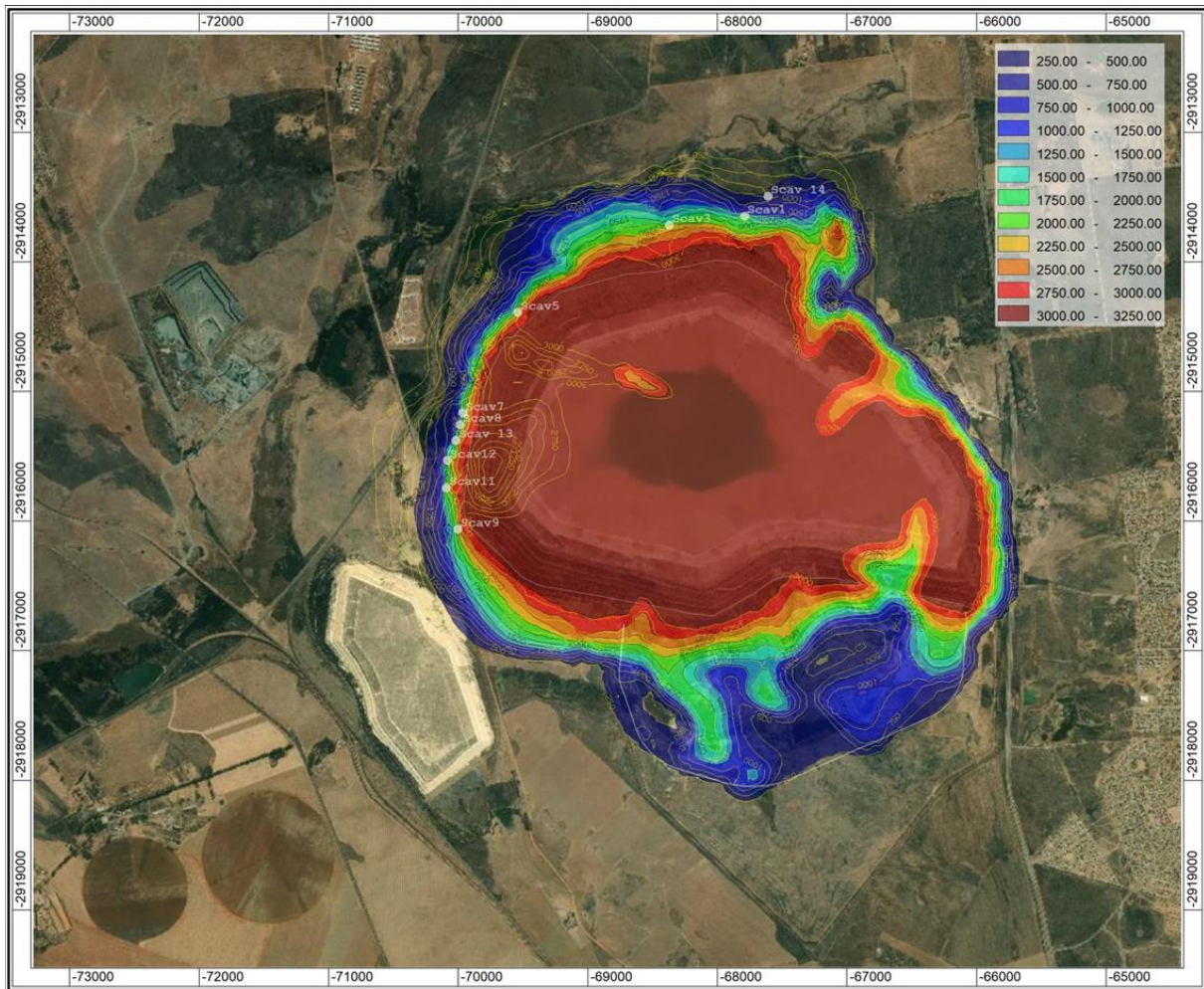


Figure 8-21: Simulated sulphate concentrations in the shallow aquifer at the end of active deposition onto the Brakpan-Withok TSF complex (2049) for the mitigated scenario (unmitigated 2049 concentrations indicated by yellow contour lines) (Water Hunters, 2024).

The mitigated 50-year post closure seepage plume is shown in Figure 8-22. The interception well system achieves a further minor reduction in the northern and western plume extent and concentrations in comparison to the life of facility extent, but a significant reduction (up to 900m) in comparison to the unmitigated scenario.

The installed hydraulic containment system for the Brakpan TSF (i.e., the current interception boreholes) appears to be feasible and effective but should be augmented by additional interception boreholes at the north-west edge of the Brakpan TSF to achieve a more comprehensive plume containment within 50 years.

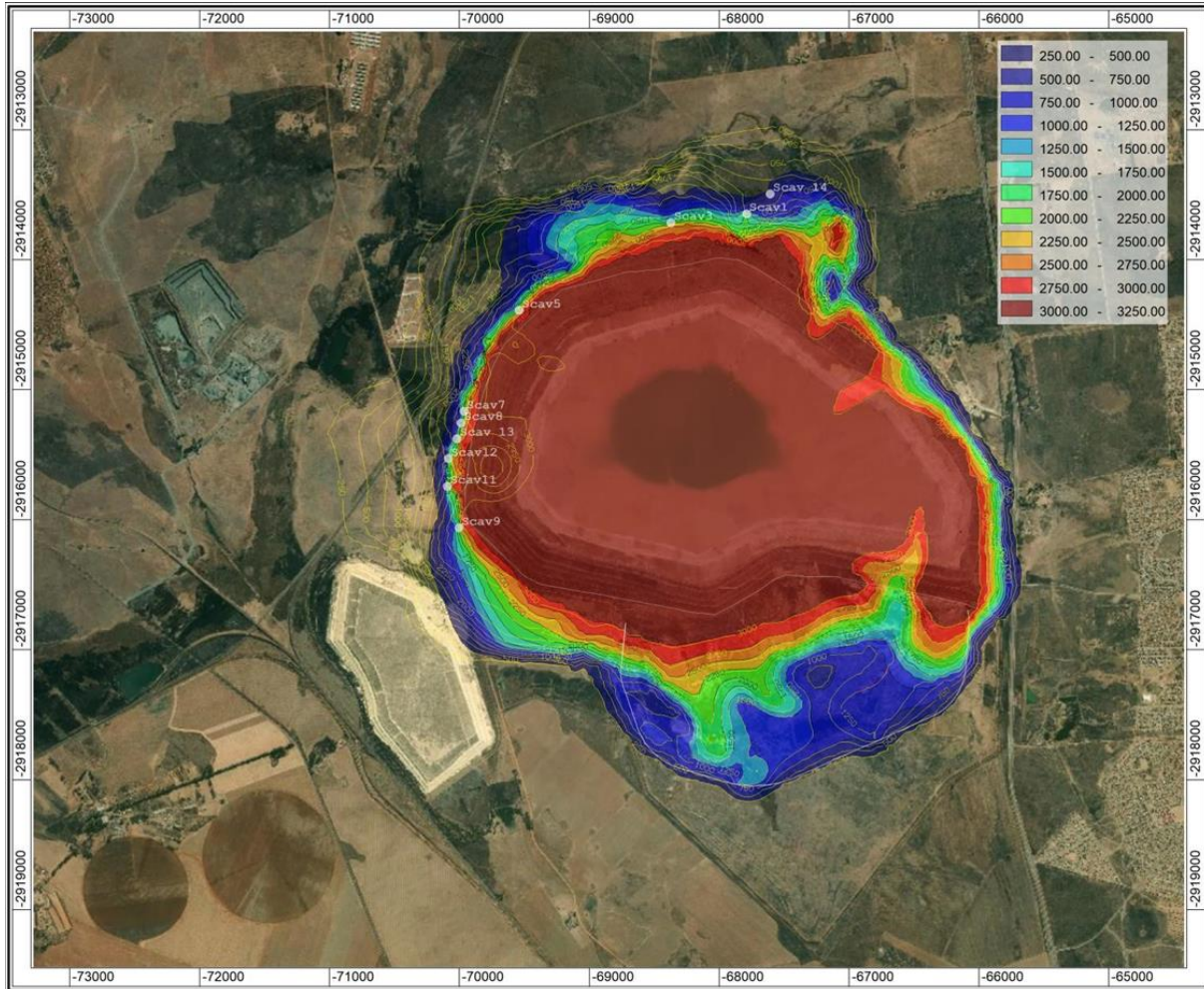


Figure 8-22: Simulated sulphate concentrations in the shallow aquifer 50 years post closure for the mitigated scenario (unmitigated concentrations indicated by yellow contour lines) (Water Hunters, 2024).

8.8 Air Quality

Refer to Specialist Study: Appendix D4 – Air Quality Impact Assessment

Numerous studies have found that air pollution in cities have a major negative impact on the health of both the environment and the surrounding communities. Repeated exposure to air pollutants over long periods of time may potentially cause several respiratory, cardiovascular, reproductive and gastrointestinal health problems.

Particulate Matter (PM) exists in the atmosphere as either solid or liquid particles varying in chemical composition and size, these particles can be considered as either primary or secondary pollutants. Particles can be classified by their aerodynamic properties into coarse particles, PM_{10} and fine particles, $PM_{2.5}$ (Harrison and Van Grieken, 1998). The fine particles contain the secondarily formed aerosols such as sulphates and nitrates, combustion particles and re-condensed organic and metal vapours. The coarse

particles contain earth crust materials and fugitive dust from roads and industries (Fenger, 2002). It is the amount of fine dust and the chemical and mineralogical composition of the dust which will dictate the potential for health impacts (Schwegler, 2006).

The most significant pollutant that is generated from a TSF is particulate matter (PM). Particulate matter with an aerodynamic diameter of less than 2.5 micrometres (μm) ($\text{PM}_{2.5}$) and particulate matter with an aerodynamic diameter of less than $10\mu\text{m}$ (PM_{10}) are criteria pollutants and maximum permissible ambient air quality concentrations of these pollutants have been prescribed in the National Ambient Air Quality Standards (NAAQSs) (Government Notice No. 1210, 2009; Government Notice No. 486, 2012).

8.8.1 Ambient Air Quality

The Withok TSF is located within the Highveld Priority Area (HPA), declared by the Minister in 2007 due to poor air quality. The area experiences elevated concentrations of criteria pollutants from industrial and non-industrial sources. High dust fallout rates and potential health risks from gold tailings containing cyanide and heavy metals are concerns. However, research suggests that cyanide vapour emissions from older tailings deposits pose little health risk.

Ekurhuleni is a key pollution hotspot where National Ambient Air Quality Standards (NAAQS) are consistently exceeded. However, ambient air quality data collection in the area has been inconsistent due to operational issues. The nearest air quality monitoring station, Tsakane, is approximately 6 km from the Withok TSF, but only has intermittent Particulate Matter (PM) readings. The Springs-NAQI station, which monitors PM_{10} and $\text{PM}_{2.5}$, is beyond a 10-km radius and provides only a general assessment of air quality conditions. (GDARD, 2012).

8.8.2 Modelling Results

Most of the land immediately surrounding the Withok TSF is predominantly farmland and open ground. The closest suburbs are Withok Estates with the closest houses approximately 0.9 km to the north-east, Tsakane with the closest houses approximately 1.2 km to the east, Geluksdal with the closest houses approximately 1.3 km to the north-east, Lesedi Local Municipality with the closest houses approximately 1.3 km to the south-west of the TSF.

Emissions from both the currently operational Brakpan TSF and the proposed Withok TSF were considered together due to their proximity. The Withok TSF cannot be assessed in isolation, as emissions from the two TSFs will have a cumulative impact on the surrounding residential areas. Dispersion simulations were, therefore, undertaken to determine ambient concentrations of $\text{PM}_{2.5}$ and PM_{10} resulting from six different possible scenarios representing different emissions from each TSF:

1. The current impact of the active Brakpan TSF, with moisture from the cyclone deposition method and with negligible emissions from the current Withok footprint.
2. The impact of the Brakpan TSF when decommissioned before vegetation has time to be established, together with negligible emissions from the current Withok footprint.

3. The impact of the Brakpan TSF when decommissioned with the top converted to paddocks that are dry for long periods of time, together with emissions from the proposed Withok TSF at approximately half of its expected final height.
4. The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with emissions from the proposed Withok TSF at approximately half of its expected final height.
5. The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with emissions from the Withok TSF with the top converted to paddocks that are dry for long periods of time.
6. The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with the Withok TSF when decommissioned with the top covered with 90% vegetation.

The following conclusions can be drawn from the modelling results:

- ❖ Emissions from the Brakpan TSF and the proposed Withok TSF in their current states are expected to be causing elevated ambient concentrations of both PM₁₀ and PM_{2.5} in downwind areas on windy days. However, residential areas to the east of the TSFs fall outside of the Gauteng Department of Agriculture, Conservation and Environment 1 000 m buffer zone and are currently not expected to experience exceedances of the NAAQS from TSF emissions only (Figure 8-23 and Figure 8-24).
- ❖ Considering that the Brakpan and Withok TSFs are in the Highveld Priority Area for air quality, baseline ambient concentrations of particulate matter are expected to be high. To prevent an increase in cumulative emissions, mitigation of the Brakpan TSF should commence on closure. Mitigation options include, but are not limited to, either the introduction of topsoil and organic matter and systematic revegetation of the top of the TSF, or the application of rock cladding to the top of the TSF. Effective mitigation of the inactive Brakpan TSF is essential as a prerequisite for the commissioning of the Withok TSF (Figure 8-24).
- ❖ Furthermore, the modelling indicates that, if the side slopes of the proposed Withok TSF are progressively cladded and vegetated, as is part of the proposal by the proponent, and the Brakpan TSF is mitigated as indicated above, ambient concentrations of PM₁₀ and PM_{2.5} over residential suburbs to the east of the TSFs will not change much from the current status-quo scenario while the Withok TSF is operational (Figure 8-27).
- ❖ In the phase immediately after closure of the Withok TSF, as well as for the scenario that involves creating paddocks on the top surface of the TSF that will be dry for long periods of time, ambient concentrations of PM and PM will increase over the residential areas of Tsakane located to the east of the Withok TSF (Figure 8-28). It is therefore essential that the closure policy for the Withok TSF be revised to include either the introduction of topsoil and organic matter to the top of the TSF and the systematic revegetation of the top of the TSF, or the application of rock cladding to the top of the TSF, to protect the health of residents in the area (Figure 8-29).

The red isopleths represent the NAAQS, therefore, all areas on the map that lie within the red coloured isopleth can be expected to experience exceedances of the relevant National Standards. The modelled concentrations of PM_{2.5} generally follow the dispersion pattern of PM₁₀, except that they do not extend

out as far from the TSFs. Furthermore, the annual average results tend to be even closer to the source. Therefore, only maps with the isopleths of maximum PM₁₀ 24-hour average concentrations are presented for scenarios.

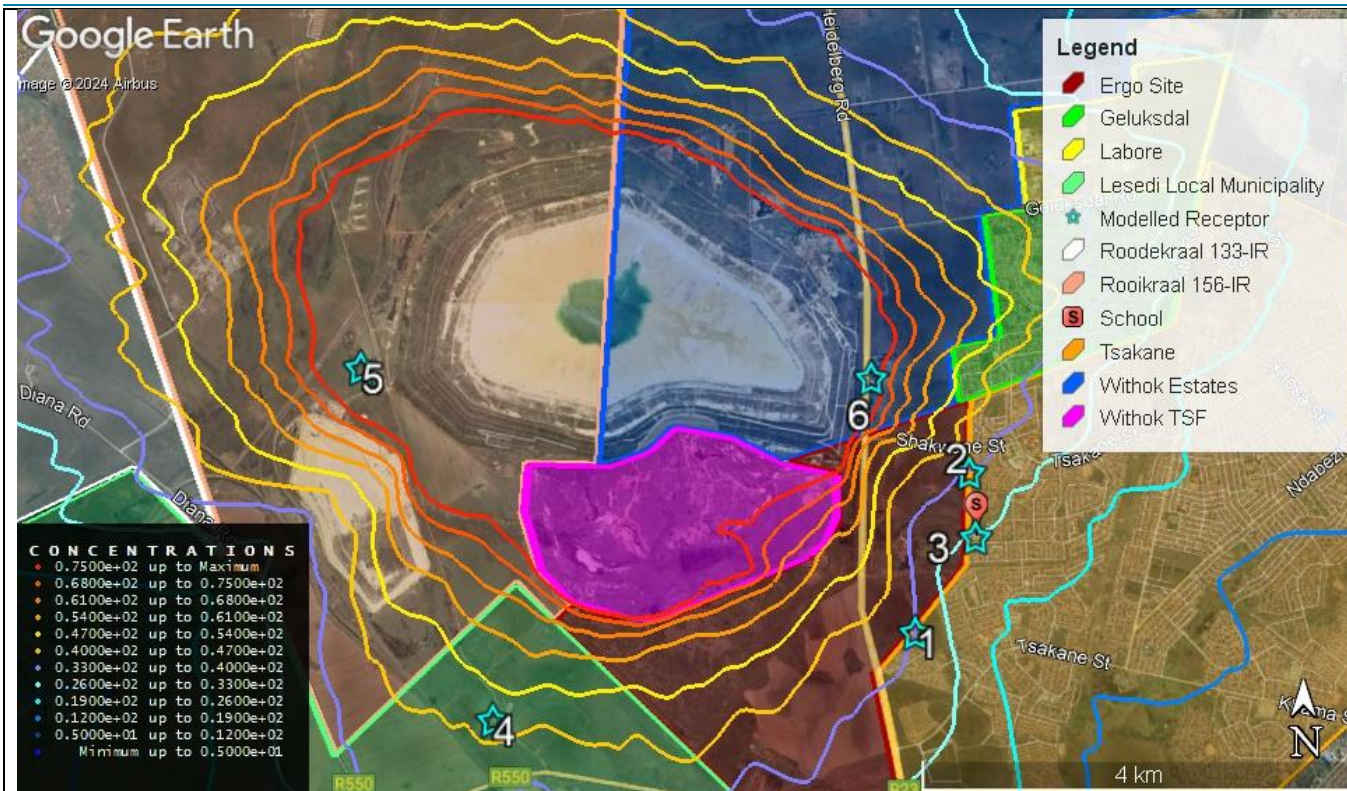


Figure 8-23: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the status quo Brakpan TSF and Withok TSF.

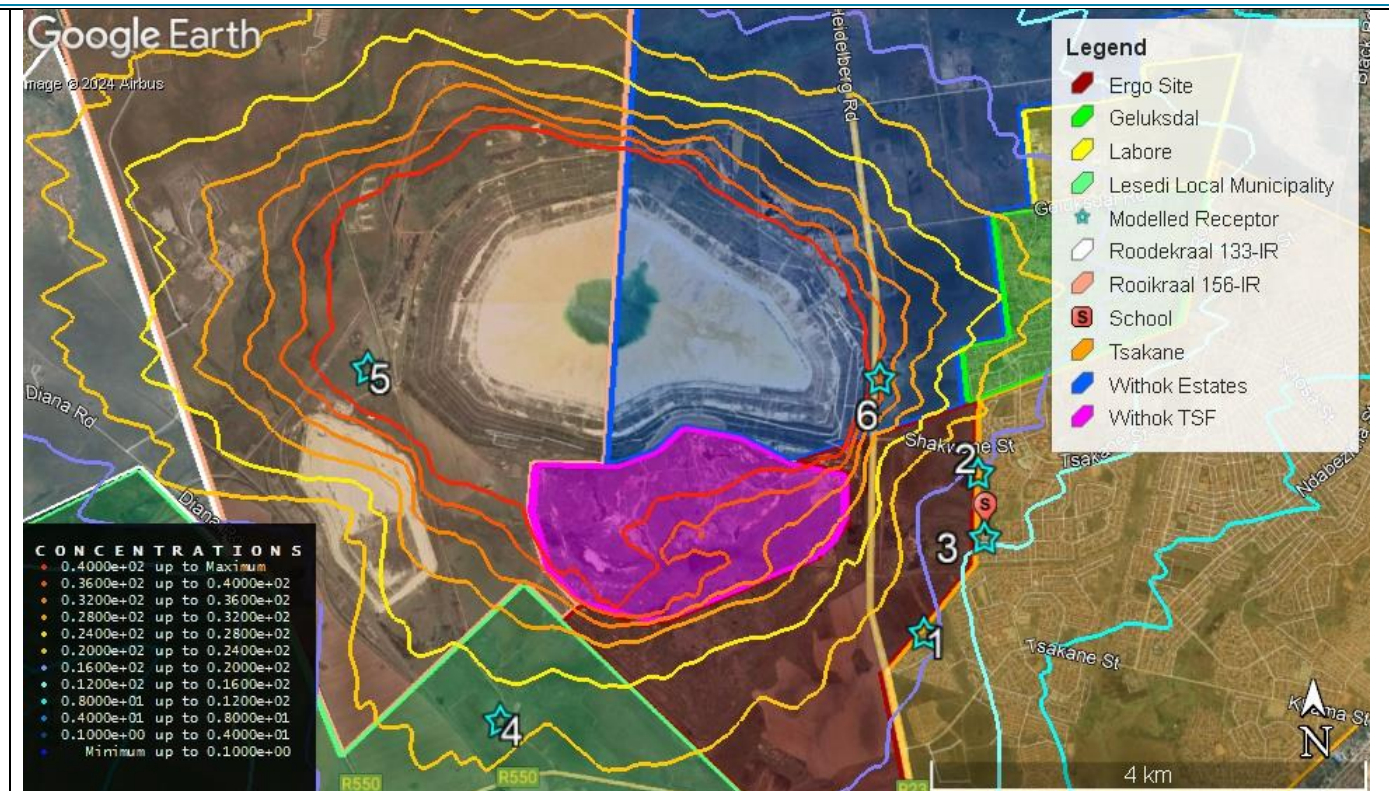


Figure 8-24: Modelled prediction of highest 24-hour average PM_{2.5} concentrations resulting from emissions from the status quo Brakpan TSF and Withok TSF.



Figure 8-25: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the worst-case Brakpan TSF scenario.

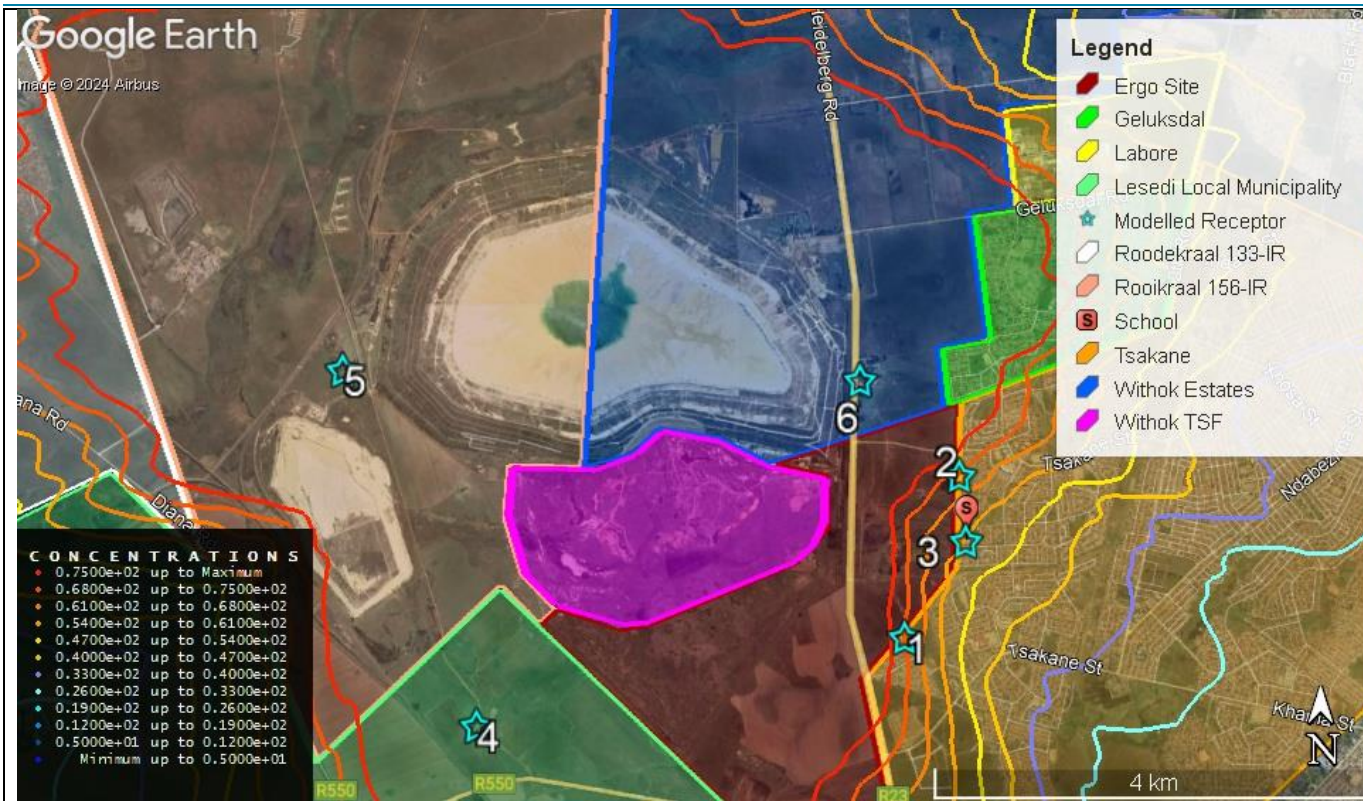


Figure 8-26: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the worst-case Brakpan TSF and operational Withok TSF scenario.

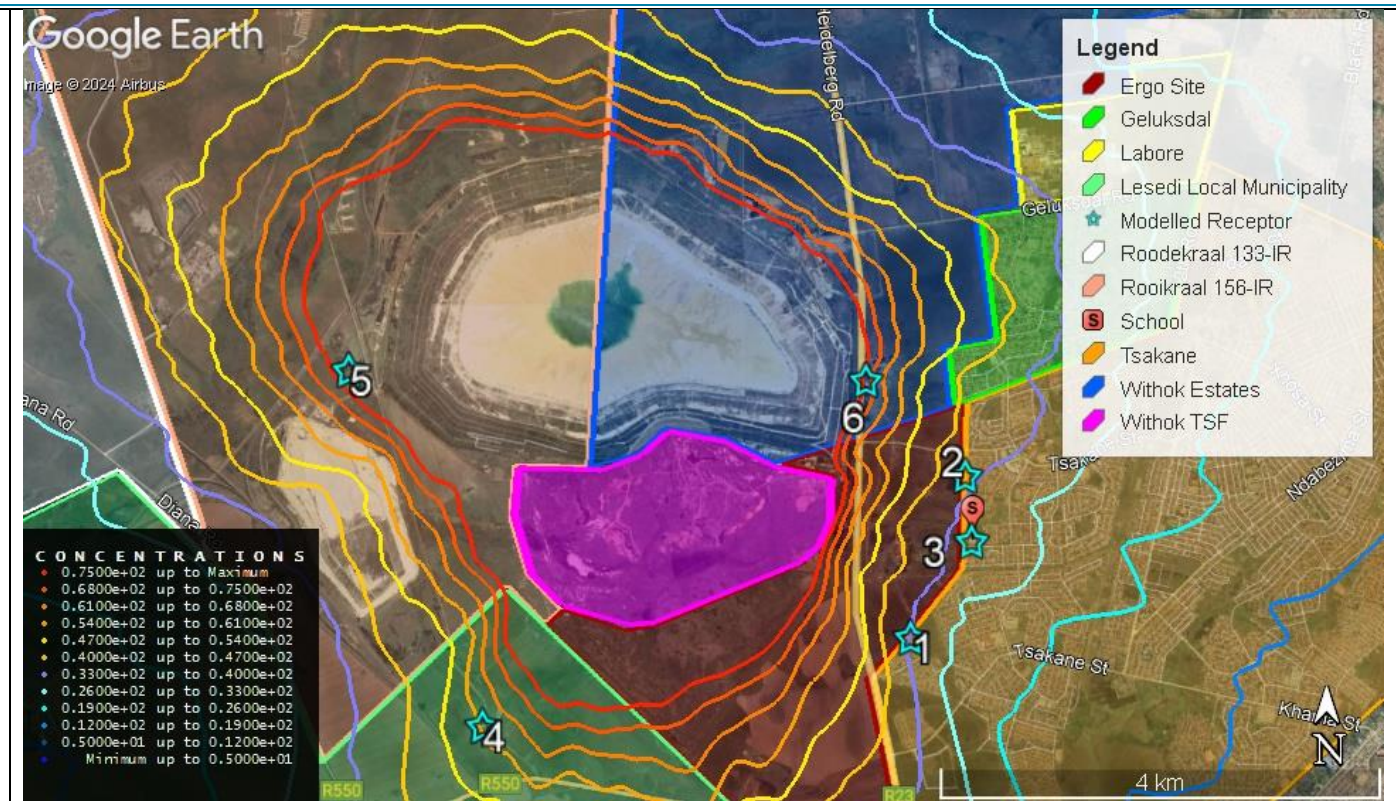


Figure 8-27: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the mitigated Brakpan TSF and operational Withok TSF scenario

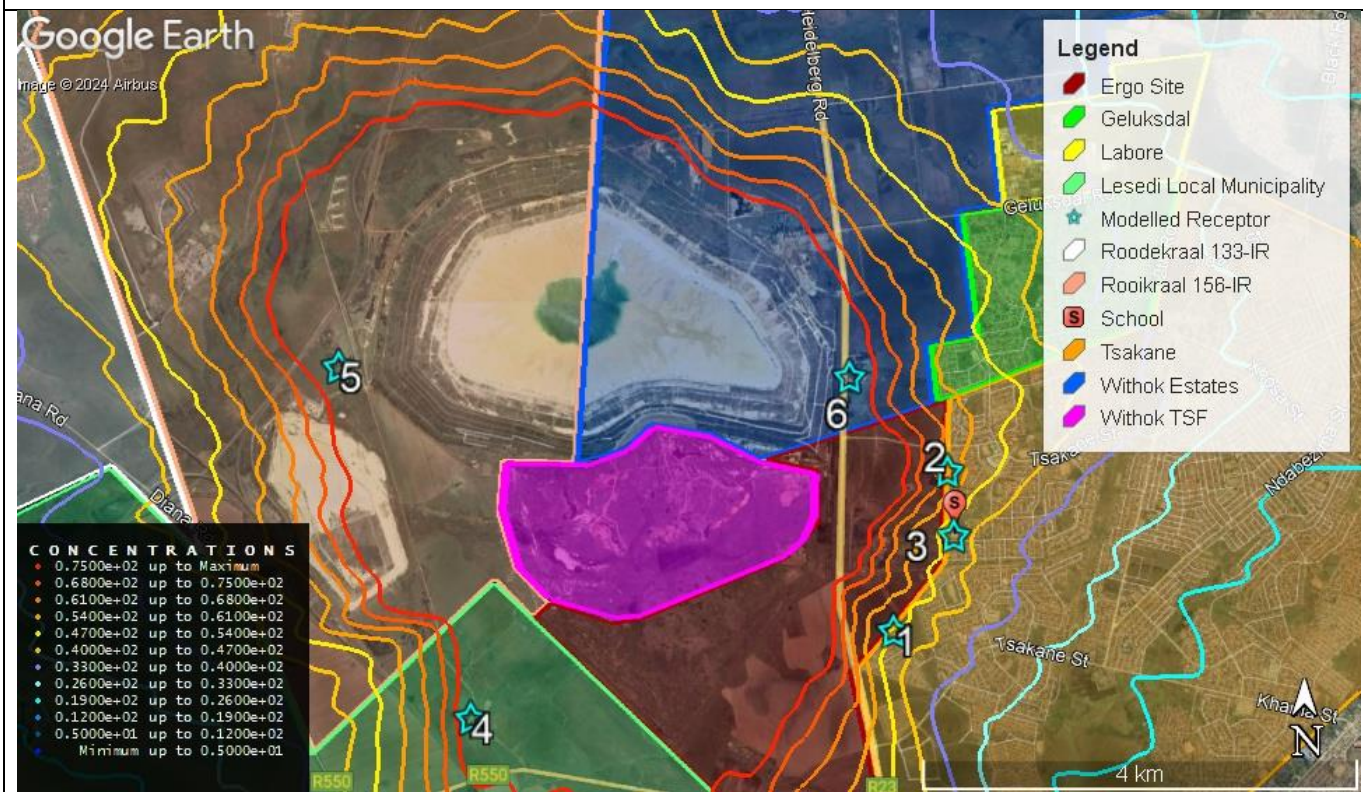


Figure 8-28: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the mitigated Brakpan TSF and worst-case Withok TSF scenario

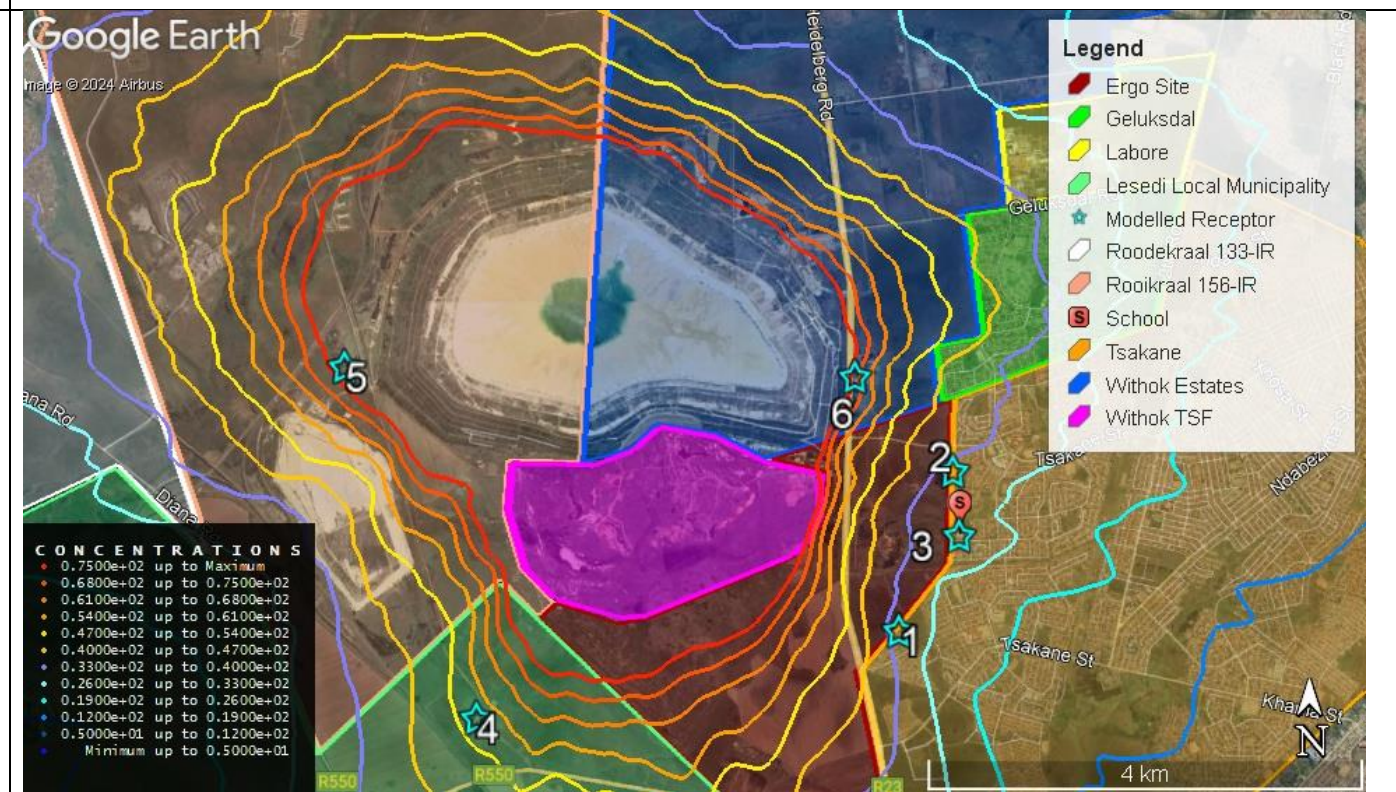


Figure 8-29: Modelled prediction of highest 24-hour average PM₁₀ concentrations resulting from emissions from the mitigated Brakpan TSF and mitigated Withok TSF scenario

8.9 Heritage

Refer to Specialist Study: Appendix D56 – Heritage and Palaeontology Impact Assessment

The fieldwork was undertaken through a field survey of the proposed development footprint areas. The fieldwork was conducted by an archaeologist (Tyron Hopf) and a field technician (Xander Fourie) on the 7th of May 2024. Hand-held GPS devices were used throughout the fieldwork to record tracklogs showing the routes followed by the fieldwork teams. It is important to note that although as intensive fieldwork coverage as possible was undertaken, sections of the study area are in areas that are more densely overgrown and/or disturbed, which limited visibility in those areas of the study area.

No heritage resources were identified during the fieldwork.

The assessment has shown that the implementation of the recommended mitigation measures will reduce the impact on cultural and palaeontological heritage resources to LOW. A field survey of the proposed alignments has not shown heritage resources within the footprint areas.

8.10 Social

Refer to Specialist Study: Appendix D6 – Socio- Economic Impact Assessment

The Proposed Project has the potential to result in both positive and negative social impacts. As such, it is important that the socio-economic baseline conditions are understood to ensure accurate identification and assessment of potential impacts associated with the Proposed Project.

Gauteng is the largest urban economy in Africa, with a population estimated to be 15.8 million, (Gauteng Spatial Development Framework 2030) (GSDF). In terms of land area, Gauteng is the smallest province in South Africa but also densely populated. Table 8-12 below provides an overview of the socio-economic baseline information for Gauteng province.

Table 8-12: Socio-economic baseline information: Gauteng at a glance

Description	Statistics
Demographics	
Population size	15 888 000
Population by size	Majority of the population (54.5%) is made up of the population group between the ages of 16-60.
Language	Isizulu is the most spoken language, approximately 19.8%
Migration	Approximately 93.9% of the population is born in South Africa (slightly less than the rate in South Africa)
Households	
Number of households	5 384 000, with 19.1% of the population reside in informal dwellings

Description	Statistics
Service Delivery	
Access to water services	98.4% are getting water from a regional or local service provider.
Access to electricity	82.7% have access to electricity.
Toilet facilities	88.7% have access to flush or chemical toilets.
Education	
Educational level	80.2% of individuals aged 5-24 are attending some form of schooling.
Employment	
Employment status	67% stated that they receive salaries as their main form of income
Unemployment status	37%
Economics	
Economic sectors	Manufacturing sector providing 14% of the total provincial output, followed by construction at 3%, mining at 2% and agriculture at under 0.5%.
Average annual income	R57 500 nearly double the amount in South Africa

8.10.1 Baseline Description

8.10.1.1 The Local Area

The social area of influence for the project is categorized into three spheres. The immediate communities surrounding the project are considered to be within a 2km radius of the TSF. This area is potentially affected by physical environmental impacts, such as dust and noise.

The local economic impacts of the project are expected to be felt in the CoE Wards 82, 99, and 112. These areas may benefit from supply-linked employment opportunities. The project's location in Gauteng province also means that the provincial economy may be impacted. At a national level, the project's macro-economic impacts, such as exports and tax contributions, are expected to be felt. These impacts have the potential to benefit the national economy (Kootbodien et al. 2020)

8.10.1.2 Socio-Economic Sensitive Areas in the Vicinity of the Project Site

The project area is surrounded by various land uses. To the west, the area is characterised by degraded mining areas. Residential areas, including Villa Liza, Dawn Park, and Vosloorus, are located to the north-west and west of the project site.

Agricultural land is the primary land use to the south of the project area, with the Suikerbosrand nature reserve located approximately 12 km to the south-west. The residential area of Tsakane, located to the east of the R23, is the primary social receptor within the 2 km radius of the project area.

Additionally, agricultural areas and smallholdings to the north and north-west of the project site may be considered socially sensitive receptors due to cumulative impacts from the Brakpan TSF.

8.10.2 Demographic Baseline

The CoE and Gauteng province have experienced high population growth rates since 2011, driven by in-migration. Ward 99, where the project is located, has a diverse population with high economic activity and a significant proportion of foreign-born residents. Despite high growth rates, Ward 99 has relatively low population densities, indicating a larger rural component

Table 8-13: Basic Demographic of the Area, 2011 and 2022

AREA	Population nr	Population growth %	Households nr	Household growth nr	Population density, persons/km ²	Average household size	% Females	Econ active
	2022	2011-2022	2022	2011-2022	2022	2022	2022	2022
CoE	4 066 691	2,3%	1 421 003	3,1%	2 055	2,9	48,9%	73%
CoE Ward 99	56 131	2,3%	19 543	3,1%	646	2,9	45,1%	74%
CoE Ward 82	36 803	2,3%	11 415	3,1%	1 438	3,2	51,3%	72%
CoE Ward 112	35 242	2,3%	10 990	3,1%	6 526	3,2	50,9%	70%
Gauteng	15 099 422	1,9%	5 318 665	2,8%	830	2,8	49,5%	72%
South Africa	62 027 503	1,7%	17 828 778	1,9%	50	3,5	51,5%	67%

Source: Stats SA, Census 2011 and 2022 Note: Ward information based on population and household growth rates in CoE since 2011

Apart from relatively high population growth rates, households also tend to split into smaller units over time resulting in household growth rates above population growth in all the local ward areas. The high growth in the number of households furthermore place extra pressure on municipal service delivery within the local area.

8.10.2.1 Basic Household Services

According to the 2022 Census, household service backlogs decreased nationally, as well as in Gauteng and the CoE. However, a significant portion of households in CoE still lack access to basic services, including housing and water.

In Ward 99, a high percentage of the population lives in informal houses/shacks, with an estimated 6,000 households in 2011. Basic service delivery, including access to improved sanitation and regular waste services, is lacking. Approximately 31% of households in Ward 99 rely on pit latrines without ventilation, which can have negative implications for groundwater quality.

Table 8-14: Backlogs in Basic Household, Basic Services. 2011 and 2022

Category	CoE	Ward 99	Ward 82	Ward 112	Gauteng	National
Informal houses, 2022	11,9%	-	-	-	11,5%	11,5%
Informal houses, 2011	22,6%	43,4%	1,2%	3,2%	20,2%	20,4%
Without piped water inside the house 2022	26,2%	-	-	-	25,0%	40,3%
Without piped water inside the house 2011	42,8%	-	-	-	37,9%	53,7%
Without flushed toilets, 2022	8,8%	-	-	-	10,3%	29,2%
Without flushed toilets, 2011	13,7%	35,6%	1,4%	0,8%	14,6%	39,9%
No electricity for lighting, 2022	6,9%	-	-	-	6,8%	5,3%
No electricity for lighting, 2011	17,8%	-	-	-	12,6%	15,2%
No regular waste services, 2022	11,4%	-	-	-	15,0%	33,7%
No regular waste services, 2011	11,6%	12,8%	3,3%	1,7%	11,7%	38,0%

8.10.2.2 Education and Skills level of the Labour Force

As indicated in the table below, a relatively lower percentage of the adult population in CoE is unskilled (without completed secondary schooling) in 2022, i.e. 41% compared to 50% nationally and 41% in Gauteng. The adult population in the project Ward 99 however had a much higher levels of unskilled labour namely 59%, also much higher than in the other adjacent wards.

Table 8-15: Education levels: percentage of the adult population above 21 years, 2022

Category	CoE	Ward 99	Ward 82	Ward 112	Gauteng	National
Without schooling	4%	7%	3%	5%	4%	7%
Some but less than secondary education	37%	52%	37%	45%	37%	43%
Completed secondary education	45%	39%	48%	44%	43%	38%
With tertiary education	14%	2%	12%	6%	16%	12%
Total	100%	100%	100%	100%	100%	100%

Source: Stats SA Census, 2011 and 2022 Ward information based on population and household growth rates CoE since 2011

In Ward 99, only 2% of the labour force has tertiary qualifications, indicating a shortage of skilled labour. Adjacent wards, such as Ward 82, have higher percentages of semi-skilled labour.

The area surrounding the project lacks adequate education infrastructure. Ward 99 has only 2 primary schools and 1 secondary school, with higher-than-average classroom sizes. Despite higher matric pass rates in CoE

than nationally, the pass rate declined from 89% in 2017 to 85% in 2020. (Department of Basic Education, 2020)

Table 8-16: Education Facilities, 2022

Category	CoE	Ward 99	Ward 82	Ward 112	National
Primary schools/10 000 people	1,5	0,4	1,4	1,4	3,8
Secondary schools/10 000 people	0,8	0,2	1,1	0,9	3,3
Pupil: educator ratio	28,4	36,5	31,9	30,7	24,9
Grade 12 pass rate (2020)	85,4%	n.a	n.a	n.a	76,2%

Source: Department of Basic Education, 2020 and 2022

8.10.2.3 Safety and Security

The project falls within the Brakpan Police precinct, with the nearest police stations being Brakpan (12km north), Tsakane (4km east), and Vosloorus (9km west).

Table 8-17: Crime Statistics, 2022

Indicator	Brakpan precinct	National
Crime rate per 1000 people	32	26
Violent crimes ¹⁾ per 1000 people	9	10
Increase in crimes (2015-2022)	-31%	-23%

Source: SAPS (2023) Including murder, attempted murder, rape, robbery, assault

The Brakpan and Tsakane areas surrounding the project have experienced violent community protests in recent years. In 2021, protests in Brakpan's Location Road Settlement involved looting and xenophobic attacks. In 2023, Tsakane residents protested against intermittent water and electricity supply, damaging public property. (SABCnews, 2023)

8.10.2.4 The Structure of the Local Economy

The CoE is the fifth-largest metropolitan economy in South Africa, with an economic output of R416 billion in 2022 and employing around 1.15 million people. The economy is dominated by finance and business services, services, and manufacturing sectors. (Stats SA,2022)

The mining sector contributes only 2.2% to the local economy and has declined at an average annual rate of 0.6% since 2008. In contrast, the finance and services sectors have experienced high growth rates. The three local wards relevant to the project area (CoE wards 99, 82, and 112) contribute around 2.4% to the jobs in the CoE municipality. Economic development in the area is centred around the Tsakane mall and includes retail, industrial, and entertainment activities. (CoE, 2021)

The main economic centres in the CoE Region E include Nigel, Carnival City, and linear development along the N17. Residents of Region E also commute to nearby areas such as Benoni, Brakpan, and Johannesburg for employment opportunities. (CoE, 2015)

8.10.2.5 The Local economic contribution of Ergo Reclamation Activities

The Recommissioning of the Withok TSF support various reclamation activities of DRDGOLD through a network of pipelines, pumping stations operated by Ergo (Pty) Ltd..

DRDGOLD provides employment to 927 permanent employees and 2,155 specialist service providers. The company also creates supply-linked jobs through its spending on local suppliers and contributes R405m in income tax.

DRDGOLD has a R53m corporate social investment budget, focusing on poverty alleviation, income generation, and job creation in local areas. The Broad-Based Livelihoods Programme has reached over 8,000 participants, promoting economic activity in various sectors. (DRDGOLD, 2023)

8.10.2.6 Composition of the Labour force

The unemployment rate in the local wards adjacent to the Project was significantly higher in 2011 than the municipal and national unemployment rates, especially in Ward 99 where the project is situated. In contrast, informal employment made a relatively low contribution to employment opportunities in these wards (Stats SA, 2011).

8.10.2.7 Income and poverty levels

In 2018, poverty levels in CoE were lower than the national average and relatively low compared to other metros in South Africa. Ward 99 had the highest poverty rate, followed by Ward 112 in the Tsakane area. In contrast, Ward 82 (Geluksdal and Labore) had a significantly lower poverty rate, below the metro average.

8.10.2.8 Economic Infrastructure

The project area is surrounded by several national and provincial roads, including the N17, N3, R550, and R23. Rail infrastructure includes the Rooikop-Mapleton freight line.

The CoE has upgraded its power supply network and stabilized electricity infrastructure in various areas. CoE also plans to roll out grid-tied renewable energy, with a solar farm already established at the OR Tambo Precinct. (CoE, 2021)

8.10.2.9 Socio-Economic Development Prioritise and Initiatives

The CoE Growth and Development Strategy 2055 (CoE, 2021) identifies five strategic imperatives for the metropolitan area:

- ❖ Re-industrialise for job creation and economic growth purposes (including a focus on agricultural (export) sector; manufacturing sector, transport and logistics, tourism and investment attraction, bio-life and pharma, Research and Development, healthcare)
- ❖ Re-urbanise including the development of informal settlements policy and the establishment of a functional land invasion unit.
- ❖ Re-govern: Effective cooperative governance.
- ❖ Re-mobilise: To achieve social empowerment.
- ❖ Re-generate sustainable environmental benefit.

The Regional Spatial Development Plan for Region E of CoE (CoE, 2015) highlights the following development priorities for the region:

- ❖ **Sustainability and conservation:** This involves managing the area in an integrated manner and protecting and optimising its environmental qualities. It also concerns the retention and protection of high potential agricultural land in order to enhance sustainable food production in the area.
- ❖ **Liveability:** This involves creating a liveable urban environment, emphasising the study area's unique and special sense of place.
- ❖ **Accessibility:** This refers to using the strengths of the area to diversify and strengthen the economic base of the broader area.
- ❖ **Connectivity:** This refers to integrating movement networks linking the study area to local and regional transport routes and sub-regional residential areas.

In terms of active mining concerns in the area the plan provides the following general guidelines:

- ❖ For any mining activity detail environmental studies need to be done.
- ❖ No residential development should be permitted / allowed other than in existing urban structures.
- ❖ Employee transport required outside the metropolitan public transport services will be the responsibility of the mining company.
- ❖ All buildings on the mining land should be subjected to normal municipal management and town planning requirements.

8.11 Noise

Refer to Specialist Study: Appendix D8– Noise Assessment study

8.11.1 Potential Noise Generation

The project is in an area described as plains. The surrounding area is heavily modified due to anthropogenic activities (mining, agriculture and urban development).

The area is further described in terms of environmental components that may contribute to or change the sound character in the area:

8.11.1.1 Roads and Railway Lines

The R23 road passes the Project Focus Area (PFA) to the east, and noises from traffic on this road could influence ambient sound levels up to 500m from this road. This road is relatively busy, and traffic noises will impact on the ambient sound levels in the vicinity of the road.

8.11.1.2 Surrounding Land Use

The area in the direct vicinity of the project is mainly used for mining (the existing Brakpan TSF directly north and the Rooikraal TSF to the west), agriculture and urban development (the R23 road and the Tsakani and Geluksdal suburbs).

8.11.1.3 Ground Conditions and Vegetation

The natural veld has been significantly impacted by anthropogenic activities with little natural vegetation remaining in the area.

8.11.1.4 Ambient Sound Levels

Ambient sound levels were not measured for this project, it is also not deemed necessary to measure the ambient sound levels for a screening level report.

8.11.2 Potential Sensitive Receptors

Residential areas and potential noise-sensitive developments/receptors (NSR) were identified using tools such as Google Earth. No NSR were identified within 500m of the Withok TSF recommissioning project. The closest NSRs are illustrated on Figure 8-30.

Noises associated with the development and operation of the borrow pits, as well as the recommissioning of the Withok TSF will be limited to less than 200m from the project activities and insignificant further than 500m from such activities.

Considering the project area to be developed, the likely elevated sound character of the area (due to traffic noises on the R23 road) as well as the distance between potential noise sources and identified NSR (more than 500 m from the proposed activities), the recommissioning activities associated with the Withok TSF will not influence ambient sound levels at any NSR residing in the vicinity of the project site.

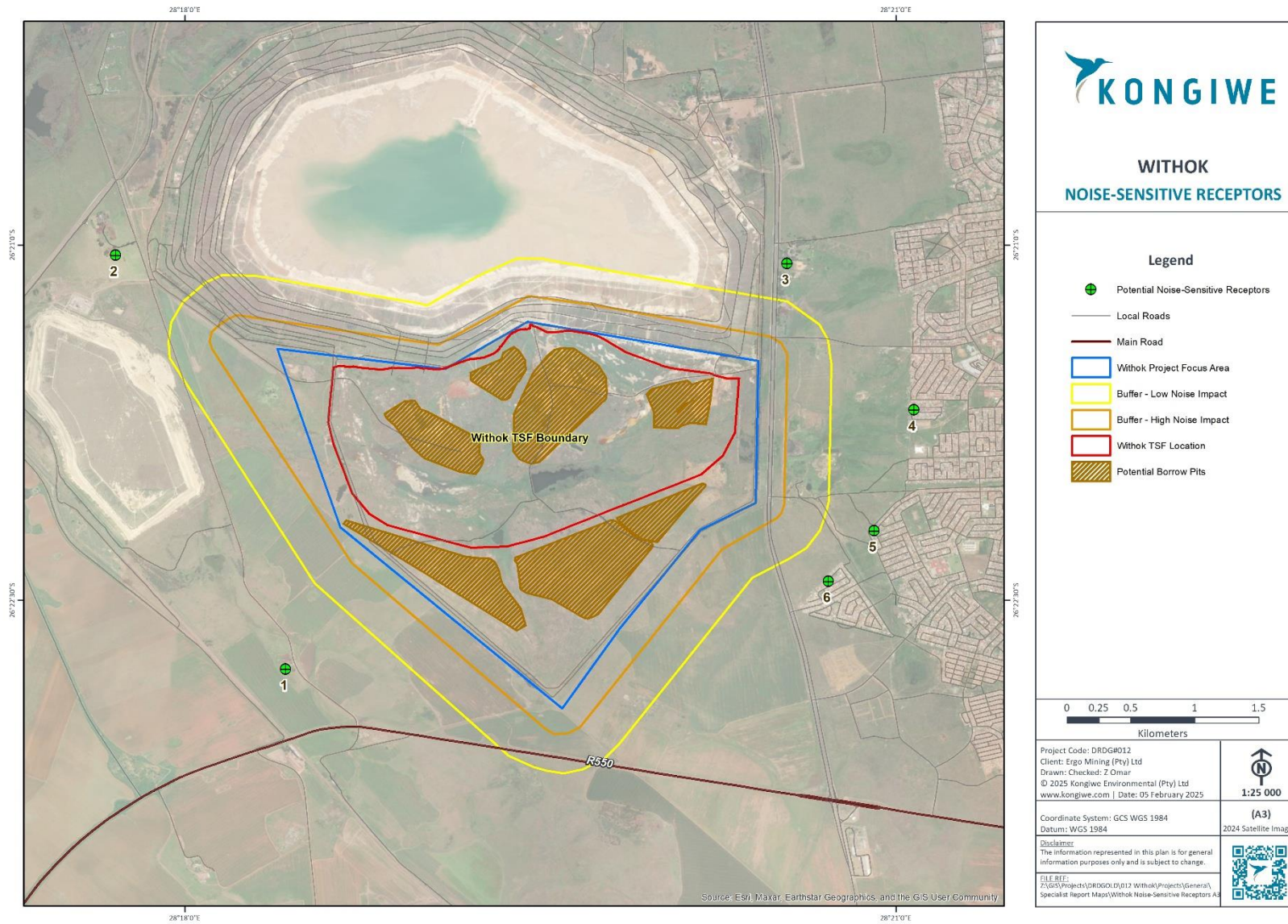


Figure 8-30: Withok TSF recommissioning project and closest noise-sensitive receptors

8.12 Visual

Refer to Specialist Study: Appendix D9 – Visual Impact Assessment

8.12.1 Baseline Description

The project site would be rated as being a **moderate visual resource** and will be **insensitive** to change. Brakpan is located on the outskirts of Ekurhuleni meaning that it provides a gradual shift from dense, built-up landscapes to more open, spacious views when leaving the urban areas. However, the landscape has been modified by industrial and agricultural purposes. It follows a fairly monotonous pattern where the vegetation is predominantly grassland and the terrain is fairly flat. The study area has a rural agricultural sense of place.

8.12.2 Viewshed Analysis

This viewshed analysis identifies areas from which the proposed recommissioned Withok TSF may be visible from, shown in Figure 8-31. The blue areas indicate that a greater extent of the TSF is visible while the green areas show that a partial extent is visible. A viewshed analysis shows areas that are visible based only on the land's elevation, without considering obstacles like vegetation or buildings. This creates an idealized and worst-case visibility range, assuming an open landscape without anything blocking the view. Figure 8-31 indicates that the Withok TSF will have **high** visibility in all directions excluding north of the development.

8.12.3 Sensitive Receptors

Due to the important travel routes surrounding the area, a considerable number of sensitive viewers would be transiently affected. Both the N3 and the N17 are important road freight corridor linking Gauteng to Richards Bay, providing a great volume of commuter traffic. The R23 and R550 main roads travel between the various towns and are also subject to substantial commuter traffic volumes. The stretch of land along the R23, east of the Withok TSF, is lined with trees that screen much of the view in both directions.

Multiple dirt roads traverse the farmland surrounding the TSF which are used by locals, farm workers and industrial workers as well as motorists for their daily commutes. People working in the area or traveling along local roads may be focused on their tasks or activities, making them potentially less sensitive to changes in the view. The only apparent businesses in the area are BP Spaarwater and PRO TEK, both located at the intersection of the R550 and R23 roads.

Farmhouses and residential areas surrounding the TSF are classified as being highly sensitive viewers due to the proximity of the project in their immediate viewing space.

8.12.4 Visual Absorption Capacity

The Visual Absorption Capacity will be High to Moderate. The impact on viewers from the south of the site will be minimal, as the existing Brakpan TSF already serves as a backdrop for the Withok TSF. The Withok TSF will be visible to the east and west several kilometres away from site owing to its imposing height on relatively flat terrain. However, due to the historical prevalence of the Brakpan TSF, the addition of Withok TSF will be relatively unobtrusive.

8.12.5 Impact Significance

The visual analysis shows high visibility of the TSF to surrounding areas, barring the north due to obstruction by Brakpan TSF. The visual zone of influence (ZOI) is estimated to be at 6 km, beyond which visual impact diminishes due to terrain, distance and obstructions. Sensitive receptors within 2 km include residents, farm workers, and motorists on the R23 and R550 main roads. While farmhouses and residential areas have high sensitivity, the long-standing presence of the existing Brakpan TSF may reduce perceived intrusiveness. The significance of the visual impact associated with surface infrastructure during the construction phase will be moderate-low, during the operational phase will be moderate-high and during the decommission phase will be moderate. These impacts can be minimized by integrating the provided recommendations, including visual screening to the site, dust suppression and employing concurrent rehabilitation and revegetation of impacted areas.

8.13 Health

Refer to Specialist Study: Appendix D10 – Health Impact Assessment

Environmental Health Impact Assessments (EHIA) focus on activities that have not yet been implemented and attempts to forecast the likely health ramifications of such activities, if any. The predictions are derived from evidence-based knowledge. Many factors combine to impact the health of individuals and communities.

Receptors were broken into clinic catchment areas based on geographical location. Thubelisha Park was distinguished from the rest of the Simunye clinic catchments due to proximity to the proposed Withok TSF. To determine the level of overall vulnerability of receptors, sensitivity was broken down into age-related vulnerability, health baseline-related vulnerability, and socio-economic vulnerability.

Community Health data was requested and obtained from the National Department of Health Research Databases after obtaining HSRC ethical approval, Department of Health ethical approval and gatekeeper permissions from the MEC for Health. Community health baseline data is reported for Ekurhuleni health sub-district East 1, which is made up of Tsakane and health sub-district South 1 which comprises Vosloorus and Villa Liza. Distinguishing factors are evident between the health sub-districts which are discussed below.

The site is near the southern perimeter of Ekurhuleni Metropolitan municipality. This forms part of the Ekurhuleni East 1 Health Sub District with Ekurhuleni South 1 Health sub district lying to the west of the site. Communities of interest with regards to potential health impacts of the proposed Withok TSF are Tsakane and Geluksdal to the East, Vosloosrus communities to the West and Villa Liza community to the northwest .

Overall community vulnerability was evidently moderate to high in the Tsakane community, with baseline indicators demonstrating high prevalence of social determinants in health outcomes of the population. Healthcare facilities are currently overburdened with Human Immunodeficiency Virus (HIV), Tuberculosis (TB), respiratory illness and under-five malnutrition being prominent. High incidence of organophosphate poisoning of youth was noted across key informant interviews. Given vulnerability of baseline communities health impacts will be prominent with existing challenges possibly being exacerbated. Primary areas of concern relating to health impacts of the project relate to potential air Pollution/particulates impacting on Tsakane community to the East and nearby Agricultural holdings/grazing areas.

9 IMPACT ASSESSMENT

9.1 Methodology for assessing the significance of Environmental Impacts

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance. As read within the DWS’s Best Practice Guideline: G4 – Impact Prediction, there are three basic components that define an impact (or a risk). Figure 9-1 represents the relationship between these three components and their influence on the significance of a certain impact of a project.

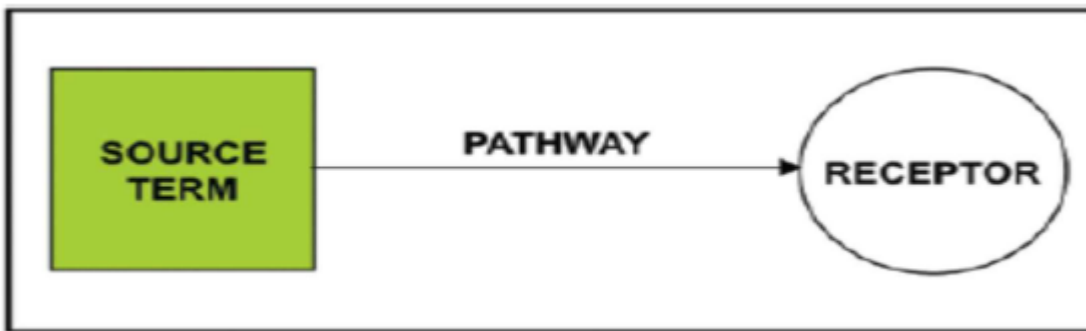


Figure 9-1: Impact prediction model.

The impact significance rating system is presented in the tables below and involves three parts:

- ❖ **Part A:** Define impact consequence using the three primary impact characteristics of magnitude, spatial scale/ population and duration;
- ❖ **Part B:** Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
- ❖ **Part C:** Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from **Part B**) and the probability of occurrence.

9.2 Part A: Defining Consequence in Terms of Magnitude, Duration and Spatial Scale

Use these definitions to define the consequence in Part B.

Table 9-1: Consequence rating definitions.

impact Characteristics	definition	criteria
Magnitude	Major -	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded.

impact Characteristics	definition	criteria
	Moderate -	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded.
	Minor -	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded.
	Minor +	Minor improvement; change not measurable; or threshold never exceeded.
	Moderate +	Moderate improvement; within or better than the threshold; or no observed reaction.
	Major +	Substantial improvement; within or better than the threshold; or favourable publicity.
Spatial scale or population	Site or local	Site specific or confined to the immediate project area.
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic.
	National/ International	Nationally or beyond.
Duration	Short term	Up to 18 months.
	Medium term	18 months to 5 years.
	Long term	Longer than 5 years.

9.3 Part B: Determining Consequence Rating

Rate consequence based on definition of magnitude, spatial extent and duration.

Table 9-2: Consequence rating methodology.

Magnitude	Duration	Spatial Scale/ Population		
		Site or Local	Regional	National/ International
Minor	Long term	Medium	Medium	High
	Medium term	Low	Low	Medium
	Short term	Low	Low	Medium
Moderate	Long term	Medium	High	High
	Medium term	Medium	Medium	High
	Short term	Low	Medium	Medium
Major	Long term	High	High	High
	Medium term	Medium	Medium	High
	Short term	Medium	Medium	High

9.4 Part C: Determining Significance Rating

Rate significance based on consequence and probability.

Table 9-3: Significance rating methodology.

Probability (of Exposure to Impacts)	Consequence Negative			Consequence Positive		
	Low	Medium	High	Low	Medium	High
Definite	Medium	Medium	High	Medium	Medium	High
Possible	Low	Medium	High	Low	Medium	High
Unlikely	Low	Low	Medium	Low	Low	Medium

9.5 Impacts and Cumulative Impacts Identified

This Subchapter serves to provide insight on the major positive, negative and cumulative impacts associated with the Project. The potential impacts are discussed per environmental feature/ aspect. For more detail, please refer to the specialist study contained in the appendices.

9.5.1 Construction Phase

Ergo will commence with the pre-construction and construction phase for its project related infrastructure in line with its approved environmental authorisations.

9.5.1.1 Biodiversity

The following potential impacts were considered on biodiversity (flora and fauna) during the construction phase:

- ❖ An impact to local vegetation and habitats;
- ❖ The spread of alien species;
- ❖ The impact of erosion;
- ❖ The impact from potential pipeline leak or spills; and
- ❖ The generation of noise, dust, and waste.

Table 9-4: Assessment of significance of potential construction impacts on vegetation and habitat.

Impact Name	Vegetation and Habitats	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate	Minor

Impact Name	Vegetation and Habitats	
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium
Management Measures:		
<ul style="list-style-type: none"> • Laydown and construction preparation activities must be limited to already modified areas and should take up the smallest footprint possible. • Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further if possible. • All vehicles and personnel must make use of existing roads and walking paths as far as possible, especially construction/operational vehicles. • The clearing of vegetation must be minimised where possible. All activities must be restricted to within the authorised areas. • All laydown, chemical toilets etc. should be restricted to disturbed areas and not be placed in sensitive areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. A TSF operational plan must be put in place to avoid tailings spillage. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. <ul style="list-style-type: none"> ○ Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. ○ No servicing of equipment on site unless necessary. ○ All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. ○ Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. ○ Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. ○ All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the PAOI. • All construction waste must be removed from site at the closure of the construction phase. • Precautions must be taken against erosion damage that would be caused by unplanned pipe leaks. A leak warning and detection system must be installed. Dense indigenous pioneer grass seeds should also be planted across all bare earth areas to prevent erosion. 		
Environmental Risk Significance (Post-mitigation)		Low
Cumulative Impacts		No

Table 9-5: Assessment of the significance of potential construction impacts on fauna.

Impact Name	Fauna	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate	Minor
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting land clearance extent • Rehabilitation plans must be initiated during construction to minimise disturbed areas. • Follow any local and national policies and plans regulating and protecting biodiversity in the project area. • Clearing and disturbance activities must be conducted in a progressive linear manner, always outwards and away from the centre of the PAOI • The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. • The duration of the activities should be minimised to as short a term as possible, to reduce the period of disturbance on fauna. • Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to reptile species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Any holes/deep excavations must be dug in a progressive manner and shouldn't be left open overnight. Should any holes remain open overnight they must be properly covered temporarily to ensure that no small fauna species fall in. Holes must be subsequently inspected for fauna prior to backfilling. • If fencing is required: wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as 		

Impact Name	Fauna
this will increase road killings in the area.	
<i>Environmental Risk Significance (Post-mitigation)</i>	Low -
Cumulative Impacts	No

Table 9-6: Assessment of significance of potential construction impacts of alien plant species

Impact Name	Alien Plant Species	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. Early identification and Eradication: regular monitoring to detect invasive species on site, early and promptly removing them before they spread, 		
<i>Environmental Risk Significance (Post-mitigation)</i>		Low
Cumulative Impacts	No	

Table 9-7: Assessment of significance of potential construction impacts of waste management.

Impact Name	Waste Management	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Waste management must be a priority, and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan. Toilets at the recommended Health and Safety standards must be provided. These should be emptied regularly and once no longer required, they must be pumped dry to prevent leakage into the surrounding environment and removed from site. The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in appropriate and secured waste skips. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

Table 9-8: Assessment of significance of potential construction impacts of erosion.

Impact Name	Erosion	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. • A stormwater management plan must be compiled and implemented if necessary. • Regular monitoring and maintenance of erosion control measures are essential to ensure their effectiveness. 		
Environmental Risk Significance (Post-mitigation)		Low
Cumulative Impacts		No

Table 9-9: Assessment of significance of potential construction impacts of pipeline leaks or spills .

Impact Name	Pipeline Leaks or Spill	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative

Impact Name	Pipeline Leaks or Spill	
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Leak detection or any similar monitoring tool must be incorporated to try identifying leaks. Use proper design and construction; use geographical maps, aerial photography, and satellite imagery to avoid geo-hazards along pipeline routes; ensure that compressors, pumps and surge suppression equipment are correctly sized. Develop and implement comprehensive emergency response plans to minimize the impact of any leaks or spillages Perform regular maintenance and proactive repairs on identified “at-risk “areas to prevent failures 		
<i>Environmental Risk Significance (Post-mitigation)</i>		Low -
Cumulative Impacts	No	

9.5.1.2 Wetlands

The assessed wetlands exhibit impacts at local scale. These impacts result from present and historical land use in or in near proximity to wetlands and has altered their natural hydrological regime and vegetation composition. The list below refers to the present-day local impacts observed within the assessed wetland areas:

The list below refers to the present-day local impacts observed within the assessed wetland areas:

- ❖ Historical alterations to the natural hydrological regime due to the presence of croplands and other industrial uses;
- ❖ Alterations to hydrology and geomorphology through the development of TSF’s and dams within the wetland catchment;
- ❖ Loss of vegetation through grazing pressure and cropland infringement;
- ❖ Impaired water quality from industrial effluents and agricultural runoff;
- ❖ Impeding flow within watercourse from informal and formal road crossings;
- ❖ Proliferation of alien invasive vegetation;
- ❖ Erosion of watercourses from altered hydrology and geomorphology; and
- ❖ Sedimentation of watercourses.

Table 9-10: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.

Activity	Impact	Significance (max = 100)	Risk Rating
Clearing of vegetation and site preparation to facilitate the development of the TSF	Loss of wetland area	57	M
	Altering surface flow patterns	36	M
	Erosion of surrounding landscape and subsequently the watercourses	24	L
	Sedimentation and siltation of watercourses	28,8	L
	Proliferation of invasive alien plants	24	L
Excavating and reshaping for the Banks of the TSF	Altering surface and subsurface flow patterns	30	M
	Erosion of surrounding landscape and subsequently the watercourses	19,2	L
	Sedimentation and siltation of watercourses	24	L
Soil stockpiling	Altering surface and subsurface flow patterns	18	L
	Erosion of surrounding landscape and subsequently the watercourses	14,4	L
	Sedimentation and siltation of watercourses	14,4	L
Storage of chemicals, mixes and fuel	Impaired water quality from spills and leaks	10,8	L
Operation of heavy machinery and equipment within and in proximity to wetlands	Altering surface flow patterns through hardened surfaces	24	L
	Erosion of surrounding landscape and subsequently the watercourses	19,2	L
	Sedimentation and siltation of watercourses	14,4	L
	Wetland vegetation disturbance and proliferation of invasive alien plants	14,4	L
	Impaired water quality from spills and leaks	10,8	L
Installation and assembly of subsurface drainage systems	Altering surface and subsurface flow patterns	33	M
Backfilling of residual excavated areas	Altering surface and subsurface flow patterns	24	L
	Erosion of surrounding landscape and subsequently the watercourses	19,2	L
	Sedimentation and siltation of watercourses	14,4	L

Activity	Impact	Significance (max = 100)	Risk Rating
Dewatering excavated areas in relation to water accumulation from rainfall and stormwater management and releasing water into the environment	Temporary alteration of hydrology within watercourse	19,2	L
	Erosion of watercourses from concentrated flows	19,2	L
	Sedimentation and siltation of watercourses	19,2	L
Domestic and industrial waste	Wetland degradation	9,6	L
	Impaired water quality	10,8	L
Ablution facilities	Impaired water quality from spills and leaks	16,2	L

9.5.1.3 Surface Water

The activities and impacts that are likely to occur during the construction phase are summarised in Table 9-11.

Table 9-11: Summary of activities and impacts for the construction phase

Activity	Impact Description
Impacts due to topsoil stripping	Excessive silt washed into water courses
Impacts due to wash bays and workshops	Hydrocarbons and other pollutant washed into water courses
Impacts due to vehicle fleet-related pollution	Hydrocarbons and other pollutant washed into water courses

The ratings and proposed mitigation measures for the construction phase are provided in Table 9-12.

Table 9-12: significance rating for the construction phase

NATURE OF IMPACT: Excessive silt washed into water courses, Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses.		
	Impact Rating without Mitigation	Impact Rating with Mitigation
Extent (Local, Regional, International)	Regional	Local
Duration (Short term, Medium term, Long term)	Short term	Short term
Magnitude (Major, Moderate, Minor)	Moderate	Minor
Probability (Definite, Possible, Unlikely)	Possible	Possible

NATURE OF IMPACT: Excessive silt washed into water courses, Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses.		
Calculated Significance Rating (Low, Medium, High)	Medium	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Irreversible	
Irreplaceable loss of resources: (Yes or No)	No	
Can impacts be enhanced: (Yes or No)	Yes	
Residual impacts		
<ul style="list-style-type: none"> None foreseen 		
Mitigation measures		
<ul style="list-style-type: none"> Clearly define areas to be cleared. Do not clear past designated areas. Dry season construction is preferable if practical. Wash bay discharge water should flow through an oil separator. All vehicles should be well maintained and inspected for hydrocarbon leaks weekly. Fuel depots and refuelling areas should be bunded. Vehicle maintenance should be a key performance objective of the plant contractor. 		

9.5.1.4 Groundwater

The most significant groundwater impacts that could potentially arise from the construction phase are as follows:

- ❖ Potential contamination of shallow groundwater resources due to accidental hydrocarbon or other chemical spillages from vehicles and operational activities might occur. Spillages are commonly minor and localised.

Table 9-13: Construction Phase water quality impacts

NATURE OF THE IMPACT: Accidental hydrocarbon or other chemical spillages from construction vehicles. Localised impacts on ambient groundwater quality due to accidental spillages		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (Local, Regional, International)	Local	Local
Duration (Short term, Medium term, Long term)	Medium term	Short term
Magnitude (Major, Moderate, Minor)	Moderate -	Minor -
Probability (Definite, Possible, Unlikely)	Possible	Possible

NATURE OF THE IMPACT: Accidental hydrocarbon or other chemical spillages from construction vehicles. Localised impacts on ambient groundwater quality due to accidental spillages		
Calculated Significance Rating (Low, Medium, High)	Low	Low
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	No	
Residual impacts		
❖ None		
Mitigation measures		
❖ Develop and maintain a Standard Operating Procedure to contain and remediate any accidental hydrocarbon or other chemical spillages.		
❖ Contain spillage using spill kits, excavate and dispose of contaminated material/soil at accredited disposal site.		

9.5.1.5 Air Quality.

The impact on the environment surrounding the proposed project area is summarised in the impact assessment table below.

Table 9-14: All project phase- Air Quality impacts not mitigated

Impact Assessment Matrix	
Impact Description	Wind erosion from exposed areas of a TSF causes the emission of particulate matter into the air, thus increasing existing ambient air concentrations of criteria pollutants (both PM ₁₀ and PM _{2.5}) at receptors.
Acceptable rating level	PM ₁₀ a) 24-hour Average Concentrations: National Ambient Air Quality Standard of 75µg/m ³ b) Annual Average Concentrations: National Ambient Air Quality Standard of 40µg/m ³ PM _{2.5} a) 24-hour Average Concentrations: National Ambient Air Quality Standard of 40µg/m ³ b) Annual Average Concentrations: National Ambient Air Quality Standard of 20µg/m ³
Activity	Without Mitigation
Magnitude	Moderate negative: The proposed TSF is located in the Highveld Priority Area for air quality. Therefore, ambient concentrations are already elevated – dust monitoring in the area substantiates this concern.
Duration	Long Term: If left unmitigated, the worst-case scenario is indefinite.

Spatial Scale	Local: Worst-case conditions may lead to the NAAQS being exceeded over residential areas to the east of the Brakpan TSF.
Consequence	Medium negative
Probability	Probable: The worst-case scenario will impact residential areas on windy days.
Significance of Air Quality Impact	Medium negative
Mitigation	Progressive revegetation of the sides of the Withok TSF should be undertaken. The top should be clad with topsoil and organic matter with the introduction of vegetation to prevent emissions from the TSF from getting worse.
Cumulative Impact	The Brakpan and Withok TSFs are located in the Highveld Priority Area for air quality. Therefore, baseline concentrations are expected to be high and therefore cumulative concentrations are likely to result in exceedances over residential areas.

Table 9-15: All project phase- Air Quality impacts mitigated

Air Quality: Impact Assessment Matrix	
Impact Description	Wind erosion from exposed areas of a TSF causes the emission of particulate matter into the air, thus increasing existing ambient air concentrations of criteria pollutants (both PM ₁₀ and PM _{2.5}) at receptors.
Acceptable rating level	PM ₁₀ a) 24-hour Average Concentrations: National Ambient Air Quality Standard of 75µg/m ³ b) Annual Average Concentrations: National Ambient Air Quality Standard of 40µg/m ³ PM _{2.5} a) 24-hour Average Concentrations: National Ambient Air Quality Standard of 40µg/m ³ b) Annual Average Concentrations: National Ambient Air Quality Standard of 20µg/m ³
Activity	With Mitigation
Magnitude	Moderate negative: If the sides of the Withok TSF are progressively clad as proposed by the proponent, there should be very little difference in the air quality of the surrounding areas compared to the current status quo. There will, however, be a period of time before mitigation measures become effective, during which impacts over Geluksdal and the western parts of Tsakane will be heavily impacted.
Duration	Long Term: If the revegetation is scientifically applied or cladding is applied, the mitigation is expected to last in the long term. The operational phase of the Withok TSF is expected to last approximately 20 years.
Spatial Scale	Local: Worst-case conditions may lead to the residential areas to the east of the TSFs experiencing raised ambient air concentrations of particulate matter.
Consequence	Medium negative

Air Quality: Impact Assessment Matrix	
Probability	Probable: The worst-case scenario will impact residential areas on windy days
Significance of Air Quality Impact	Medium negative
Mitigation	The plan is to progressively clad the sides as the height of the Withok TSF increases. This mitigated scenario includes mitigation of the Brakpan TSF by the application of topsoil and organic matter with the systematic introduction of vegetation to the top of the Brakpan TSF.
Cumulative Impact	The Brakpan and Withok TSFs are located in the Highveld Priority Area for air quality. Therefore, baseline concentrations are expected to be high. To prevent an increase in cumulative emissions, mitigation is essential.

9.5.1.6 Heritage and Palaeontology

No heritage resources were identified during the fieldwork. The only impacts anticipated are related to chance finds described below.

Table 9-16: impact Assessment Table for Heritage Resources

NATURE OF THE IMPACT: <i>Potential discovery of heritage resources</i>		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (<i>Local, Regional, International</i>)	Local	Local
Duration (<i>Short term, Medium term, Long term</i>)	Short term	Short term
Magnitude (<i>Major, Moderate, Minor</i>)	Minor -	Minor -
Probability (<i>Definite, Possible, Unlikely</i>)	Unlikely	Unlikely
Calculated Significance Rating (<i>Low, Medium, High</i>)	Low	Low
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	No	
Mitigation measures		
<ul style="list-style-type: none"> ❖ Implement a chance to find procedures in case where possible heritage finds are uncovered. ❖ If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments ❖ These discoveries ought to be protected (if possible, in situ) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a palaeontologist 		

NATURE OF THE IMPACT: *Potential discovery of heritage resources*

- ❖ Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

9.5.1.7 Socio-Economic

The scope and purpose of the Social and Economic Impact Assessment (SEIA) report are to provide the background of the socio-economic characteristics of the local area relevant to the project; to provide an assessment of potential impacts that are anticipated during the construction, operational, and decommissioning phases, and provide a socio-economic management plan to enhance positive impact and mitigate negative impacts.

Table 9-17: Summary of Socio-Economic Impacts

Impact Description	BEFORE MITIGATION	AFTER MITIGATION	Cumulative Impact
	SIGNIFICANCE	SIGNIFICANCE	
Construction			
Temporary jobs and income	Low +	Low +	No
Informal influx and security	Medium -	Low -	Yes
Nuisance factors	Low -	Low -	Yes
Operations			
Enabling continued Ergo recommissioning activities	High +	High+	No
Continued Social funds	Low+	Medium+	No
Nuisance factors	Low -	Low-	Yes
Community health and safety	High-	Medium-	Yes
Informal influx and security	Medium -	Low-	Yes
Impact of adjacent economic activities	Medium-	Medium-	Yes
Decommissioning			
Loss of agricultural land	Low-	Low-	Yes
Continued impacts on local economic activities	Medium-	Medium-	Yes
Cessation of employment	Medium-	Medium-	No
Cessation of social funds	Medium-	Medium-	No
Community health and safety	High-	Medium-	Yes

Table 9-18: Rating of impact on local employment and income

Impact Name	Employment and Income	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Positive	Positive
Magnitude	Minor +	Moderate +
Duration	Short term (up to 18 months)	Short term (up to 18 months)
Scale	Site or local	Site or local
Consequence	Low	Low
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low +
Management Measures:		
<ul style="list-style-type: none"> Ergo should consider a local internship/job shadowing strategy that could benefit talented youth from the local communities in the ward where the project is situated COE Ward 99) as well as the adjacent COE Wards 112 and 82. Communicate local employment clearly to the local communities adjacent to the mine . 		
Environmental Risk Significance (Post-mitigation)		Low +
Monitoring:		
On a monthly basis during the construction phase		
Cumulative Impacts		No

Table 9-19: Rating of impact on informal influx

Impact Name	Informal Influx Impact	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative

Impact Name	Informal Influx Impact	
Magnitude	Medium -	Minor -
Duration	Short term (up to 18 months)	Short term (up to 18 months)
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Engage with local representatives to communicate the recruitment strategy of the Project and to register complaints related to increase level of influx into informal settlements. Solutions to address service delivery require interventions from the local authorities. However, the applicant can address potential issues that could lead to unrest by ensuring that an effective grievance mechanism is put in place to ensure that stakeholders are provided with a platform to raise their concerns/complaints. The company to cooperate with the local SAPS and community safety forums. Establish a communication strategy and network with the local community with a specific focus on informal settlement. The communication strategy should include protocols to lodge complaints, complaints register, speedy resolution of complaints and meetings with community leaders on a bi-monthly basis). 		
Monitoring:		
On a monthly basis during the construction phase		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		Yes
Other economic activities and industrial areas in local area		

Table 9-20: Rating of Impact on Nuisance factors (noise, dust and traffic)

Impact Name	Impact of Nuisance Factors	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short term (up to 18 months)	Short term (up to 18 months)
Scale	Site or local	Site or local
Consequence	Low	Low
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> All construction vehicles should be in a good condition and adhere to road-worthy standards. Construction vehicles operators must adhere to the speed limit parameters at all times. Strict security measures to apply at the Project. Unauthorised entry to the transfer station must not be allowed. Access control should continue to be implemented Strict adherence to the mitigation measures of the traffic and air quality impact reports. Construction site management to adhere to Ergo policies and procedures. Dust control measures e.g., wetting of gravel roads to be implemented where feasible. A grievance management mechanism should be in place to receive incident related queries 		
Monitoring:		
On a monthly basis during the construction phase		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		Yes
Due to other economic activities and industrial areas in local area		

9.5.1.8 Noise

Noises are associated with the development of the borrow pits as well as the future construction of the TSF. Such a project may require a small bulldozer, an excavator, a front-end loader, tipper trucks and vibrating

compactors during the construction phase, as well as numerous road trucks to deliver material and equipment. Some of these machines may be replaced by multi-use tipper loader buckets (TLB).

The development of borrow pits and the construction of the TSF will be the main source of noise, with the magnitude of the noise level depending on the sound power emission characteristics of the equipment and construction activities, the number of simultaneous activities taking place and the intensity of the activity. Generally, noise from such activities would be:

- ❖ Limited to within 200m from borrow pit or construction activities. Noise levels could be as high as 65 dBA though it would generally average below 50 dBA when measured over an hour period. Noises are normally of a temporary to short term duration; and
- ❖ Could be audible at 500m, but of an insignificant level further than 500m from the activities.

Table 9-21: Noise Impact Rating

Impact Name	Impact of Noise	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short term (up to 18 months)	Short term (up to 18 months)
Scale	Site or local	Site or local
Consequence	Low	Low
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> • All construction vehicles should be in a good condition and adhere to road-worthy standards. • A grievance management mechanism should be in place to receive incident related queries 		
Monitoring:		
On a monthly basis during the construction phase		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

9.5.1.9 Health

Health impacts are expected to occur mostly during the operational and decommissioning phases of the project.

9.5.2 Operational Phase

This section comprises of the description of potential impacts associated with the proposed operation of the recommissioning project on the biophysical, socio-economic and heritage and cultural environment. These descriptions are followed by the impact tables which contain the assessment of the significance of each identified impact without, and then with mitigation measures.

9.5.2.1 Biodiversity

The following potential impacts were considered on biodiversity (fauna and flora) during operational phase:

- ❖ An impact to local vegetation and habitats;
- ❖ The spread of alien species;
- ❖ The impact of erosion; and
- ❖ The impact from pipeline leak or spills.

Table 9-22: Assessment of significance of potential operational impacts on vegetation and habitat.

Impact Name	Vegetation and Habitats	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> • Develop post-operation environments, in conjunction with regional development plans; and the recreation of habitats, where possible; or structure altered landscapes to be compatible with regional habitats. • All laydown, chemical toilets etc. should be restricted to disturbed areas and placed outside of sensitive 		

Impact Name	Vegetation and Habitats
<p>areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.</p> <ul style="list-style-type: none"> • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. A Withok TSF operational plan must be put in place to avoid tailings spillage. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. • Precautions must be taken against the erosion damage that would be caused by unplanned pipe leaks. A leak warning and detection system must be installed. Dense indigenous pioneer grass seeds should also be planted across all bare earth areas to prevent erosion. 	
Environmental Risk Significance (Post-mitigation)	
Low -	
Cumulative Impacts	
No	

Table 9-23: Assessment of significance of potential operational impacts on fauna

Impact Name	Fauna	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> • The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. • No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits 		

Impact Name	Fauna
must be enforced to ensure that road killings and erosion is limited.	
<i>Environmental Risk Significance (Post-mitigation)</i>	Low -
Cumulative Impacts	No

Table 9-24: Assessment of significance of potential operational impacts of alien plant species.

Impact Name	Alien Plant Species	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. Early identification and Eradication: regular monitoring to detect invasive species on site, early and promptly removing them before they spread. 		
<i>Environmental Risk Significance (Post-mitigation)</i>		Low -
Cumulative Impacts	No	

Table 9-25: Assessment of significance of potential operational impacts of erosion.

Impact Name	Erosion	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. • A stormwater management plan must be compiled and implemented if necessary. • Regular monitoring and maintenance of erosion control measures are essential to ensure their effectiveness. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

Table 9-26: Assessment of significance of potential operational impacts of waste management .

Impact Name	Waste Management	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • Waste management must be a priority and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. • Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan. • Toilets at the recommended Health and Safety standards must be provided. These should be emptied regularly and once no longer required, they must be pumped dry to prevent leakage into the surrounding environment and removed from site. • The Contractor should supply appropriate and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. • Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in appropriate and secured waste skips. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

Table 9-27: Assessment of significance of potential operational impacts of pipeline leaks or spills.

Impact Name	Pipeline Leaks or Spill	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Leak detection or any similar monitoring tool must be incorporated to try identifying leaks. Use proper design and construction; use geographical maps, aerial photography, and satellite imagery to avoid geo-hazards along pipeline routes; ensure that compressors, pumps and surge suppression equipment are correctly sized. Develop and implement comprehensive emergency response plans to minimize the impact of any leaks or spillages Perform regular maintenance and proactive repairs on identified “at-risk “areas to prevent failures. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

9.5.2.2 Wetlands

The following impacts have been identified during the Operational phase:

Table 9-28: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.

Activity	Impact	Significance (max = 100)	Risk Rating
Operation of TSF relating to consistent stockpiling of tailings material	Altering surface and subsurface flow patterns	42	M
	Sedimentation and siltation of watercourses	28,8	L
	Impaired water quality from residual tailings materials entering the system	36	M

Activity	Impact	Significance (max = 100)	Risk Rating
Operation of drainage systems	Altering surface and subsurface flow patterns	42	M
	Sedimentation and siltation of watercourses	28,8	L
	Impaired water quality from residual tailings materials entering the system	36	M

9.5.2.3 Surface Water

Table 9-29: Summary of activities and impacts for the operational phase

Activity	Impact Description
Impacts due to wash bays and workshops	Hydrocarbons and other pollutant washed into water courses
Impacts due to vehicle fleet-related pollution	Hydrocarbons and other pollutant washed into water courses
Impacts due to leaking or burst dirty water pipes	Salts and other pollutant washed into water courses
Impacts due to leaking or burst slurry pipes	Polluted sediments, salts and other pollutant washed into water courses
Impacts due to catchment paddocks overflowing	Salts and other pollutant washed into water courses
Impacts due to catchment return water dam overflowing	Salts and other pollutant washed into water courses
Loss of catchment yield	Reduced catchment yield
Dam break	Polluted sediments, salts and other pollutant washed into water courses

The ratings and proposed mitigation measures for the operational phase are indicated in Table 9-30 and Table 9-31.

Table 9-30: Significance rating of operational impact 1

NATURE OF IMPACT 1: Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses, Salts and other pollutant washed into water courses.		
	Impact Rating without Mitigation	Impact Rating with Mitigation
Extent (Local, Regional, International)	Regional	Local
Duration (Short term, Medium term, Long term)	Medium term	Medium term
Magnitude (Major, Moderate, Minor)	Major	Moderate

NATURE OF IMPACT 1: Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses, Salts and other pollutant washed into water courses.		
Probability (<i>Definite, Possible, Unlikely</i>)	Definite	Possible
Calculated Significance Rating (<i>Low, Medium, High</i>)	High	Medium
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Irreversible	
Irreplaceable loss of resources: (Yes or No)	No	
Can impacts be enhanced: (Yes or No)	Yes	
Residual impacts		
<ul style="list-style-type: none"> None, as the impact will cease provided that rehabilitation is done appropriately. 		
Mitigation measures		
<ul style="list-style-type: none"> It is preferable to run the dirty water pipelines through areas already serviced by dirty water systems where possible. Pipelines should be subjected to frequent patrols. An efficient system of reporting should be available to allow the immediate tripping of pumps should a leak be found. 		

Table 9-31: Significance rating of operational impact2

NATURE OF IMPACT 2: Hydrocarbons and other pollutant washed into water courses, Polluted sediments, salts and other pollutant washed into water courses, Salts and other pollutant washed into water courses, Reduced catchment yield		
	Impact Rating without Mitigation	Impact Rating with Mitigation
Extent (<i>Local, Regional, International</i>)	Regional	Local
Duration (<i>Short term, Medium term, Long term</i>)	Medium term	Medium term
Magnitude (<i>Major, Moderate, Minor</i>)	Major	Moderate
Probability (<i>Definite, Possible, Unlikely</i>)	Definite	Possible
Calculated Significance Rating (<i>Low, Medium, High</i>)	High	Medium
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Irreversible	
Irreplaceable loss of resources: (Yes or No)	No	
Can impacts be enhanced: (Yes or No)	Yes	
Residual impacts		
<ul style="list-style-type: none"> None, as the impact will cease provided that rehabilitation is done appropriately. 		
Mitigation measures		

NATURE OF IMPACT 2: Hydrocarbons and other pollutant washed into water courses, Polluted sediments, salts and other pollutant washed into water courses, Salts and other pollutant washed into water courses, Reduced catchment yield
<ul style="list-style-type: none"> • It is preferable to run the slurry pipelines through areas already serviced by dirty water systems where possible. Pipelines should be subjected to frequent patrols. An efficient system of reporting should be available to allow the immediate tripping of pumps should a leak be found. • Catchment paddocks must be sized must be sized in accordance with GN704. • The RWD must be sized in accordance with GN704.

9.5.2.4 Groundwater

The seepage plume emanating from the Brakpan TSF has and will continue to predominantly impact on the groundwater quality of the aquifer. The significance rating of impacts of the seepage plume emanating from the Brakpan-Withok TSF complex on the groundwater quality during the operational phase of the facility is provided in Table 9-32. They should be seen as related to the existing Brakpan TSF with no significant contributions of the lined Withok TSF extension.

It is important to note that hydraulic containment of the existing seepage plume is recommended to continue as a management measure and will improve observed plume concentrations significantly. The hydraulic plume containment will have to continue beyond the life of the facility until acceptable source and plume concentrations allow for monitored natural attenuation.

Table 9-32: Operational Phase Water quality impacts

NATURE OF THE IMPACT: Continuing deposition of tailings material onto the existing unlined Brakpan TSF and the lined Withok extension with subsequent seepage from the unlined TSF.		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (<i>Local, Regional, International</i>)	regional	Local
Duration (<i>Short term, Medium term, Long term</i>)	Long term	Short term
Magnitude (<i>Major, Moderate, Minor</i>)	Major -	Major -
Probability (<i>Definite, Possible, Unlikely</i>)	Definite	Possible
Calculated Significance Rating (<i>Low, Medium, High</i>)	High	Medium
Impact Status (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	No	
Residual impacts		

NATURE OF THE IMPACT: Continuing deposition of tailings material onto the existing unlined Brakpan TSF and the lined Withok extension with subsequent seepage from the unlined TSF.
❖ Deterioration of groundwater quality underneath the unlined Brakpan TSF
Mitigation measures
<ul style="list-style-type: none"> ❖ Continuous monitoring of source concentrations (i.e. within drains and interception boreholes) concentrations and downstream plume migration using proposed monitoring network. ❖ Hydraulic plume containment using proposed interception boreholes until acceptable plume concentrations allow for monitored natural attenuation.

Seepage from the Brakpan TSF has changed, and will continue to change, the volume of groundwater in storage locally due to mounding of water table within the TSF and its surrounds. On the other hand, a localised lowering of the water table around the interception boreholes themselves is expected. Similarly, the lined Withok TSF extension will lead to reduced recharge underneath its footprint.

Table 9-33: Operational Phase Water quantity impacts

NATURE OF THE IMPACT: Local changes of water table and associated local groundwater flow direction due to seepage from the unlined Brakpan TSF, hydraulic plume containment with interception boreholes and minor leakage from the lined Withok TSF extension.			
	Impact Rating Without Mitigation	Without	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative		Negative
Extent (Local, Regional, International)	Local		Local
Duration (Short term, Medium term, Long term)	Long Term		Long Term
Magnitude (Major, Moderate, Minor)	Minor -		Minor +
Probability (Definite, Possible, Unlikely)	Possible		Unlikely
Calculated Significance Rating (Low, Medium, High)	Medium		Low
Reversibility: (Reversible or Irreversible)	Reversible		
Irreplaceable loss of resources: (Yes or No)	No		
Can impacts be enhanced: (Yes or No)	No		
Residual impacts			
❖ None.			
Mitigation measures			
<ul style="list-style-type: none"> ❖ Continuous monitoring of water levels within the TSFs and monitoring boreholes. ❖ Continuous operation of the existing interception well system. 			

9.5.2.5 Air Quality.

See Table 9-15 under the construction phase above for applicable impacts identified.

9.5.2.6 Heritage and Palaeontology

No Heritage impacts are expected during the operational phase.

9.5.2.7 Socio-Economic Impact

Table 9-34: Rating of Impact on Enabling of Continued Ergo Activity

Impact Name	Enabling of continued recommissioning activities at Ergo	
	Pre-mitigation	Post-mitigation
Attribute		
Nature	Positive	Positive
Magnitude	Moderate +	Moderate +
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Regional	Regional
Consequence	High	High
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		High +
Management Measures:		
<ul style="list-style-type: none"> Ergo should consider a local internship/job shadowing strategy that could benefit talented youth from the local communities in the ward where the project is situated COE Ward 99) as well as the adjacent COE Wards 112 and 82. Develop a database of potential suppliers within the local area (including the wards around the project). Ergo to earmark a percentage of potential intermediary inputs that it could source from local suppliers, HDSAs and Small, Medium and Micro-sized Enterprises (SMMEs). Preference should be given to capable subcontractors who based within the local municipal area. Support government initiatives to development SMMEs in the local township areas. Encourage the company’s existing suppliers to enter into a Joint Venture (JV) with local SMMEs to aid with the transfer of skills. Develop skills development and training targets for local procurement and include these in contractor management plans. Communicate the local employment clearly to the local communities adjacent to the mine 		
Monitoring:		

Impact Name	Enabling of continued recommissioning activities at Ergo	
On an annual basis through the community engagement plan		
Environmental Risk Significance (Post-mitigation)		High+
Cumulative Impacts		No

Table 9-35: Rating of Impact on Social Funds

Impact Name	Employment and Income	
Attribute	Pre-mitigation	Post-mitigation
Nature	Positive	Positive
Magnitude	Minor +	Moderate +
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Site or local	Site or local
Consequence	Low	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low +
Management Measures:		
<ul style="list-style-type: none"> Develop a targeted social development strategy in the ward where the project is situated COE Ward 99) as well as the adjacent COE Wards 112 and 82. Support the local procurement strategy through the support of local SMMEs and contractors. Communicate the local employment strategy clearly to the local communities adjacent to the mine. 		
Monitoring:		
On an annual basis through the community engagement plan		
Environmental Risk Significance (Post-mitigation)		Medium +
Cumulative Impacts		No

Table 9-36: Rating of Impact on Nuisance factors (noise, dust and traffic)

Impact Name	Impact of Nuisance Factors	
	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> • Strict adherence to the mitigation measures of the traffic and air quality impact reports. • A grievance management mechanism should be in place to receive incident related queries. 		
Monitoring:		
On an annual basis through the community engagement plan		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		Yes
Due to other economic activities and industrial areas in local area		

Table 9-37: Rating of Impact on Community Health and Safety

Impact Name	Community health and safety	
	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	High -	Moderate -
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Site or local	Site or local

Impact Name	Community health and safety	
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		High -
Management Measures:		
<ul style="list-style-type: none"> • Unauthorised access to the TSF should be prevented. The area must have strict access control and must be fenced off • Mitigation against potential impacts of air pollution and radiation strict adherence to air quality impact and health impact studies related to the project • Strict adherence to standards of Occupational Health and Safety Act, 1993 for personnel working close to the TSF <ul style="list-style-type: none"> ○ Align the safety management of the with good practice recommendations of Global Industry Standard on Tailings Management (GISTM). ○ Stakeholder engagement and communication of risks on a regular basis 		
Monitoring:		
On a bi-annual basis through the community engagement plan		
Environmental Risk Significance (Post-mitigation)		Medium -
Cumulative Impacts		Yes
Existing Brakpan TSF		

Table 9-38: Rating of Impact on Informal Influx

Impact Name	Informal Influx Impact	
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Medium-	Minor -
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Unlikely

Impact Name	Informal Influx Impact	
Environmental Risk Significance (Pre-mitigation)	Medium -	
Management Measures:		
<ul style="list-style-type: none"> Engage with local representatives to communicate the recruitment strategy of the Project and to register complaints related to increase level of influx into informal settlements (See Section 10 below). Solutions to address service delivery require interventions from the local authorities. However, the applicant can address potential issues that could lead to unrest by ensuring that an effective grievance mechanism is put in place to ensure that stakeholders are provided with a platform to raise their concerns/complaints. The company to cooperate with the local SAPS and community safety forums. Establish a communication strategy and network with the local community with a specific focus on informal settlement. The communication strategy should include protocols to lodge complaints, complaints register, speedy resolution of complaints and meetings with community leaders on a bi-monthly basis. 		
Monitoring:		
On a bi-annual basis through the community engagement plan		
Environmental Risk Significance (Post-mitigation)	Low -	
Cumulative Impacts	Yes	
Other economic activities and industrial areas in local area		

Table 9-39: Rating of Negative Impact on Adjacent Economic Activities

Impact Name	Impact on Adjacent Economic Activities	
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Medium -	Medium -
Duration	Long Term > 5 years	Long Term > 5 years
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)	Medium -	

Impact Name	Impact on Adjacent Economic Activities
Management Measures:	
<ul style="list-style-type: none"> Strictly adhere to management plan of the groundwater report Engage with local representatives of the farming community to discuss and address potential impacts of the TSF on the local farming community 	
Monitoring:	
On a bi-annual basis through the community engagement plan	
Environmental Risk Significance (Post-mitigation)	Medium -
Cumulative Impacts	Yes
Existing Brakpan TSF	

9.5.2.8 Noise

As per construction phase impact assessment.

9.5.2.9 Health

The following potential impacts were considered on health:

- ❖ Dispersion of particulates into the air, especially during construction and windy conditions. Dust reducing visibility and air quality. Reducing air quality and exposing surrounding communities to airborne TEs.
- ❖ Bioaccumulation in soil and crops.
- ❖ Workforce utilizing local healthcare facilities increasing the burden of local facilities which are already not able to manage existing needs of the community.

Table 9-40: Health Impacts from PM.

Impact summary	Pathway						
	Additional generation of PM ₁₀ and PM _{2.5} into Tsakane Extension 8 and Extension 11, especially during construction and windy conditions.						
	Health consequence/outcome						
Stroke, ischaemic heart disease, chronic obstructive pulmonary disease, lung cancer, pneumonia, cardiovascular disease, skin and eye irritation.							
Potential Impact Rating	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-	
Pre mitigation	High	Moderate	Moderate	Possible	13 (S)	-	

Mitigation	To reduce vulnerability: Socio-economic development programs aimed at reducing poverty. Health programs targeting maternal health, TB and HIV			To reduce scale: Improving health services in the communities thereby enabling early detection and treatment of health outcomes		
Post mitigation	Minor	Insignificant	Insignificant	Possible	8 (M)	-

Table 9-41: Impact of Bioaccumulation.

Activity	TSF - Concentration of elements					
Project phase	Construction, Operation, Closure, Post Closure					
Impact summary	Pathway					
	Elevated concentrations of HMs in dust settling on agriculture land used for grazing cattle or growing <i>Zea mays</i> and hay. HMs bioaccumulate in plants and enter the food chain. Elevated concentrations of HMs in dust settling on community school grounds/playgrounds where children play. HMs absorbed through skin, ingested (young children and animals).					
	Health consequence/outcome					
	Increase in poor SDoH outcomes. Increase in communicable disease and antimicrobial resistance (AMR) leading to disease treatment failures, prolonged illness, and increased risk of disease transmission, morbidity, and mortality. Increase in communicable disease transmission, morbidity and mortality.					
Pre mitigation	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
	Major	Minor	Moderate	Possible	13 (S)	-
Mitigation	To reduce vulnerability: Socio-economic development programs aimed at reducing poverty and training community members around phytoremediation.			To reduce scale: Improving health services in the communities thereby enabling early detection and treatment of health outcomes		
Post mitigation	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
	Moderate	Minor	Minor	Possible	8 (M)	-

Table 9-42: Impact analysis of stormwater drainage.

Activity	TSF - Concentration of elements
Project phase	Construction, Operation, Closure, Post Closure
Impact summary	Pathway
	Extreme weather events dispersing TSF material into surrounding communities. Poor stormwater drainage within communities. Flooding communities. Contaminating soil and water bodies with elements. Receptors being exposed to contaminated water and soil bodies through agriculture, direct contact or consumption.
	Health consequence/outcome

Activity	TSF - Concentration of elements					
	Increase in poor SDoH outcomes. Increase in communicable disease and antimicrobial resistance (AMR) leading to disease treatment failures, prolonged illness, and increased risk of disease transmission, morbidity, and mortality. Increase in communicable disease transmission, morbidity and mortality.					
Potential Impact Rating	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
	Insignificant	Minor	Minor	Unlikely	9 (M)	-

Table 9-43: Impact analysis of socio-economic health determinants.

Activity	Presence of TSF within community context					
Project phase	Construction, Operation, Closure, Post Closure					
Impact summary	Pathway					
	Effect of TSF on living environment impacting on the "livability" of the surrounding communities thereby reducing the socio-economic growth of the receptor communities. Stagnation or reduction in socio-economy impacting on wellbeing of community members					
	Health consequence/outcome					
	Poor mental health, suicide, reduced well being					
Potential Impact Rating	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
	Moderate	Minor	Moderate	Possible	13 (S)	-

Table 9-44: Impact analysis of site utilizing public healthcare facilities

Activity	Site workforce utilizing local healthcare facilities					
Project phase	Construction, Operation, Closure, Post Closure					
Impact summary	Pathway			Health consequence/outcome		
	Workforce utilizing local healthcare facilities and increasing the burden of local facilities which are already not able to manage the existing needs of the community.			Increased pressure in health care facilities causing a reduction in disease diagnosis, treatment. Increase in morbidity. Increase in poor health outcomes.		
	Health consequence/outcome					
	Increased pressure in health care facilities causing a reduction in disease diagnosis, treatment. Increase in morbidity. Increase in poor health outcomes.					
Potential Impact Rating	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
	High	Minor	Moderate	Unlikely	9 (M)	-

Table 9-45: Impact analysis of employment

Activity	Prioritizing contractors from local community						
Project phase	Construction, Operation						
Impact summary	Pathway						
	Priority given to local contractors and workforce. In providing employment opportunities, social determinants for health will be positively impacted. Improving SDOH leads to better health outcomes, reduces health inequities and boosts overall well-being by addressing factors like poverty, education and housing, which are more influential than healthcare access alone						
	Health consequence/outcome						
Improved health and wellbeing of communities							
Potential Rating	Impact	Vulnerability	Scale	Consequence	Likelihood	Significance	+/-
		Moderate	Minor	Moderate	Possible	13 (S)	+

9.5.3 Decommissioning Phase

This section comprises of the description of potential impacts associated with the closure, decommissioning and rehabilitation activities on the biophysical, socio-economic and heritage and cultural environment. These descriptions are followed by the impact tables which contain the assessment of the significance of each identified impact without, then with mitigation measures.

9.5.3.1 Biodiversity

The following potential impacts were considered on biodiversity (fauna and flora) during the decommissioning phase:

- ❖ An impact to local vegetation and habitats;
- ❖ The spread of alien species;
- ❖ The impact of erosion; and
- ❖ The impact from pipeline leak or spills.

Table 9-46: Assessment of significance of potential impacts on vegetation and habitat .

Impact Name	Vegetation and Habitats	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation

Impact Name	Vegetation and Habitats	
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> • Develop post-operation environments, in conjunction with regional development plans; and the recreation of habitats, where possible; or structure altered landscapes to be compatible with regional habitats. • All laydown, chemical toilets etc. should be restricted to disturbed areas and be placed outside of sensitive areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. All grazing mammals must be kept out of the areas that have recently been re-planted. • All footprints to be rehabilitated after construction is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. A TSF operational plan must be put in place to avoid tailings spillage. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. <ul style="list-style-type: none"> ○ Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. ○ No servicing of equipment on site unless necessary. ○ All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. ○ Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. ○ Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. ○ All vehicles and equipment must be maintained, and all re-fueling and servicing of equipment is to take place in demarcated areas outside of the PAOI. • It must be made an offence for any staff member to remove any indigenous plant species from the PAOI or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants. 		

Impact Name	Vegetation and Habitats
<ul style="list-style-type: none"> Precautions must be taken against the erosion damage that would be caused by unplanned pipe leaks. A leak warning and detection system must be installed. Dense indigenous pioneer grass seeds should also be planted across all bare earth areas to prevent erosion. 	
Environmental Risk Significance (Post-mitigation)	
Low -	
Cumulative Impacts	
No	

Table 9-47: Assessment of significance of potential impacts on fauna.

Impact Name	Fauna	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		
<ul style="list-style-type: none"> The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to reptile species and nocturnal mammals. No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons. In this case, activities should take place during the day. 		
Environmental Risk Significance (Post-mitigation)		Low -

Impact Name	Fauna
Cumulative Impacts	No

Table 9-48: Assessment of significance of potential impacts on alien plant species.

Impact Name	Alien Plant Species	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> An Alien Invasive Plant (AIP) Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in AIP composition. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprints of the roads must be kept to prescribed widths. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts	No	

Table 9-49: Assessment of significance of potential impacts of waste management .

Impact Name	Waste Management	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative

Impact Name	Waste Management	
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Waste management must be a priority and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan. Toilets at the recommended Health and Safety standards must be provided. These should be emptied regularly and once no longer required, they must be pumped dry to prevent leakage into the surrounding environment and removed from site. The Contractor should supply appropriate and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Refuse bins will be responsibly emptied and secured. Temporary storage of domestic waste shall be in appropriate and secured waste skips. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts		No

Table 9-50: Assessment of significance of potential impacts of erosion.

Impact Name	Erosion	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -

Impact Name	Erosion	
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. • Only existing access routes and walking paths may be made use of. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. • A stormwater management plan must be compiled and implemented if necessary. 		
Environmental Risk Significance (Post-mitigation)		Low -
Cumulative Impacts	No	

Table 9-51: Assessment of significance of potential impacts of pipeline leaks or spills.

Impact Name	Pipeline Leaks or Spill	
Environmental Risk		
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Short Term	Short Term
Scale	Site or local	Site or local
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> • Leak detection or any similar monitoring tool must be incorporated to try identifying leaks. • Use proper design and construction; use geographical maps, aerial photography, and satellite imagery to 		

Impact Name	Pipeline Leaks or Spill
avoid geo-hazards along pipeline routes; ensure that compressors, pumps and surge suppression equipment are correctly sized. <ul style="list-style-type: none"> • Develop and implement comprehensive emergency response plans to minimize the impact of any leaks or spillages. • Perform regular maintenance and proactive repairs on identified “at-risk “areas to prevent failures. 	
Environmental Risk Significance (Post-mitigation)	Low -
Cumulative Impacts	No

9.5.3.2 Wetlands

The following impacts have been identified in the decommissioning phase.

Table 9-52: Mitigated DWS Risk Assessment Matrix for wetlands in relation to the proposed project.

Activity	Impact	Significance (max = 100)	Risk Rating
Dewatering of TSF compartments	Altering surface and subsurface flow patterns	33	M
	Sedimentation and siltation of watercourses	16,2	L
	Impaired water quality from residual tailings materials entering the system	16,2	L
Excavating and reshaping TSF to pre-construction state	Altering surface and subsurface flow patterns	33	M
	Erosion of surrounding landscape and subsequently the watercourses	21,6	L
	Sedimentation and siltation of watercourses	21,6	L
Removal of TSF drainage systems	Altering surface and subsurface flow patterns	33	M
	Sedimentation and siltation of watercourses	21,6	L
	Impaired water quality from residual tailings materials entering the system	21,6	L
Rehabilitation of reworked area	Altering surface and subsurface flow patterns	33	M
	Sedimentation and siltation of watercourses	16,2	L
	Impaired water quality from residual tailings materials entering the system	27	L
	Proliferation of invasive alien plants	21,6	L

9.5.3.3 Surface Water

All supernatant and storm water on the basin will be pumped back to the process via a decant barge. All side slope water will be routed to the return water dam via the catchment paddocks. The catchment paddocks serve to desilt this water and to temporarily store it, before it is released to the return water dam via the drain flow collector system. The drain flow collector system is a below-surface piped system. The catchment paddocks have penstocks that feed into the drain flow collector system. The drain flow collector system discharges into the return water dam, via a silt trap.

The recommended closure concept is to paddock the top surface, while treating drain flows. The drain flow water can be treated to discharge quality and released into the receiving environment. Alternatively, this water can be treated to higher water quality standards and sold for domestic or industrial consumption. The brine from the treatment process would have to be pumped to the top surface where it will be evaporated. There will be significant periods where the paddocks are dry so no long-term brine ponds will form. Side slopes will be rehabilitated and runoff from these slopes will be clean and released to the environment.

The activities and impacts that are likely to occur during the closure and rehabilitation phase are summarised below.

Table 9-53: Summary of activities and impacts for the closure and rehabilitation phase

	Impact Description
Impacts due to the removal of surface infrastructure	Excessive silt washed into water courses
Impacts due to wash bays and workshops	Hydrocarbons and other pollutant washed into water courses
Impacts due to vehicle fleet-related pollution	Hydrocarbons and other pollutant washed into water courses

The ratings and proposed mitigation measures for the closure and rehabilitation phase are indicated below.

Table 9-54: Significance rating of closure impact 1

NATURE OF IMPACT: Excessive silt washed into water courses, Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses.		
	Impact Rating without Mitigation	Impact Rating with Mitigation
Extent (Local, Regional, International)	Regional	Local
Duration (Short term, Medium term, Long term)	Long term	Medium term
Magnitude (Major, Moderate, Minor)	Major	Minor
Probability (Definite, Possible, Unlikely)	Possible	Possible

NATURE OF IMPACT: Excessive silt washed into water courses, Hydrocarbons and other pollutant washed into water courses, Hydrocarbons and other pollutant washed into water courses.		
Calculated Significance Rating (Low, Medium, High)	Moderate	Low
Impact Status: (positive or negative)	Negative	Negative
Reversibility: (Reversible or Irreversible)	Irreversible	
Irreplaceable loss of resources: (Yes or No)	No	
Can impacts be enhanced: (Yes or No)	Yes	
Residual impacts		
<ul style="list-style-type: none"> Possible, unless potential spills are rehabilitated. 		
Mitigation measures		
<ul style="list-style-type: none"> Clearly define areas to be cleared. Do not clear past designated areas. Dry season construction is preferable where practical. Wash bay discharge water should flow through an oil separator. All vehicles should be well maintained and inspected for hydrocarbon leaks weekly. Fuel depots and refuelling areas should be bunded. Vehicle maintenance should be a key performance objective of the plant contractor. 		

9.5.3.4 Groundwater

Seepage from the Brakpan TSF and to a minor extent the Withok TSF extension will continue to impact on the ambient groundwater quality post closure. While lower seepage rates are expected once active deposition onto the TSFs ends, post closure seepage concentrations will have a significant impact on the ambient groundwater quality for several decades as the TSF complex drains down and the tailings material is leached out.

Table 9-55: Decommissioning and Closure Phase Water quality impacts

NATURE OF THE IMPACT: Local changes of water table and associated local groundwater flow direction due to seepage from the unlined Brakpan TSF, hydraulic plume containment with interception boreholes and minor leakage from the lined Withok TSF extension. <i>Impact on the local groundwater quality</i>		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (Local, Regional, International)	Local	Local
Duration (Short term, Medium term, Long term)	Short term	Short term
Magnitude (Major, Moderate, Minor)	Minor -	Minor -
Probability (Definite, Possible, Unlikely)	Possible	Possible
Calculated Significance Rating (Low, Medium, High)	High	Low
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	

NATURE OF THE IMPACT: Local changes of water table and associated local groundwater flow direction due to seepage from the unlined Brakpan TSF, hydraulic plume containment with interception boreholes and minor leakage from the lined Withok TSF extension. <i>Impact on the local groundwater quality</i>	
Cumulative impacts (yes or no)	No
Residual impacts	
❖ Deterioration of groundwater quality underneath the unlined Brakpan TSF.	
Mitigation measures	
<ul style="list-style-type: none"> ❖ Continuous monitoring of source concentrations (i.e. within drains and interception boreholes) concentrations and downstream plume migration using proposed monitoring network. ❖ Hydraulic plume containment using proposed interception boreholes until acceptable plume concentrations allow for monitored natural attenuation. 	

9.5.3.5 Air Quality.

See Table 9-19 under the construction phase above for applicable impacts identified. 9.5.3.6 Heritage and

Palaeontology

See Section 9.5.1.6 above

9.5.3.7 Social Impact

Table 9-56: Rating of impact on loss of agricultural land

Impact Name	Loss of agricultural land	
	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Minor -	Minor -
Duration	Long term (longer than 5 years)	Long term (longer than 5 years)
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Low -
Management Measures:		

Impact Name	Loss of agricultural land	
• None		
Monitoring:		
-		
<i>Environmental Risk Significance (Post-mitigation)</i>	Low -	
Cumulative Impacts	Yes	
Existing Brakpan TSF		

Table 9-57: Rating of Negative Impact on Adjacent Economic Activities

Impact Name	Impact on Adjacent Economic Activities	
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Medium -	Medium -
Duration	Long Term > 5 years	Long Term > 5 years
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
<i>Environmental Risk Significance (Pre-mitigation)</i>	Medium -	
Management Measures:		
<ul style="list-style-type: none"> Strictly adhere to management plan of the groundwater report Communicate risks to local public representatives and hand regular community monitoring over to local entities 		
Monitoring:		
Based on measures of the groundwater management plan		
<i>Environmental Risk Significance (Post-mitigation)</i>	Medium -	
Cumulative Impacts	Yes	

Impact Name	Impact on Adjacent Economic Activities
Existing Brakpan TSF	

Table 9-58: Rating of Cessation of Employment and Income

Impact Name	Cessation of employment and income	
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative
Magnitude	Moderate -	Minor -
Duration	Long Term > 5 years	Long Term > 5 years
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Possible	Possible
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Consider implementing a portable skills programme for the existing workforce. Consider placement of workers in other Ergo operations. 		
Monitoring:		
A year before closure through the larger SLP: human resource plan		
Environmental Risk Significance (Post-mitigation)		Medium -
Cumulative Impacts		No

Table 9-59: Rating of Cessation of Social Funds

Impact Name	Cessation of social funds	
Attribute	Pre-mitigation	Post-mitigation
Nature	Negative	Negative

Impact Name	Cessation of social funds	
Magnitude	Moderate -	Minor -
Duration	Long Term > 5 years	Long Term > 5 years
Scale	Site or local	Site or local
Consequence	Medium	Medium
Probability	Definite	Definite
Environmental Risk Significance (Pre-mitigation)		Medium -
Management Measures:		
<ul style="list-style-type: none"> Plan social programmes with clear exit strategies well ahead of the closure of the project (e.g. handing over to other entities or clearly communicate limited timeframe to communities). Avoid social spending on infrastructure projects that would require long-term operational and maintenance funding. Focus social programmes on local capacity building and training. 		
Monitoring:		
A year before closure through the larger SLP		
Environmental Risk Significance (Post-mitigation)		Medium -
Cumulative Impacts		No

Table 9-60: Rating of Impact on Community Safety

Impact Name	Community safety	
Attribute	Pre-mitigation	Post-mitigation
Nature	Positive	Positive
Magnitude	High-	Moderate -
Duration	Long Term > 5 years	Long Term > 5 years
Scale	Site or local	Site or local
Consequence	High	Medium
Probability	Possible	Possible

Impact Name	Community safety
Environmental Risk Significance (Pre-mitigation)	High-
Management Measures:	
<ul style="list-style-type: none"> The terrain should be barricaded against potential illegal entrants Mitigation against potential impacts of air pollution and radiation strict adherence to air quality impact and health impact studies related to the project Align the safety management of the with good practice recommendations of Global Industry Standard on Tailings Management (GISTM). 	
Monitoring:	
Continuous monitoring for 3 years after closure with succession planning on continued safety monitoring of the TSF in perpetuity	
Environmental Risk Significance (Post-mitigation)	Medium -
Cumulative Impacts	Yes
Existing Brakpan TSF	

9.5.3.8 Noise

As per construction phase impact assessment

9.5.3.9 Health

As per operational phase impact assessment.

9.5.4 Post-Decommissioning Impacts

9.5.4.1 Biodiversity

No significant residual impacts are envisaged. There is a risk of alien invasive vegetation encroaching on the cleared areas.

9.5.4.2 Wetlands

Incomplete removal of infrastructure and waste following mine closure could provide sources of pollutants leading to water quality deterioration. This will affect the downstream water users if not mitigated. Complete removal of all infrastructure and waste must be ensured following mine closure.

9.5.4.3 Surface Water

Should rehabilitation be successfully implemented, then it is unlikely that any negative impacts will occur during the post closure phase.

Table 9-61: Impact Assessment summary for surface water on Post closure

	Impact Description
Impacts due to leaking or burst dirty water pipes	Salts and other pollutant washed into water courses
Impacts due to the discharge of untreated contaminated water	Salts and other pollutant washed into water courses

Table 9-62: Impact Assessment summary for surface water on Post closure

NATURE OF THE IMPACT: Impacts due to leaking or burst dirty water pipes, Impacts due to the discharge of untreated contaminated water		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (Local, Regional, International)	Local	Local
Duration (Short term, Medium term, Long term)	Short term	Short term
Magnitude (Major, Moderate, Minor)	Minor -	Minor -
Probability (Definite, Possible, Unlikely)	Possible	Possible
Calculated Significance Rating (Low, Medium, High)	High	Medium
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	Yes	
Residual impacts		
❖ Deterioration of groundwater quality underneath the unlined Brakpan TSF.		
Mitigation measures		
❖ It is preferable to run the dirty water pipelines through areas already serviced by dirty water systems where possible. Pipelines should be subjected to frequent patrols. An efficient system of reporting should be available to allow the immediate tripping of pumps should a leak be found.		
❖ Water treatment plant to be properly managed.		

9.5.4.4 Groundwater

Seepage from the Brakpan TSF and to a minor extent the Withok TSF extension will continue to impact on the ambient groundwater quality post closure. While lower seepage rates are expected once active deposition onto the TSFs ends, post closure seepage concentrations will have a significant impact on the ambient

groundwater quality for several decades as the TSF complex drains down and the tailings material is leached out.

Table 9-63: Groundwater quality impacts during the post closure phase.

NATURE OF THE IMPACT: Continuing deposition of tailings material onto the existing unlined Brakpan TSF and the lined Withok extension with subsequent seepage from the unlined TSF.		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (<i>Local, Regional, International</i>)	Regional	Local
Duration (<i>Short term, Medium term, Long term</i>)	Long term	Long term
Magnitude (<i>Major, Moderate, Minor</i>)	Major -	Moderate -
Probability (<i>Definite, Possible, Unlikely</i>)	Definite	Possible
Calculated Significance Rating (<i>Low, Medium, High</i>)	High	Low
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	No	
Residual impacts		
❖ Deterioration of groundwater quality underneath the unlined Brakpan TSF.		
Mitigation measures		
<ul style="list-style-type: none"> ❖ Continuous monitoring of source concentrations (i.e. within drains and interception boreholes) concentrations and downstream plume migration using proposed monitoring network. ❖ Hydraulic plume containment using proposed interception boreholes until acceptable plume concentrations allow for monitored natural attenuation. 		

Operational impacts on the groundwater quantity and flow regime are expected to persist post closure, although seepage rates from the Brakpan TSF will recede once tailings deposition end and water levels drop within the TSF. The minor leakage rates of the lined Withok extension are predicted to persist post closure. As for the operational phase, the plume control borehole system will reduce the localised mounding and the groundwater baseflow towards the Withokspruit and Rietspruit due to seepage from the unlined Brakpan TSF.

Table 9-64: Ground water quality impacts during the post closure phase.

NATURE OF THE IMPACT: Continuing deposition of tailings material onto the existing unlined Brakpan TSF and the lined Withok extension with subsequent seepage from the unlined TSF.		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (<i>Local, Regional, International</i>)	Regional	Local
Duration (<i>Short term, Medium term, Long term</i>)	Long term	Long term
Magnitude (<i>Major, Moderate, Minor</i>)	Minor -	Minor -
Probability (<i>Definite, Possible, Unlikely</i>)	Possible	Unlikely
Calculated Significance Rating (Low, Medium, High)	Medium	Low
Reversibility: (Reversible or Irreversible)	Reversible	
Irreplaceable loss of resources: (Yes or No)	No	
Cumulative impacts (yes or no)	No	
Residual impacts ❖ None.		
Mitigation measures ❖ Continuous monitoring of water levels within the TSFs and monitoring boreholes. ❖ Continuous operation of the existing interception well system.		

9.5.4.5 Air Quality.

No significant residual impacts are envisaged

9.5.4.6 Heritage and Palaeontology

No significant residual impacts are envisaged.

9.5.4.7 Social Impact

Post- closure impacts are explained on Section 9.5.3.7 Social Impact

9.5.4.8 Noise

No significant residual impacts are envisaged.

9.5.5 Emergency Incidents

This section deals separately with the impacts that may occur in the unlikely event of a dam break/breach. This is considered an emergency incident and is assessed separately.

A tailings dam, by virtue of its existence above ground creates a Hazard, i.e., the potential to cause harm, particularly to the public. So, while the design, operation and management of the facility are intended to ensure that the hazard does not manifest, the possibility remains.

Consequently, it is prudent to forewarn potentially Affected Parties in the event of a pending failure. This is usually done by way of an Emergency Preparedness Plan (EPP) which requires that Affected Parties are identified. This in turn requires the potential inundation zone – termed the Zone of Influence (Zoi) – to be defined.

Such a Zone is a function of the size of the TSF and the topography of the surrounding area. Most of the Brakpan and Withok TSF complex is surrounded by sparsely populated undeveloped rural land, various residential areas are noted along the floodplain, especially to the west where urbanization could be impacted.

The following potential impacts could result from a dam break:

- ❖ An impact to local vegetation and habitats;
- ❖ An impact to local fauna;
- ❖ An impact on aquatic ecosystems;
- ❖ An impact on surface water quality;
- ❖ Impacts on infrastructure within the zone of influence;
- ❖ Impacts on developments within the zone of influence;
- ❖ Potential loss of lives;
- ❖ Loss of economic livelihoods;
- ❖ Health impacts as a results of contaminants in surface water.

Table 9-65: Dam Break Impacts

NATURE OF THE IMPACT: Dam Break		
	Impact Rating Without Mitigation	Impact Rating with Mitigation
Impact Status: (positive or negative)	Negative	Negative
Extent (<i>Local, Regional, International</i>)	Regional	Local
Duration (<i>Short term, Medium term, Long term</i>)	Long term	Medium term
Magnitude (<i>Major, Moderate, Minor</i>)	Major -	Major -
Probability (<i>Definite, Possible, Unlikely</i>)	Possible	Unlikely

<i>Calculated Significance Rating (Low, Medium, High)</i>	Major	Medium
Reversibility: (Reversible or Irreversible)	Irreversible	
Irreplaceable loss of resources: (Yes or No)	Yes	
Cumulative impacts (yes or no)	No	
Residual impacts <ul style="list-style-type: none"> ❖ Contamination of land and surface water as a result of slime residues. ❖ Destruction of biodiversity and aquatic systems. 		
Mitigation measures <ul style="list-style-type: none"> ❖ Design TSF in line with Code of Practice for Mine Residue Deposits (SANS 10286) and the Dam Safety Regulations (GNR. 139 of 24 February 2012). ❖ Ergo to implement its Tailings Management Policy and a Tailings Storage Facility Management Standard. ❖ Develop an Emergency Preparedness Plan. ❖ Undertake a dam break analysis to determine the zone of influence. ❖ Consultation with I&APs in the Zone of Influence. ❖ Register Dam with the Dam Safety Office ❖ Align with the Global Industry Standard on Tailings Management (GISTM) where appropriate. ❖ Build and operate the facility according to its design and construction criteria. 		

9.5.6 Specialist Studies Conclusions and Recommendations

The preceding sections of Chapter 9 of this report together with the specialist studies contained within Appendices D of this EIA provide a detailed assessment of the potential impacts that may result from the recommissioning and reprocessing of the project.

This section aims to conclude the environmental assessment providing a summary of the results and conclusions of the assessment of the project as found in the Specialist Studies. In so doing, it draws on the information gathered as part of the EIA process, the knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of highly sensitive features within the project site by the development footprint and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with Proposed Project identified and assessed through the EIA process include:

9.5.6.1 Biodiversity

The PAOI exists in a predominantly degraded or modified state owing to inadequate rehabilitation procedures following the TSF closure in 1996. The PAOI has been subjected to various anthropogenic impacts such as, human and vehicle ingress, invasions and infestations by alien and invasive plants, overgrazing by livestock, and the edge effects associated with the nearby mining activities and adjacent TSF. This habitat is unlikely to recover without human intervention and will continue to degrade further without active rehabilitation. It no longer represents viable portions of the Endangered and Vulnerable ecosystems that were once there, however, adequate rehabilitation may achieve this.

Due to the seasonal restraints at the time of this assessment, a site walkdown is recommended prior to any construction activities taking place to identify any protected plant species which may occur on site. These must be marked and relocated to a similar habitat nearby which will not be affected by construction activities. Alternatively, applications for destruction permits must be made.

Completion of the terrestrial biodiversity assessment led to the dispute of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The PAOI is instead assigned an overall terrestrial sensitivity of 'Low'. However, the ESA status is still considered to be relevant, albeit limited, due to it overlapping with water resources and forming a valuable movement corridor between adjacent undeveloped areas.

- ❖ It is the opinion of the specialist that the proposed development is favourable only if all mitigation measures provided in this and other specialist reports are implemented, as well as the following:
- ❖ A site walkdown during the correct flowering season (between October and March) must be conducted for all provincially protected plant species present on site, along with the acquisition of permits for the relocation/destruction of species;
- ❖ An alien invasion plant (AIP) management plan must be compiled and implemented; and
- ❖ A rehabilitation plan must be compiled and implemented for all areas of the PAOI impacted by the project activities.

9.5.6.2 Wetlands

Three HGM units were identified within the encompassing 500 m PAOI. These were classified as; One unchannelled valley-bottom and, two seeps.

Additionally, several artificial features were observed which are attributed to the nature of the historical land use (a TSF) and owing to extensive reshaping of the topography during the site's rehabilitation stages after decommissioning of the old TSF. The artificial seep features are a result of hydrological inputs via trenched drains from the adjacent Brakpan TSF. Other artificial areas include the dam feature that occurs within the path of the unchannelled valley-bottom and depression features that are a result of historic rehabilitation efforts and ongoing excavation. Only natural features that were determined to be "At Risk" were considered for the ecological components of the assessment.

Considering the assessment findings and the assumption that the suggested recommendations and mitigation measures will be implemented, no fatal flaws are evident for the proposed project at this stage. It is the opinion of the specialists that the project may be favourably considered for authorisation on condition that a wetland offset plan be undertaken and implemented for those systems that are lost resulting from the proposed activities.

9.5.6.3 Surface Water

Dirty side slope storm water management on the TSF is achieved through chutes discharging into catchment paddocks, some of which decant into a collector pipe. This water is piped to the return water dam for recycling. The remainder is evaporated in the catchment paddocks. Drain flows are also collected in the same collector pipe. Once side slopes are rehabilitated, side slope storm water is managed as part of the dirty water system via chutes and the catchment paddocks to provide a conservative storm water management plan.

A barge with a capacity of 54 000 m³/day (3 000 m³/hr @ 18 hrs/day) is sufficient to maintain pool control. This is approximately 100% of the slurry water requirements. This barge pumps back to the process. The return water dam must have a capacity of at least 65 000 m³ to comply with GN 704. Additional capacity will provide operational flexibility and reduce the risk of discharge during high rainfall periods. Water must be returned to process at a rate of up to 9 800 m³/day. The barge decant plus drain flow returns from the TSF complex is expected to be 56% of slurry water. Post closure modelling shows that an evaporative concept with a paddocked top surface, with drain flows being treated and released is hydrologically sustainable. There will be significant periods where the paddocks are dry so no long-term brine ponds will form.

9.5.6.4 Groundwater

Delta H (Delta-H Water System Modelling Pty Ltd) was appointed by Water Hunters CC, in turn appointed by Ergo, to develop a three-dimensional numerical groundwater flow and transport model for the Brakpan-Withok TSF complex, to assess its impacts on the ambient groundwater environment. Deposition onto the unlined existing Brakpan TSF started in 1985 and, due to highly concentrated tailings liquor, an extensive seepage plume developed. The seepage plume has already reached the nearby Withokspruit stream, with a high likelihood of off-site migration via the surface drainages.

To manage the impact, Ergo installed an interception well system for hydraulic plume containment on the downstream side of the Brakpan TSF. A three-dimensional numerical groundwater flow and transport model was developed to quantify the impacts of the current and future seepage plume emanating from the unlined Brakpan TSF and the (class C) lined Withok TSF extension on the underlying aquifer during the life of the facility (approximately 24.5 years) and 50 years post closure. The model was also used to evaluate the efficiency of the currently installed interception well system in the mitigation of impacts. The seepage plume emanating from the Brakpan-Withok TSF complex is primarily associated with the Brakpan TSF.

The lined Withok expansion reduces essentially the recharge over its footprint, which leads to less dilution of the existing Brakpan seepage plume and thereby an increase in its concentrations. The seepage contributions from the Withok TSF extension are on the other hand negligible. While the interception well system is predicted to achieve a significant reduction in plume extent and concentrations during the life of the facility

and post closure, the wide spacing of interception wells at the northern edge of the Brakpan TSF allows parts of the seepage plume to bypass the hydraulic containment system and continue to impact onto the Withokspruit. The drilling of three additional monitoring boreholes at this edge of the existing Brakpan TSF as well as one on its south-western and south-eastern edges is recommended.

Depending on encountered concentrations, the monitoring boreholes should be converted into interception wells. The model predictions were formally classified as class 1 or low confidence. To increase the confidence level, the model predictions should be updated biennially as monitoring data (water level and qualities) during the operation of the interception well system becomes available.

9.5.6.5 Air Quality.

An air quality impact assessment was undertaken for the emissions from the Brakpan TSF and Withok TSF. PM_{2.5} and PM₁₀ represent the main criteria pollutants of concern. Six operating scenarios are assessed in this report.

The following conclusions can be drawn from the modelling results: Emissions from the Brakpan TSF and the proposed Withok TSF in its current state are expected to be causing elevated ambient concentrations of both PM₁₀ and PM_{2.5} in downwind areas on windy days. However, residential areas to the east of the TSFs fall outside of the 1000 m buffer zone and are currently not expected to experience exceedances of the NAAQS from TSF emissions only. It should be noted that this evaluation excludes cumulative concentrations from other sources.

If the closure methodology for the Brakpan TSF involves creating paddocks that will be dry for long periods of time, emissions from the TSF will increase and exceedances of the NAAQs may be expected over residential areas to the east of the TSF. The Geluksdal residential suburb to the east of the Brakpan TSF is most affected by this increase in emissions as well as some of the western parts of Tsakane. This scenario does not include any additional emissions from the commissioning of the Withok TSF. Considering that the Brakpan and Withok TSFs are located in the Highveld Priority Area for air quality, baseline concentrations are expected to be high. To prevent an increase in cumulative emissions, mitigation of the Brakpan TSF is essential as a prerequisite for the commissioning of the Withok TSF.

To keep the impact of the proposed Withok TSF on neighbouring communities to a minimum, it is essential that progressive vegetation or cladding of the sides as stated in the recommissioning document (Kongiwe, 2024) is meticulously implemented. Furthermore, the proposed paddocking closure method with paddocks that are dry for long periods of time will have to be changed. The modelling indicates that, with careful mitigation, impacts on surrounding communities will not change significantly from the status quo situation.

9.5.6.6 Heritage and Palaeontology

On the condition that the general recommendations and mitigation measures outlined in this HIA report are adhered to and in cognisance of the assumptions and limitations contained in this report, no heritage reasons can be given for the development not to continue.

With the implementation of recommended mitigation measures, the overall impact on heritage resources will be reduced to acceptable levels during the project activities.

9.5.6.7 *Social Impact*

There are no fatal flaws associated with the social risks of the project and it is expected that negative impacts can be effectively managed if there is strict adherence to the proposed environmental management plan. Based on the findings of the socio-economic impact assessment for the project it is therefore recommended that the proposed project be approved.

9.5.6.8 *Noise*

For the project development area, it is the opinion of the author that no further Scoping or other acoustical studies would be required, and it is recommended that the recommissioning of the Withok TSF be authorized (in terms of acoustics).

9.5.7 Summarised Environmental Risk Matrix

A detailed description of the methodology utilised to determining the environmental impacts and their respective probability, magnitude and severity is provided in Subchapter 9 as well as in the specialist reports contained in Appendix D.

During the risk assessment process, it was found that the negative impacts of the proposed project with mitigation would be mostly medium to low in nature, and the positive impacts medium to high.

The EAP and environmental consultants responsible for the compilation of this document, and PPP feel that the Withok TSF Project should be approved, on condition that the mine implements all identified management measures and implements the monitoring plan.

Table 9-66: Key Findings

Impact	Rating Pre-Mitigation	Construction	Operation	Decommissioning	Post closure	Rating Post Mitigation	Construction	Operation	Decommissioning	Post closure
Positive (+)	Major (high)		❖ Enabling continued Ergo recommissioning activities			Major (high)		❖ Enabling continued Ergo recommissioning activities		
Positive (+)	Moderate (medium)					Moderate (medium)		❖ Continued Social funds		
Positive (+)	Minor (low)	❖ Job creation	❖ Continued Social funds			Minor (low)	❖ Job creation			
No Impact	No Impact		❖ Heritage	❖ Heritage	❖ Heritage	No Impact		❖ Heritage	❖ Heritage	❖ Heritage
Negative (-)	Minor (low)	❖ Operations near Wetlands ❖ Heritage ❖ Groundwater quality	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Noise	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna)	❖ Air quality	Minor (low)	❖ Biodiversity (vegetation and habitats) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Operations near Wetlands ❖ Surface water pollution ❖ Groundwater quality ❖ Heritage ❖ Informal influx and security	❖ Informal influx and security ❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Erosion ❖ Groundwater	❖ Biodiversity (vegetation and habitat) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Erosion ❖ Groundwater	❖ Groundwater quality ❖ Groundwater quantity
Negative (-)	Moderate (medium)	❖ Air Quality ❖ Biodiversity (vegetation and habitats) ❖ Biodiversity (fauna) ❖ Biodiversity (alien species) ❖ Wetland loss ❖ Surface water pollution ❖ Informal influx and security	❖ Biodiversity (alien species) ❖ Informal influx and security ❖ Impact of adjacent economic activities ❖ Wetlands ❖ Groundwater quantity ❖ Air quality	❖ Biodiversity (alien species) ❖ Wetland loss ❖ Erosion ❖ Air quality		Moderate (medium)	❖ Air Quality	❖ Community health and safety ❖ Impact of adjacent economic activities ❖ Surface water ❖ Groundwater quality ❖ Health ❖ Dam failure ❖ Air quality	❖ Dam failure ❖ Social-Economic ❖ Air quality	❖ Surface Water ❖ Dam failure
Negative (-)	Major (high)	❖	❖ Surface Water ❖ Groundwater quality ❖ Health ❖ Dam failure	❖ Community health and safety ❖ Groundwater ❖ Dam failure	❖ Surface Water ❖ Groundwater quality ❖ Dam failure	Major (high)				

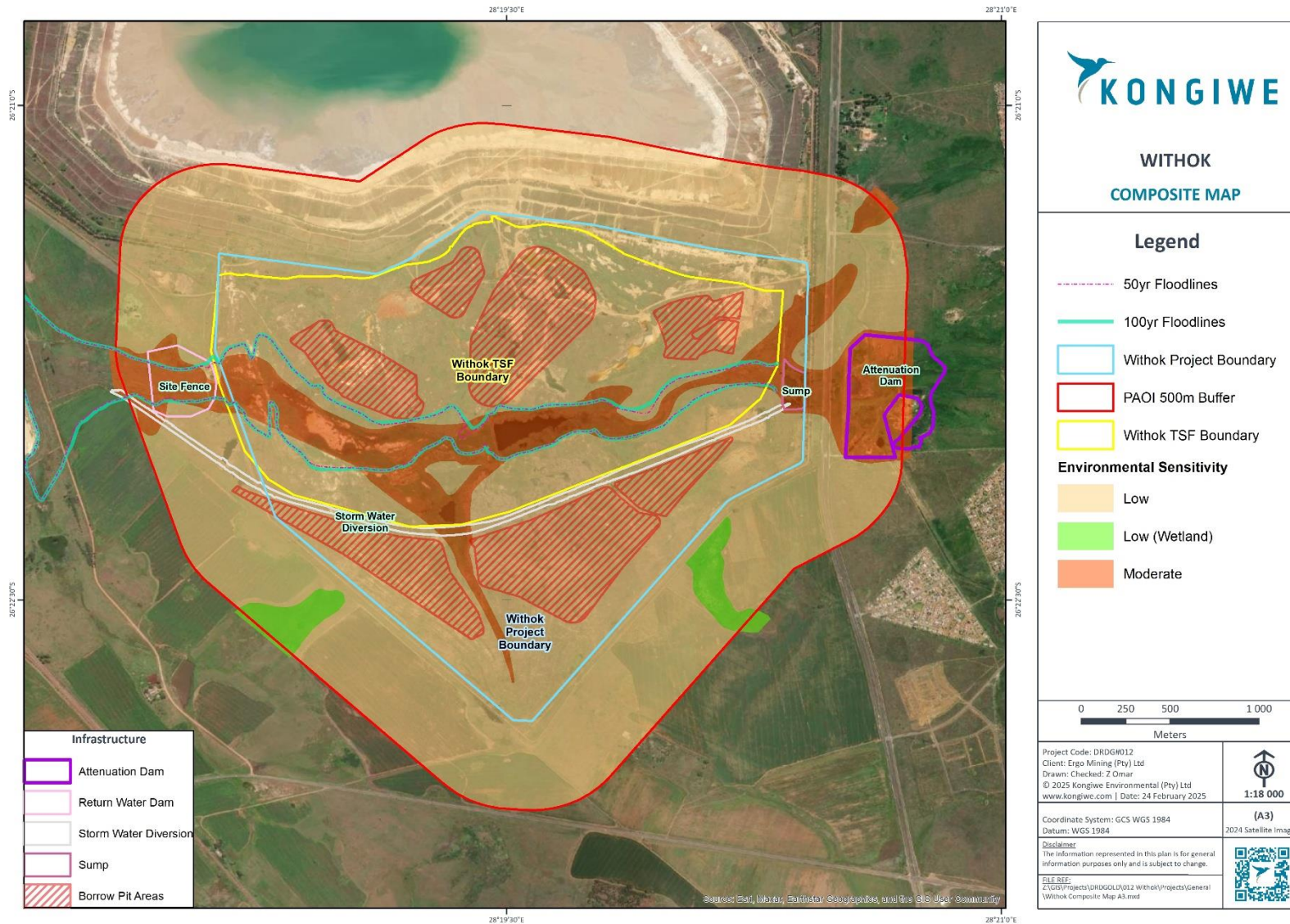


Figure 9-2: Preferred Layout and Sensitivities

10 Information for Consideration

10.1 Assumptions, Uncertainties and Gaps in Knowledge

The following assumptions and limitations are applicable to this EIA report:

10.1.1 Biodiversity and Wetlands

The following limitations are relevant for this project:

- ❖ A site walkdown during the correct flowering season (between October and March) must be conducted for all provincially protected plant species present on site, along with the acquisition of permits for the relocation/destruction of species;
- ❖ An alien invasion plant (AIP) management plan must be compiled and implemented; and
- ❖ A rehabilitation plan must be compiled and implemented for all areas of the PAOI impacted by the project activities.

10.1.2 Surface Water

The following limitations are relevant for this project:

- ❖ Dirty side slope storm water management on the TSF is achieved through chutes discharging into catchment paddocks, some of which decant into a collector pipe. This water is piped to the return water dam for recycling. The remainder is evaporated in the catchment paddocks.
- ❖ Drain flows are also collected in the same collector pipe.
- ❖ Once side slopes are rehabilitated, side slope storm water is managed as part of the dirty water system via chutes and the catchment paddocks to provide a conservative storm water management plan.
- ❖ A barge with a capacity of 54 000 m³/day (3 000 m³/hr @ 18 hrs/day) is sufficient to maintain pool control. This is approximately 100% of the slurry water requirements. This barge pumps back to the process.
- ❖ The return water dam must have a capacity of at least 65 000 m³ to comply with GN 704. Additional capacity will provide operational flexibility and reduce the risk of discharge during high rainfall periods.
- ❖ Water must be returned to process at a rate of up to 9 800 m³/day.
- ❖ The barge decant plus drain flow returns from the TSF complex is expected to be 56% of slurry water.
- ❖ Post closure modelling shows that an evaporative concept with a paddocked top surface, with drain flows being treated and released is hydrologically sustainable. There will be significant periods where the paddocks are dry so no long-term brine ponds will form.

10.1.3 Groundwater

The following limitations are relevant for this project:

- ❖ The static groundwater levels should be measured in the boreholes without any preceding abstractions (obviously not applicable for interception wells).

- ❖ The boreholes should be purged (replacing approximately three times the stagnant water within the borehole) until the physio-chemical parameters stabilize and are determined. Samples for analysis should be retrieved after stabilization of the field parameters.
- ❖ Interception wells do obviously not need to be purged and can be sampled directly.
- ❖ Suitable sample containers should be utilised for the sample collection, i.e. plastic or glass containers for major elements and plastic or boron-glass containers for minor and trace elements.
- ❖ Samples for trace element analysis should be filtered and acidified (HNO₃, pH < 2) on-site.
- ❖ Sample collection including determined physio-chemical parameters should be documented in a sample protocol for each site and signed off by the sampling personnel as part of the chain of custody.
- ❖ The samples should be delivered to an accredited laboratory as soon as possible for analysis of the above parameters

10.1.4 Air Quality.

The following limitations are relevant for this project:

- ❖ The incomplete vegetation of the sides of the three most recent 'steps' of the Brakpan TSF.
- ❖ The upstream cyclone deposition method which means that much of the beach remains wet and thus will suppress most of the emissions from the top of the TSF during the deposition phase of the project.
- ❖ The proponent is planning to progressively clad the sides of the Withok TSF as the project progresses (Kongiwe, 2024). The worst-case scenarios are, therefore, the phase after deposition has ended and before any mitigation of the top of the TSF has been initiated.
- ❖ The proponent has proposed to create paddocks on the top of the TSF for the evaporation of brine as part of their closure concept. This would mean that there would be significant periods when the paddocks would be dry (Kongiwe, 2024).
- ❖ The possibility of comprehensively mitigating emissions from the top of the TSFs – including, but not limited to, either applying organic matter and topsoil together with systematic revegetation or applying cladding to the top of the TSF.
- ❖ It was assumed that the sides and top of the proposed Withok TSF during its operational phase would have similar vegetation and moisture mitigating factors to the current Brakpan TSF.
- ❖ The current impact of the active Brakpan TSF, with moisture from the cyclone deposition method and with minimal emissions from the current Withok footprint.
- ❖ The impact of the Brakpan TSF when decommissioned before vegetation has time to be established, together with negligible emissions from the current Withok footprint.
- ❖ The impact of the Brakpan TSF when decommissioned with the top converted to paddocks that are dry for long periods of time, together with emissions from the proposed Withok TSF at approximately half of its expected final height.
- ❖ The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with emissions from the operational phase of the proposed Withok TSF at approximately half of its expected final height.
- ❖ The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with emissions from the Withok TSF with the top converted to paddocks that are dry for long periods of time.

- ❖ The impact of the Brakpan TSF when decommissioned with the top covered with 90% vegetation, together with the Withok TSF when decommissioned with the top covered with 90% vegetation.

10.1.5 Heritage and Palaeontology

The following limitations are relevant for this project:

- ❖ It is important to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area.
- ❖ This may inter alia be due to dense vegetation cover and the subterranean characteristics of archaeological sites.
- ❖ As a result, it is always possible that the fieldwork findings made in this report are not a complete indication of all the archaeological and heritage fabric from within the study area.
- ❖ Any observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question.
- ❖ This applies to graves and cemeteries as well. In the event that any graves or burial places are identified during the development, the procedures and requirements pertaining to graves and burials as set out elsewhere in this report will apply.

10.1.6 Social Impact

The following limitations are relevant for this project:

- ❖ The assessment includes consultations with key stakeholders and potentially affected parties as part of the impact assessment phase. This does not form part of the Public Participation Process (PPP) required for the overall EIA process, except where it was specifically specified as such during the consultation session.
- ❖ Socio-economic baseline information was mainly based on official statistics from Stats SA, as well as municipal documentation. Sub-municipal data was only available for 2011. Recent trends, as well as information on a sub-municipal level, were also based on quantitative and qualitative information received from local representatives with local knowledge. The lack of more recent official socio-economic data is therefore seen as a limiting factor, although it is not anticipated to influence the outcome of the report.
- ❖ Communities should democratically elect representatives to voluntarily sit on the Forum, which meets quarterly.
- ❖ Representatives would be responsible for disseminating project information to community members, and Ergo would be responsible for taking minutes and attendance registers at Forum meetings.
- ❖ The composition of the Forum might include the following Committee members:
- ❖ Community members from the communities within the Projects area of interest; Focus should especially be on areas that represents a larger risk in terms of social mobilisation including informal settlements – specifically in Wards 93 and 21; Representatives from the Municipal Authorities; and
- ❖ Ergo's representatives from the following divisions: Community Relations; Social Labour Plan and Environmental Management.

- ❖ Forum members would be required to hold meetings with their communities and provide Ergo with copies of the attendance registers and minutes of these meetings.
- ❖ Solutions to address service delivery require interventions from the local authorities. However, the applicant can address potential issues that could lead to unrest by ensuring that an effective grievance mechanism is put in place to ensure that stakeholders are provided with a platform to raise their concerns/complaints.
- ❖ Collaborate with the unit of the DMRE that deals with illegal mining-related issues and the SAPS to establish standard operating procedures for the control and/or removal of unauthorised individuals.

10.1.7 Noise

- ❖ Noises associated with the development and operation of the borrow pits, as well as the recommissioning of the Withok TSF will be limited to less than 200m from the project activities and insignificant further than 500m from such activities.
- ❖ Considering the project area to be developed, the likely elevated sound character of the area (due to traffic noises on the R23 road) as well as the distance between potential noise sources and identified NSR (more than 500 m from the proposed activities), the recommissioning activities associated with the Withok TSF will not influence ambient sound levels at any NSR residing in the vicinity of the project site.
- ❖ For the project development area, it is the opinion of the author that no further Scoping or other acoustical studies would be required and it is recommended that the recommissioning of the Withok TSF be authorized (in terms of acoustics).

10.2 Aspects for Inclusions as Considerations of the Environmental Authorisation

Should the DMRE grant EA for this project, it should be subject to the following conditions:

- ❖ The project may not commence prior to the EA being issued;
- ❖ The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements;
- ❖ The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Ergo management to provide guidance and instructions to employees and contractors;
- ❖ Ergo must undertake external auditing of the environmental performance as per the conditions of the Environmental Authorisation and provide the DMRE with a copy of the auditing report;
- ❖ The Applicant must report to the Department, with reason, if requirements of the EA have not been met.
- ❖ Stakeholder engagement must be maintained during the construction, operational and decommissioning/rehabilitation phases of the project, with the emphasis on the continuing provision of information;
- ❖ A community forum should be implemented by Ergo, with the aim of engaging Stakeholders and the public;

- ❖ All laydown, storage areas etc should be restricted to transformed areas close to the preferred option and existing roads should be used as far as possible;
- ❖ Keep stormwater away from the workingg areas;
- ❖ Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion;
- ❖ Prevent dust pollution during dry, windy conditions.
- ❖ All necessary authorisation must be in place prior to commencement of the project activities.
- ❖ All employees and contractors should receive induction that includes an environmental awareness component (noise). This is to allow employees and contractors to become aware of the potential noise risks that activities (especially night-time activities) pose to the surrounding environment.
- ❖ Ergo must adhere to the Rehabilitation Plan contained in the EMPr.
- ❖ The Applicant must maintain all financial responsibility throughout all phases of the project lifespan, including monitoring.
- ❖ Should the economic gold price diminish and not be seen as favourable to continue activities, Ergo must continue to implement monitoring and rehabilitation requirements as set out in the EMPr.
- ❖ The Applicant must ensure that there are sufficient funds set aside to complete the project fully. Partial recommissioning and partial rehabilitation should not be accepted.
- ❖ Management and Monitoring plans contained in the EMPr must be strictly adhered to.
- ❖ A Chance Find procedure for heritage resources and artefacts needs to be in place.

10.3 Proposed Management Objectives and Outcomes for Inclusion in the EMPr

The EMPr is compiled with the aim of achieving a required end state that, as far as possible, ensures that environmental quality is maintained. The impact management objectives and outcomes for the Project are as follows:

- ❖ To minimise the negative environmental impacts as far as feasible;
- ❖ To maximise the positive and minimise the negative socio-economic impacts;
- ❖ To capture, contain, treat and recycle all contaminated water arising from the mining operations on site and to prevent the discharge of contaminated water to the environment; and
- ❖ To maintain cordial relationships with local residents, authorities and other stakeholders via sustained open communication.

The EMPr describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored. Moreover, the EMPr will address the environmental impacts during the construction, operational, decommissioning (where applicable post-closure) phases of the Project. Due regard must be given to environmental protection during the entire Project, and a number of environmental recommendations are made in this regard. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- ❖ Minimise the extent of an impact during the life of the Project;
- ❖ Maintain a state of Environmental Quality following completion of the Project;
- ❖ Ensure appropriate restoration of areas affected by the Project; and
- ❖ Prevent long term environmental degradation.

10.4 Rehabilitation Requirements

Final rehabilitation will be carried out once the Recommissioning of the Withok TSF Project goes into its closure phase. This final rehabilitation will be carried out within the context of the closure plan.

The principles for proper rehabilitation, which should be followed, are:

- ❖ Preparing a comprehensive rehabilitation plan prior to the commencement of any activities on site;
- ❖ Stormwater management must be in place at the site prior to commencing with any activities;
- ❖ Landform design (shaping, re-grassing);
- ❖ Maintenance management and eradication of invader species;
- ❖ A plan which negates how waste will be managed on site; and
- ❖ An Emergency Preparedness/Response plan .

The objective of the site rehabilitation (in accordance with the NEMA EIA Regulations of 2014) must be measurable, practical and is feasible to implement through:

- ❖ Providing the vision, objectives, targets and criteria for final rehabilitation of the project;
- ❖ Outlining the principles for rehabilitation;
- ❖ Explaining the risk assessment approach and outcomes and link decommissioning activities to risk rehabilitation;
- ❖ Detailing the decommissioning and rehabilitation actions that clearly indicate the measures that will be taken to mitigate and/ or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
- ❖ Identifying knowledge gaps and how these will be addressed and filled;
- ❖ Detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
- ❖ Outlining monitoring, auditing and reporting requirements.

Rehabilitation has been dealt with throughout this EIA. Mitigation / Management and Monitoring measures are proposed in the EMPr.

10.5 A Reasoned Opinion: Should the Withok TSF Recommissioning Project be Approved?

Key findings from the EIA have been incorporated into a high-level summary presented in the risk matrix found in Chapter 9.5.7.

10.5.1 Conclusions of the Report

Chapter 6 outlines the need for the project in a local and regional sense, as well as the overall desirability for the project in a local and regional sense.

Based on the information contained in this report, it is the opinion of the EAP that the negative environmental impacts resulting from the Withok TSF Project can be mitigated to within acceptable limits and that the project should be authorised.

This opinion holds provided all the recommendations proposed in the specialist studies and the EIA and EMP as well as legislative requirements are implemented and adhered to.

An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to better mitigate and manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed. As a final option, offset strategies should be investigated, if feasible.

The findings of the impact assessment have shown that the Withok TSF Project would conclusively result in certain negative impacts during the operational phase to the environment, however, none of the specialist studies objected to the project. Moreover, the scientific specialist mitigations measures have been included into this EIA and EMP Report to reduce the significance of all the identified negative impacts. Most negative impacts can be reduced through the implementation of mitigation measures.

11 Financial Provisions

The closure cost assessment was developed in line with the requirements of the NEMA as amended. These Regulations provide that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts.

The financial provision must guarantee the availability of sufficient funds to undertake the following:

- ❖ Rehabilitation of the adverse environmental impacts of the listed or specified activities;
- ❖ Rehabilitation of the impacts of the project activities, including the pumping and treatment of polluted or extraneous water;
- ❖ Decommissioning and closure of the operations;
- ❖ Remediation of latent or residual environmental impacts which become known in the future;
- ❖ Removal of building structures and other objects; and/or
- ❖ Remediation of any other negative environmental impacts.

The Financial Provisioning Regulations, 2015 (GN R1147) for the determination of financial provision for mine rehabilitation and closure were promulgated on 20 November 2015 under the NEMA, as amended.

On 1 February 2024, the Minister of Forestry, Fisheries and the Environment (Minister) again amended the transitional period contained in regulation 17B of the Financial Provision Regulations, 2015. The transitional arrangements in regulation 17B of the Financial Provision Regulations allows the holder of a right or permit granted or issued, as the case may be, in accordance with the Mineral and Petroleum Resources Development Act, 2002 (MPRDA), who applied for such right or permit before 20 November 2015, to continue making financial provision in accordance with regulations 53 and 54 of the regulations published under the MPRDA. Stated differently, a person who applied for a right or permit prior to 20 November 2015, is not yet required to comply with the Financial Provision Regulations.

In the previous amendments to the regulation 17B of the Financial Provision Regulations, the Minister always specified a date by when the transitional period would expire and when all holders would be required to comply with the Financial Provision Regulations. However, this time the Minister has amended regulation 17B to provide that the transitional period will continue to apply until the Minister published a date by when all holders are required to comply with the Financial Provision Regulations.

It should also be noted that on 11 July 2022, the Minister of Forestry, Fisheries and the Environment published the latest draft version of the Proposed Regulations Pertaining to Financial Provisioning for the Mitigation and Rehabilitation of Environmental Damage Caused by Reconnaissance, Prospecting, Exploration, Mining or Production Operations NEMA FP Regulation. The draft regulations are intended to repeal and replace the current Financial Provisioning Regulations, 2015.

The closure model calculates the cost of demolishing, removing and rehabilitating each infrastructure component which may include (but is not limited to):

- ❖ Rehabilitation of the disturbed footprints;
- ❖ Generalised rehabilitation and vegetation management strategies;
- ❖ Vegetation on the TSF that will remain post-closure;
- ❖ Post-closure maintenance and monitoring costs.

The following assumptions were made.

Table 11-1: Closure Cost Assumptions

Assumptions	Consequences
The Unit cost for Ergo’s 2024 closure costing were used.	Costs will need annual re-evaluation.
The calculations do not account for any value recovered from sale of plant, steel or other material.	Value recovered from sale of the mine’s operational infrastructure can be used for any other purpose.
Where contractor rates were not received, the current rates database was used and escalated with an average annual inflation of 5.9%.	Impact on overall closure cost estimate.
Water tariffs updated as per the quotations received in 2024.	Impact on overall closure cost estimate should the actual rate be different.
Ergo will: <ul style="list-style-type: none"> • Demolish all prefabricated buildings at the end of operations; and • Remove all temporary structures from site prior to closure. 	Listed components removed prior to closure have not been considered in the Financial Provision calculations.
General surface rehabilitation must involve the shaping of the surface topography to match the surrounding landscape. During the process of shaping the landscape and drainage lines must be properly reinstated into the topography; <ul style="list-style-type: none"> • The footprint areas occupied by temporary surface infrastructure will require ripping, followed by vegetation; and • Any heaps of excess material also need to be removed to ensure effective revegetation. 	Ability to effectively implement the final land use.
The financial provision estimate does not include VAT	VAT must be included separately
A contingency of 10% on the financial provision has been provided for.	Price fluctuations with regard to plant hire, fuel prices and possible omissions from the assessment have been accounted for.
A 6% allowance has been made where the cost is more than R100,000,000, and 12% allowance where the cost is less than R100,000,000 for preliminary and general (P&Gs).	Changes to this assumption will impact the closure cost.

Assumptions	Consequences
It is assumed that the machine hire rates and rehabilitation quotations received are independent and accurate.	Any changes to the prices quoted will impact the closure cost.

11.1 Annual Rehabilitation Costs

Annual rehabilitation costs are included into Ergo’s operating budget. The operation has not been initiated and a Zero (R 0.00) rand annual rehabilitation cost is reported for the Withok site.

It must be noted that costing for the rehabilitation of the Withok TSF footprint as it stands prior to any operations taking place has been costed at R24 246 174.03.

The closure costing presented below takes into account the start of project activities.

11.2 Summary of Closure Costs

A summary of the closure cost estimate (excl. VAT) is presented in Table 11-2. Table 11-3 presents the detailed costing.

Table 11-2: Closure costs

	Unplanned closure (year 1)	Unplanned Closure (year 10)	Closure (Year 20)
Withok TSF	R 59 039 288.46	R 63 802 615.61	R 57 584 358.35
Rehabilitation already costed for	R 24 246 174.03	R 24 246 174.03	R 24 246 174.03
Cost to be planned for	R 34 793 114.43	R 39 556 441.58	R 33 338 184.32

According to Section 7 of the NEMA Financial Provisioning Regulations, 2015, the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the rehabilitation for a period of at least 10 years forthwith. Although the date of compliance with the regulations has been extended (GN R 4296, 1 February 2024), it is considered best practice to provide provision for the 10 year period. Therefore Ergo will need to provide a guarantee of **R 39 556 441.58**.

Table 11-3: Detailed Closure Costing

Description	Closure				
	Quantity	Unit	Rate	Amount	Comments
Unplanned - Year 1					
Shaping of footprint area - To ensure site drainage	400	Ha	R 40 454.33	R 16 181 731.83	Stormwater management fishbone drain across site
Stormwater management site establishment	1	Sum	R 7 033.88	R 7 033.88	
Site Establishment for rehabilitation	1	Sum	R 108 015.00	R 108 015.00	Includes Site Establishment/De-establishment and Pre-Project meetings
Borrow pits - Ripping, Scarification, Ameliorants, seeding & application	76	ha	R 32 243.10	R 2 450 475.43	3 borrow pits outside TSF footprint
Establish vegetation	400	Ha	R 62 141.82	R 24 856 727.04	Assumption that borrow pits and TSF footprints have been prepared
Vegetation Monitoring	400	ha	R 3 204.15	R 1 281 660.00	Monitoring for five years for 25% of the area. The percentage is already worked into the rate.
Vegetation Maintenance	400	ha	R 35 318.86	R 14 127 545.28	Maintenance for five years for 25% of the area. The percentage is already worked into the rate.
Groundwater Monitoring	0	sum	R 156 600.00	R -	30 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 30 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Surface water monitoring	1	sum	R 26 100.00	R 26 100.00	5 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 5 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Total Cost Unplanned - Year 1				R 59 039 288.46	
Unplanned - Year 10				R -	
Rehabilitation of side slopes	7.67	ha	R 507 249.91	R 3 890 606.81	The side slope vegetation includes, Site Establishment and De-Establishment, Project Management, Leaching Equipment, Maintenance of Leach Equipment (18 months), Vegetation and side slope preparation. The total TSF area is 440ha. At 10 years the side slopes would be 7.6ha
Vegetate upper surface of the TSF	350	ha	R 97 278.00	R 34 047 300.00	
Vegetation Monitoring	400	ha	R 5 340.25	R 2 136 100.00	Monitoring for three years for 25% of the area. The percentage is already worked into the rate.
Vegetation Maintenance	400	ha	R 58 864.77	R 23 545 908.80	Maintenance for Three years for 25% of the area. The percentage is already worked into the rate.
Groundwater Monitoring	1	sum	R 156 600.00	R 156 600.00	30 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 30 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Surface water monitoring	1	sum	R 26 100.00	R 26 100.00	5 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 5 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Total Cost Unplanned - Year 10				R 63 802 615.61	
Planned					
Rehabilitation of side slopes	5	ha	R 507 249.91	R 2 536 249.55	The side slope vegetation includes, Site Establishment and De-Establishment, Project Management, Leaching Equipment, Maintenance of Leach Equipment (18 months), Vegetation and side slope preparation. The total TSF area is 440ha. At closure the side slopes would be 5ha
Vegetate upper surface of the TSF	300	ha	R 97 278.00	R 29 183 400.00	
Vegetation Monitoring	400	ha	R 5 340.25	R 2 136 100.00	Monitoring for three years for 25% of the area. The percentage is already worked into the rate.
Vegetation Maintenance	400	ha	R 58 864.77	R 23 545 908.80	Maintenance for Three years for 25% of the area. The percentage is already worked into the rate.
Groundwater Monitoring	1	sum	R 156 600.00	R 156 600.00	30 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 30 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Surface water monitoring	1	sum	R 26 100.00	R 26 100.00	5 Years post closure Quarterly monitoring, for one monitoring point. 4 times per year for 5 years (Excl. VAT). Latest sample costs received from Ergo in 2024 (R1,305/sample).
Planned Closure - Year 20				R 57 584 358.35	

12 Oath Undertaking

The EAP hereby confirms:

- ❖ The correctness, to the best of his knowledge, of the information provided in the specialist reports and on information provided by Ergo. The information was accepted as being as reliable as information generated during an EIA and a feasibility study, and provided in good faith, can be;
- ❖ The inclusion of comments and inputs from stakeholders and I&APs;
- ❖ The inclusion of inputs and recommendations from the specialist reports where relevant; and
- ❖ The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

KONGIWE ENVIRONMENTAL (PTY) LTD

Company Name



Phathutshedzo Nelson Munyai

Name of the Environmental Assessment Practitioner

Signature

22 May 2025

Date

13 References

- Banzai Environmental (2024). Palaeontological Desktop Assessment - Withok Tailings Storage Facility (TSF) in Gauteng's East Rand.
- Bioswitch (2025). Health Impact Assessment – Brakpan/Withok TSF.
- Cambardella, C.A. and Karlen, D.L., 1999. Spatial analysis of soil fertility parameters. *Precision Agriculture*, 1(1), pp.5-14.
- CoE (2015). Regional Spatial Development Framework: Region E, Ekurhuleni Metropolitan Municipality, Germiston
- CoE (2021). Reviewed Integrated Development Plan 2021-2022, Ekurhuleni Metropolitan Municipality, Germiston
- Department of Basic Education (2022). School Masterlist Data (EMIS) for Gauteng, 3rd Quarter 2022, Department of Education, Pretoria
- Department of Water and Sanitation (DWS). (2018). *Proposed reserve determination of water resources for the Vaal catchment*. Pretoria, Department of Water and Sanitation.
- DRDGOLD.com. (2018). Ergo | Our business | DRDGOLD. [online] Available at: <http://www.drdgold.com/our-business/Ergo> [Accessed 10 Oct. 2019].
- DRDGOLD (2023). Annual Integrated Report 2022/23, DRDGOLD, Roodepoort
- Durand, J, F. (2012) The impact of gold mining on the Witwatersrand in the rivers and karst system of Gauteng and North West Province, South Africa. *Journal of African Earth Science*; 68 (2012), 24-43.
- EARES (2024). Noise Screening Report for the Proposed Withok Recommissioning Project, Gauteng Province.
- Environmental Law Group, 2022. DRD Gold Limited: Environmental Legal Due Diligence Assessment - Brakpan Withok Tailings Complex Facility.
- Fenger, J. (2002). Urban air quality. In J. Austin, P. Brimblecombe, & W. Sturges (Eds.), *Air Pollution Science for the 21st Century*. Oxford: Elsevier.
- Gauteng Department of Agriculture and Rural Development, 2012. Gauteng Mine Residue Areas Strategy Final Report.
- GDARD. (2014b). Technical Report for the Gauteng Conservation Plan (Gauteng C-Plan v3.3). Gauteng Department of Agriculture and Rural Development: Nature Conservation Directorate. 60 pages. Pretoria.

- GeoTail (2024). Withok Tailings Storage Facility Design Report. Report no. GTSA|06/2024-RP-01-Rev 01.
- GISTM (2020). Global Industry Standard on Tailings Management, August 2020
- Gondwana Environmental Services (2024). Air Quality Impact Assessment for the Proposed Recommissioning of the Withok Tailings Storage Facility.
- Goldfields (2024). Deposition techniques. Available from <https://www.goldfields.com/deposition-techniques.php>
- GSDf (2016). Gauteng Spatial Development Framework (GSDf) 2030.
- Haukos, D.A., Smith, L.M. The Importance of Playa Wetlands to Biodiversity of the Southern High Plains. *Landsc. Urban Plan.* 1994, 28, 83-98.
- Harrison, R. M., and Van Grieken, R. E. (1998). *Atmospheric Aerosols*. Great Britain: John Wiley.
- Harrison, P., and Zack, T. (2012) *The power of mining: the fall of gold and the rise of Johannesburg*. *Journal of Contemporary African Studies*; *Journal of Contemporary African Studies*; 30,(4). 551-570.
- iLanda Water Services (2024). Withok TSF – Water Management Plan. Report no. 0442-Rep-001-Rev 0.
- iLanda Water Services (2024). Surface Water Specialist Study - Baseline Hydrology & Impact Assessment. Report no. 492-Rep-001-Rev 0.
- Irene Lea Environmental and Hydrogeology cc, 2 November 2016. Withok Tailings Storage Facility Numerical Geohydrological Model. Report No iLEH-DRD WIT 04-16.
- Keddy, P.A., Fraser, L.H., Solomeshch, A.I., Junk, W.J., Campbell, D.R., Arroyo, M.T., Alho, C.J. Wet and Wonderful: The World's Largest Wetlands Are Conservation Priorities. *Bioscience* 2009, 59, 39-51.
- Kongiwe Environmental (Pty) Ltd (2024). The Recommissioning of the Withok Tailings Storage Facility in the City of Ekurhuleni, Gauteng Province - Final Visual Impact Assessment.
- Kongiwe Environmental (Pty) Ltd (2025). The Recommissioning of the Withok Tailings Storage Facility in the City of Ekurhuleni, Gauteng Province – Closure and Rehabilitation Plan.
- Kootbodien, I.S., Naicker T., Kgalamono N. Wilson S. and D. Rees (2020). Respiratory Health in a Community Living in Close Proximity to Gold Mine Waste Dumps, Johannesburg, South Africa. *Int J Environ Res Public Health*. 2020 Mar 26;17(7):2240. doi: 10.3390/ijerph17072240. PMID: 32225030; PMCID: PMC7178068
- Land Type Survey Staff. 1972–2006. Land types of South Africa: Digital map (1:250 000 scale) and soil inventory datasets. ARC-Institute for Soil, Climate and Water, Pretoria.

- Lieferink, M. (2023). Preliminary Comments on the Reclamation of the 4I39 Tailings Storage Facility in Ekurhuleni, Gauteng Province Draft Scoping Report, Federation for a Sustainable Environment, Johannesburg
- Macrotrends (2025). 10- year Daily chart. Available from <https://www.macrotrends.net/1333/historical-gold-prices-100-year-chart>. Middleton, B.J. and Bailey, A.K. (2009). Water Resources of South Africa, 2005 study (WR2005), 2009. WRC Report No TT 382/08.
- Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria, South African.
- Pfab, M.F., Compaan, P., Whittington-Jones, C.A., Engelbrecht, I., Dimalisile, L., Mills, L., West, S.D., Muller, J., Masterson, G.P.R., Nevhultalu, L.S., Holneem S.D., and Hoare, D.B. (2017). The Gauteng Conservation Plan: Planning for biodiversity in a rapidly urbanising province. *Bothalia – African Biodiversity and Conservation* 47 (1), pp 1-16.
- PGS HERITAGE. (2018). The Proposed ERGO reprocessing Project of tailings dumps 4L3, 4L4 and 4L6, City Deep, Johannesburg, Gauteng. PSG Heritage, Pretoria.
- PGS HERITAGE (2024). Proposed Withok TSF Recommissioning Project - Phase I Heritage Impact Assessment.
- PRETORIUS, D.A., 1963. The geology of the Central Rand goldfield. University of the Witwatersrand, Economic Geology Research Unit.
- SABCnews (2023). Tsakane Protests. <https://www.sabcnews.com/sabcnews/tsakane-residents-protest-turns-violent-over-a-lack-of-water-supply/>. Accessed 23 August 2024
- Schwegler, F. (2006). Air quality management: a mining perspective. *WIT Transactions on Ecology and the Environment*, 86.
- SED (2024). Socio-Economic Impact Assessment Report for the Expansion of Withok Tailings Storage Facility (TSF) in Ekurhuleni, Gauteng Province.
- STATS SA (2011). Census 2011, Stats SA Pretoria
- The Biodiversity Company (2024). Terrestrial Biodiversity Compliance Statement for the Proposed Withok Tailings Storage Facility Recommissioning Project.
- The Biodiversity Company (2024). Wetland Functional and Impact Assessment for the proposed Withok Tailings Storage Facility Project.
- USGS. (2001). *Gold*. Available from: <https://pubs.usgs.gov/gip/gold/>.
- USGS. (2018). *National Minerals information Center, Gold Statistics and Information*. Available from:

<https://www.usgs.gov/centers/nmic/gold-statistics-and-information>.

Viljoen, M.J. and Reimold, W.U., 2002. An Introduction to South Africa's Geological Heritage. Mintek in association with the Geological Society of South Africa, Randburg.

Water Hunters cc (2024). Brakpan-Withok TSF Complex - Groundwater Model Report. Delh. 2021.007-011.

Frank Winde, Gerhard Geipel, Carolina Espina, Joachim Schüz (2019). Human exposure to uranium in South African gold mining areas using barber-based hair sampling. Available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0219059>



**Appendix A:
EIA Project Team CV's**

Curriculum Vitae – Phathutshedzo Munyai

Junior Environmental Consultant

Professional Registration

- Registered Environmental Assessment Practitioners Association of South Africa (EAPASA).
- International Association For Public Participation (IAP2)

Qualifications

- Bachelor of Arts in Environmental Management, University of South Africa 2020.

Languages

- English – Fluent
- Tshivenda – Fluent
- Isizulu – Fluent
- Sepedi – Fluent
- Sesotho - Average

Countries Worked in

- South Africa

Phathutshedzo is a qualified Environmental Assessment Practitioner and registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA) as well as the International Association for Public Participation (IAP2). He holds a Bachelor of Arts in Environmental Management from UNISA and brings over three years of experience across various sectors, including mining, waste management, and infrastructure development.

His expertise includes conducting Environmental Impact Assessments (EIAs), public participation processes, and compiling key regulatory documents such as BARs, EMPs, Scoping Reports, and EIRs. His expertise spans various projects, including mining prospecting rights, mining permits, mining rights, and infrastructure and non-infrastructure developments. He also has a background as a Safety Officer in the mining industry, he brings a strong grounding in risk assessment and legal compliance.

His skills include:

- ❖ Environmental Impact Reporting and Authorisation;
- ❖ ECO field work and reporting; and
- ❖ Report writing

**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2021/4297

Herewith certifies that
PHATHUTSHEDZO NELSON MUNYAI
is registered as an
Environmental Assessment Practitioner

**Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).**

Effective: 01 March 2025

Expires: 31 March 2026

Chairperson

Registrar



Professional Registration

- South African Council for Natural Science Professionals (SACNASP) – 2009
- Environmental Assessment Practitioners Association of South Africa (EAPASA) – 2019
- International Association of Impact Assessment South Africa

Qualifications

- Management Development Programme, University of Stellenbosch Business School, 2021
- Diploma Environmental Law, University of Johannesburg, 2005
- M.Sc. Environmental Management, RAU, 2004
- B.Sc. Hons Environmental Management, RAU, 2002
- B.Sc. Earth Sciences, RAU, 2001

Languages

- English – Fluent
- French – Fluent
- German – Fluent
- Afrikaans – Average

Countries Worked in

- South Africa
- Democratic Republic of Congo
- Mauritania
- Mali
- Senegal
- Zambia

Gerlinde is the Technical Director of Kongiwe Environmental (Pty) Ltd. with 18years' work experience, predominantly in the mining industry. Her practical experience in the mining and construction industry has given her a depth of knowledge regarding project processes from pre-feasibility phases through to implementation. She is adept at working in different contexts, and problem-solving with her team to meet the required outcomes. She has a M.Sc. Environmental Management from the former RAU (now UJ) (2004). She is also a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and a Natural Scientist with the South African Council for Natural Science Professionals (SACNASP).

Her skills include:

- ❖ Project Management;
- ❖ Environmental Authorisations;
- ❖ Environmental Auditing;
- ❖ Environmental Control Officer; and
- ❖ Gap analyses and Due Diligences.

**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2019/1589

Herewith certifies that

GERLINDE WILREKER

is registered as an

Environmental Assessment Practitioner

**Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).**

Effective: 01 March 2025

Expires: 31 March 2026

Chairperson

Registrar





herewith certifies that
Gerlinde Isabelle Wilreker
Registration Number: 400261/09
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)
Environmental Science (Professional Natural Scientist)

Effective **11 November 2009**

Expires **31 March 2026**



A handwritten signature in black ink, appearing to read 'S. Neph'.

Chairperson

A handwritten signature in black ink, appearing to read 'N. M. M. M.'.

Chief Executive Officer



Curriculum Vitae – Bradly Thornton



Chief Executive Officer

Qualifications

- Management Development Program, University of Stellenbosch Business School Executive Development, 2012
- B.Sc. Hons Environmental Management, RAU, 2004
- B.Sc. Geography & Geology, RAU, 2003

Languages

- English – Fluent
- Afrikaans – Average

Countries Worked in

- South Africa
- Botswana
- Namibia
- Malawi
- Ghana
- Mozambique
- Zimbabwe

Bradly has over 20 years' experience in environmental advisory and geospatial sciences. His purpose includes leading or being part of positive and progressive teams which provide relevant and applicable environmental solutions; ultimately contributing to the balance between development, preservation of the planet's natural resources and social progress. His role includes the executive management responsibilities of Kongiwe, project management of key client projects, client and business development, marketing, quality assurance and corporate compliance. He has significant experience in conducting EIA's and advisory projects on large scale mining, energy and industrial projects as well as due diligence and environmental liability assessments for listed companies.

His skills include:

- ❖ Proven track record in project management of environmental projects to required quality standards, timeframes and budgets.
- ❖ Executive experience in business management and business development.
- ❖ Exceptional client relationship and managerial skills.
- ❖ Proactive leader and team player, flexible and versatile.
- ❖ 20 Years work experience in Environmental Management and Geographic Information Systems (GIS).

Professional Engineer

Professional Registration

- Engineering Council of South Africa, Pr Eng 740604
- South African Council for the Project and Construction Management Professions, PrCPM D/202/2004

Qualifications

- B Sc Eng

Languages

- English – Fluent
- Afrikaans - Fluent

Countries Worked in

- South Africa
-

Hilton Sparks has a B Sc Eng degree from University of Natal, and a Diploma in Business Management. He is a registered Professional Engineer with the Engineering Council of South Africa and a registered Construction Project Manager with the South African Council for Project and Construction Managers, and has a NQF 7 qualification in labour based construction.

He has 54 years of experience in the built environment. He worked for 10 years at a Parastatal Water Utility, where he was involved in the design and construction of major water treatment works (600 MI/d) and reservoirs, the project management of a 800 MI/d water treatment works, and the design and construction of water pumping and gravity mains varying in size from 450 mm diameter to 3500 mm diameter. He then worked in the consultancy field where his work spanned across the different sectors of the civil engineering industry, i.e. planning, urban and rural community water and sanitation supply, housing developments and township services, and the project management of built environment projects utilising the PMBOK principles.

Environmental Consultant

Professional Registration

- South African Council for Natural Science Professionals (SACNASP) – 2024

Qualifications

- BSc (Hons): Geography and Environmental Science, University of Pretoria , 2017
- BSc: Geography, University of Pretoria , 2016

Languages

- English – Fluent
- IsiZulu – Fluent

Countries Worked in

- South Africa
- Zimbabwe

Phumla is a dedicated Environmental Consultant and holds a BSc (Hons) in Environmental Science and Geography from the University of Pretoria. Her professional experience in mining and construction projects has equipped her with invaluable insights into project processes, spanning from the pre-feasibility phase to implementation and execution. Her versatility shines as she adeptly navigates various contexts and tasks, ensuring optimal outcomes to meet client needs. Her responsibilities include environmental impact reporting and authorisations, water use licencing, environmental compliance and auditing, project management, authority liaison and stakeholder engagement. Driven by a passion for environmental stewardship, Phumla is committed to delivering excellence in every project she undertakes.

Her skills include:

- ❖ Environmental impact reporting and authorisation;
- ❖ Report writing;
- ❖ Stakeholder engagement;
- ❖ Water Use Licencing;
- ❖ Environmental Compliance Auditing; and
- ❖ GIS.

Stakeholder Engagement Consultant

Professional Registration

- International Association for Public Participation Practitioners, Southern Africa (IAP2- Southern Africa)

Qualifications

- Matriculated in 1988
- Completed the International Association of Public Participation IAP2 course (all 3 modules) for Public Participation Practitioners

Languages

- English – Fluent
- Afrikaans – Fluent

Countries Worked in

- South Africa
- Democratic Republic of Congo
- Nigeria
- Botswana
- Swaziland

Vanessa Viljoen has over 25 years' experience in process management/project co-ordination of Public Participation Projects / Stakeholder Engagement Processes. Her expertise involves the design, planning and the execution of the public participation processes for Environmental Impact Assessment projects and other applications. As a Stakeholder Engagement Consultant, some of her duties include identifying and consulting with Interested and Affected Parties, liaising with government departments, and compilation and dissemination of project information to stakeholders to obtain their comments. Development and management of stakeholder databases through networking and referral is also a key focus area. Her duties also include co-ordination of logistics for group meetings such as public meetings, focus group meetings, landowner meetings, open days, multi-stakeholder workshops and other events, including meetings in remote rural areas. She has worked both locally in South Africa and internationally in the Democratic Republic of Congo, Nigeria, Zimbabwe, Botswana and Swaziland.

Her skills include:

- ❖ Stakeholder engagement;
- ❖ Project/logistical co-ordination;
- ❖ Database development;
- ❖ Facilitation of landowner activities.

Stakeholder Engagement Consultant

Professional Registration

- International Association for Public Participation Practitioners, Southern Africa (IAP2- Southern Africa)

Qualifications

- Postgraduate Diploma (2010) Media Practices (Boston Media House)
- Certificate in Project Management (2023) University of Pretoria
- Creative Writing and Editing for Corporate Publications (2018 Institute for the Advancement of Journalism)

Languages

- English
- IsiZulu
- Sesotho
- Sepedi
- Setswane
- Venda

Countries Worked in

- South Africa

Thuli Phakathi has 8 years of experience as a stakeholder engagement specialist. This includes all aspects of ESIA engagement as well as managing the stakeholder engagement and grievance office of a large-scale South African mining operation. Thuli is a former Board member of the International Association for Public Participation Southern Africa (IAP2sa) (2019 – 2021) and is currently still active as a member of this organisation.

As a Stakeholder Engagement Consultant, her duties include identifying and consulting with Interested and Affected Parties, liaising with government departments, and dissemination of project information to stakeholders to obtain their comments. Development and updating of stakeholder databases through networking and referral is also a key focus area. Her duties also include co-ordination of logistics for group meetings such as public meetings, focus group meetings, landowner meetings, open days, multi-stakeholder workshops and other events, including meetings in remote rural areas.

Her skills include:

- ❖ Community Relations
- ❖ Social Facilitation
- ❖ Community Stakeholder engagements
- ❖ Asset Based Community Development (ABCD)
- ❖ Project/logistical co-ordination
- ❖ Database development
- ❖ Facilitation of landowner activities

Curriculum Vitae – Zubher Omar



GIS Consultant

Qualifications

- BSocSc, Geography and Environmental Management, 2011

Languages

- English – Fluent
- IsiZulu – Fluent

Countries Worked in

- South Africa

Zubher is a highly skilled GIS Specialist with a decade's worth of extensive experience in the agricultural, town planning, and property sectors. He has a proven track record in leading and contributing to a wide range of GIS projects, including GIS implementation, map production, client relations, data analysis, database management, and user training. Zubher holds a degree in Geography & Environmental Management and is certified in ArcGIS Advanced software. Known for his excellent problem-solving skills, strong communication abilities, and dedication to fostering innovation within teams, Zubher excels in creating efficient and effective GIS solutions that meet client needs. He has led multiple high-impact GIS projects, delivering precise and insightful spatial data solutions, and is recognized for his ability to bridge the gap between interpreting client needs and technical requirements, ensuring successful project outcomes. His expertise with ESRI products and in-depth knowledge of GIS technologies make him an asset in any project.

His software System skills include:

- ❖ ArcGIS /Pro
- ❖ ArcGIS Online
- ❖ MS Office Suite



Appendix B1:
A3 Maps



WITHOK RECOMMISIONING PROJECT LOCAL ORIENTATION

Legend

- Capital
- City
- Major Town
- Other Settlement
- National Road
- Main Road
- + + + Railway
- Streams
- Withok TSF Boundary
- Local Municipality
- Ward Boundary
- Water Area



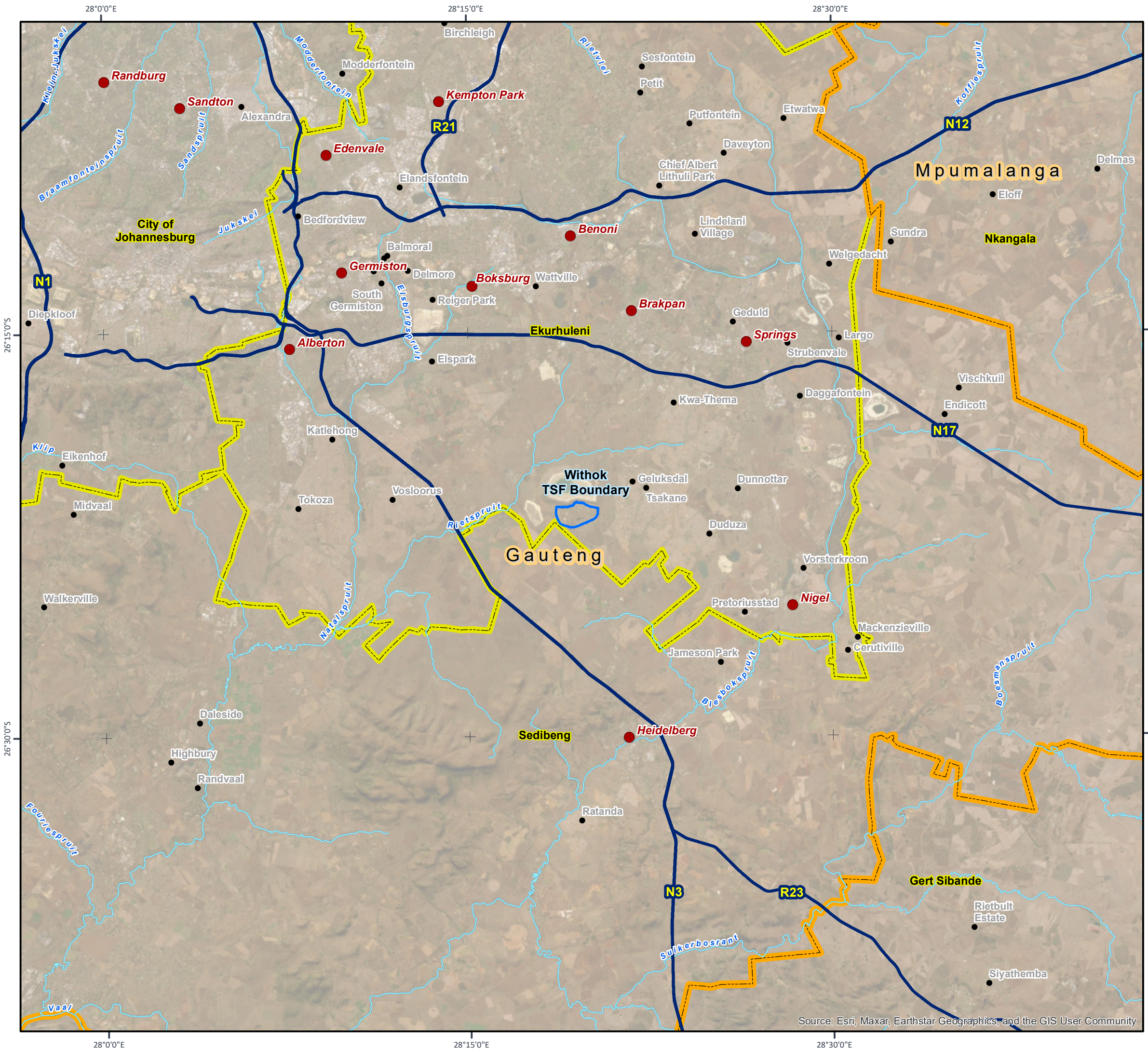
Project Code: DRDG#012 Client: Ergo Mining (Pty) Ltd Drawn: Z Omar Checked: B Thornton © 2024 Kongiwe Environmental (Pty) Ltd www.kongiwe.com	 1:75 000
---	---------------------

Coordinate System: WGS84 TM LO29 Projection: Transverse Mercator Datum: WGS 1984	(A3) 2024 Satellite Imagery
--	---------------------------------------

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF: Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General \Map Set 1\Withok Local Orientation Landscape A3.mxd	DATE: 13 August 2024
---	--------------------------------

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



**WITHOK
RECOMMISIONING PROJECT
REGIONAL ORIENTATION**

Legend

- Major Town
- Other Settlement
- National Road
- Streams
- Withok TSF Boundary
- Provincial Boundaries
- District Municipalities



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Z Omar | Checked: B Thornton
 © 2024 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com



Coordinate System: WGS84 TM LO29
 Projection: Transverse Mercator
 Datum: WGS 1984

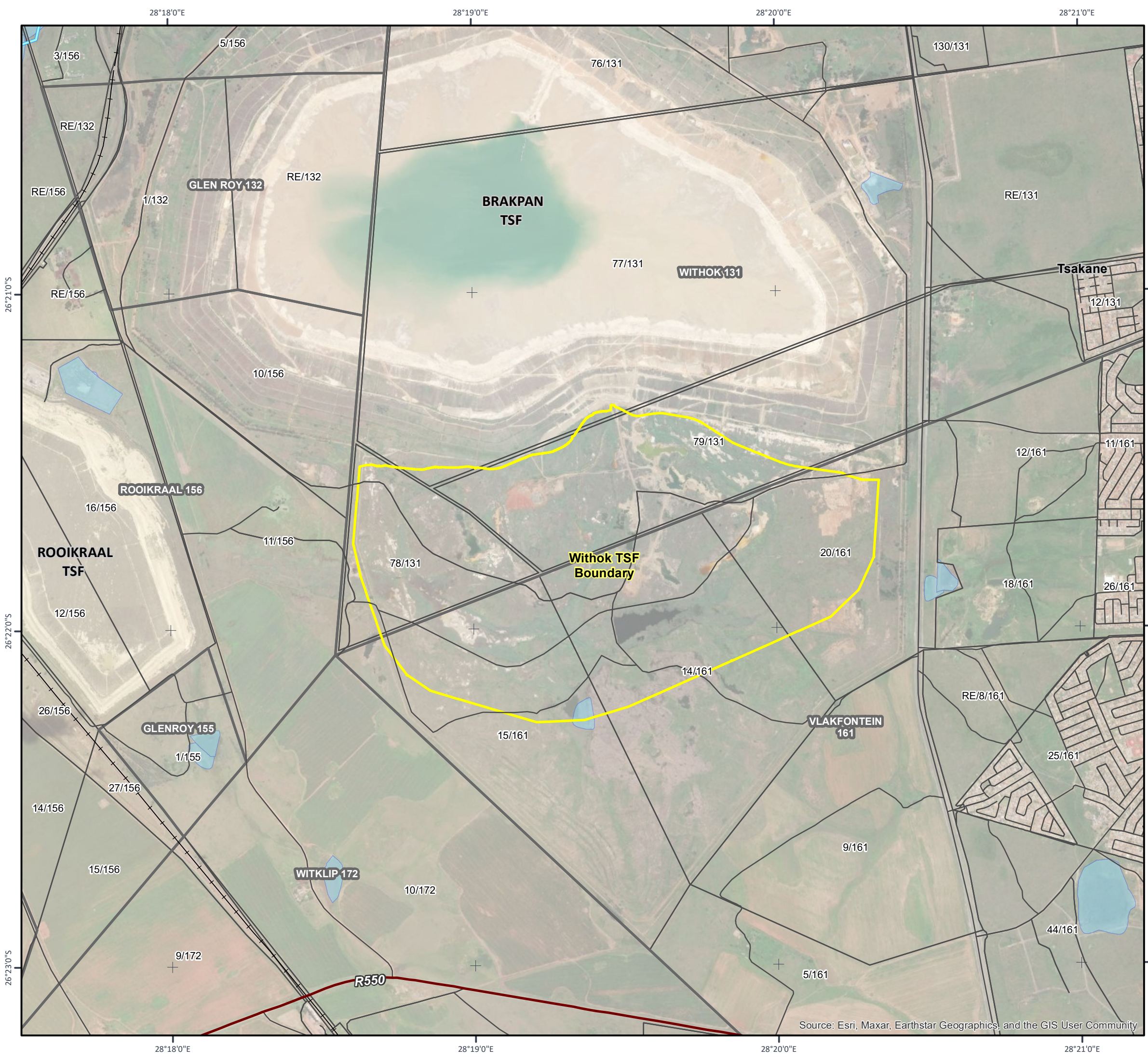
(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General
 \Map Set 1\Withok Regional Orientation Landscape A3.mxd

DATE:
 13 August 2024

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



WITHOK RECOMMISIONING PROJECT SITE ORIENTATION

Legend

- National Road
- Main Road
- Minor Road
- Railway
- Streams
- Withok TSF Boundary
- Parent Farm
- Farm Portion
- Water Area



Project Code: DRDG#012 Client: Ergo Mining (Pty) Ltd Drawn: Z Omar Checked: B Thornton © 2024 Kongiwe Environmental (Pty) Ltd www.kongiwe.com	 1:20 000
Coordinate System: WGS84 TM LO29 Projection: Transverse Mercator Datum: WGS 1984	(A3) 2024 Satellite Imagery

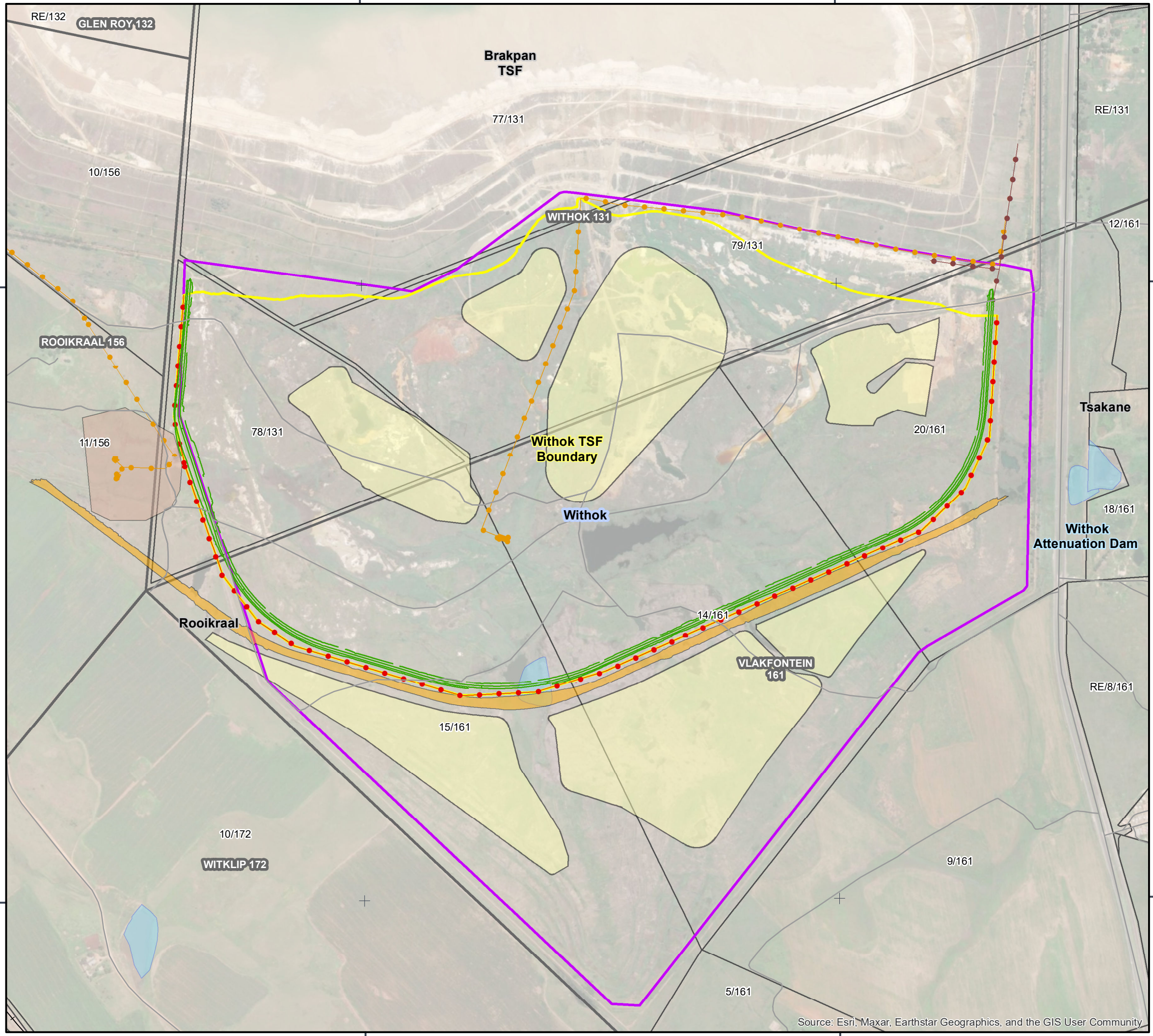
Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF: Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General \Map Set 1\Withok Site Orientation Landscape A3.mxd	DATE: 13 August 2024
--	--------------------------------

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'0"E

28°20'0"E



**WITHOK
RECOMMISSIONING PROJECT
SITE INFRASTRUCTURE**

Legend

- Minor Road
- Railway
- Collector Pipeline
- Decant Pipeline
- Incoming Slurry Pipeline
- Toe Embankment/Access Roads
- Farm Portion
- Parent Farm
- Withok Project Boundary
- Withok TSF Boundary
- Return Water Dam
- Storm Water Diversion
- Water Area
- Borrow Pit Areas



Project Code: DRDG#012 Client: Ergo Mining (Pty) Ltd Drawn: C Strooh Checked: Z Omar © 2024 Kongiwe Environmental (Pty) Ltd www.kongiwe.com	 1:13 000
Coordinate System: WGS84 TM LO29 Projection: Transverse Mercator Datum: WGS 1984	(A3) 2024 Satellite Imagery

Disclaimer
The information represented in this plan is for general information purposes only and is subject to change.

FILE REF: Z:\GIS\Projects\DRDG\012 Withok\Projects\General \Map Set 1\Withok Site Infrastructure Landscape v2 A3.mxd	DATE: 05 November 2024
---	----------------------------------

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'0"E

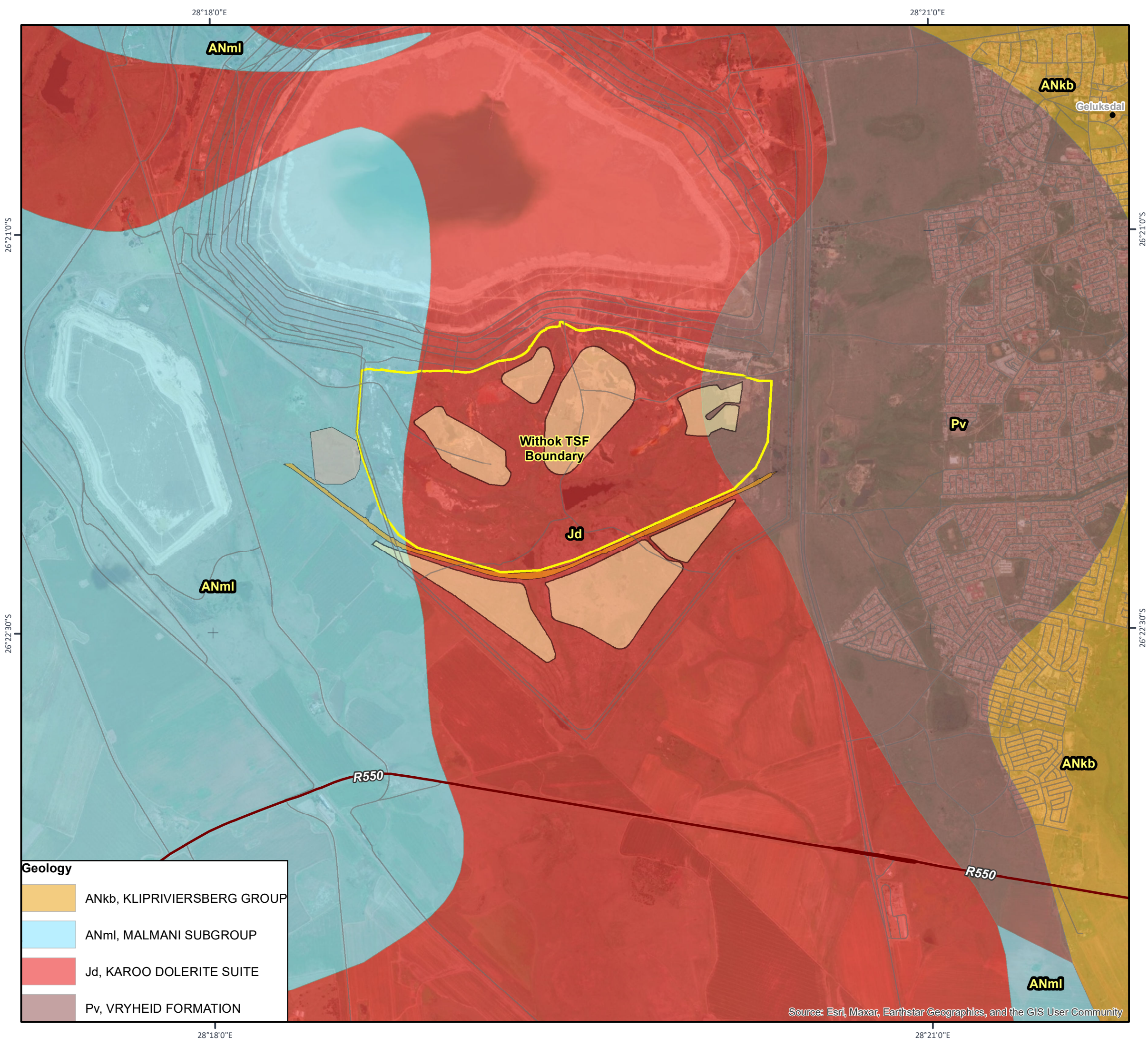
28°20'0"E

26°21'30"S

26°21'30"S

26°22'40"S

26°22'40"S



Geology

	ANkb, KLIPRIVIERSBERG GROUP
	ANml, MALMANI SUBGROUP
	Jd, KAROO DOLERITE SUITE
	Pv, VRYHEID FORMATION



**WITHOK
GEOLOGY**

Legend

- Other Settlement
- Main Road
- Local Roads
- Withok TSF Boundary
- Return Water Dam
- Storm Water Diversion
- Borrow Pit Areas



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Z Omar | Checked: B Thornton
 © 2024 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com



1:25 000

Coordinate System: WGS84 TM L029
 Projection: Transverse Mercator
 Datum: WGS 1984

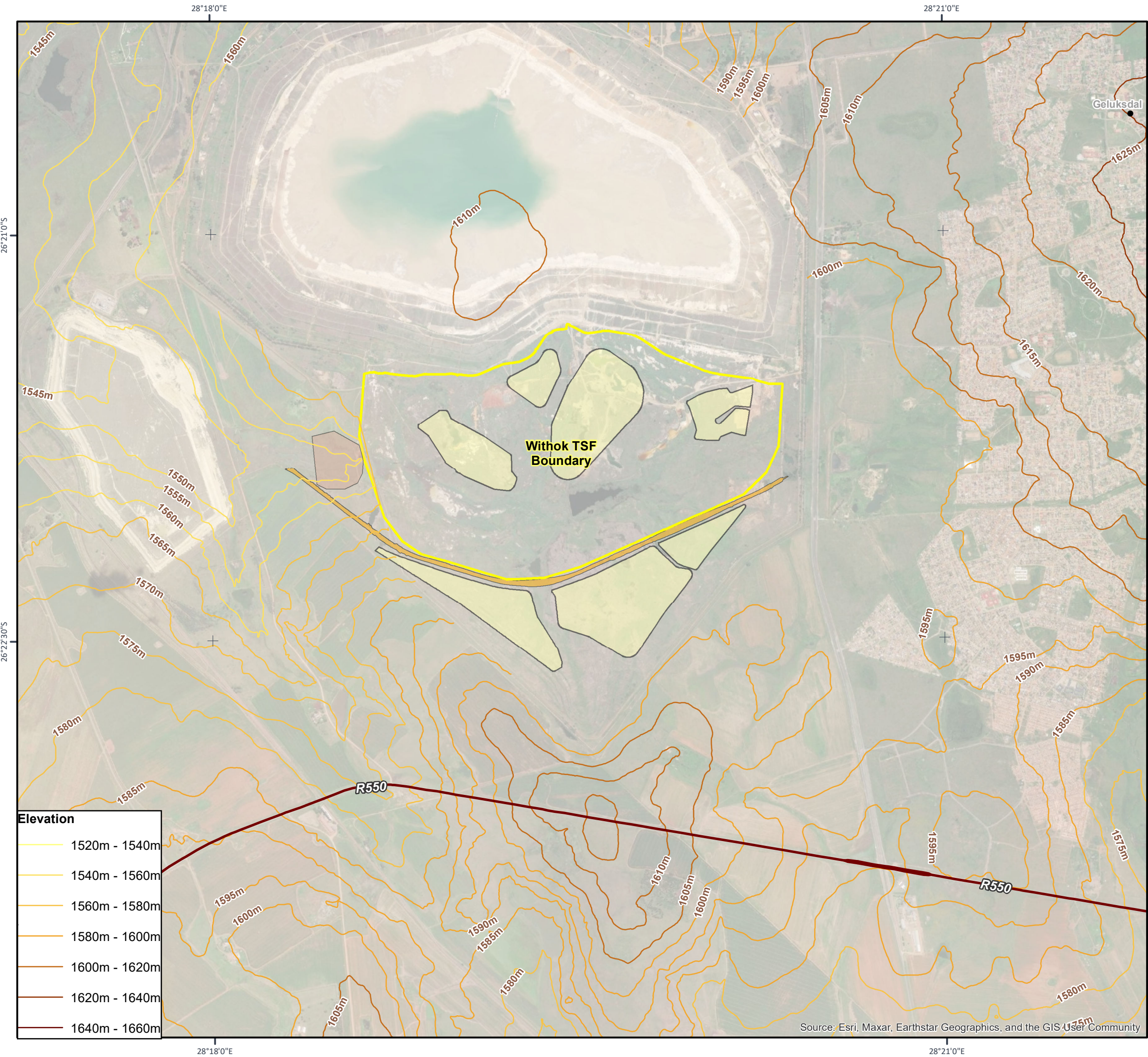
(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Map Set 2\Withok Geology Landscape A3.mxd

DATE:
 09 October 2024

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



WITHOK TOPOGRAPHY

Legend

- Other Settlement
- Main Road
- National Road
- Withok TSF Boundary
- Return Water Dam
- Storm Water Diversion
- Borrow Pit Areas



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Z Omar | Checked: B Thornton
 © 2024 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com



Coordinate System: WGS84 TM L029
 Projection: Transverse Mercator
 Datum: WGS 1984

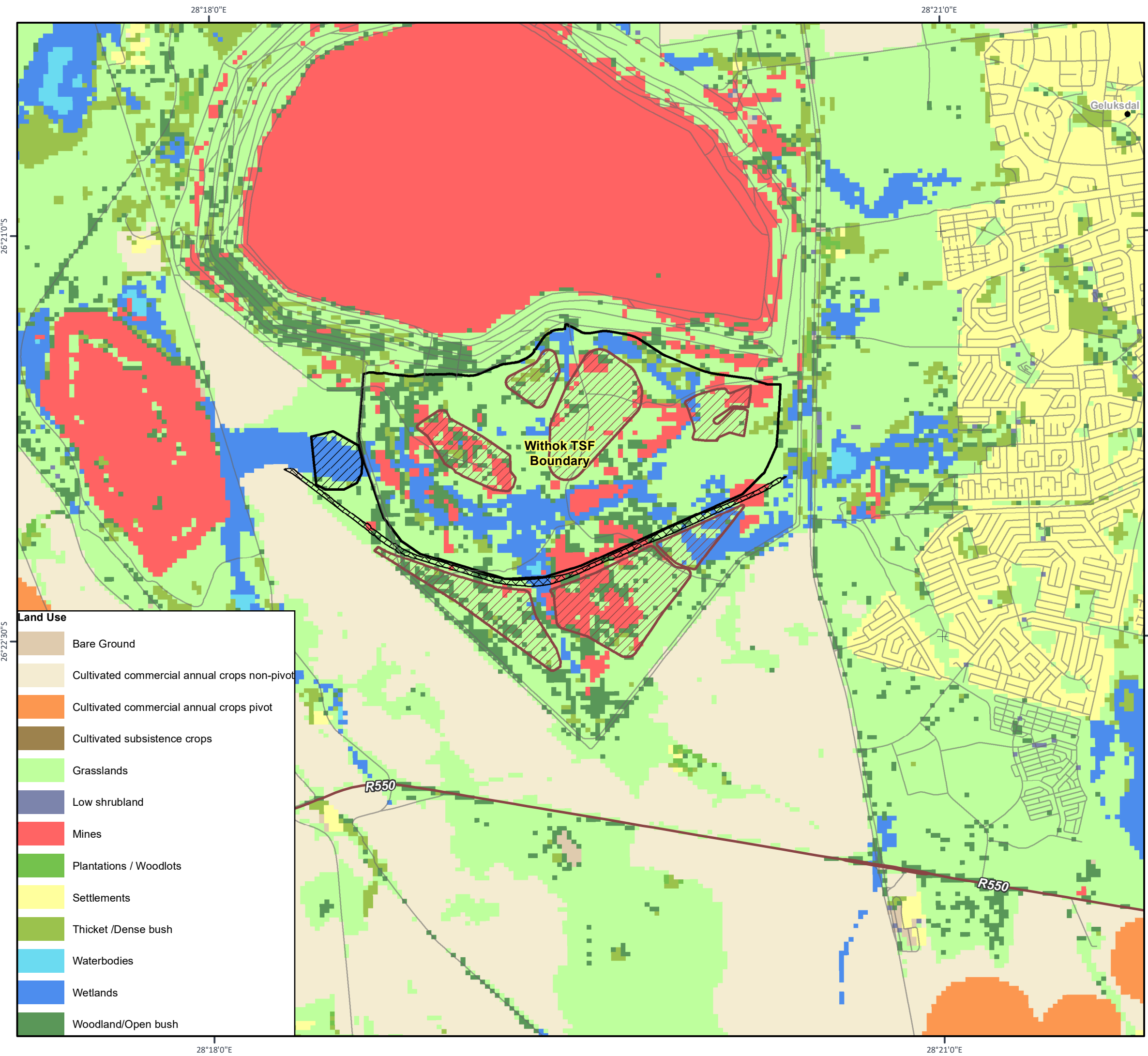
(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects
 \General\Map Set 2\Withok Topography Landscape
 A3.mxd

DATE:
 09 October 2024

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Land Use

[Light Brown]	Bare Ground
[Light Tan]	Cultivated commercial annual crops non-pivot
[Orange]	Cultivated commercial annual crops pivot
[Dark Brown]	Cultivated subsistence crops
[Light Green]	Grasslands
[Dark Blue]	Low shrubland
[Red]	Mines
[Dark Green]	Plantations / Woodlots
[Yellow]	Settlements
[Olive Green]	Thicket /Dense bush
[Light Blue]	Waterbodies
[Blue]	Wetlands
[Dark Green]	Woodland/Open bush



**WITHOK
LAND USE**

Legend

- Other Settlement
- Main Road
- Local Roads
- Withok TSF Boundary
- ▨ Return Water Dam
- ▩ Storm Water Diversion
- ▧ Borrow Pit Areas



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Z Omar | Checked: B Thornton
 © 2024 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com



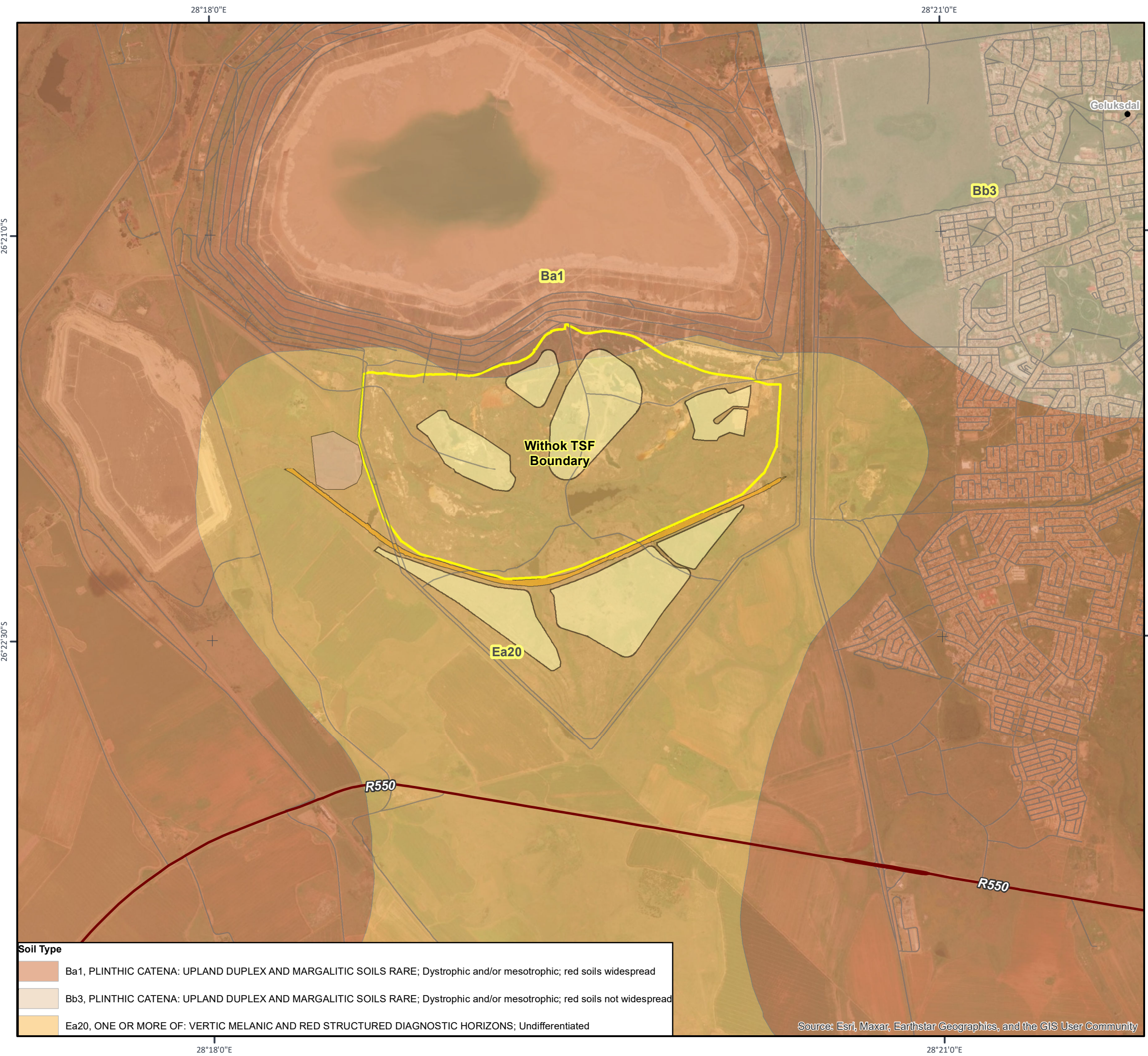
Coordinate System: WGS84 TM L029
 Projection: Transverse Mercator
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Map Set 2\Withok Land Use Landscape A3.mxd

DATE:
 09 October 2024



WITHOK SOIL CLASSIFICATION

Legend

- Other Settlement
- Main Road
- Local Roads
- Withok TSF Boundary
- Return Water Dam
- Storm Water Diversion
- Borrow Pit Areas



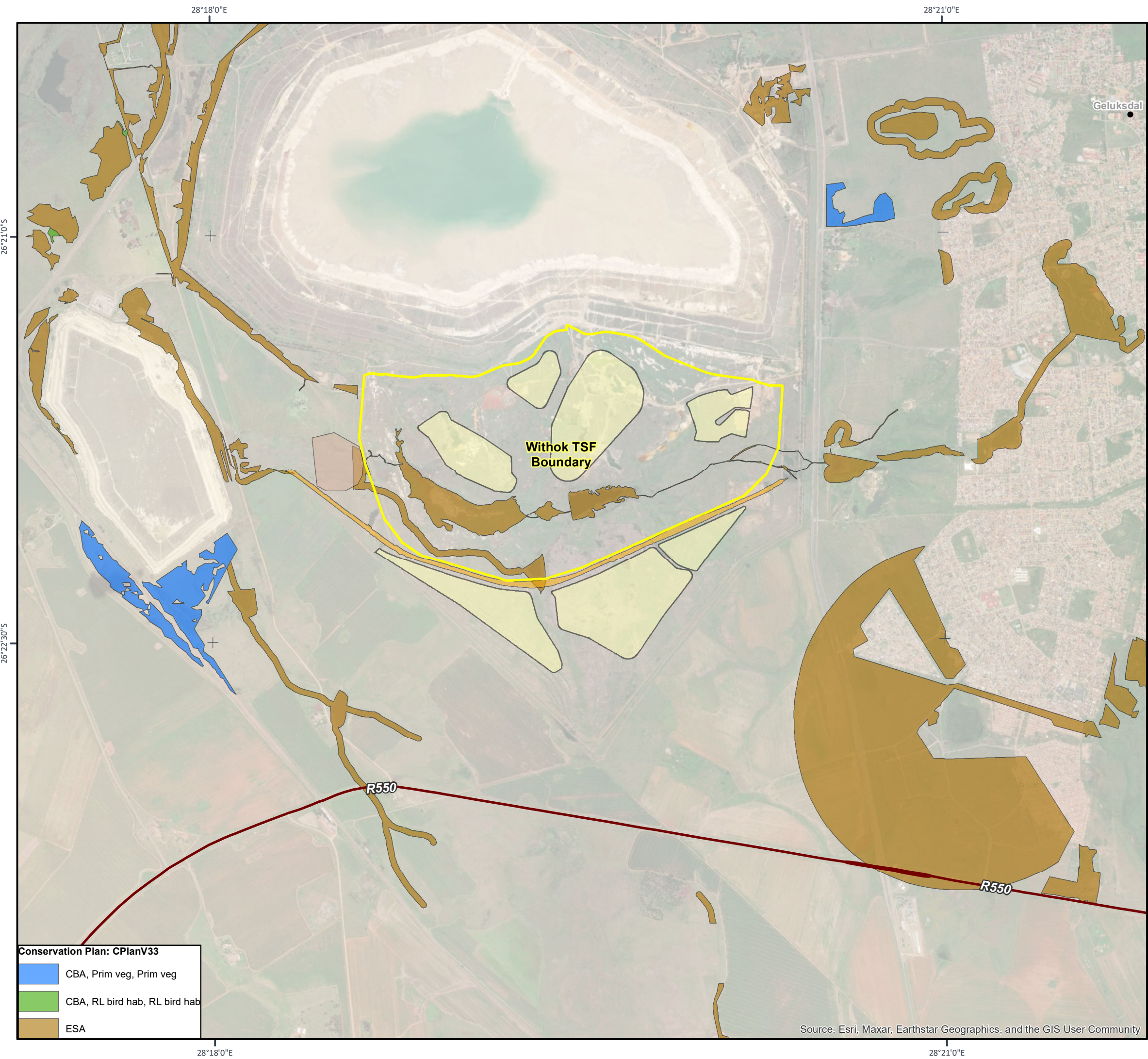
Project Code: DRDG#012 Client: Ergo Mining (Pty) Ltd Drawn: Z Omar Checked: B Thornton © 2024 Kongiwe Environmental (Pty) Ltd www.kongiwe.com	 1:25 000
Coordinate System: WGS84 TM L029 Projection: Transverse Mercator Datum: WGS 1984	(A3) 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF: Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\ Map Set 2\Withok Soil Classification Landscape A3.mxd	DATE: 09 October 2024
---	---------------------------------

Soil Type	
	Ba1, PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
	Bb3, PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils not widespread
	Ea20, ONE OR MORE OF: VERTIC MELANIC AND RED STRUCTURED DIAGNOSTIC HORIZONS; Undifferentiated

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Conservation Plan: CPlanV33

- CBA, Prim veg, Prim veg
- CBA, RL bird hab, RL bird hab
- ESA

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



WITHOK CONSERVATION PLAN

Legend

- Other Settlement
- Main Road
- Withok TSF Boundary
- Return Water Dam
- Storm Water Diversion
- Borrow Pit Areas



Project Code: DRDG#012 Client: Ergo Mining (Pty) Ltd Drawn: Z Omar Checked: B Thornton © 2024 Kongiwe Environmental (Pty) Ltd www.kongiwe.com	 1:25 000
--	---------------------

Coordinate System: WGS84 TM L029 Projection: Transverse Mercator Datum: WGS 1984	(A3) 2024 Satellite Imagery
--	---------------------------------------

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF: Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\ Map Set 2\Withok Conservation Plan Landscape A3.mxd	DATE: 09 October 2024
---	---------------------------------

28°19'0"E

28°20'0"E

26°21'45"S

26°21'45"S

26°22'30"S

26°22'30"S






28°19'0"E

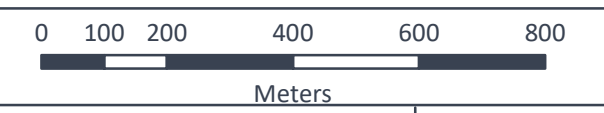
28°20'0"E



WITHOK HABITATS WITHIN THE PAOI

Legend

-  PAOI
- Habitat**
-  Artificial Water Resource
-  Degraded Grassland
-  Modified Grassland
-  Water Resource



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Withok Habitats Within the PAOI A3.mxd



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'0"E

28°20'0"E

26°21'45"S

26°21'45"S

26°22'30"S

26°22'30"S

28°19'0"E

28°20'0"E



WITHOK ECOLOGICAL IMPORTANCE

Legend



PAOI

Sensitivity



Low



Moderate



Project Code: DRDG#012
Client: Ergo Mining (Pty) Ltd
Drawn: Checked: Z Omar
© 2025 Kongiwe Environmental (Pty) Ltd
www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
Datum: WGS 1984

(A3)
2024 Satellite Imagery

Disclaimer
The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\
Specialist Report Maps\Withok PAOI Site Ecological
Importance A3.mxd



28°19'30"E

28°21'0"E

26°21'0"S

26°21'0"S

26°22'0"S

26°22'0"S

26°23'0"S

26°23'0"S

28°19'30"E

28°21'0"E



WITHOK WETLAND DELINEATION

Legend

- PAOI
- PAOI 500m Buffer
- Brakpan TSF
- Wetland Delineation**
- Artificial Depression (Excavation & Landscaping)
- Artificial Seep
- Dam
- HGM 1 - Unchannelled Valley-Bottom
- HGM 2 - Seep
- HGM 3 - Seep
- Stormwater Drain



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.



FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Withok Withok Wetland Delineation A3.mxd

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°18'40"E

28°20'0"E

26°21'0"S

26°21'0"S

26°22'30"S

26°22'30"S





28°18'40"E

28°20'0"E







WITHOK WETLAND ECOLOGICAL STATE CLASSES

Legend

-  PAOI
-  PAOI 500m Buffer
-  Brakpan TSF
-  Dam

Ecological State Classes

-  C - Moderately Modified
-  D - Largely Modified
-  E - Seriously Modified
-  N/A

0 100 200 400 600 800 1 000 1 200 1 400

Meters

Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



1:18 000

Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Wetland Ecological State Classes A3



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'30"E

28°21'0"E

26°21'0"S

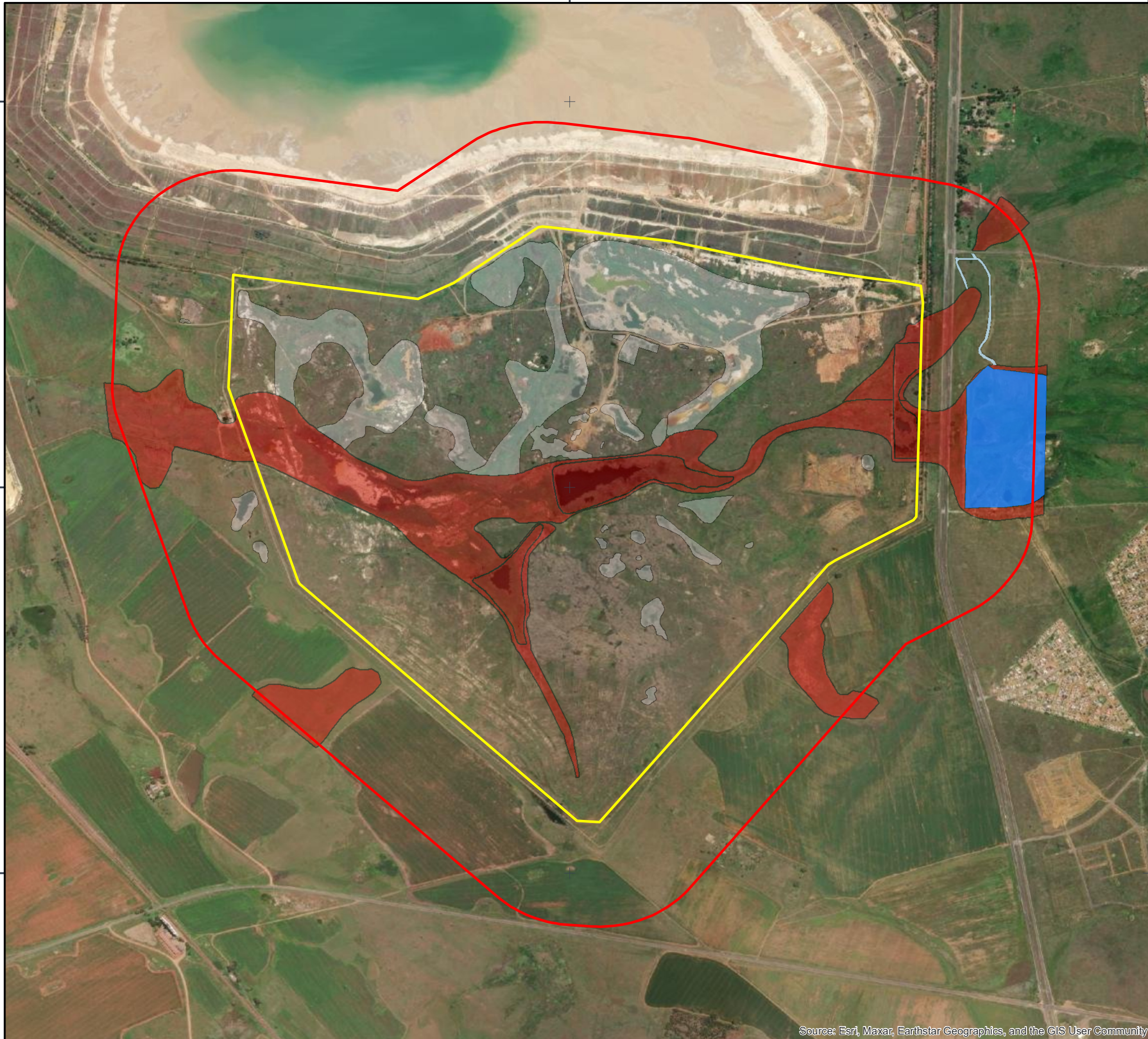
26°21'0"S

26°22'0"S

26°22'0"S

26°23'0"S

26°23'0"S



WITHOK
WETLAND RISK STATUS

Legend

- PAOI
 - PAOI 500m Buffer
 - Dam
 - Stormwater Drain
- Risk Status**
- At Risk
 - N/A



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

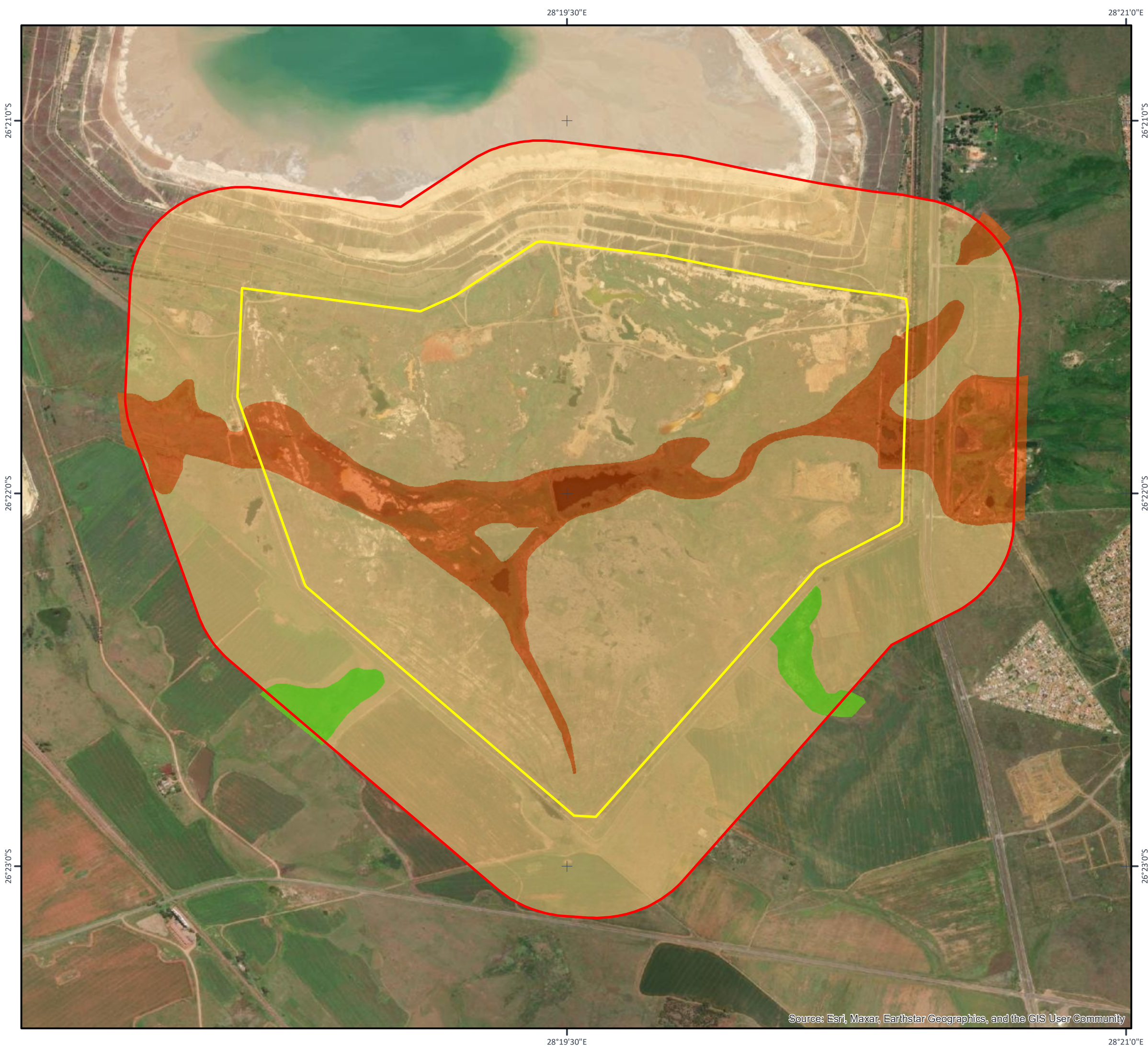


FILE REF:
 Z:\GIS\Projects\DRDG\012 Withok\Projects\General\Specialist Report Maps\Withok Wetland Risk Status A3.mxd

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'30"E

28°21'0"E



**WITHOK
WETLAND
SENSITIVITY CLASSIFICATION**

Legend

- PAOI
 - PAOI 500m Buffer
- Sensitivity**
- Low
 - Low (Wetland)
 - Moderate



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Withok Withok Wetland Delineation A3.mxd



28°18'0"E

28°21'0"E

26°21'0"S

26°21'0"S

26°22'30"S

26°22'30"S

28°18'0"E

28°21'0"E



WITHOK NOISE-SENSITIVE RECEPTORS

Legend

- Potential Noise-Sensitive Receptors
- Local Roads
- Main Road
- Withok Project Focus Area
- Buffer - Low Noise Impact
- Buffer - High Noise Impact
- Withok TSF Location
- Potential Borrow Pits



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 05 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

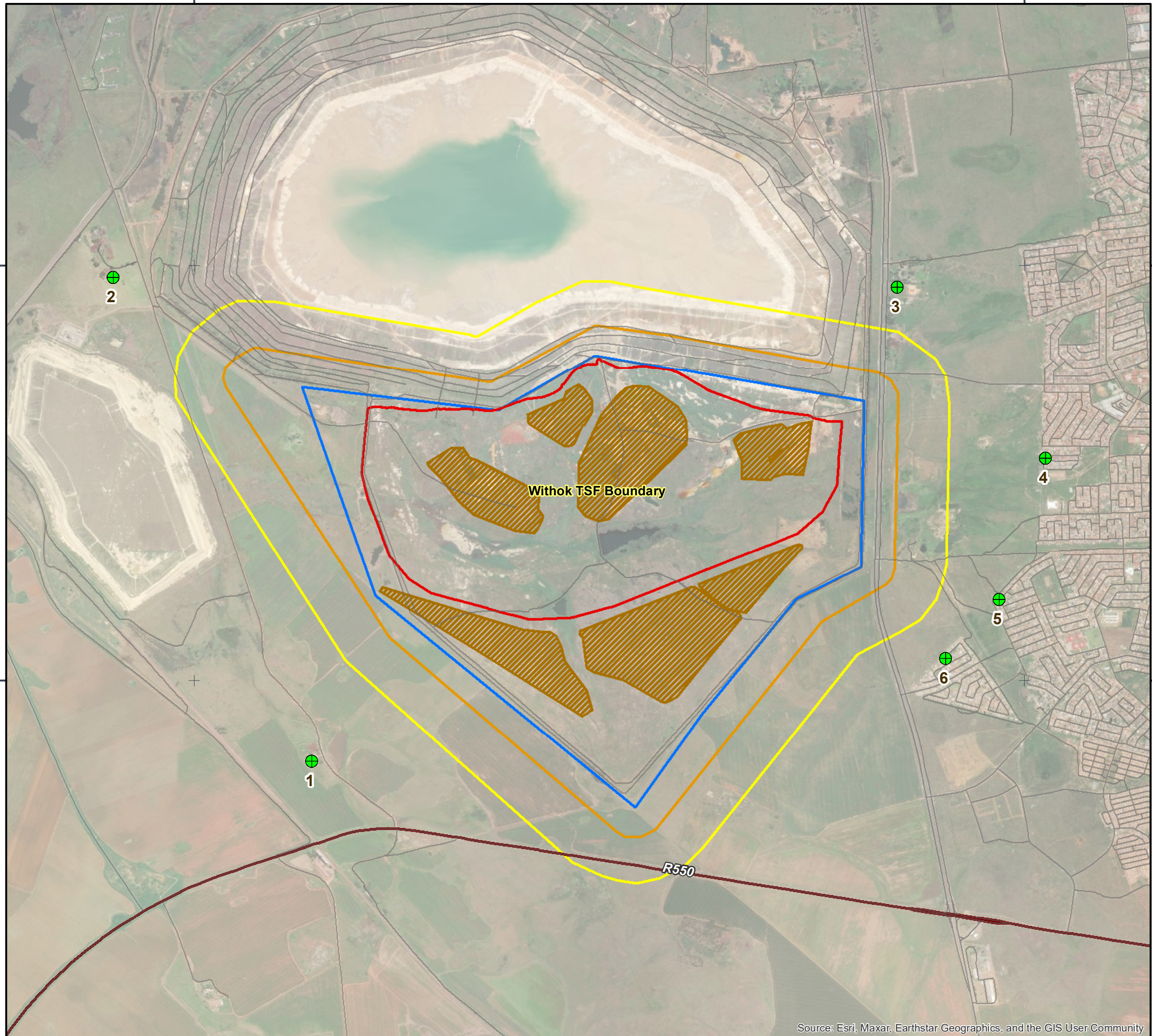
(A3)
 2024 Satellite Imagery

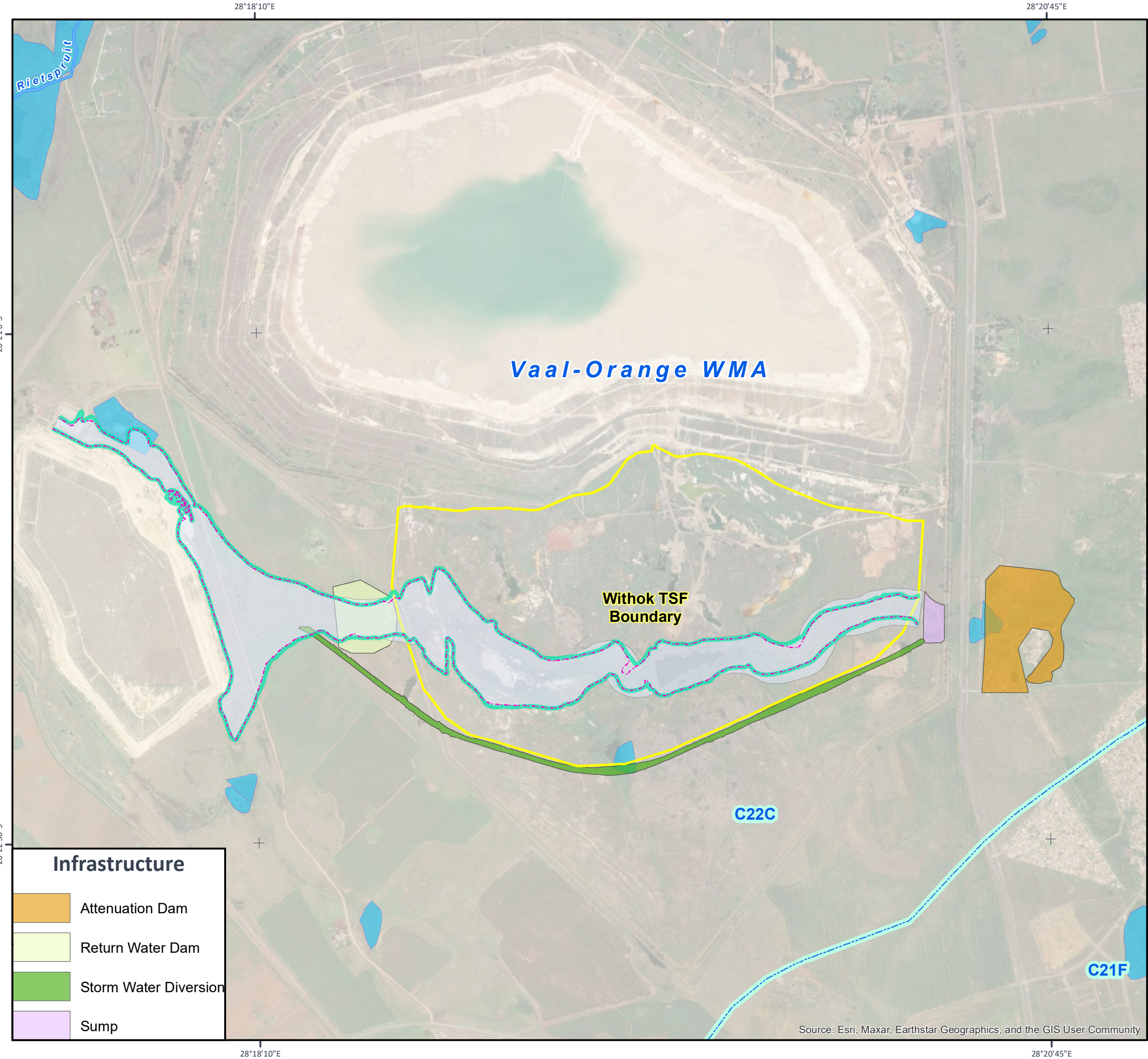
Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.



FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Withok Noise-Sensitive Receptors A3

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



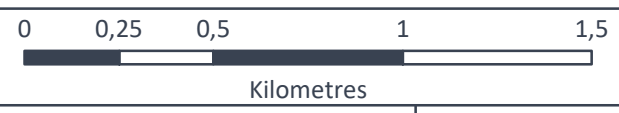


**WITHOK
SURFACE WATER**

Legend

- 50yr Floodlines
- 100yr Floodlines
- Rivers
- Without TSF Boundary
- Quaternary Catchments
- Water Areas
- Surface Water Buffer Zones

- Infrastructure**
- Attenuation Dam
 - Return Water Dam
 - Storm Water Diversion
 - Sump



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: C Strooh | Checked: Z Omar
 © 2024 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com



1:20 000

Coordinate System: WGS84 TM LO29
 Projection: Transverse Mercator
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\
 Map Set 2\Withok Surface Water Landscape A3.mxd

DATE:
 23 January 2025

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°17'30"E

28°20'0"E

26°19'20"S

26°19'20"S

26°21'10"S

26°21'10"S

28°17'30"E

28°20'0"E



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



**WITHOK
RECOMMISSIONING PROJECT
SURFACE WATER
MONITORING POINTS**

Legend

- Proposed Monitoring Points
- Surface Water Monitoring Points
- Rivers
- Withok TSF Boundary
- Sump
- Attenuation Dam
- Return Water Dam
- Storm Water Diversion



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: C Strooh | Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 24 February 2025



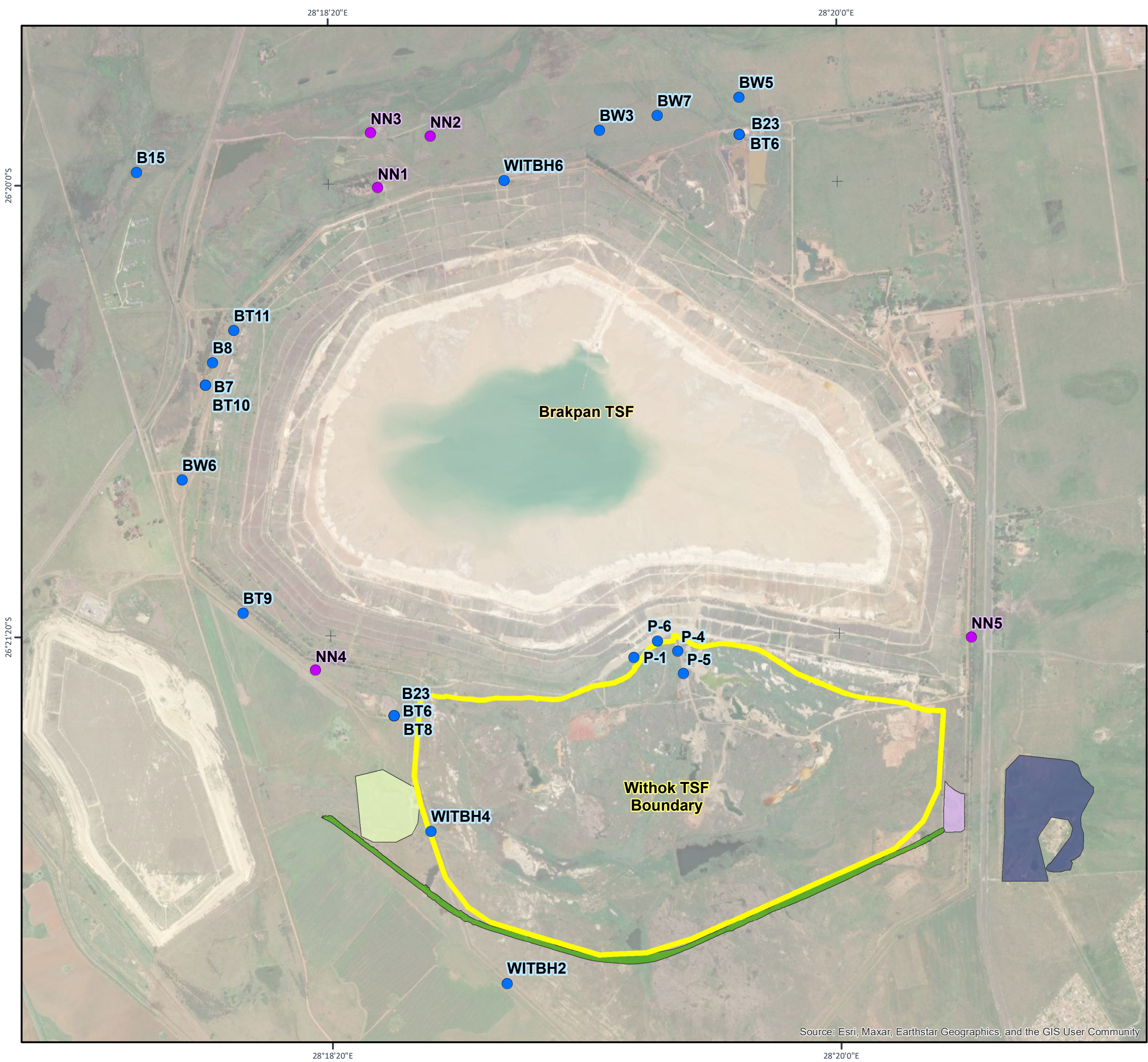
Coordinate System: WGS84 TM LO29
 Projection: Transverse Mercator
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDG\012 Withok\Projects\General\
 Specialist Report Maps\Monitoring points\
 Withok Surface Water Monitoring Points Landscape A3.mxd





WITHOK RECOMMISSIONING PROJECT GROUNDWATER BOREHOLES

Legend

- Proposed Groundwater Monitoring Boreholes
- Groundwater Monitoring Points
- Withok TSF Boundary
- Sump
- Attenuation Dam
- Return Water Dam
- Storm Water Diversion



Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: C Strooh | Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 24 February 2025



Coordinate System: WGS84 TM LO29
 Projection: Transverse Mercator
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDGOLD\012 Withok\Projects\General\Specialist Report Maps\Monitoring points\Withok Groundwater Monitoring Points Landscape A3.mxd



28°19'30"E

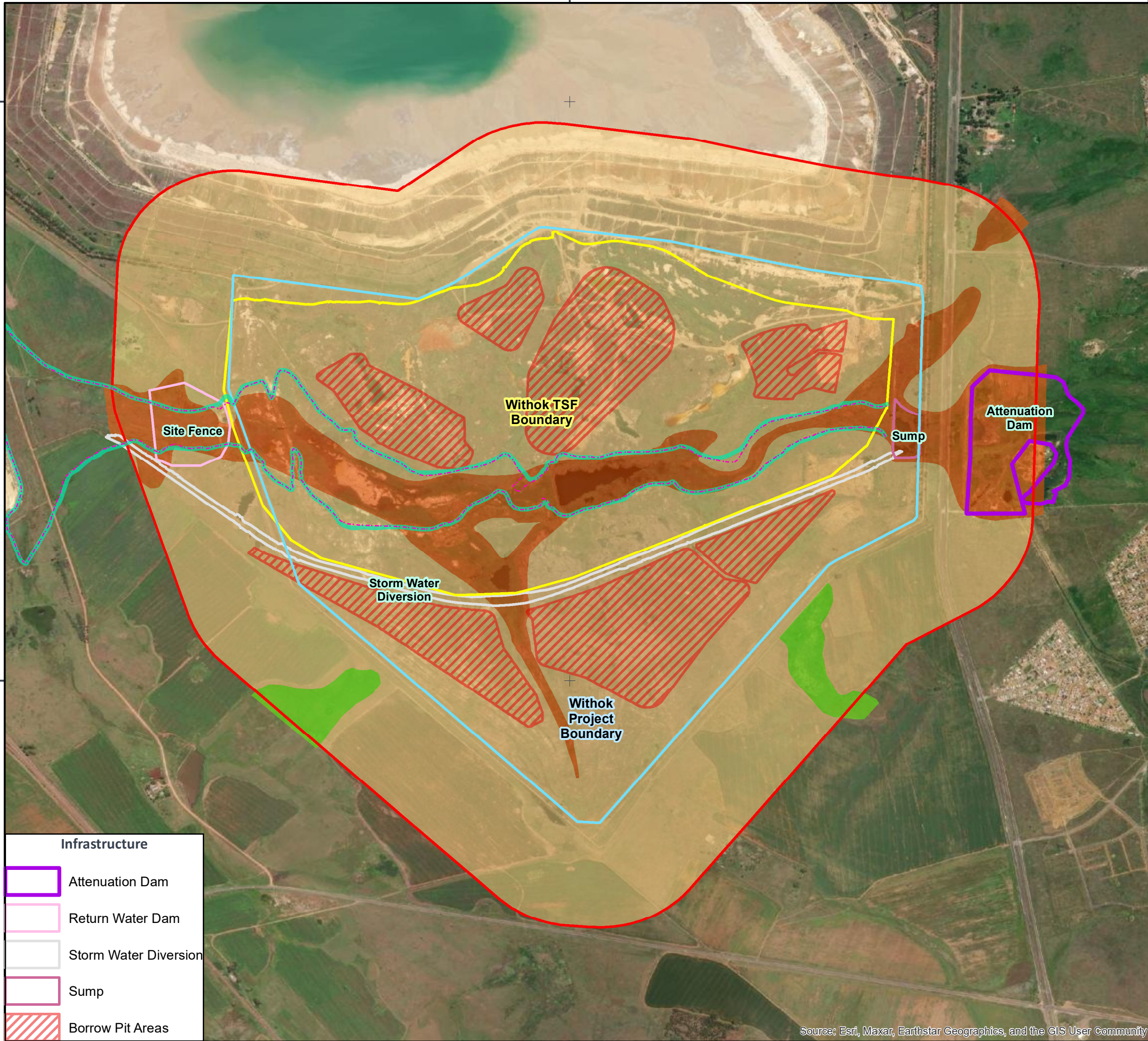
28°21'0"E

26°21'0"S

26°21'0"S

26°22'30"S

26°22'30"S



WITHOK
COMPOSITE MAP

Legend

- 50yr Floodlines
- 100yr Floodlines
- Withok Project Boundary
- PAOI 500m Buffer
- Withok TSF Boundary

Environmental Sensitivity

- Low
- Low (Wetland)
- Moderate



- Infrastructure**
- Attenuation Dam
 - Return Water Dam
 - Storm Water Diversion
 - Sump
 - Borrow Pit Areas

Project Code: DRDG#012
 Client: Ergo Mining (Pty) Ltd
 Drawn: Checked: Z Omar
 © 2025 Kongiwe Environmental (Pty) Ltd
 www.kongiwe.com | Date: 24 February 2025



Coordinate System: GCS WGS 1984
 Datum: WGS 1984

(A3)
 2024 Satellite Imagery

Disclaimer
 The information represented in this plan is for general information purposes only and is subject to change.

FILE REF:
 Z:\GIS\Projects\DRDG\012 Withok\Projects\General\Withok Composite Map A3.mxd



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

28°19'30"E

28°21'0"E



Appendix B2
Site Photographs



Unchanneled Valley Bottom Wetland on Eastern edge of the project area



Cladding stockpiles for the Brakpan TSF



Dam



Artificial seep



South side of the adjacent BrakpanTSF



Vegetation established on site