# THE RECLAMATION OF THE MARIEVALE TAILINGS STORAGE FACILITIES IN EKURHULENI, GAUTENG PROVINCE.

## FINAL SCOPING REPORT

**DME Reference Number: GP 30/5/1/1/2 (000007BP) BAR**

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

# FINAL SCOPING REPORT

## FOR LISTED ACTIVITIES ASSOCIATED WITH THE RECLAMATION AND REPROCESSING OF THE MARIEVALE TAILINGS STORAGE FACILITIES SITUATED ON PORTION 0 (RE) OF VOGELSTRUISBULT 127 IR, AND PORTION 0 (RE) OF VLAKFONTEIN 281 IR, IN EKURHULENI, GAUTENG PROVINCE.

### APPLICATION FOR ENVIRONMENTAL AUTHORISATION (EA):

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT MAY BE TRIGGERED.

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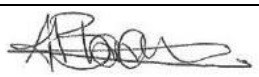
**Document prepared by**: Kongiwe Environmental (Pty) Ltd

**Document Date:** 28 November 2019

# Final Scoping Report Information

| PROJECT: | THE RECLAMATION OF THE MARIEVALE TSFs |
|---|---|
| **Report Title:** | The Reclamation of the Marievale Tailings Storage Facilities in Ekurhuleni, Gauteng Province |
| **Client:** | Ergo Mining (Pty) Ltd |
| **Project No:** | DRDG#005 |
| **Compilation Date:** | 28 November 2019 |
| **Status of Report:** | **Final Scoping Report** |

| VERIFICATION | CAPACITY | NAME | SIGNATURE | DATE |
|---|---|---|---|---|
| **By Author** | EAP | Siphesihle Dambuza |  | 28 November 2019 |
| **Reviewed by:** | Legal Director | Michael Hennessy |  | 28 November 2019 |
| **Reviewed by:** | Project Manager | Ashleigh Blackwell |  | 28 November 2019 |
| **Reviewed by:** | Technical Director (*Pr.Sci.Nat)* | Gerlinde Wilreker |  | 28 November 2019 |
| **Authorised by** | Chief Executive Officer | Bradly Thornton |  | 28 November 2019 |

# SECTION 1:

# SCOPING REPORT OVERVIEW

## Important Notice

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 Scoping Process

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

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

## Public Review Period for the Draft Scoping Report

The Draft Scoping Report (DSR) was made available to stakeholders on the Kongiwe Environmental website and in public places for a 30-day comment period from **23 October 2019 to 21 November 2019.** Notification of the availability of the documentation for review was distributed on the 16 October 2019. The report was made available at the following locations:

| Location | Physical Address | Contact person |
|---|---|---|
| **Hard copies** | | |
| Dunnottar Public Library | 47 Rhodes Avenue, Dunnottar | Mr. Shelton Mmisi<br><br>(011) 999 9118 |
| Kwa-Thema Public Library | 7019 Nkosi Street, Kwa-Themba, Springs | Ms. Portia Mosetlhe<br><br>(011) 999 8494 |
| **Electronic copies** | | |
| Kongiwe Environmental website | www.kongiwe.co.za/ public documents | Sibongile Bambisa /<br><br>Vanessa Viljoen |
| For a CD copy please contact the stakeholder engagement team (Sibongile Bambisa/ Vanessa Viljoen), Tel: (012) 003 6627, Email: stakeholders@kongiwe.co.za | | |

Comments received from the public throughout the public review process have been addressed and included within this Final Scoping Report.

# Executive Summary:

Kongiwe has been appointed, by Ergo Mining (Pty) Limited, as the Independent Environmental Service Provider and 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 **Reclamation of Marievale Tailings Storage Facilities** (hereafter the Proposed Project).

The Application for Environmental Authorisation was submitted to the Department of Mineral Resources and Energy (DMRE) on **Tuesday**, **15 October 2019**. The DSR was made available for public review from **23 October 2019 to 21 November 2019.**

## Project Introduction and Background

Ergo Mining (Pty) Limited (hereafter Ergo), a subsidiary of DRDGold, intends to reclaim and reprocess gold residues from the Marievale tailings storage facilities (TSFs) Nos. 7L5, 7L6 and 7L7. These TSFs are historical mineral deposits (slimes dams), situated approximately 6 km north-east of Nigel and 10 km south-east of Springs, in the Ekurhuleni Metropolitan Municipality (EMM). These TSFs were created prior to the promulgation of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) (MPRDA) and are accordingly not regulated by the MPRDA.

Surface gold retreatment is a largely mechanised process with a risk profile that is significantly lower than that of conventional mining. The slimes dams will be reclaimed by hydraulic mining. During Hydraulic mining, the used process water mixes with the unconsolidated material of the slimes dams, resulting in what is known as a 'slurry'. This slurry will be conveyed to the Ergo Processing Plant (hereafter Ergo Plant) for reprocessing using newly constructed pipelines. Final deposition of reprocessed slurry residue will be on the licenced Brakpan/Withok TSF.

## Project Alternatives

The Proposed Project will investigate two alternative pipeline routes to convey slurry from the TSFs to the Ergo Plant for reprocessing; and return process water to the project site for reclamation. The pipeline configuration would consist of two, 600 mm diameter, slurry pipelines and one, 600 mm diameter, process water pipeline.

The **first alternative** pipeline route would be approximately 25 km long and made up of a two parts. The first part would be a 7 km extension from the project site to the Daggafontein Plant; while the second part would be a 17 km extension from the Daggafontein Plant to the Ergo Plant. This alternative is being considered due to existing surface right permits that run along this proposed route. The Daggafontein Plant is not part of the Proposed Project and is not owned by Ergo.

The **second alternative** route would be a 19 km extension from the Proposed Project site, directly to the Ergo Plant.

The proposed reclamation site will be situated in Zone 3 of the Gauteng Provincial Environmental Management Framework (GPEMF) (2018); and even though some parts of the proposed pipelines may be laid in Zones 1 and 5, they may require authorisation in terms of the National Water Act (Act No. 36 of 1998) (NWA) for Section 21 water uses. An Integrated Water Use Licence Application (IWULA) will 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 will be supported by a Technical Report and other necessary supplementary reports.

## Environmental Impact Process

The Department of Environment, Forestry and Fisheries (DEFF), in consultation with the 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 (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. With reference to the aforementioned, this S&EIA, prepared in support of the EA application, will comply with the requirements of the EIA 2014 Regulations, as amended.

The Proposed Project therefore requires Environmental Authorisation (EA) in terms of the NEMA and the NEM:WA and will follow 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 FSR.

## Legal Background and Requirements

This FSR has been compiled in terms of the provisions of Appendix 2 of the EIA Regulations 2014, as amended, and the Directive set out in the template prescribed by the DMRE. Table 1-1 cross-references the various sections in this report with these requirements.

**Table 1-1: Structure of the Scoping Report in line with the Appendix 2 of the EIA 2014 Regulations, as amended.**

| NO. | REGULATION REQUIREMENT | REPORT SECTION | PAGE NUMBER |
|---|---|---|---|
| **(a)** | **Details of -** | 1.5 | 8 |
| (i) | The EAP who prepared the report and; | | |
| (ii) | The expertise of the EAP<br><br>including a CV | | |
| **(b)** | **The location of the activity, including –** | 2 | 10-16 |
| (i) | The 21-digit Surveyor General code of each cadastral land parcel | | |
| (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 | N/A | N/A |
| **(c)** | **A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is –** | 2.1 | 10 |
| (i) | A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken | | |
| (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 –** | 2 | 10-25 |
| (i) | All listed and specified activities triggered | 2.5 | 19-22 |
| (ii) | A description of the activities to be undertaken, including associated structures and infrastructure | 2.6 | 23-25 |
| **(e)** | **A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process** | 3 | 26-46 |
| **(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 location** | 4 | 47-50 |
| **(g)** | **Period of environmental authorisation** | 5 | 51 |
| **(h)** | **A full description of the process followed to reach the proposed preferred activity, site and location within the site, including -** | 6 | 52-59 |
| (i) | Details of the alternatives considered | 6.1 | 53-59 |
| (ii) | Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs | 7 | 60-67 |
| (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. | 7<br><br>Appendix C | 60-67<br><br>Appendix C |

| NO. | REGULATION REQUIREMENT | REPORT SECTION | PAGE NUMBER |
|---|---|---|---|
| (iv) | **The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects** | 8 | 69-89 |
| (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 –**<br><br>**(aa) can be reversed;**<br><br>**(bb) may cause irreplaceable loss of resources; and**<br><br>**(cc) can be avoided, managed or mitigated** | 9 | 90-100 |
| (vi) | The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives | 9.1 | 90-95 |
| (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 | 9.2 | 96-98 |
| (viii) | The possible mitigation measures that could be applied and level of residual risk | 9.4 | 99 |
| (ix) | The outcome of the selection matrix | 9.5 | 99 |
| (x) | If no alternatives, including alternative locations for the activity were investigated, the motivation for no considering such | 9.6 | 100 |
| (xi) | A concluding statement indicating the preferred alternatives, including preferred locations of the activity | 9.7 | 100 |
| **(i)** | **A plan of study for undertaking the environmental impact assessment process to be undertaken, including -** | 10 | 101-126 |
| (i) | A description of the alternatives to be considered and assessed within the preferred site | 10.1 | 101 |
| (ii) | A description of the aspects to be assessed as part of the environmental impact assessment process | 10.2 | 101 |
| (iii) | Aspects to be assessed by specialists | 10.3 | 101-112 |
| (iv) | A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists | 10.4 | 113-125 |
| (v) | A description of the proposed method assessing duration significance | 10.4.1 | 113 |
| (vi) | An indication of the stages at which the competent authority will be consulted | 10.4.2 | 113 |
| (vii) | Particulars of the public participation process that will be conducted during the environmental impact assessment process | 10.4.3 | 114 |
| (viii) | A description of the tasks that will be undertaken as part of the environmental impact assessment process | 10.4.4 | 114 |
| (ix) | Identify suitable measures to avoid, reverse, mitigate or manage | 10.4.5 | 115 |

| NO. | REGULATION REQUIREMENT | REPORT SECTION | PAGE NUMBER |
|---|---|---|---|
| | identified impacts and to determine the extent of the residual risks that need to be managed and monitored | | |
| **(j)** | **An undertaking under oath or affirmation by the EAP in relation to –**<br><br>(i) The correctness of the information provided in the report;<br>(ii) The inclusion of comments and inputs from stakeholders and interested and affected parties;<br>(iii) 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 | 11.1 | 127 |
| **(k)** | **An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment** | 11 | 127 |
| **(l)** | **Where applicable, any specific information required by the competent authority** | N/A | N/A |
| **(m)** | **Any other matter required in terms of section 24(4)(a) and (b) of the Act** | N/A | N/A |

## Environmental Considerations

The Proposed Project will adopt the standards as set out in the Ergo's Environmental Policy. The Policy states that Ergo is committed to the responsible management of the environment in which it operates, adopting and implementing environmental practice as outlined in the National Environmental Management Act, 1998. Recognising that the environment is held in trust for the people, the policy commits to:

- Complying with relevant environmental legislation as a minimum, and adopting and applying the best practicable environmental option with respect to current activities as well as prospective projects;
- Evaluating, through a process of monitoring, auditing and reviewing by management, the success of the management and mitigation measures applied; and
- Ensuring that environmental risks and potential emergencies are identified and managed through effective controls and procedures as identified in the applicable Environmental Management Programmes.

## Key Findings of the Scoping Report

The report provides a scoping-level identification of potential environmental impacts (physical, biological and social) associated with the Proposed Project, as well as a strategy for how these impacts will be investigated and assessed further in the EIA Phase. The baseline environmental information provided in this FSR was compiled as a high-level desktop investigation, and the project information is sourced from existing background information, relevant to the Proposed Project. The preliminary environmental impacts identified in Table 1-2 will be further refined, calculated and assessed for all the feasible alternatives identified. Mitigation and management measures will also be suggested by the specialists for all impacts identified. The potential positive and negative impacts which may arise because of the Proposed Project have also been summarised in the Table 1-2 overleaf.

**Table 1-2: 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) | ❖ Potential for further acid mine drainage (AMD), increased heavy metal concentrations and increased sulphate concentrations in the adjacent Blesbokspruit and local groundwater if runoff from operations is not adequately managed through efficient storm water management structures;<br>❖ Water and ground contamination due to pipeline leaks/spillages if inadequate preventative measures are not implemented;<br>❖ Improved surface and ground water quality around the project area due to the removal of the TSFs;<br>❖ Changes in natural surface water flow parameters due to the removal of the TSFs;<br>❖ Potential impact on drainage lines from access runoff during the operational phase of the project;<br>❖ Improved visual aesthetics of the area after the removal of the TSFs. | Surface Water Impact Assessment<br><br>Groundwater Impact Assessment<br><br>Wetland Impact Assessment |
| **Biological Environment (living)** | Ecology and Biodiversity (including fauna and flora) | ❖ Disturbance of sites and species of ecological importance;<br>❖ Loss of migration corridors, and access to nesting and refuge areas, watering points, food supplies for faunal species by removing the TSFs;<br>❖ Displacement of animal habitat by removing the TSFs;<br>❖ Removal of invasive species from the TSFs; | Biodiversity Impact Assessment |

| ENVIRONMENTAL COMPONENT | COMPONENT TYPE | POTENTIAL IMPACT | SPECIALIST STUDY PLANNED FOR EIA |
|---|---|---|---|
| | | ❖ Improvement of species diversity in the Blesbokspruit Wetland System by removing a pollution source in the form of the TSFs;<br>❖ Long-term improvement of ecosystem health and functioning of the project area following rehabilitation. | |
| **Cultural Environment** | Heritage Resources | ❖ Should heritage resources be present in the area, the reclamation project could potentially impact these;<br>❖ Destruction of a heritage resource, if the TSFs are older than 60 years, by reclaiming the TSFs. | Heritage Impact Assessment |
| **Social and Economic Environment** | Employment | ❖ Continued employment and job security;<br>❖ Continued investment in local economy;<br>❖ Removal of the dumps could eliminate the attraction of illegal/informal miners who seek gold. | Social Impact Assessment |
| | Land-use | ❖ Land use will change to an active reclamation site;<br>❖ Restoration and unlocking of land for future land uses. The removal of TSFs could result in the extension of the Blesbokspruit Wetland System footprint;<br>❖ Better management and control of the area against illegal/informal mining. | Social Impact Assessment |
| | Noise | ❖ Increase in ambient noise levels during the operational phase;<br>❖ Disturbances to faunal species during the operational phase. | Noise Impact Assessment |
| | Air Quality | ❖ Possible increase in dust levels in some areas during operations;<br>❖ Overall removal of an air pollution source after the removal of the TSFs; | Air Quality Impact Assessment |

| ENVIRONMENTAL COMPONENT | COMPONENT TYPE | POTENTIAL IMPACT | SPECIALIST STUDY PLANNED FOR EIA |
|---|---|---|---|
| | | ❖ Health impacts on livestock and people in proximity to the project site due to fine particulate emissions during construction and operational phases. | |

## Overall Conclusions

At this stage, the findings of this FSR indicate that the Proposed Project and its associated infrastructure would pose minimal and short-term negative environmental impacts if adequate and appropriate mitigation measures are implemented; and positive long-term environmental impacts when the project has been completed. Most importantly, the removal of these TSFs would assist with the alleviation of a major pollution source to the Blesbokspruit and Marievale Bird Sanctuary Nature Reserve (Ambani and Annegarn, 2015; McKay et al., 2018).

According to the Way Forward and the Plan of Study, contained in this report, impacts associated with the Proposed Project need 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 sensitive environment around it. The TSFs are a source of pollution and cause other direct and indirect nuisances to the surrounding environment. The Proposed Project is also in line with the Gauteng Mine Residue Area Strategy (2012), Ekurhuleni Metropolitan Spatial Development Framework (2011) and the Ekurhuleni Environmental Management Framework's (2014) objectives to remove the TSFs scattered on Gauteng landscape, especially in ecologically sensitive areas.

## Way Forward

This FSR has been undertaken with the aim of identifying potential positive and negative impacts on the environment and gathering comments on concerns and queries from stakeholders. It documents the process followed, the findings and recommendations of the Scoping Phase study, and the proposed Plan of Study for the EIA Phase to follow. The overarching objectives of the EIA process will be to:

- Prepare integrated sensitivity maps for the study area based on the findings of specialist assessments as input into the project design process;
- Identify and assess the significance of potential impacts associated with the project activities; and
- Recommend mitigation and enhancement measures to ensure that the development is undertaken in such a way as to promote the positive impacts and to minimise the negative impacts.

The procedure for this study going forward is as follows:

- Submit the finalised Scoping Report to the competent authority for permission to undertake the EIA Phase of the project;
- Upon the decision to grant or refuse the final Scoping Report, all stakeholders will be notified. If granted, stakeholders will also be notified of the conditions of the DMRE for proceeding with the EIA Phase of the project;
- In the case of approval of the final scoping, execute the Plan of Study for the Impact Assessment during the EIA Phase of the project;
- Incorporate and address comments and issues raised during the consultation period on the

Scoping Report into the EIA, and make changes to the report where relevant;

- Make the EIA Report and Environmental Management Programme report (EMPr) available to the public, stakeholders and authorities;
- Finalise the EIA Report and submit the final EIA Report to the Competent Authority (CA); and
- Authority review period and decision-making for 107 calendar days.

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**Appendix D** – Site Photographs

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# Figures

## Tables:

# Abbreviations

| ABBREVIATION/ SYMBOL | DESCRIPTION |
|---|---|
| AQIA | Air Quality Impact Assessment |
| BID | Background Information Document |
| BWS | Blesbokspruit Wetland System |
| CA | Competent Authority/Authorities |
| CBA | Critical Biodiversity Area |
| CRR | Comments and Response Report |
| DALRRD | Department of Agriculture, Land Reform and Rural Development |
| DEFF | Department of Environment, Forestry and Fisheries |
| DHSWS | Department of Human Settlements, Water and Sanitation |
| DMRE | Department of Mineral Resources and Energy |
| DoH | Department of Health |
| DPWI | Department of Public Works and Infrastructure |
| DSR | Draft Scoping Report |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| EIA | Environmental Impact Assessment |
| EMF | Environmental Management Framework |
| EMM | Ekurhuleni Metropolitan Municipality |
| EMPr | Environmental Management Programme Report |
| FSR | Final Scoping Report |
| GDARD | Gauteng Department of Agriculture and Rural Development |
| GDRDLR | Gauteng Department of Rural development and Land Reform |
| Ha | Hectare |
| IDP | Integrated Development Plan |
| I-SWQG | In-Stream Water Quality Guidelines |
| IWULA | Integrated Water Use Licence Application |
| IWWMP | Integrated Water and Waste Management Plan |
| Km | Kilometre |
| M | Metre |
| MAP | Mean annual precipitation |
| MPRDA | Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) |
| 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) |
| NEM:WA | National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) |

| ABBREVIATION/ SYMBOL | DESCRIPTION |
|---|---|
| NEMLAA | National Environmental Laws Amendment Act, 2014 (Act No. 25 of 2014) |
| NHRA | National Heritage Resources Act, 1999 (Act No. 25 of 1999) |
| NNR | National Nuclear Regulator |
| NWA | National Water Act, 1998 (Act No. 36 of 1998) |
| PPP | Public participation process |
| RoD | Record of Decision |
| S&EIA | Scoping and Environmental Impact Assessment |
| SAHRA | South African Heritage Resources Agency |
| SDF | Spatial Development Framework |
| SIA | Social Impact Assessment |
| TSF | Tailings Storage Facility |
| WMA | Water Management Area |
| WML | Waste Management Licence |

# SECTION 2:

# THE RECLAMATION OF THE MARIEVALE TAILINGS STORAGE FACILITIES

## 1 Introduction and Background

### 1.1 The History of Gold Mining in South Africa

The first official gold prospector of the Transvaal Republic was Mr Pieter Jacob Marias 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, Mr 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.

Durant (2012) further explains that in September 1886, nine farms were proclaimed as public diggings. These public digging sites formed the main 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 (Harrison and Zack, 2012).

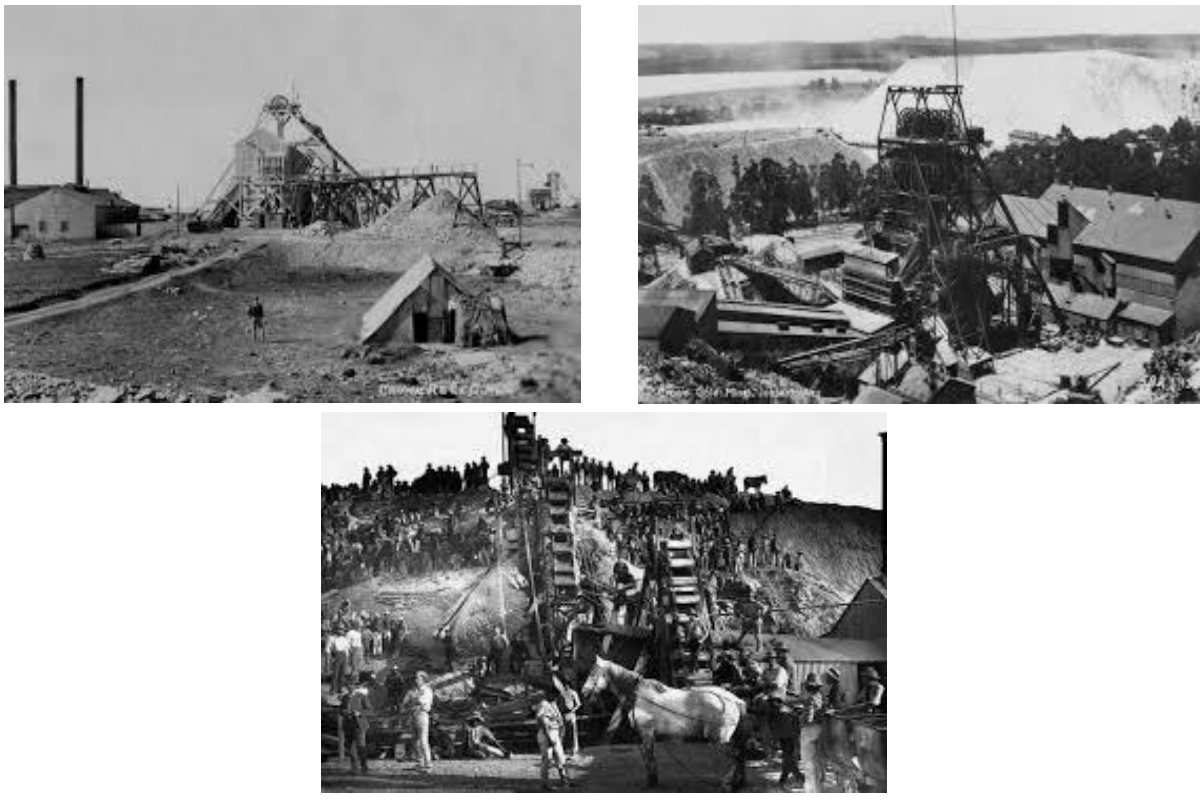


**Figure 1-1: Historic mining activities within the Johannesburg area.**

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 is contained within a distance of approximately 46 km, east to west, from the Roodepoort Fault in the west, and through Johannesburg, to Boksburg in the east. From west to east, the outcrop of auriferous conglomerates were located on the farms Witpoortje 245 in Krugersdorp; Roodepoort 237, Vogelstruisfontein 231, and Paardekraal 226, in Roodepoort; Laanlaagte 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).

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.

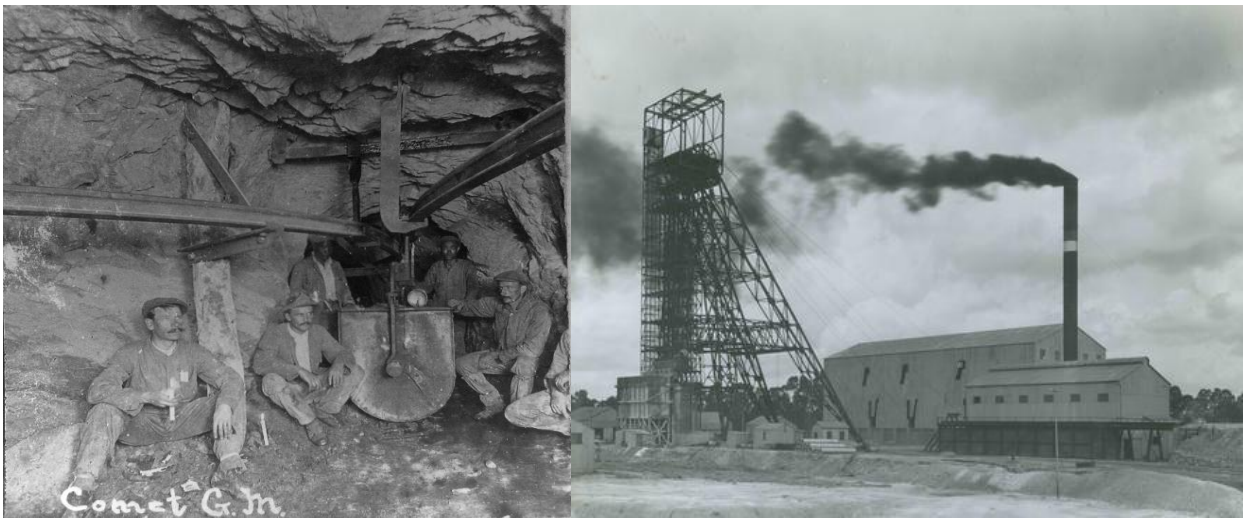



**Figure 1-2: Mine workers at Comet Gold Mine 1903 (left) and Simmer and Jack Mine Colliery 1939 (right)**

## 1.2 The Origin of Mine Dumps in Johannesburg

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. During this time, mining and gold recovery were left 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) ("the 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 felt today.

As the mines in the Witwatersrand area began to close down 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 (Ergo) 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 incenticised the reclamation of TSFs. Today, Gauteng's physical landscape is once again in a state of transition due to the demand for the reclamation of historic mine dumps.

Through the process of reclamation, gold recovered from the historic mine dumps is made available for domestic and international markets. On the 7$^{th}$ of May 2019 DRDGold (DRD) recorded a 15% quarter-on-quarter rise in gold production to 1279 kg. This means that the continual reclamation of mine residue material (from historic mine dumps) will result in additional gold supply onto the gold market - which has been experiencing a downward trend over the last few years. 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 awarded. The aim of rehabilitation would be to return the land to a functional topography, 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.

## 1.3 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 Witswatersrand 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 worlds 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, 2019). Today, South Africa is no longer even the largest gold producer in Africa, having lost that position to Ghana.

The price of gold per ounce underwent a steady increase from 2001 until it reached the high point in August of 2011 ($2058.60). Figure 1-3 below indicates how, from August 2011, the price of gold per ounce continually fluctuated in a decreasing trend until its current price of $ 1275.21 per ounce on 20 May 2019. In recent months, for various geopolitical reasons, the gold price has far exceeded $1300 per ounce, reaching $1478 at the beginning of October 2019. This indicates that the gold price remains a volatile market with an ever-fluctuating commodity price.

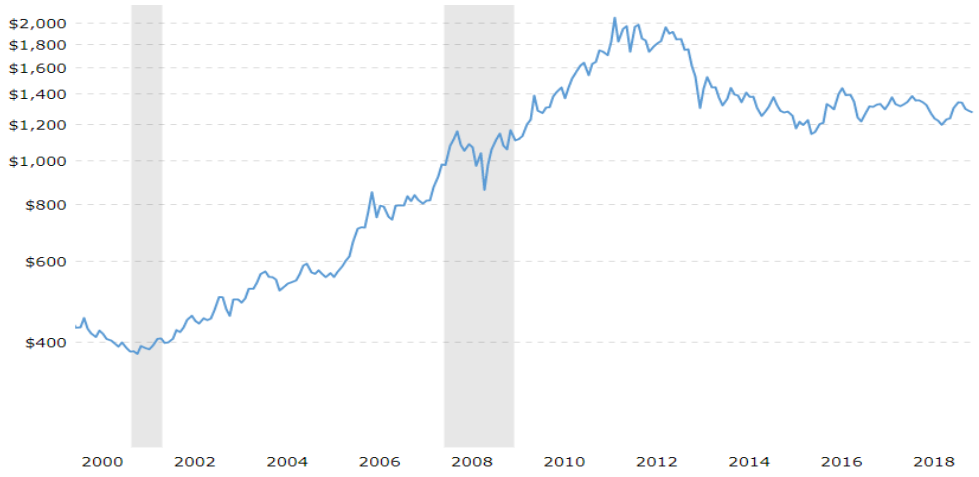



**Figure 1-3: Price of Gold per ounce 2000-2018 (Macrotrends, 2019)**

## 1.4 Scoping and Environmental Impact Assessment

### 1.4.1 Applications Relevant to the S&EIA Process

Kongiwe has been appointed by **Ergo Mining (Pty) Limited** (hereafter 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 Environmental Authorisation (EA). The S&EIA and specialist studies to be undertaken will support the applications for the required approvals. The following applications will be made to the DMRE for the Proposed Project:

1. **Application for EA** for listed activities triggered in Listing Notices GN R983, GN R984 and GN R985[1] published pursuant to the EIA Regulations 2014 (as amended), promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); and
2. **Application for a waste management licence (WML)** authorising waste management activities listed in GN R921 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 applications will be made to the relevant Competent Authorities:

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

The period of EA being applied for is **20 years for the reclamation period.**

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 during the mining of the proposed area. Measures for the avoidance or mitigation of negative impacts will be proposed and positive impacts will be enhanced.

### 1.4.2 Methodology applied to conducting the Scoping Process

The outcome of the first phase of the S&EIA is the Scoping Report, which provides the terms of reference for undertaking the EIA Phase of the project. The figure below indicates the methodology that is applied in conducting the S&EIA process.

[1] [1] These Listing Notices have been amended by GN R327, GN R325 and GN R324 of 7 April 2017

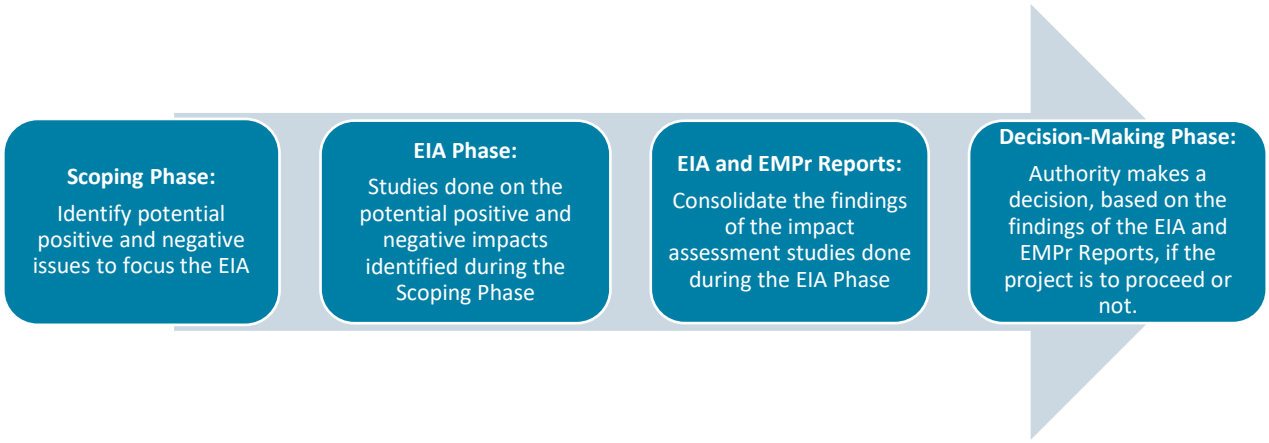



**Figure 1-4: Different phases of S&EIA**

### 1.4.3 S&EIA Timeframes

The Draft Scoping Report (DSR) was submitted and made available for a **30-day** public review period. The comments received during this period have been captured in a Comments and Responses Report (CRR) that was submitted with this Final Scoping Report.

Once the Final Scoping Report (FSR) has been submitted to the DMRE, the Department must either accept or reject the Scoping Report within **43 days**. Once confirmation of acceptance has been received from the DMRE, 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.

Upon submission of the Environmental Impact Assessment / Environmental Management Programme (EIA/EMPr) document the Competent Authority 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.

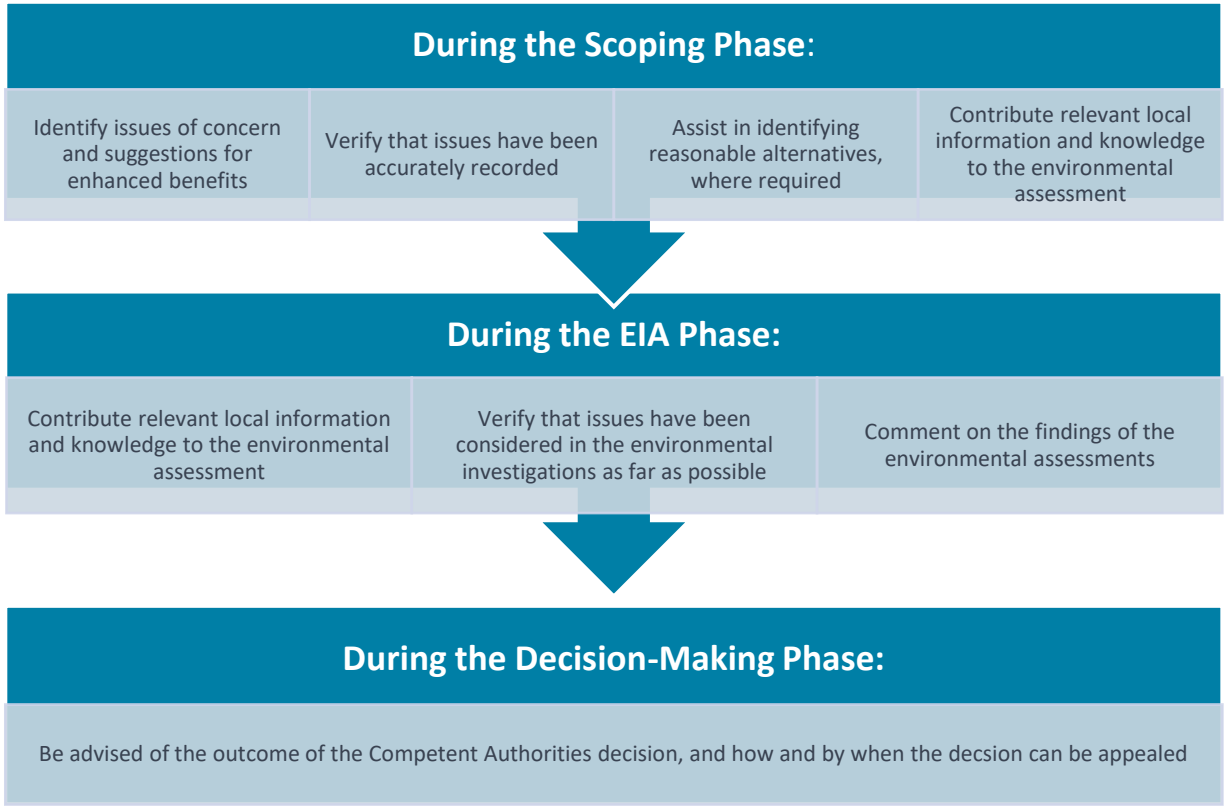
If significant changes to the EIA/EMPr are required, which were not consulted on during the initial public participation process, a notice may be submitted to the DMRE stating that the EIA/EMPr will be submitted within **156 days** from date of acceptance of the Scoping Report. During the aforesaid 156-day period, stakeholders will be afforded a further **30-day** period in which to review the amended EIA/EMPr documentation.

### 1.4.4 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 (IAP2, 2006).

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:




The Draft Scoping Report (DSR) was made available for public comment from **23 October 2019 to 21 November 2019.** The project team conducted an Open Day with stakeholders at **the Grootvaly Environmental Centre** on **Saturday, 09 November 2019 from 10H00 to 15H00**. During the open day, the DSR content was presented and discussed. Comments received during the DSR commenting period have been captured in the CRR and made available in this Final Scoping Report.

## 1.5 Details of the Environmental Consultant

**Kongiwe** is a contemporary, problem-solving consultancy specialising in solving real-world environmental challenges. We pride ourselves in using the latest technology available to realise pragmatic solutions for our clients. The company was created with the essential intent: *'To solve environmental challenges for a world driven towards a sustainable future.'*

With offices in both Johannesburg and Pretoria, South Africa, our team of professional Environmental Scientists are highly trained in various environmental disciplines and have significant, hands-on experience in an array of projects across numerous industries. The company has extensive environmental and project management experience in multiple sectors, with significant experience in South Africa, as well as internationally. **Kongiwe** focuses on the integration of environmental studies and processes into larger engineering and mining projects. Moreover, **Kongiwe** provides clients with strategic environmental assessments and compliance advice, the identification of environmental management solutions and mitigation / risk minimising measures throughout the project lifecycle.

### 1.5.1 Contact Person and Corresponding Address

**Details of the EAP:**

**Table 1-1: Details of EAP**

| | |
|---|---|
| **Name of Practitioner** | Siphesihle Dambuza, Kongiwe Environmental (Pty) Ltd |
| **Tel No** | +27 (10) 140 6508 |
| **Cell No** | 081 248 4890 |
| **e-mail address** | sdambuza@kongiwe.co.za |

Siphesihle Dambuza has a B.Sc. (Hons) Geography and Environmental Sciences degree from the University of Pretoria (UP) and is a registered Candidate Natural Scientist (Environmental Science) (*Cand.Sci.Nat* Registration No: 119264). Qualifications in Appendix A.

Siphesihle has been predominantly working as an Environmental Consultant in the mining industry. Multiskilled, he has had responsibilities in environmental impact reporting, air quality monitoring, environmental auditing, water use permitting and licensing, as well as public participation.

**Expertise of the Peer Review (Pr.Sci.Nat):**

**Table 1-2: Peer Review Pr.Sci.Nat**

| | |
|---|---|
| **Name of Practitioner** | Gerlinde Wilreker, Kongiwe Environmental (Pty) Ltd |
| **Tel No** | +27 (10) 140 6508 |
| **Fax No** | 083 476 6438 |
| **e-mail address** | gwilreker@kongiwe.co.za |

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

Gerlinde Wilreker has over 13 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.

# 2 Project Description

## 2.1 Description and Location of the Property

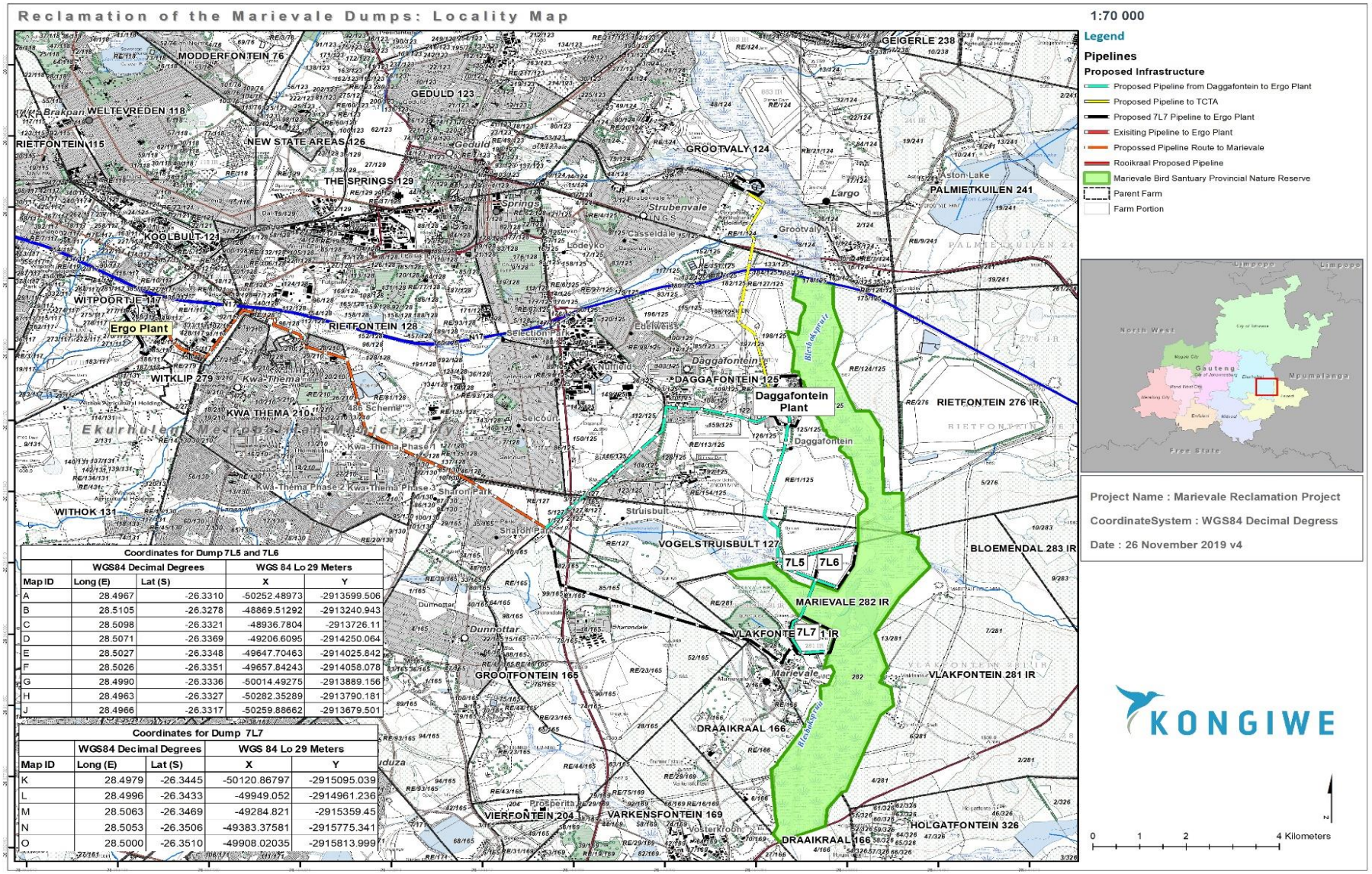
In terms of regional locality, the dumps are situated approximately 6 km north-east of Nigel and about 10 km south-east of Springs, in the Ekurhuleni Metropolitan Municipality (EMM). The three dumps are positioned as follows:

- Site 1: This site consists of dumps 7L5 and 7L6, which are both located on Portion 0 (RE) of the farm Vogelstruisbult 127 IR. The dumps fall within Ward 88, covering just over 80 Ha.
- Site 2: Dump 7L7 is located approximately 1 km south of Site 1, on Portion 0 (RE) of the farm Vlakfontein 281 IR. This site is also in Ward 88 and covers roughly 60 Ha.

The area is predominantly surrounded by other mine dumps, active mining operations, agricultural lands, scattered settlements, bare ground. The Ramsar Blesbokspruit Wetland System and protected Marievale Bird Sanctuary Nature Reserve are situated just east of the dumps. Please see **Appendix D** for more images of the Proposed Project site.

The following infrastructure is encountered in the area:

- National and provincial roads (N17 and R51);
- Residential and commercial properties;
- The Engineers Golf Club;
- The abandoned Grootvlei and Vogelstruisbult Gold Mines upstream;
- Vlakfontein Quarry Mine;
- Power lines;
- Railway lines;
- Water reticulation systems; and other
- Mine dumps.




Coordinates for Dump 7L5 and 7L6

| | WGS84 Decimal Degrees | | WGS 84 Lo 29 Meters | |
|---|---|---|---|---|
| Map ID | Long (E) | Lat (S) | X | Y |
| A | 28.4967 | -26.3310 | -50252.48973 | -2913599.506 |
| B | 28.5105 | -26.3278 | -48869.51292 | -2913240.943 |
| C | 28.5098 | -26.3321 | -48936.7804 | -2913726.11 |
| D | 28.5071 | -26.3369 | -49206.6095 | -2914250.064 |
| E | 28.5027 | -26.3348 | -49647.70463 | -2914025.842 |
| F | 28.5026 | -26.3351 | -49657.84243 | -2914058.078 |
| G | 28.4990 | -26.3336 | -50014.49275 | -2913889.156 |
| H | 28.4963 | -26.3327 | -50282.35289 | -2913790.181 |
| J | 28.4966 | -26.3317 | -50259.88662 | -2913679.501 |

Coordinates for Dump 7L7

| | WGS84 Decimal Degrees | | WGS 84 Lo 29 Meters | |
|---|---|---|---|---|
| Map ID | Long (E) | Lat (S) | X | Y |
| K | 28.4979 | -26.3445 | -50120.86797 | -2915095.039 |
| L | 28.4996 | -26.3433 | -49949.052 | -2914961.236 |
| M | 28.5063 | -26.3469 | -49284.821 | -2915359.45 |
| N | 28.5053 | -26.3506 | -49383.37581 | -2915775.341 |
| O | 28.5000 | -26.3510 | -49908.02035 | -2915813.999 |

**Figure 2-1: Locality map of the Proposed Project**

### 2.1.1. Description of the Properties affected by the Project

This S&EIA process is being conducted for an EA to reclaim all three dumps and will be confined to farms Vogelstruisbult 127 IR and Vlakfontein 281 IR, as well as all farms to be affected by the final pipeline route.

This is a “Brownfield Project" as it is the reclamation of historical tailings deposits with partly existing infrastructure. The potential negative and positive impacts of the Proposed Project on the environmental and social aspects will be objectively considered though studies undertaken by specialist professionals during the EIA phase.

Dumps 7L5 and 7L6 are both located on Portion 0 (RE) of the farm Vogelstruisbult 127 IR; while dump 7L7 is located on Portion 0 (RE) of Vlakfontein 281 IR farm. Other properties have been identified as directly and indirectly affected landowners due to the pipeline alternatives of the project. See Table 2-1 and Table 2-3.

**Table 2-1: Description of the Directly and Indirectly Affected Properties**

| Farm Names | Farm Name: | Farm ID | Portion | Landowner |
|---|---|---|---|---|
| | | | | |
| | Vogelstruisbult | 127 IR | 0 (RE) | Ekurhuleni Metropolitan Municipality |
| | Vogelstruisbult | 127 IR | 1 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 2 | City Council of Springs |
| | Vogelstruisbult | 127 IR | 3 | Ekurhuleni Metropolitan Municipality |
| | Vogelstruisbult | 127 IR | 5 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 6 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 7 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 8 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 9 | Transnet Ltd |
| | Vogelstruisbult | 127 IR | 10 | Transnet Ltd |
| | | | | |
| | Daggafontein | 125 IR | 1 (RE) | STI Consulting Services (Pty) Ltd |
| | Daggafontein | 125 IR | 93 (RE) | I&W Van Der Merwe Boerdery (Pty) Ltd |
| | Daggafontein | 125 IR | 104 | To be determined |
| | Daggafontein | 125 IR | 108 | WMG Estates (Pty) Ltd |
| | Daggafontein | 125 IR | 110 | To be determined |
| | Daggafontein | 125 IR | 112 | I&W Van Der Merwe Boerdery (Pty) Ltd |
| | Daggafontein | 125 IR | 113 (RE) | Consolidated Modderfontein Mines 1979 Ltd |
| | Daggafontein | 125 IR | 114 | Fondagtuin Landgoed CC |
| | Daggafontein | 125 IR | 117 (RE) | CLPF Prop Inv (Pty) Ltd |

| | | | |
|---|---|---|---|
| Daggafontein | 125 IR | 122 | To be determined |
| Daggafontein | 125 IR | 123 | To be determined |
| Daggafontein | 125 IR | 125 | Gauteng Provincial Government |
| Daggafontein | 125 IR | 126 | STI Consulting Services (Pty) Ltd |
| Daggafontein | 125 IR | 127 (RE) | Palmkuilen (Pty) Ltd |
| Daggafontein | 125 IR | 128 | EBM Project (Pty) Ltd |
| Daggafontein | 125 IR | 133 | South African National Roads Agency Ltd |
| Daggafontein | 125 IR | 137 | Transnet Ltd |
| Daggafontein | 125 IR | 146 | Greater East Rand Metro |
| Daggafontein | 125 IR | 151 (RE) | East Rand Water Care Company |
| Daggafontein | 125 IR | 154 (RE) | Exxaro Base Metals (Pty) Ltd |
| Daggafontein | 125 IR | 159 | Rappa Resources (Pty) Ltd |
| Daggafontein | 125 IR | 180 | To be determined |
| Daggafontein | 125 IR | 181 | To be determined |
| Daggafontein | 125 IR | 182 | To be determined |
| Daggafontein | 125 IR | 184 | South African National Roads Agency Ltd |
| Daggafontein | 125 IR | 196 | To be determined |
| Daggafontein | 125 IR | 197 | To be determined |
| Daggafontein | 125 IR | 198 | To be determined |
| Daggafontein | 125 IR | 199 | To be determined |
| | | | |
| Draaikraal | 166 IR | 2 | National Government of the Republic of SA |
| | | | |
| Grootvaly | 124 IR | 1 (RE) | To be determined |
| | | | |
| Marievale | 282 IR | 282 | Marievale Nature Reserve |
| | | | |
| Vlakfontein | 281 IR | 0 (RE) | Scarlet Sun 33 (Pty) Ltd |
| Vlakfontein | 281 IR | 9 | National Government of the Republic of SA |
| | | | |
| Grootfontein | 165 IR | 0 (RE) | Gauteng Provincial Government |
| Grootfontein | 165 IR | 7 | To be determined |
| Grootfontein | 165 IR | 10 | Transnet Ltd |
| Grootfontein | 165 IR | 29 | Inyanga Trading 102 ((Pty)) Ltd |
| Grootfontein | 165 IR | 35 | To be determined |
| Grootfontein | 165 IR | 52 (RE) | Greater Nigel Transitional Local Council |
| Grootfontein | 165 IR | 81 | Nigel Municipality |
| Grootfontein | 165 IR | 82 | Nigel Municipality |

| | | | | |
|---|---|---|---|---|
| | Grootfontein | 165 IR | 85 | Greater Nigel Transitional Local Council |
| | Grootfontein | 165 IR | 99 | To be determined |
| | | | | |
| | Rietfontein | 128 IR | 0 (RE) | To be determined |
| | Rietfontein | 128 IR | 46 | Rand Water Board |
| | Rietfontein | 128 IR | 96 (RE) | City Council of Springs |
| | Rietfontein | 128 IR | 135 (RE) | Alstonville Investment ((Pty)) Ltd |
| | Rietfontein | 128 IR | 137 | Rand Water Board |
| | Rietfontein | 128 IR | 167 | To be determined |
| | | | | |
| | Witpoortje | 117 IR | 1 (RE) | To be determined |
| | Witpoortje | 117 IR | 91 | To be determined |
| | Witpoortje | 117 IR | 92 | To be determined |
| | Witpoortje | 117 IR | 108 | Greater East Rand Metro Metropolitan Municipality |
| | Witpoortje | 117 IR | 155 | To be determined |
| | Witpoortje | 117 IR | 442 | To be determined |

### Table 2-2: Property Details

| | |
|---|---|
| **Application Area (ha)** | The Proposed Project site covers a combined area of approximately **140 Ha**. |
| **Magisterial District** | Ward 88 of Ekurhuleni Metropolitan Municipality (EMM). |
| **Distance and Direction from Nearest Town** | The site is located approximately 6 km north-east from Nigel, 10 km south-east of Springs and falls within the Ekurhuleni Metropolitan Municipality district. |

### Table 2-3: 21-digit Surveyor General Code for each Farm Portion

| Farm Names | Farm Name: | Farm ID | Portion | SG Code |
|---|---|---|---|---|
| | | | | |
| | Vogelstruisbult | 127 IR | 0 (RE) | T0IR00000000012700000 |
| | Vogelstruisbult | 127 IR | 1 | T0IR00000000012700001 |
| | Vogelstruisbult | 127 IR | 2 | T0IR00000000012700002 |
| | Vogelstruisbult | 127 IR | 3 | T0IR00000000012700003 |
| | Vogelstruisbult | 127 IR | 5 | T0IR00000000012700005 |
| | Vogelstruisbult | 127 IR | 6 | T0IR00000000012700006 |
| | Vogelstruisbult | 127 IR | 7 | T0IR00000000012700007 |
| | Vogelstruisbult | 127 IR | 8 | T0IR00000000012700008 |
| | Vogelstruisbult | 127 IR | 9 | T0IR00000000012700009 |
| | Vogelstruisbult | 127 IR | 10 | T0IR00000000012700010 |
| | | | | |

| | | | |
|---|---|---|---|
| Daggafontein | 125 IR | 1 (RE) | T0IR00000000012500001 |
| Daggafontein | 125 IR | 93 (RE) | T0IR00000000012500093 |
| Daggafontein | 125 IR | 104 | T0IR00000000012500104 |
| Daggafontein | 125 IR | 108 | T0IR00000000012500108 |
| Daggafontein | 125 IR | 110 | T0IR00000000012500110 |
| Daggafontein | 125 IR | 112 | T0IR00000000012500112 |
| Daggafontein | 125 IR | 113 (RE) | T0IR00000000012500113 |
| Daggafontein | 125 IR | 114 | T0IR00000000012500114 |
| Daggafontein | 125 IR | 117 (RE) | T0IR00000000012500117 |
| Daggafontein | 125 IR | 122 | To be determined |
| Daggafontein | 125 IR | 123 | T0IR00000000012500123 |
| Daggafontein | 125 IR | 125 | T0IR00000000012500125 |
| Daggafontein | 125 IR | 126 | T0IR00000000012500126 |
| Daggafontein | 125 IR | 127 (RE) | T0IR00000000012500127 |
| Daggafontein | 125 IR | 128 | T0IR00000000012500128 |
| Daggafontein | 125 IR | 133 | T0IR00000000012500133 |
| Daggafontein | 125 IR | 137 | T0IR00000000012500137 |
| Daggafontein | 125 IR | 146 | T0IR00000000012500146 |
| Daggafontein | 125 IR | 151 (RE) | T0IR00000000012500151 |
| Daggafontein | 125 IR | 154 (RE) | T0IR00000000012500154 |
| Daggafontein | 125 IR | 159 | T0IR00000000012500159 |
| Daggafontein | 125 IR | 180 | To be determined |
| Daggafontein | 125 IR | 181 | To be determined |
| Daggafontein | 125 IR | 182 | To be determined |
| Daggafontein | 125 IR | 184 | T0IR00000000012500184 |
| Daggafontein | 125 IR | 196 | To be determined |
| Daggafontein | 125 IR | 197 | To be determined |
| Daggafontein | 125 IR | 198 | To be determined |
| Daggafontein | 125 IR | 199 | To be determined |
| | | | |
| Draaikraal | 166 IR | 2 | T0IR00000000016600002 |
| | | | |
| Grootvaly | 124 IR | 1 (RE) | T0IR00000000012400001 |
| | | | |
| Marievale | 282 IR | 282 | T0IR00000000028200000 |
| | | | |
| Vlakfontein | 281 IR | 0 (RE) | T0IR0000000000281000RE |
| Vlakfontein | 281 IR | 9 | T0IR00000000028100009 |
| Vlakfontein | 130 IR | 10 | T0IR00000000013000010 |
| Vlakfontein | 130 IR | 85 | T0IR00000000013000085 |
| Vlakfontein | 130 IR | 92 | T0IR00000000013000092 |
| Vlakfontein | 130 IR | 96 | T0IR00000000013000096 |
| | | | |

| | | | |
|---|---|---|---|
| Grootfontein | 165 IR | 0 (RE) | T0IR00000000016500000 |
| Grootfontein | 165 IR | 7 | T0IR00000000016500007 |
| Grootfontein | 165 IR | 10 | T0IR00000000016500010 |
| Grootfontein | 165 IR | 29 | T0IR00000000016500029 |
| Grootfontein | 165 IR | 35 | T0IR00000000016500035 |
| Grootfontein | 165 IR | 52 (RE) | T0IR00000000016500052 |
| Grootfontein | 165 IR | 81 | T0IR00000000016500081 |
| Grootfontein | 165 IR | 82 | T0IR00000000016500082 |
| Grootfontein | 165 IR | 85 | T0IR00000000016500085 |
| Grootfontein | 165 IR | 99 | T0IR00000000016500099 |
| Grootfontein | 165 IR | 0 (RE) | T0IR00000000016500000 |
| | | | |
| Rietfontein | 128 IR | 0 (RE) | T0IR00000000012800000 |
| Rietfontein | 128 IR | 46 | T0IR00000000012800046 |
| Rietfontein | 128 IR | 96 (RE) | T0IR00000000012800096 |
| Rietfontein | 128 IR | 135 (RE) | T0IR00000000012800135 |
| Rietfontein | 128 IR | 137 | T0IR00000000012800137 |
| Rietfontein | 128 IR | 167 | T0IR00000000012800167 |
| | | | |
| Witpoortje | 117 IR | 1 (RE) | T0IR00000000011700001 |
| Witpoortje | 117 IR | 91 | T0IR00000000011700091 |
| Witpoortje | 117 IR | 92 | T0IR00000000011700092 |
| Witpoortje | 117 IR | 108 | T0IR00000000011700108 |
| Witpoortje | 117 IR | 155 | T0IR00000000011700155 |
| Witpoortje | 117 IR | 442 | T0IR00000000011700442 |

All outstanding landowner information is being actively sourced through one-on-one consultations and the Deeds Office. This information should be available during the EIA phase.

## 2.2 Description of the Current Land Uses Applicable

According to the Gauteng Provincial Environmental Management Framework (2018), the Proposed Project area is in a Control Zone (Zone 3) and these areas are defined as sensitive areas that fall outside of Urban Zones. The current land uses of the surrounding areas are typified by mining and agricultural activities; dispersed settlements; sensitive areas like the Marievale Nature Reserve Bird Sanctuary and Blesbokspruit Wetland System (which are Protected and Conservation areas respectively); and other mine dumps such as dump 7L4, situated just north of the project site, and the 7L3 zinc dump being reclaimed by Exxaro Base Metals (EBM) Projects 1 km north-west from the project site.

## 2.3 Known Mining Rights held in the Area

The assessment of cumulative impacts is required under the EIA Regulations 2014 (as amended in 2017), promulgated in accordance with Section 44 of the NEMA. In support of the above, Kongiwe will assess the impact of the Proposed Project in context of other similar activities in the local area. This will be undertaken during the EIA Phase of the project.

The Proposed Project area is enclosed by several active and historic mining activities. Notable current and prospective mining activities in the area vary in ownership but are primarily quarries (e.g. Vlakfontein Quarry); coal mines such as the proposed Bloemendal Coal Mine (GP30/5/1/2/2/10071MR); the abandoned Grootvlei and Vogelstruisbult Gold Mines, and other proposed/active reclamation projects (e.g. the EBM Projects' 7L3 zinc reclamation project). In addition, there are two proposed solar development projects within 30 km of the project site (Environmental Screening Tool, 2019). A solar photovoltaic (PV) and concentrated solar power (CSP) development, with approved EA applications, under consideration. The EIA reference numbers for the developments are 14/12/16/3/3/1/569 and 14/12/16/3/3/2/706 respectively.

## 2.4 Description of the Activities to be Undertaken and the Infrastructure Plan

Ergo Mining (Pty) Limited (hereafter Ergo), intends to reclaim and reprocess gold residues from the Marievale tailings storage facilities (TSFs) Nos. 7L5, 7L6 and 7L7. The TSFs will be reclaimed by hydraulic mining. Water from hydraulic mining mixes with the unconsolidated material of the TSFs, resulting in a slurry. This slurry will be conveyed to the Ergo Processing Plant (hereafter Ergo Plant) for reprocessing using a newly constructed pipeline. Final deposition of the reprocessed slurry residue will be on the licenced Brakpan/Withok TSF.

The Proposed Project will investigate two alternative pipeline routes to convey slurry from the TSFs to the Ergo Plant for reprocessing; and return process water to the project site for reclamation. The pipeline configuration would consist of two, 600 mm diameter, slurry pipelines and one, 600 mm diameter, process water pipeline.

The **first alternative** pipeline route would be approximately 25 km long and made up of a two parts. The first part would be a 7 km extension from the project site to the Daggafontein Plant; while the second part would be a 17 km extension from the Daggafontein Plant to the Ergo Plant. This alternative is being considered due to existing surface right permits that run along this proposed route. The Daggafontein Plant is not part of the Proposed Project and is not owned by Ergo.

The **second alternative** route would be a 19 km extension from the Proposed Project site, directly to the Ergo Plant.

The proposed reclamation site will be situated in Zone 3 of the Gauteng Provincial Environmental Management Framework (GPEMF) (2018); and even though some parts of the proposed pipelines may be laid in Zones 1 and 5, they may require authorisation in terms of the National Water Act (Act No. 36 of 1998) (NWA) for Section 21 water uses. An Integrated Water Use Licence Application (IWULA) will 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 will be supported by a Technical Report and other necessary supplementary reports.

Major routes around the mine dumps are the N17 which runs parallel to and north of the dumps and the R51 which runs west of and perpendicular to the dumps. As far as possible, existing access roads will be utilised, and where this is not possible, these will be constructed as a two-by-two roadway, operating in both directions. Where access roads are to be constructed, these will be 4 m wide gravel road with storm water earth channels and mitre drains to protect the road structure from flood damage. Intersections will be properly designed to provide safe entry and exit in and out of the project area. Approvals from the provincial roads' authorities will be obtained where necessary.

Power will be supplied by Eskom and potable water will be purchased from Rand Water or the Ekurhuleni Municipality, with a contingency for portable JoJo tanks or connection to existing water pipeline infrastructure.

In terms of process water, the water cycle operates as a closed circuit, meaning that limited make-up water will be required for the reclamation of the Marievale TSFs.

Originally, water required for the reclamation activities was to be sourced from the existing Ergo central water storage facility located in Germiston and conveyed through existing and proposed process water pipelines to the project site for reuse in the closed-circuit system.

Technical challenges with the distance of transporting this water from Germiston to the Marievale site have resulted in there being a need to investigate alternative/supplementary water sources. These may include sourcing water from the existing Brakpan/Withok TSF, Daggafontein TSF or Marievale One and Two Shafts, wastewater treatment works, as well as the Trans-Caledon Tunnel Authority (TCTA) AMD treatment project. The available quantities and suitability of quality requires further investigation.

These options will be investigated and elaborated on during the EIA phase. Especially with regards to the TCTA option as the Blesbokspruit Wetland System obtains discharge from the TCTA upstream of the project site and any offtake would need to be evaluated against the total inputs to the wetland system. Similarly, any extraction from Marievale One or Two shafts would need to be investigated in terms of the greater groundwater environment.

The life of mine for the Proposed Project is expected to be 20 years. An estimated amount of 500 000 tons/month ramping up to 1.2 million tons/month of slurry is expected to be pumped from the Marievale TSFs to Ergo Plant for beneficiation.

Information that provides perspective on the scale of the Proposed Project is presented in Table 2-4 below. It should however be noted that this information may be refined further during the EIA Phase.

**Table 2-4: Project perspective and technical details.**

| Group | Specific | Details |
|---|---|---|
| **Mining** | Target Mineral | Gold, nickel, silver, pyrites and all associated minerals in mine tailings dams and dumps. |
| | Minable Area | The Proposed Project site covers a combined total area of approximately **140 Ha**. |
| | Depth of minerals | Only surface reclamation will be taking place. |
| | Extent of area for infrastructure | 0.5 Ha at each dump |
| | Product | Gold will be the primary product during the reclamation of the dams, although nickel, silver and associated metals are present in the tailings. |
| **Resource use** | Water demand | Process water in a closed circuit for hydraulic mining and mining activities. |
| | Power demand | Eskom |
| **Employment** | Staff allocation: construction | Continual Development |
| | Operating Times | 7 days a week- 24 hours a day |

## 2.5 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, and which may not commence without an EA from the Competent Authority (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 2-5 below contains all the listed activities identified in terms of NEMA, NEM:WA, and the EIA Regulations of 2014 (GN R982 of December 2014, as amended by GNR 326 of April 2017) 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) which may be triggered by the Proposed Project, and for which an application for EA has been submitted. The table also includes a description of those project activities which relate to the applicable listed activities.

The **DMRE** will act as the CA on the project.

The Commenting Authorities for the Marievale TSFs Reclamation Project are:

- Gauteng Department of Agriculture and Rural Development (GDARD);
- The Department of Environment, Forestry and Fisheries (DEFF);
- Department of Human Settlements, Water and Sanitation (DHSWS);
- Department of Environment, Forestry and Fisheries (DEFF);
- 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 Metropolitan Municipality (EMM).

**Table 2-5: Listed Activities Triggered by the Proposed Project.**

| Name of activity<br><br>*Mining (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, stormwater control, berms, roads pipelines, power lines, conveyors, etc.)* | Aerial extent of the activity (ha)[2]<br><br>*Ha or m²*<br><br>*Expressed in m² unless otherwise stated* | Listed activity<br><br>*Mark with an X where applicable or affected.* | Applicable listing notice as amended<br><br>*GNR 983 as amended by GNR 327, GNR 984 as amended by GNR 325 or GNR 985 as amended by GNR 324* | Waste management authorisation<br><br>*(Indicate whether an authorisation is required in terms of the Waste Management Act).*<br><br>*(Mark with an X)* | Water use licence authorisation[3] |
|---|---|---|---|---|---|
| Access roads routed from existing entry points. | | X | **GNR 983 – 24**<br><br>**GNR 985 – 4** | | |
| Temporary Site infrastructure (offices, change house, workshops). | | X | | | |
| •Satellite pump station / Reclamation Station | | X | **GNR 984 – 6** | **X** | **21(c) & (i)** |
| • slurry receiving facility | | X | **GNR 983 – 12; 13**<br><br>**GNR 984 – 6**<br><br>**GNR 985 – 2; 14** | **X** | |

[2] The total area of the mining and associated areas is approximately 16.04 hectares.

[3] 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 will be submitted to the Department of Water and Sanitation

| **Name of activity**<br><br>***Mining (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, stormwater control, berms, roads pipelines, power lines, conveyors, etc.)*** | **Aerial extent of the activity (ha)**[2]<br><br>***Ha or m²***<br><br>***Expressed in m² unless otherwise stated*** | **Listed activity**<br><br>***Mark with an X where applicable or affected.*** | **Applicable listing notice as amended**<br><br>***GNR 983 as amended by GNR 327, GNR 984 as amended by GNR 325 or GNR 985 as amended by GNR 324*** | **Waste management authorisation**<br><br>***(Indicate whether an authorisation is required in terms of the Waste Management Act).***<br><br>***(Mark with an X)*** | **Water use licence authorisation**[3] |
|---|---|---|---|---|---|
| • screening facility at the pump station | | X | **GNR 984 – 6** | **X** | |
| • storage | | X | **GNR 984 – 6** | **X** | |
| • transfer pumps in series | | X | **GNR 984 – 6** | **X** | |
| Power supply (transformers and 11kV powerlines) | | | | | |
| Stormwater systems, including: | | | | | **21(c) & (i)** |
| Process water pipeline | | X | **GNR 983 – 9; 19** | | **21(c) & (i)** |
| Overland slurry pipeline | | X | **GNR 983 – 10; 19**<br><br>**GNR 985 - 7** | | **21(c) & (i)** |

## 2.6 Environmental Authorisation Application: Activities and Infrastructure

### 2.6.1. Infrastructure intended for the project

The following infrastructure will be utilised on site:

- Two overland slurry pipelines of 600 mm in diameter;
- An overland return water pipeline of 600 mm in diameter;
- Reclamation pump stations;
- Water infrastructure, stormwater systems and spillage handling systems;
- Electricity reticulation;
- Temporary Administration buildings, including change houses and ablution facilities;
- Existing Emergency Stormwater Dams;
- Access roads, routed from existing entry points; and
- Construction contractors' yards (temporary facilities).

### 2.6.2. Method of Reclamation

Hydraulic Mining of Slimes Dams:

The proposed mining method which will be used to remove the slimes dams are referred to as top-down hydraulic mining. This technique uses high-pressure water monitors (or mobile tracked hydraulic monitors) to deliver a high-pressure water jet to excavate unconsolidated tailings material within the slimes dams hydraulically. The water from the cannon mixes with the tailings and forms a slurry with a high solids content. The slurry then flows under gravity along trenches at the base of the TSF to a collection sump which is positioned at the lowest elevation of the bench being mined.

At the sump, finger screens remove any debris that may impact pumping operations, and a penstock will control water flow into the sump. The position of the collection sump will change as the reclamation progresses. From the collection sump, the slurry reports to a reclamation station. To control the volume of water reporting to the reclamation station, flapper valves are used to hold, and release slurry contained

in the collection sump. This slurry is then pumped via pipelines to the Ergo Processing Plant. At the Ergo Plant, the slurry is prepared and treated for gold extraction and beneficiation.

**Figure 2-2: Mobile tracked hydraulic monitor on a tailings facility in South Africa**

Mining will take place in predetermined benches (or 'cuts') and will move unidirectionally until the entire dump has been reclaimed. Generally, 30 m cuts are made for reclamation as per Figure 2-3 below.

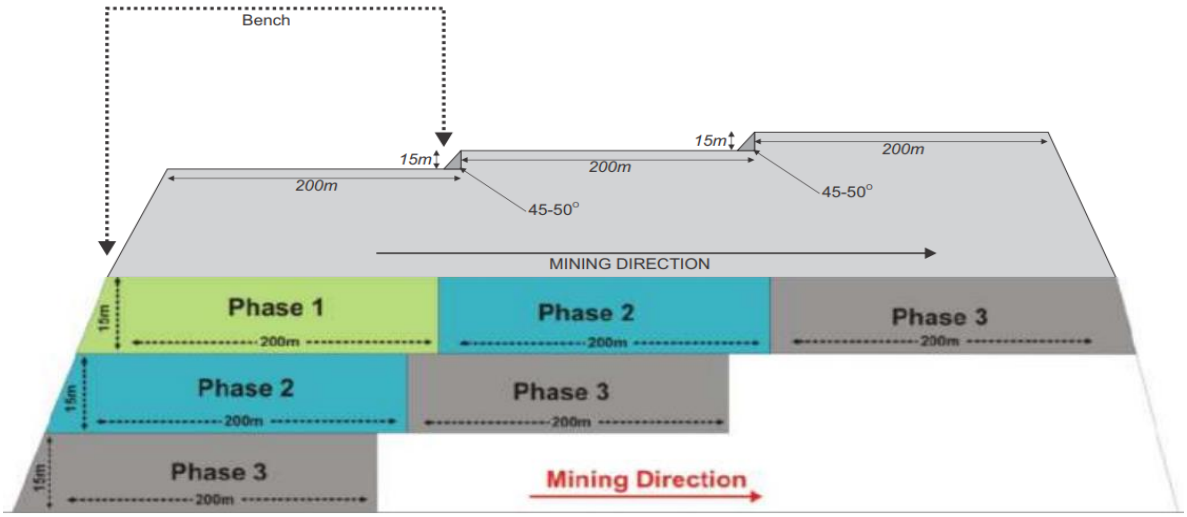



**Figure 2-3: Typical mining widths proposed for a gold reclamation project (Source: www.drdgold.com/investors-and-media/circulars/cpr-samrec-wrtrp-26022018.pdf).**

### 2.6.3. Rehabilitation

Once the dumps have been reclaimed, rehabilitated, cleared of radiation and closure has been agreed from the DMRE, the land will be shaped and revegetated to match the surrounding environment.

### 2.6.4. The Period required for Environmental Authorisation:

The anticipated period required for EA is **20 years.**

### 2.6.5. Works Schedule

The anticipated life span of the project is approximately 20 years. It is expected that there would be a 5 year construction and ramp-up period which would include, the placement of infrastructure and site preparation, a 10 year Life of Operation (LOO) where active hydraulic mining and mechanical removal would take place, a 2 year ramp-down period and 3 years to rehabilitate the reclaimed sites.

# 3 Policy and Legislative Context

This chapter provides an overview of the policy and legislative context relevant to the reclamation of the Marievale TSFs. 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 (Act No. 108 of 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, additional legislation and regulations have been promulgated in addition to those contained within the Constitution. The additional legislature 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 3-1: Applicable National Legislation and Guidelines

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| **The Constitution of South Africa, 1996 (Act 108 of 1996)**<br><br>Section 24 of the Act 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.<br><br>Section 32 of the Act 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.<br><br>Section 33 of the Act states that everyone has a right to just and procedurally fair administrative action.<br><br>The Marievale TSFs, along with mine works discharge, agricultural runoff and sewage effluent, have been identified as one of the pollution sources to the Blesbokspruit Wetland System (Ambani and Annegarn, 2015; McKay et al., 2018). The Proposed Project 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. | 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. The DSR was made available for public review & Draft EIA Report will be 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. |
| **The One Environmental System**<br><br>In terms of the One Environmental System established by the NEMLAA, an EA in respect of a reclamation operation 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. | Ergo proposes to reclaim the Marievale TSFs and submit the required documents within the prescribed timeframes. |
| **Mine Health and Safety Act (MHSA), Act 29 of 1996 (as amended):**<br><br>Although the Mineral and Petroleum Resources Development Act, 2002, does not apply to this project, Ergo operates in accordance to the MHSA and associated regulations. This includes creating a safe and healthy work environment | Although not strictly addressed in the Scoping Report or EMPr, protecting the environment contributes to a safe working environment. MHSA regulations will be worked into the |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| and providing the necessary protection and training to staff to ensure their health and safety is not compromised.<br><br>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 reclamation 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. | mine's Code of Practice (COP) and Standard Operating Procedures (SOPs). |
| **National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)**<br><br>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. In this regard the MPRDA specifically states that the NEMA principles apply to all prospecting and mining operations and any matter or activity relating to such operation and serve as guidelines for the interpretation, administration and implementation of the environmental requirements of the MPRDA.<br><br>NEMA authorises the Minister of the DEFF to issue Regulations relating to the administration of the Act[4], 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 | It is the objective of this application to align to NEMA.<br><br>The NEMA is the overarching Act governing sustainable development and the NEMA principles apply to all prospecting and mining operations (which included reclamation activities) and any matter or activity relating to such operation.<br><br>Listed activities as per the EIA 2014 Regulations, as amended, have been identified (refer to Chapter 2, subsection 2.5). |

4 Sections 24(5) and Section 44

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| 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.<br><br>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 an EMPr. This process is generally referred to as the S&EIR 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.<br><br>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 DMRE (the competent authority) and must, amongst others, include proof of payment of the prescribed application fee.<br><br>Regulation 21 provides for the submission of the Scoping Report to the DMRE (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 DMRE 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 DMRE, 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 DMRE must consider the reports and approve the EA are prescribed in regulations 21 to 24 of the EIA 2014 Regulations.<br><br>Once a decision on the EA application has been reached, the DMRE (the competent authority) must notify the applicant in writing of the decision and give reasons for the decision. | |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| **National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA)**<br><br>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[5]: 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 Waste Management Licence (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.[6]<br><br>Category A activities require a BAR process while Category B Activities require a S&EIR 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 the NEM:WA and residue stockpiles and residue deposits therefore fall within the ambit of the NEM:WA and its various regulations. Activity B 4(11) of GN 921, as amended by GN 633 of 24 July 2015 now refers to "the establishment or reclamation 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)". Since the Marievale TSFs are comprised of historic mineral deposits, the MPRDA does not apply and Activity B4(11) will likewise not apply. However, it must be noted that Schedule 3, Category A (Hazardous Waste) of NEM:WA itself adopts a definition for residue stockpiles precisely similar to the definition proposed for the MPRDA 3rd Amendment which never came into force. Accordingly, the Marievale TSFs must be regarded as waste accordingly and recovery operations would require a waste management licence, but in terms of Section 20 of the NEM:WA, not Activity B 4(11). | Listed activities as per the NEM: WA regulations have been identified (refer to Chapter 2, subsection 2.5). |

5 Published in Government Gazette 37083

6 The following National Norms and Standards have been published: Norms and Standards for Storage of Waste, 2013 (GN 926 of 29 November 2013); Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013 (GN 924 of 29 November 2013); and Standards for Scrapping or Recovery of Motor Vehicles, 2013 (GN 925 of 29 November 2013

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| In addition to the requirement for a WML for the mine discard dump (historic mineral deposits), the mine is likely to trigger the following waste activities, all of which require a Category B WML:<br><br>1) The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage;<br>2) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the MPRDA.<br><br>The EA and WML are being dealt with as integrated application. | |
| **National Water Act, 1998 (Act No. 36 of 1998) (NWA)**<br><br>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)).<br><br>In terms of the NWA a person may only use water without a license 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.<br><br>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 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:<br><br>(a) taking water from a water resource; | An IWULA will be required for the reclamation of the Marievale TSFs and will be submitted to the DHSWS. |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
|---|---|
| (b) storing water;<br>**(c) impeding or diverting the flow of water in a watercourse;**<br>(d) engaging in a stream flow reduction activity contemplated in Section 36;<br>(e) engaging in a controlled activity identified as such in Section 37(1) or declared under Section 38(1);<br>(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;<br>(g) disposing of waste in a manner which may detrimentally impact on a water resource;<br>(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;<br>**(i) altering the bed, banks, course or characteristic of a watercourse;**<br>(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<br>(k) using water for recreational purposes.<br><br>It is not likely that sub-sections **(a), (b), (d), (e), (f), (g), (h), (j) or (k)** will apply to the Proposed Project.<br><br>Water uses associated with the reclamation activities, **may** include the actual reclamation of the Marievale TSFs within 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.<br><br>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. | |
| **National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA)**<br><br>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 | NEM:BA was used to inform the activities triggered by Listing Notice 3 (refer to Chapter 2, subsection 2.5). |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| of indigenous biological resources. SANBI website and GIS tools were utilised to determine whether any nationally protected and threatened ecosystems occur on site. Therefore, NEMA Listing Notice 3 activities have been included in the EA application.<br><br>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. | |
| **National Environmental Management: Protected Areas Act (NEM:PAA), Act 57 of 2003 as amended**<br><br>The National Environmental Management Protected Areas 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 *inter alia*:<br><br>❖ The establishment of a national register of all national, provincial and local protected areas;<br>❖ The management of those areas in accordance with national standards; and<br>❖ Inter-governmental co-operation and public consultation in matters concerning protected areas.<br><br>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:<br><br>❖ Special nature reserve or nature reserve;<br>❖ Protected environment without the written permission of the Minister and the Cabinet member responsible for minerals and energy affairs; and<br>Protected area referred to in Section 9:<br><br>❖ (b) world heritage sites; and<br>❖ specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the | SANBI website and GIS tools were utilised to determine if the project area overlaps with CBAs. Some sections of the project area were rated as Protected Area (PA) and Ecological Support Area (ESA); while some parts of the proposed pipeline routes traverse Ecological Support Areas, Important Areas and Protected Areas. Therefore, it is anticipated that some restrictions will apply to the reclamation project in terms of protected areas (pending ground truth verification).<br><br>The Regulations were utilised to determine the need for any additional listed scheduled activities under GNR 985. |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| National Forests Act (No. 84 of 1998);<br><br>The Proposed Project is situated within 500 m of an important river (Blesbokspruit); within an important wetland and conservation area (Blesbokspruit Wetland System); and within a Protected Area (Marievale Bird Sanctuary Nature Reserve). However, the Proposed Project is neither a commercial prospecting nor mining activity but the reclamation of a pollution source from a protected site. Furthermore, the Proposed Project falls in an area identified in the 2018 Gauteng Environmental Management Framework's Focus Areas for land-based protected areas expansion. | |
| **National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)**<br><br>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.<br><br>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.<br><br>❖ The South African Heritage Resources Agency (SAHRA) will need to approve the heritage assessment undertaken as part of the impact assessment process.<br><br>The Marievale TSFs may represent 'Historical Settlements and Townscapes' as per the NHRA if they were established more than 60 years ago. The dumps and other associated mining infrastructure are integral components of the historical mining townscapes and settlements of the East Rand. This will be verified during the EIA phase of the project and if needed, appropriate authorisations will be sought via the NHRA. | A Heritage Impact Assessment will be undertaken as part of the EIA Phase and the assessment will be uploaded on the SAHRA web site along with the EIA Report. |
| **Conservation of Agricultural Resources Act (No. 43 of 1983)**<br><br>The Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) includes the use and protection of land, | The protection of land, soil, wetlands and vegetation and the control of weeds and invader plants will be contained within the EIA |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| 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:<br><br>❖ 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;<br>❖ Category 2: Declared invader species that are only allowed in demarcated areas under controlled conditions and prohibited within 30m of the 1:50 year floodline of any watercourse or wetland; and<br>❖ Category 3: Declared invader species that may remain but must be prevented from spreading. No further planting of these species is allowed.<br><br>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. | Report. |
| **The South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998)**<br><br>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.<br><br>The mine owner is responsible for:<br><br>❖ Offloading of the dangerous goods;<br>❖ Providing the dangerous goods offloading supervisor; and<br>❖ Ensuring that the loading and offloading are carried out by qualified employees trained in the relevant | The requirements of the Act and Regulations will be considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase. |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| procedures.<br><br>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. | |
| **Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) (SPLUMA)**<br><br>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. 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. | The Marievale TSFs are already in existence and fall within a Control Zone (Zone 3). |
| **Hazardous Substances Act, 1973 (Act No. 15 of 1973)**<br><br>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. | The requirements of the Act and Regulations will be considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase. |
| **National Development Plan, 2030**<br><br>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.<br><br>As a long-term strategic plan, it serves four broad objectives:<br><br>1. Providing overarching goals for what we want to achieve by 2030. | The requirements of this Plan will be considered when assessing the project impacts and developing the associated mitigation measures in the EIA Phase. |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| 2. Building consensus on the key obstacles to us achieving these goals and what needs to be done to overcome those obstacles.<br>3. Providing a shared long-term strategic framework within which more detailed planning can take place in order to advance the long-term goals set out in the NDP.<br>4. Creating a basis for making choices about how best to use limited resources.<br><br>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:<br><br>❖ Housing, water, electricity and sanitation;<br>❖ Safe and reliable public transport;<br>❖ Quality education and skills development;<br>❖ Safety and security;<br>❖ Quality health care;<br>❖ Social protection;<br>❖ Employment;<br>❖ Recreation and leisure;<br>❖ **Clean environment**; and<br>❖ Adequate nutrition<br><br>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. | |
| **Action Plan of the Environmental Initiative of the New Partnership of Africa's Development, 2003.**<br><br>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 | As the Proposed Project may result in the decrease of pollution affecting the Blesbokspruit Wetland System, the objectives of the NEPAD to systematically address and sustain ecosystems, biodiversity and wildlife |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| and sustain ecosystems, biodiversity and wildlife. Six areas have been identified:<br><br>❖ Combating land degradation, drought and desertification;<br>❖ **Conserving Africa's wetlands**;<br>❖ Preventing and controlling invasive alien species;<br>❖ Conservation and sustainable use of coastal and marine resources;<br>❖ Combating climate change in Africa; and<br>❖ Cross-border conservation and management of natural resources.<br><br>The Proposed Project is expected to contribute to the conservation of Africa's wetlands by removing a pollution source of the Blesbokspruit Wetland System. | will be considered during the EIA Phase of the project. |
| **South Africa's National Biodiversity Strategy and Action Plan**<br><br>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. In support of this goal, five key strategic objectives (SOs) have been identified, each with a number of outcomes and activities. The schematic below represents the objectives and their interconnection in achieving the NBSAP "Goal", although the project is related to reclamation, the following would still apply: | 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 will be taken into consideration during the EIA Phase. |

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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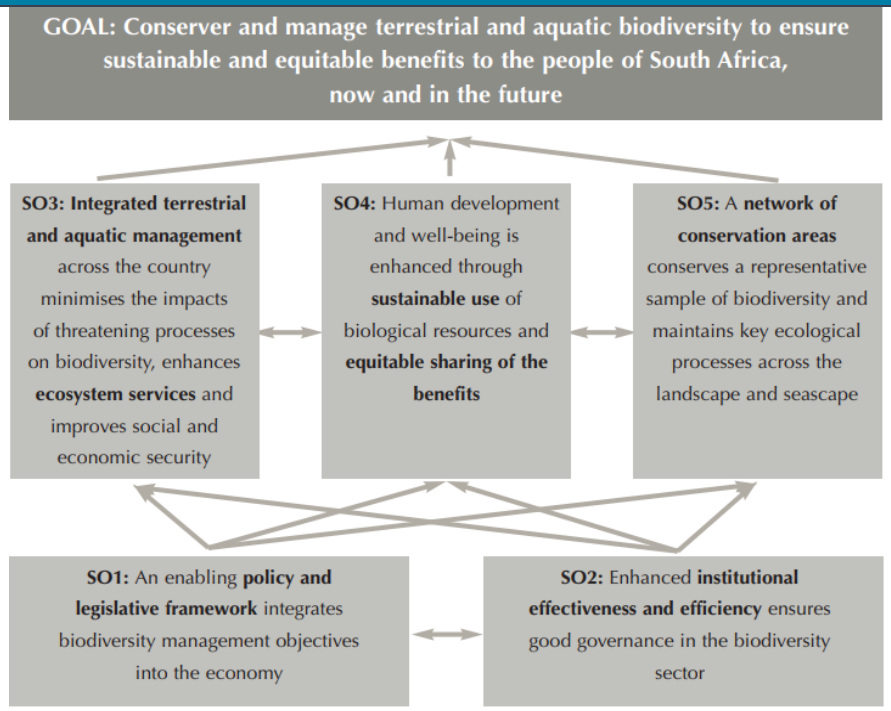


Through the NSBA, it is recognised that biodiversity cannot be conserved through protected area networks only. All stakeholders, from private landowners and communities to business and industry must get involved in biodiversity management.

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.

| Applicable Legislation and Guidelines used to compile the report. | Reference where Applied |
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| **Promotion of Access to Information Act, 2000**<br><br>❖ 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. | The requirements of the Act will be considered when assessing and involving the public and registered interested and affected parties. |
| **National Environmental Management Act; National Appeal Regulations, 2014**<br><br>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. | The requirements of the Act will be considered if an appeal may need to be or is lodged for the project. |

### Table 3-2: Applicable Provincial and Local Policies, Guidelines and By-Laws

| Policies, Guidelines and By-Laws | |
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| **Gauteng Mine Residue Areas Strategy, 2012**<br><br>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:<br><br>❖ To evaluate current pollution problems caused by mining activities and suggest how they should be addressed;<br>❖ To quantify the amount of land under mining activities and classify them in terms of impacts and potential for reclamation;<br>❖ To investigate which mining areas could be made available to be used for other purposes; and<br>❖ To provide preliminary and conceptual recommendations on the short-term priorities for the reclamation of the mining sites which could be economically sustainable. | The Proposed Project is in line with the objectives of the Strategy. The guidelines of the Strategy will be considered throughout the S&EIA process and reporting. |
| **Gauteng Nature Conservation Bill, 2014** | Aspects of this Bill are applicable to the Proposed Project. Where applicable, these |

| Policies, Guidelines and By-Laws | |
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| The Bill was established in 2014, and contains the following objectives:<br><br>❖ To provide for the sustainable utilization and protection of biodiversity within Gauteng;<br>❖ to provide for the protection of wild and the management of alien animals; protected plants; aquatic biota and aquatic systems;<br>❖ To provide for the protection of invertebrates and the management of alien invertebrates;<br>❖ To provide for professional hunters, hunting outfitters and trainers;<br>❖ To provide for the preservation of caves, cave formations, cave biota and karst systems;<br>❖ To provide for the establishment of zoos<br>❖ To provide for the powers and establishment of Nature Conservators;<br>❖ To provide for administrative matters and general powers; and to provide for matters connected therewith.<br><br>The Proposed Project is in close proximity to both the Blesbokspruit and Marievale Bird Sanctuary Nature Reserve; therefore, it is imperative for all phases of the S&EIA, as well those of the construction, operation and closure of the Proposed Project ensure the protection of biodiversity within Gauteng. | will be considered throughout the S&EIA process and will be included within the reporting documents. |
| **Gauteng Conservation Plan Version 3.3**<br><br>The main purposes of C-Plan 3.3 are:<br><br>❖ To serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;<br>❖ To inform protected area expansion and biodiversity stewardship programmes in the province;<br>❖ To serve as a basis for development of Bioregional Plans in municipalities within the province.<br><br>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. | Aspects of this Plan are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA process and will be included within the reporting documents. |

| Policies, Guidelines and By-Laws | |
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| **Gauteng Environmental Implementation Plan, 2016**<br><br>The purpose of the EIP is to:<br><br>❖ 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;<br>❖ Give effect to the principle of cooperative governance in Chapter 3 of the Constitution;<br>❖ Secure the protection of the environment across the country as a whole;<br>❖ 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<br>❖ Enable monitoring of the achievement, promotion and protection of a sustainable environment. | Aspects of this Plan are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA process and will be included within the reporting documents. |
| **Gauteng Growth and Development Agency Strategic Plan 2014-2019**<br><br>The main purpose of the GGDA Strategic Plan is:<br><br>❖ Addressing the persistent racial imbalances regarding ownership and general configuration of Gauteng's economy;<br>❖ Addressing the spatially distorted economic development legacy of apartheid rule;<br>❖ Broadening the base of economic development beyond the Province's dominant metropolitan municipal areas;<br>❖ The socio-economic transformation envisaged for the second phase of transition to a national democratic society; and<br>❖ Achieving the outcomes of creating decent work, economic inclusion and equality. | 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. |
| **Ekurhuleni Regional Spatial Development Framework,2015**<br><br>The Ekurhuleni Spatial Development Framework (SDF) provides a framework for making resource-effective decisions | Aspects of this SDF are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA |

| Policies, Guidelines and By-Laws | |
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| that can help mitigate the following identified issues in the municipal zone:<br><br>❖ Increasing pressure on the natural environment and green infrastructure;<br>❖ Urban sprawl and fragmentation;<br>❖ Spatial inequalities and the job-housing mismatch;<br>❖ Exclusion and disconnection emanating from high potential underused areas;<br>❖ Lack of securitisation and gated developments, and disconnected street networks (high cul-de-sac ratios and low intersection densities);<br>❖ Inefficient residential densities and land use diversity.<br><br>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. | process and will be included within the reporting documents. |
| **Ekurhuleni Environmental Management Framework (EMF), 2007**<br><br>The aim of the EMF for the EMM is to provide a framework that identifies and illustrates the general environmental characteristics of the municipality:<br><br>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 of development constraint zones identified in the EMF include:<br><br>❖ low to no constraint zone;<br>❖ agricultural constraint zone;<br>❖ geotechnical constraint zone;<br>❖ hydrological constraint zone; and<br>❖ ecological constraint zone. | Aspects of this EMF are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA process and will be included within the reporting documents. |

| Policies, Guidelines and By-Laws | |
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| The Proposed Project is within the vicinity of a protected and conservation area. These areas are identified as ecological constraint zones in the Ekurhuleni EMF. Guidelines discussed in the EMF, on these zones, will need to be considered throughout the S&EIR of the project. | |
| **Ekurhuleni Bioregional Plan (BRP), 2014**<br><br>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. EMM, together with the South African Biodiversity Institute (SANBI) and the Gauteng Department of Agriculture and Rural Development (GDARD), developed the EMM 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.<br><br>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:<br><br>❖ Critical Biodiversity Area One;<br>❖ Critical Biodiversity Area Two;<br>❖ Ecological Support Area One;<br>❖ Ecological Support Area Two;<br>❖ Protected areas;<br>❖ Important areas<br>❖ Other natural areas | Aspects of this EMF are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA process and will be included within the reporting documents. |

| Policies, Guidelines and By-Laws | |
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| The Project is expected to affect Ecological Support Areas, Protected Areas and Important Areas. | |
| **The Centre for Environmental Rights - Mining and your Community: Know your Environmental Rights**<br><br>To exploit a mineral, mining companies must get permission to mine from the government. This is known as an Environmental Authorisation. To get permission, the mining company is required to assess the environment and learn about the community and consult with everyone who will be affected by the proposed mining. The Guide published in 2014 by the CER discusses what rights communities and individuals who are affected by mining have, and what laws and processes must be followed by a mining company before it can start mining. | Even though the recovery of the Marievale TSFs is not mining governed by the MPRDA, this FSR incorporates the recommendations and guidelines listed in the guide when undertaking Public Participation (PP). All PP is implemented according to the requirements listed in the NEMA EIA Regulations of 2017.<br><br>Refer to Chapter 7 for an overview of Public Participation to be undertaken. |
| **The Gauteng Province Environmental Management Framework, 2014**<br><br>The Gauteng Department of Agriculture and Rural Development (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:<br><br>❖ To provide a strategic and overall framework for environmental management in Gauteng;<br>❖ Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng;<br>❖ Determine geographical areas where certain activities can be excluded from an EIA process; and<br>❖ Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making. | Aspects of this management framework are applicable to the Proposed Project. Where applicable, these will be considered throughout the S&EIA process and will be included within the reporting documents. |
| **The Public Participation Guidelines in terms of the National Environmental Management Act, 1998 Environmental Impact Assessment Regulations, 2017** | This guideline was used to ensure that all of the required steps are followed to ensure that a complete and successful public |

| Policies, Guidelines and By-Laws | |
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| 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. | participation process is conducted. |
| **Integrated Environmental Management Guideline on Need and Desirability, 2017**<br><br>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. | 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. |

# 4 The Need and Desirability of the Project

Historical underground mining operations on the Witwatersrand have left the area littered with Tailings Storage Facilities 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.

## 4.1 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 TSFs. However, the particulate matter associated with these areas can travel for kilometres, and pollution caused by decant can also be far reaching.

Dust is a human and animal health risk for a number of reasons. The dust usually contains fine particulate matter, which can be inhaled, causing damage to lung tissues. The dust also potentially contains a number of hazardous substances that can result in chemical toxicity. Tailings may have high levels of radioactive material which can cause radiological pollution. Collectively, the dust problem poses a significant health risk and reduces the quality of life for a large number of citizens. Furthermore, this undermines the credibility of the mining industry as a responsible corporate citizen (GDARD, 2012, p16). The approval of this project would eliminate the Marievale TSFs as a source of pollution to the surrounding areas.

According to the Gauteng Department of Agriculture and Rural Development (GDARD, 2011), 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 in finding a solution to these problems.

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 chemotoxic metals, as well as the

physical dangers inherent to mining sites (GDARD, 2012, pg16).

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 some of these suspected Uranium pollution sources and reducing the extent of exposure to surrounding communities.

### 4.2 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 back 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 land owners and adjacent communities.

### 4.3 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.

The Proposed Project is situated in Zone 3 of the Gauteng Provincial Environmental Management Framework (GPEMF) (2018), which are sensitive areas outside of urban areas. It is also directly adjacent to

the Blesbokspruit Wetland System and Marievale Bird Sanctuary Nature Reserve, Conservation and Protected Areas respectively. The project site is also situated in one of the focus areas for land-based protected areas expansion identified in the GPEMF (2018), it is anticipated that the land will be levelled and revegetated to match the surrounding environment after it has been rehabilitated.

## 4.4 The Gold Industry of South Africa

South Africa has been undergone a long-term decline in gold output, the share of South Africa's world gold production decreased from 14% to about 5%. This trend continued in 2018. 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.

The reprocessing and reclamation of the Marievale TSFs will help retrieve gold from the slimes dams. The revival of gold processing and recovery will add valuable tonnages to a declining market.

## 4.5 Conclusion: Need and Desirability

The overall objective of this project is to recover residual gold from tailings within three existing TSFs (7L5, 7L6 and 7L7). The resultant residue from the reprocessing plant will be deposited at the Brakpan/Withok facility. This will allow for the rehabilitation and clearance of land currently occupied by the Marievale TSFs.

The land being cleared could be seen as a secondary or consequential product. The clearing of land is an extremely important and positive benefit, as the removal of the TSFs would result in the removal of a water, land and dust pollution source to a highly sensitive surrounding environment, as well as costs associated with tailings dam maintenance. The land would be cleared to ground level and thereafter be available for a different land use. This could result in the reinstatement of the natural drainage lines of the Blesbokspruit and the subsequent expansion of the Blesbokspruit Wetland System, as well as an improvement in the biodiversity of the Marievale Bird Sanctuary Nature Reserve (McKay et al., 2018).

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. See Figure 4-1 below for the GDARD TSFs Decision Tree.

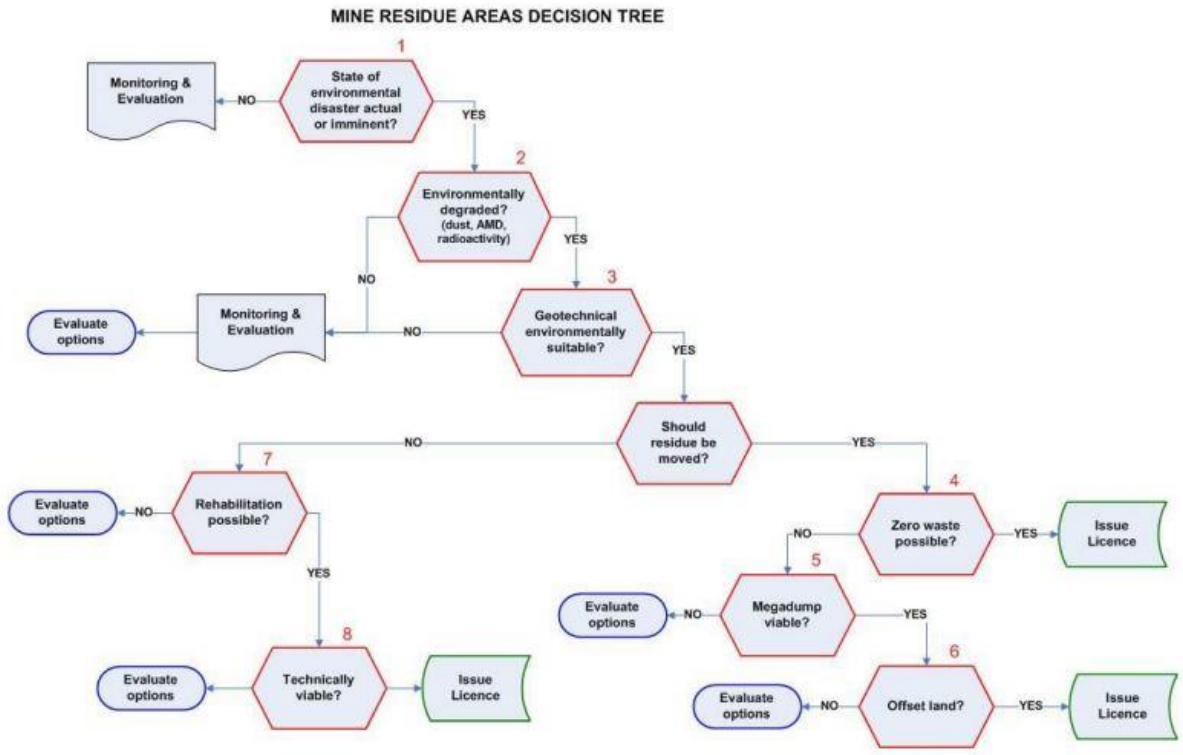


**Figure 4-1: GDARD's TSFs decision making tree as illustrated in the Gauteng Mine Areas Strategy (Source: GDARD, 2012).**

# 5 Period for which the environmental authorisation is required

The environmental authorisation (EA) is required for **20 years**. Subsequent amendments can be lodged as the operational structures change accordingly.

# 6 Description of the Process Followed to Reach the Proposed Preferred Site

The Marievale TSFs are existing facilities. For the proposed pipelines, it is anticipated that the route will be evaluated as part of the EIA process, and a site sensitivity assessment will be carried out. The assessment will be conducted using desktop and mapping data to ensure that the reclamation areas can be suitably positioned within the site boundary and servitude areas, and that areas of environmental sensitivity are avoided as far as practically possible. Environmental sensitivities which might be identified and mapped for the project may include the following:

- **Low Sensitivities**: Low sensitivity areas are likely to be transformed with the risk of significant ecological impact being very low.
  - Grazing areas and pastures
  - Areas of historically cultivated land
  - Areas that are already heavily modified
- **Medium Sensitivities**: Medium sensitivity areas are likely to contain natural vegetation without any known highly sensitive features.
  - Areas of natural vegetation
  - Protected environments that have been modified
- **High Sensitivities**: High sensitivity areas are likely to contain some sensitive ecological features or processes that need to be addressed before development can be considered.
  - Sensitive areas that are species specific
  - Non-perennial and perennial pans and watercourses identified under the National Freshwater Ecosystem Priority Area (NFEPA)
  - Farm dams
  - Sensitive areas with landscape and local corridors
- **Very High Sensitivities:** Very high sensitivity areas are potentially unsuited for development owing to their high ecological importance.
  - Areas identified under the Gauteng Conservation Plan (GCP) as “Optimal” or “Irreplaceable” Critical Biodiversity Areas (CBA).
  - Areas identified under the Gauteng Conservation Plan (GCP) as “Species Specific” Ecologically Sensitive Areas (ESA).
  - Areas identified under the Gauteng Biodiversity Sector Plan as “National Park/Nature Reserve” and a “Protected Environment: Natural” Protected Areas (PA).

Following the completion of the specialist studies during the EIA Phase of the project, the infrastructure Plans and the pipeline route will be amended, where practical and feasible, based on specialist recommendations to have the least possible negative environmental impacts.

## 6.1 The 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 FSR and are discussed in greater detail below. Kongiwe strives to seek alternatives that maximise efficient and sustainable resource utilisation and minimise environmental impacts.

### 6.1.1 The property on which or location where it is proposed to undertake the activity

The Proposed Project is the reclamation of already existing TSFs (7L5, 7L6 and 7L7). Therefore, there can be **no alternative sites**.

Currently the TSFs are passive mineral disposal areas with no other land use or development associated with them. The goal of reclamation will be to return the sites to a condition that most resembles the pre-mining condition. When the TSFs have been reclaimed, rehabilitated and cleared of radiation, a closure certificate will be obtained and the land will be levelled and revegetated to match the surrounding environment.

### 6.1.2 The type of activity to be undertaken

The only optional activity for Ergo is to reclaim and reprocess the existing Marievale TSFs. Gold reclamation and processing is the recovery and treatment of gold surface tailings generated from historical underground mining operations. According to DRDGold (2018), the retreatment business is high-volume and low-risk. Vast quantities of material are processed monthly through their plants to recover gold from old mine dumps at a recovery rate that varies depending on the material being treated.

The depleting quantity and quality of gold recovered from underground mining operations in the province versus the extensive safety and environmental risks, as well as the labour and electricity costs associated with the activity has seen an underlining increase in the attractiveness of gold tailings reclamation. This, together with the incentive to find a solution to Gauteng's TSF-related issues, has led to the 'Preferred Activity'.

**Table 6-1: The advantages and disadvantages of reclaiming and reprocessing of the Marievale TSFs – Preferred**

| OPTION | ADVANTAGE | DISADVANTAGE |
|---|---|---|
| Reclaiming and reprocessing of the Marievale TSFs (Preferred) | ❖ Low-technical-risk nature of tailings retreatment projects sets them apart from traditional underground operations<br>❖ Not labour intensive.<br>❖ Minimal safety issues.<br>❖ Easy access to surface tailings, as well as lower labour and operating costs.<br>❖ Boost to local economy.<br>❖ Removal of pollution source after rehabilitation and cessation of project. | ❖ Potential profits rely on substantial volumes of material.<br>❖ Potential negative environmental effects during construction and operational phase of the project.<br>❖ Not labour intensive. |

### 6.1.3 The Design and Layout of the Activity

The current layout plan alternatives for the Proposed Project are considered as the preferred layout plan. The layout plan is dictated by the existing location of the TSFs, their associated infrastructure and the routes of the proposed pipelines. The routes of these pipeline are limited to an existing servitude route or wayleave that is in favour of Ergo, where not existing, a new servitude, usufruct or wayleave will be sought.

The existing paddocks/stormwater dams may need to be desilted and/or reinstated. The paddocks are provided to capture storm water overflow from the TSFs in the event of a rain event, and for pump station overflows. If water accumulates within the storm water paddock below the pump stations it will be pumped back into the reticulation circuit.

The alternative layout plans for all other ancillary infrastructure will be assessed by specialist studies and will be addressed in the EIA phase.

### 6.1.4 The Technology to be Used in the Activity

The reclamation of the Marievale TSFs is the "Preferred Activity" and there are no alternatives. The dumps will be reclaimed using **Hydraulic Mining**. Other technology options which will be considered by Ergo for the reclamation of the Marievale TSFs are: Recycling initiatives, water conservation and electricity alternatives. These technology alternatives are discussed in greater detail below.

**Hydraulic Mining:**

Hydraulic mining is a method which uses a mobile, high-pressure water monitor to erode the slime dams in sections, washing the unconsolidated tailings material downstream (slurry) which is collected in a sump. Slimes dams are generally segregated by the coarseness of the material and grade of gold, and if a particular area of a dam is too coarse for pumping then blending is required. Once the required slurry density is obtained in the sump, and screening has prevented large objects from passing, the slurry is then pumped to thickeners and the underflow is reprocessed in a licenced processing plant. Waste material, after processing is then deposited onto a licenced TSF. A typical flow sheet for the reprocessing of a slimes dam is shown below:

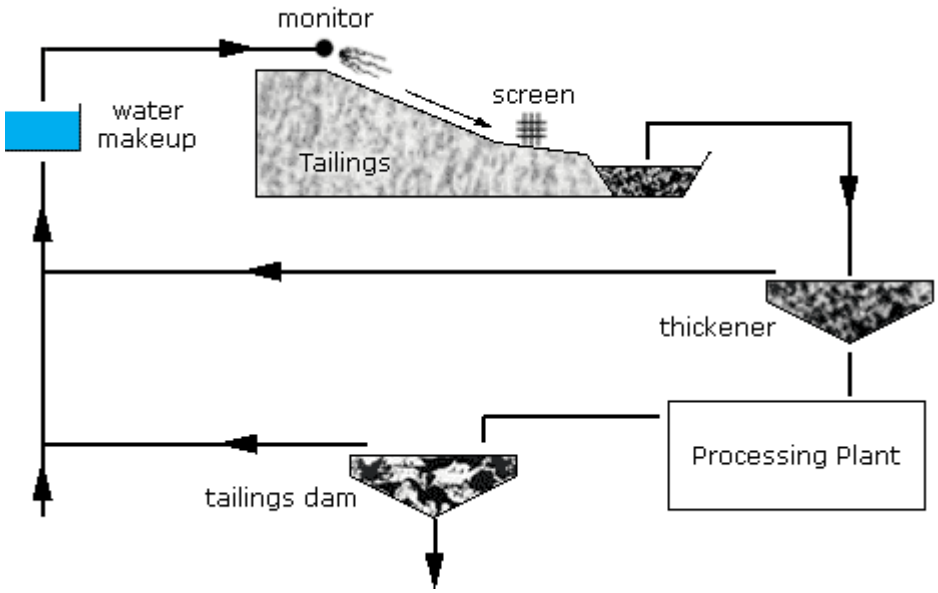


**Figure 6-1: A typical flow sheet for the reprocessing of a slimes dam**

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.

**Table 6-2: The advantages and disadvantages of hydraulic mining**

| OPTION | ADVANTAGE | DISADVANTAGE |
|---|---|---|
| Hydraulic Mining | ❖ Cost effective<br>❖ Easier to transport slurry for processing.<br>❖ Compatible with existing infrastructure.<br>❖ Lowered risks when compared to other methods of reclamation | ❖ Dust emissions which are to be mitigated<br>❖ Not very labour intensive, thus new employment opportunities are limited<br>❖ May cause environmental impacts if not done responsibly. |

**Recycling, Water and Electricity**

The reclamation of the Marievale TSFs 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 Rand Water, 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 reclamation of the TSFs. Water required for the reclamation activities will be recovered from recycled process water in the closed system. Fuel types will be investigated and energy conserving measures will be implemented where necessary.

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. The preferred options, in terms of recycling, water and energy have been described below for the Proposed Project.

### 6.1.5 The Operational Aspects of the activity

Two operational alternatives are being considered for the transportation of slurry and return water. There are no alternatives to the processing plant and depositional facility, as all reclaimed slurry will be processed at the existing Ergo Plant and deposition will take place at the licensed Withok/Brakpan TSF. See Figure 6-2. These alternatives have been described in detail below to visualise the alternative concepts. The final preferred alternative will be reported on in greater detail in the EIA phase of the project following recommendations and findings from independent specialist studies.

- **Alternative 1:** Marievale TSFs are reclaimed, and slurry is transported through two new, 600 mm diameter, pipelines from the lowest point at 7L7 to the old Daggafontein Plant which is about 7 km north-west of the dumps. Thereafter, the slurry is transported a further 17 km to the Ergo Plant for reprocessing. Final deposition will take place at the Withok/Brakpan TSF.
- **Alternative 2:** Marievale TSFs are reclaimed and slurry is transported via two new 19 km, 600 mm diameter, pipelines from the lowest point at 7L6 to the Ergo Plant for reprocessing. Deposition will also take place at the Withok/Brakpan TSF.

**Table 6-3: The advantages and disadvantages of each operational alternative considered**

| OPTION | ADVANTAGE | DISADVANTAGE |
|---|---|---|
| *Alternative 1: Daggafontein Plant, Ergo Plant, Brakpan/Withok TSF and associated slurry and return water pipeline (s)* | ❖ The plant and deposition facility are existing.<br>❖ The route avoids traversing through any watercourses.<br>❖ Welded, HDPE lined steel pipelines.<br>❖ The Brakpan/Withok TSF is currently used as the preferred deposition facility for most reclamation clean-up projects.<br>❖ The Plant has the capacity to recovery the intended quantities of gold. | ❖ Potential for tampering with infrastructure which could lead to mechanical failures and spillages.<br>❖ Security could be an issue during the construction of the above-ground pipeline.<br>❖ The proposed pipeline route is quite extensive.<br>❖ The proposed route traverses more residential areas. |
| *Alternative 2: Ergo Plant, Brakpan/Withok Tailings Storage Facility and associated slurry and return water pipeline (s)* | ❖ The plant and deposition facility are existing.<br>❖ The route avoids traversing through any watercourses.<br>❖ Welded, HDPE lined steel pipelines.<br>❖ The Brakpan/Withok TSF is currently used as the preferred deposition facility for most reclamation clean-up projects.<br>❖ The Plant has the capacity to recovery the intended quantities of gold.<br>❖ The proposed pipeline to be constructed will not traverse a great distance.<br>❖ The proposed route traverses less residential areas. | ❖ Potential for tampering with infrastructure which could lead to mechanical failures and spillages.<br>❖ Security could be an issue during the construction of the above-ground pipeline. |

### 6.1.6 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 short-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, and the availability of land for re-development would not occur. The only alternative land use is to leave the dumps as they stand; there is no other potential use of the space as the project area is

a cluster of polluting historic mine dumps that impact upon the surrounding biophysical and social environment.

The “No-Go” Option also assumes the continuation of the current land use, implying the absence of any reclamation activities and associated infrastructures. The 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.

The ‘No Project’ alternative is not preferred due to the anticipated benefits of the proposed reclamation project. The expected indirect benefits resulting from the reclamation of the Marievale TSFs include:

- Removal of a source of pollution and radiation in 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.
- Removal of a pollution source to the Blesbokspruit Wetland System and the associated Marievale Bird Sanctuary Nature Reserve.

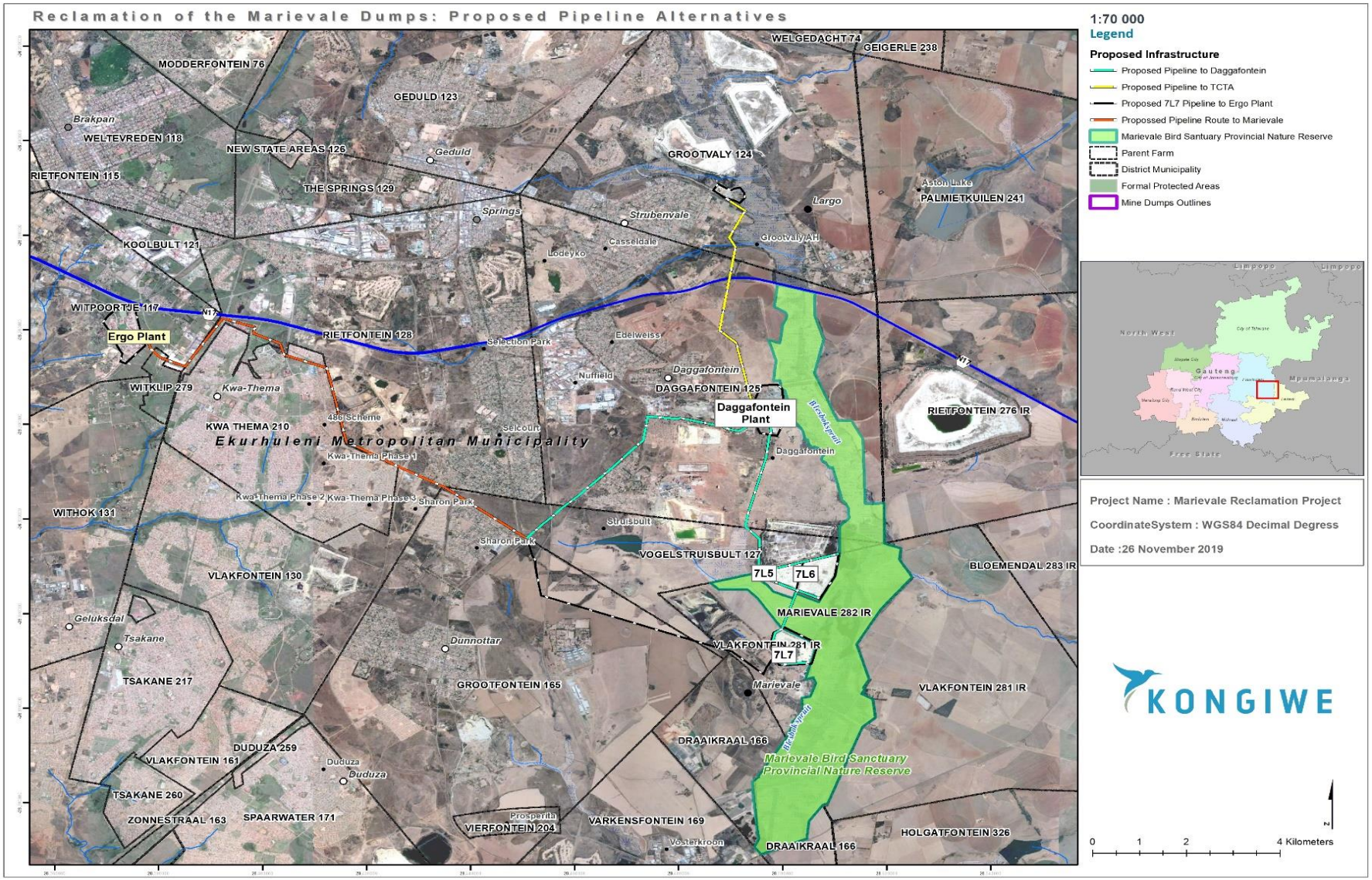


**Figure 6-2: Pipeline alternatives for the Proposed Project**

# 7 Public Participation

The public participation process offers stakeholders a fair opportunity to be informed about the proposed project, to raise issues of concern and to make suggestions for enhanced project benefits. The public participation process (PPP) has been developed to ensure compliance with the Environmental Authorisation and an Integrated Water Use Licence Application for the Reclamation of the Marievale Tailings Surface Facilities, City of Ekurhuleni Metropolitan Municipality, Gauteng Province.

## 7.1 Public Participation Process Objectives

**The PPP objectives are to:**

- Ensure that stakeholders are informed about the Proposed Project;
- Provide stakeholders the opportunity to participate in the process and provide comment;
- Draw on local knowledge by identifying environmental and social concerns associated with the Proposed Project;
- Involve stakeholders in identifying ways in which concerns can be addressed;
- Verify that stakeholder comments have been recorded; and
- Comply with the legal requirements.

The PPP has four phases of consultation with stakeholders during the environmental regulatory process. These are presented in **Table 7-1** below:

**Table 7-1: Activities undertaken and to be undertaken during the public participation process**

| PROJECT PHASE | ACTIVITIES UNDERTAKEN |
|---|---|
| **Pre-scoping Phase** | ❖ Identification of stakeholders;<br>❖ Providing project information to Stakeholders;<br>❖ Consultation with Stakeholders; and<br>❖ Obtaining comments, suggestions and concerns from Stakeholders. |
| **Scoping Phase**<br><br>**(WE ARE HERE)** | ❖ Consult with Directly Affected Landowners<br>❖ Distribution and placement of project announcement materials;<br>❖ Updating of the Stakeholder database;<br>❖ Making the Scoping Report available for public comment;<br>❖ Providing Stakeholders with further details of the Proposed Project and associated specialist studies;<br>❖ Consult with Stakeholders;<br>❖ Obtaining further comments, suggestions and concerns from Stakeholders; and<br>❖ Informing specialists and the proponent of stakeholder comments. |
| **EIA Phase** | ❖ Provide feedback about the specialist studies conducted and mitigation measures proposed by means of consultation with Stakeholders;<br>❖ Make the relevant environmental reports available for public comment;<br>❖ Consult with Stakeholders; |

| PROJECT PHASE | ACTIVITIES UNDERTAKEN |
|---|---|
| | ❖ Provide opportunity for Stakeholders to comment on specialist findings, impacts assessments and recommendations;<br>❖ Verify that comments raised by Stakeholders have been accurately recorded; and<br>❖ Inform specialists and the proponent of stakeholder comments. |
| **Decision Making Phase** | ❖ Once the competent authority 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 will be explained. |

### 7.2 Summary of issues raised by stakeholder's

Comments raised by stakeholders during the draft scoping phase have been included in the Comments and Responses Report (CRR) of the Final Scoping Report.

### 7.3 Submission of Application Form

An application for an Integrated Environmental Authorisation listed in terms of the National Environmental Management Act, (Act No. 107 of 1998) (NEMA) was submitted to the Department of Mineral Resources on 15 October 2019. An acknowledgement letter from the DMRE was received on 28 October 2019 and the following reference number ***(GP 30/5/1/1/2 (000007BP) BAR*** was assigned to the proposed project- Please see Appendix C7 for a copy of an acknowledgement letter.

### 7.4 Identification of Stakeholders

To ensure representation of stakeholders, the methods below were utilised to develop a comprehensive stakeholder database.

- ❖ WinDeed searches were undertaken for farm portions in and around the project site to verify land ownership and obtain contact details;
- ❖ Desktop and online research;
- ❖ Stakeholder networking and chain referral systems - this entailed the following activities:
    - Telephonic consultations and meetings with landowners, National, Provincial and Local Government and other representatives; and
    - A site visit was undertaken in an effort to identify I&APs for which no contact details could be obtained;
    - Consultation meetings with the ward councillors;
    - Additional Windeed searches.

Stakeholders identified who are affected by or interested in the Proposed Project are grouped into the following broad categories:

- Government: National, Provincial, District and Local Authorities;
- Parastatals: Various semi-Government entities, Organs of State;
- Landowners: Directly or indirectly affected and adjacent;
- Land occupiers: Directly or indirectly affected and adjacent;
- Surrounding communities
- Labour Unions;
- Agriculture and Water: Farmers associations, entities responsible for water management and/or regulation;
- Non-Governmental Organisations (NGOs): Environmental organisations, community-based organisations; and
- Business and industry: small to medium enterprises, mines, industrial and large business organisations.
- Mature Reserves.

A Stakeholder database has been compiled and will be updated throughout the environmental regulatory process **(refer to Appendix C1)**.

### 7.5 Land Claims

A formal enquiry, which contained a list of all the directly affected properties for the project, was submitted to the Land Claims Commission, Gauteng Department of Agriculture, Land Reform and Rural Development (DALRRD) on **Thursday, 17 July 2019 (refer to Appendix C2).** Feedback was received by means of letters dated **Wednesday, 30 October 2019 (refer to Appendix C2)** indicating that there are land claims on the following properties:

- Portion 1 (RE), 93 (RE), 104, 113 (RE), 117 (RE), 122, 122, 123, 125, 126, 127 (RE), 128, 146, 151 (RE), 159, 180, 181, 182, 196, 197 and 199 of the farm Daggafontein 125 – Registration Division IR, Gauteng;
- Portion 0 (RE), 10, 35, 52 (RE), 82, 85, and 99 of the farm Grootfontein 165 – Registration Division IR, Gauteng;
- Portion 10, 85, 97 and 96 of the farm Vlakfontein 130 – Registration Division IR, Gauteng;
- Portion 1 (RE), 150, and 1558 of the farm Witpoortje 117 – Registration Division IR, Gauteng.

### 7.6 Public Participation Materials

Considering the legislative requirements and good practice, the following documents below have been developed and distributed to stakeholders. The various PPP materials which were used during the Pre-Scoping and Scoping Phases are included as appendices to this report.

**Background Information Document (BID):** The BID (**Appendix C3**) provides aims to provide important information regarding the following:

- Project description;
- The Environmental Impact Assessment and the Public Participation Process to be undertaken in support of the reclamation process and relevant contact details;
- An Integrated Water Use Licence Application process;
- Details about how stakeholders can register as an Interested and Affected Party (I&AP) and be kept informed about the project developments;
- The public review and comment period for the Draft Scoping Report; and
- An invitation to attend an open day.

**The BIDS were distributed as follows:**

- Emailed to all stakeholders on the database,
- Hand delivered to the directly affected and surrounding landowners and public places; and
- The BID is available on Kongiwe's website (under public documents).

**Newspaper advertisements:** Newspaper advert (**Appendix C4**) was placed in The Springs Advertiser, a local newspaper on **Thursday, 24 October 2019** within project area. The newspaper advertisement provided the following details:

- Brief project description;
- Applicable listed activities;
- Information about availability of the DSR;
- Invitation to an open day;
- Registration as I&APs;
- Contact details of the public participation team.

**Site notice:** Site notices were developed to announce the Proposed Project and were placed in various public places. The information included in the site notice was similar to the information provided in the newspaper advertisement. A locality map of the project site was included in the site notice. Pictures and Co-ordinates of where the site notices were placed were recorded in the site notice report. **(Please refer to Appendix C5 for a copy of the site notice and the site notice report).**

**Notification Letter with a Comment and Registration Form:** A notification letter was sent to stakeholders on **Wednesday, 16 October 2019** to inform them about the Proposed Project, applicable legislation and competent authorities. The letter also shared details of the open day and invited stakeholders to register formally as stakeholders. A Registration Form was also provided for stakeholders to use for formal registration as stakeholders or to submit comments. (See **Appendix C3**). A reminder email was sent on **Monday, 4 November** to all stakeholders to inform them of the availability of the Draft Scoping Report public review period and the open day **(Appendix C6).**

**Telephonic discussions:** Stakeholders were also consulted by means of telephonic discussions. Furthermore, these discussions aided with the process of invitations to the open day.

### 7.7 Stakeholder Consultations

**Pre-scoping consultation:** Pre-scoping consultation with key stakeholders is aimed at providing stakeholders with an overview of the Proposed Project and to obtain initial comments which informed specialist studies and project planning. This will be done by means of a PowerPoint Presentation and a map showing the properties. Pre-consultation meetings will be held with the Competent and Commenting authorities and Environmental Non-Governmental Organisation. Meetings will also be held with the directly affected landowners on a one-on-one basis. Minutes of these meetings will be compiled and distributed to stakeholders. Refer to **(Appendix C8)** for a list of meetings and consultations that were undertaken.

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

**Open Day**

An Open Day was held on **Saturday, 09 November 2019, from 10H00 until 15H00 at the Grootvaly Blesbokspruit Wetland Reserve in Welgadacht Road in Springs.** The purpose of the open day was to discuss the proposed project, contents of the Draft Scoping Report, to provide stakeholders with an opportunity to raise their concerns/comments and also to interact with the project team members. Minutes from the open day have been compiled and distributed to all stakeholders on the database. **(Appendix C8).**

Mobilisation of stakeholders was done for Authorities, NGOs, landowners / land occupiers and community members to promote attendance, by means of telephonic consultation and distribution of emails and Short Message Services (SMS).

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Mobilisation of stakeholders was done for Authorities, NGOs, landowners / land occupiers and community members to promote attendance, by means of telephonic consultation and distribution of emails and Short Message Services (SMS).

**Figure 7-1: Pictures from the Open Day held on Saturday, 9 November 2019.**

All comments raised by stakeholders have been captured into the CRR **(Appendix C9).** Stakeholder comments will be closely considered and addressed, where applicable, by the project team to ensure that the scope for specialist studies to be undertaken is well defined. Responses will be provided to the comments raised by stakeholders and included in the CRR throughout the PPP.

Comment sheets and electronic copies of the Draft Scoping Report were made available at the open day.

**Availability of the Draft Scoping Report for public review and comment**

The Draft Scoping Report (DSR) was made available to stakeholders for a 30-day commenting period from **Tuesday, 23 October 2019 to Wednesday, 21 November 2019** (please refer to Table 7-2 for a list of places where the report could be accessed). Notification of the availability of the documentation for review was distributed on **Wednesday, 16 October 2019.**

**Table 7-2: Public places where the Draft Scoping Report was accessible**

| Location | Physical Address | Contact person |
|---|---|---|
| **Hard copies** | | |
| Dunnottar Public Library | 47 Rhodes Avenue, Dunnottar | Mr Shelton Mmisi (Librarian) (011) 999 9118 |
| Kwa-Thema Public Library | 7019 Nkosi Street, Kwa-Themba, Springs | Ms Portia Mosetlhe (Librarian) (011) 999 8494 |
| **Electronic copies** | | |
| Kongiwe Environmental website | www.kongiwe.co.za/ public documents | Sibongile Bambisa / Vanessa Viljoen |
| For a CD copy please contact the stakeholder engagement team (Sibongile Bambisa/ Vanessa Viljoen), Tel: (012) 003 6627, Email: stakeholders@kongiwe.co.za | | |

The DSR was distributed to the Competent Authority, the Department of Mineral Resources and Energy (DMRE) and key Commenting Authorities.

**Key Commenting Authorities that have received copies of the DSR are as follows:**

- Department of Human Settlements, Water and Sanitation (DHSWS);
- National Nuclear Regulator (NNR);
- Gauteng Department of Agriculture and Rural Development (GDARD);
- National Department of Health (DoH);
- Johannesburg Health District;
- South African Heritage Resources Agency (SAHRA);
- Department of Public Works and Infrastructure (DPW);
- Department of Environment, Forestry and Fisheries (DEFF);
- Ekurhuleni Metropolitan Municipality (EMM)

Table 7-3 below provides details of the activities that formed part of the Draft Scoping Phase.

**Table 7-3: PPP activities during the Draft Scoping Phase**

| Activity | Details | Reference in Scoping Report |
|---|---|---|
| **Pre-scoping Phase** | | |
| Identification of stakeholders | Stakeholders, were identified by means of WinDeed searches, stakeholder networking and research for the compilation of a stakeholder database. | Appendix C1<br><br>Stakeholder database |
| Identification of land claims | A formal enquiry, which contained a list of all the directly affected properties for the project, has been submitted to the Land Claims Commission, Gauteng Department of Agriculture, Land Reform and Rural Development (DALRRD) on **Thursday, 17 July 2019 (refer to Appendix C2).** Feedback was received by means of letters dated **Wednesday, 30 October 2019 (refer to Appendix C2)** indicating that there are land claims on some of the properties. | Appendix C2<br><br>Land claims letters |

| Activity | Details | Reference in Scoping Report |
|---|---|---|
| Development of the Background Information Document | The BID was developed and emailed to the full stakeholder database on **Wednesday 16 October 2019**. The BID was also distributed at stakeholder meetings, libraries and it is available on Kongiwe's website. | Appendix C3<br><br>BIDs |
| Placing of media advertisements | An advertisement was placed in the Springs Advertiser on **Thursday, 24 October 2019**. | Appendix C4<br><br>Advertisements |
| Placing of site notices | Site notices were placed within publicly accessible places that are within proximity of the project area on **Tuesday, 29 October 2019**. Site Notices were placed at the following locations:<br><br>❖ Marievale Bird Sanctuary Nature Reserve;<br>❖ Dunnottar Public Library;<br>❖ Kwa-Thema Public Library;<br>❖ Blesbok Shooting Range;<br>❖ Nigel Marievale Road; and<br>❖ Oasis Café.<br><br>A site notice placement report and map have been developed, indicating the exact locations where site notices were placed, with photos and GPS coordinates. | Appendix C5<br><br>Site notice report and placement map |
| Announcement of the project and Draft Scoping Report | The announcement letter was emailed to the full stakeholder database on Wednesday, 16 October 2019 to:<br><br>❖ Announce availability of the DSR;<br>❖ Share information about the open day;<br>❖ Indicate where the DSR was available for public review and comment; and<br>❖ Provide the public comment period.<br><br>The Draft Scoping Report was also made available on Kongiwe's website http://www.kongiwe.co.za/publications-view/public-documents/ | Appendix C6<br><br>Announcement Letter |
| Stakeholder meetings | One-on-one meetings and focus group meetings were held with Authorities and Directly Affected landowners, which is still ongoing. A list of meetings and minutes of these meetings will be compiled and distributed.<br><br>A high-level overview of the Proposed Project was discussed, and stakeholder comments have been captured into and responded to in the CRR. | Appendix C8<br><br>List of meetings & Meeting Minutes<br><br>Appendix C9<br><br>Comment and Response Report |

| Activity | Details | Reference in Scoping Report |
|---|---|---|
| Open Day | An open day was held with stakeholders from **10H00 – 15H00 at the Grootvaly Environmental Centre, 9 November 2019**. Minutes of this meeting were distributed to everyone who attended the meeting. Comments raised from the meeting have been included in the Comment and Response Report. | Comments and Response Report |

### 7.8 Consultation Undertaken as Part of The Final Scoping Phase:

The aim of consultation during the scoping phase is to focus on the formal EIA process, specialist impact studies, terms of reference and addressing stakeholder comments already submitted. Stakeholders were notified of the availability of the Final Scoping Report for review on Thursday, 28 November 2019 **(Appendix C6)**. In the submission of the FSR, stakeholders will have the opportunity to verify that their comments were captured during the draft scoping phase, and to review responses provided by the project team.

**Table 7-4: PPP activities to be undertaken during the Final Scoping Phase**

| Activity | Details | Reference in the EIA Report |
|---|---|---|
| Update of stakeholder information | The stakeholder database will be updated with new Stakeholders who formally registered, attended stakeholder meetings or submitted comments. | Appendix C1<br><br>Stakeholder database |
| Placement of Final Scoping Reports | The Final Scoping Report will be made available on the Kongiwe Environmental website http://www.kongiwe.co.za/publications-view/public-documents/ | |
| Announcement of the Final Scoping Report | Announcement letter of availability of the Final Scoping Report for comment will be emailed to the full stakeholder database on **Thursday, 28 November 2019**. | Appendix C6<br><br>Announcement Letter |

### 7.9 Consultation with Stakeholders during the EIA Phase

Consultation with stakeholders during the EIA Phase will involve stakeholders providing comments on specialist study findings, recommendations and mitigation measures proposed. These studies and recommendations will be included as part of the Environmental Impact Assessment Report and the Environmental Management Programme EIA/EMPr. An Open Day will also be held to present the findings of the specialist studies and to obtain comments from stakeholders.

### 7.10 Consultation during the decision-making phase

Once the competent authority 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.

# 8 The Baseline Environment

At this stage of the scoping phase, only high level desktop baseline studies have been conducted; however, specialist studies are ongoing and findings will be included in the EIA stage.

## 8.1 Climate

The Marievale TSFs are situated within the Highveld climatic zone. The Highveld is characterised by warm, rainy summers; while winters are typified by mild to warm days and cold, frosty nights. The area receives mean annual rainfall of about 400 to 900 mm.

Mean maximum temperatures range from 21 to 24°C, and mean minimums range from 3 to 6° C, with temperatures sometimes reaching 38° C in the summer and -11°C in the winter (WWF, 2018). The area experiences strong winds during the month of August. The warmest months occur from October through to March; whereas the coolest months occur over the period of May to August. See Figure 8-1 below.

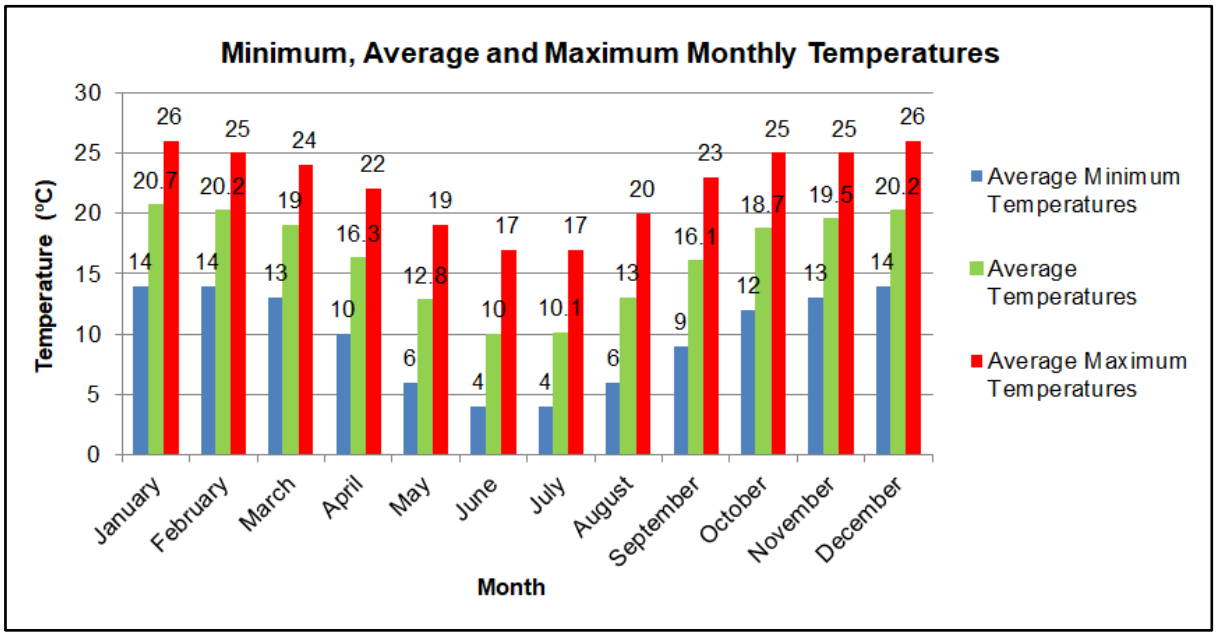


**Figure 8-1: Minimum, average and maximum monthly temperatures for the Project**

## 8.2 Topography

The Highveld inland plateau has an elevations varying from 1 400 m to 1 800 m (Johannesburg 1 757 m), prominent morphological features in the area include historic mine dumps which rise to about 50 - 60 m above ground. The local terrain morphology has been classified as undulating plains (GPEMF, 2014).

## 8.3 Geology

The Proposed Project area is located within the Central Rand Goldfields of the Witwatersrand Supergroup. The Central Rand Goldfield's are geologically one of the most interesting and economically significant areas in South Africa's history (Figure 8-2). Having yielded more than one third of all the gold ever produced on the planet, the Witwatersrand Basin held the world's largest gold reserves (Tucker et al., 2016).

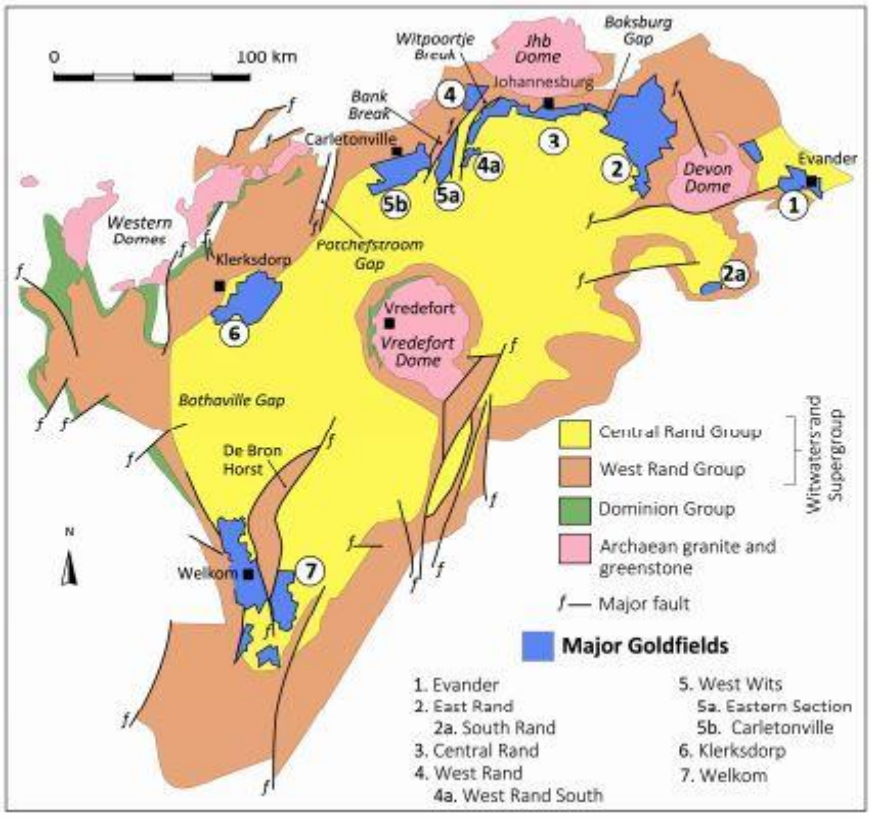


**Figure 8-2: The geology of the Witwatersrand Basin stripped of younger cover and showing the position of the seven major goldfields (Source: Tucker *et al.*, 2016).**

The Witwatersrand Supergroup comprises of a lower "West Rand Group (WRG)" and an upper "Central Rand Group (CRG)" (SACS, 1980). The continuity of the major geological units, marker horizons and individual conglomerate reef horizons around the auriferous northern and western basin edges, are features of the Witwatersrand as exemplified by the major stratigraphic units of the Central Rand Group.

The WRG comprises of the lower Hospital Hill Subgroup; middle Government Subgroup and upper Jeppestown Subgroup. The shales of the WRG are characterised by the presence of magnetite bearing interlayers. These layers played a significant role during deep basin exploration, as they were used as magnetic markers.

The CRG contains by far the bulk of the gold mineralisation. It is divided into a lower Johannesburg Subgroup and an upper Turffontein Subgroup. These Subgroups are separated by the Booysens Shale Formation, often called the "Upper Shale marker" in the Welkom Goldfield. The Central Rand Group comprises a number of formations which, although varying in thickness, can be traced and correlated, with a few exceptions, in all the goldfields. The gold-bearing conglomerate reefs tend to occur in clusters which are informally referred to as "reef groups". All of the important gold reefs lie on prominent unconformity surfaces, many of which can be traced around the entire basin.

According to Tucker et al. (2016), another characteristic of the Witwatersrand mining area is a series of cross-cutting lineaments representing faults and dykes. The dykes are not 100% impermeable and fault appearance varies from a hairline width to large breccia filled widths and faults are commonly filled with intrusive material. The geology underlying the project area consist of the Turffontein and Johannesburg Subgroups of the Central Rand Group.

## 8.4 Soils, Land Capability and Land Use

### 8.4.1 Soils

According to a report by Environmental Assurance (2017), the soils in and around the project area are derived from underlying sandstone and clay, dolomite and chert, as well as tillite and diamicite of the Vryheid, Chunispoort and Dwyka Formations respectively. The soil types include Avalon (Av), Hutton (Hu), Katspruit (Ka), Rensburg (Rg), Witbank (Wb), and Wasbank (Wa).

The report further explains that the dominant soil in the area is **Avalon**, which is characterised by pinkish grey, structureless, sandy loam topsoil on brown to yellow-brown, structureless, non-calcareous, well drained sandy clay loam subsoil, underlain by mottled brown, non-calcareous soft plinthic.

In the higher areas just west of the dumps red, structureless, sandy loam topsoil on red, structureless, non-calcareous sandy clay loam subsoil occurs. The soil is well-drained and belongs mainly to the **Hutton** soil form. In the lower areas, the water table is present for longer and occurs higher in the soil profile, causing a cemented, mottled, hard plinthic subsoil. This gives rise to a pinkish-grey to brown, structureless, loamy sand topsoil on a hard plinthic B horizon. The dominant soil form is **Wasbank**. Areas with this soil are not cultivated, because of a shallow rooting depth.

In some areas, water tables occur close to the surface during the wet season. The dominant soil consists of a grey, moderately structured, non-calcareous, clay loam topsoil on a mottled grey, clayey calcareous subsoil gley horizon. The dominant soil form is **Katspruit**. Around dump 7L7, a narrow strip of soils with swelling clays occurs. The soils consist of dark-brown, moderately structured, calcareous clays on dark,

swelling calcareous clays overlying a gleyed horizon. This dominant soil form is **Rensburg**. The soils immediately surrounding dumps 7L5 and 7L6 are very disturbed and can only be classified as belonging to the **Witbank** form (man-made soil materials).

### 8.4.2 Land Capability

The assessment of agricultural potential rests primarily on the identification of soils that are suited to crop production. For soils to qualify as high potential soils they require the right properties such as a deep profile, sufficient clay and rock content, a good structure and distribution, as well as good internal and external drainage (Cambardella and Karlen, 1999). Based on this, Avalon and Hutton soils hold the highest agricultural potential around the project area. However, due to the mining history of the area, the land has been significantly modified and degraded.

### 8.4.3 Land Use

According to the Gauteng Provincial Environmental Management Framework (2018), the Proposed Project area is in a High Control Zone (Zone 3) and these zones are defined as sensitive areas that fall outside of Urban Zones. These areas are sensitive to development activities and in several cases also have specific values that need to be protected (GPEMF, 2018).

The current land uses of the surrounding areas are typified by mining and agricultural activities, dispersed settlements, sensitive areas (i.e. the Marievale Bird Sanctuary Nature Reserve and Blesbokspruit Wetland System) and sections of TSFs. See Figure 8-3 below.

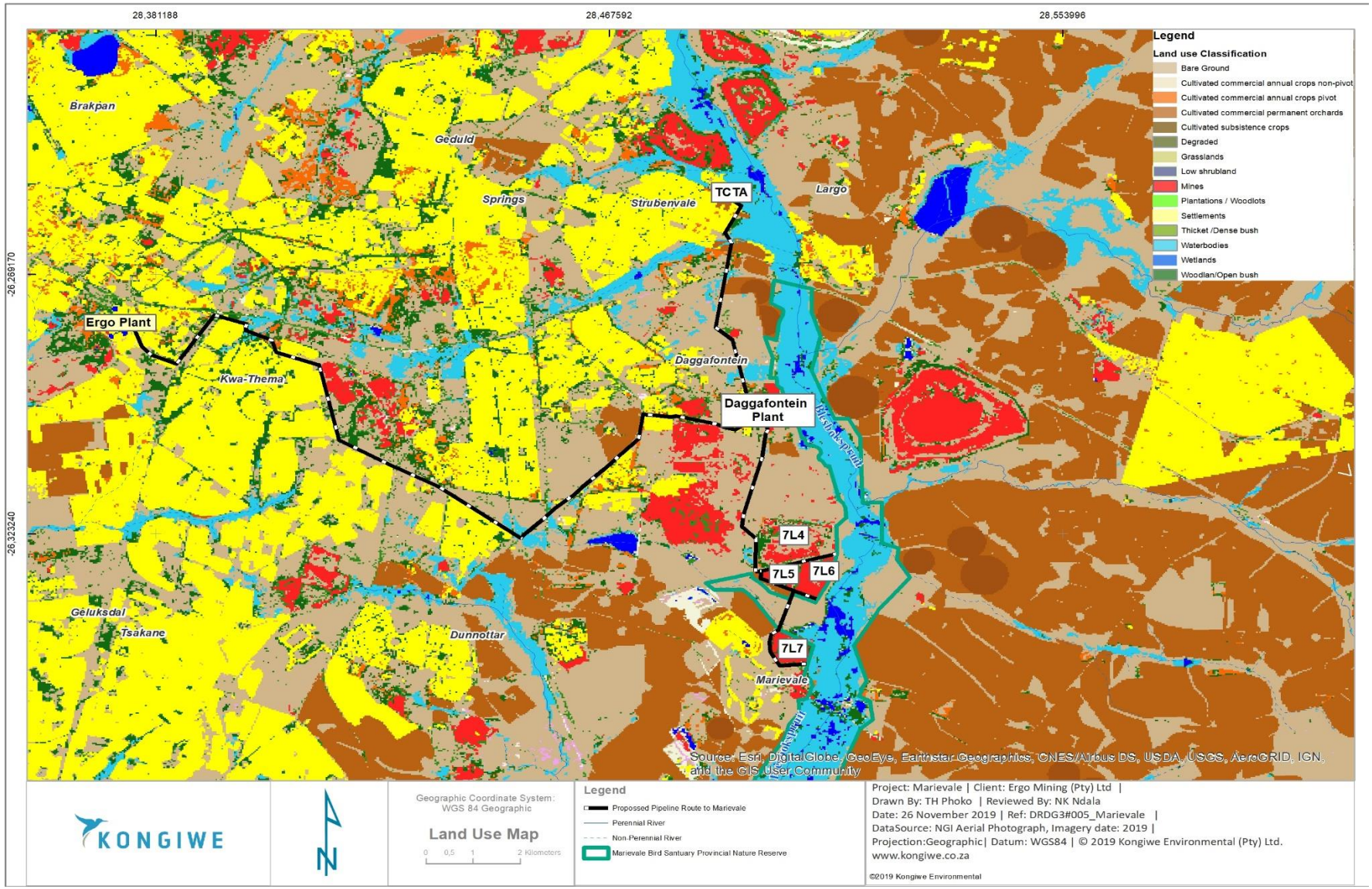


**Figure 8-3: Land uses of the Proposed Project site and surrounding area**

## 8.5 Surface Water and Ground Water

### 8.5.1 Surface Water

The water sources of South Africa are vital to the health and prosperity of its people, the sustenance of its natural heritage and to its economic development. The Orange/Vaal River Basin extends over four countries, covering an area of 964 000km$^2$. The Proposed Project area is located in the Upper Vaal Management Area, which is one of the 19 Water Management Areas (WMAs) included into Orange/Vaal River Basin. The Upper Vaal WMA is the most developed, industrialised and populous of the Orange/Vaal WMAs (DWAF, 2002). Large quantities of water are transferred into this WMA from the Usutu to Mhlathuze and the Thukela WMAs as well as from the Senqu (Orange) River in Lesotho. This WMA releases similar quantities of water into the Vaal River which leads to the Middle Vaal and Lower Vaal WMAs. Water is also transferred from here to the Crocodile West, Marico and Olifants WMAs (DWAF, 2002).

The Proposed Project is located within the C21E Quaternary catchment which is not classified as a Freshwater Ecosystem Priority Area (FEPA) (DHSWS, 2018). The Blesbokspruit was originally a non-perennial stream whose water levels are now artificially maintained by the inflow of mining, industrial and municipal effluents that are contained by embankments (Birdlife, 2018). According to Nel et al.(2007), the present ecological management class for Blesbokspruit is a Class C (moderately modified) which indicates a loss and change of natural habitat and biota has occurred; however, the basic ecosystem functions are still predominantly unchanged. The ecological management class of this quaternary catchment is a Class B, which describes a largely natural system with a few modifications. The Blesbokspruit is also considered irreplaceable by the Gauteng C-Plan, meaning no other river system available could meet its prescribed ecological targets, thus its protection is vital (Ferrar and Lotter, 2007).

McKay et al. (2018) state that the Blesbokspruit had unrestricted flow until the 1930's, this was due to land use changes associated with gold mining, industrialisation and urbanisation. At present the watercourse is characterised by upstream flooding caused by reed beds, wastewater discharges and even raw sewage spills. Significant threats to the watercourse have been listed as acid mine-water discharge from local mining operations (e.g. abandoned Vogelstruispruitt Grootvlei mine), nearby mine dumps such as the Marievale TSFs, the South African Pulp and Paper Industries (SAPPI) plant upstream, as well as impacts from urban and agricultural activities (livestock farming in particular) (McKay et al., 2018). The stream flows southerly until it connects to the Suikerbosrand, and then ultimately into the Vaal River. The Blesbokspruit is an important tributary of the Vaal River, a river that supplies water to over 10 million people (du Plessis et al., 2014). C21 has a Mean Annual Runoff (MAR) of 98.98 million cubic metres (MCM) and covers an area of about 3541 km$^2$ (Ilunga, 2017).

According to a surface water quality study conducted by McKay et al. (2018), water quality in the Blesbokspruit and its tributaries is significantly polluted by agricultural and mining activities near the catchment. Water quality results, from water quality testing conducted between October 2007 – September 2012, indicated several exceedances in the In-Stream Water Quality Guidelines (I-SWQG) for the BBS catchment. The catchment exhibited elevated levels of phosphate, nitrates, ammonia, *E. coli* and

electrical conductivity. The presence of nitrates, phosphate and ammonia are indicators of sewage and agricultural contamination; while the low dissolved oxygen levels, presence of *E. coli* and high conductivity levels exhibited by the water may be an indication of sewage pollution.

### 8.5.2 Ground Water

**Regional Geohydrology**

The project area is underlain by sandstone, shale and coal seams of the Vryheid Formation, Karoo Supergroup. The area is characterised by the intrusion of interconnected diabase sills. Transvaal Supergroup formations, predominantly dolomite and quartzite are found below the Vryheid Formations.

The water table mimics the topography and drains on a regional scale into the local rivers and streams. Groundwater level measurements suggest that groundwater drains radially from the TSFs complex due to the impact of artificial recharge from the TSFs to the underlying aquifers. Groundwater levels in the area generally occur between 5 and 25 mbgl (Barnard, 2000). According to a study by GPT in 2018, the groundwater levels to the east of the Blesbokspruit were between 1.53 and 3.77 m bgl. The groundwater flow direction is in an easterly to south-easterly direction, towards the Blesbokspruit.

**Groundwater Quality**

Six boreholes at the Daggafontein TSF (2.5 km north) are included in Ergo Mining's water quality monitoring programme, but only five boreholes are sampled on a regular basis. The water qualities for the Ergo sites are measured against the Blesbokspruit Catchment Water Quality Objectives.

The following were identified from the Daggafontein TSF's groundwater quality reports:

- The groundwater sampled from the six boreholes is not suitable for human consumption.
- The groundwater quality at some of the boreholes is within the Ideal and Acceptable ranges of the Blesbokspruit Guideline Limits.
- The pH levels at the monitoring points are generally neutral; however, there are some points which are no longer being monitored and an acidic outlier that can possibly be associated with contamination from the Marievale TSFs or a pollution control dam overflow further upstream.
- The chemicals of concern associated with the sampled sites are chloride, sulphate and magnesium, with isolated exceedances for pH, nitrate, sodium, iron and manganese.
- Some of the monitoring boreholes indicate varying water qualities over time, with no visible trends.

Detailed groundwater quality monitoring data will be obtained from groundwater specialist studies and assessed in detail during the EIA phase of the project.

## 8.6 Fauna and Flora

Gauteng is the smallest of South Africa's nine provinces, but despite this, Gauteng is rich in biodiversity. The province is situated in two biomes (both the Savanna and the Grassland biome). Approximately 80% of the province's area is designated as Highveld Grassland, this is one of the richest primary grasslands in the world. This grassland is also particularly poorly conserved (less than 2% protected) (Pfab et al., 2017). The province has an estimated 2183 plant taxa, 125 mammal species, 488 bird species, 21 Amphibians and 92 reptile species. At least 11 taxa are endemic to the province.

The Gauteng Conservation Plan (Version 3.3) (Gauteng C-Plan) (GDARD, 2014) classified areas within the province based on its contribution to reach the conservation targets within the province. The Gauteng C-Plan uses the following terms to categorise the various land use types according to their biodiversity and environmental importance:

- Critical Biodiversity Area (CBA);
- Ecological Support Area (ESA);
- Important Area (IA);
- Irreplaceable Area (IA);
- Other Natural Area (ONA);
- Protected Area (PA); and
- Moderately or Heavily Modified Areas (MMA's or HMA's).

The Proposed Project is situated within 500 m of an important river (Blesbokspruit); within an important wetland and conservation area (Blesbokspruit Wetland System); and within a Protected Area (Marievale Bird Sanctuary Nature Reserve) (Environmental Screening Tool Report, 2019). This means that the Proposed Project falls within a high sensitivity area. See Figure 8-4 below.

However, according to the Gauteng C-plan and available desktop information (Figure 8-5), the actual project area containing the three dumps is identified as unclassified, and some parts of the proposed pipeline routes fall within ESAs, IAs, and PAs. The data used for this analysis is often captured remotely, thus an important aspect of this study will be to ground-truth the boundaries of these areas through appropriate specialist studies.

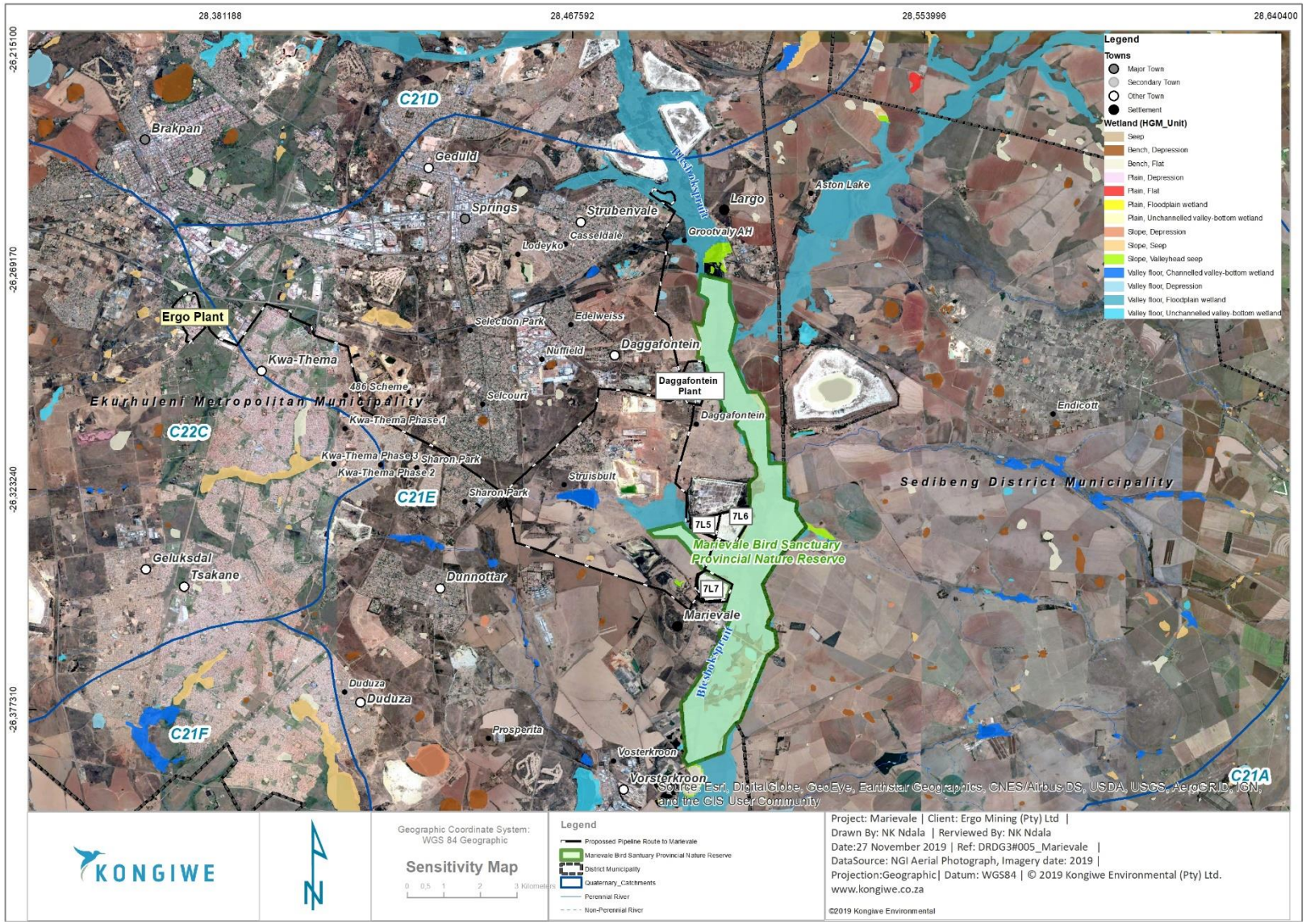


**Figure 8-4: Sensitivity map of the Proposed Project**

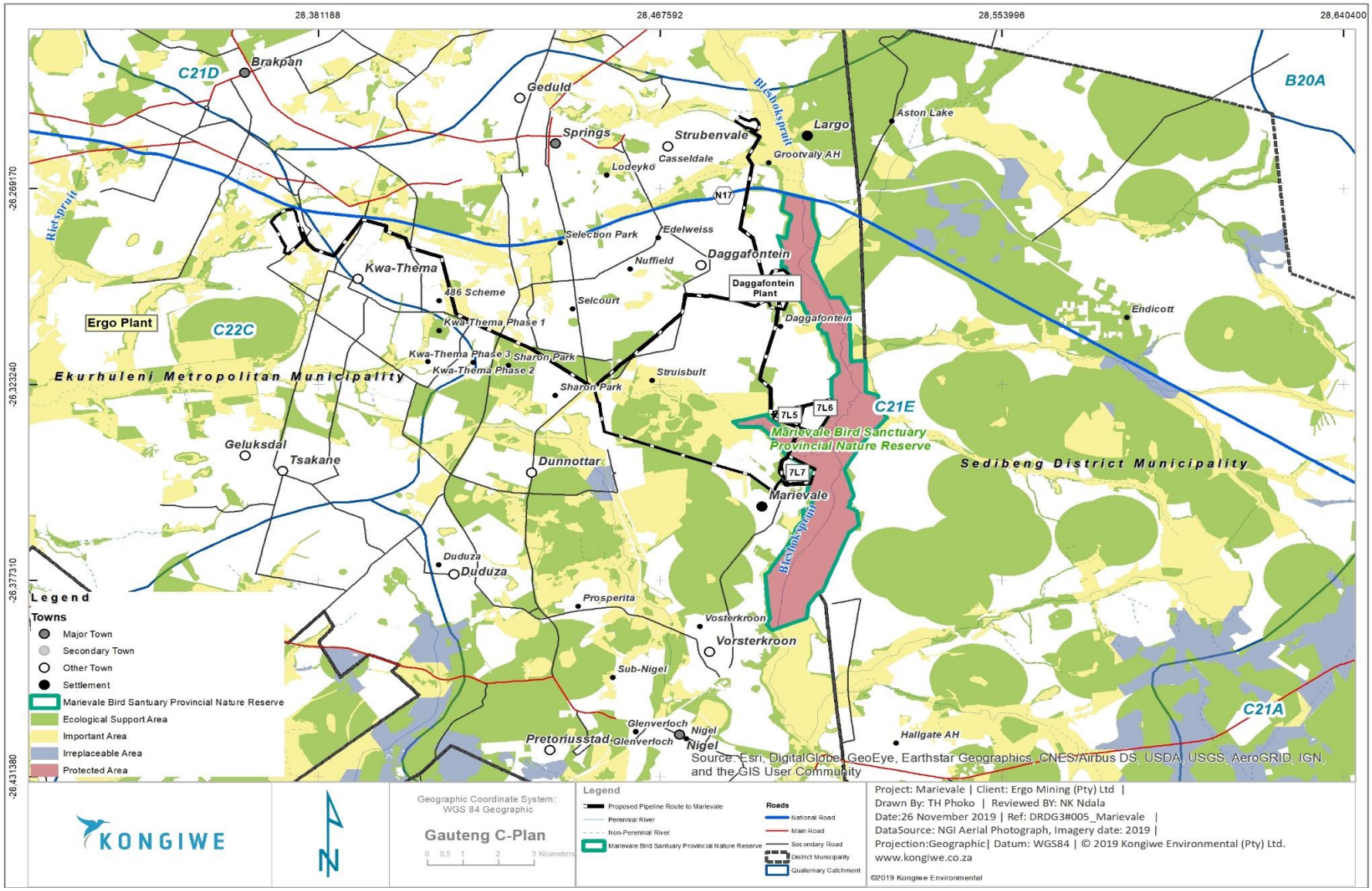


**Figure 8-5: Marievale TSFs project area superimposed on the Gauteng C-plan.**

### 8.6.1 Flora

The project area falls within the Grassland and Savanna biome. As majority of the project area fall within the grassland its description follows. The grassland biome is centrally located in southern Africa, and adjoins all biomes except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include seasonal precipitation and low temperatures in winter (Mucina & Rutherford, 2006).

The project area falls within the Soweto Highveld Grassland, the Andesite Mountain Bushveld and the Tsakane Clay Grassland vegetation types (Mucina & Rutherford, 2018) (Figure 8-6). The Tsakane Clay Grassland vegetation type occurs in patches extending from Soweto and Springs, southwards to Nigel and Vereeniging. It also occurs north of the Vaal Dam and between the towns of Balfour and Standerton (Mucina & Rutherford 2006). According to Mucina and Rutherford (2006), the Tsakane Clay Grassland vegetation type is classified as Endangered.

### 8.6.2 Fauna

As mentioned above, Gauteng is relatively prosperous in biodiversity but this resource tends to be poorly conserved. The province has a vast range of mammal, bird, amphibian and reptile species. Moreover, the project site is directly adjacent to the Marievale Bird Sanctuary Nature Reserve which is an area of rich biodiversity.

The prevalence of all these species occurring at the specific project site is slim due to the availability of habitats suitable for survival, and anthropogenic influences which have led to the current altered state of the immediate project area.

The specific Proposed Project area (dump 7L5, 7L6 and 7L7) has an extremely altered and degraded habitat due to the historical mining activities that have occurred there. As a result, the possibility of many species being supported by the remaining immediate habitat is quite low. The anticipated fauna of the Proposed Project area is likely to be limited and associated with grasslands and cultivated lands on site.

The Blesbokspruit supports a variety of fish, amphibians, reptiles, crustaceans and rodents. Spotted-necked otters (*Lutra maculicollis)*, Water mongoose (*Atilax palidinosus)* and many larger birds depend on these animals for their food. The Reedbuck (*Redunca arundinum)* regarded as uncommon in South Africa, has also been recorded in the area (Digby Wells, 2015, p21). In addition, the project is situated directly adjacent to the Marievale Bird Sanctuary Nature Reserve which is an important birding area with a wetland of Ramsar status and rich biodiversity despite pollution of the stream (Birdlife, 2018). However, the EIA phase will determine the presence of any sensitive animal species with certainty.

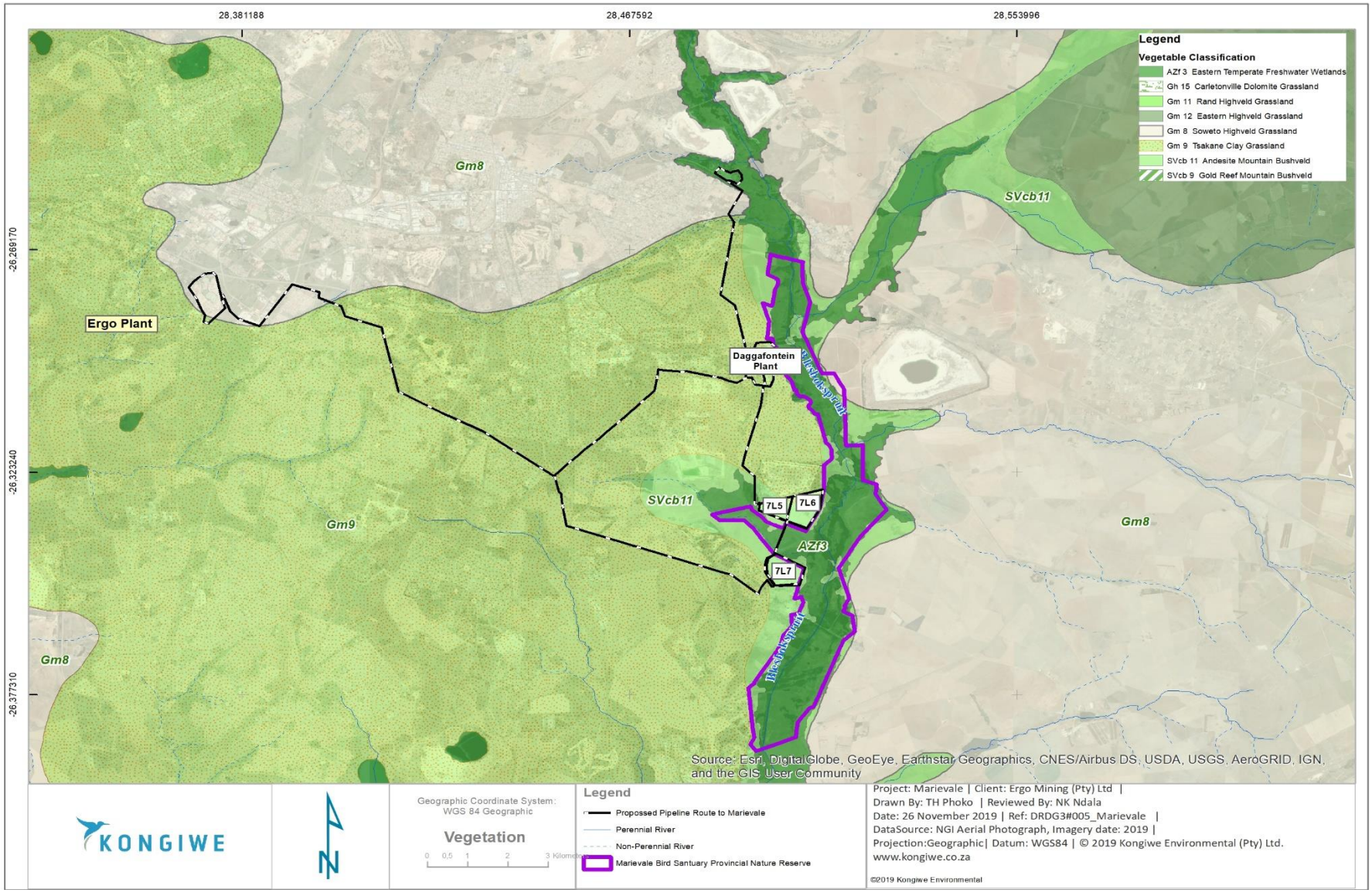


**Figure 8-6: Vegetation type in and around the Proposed Project area**

## 8.7 Wetlands

Wetlands are often biodiversity hotspots and provide ecosystem services such as flood control and aquifer recharge (Haukos and Smith, 1994; Keddy et al., 2009). Thus, if biodiversity is to be conserved, the maintenance of wetlands is essential. Unfortunately, a large number of wetlands have been degraded or lost worldwide in recent years due to land use conversions, water pollution and soil salinization amongst other reasons.

The Proposed Project site is situated adjacent to the Blesbokspruit Wetland System (BWS). It is a high-altitude Ramsar site of global significance and the largest permanent wetland in the Highveld region of South Africa, with significant bird and ecological diversity (McKay et al., 2018). The BWS covers about 1 858 $km^2$ and extends 21 km along the Blesbokspruit (from the Grootvaly Wetland Reserve in the north to the Marievale Bird Sanctuary Nature Reserve in the south) (McKay et al., 2018). The BWS hosts up to 250 bird species, along with many other species of fauna and flora. See Figure 8-7 below.

According to Driver et al. (2012), the BWS is under enormous threat from pollution caused by mining, sewage and industrial discharges, as well as runoff from agricultural activities upstream of the Blesbokspruit. This has left the BWS severely degraded with the wetland now characterised by poor water quality and ecological health, an artificially high water table, as well as an infestation of *Phragmites australis* and *Typha capensis* reeds (Phaleng, 2009; Carr, 1999). Thus, the wetland has been placed on the Montreux Record (1996) list of potentially threatened or degraded Ramsar sites. The Montreux Record of the Ramsar Convention is a register of wetland sites on the List of Wetlands of International Importance where changes in the ecological character and integrity have occurred, are occurring, or are likely to occur as a result of developments, pollution or other human interference (Digby Wells, 2015, p25).

That is why the possible removal of all pollution sources, including the Marievale TSFs, is paramount to the preservation of the BWS.

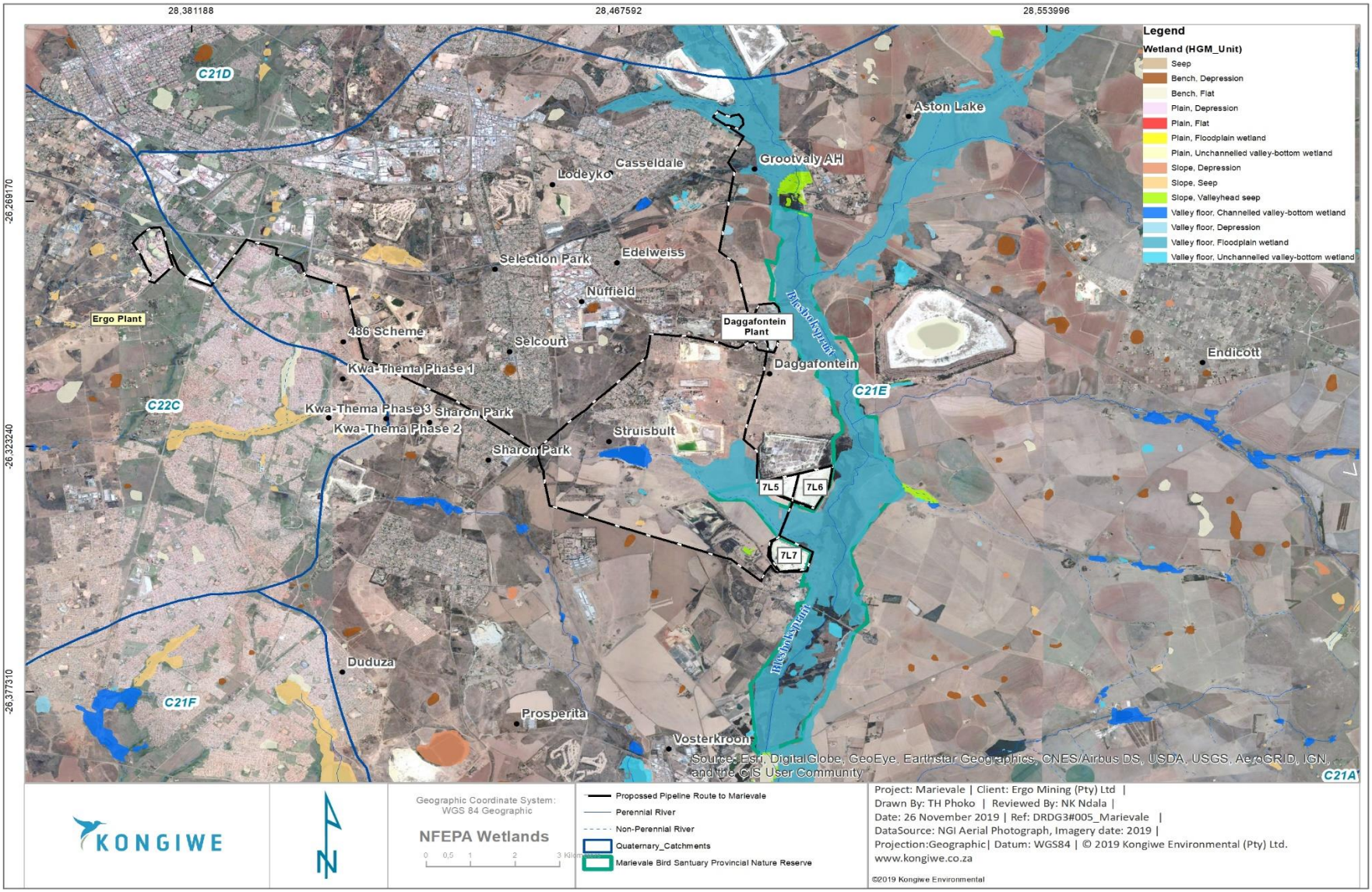


**Figure 8-7: NFEPA wetlands around the Proposed Project Area**

## 8.8 Air Quality

Numerous studies have found that air pollution in cities has 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 (Mayer, 1999).

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 Proposed Project falls within the Highveld Priority Area (HPA). This area of South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occurring due to the concentration of industrial and nonindustrial activities. The priority area covers 31,106 $km^2$, including parts of Mpumalanga Province (Highveld Priority Area Air Quality Management Plan, 2011). The Ekurhuleni Metropolitan Municipality has both a high population density and a high-density industrial sector (DEA, 2015).

The cumulative air pollution associated with the HPA means that it is imperative for the Proposed Project to formulate and implement a sustainable and effective air quality management plan, if one is found to be a requirement by the Air Quality Impact Assessment conducted during the EIA phase, to comply with $P_{2.5}$ and $P_{10}$ national ambient air quality standards (NAAQS).

## 8.9 Noise

Natural sounds are a part of the environmental noise surrounding humans. Ambient sound levels are significantly affected by the area where the sound measurement location is situated. When the sound measurement location is situated within an urban area, close to industrial plants or areas with a constant sound source (ocean, rivers, etc.), seasons and even increased wind speeds have an insignificant to massive impact on ambient sound levels.

The Proposed Project site is in an area with a mixed-use development character, with agricultural and mining activities being the predominant activities in the area. The major noise sources in the area include; vehicular traffic on the national and provincial roads in the areas, noises from the local communities such as Nigel, Selcourt, Grootvlay and Springs; and other industrial and mining related noises.

There are a number of potential noise sources associated with the Proposed Project during both the construction and operational phase.

### *8.9.1 Construction Phase*

The level and character of the construction noise will be highly variable as different activities with different equipment take place at different times, for different periods of time (operating cycles), in different combinations/sequences and on different parts of the construction site. The main construction related noises that are expected are listed below:

- Transport of workers, components & equipment to site – brought to site by means of flatbed trucks;
- Digging of foundations for infrastructure and pipeline support – TLB;
- Development of stormwater infrastructure – TLB;
- Civil work to install the substation / transformer, screens, tanks and pump station – cement truck, flatbed trucks (with mobile crane);
- Civil construction activities.

### *8.9.2 Operational Phase*

The level and character of the noise during this phase is generally constant as it does not involve mobile equipment movement around the site. The noises expected during this phase are listed below:

- General operational noises;
- JCB/TLB backhoe loader being operated;
- The slurry pumps;
- Vibrating screens; and
- Water Dozers and site equipment.

Noise can be defined as "unwanted sound", and an audible acoustic energy that adversely affects the physiological and/or psychological well-being of people, or which disturbs or impairs the convenience or peace of any person. Figure 8-8 illustrates the acceptable zone sound levels as set out by SANS. Ambient noise levels will be further assessed during the EIA phase and appropriate mitigation measures applied where applicable.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Type of district | Equivalent continuous rating level ($L_{Req,T}$) for noise dBA | | | | | |
| | Outdoors | | | Indoors, with open windows | | |
| | Day/night $L_{R,dn}$[a] | Daytime $L_{Req,d}$[b] | Night-time $L_{Req,n}$[b] | Day/night $L_{R,dn}$[a] | Daytime $L_{Req,d}$[b] | Night-time $L_{Req,n}$[b] |
| a) Rural districts | 45 | 45 | 35 | 35 | 35 | 25 |
| b) Suburban districts with little road traffic | 50 | 50 | 40 | 40 | 40 | 30 |
| c) Urban districts | 55 | 55 | 45 | 45 | 45 | 35 |
| d) Urban districts with one or more of the following: workshops; business premises; and main roads | 60 | 60 | 50 | 50 | 50 | 40 |
| e) Central business districts | 65 | 65 | 55 | 55 | 55 | 45 |
| f) Industrial districts | 70 | 70 | 60 | 60 | 60 | 50 |

**Figure 8-8: Acceptable Zone Sound Levels for noise in districts (from SANS 10103:2008)**

## 8.10 Traffic

The Proposed Project Site is located in an area with an existing road network. The site is surrounded by the N17 to the north, R51 to the west and street level routes.

**Road Classification**

The Road Classification and Access Management (RCAM) guideline 2010 provides for roads classification into

the following six class systems:

- Class 1 Principal arterial
- Class 2 Major arterial
- Class 3 Minor arterial
- Class 4 Collector
- Class 5 Local street
- Class 6 Walkway

The first three classes (the arterials) are mobility roads, the second three classes are activity/access streets. Regarding the Proposed Project, mobility roads will include the N17 and R51.

## 8.11 Visual

The Proposed Project site has been disturbed by the legacy of historic mining in the area. This then means that the Proposed Project will result in the removal of a visual disturbance source. The surrounding area around the dumps are lacking in natural vegetation that would help to screen off the proposed operation. The proposed site is also visible from the nearby residential and industrial areas as well as from the major and minor road routes surrounding the proposed site. It is also anticipated that the project would result

in a positive visual impact after the removal of the dumps in relation to the surrounding environment of the site.

## 8.12 Heritage and Palaeontology

### 8.12.1 Heritage Sensitivity

As a historical mining site, several areas containing historical mining and residential structures are likely to be impacted by the Proposed Project. The Marievale TSFs may also represent 'Historical Settlements and Townscapes' as per the NHRA if they were established more than 60 years ago. The dumps and other associated mining infrastructure are integral components of the historical mining townscapes and settlements of the East Rand.

Additionally, a few areas containing graves and burial grounds could also be impacted by the Proposed Project. Heritage sensitivity will be further assessed during the EIA phase.

### 8.12.2 *Palaeontological* Sensitivity

The Proposed Project area is underlain by the Malmani Subgroup, (Chuniespoort Group, Transvaal Supergroup), Dwyka Group, Vryheid Formation (Ecca Group) and Karoo Dolerite Suite. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, the Dwyka Group has a Moderate Palaeontological Sensitivity, Malmani Subgroup a High Palaeontological Sensitivity and Karoo Dolerite Suite has a Zero Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Groenewald and Groenewald (2014) allocated a high Sensitivity to the Malmani Subgroup. Noting that in addition to stromatolites, potentially fossiliferous Late Caenozoic Cave breccias (within the "Transvaal dolomite" outcrop area) could be present on site. See Table 8-1 below.

Therefore, the requirement of a palaeontology study, to assess the value and prominence of fossils in the project area and the effect of the proposed development on the palaeontological heritage, will be further assessed in the EIA phase.

**Table 8-1: Palaeontological Sensitivity of the geological supergroups at the project site (Butler, 2018)**

| Symbol | Group/Formation | Lithology | Approximate Age | Palaeontological Sensitivity |
|---|---|---|---|---|
| Jd | Jurassic dolerite dykes | Dolerite | Ca 180 Ma | Zero |
| Pv | Vryheid Fm, Ecca Group | Sandstone, shale, coal | Upper Carboniferous, Early Permian 295-290 Ma | Very High |
| C-Pd | Dwyka | Tillite, sandstone, mudstone, shale | Upper Carboniferous, | Moderate |

| | | | | |
|---|---|---|---|---|
| | | | Early Permian 295-290 Ma | |
| Vm | Malmani subgroup, Chuniespoort Group | Dolomite, chert | 2642 – 2500 Ma | High |

## 8.13 Socio-Economic

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 if Africa, with a population estimated to be 13.3 million, (Gauteng Spatial Development Frame work 2030) (GSDF). In terms of land area, Gauteng is the smallest province in South Africa but also densely populated. Gauteng accounts for only 1.5% of the land area. Table 8-2 below provides an overview of the socio-economic baseline information for Gauteng province.

**Table 8-2: Socio-economic baseline information: Gauteng at a glance**

| DESCRIPTION | STATISTICS |
|---|---|
| **Demographics** | |
| Population size | 13 399 724 (about one-quarter of the figure in South Africa |
| Population by size | Majority of the population (64%) is made up of the population group between the ages of 18-64. |
| Language | Isizulu is the most spoken language, approximately 3 022 844-slightly less that the figure in South Africa. |
| Migration | Approximately 93.9% of the population is born in South Africa (slightly less than the rate in South Africa) |
| **Households** | |
| Number of households | 4 951 135, with 62% of the population reside in formal dwellings |
| **Service Delivery** | |
| Access to water services | 96.8% are getting water from a regional or local service provider (about 10% higher than the rate in South Africa. |
| Access to electricity | 7.4% have no access to electricity. |
| Toilet facilities | 89% have access to flush or chemical toilets. |
| **Education** | |
| Educational level | 78.7% have completed grade 9 or higher (about 10% higher than the rate in South Africa. 52.4% have completed Matric. |
| **Employment** | |

| DESCRIPTION | STATISTICS |
|---|---|
| Employment status | 51% are employed (about 1.3 times the rate in South Africa). |
| Unemployment status | 26.63% |
| **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 on South Africa |

*Information extracted from Stats SA: Census 2011 and the Community Survey: 2016*

**Ekurhuleni Metropolitan Municipality - Overview**

The City of Ekurhuleni comprises of communities such as Tembisa, Katlehong, Vosloorus, Duduza, Daveyton and Thokoza that collectively house over 68% of the City's total population.

Ekurhuleni has a total surface area of 1975km² that accommodates a population of about 3 379 104 people, about one quarter of the figure in Gauteng (City of Ekurhuleni IDP, 2018). This population is living in an estimated 1 299 490 households, with 18.7% of those being informal dwellings (shacks). The city has a median age of 30 and 66% of the population is between the ages of 18-64, 18% is below the age of 18 and 6% is above the age of 65.

Black Africans make up 82% of the population. In 2015, the unemployment rate in Ekurhuleni (based on the official definition of unemployment) was approximately 29%. About half of the population have completed matric or higher, which is about 20% higher compared to the national statistic and approximately 4% of the population have post graduate qualification (IDP, 2018, 37).

Access to basic services (in terms of water supply) is relatively high, majority (98.5%) of the population get water from a regional or local service provider. 90% of the city has access to electricity; while only 89% of the population has flushing toilet facilities (Community Survey, 2016).

**Key Challenges with Ekurhuleni**

According to the IDP 2018/2019 review, the municipality is currently faced with the following challenges:

- Service delivery failure;
- Rapid population growth spurred by in-migration;
- Mushrooming of informal settlements which contributes to service delivery challenges;
- Ageing sanitation infrastructure and an increasing backlog for infrastructure in new developments;
- Illegal mining;
- Unemployment.

The abovementioned issues have a bearing on how the Proposed Project may bring about social change within the affected local area.

As mentioned previously, the proposed project is likely to pose both negative and positive impacts and these are listed as follows:

**Table 8-3: The expected positive and negative impacts of the Proposed Project**

| Positive impacts | Negative impacts |
|---|---|
| Job security and career development for existing personnel | Increase in ambient noise levels during the construction phase. |
| Potential benefits for local communities arising from Ergo's Corporate Social Responsibility (CSR) | Possible increase in dust levels in some areas during operations |
| Decreased dust levels - Eliminate the Marievale TSF's as a source of pollution to the surrounding areas. | Exposure to increased dust levels and the rise in associated health impacts- construction and operational phases. |
| Availability of alternative post-project land uses. | Change in movement patterns for bird watchers/individuals visiting the Marievale Bird Sanctuary |

# 9 Potential Impacts Identified during the Scoping Phase

## 9.1 Methodology for determining the Significance of Environmental Impacts

This part of the document focuses on the identification of the major potential impacts the activities, processes and actions may have on the surrounding environment. Table 9-1 will be inserted into the EIA report once all specialist studies have been completed. The table represents compliance with the EIA Regulations of 2014 in terms of assessing the significance of direct, indirect, cumulative and residual impacts. Each specialist has been requested to include Table 9-2 whilst compiling their reports to streamline the coherence of the EIA Report.

Potential environmental impacts (physical, biological, social and economic) associated with the Proposed Project are listed in Table 9-2. The significance of these impacts will be systematically assessed and rated, using the assessment mythology described in Section 9.1, once the results of the various specialist studies are available. The EIA will include a full risk assessment of all environmental impacts. The EIA/EMPr Report will set out mitigation measures to be implemented during the Construction, Operational, Decommissioning and Closure, as well as Post-Closure Phases in accordance with NEMA requirements.

**Table 9-1: Typical tables used to identify and classify the significance of identified impacts**

| **Nature of The Impact:** ***Describe the Impact in Respect to The Activity to be Undertaken*** | | |
|---|---|---|
| | **Impact Rating Without Mitigation** | **Impact Rating With Mitigation** |
| ***Extent*** *(Local, Regional, International)* | | |
| ***Duration*** *(Short term, Medium term, Long term)* | | |
| ***Magnitude*** *(Major, Moderate, Minor)* | | |
| ***Probability*** *(Definite, Possible, Unlikely)* | | |
| ***Calculated Significance Rating (Low, Medium, High)*** | | |
| **Impact Status: (**positive or negative) | | |
| **Reversibility: (**Reversible or Irreversible) | | |
| **Irreplaceable loss of resources:** (Yes or No) | | |
| **Can impacts be enhanced:** (Yes or No) | | |
| **Residual impacts**<br>❖ (List these below) | | |
| **Cumulative Impacts**<br>❖ (List these below) | | |
| **Mitigation measures** | | |

Table 9-2 below will be used during the EIA Phase to describe the identified impacts of the Proposed Project, as well as the relevant mitigation measures proposed by specialist studies.

**Table 9-2: Potential Impacts Identified for the Project**

| ENVIRONMENTAL COMPONENT | COMPONENT TYPE | POTENTIAL IMPACT | SPECIALIST STUDY PLANNED FOR EIA |
|---|---|---|---|
| **Physical Environment (non-living)** | Hydrology (including wetlands, surface water and ground water) | ❖ Potential for further acid mine drainage (AMD), increased heavy metal concentrations and increased sulphate concentrations in the adjacent Blesbokspruit and local groundwater if runoff from operations is not adequately managed through efficient storm water management structures;<br>❖ Improved surface and ground water quality around the project area due to the removal of the TSFs;<br>❖ Water and ground contamination due to pipeline leaks/spillages if inadequate preventative measures are not implemented;<br>❖ Changes in natural surface water flow parameters due to the removal of the TSFs;<br>❖ Potential impact on drainage lines from access runoff during the operational phase of the project;<br>❖ Improved visual aesthetics of the area after the removal of the TSFs | Surface Water Impact Assessment<br><br>Groundwater Impact Assessment<br><br>Wetland Impact Assessment |
| **Biological Environment (living)** | Ecology and Biodiversity (including fauna and flora) | ❖ Disturbance of sites and species of ecological importance;<br>❖ Loss of migration corridors, and access to nesting and refuge areas, watering points, food supplies for faunal species by removing the TSFs;<br>❖ Displacement of animal habitat by removing the TSFs;<br>❖ Removal of invasive species from the TSFs; | Biodiversity Impact Assessment |

| ENVIRONMENTAL COMPONENT | COMPONENT TYPE | POTENTIAL IMPACT | SPECIALIST STUDY PLANNED FOR EIA |
|---|---|---|---|
| | | ❖ Improvement of species diversity in the Blesbokspruit Wetland System by removing a pollution source in the form of the TSFs;<br>❖ Long-term improvement of ecosystem health and functioning of the project area following rehabilitation. | |
| **Cultural Environment** | Heritage Resources | ❖ Should heritage resources be present in the area, the reclamation project could potentially impact these;<br>❖ Destruction of a heritage resource, if the TSFs are older than 60 years, by reclaiming the TSFs. | Heritage Impact Assessment |
| **Social and Economic Environment** | Employment | ❖ Continued employment and job security;<br>❖ Continued investment in local economy;<br>❖ Removal of the dumps could eliminate the attraction of illegal/informal miners who seek gold. | Social Impact Assessment |
| | Land-use | ❖ Land use will change to an active reclamation site;<br>❖ Restoration and unlocking of land for future land uses. The removal of TSFs could result in the extension of the Blesbokspruit Wetland System footprint;<br>❖ Better management and control of the area against illegal/informal mining. | Social Impact Assessment |
| | Noise | ❖ Increase in ambient noise levels during the operational phase;<br>❖ Disturbances to faunal species during the operational phase. | Noise Impact Assessment |
| | Air Quality | ❖ Possible increase in dust levels in some areas during operations;<br>❖ Overall removal of an air pollution source after the removal of the TSFs; | Air Quality Impact Assessment |

| ENVIRONMENTAL COMPONENT | COMPONENT TYPE | POTENTIAL IMPACT | SPECIALIST STUDY PLANNED FOR EIA |
|---|---|---|---|
| | | ❖ Health impacts on livestock and people in proximity to the project site due to fine particulate emissions during operational phase. | |

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.

The impact significance rating system is presented in Table 9-3, Table 9-4, as well as Table 9-5 and it 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.

### 9.1.1 **Part A:** Defining Consequence in Terms of Magnitude, Duration and Spatial Scale

Use these definitions to define the consequence in Part B.

**Table 9-3: Consequence Rating Methodology**

| 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 |
| | 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 |

| IMPACT CHARACTERISTICS | DEFINITION | CRITERIA |
|---|---|---|
| | Long term | Longer than 5 years |

### 9.1.2 **Part B:** Determining Consequence Rating

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

**Table 9-4: : Consequence Rating Methodology**

| | | | SPATIAL SCALE/ POPULATION | | |
|---|---|---|---|---|---|
| | | | Site or Local | Regional | National/ international |
| **MAGNITUDE** | | | | | |
| **Minor** | **DURATION** | **Long term** | Medium | Medium | High |
| | | **Medium term** | Low | Low | Medium |
| | | **Short term** | Low | Low | Medium |
| **Moderate** | **DURATION** | **Long term** | Medium | High | High |
| | | **Medium term** | Medium | Medium | High |
| | | **Short term** | Low | Medium | Medium |
| **Major** | **DURATION** | **Long term** | High | High | High |
| | | **Medium term** | Medium | Medium | High |
| | | **Short term** | Medium | Medium | High |

### 9.1.3 **Part C:** Determining Significance Rating

Rate significance based on consequence and probability.

**Table 9-5: 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 |

## 9.2 Possible Positive and Negative Impacts identified

The table below identifies the positive and negative impacts associated with each alternative identified for the Proposed Project:

**Table 9-6: Positive and negative impacts regarding project alternatives for the Project**

| OPTION | POSITIVE IMPACTS | NEGATIVE IMPACTS |
|---|---|---|
| **The property on which or location where it is proposed to undertake the activity** | | |
| The Proposed Project is the reclamation and reprocessing of already existing dumps (7L5, 7L6 and 7L7). Therefore, there can be no alternative sites. | | |
| **The Type of Activity to be undertaken** | | |
| **1. Alternatives to reclaiming and treating existing gold dumps.** | | |
| The Reclamation and Processing of the Marievale TSFs (Preferred Option) | ❖ Low-technical-risk nature of tailings retreatment projects sets them apart from traditional underground operations<br>❖ Not labour intensive.<br>❖ Minimal safety issues.<br>❖ Easy access to surface tailings, as well as lower labour and operating costs.<br>❖ Boost to local economy.<br>❖ Removal of pollution source after rehabilitation and cessation of project. | ❖ Potential profits rely on substantial volumes of material.<br>❖ Potential negative environmental effects during construction and operational phase of the project.<br>❖ Not labour intensive. |
| **The Design and Layout of the Activity** | | |
| None – No reasonable and feasible alternatives exist for the Proposed Project. | | |
| **Technology to be used in the Activity** | | |
| The reclamation of the Marievale TSFs is the "Preferred Activity" and there are no alternatives. The dumps will be reclaimed using **Hydraulic Mining**. Other technology options which will be considered by Ergo for the reclamation of the Marievale TSFs are: Recycling initiatives, water conservation and electricity alternatives. These technology alternatives are discussed in greater detail below.<br><br>**Recycling, Water and Electricity**<br><br>The reclamation of the Marievale TSFs 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 Rand Water, with a contingency for portable JoJo tanks or connection to existing water pipeline infrastructure. In | | |

| OPTION | POSITIVE IMPACTS | NEGATIVE IMPACTS |
|---|---|---|
| terms of process water reticulation, the water cycle operates as a closed circuit, meaning that limited make-up water will be required for the reclamation of the TSFs. Water required for the reclamation activities will be recovered from either of the four TSFs mentioned above, or from water contained in existing mine shafts and wastewater treatment facilities. Fuel types will be investigated and energy conserving measures will be implemented where necessary. | | |
| **1. Technological Alternatives Considered** | | |
| Hydraulic Mining | ❖ Cost effective<br>❖ Easier to transport slurry for processing.<br>❖ Compatible with existing infrastructure.<br>❖ Lowered risks when compared to other methods of reclamation | ❖ Dust emissions which are to be mitigated<br>❖ Not very labour intensive, thus new employment opportunities are limited<br>❖ May cause environmental impacts if not done responsibly. |
| **The operational aspects of the activity** | | |
| Two operational alternatives are being considered for the transport of slurry and return water. These alternatives have been described in detail in Chapter 6. The final preferred alternative will be reported on in greater detail in the EIA phase of the project following recommendations and findings from independent specialist studies. | | |
| **1. Two Operational Alternatives Considered** | | |
| **Alternative 1:** Daggafontein Plant, Ergo Plant, Brakpan/Withok TSF and associated slurry and return water pipeline (s) | ❖ The plant and deposition facility are existing.<br>❖ The route avoids traversing through any watercourses.<br>❖ Welded, HDPE lined steel pipelines.<br>❖ The Brakpan/Withok TSF is currently used as the preferred deposition facility for most reclamation clean-up projects.<br>❖ The Plant has the capacity to recovery the intended quantities of gold. | ❖ Potential for tampering with infrastructure which could lead to mechanical failures and spillages.<br>❖ Security could be an issue during the construction of the above-ground pipeline.<br>❖ The proposed pipeline route is quite extensive.<br>❖ The proposed route traverses more residential areas. |
| **Alternative 2:** Ergo Plant, Brakpan/Withok Tailings Storage Facility and associated slurry and return water pipeline (s) | ❖ The plant and deposition facility are existing.<br>❖ The route avoids traversing through any watercourses. | ❖ Potential for tampering with infrastructure which could lead to mechanical failures and spillages.<br>❖ Security could be an issue during the |

| OPTION | POSITIVE IMPACTS | NEGATIVE IMPACTS |
|---|---|---|
| | ❖ Welded, HDPE lined steel pipelines.<br>❖ The Brakpan/Withok TSF is currently used as the preferred deposition facility for most reclamation clean-up projects.<br>❖ The Plant has the capacity to recovery the intended quantities of gold.<br>❖ The proposed pipeline to be constructed will not traverse a great distance.<br>❖ The proposed route traverses less residential areas. | construction of the above-ground pipeline. |

**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 short 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, and the availability of land for re-development would not occur. The only alternative land use is to leave the dumps as they stand; there is no other potential use of the space as the project area is a group of polluting historic mine dumps that impact upon the surrounding biophysical and social environment.

The "No-Go" Option also assumes the continuation of the current land use, implying the absence of any reclamation activities and associated infrastructures. The means that the attraction of the gold reserves located within the dumps could potentially enhance Illegal mining, and if left as is, illegal settlements on or around the dumps could occur.

The 'No Go' alternative is not preferred due to the anticipated benefits of the proposed reclamation project. The expected indirect benefits resulting from the reclamation of the Marievale TSFs include:

- ❖ Removal of a source of pollution and radiation in the area.
- ❖ The potential to unlock land for a different land use, as per GDARD's (2012) Gauteng Mine Areas Strategy.
- ❖ Continued supply of gold to the local and national markets, and therefore contribution to local, provincial and national economy.

## 9.3 Cumulative Impacts

Due to the existence of other TSFs and mining operations in the region, cumulative impacts and their assessment are of great importance. The identification and assessment of cumulative impacts will be undertaken, and mitigation measures suggested during the detailed EIA level investigation. The impact identification and calculation methodology employed by all specialists incorporates cumulative impacts in a quantitative manner to determine the final impact score and corresponding rating.

## 9.4 Application of Possible Mitigation Measure

Mitigation measures are implemented to ensure that the identified impacts from the Proposed Project activities are reduced as far as possible. Mitigation measures will be provided in the specialist reports to be undertaken in the EIA Phase of the project. Specialist will be informed to be cognisant of the following mitigation measure objectives:

- To find more environmentally sound ways of undertaking specific activities;
- To enhance any environmental and social benefits of a proposed activity;
- To avoid, minimise or remedy negative environmental impacts; and
- To ensure that any residual negative environmental impacts are environmentally acceptable.

The identification of appropriate mitigation measures will be conducted in a hierarchal manner:

1. Preventative measures will be identified to avoid, where possible, negative impacts that may arise as a result of the proposed activity;
2. Measures will be identified to minimise and/or reduce the negative impacts to “as low as practicable” levels; and
3. Measures will be identified to compensate or remedy residual negative impacts that are unavoidable and cannot be minimised or reduced any further (Department of Environmental Affairs, 2006).

Proposed mitigation measures will be communicated to the applicant for review as part of draft EMPr. The applicant will comment on the feasibility and practicality of implementing the mitigation measures. The mitigation measures may be adjusted based on the applicant’s comments.

## 9.5 Outcome of the Site Selection Matrix. The Final Site Layout Plan

The finalisation of specialist studies and recommendations made within the specialist reports will help to inform a final site layout plan. At the time of compiling the DSR, preliminary site layout plans were included in **Appendix B** and these maps were presented as part of the pre-application process with stakeholders.

## 9.6 Motivation where no Alternative sites were considered

Alternatives were considered during the DSR, as per Chapter 6 above, and the site selected was chosen based on economic and environmental criteria.

## 9.7 Statement motivating the Preferred Site

The preferred sites were chosen as per Chapter 6.

# 10 Plan of Study for the Environmental Impacts Assessment

## 10.1 Alternatives to be considered, including the "No-Go" Option

Alternatives to be considered during the EIA phased will be informed by the Alternatives described in Chapter 6 above.

## 10.2 Aspects to be assessed as part of the Environmental Impact Process

The following aspects will be assessed as part of the EIA process:

- Terrestrial Ecology
- Wetlands;
- Surface Water;
- Groundwater;
- Air Quality;
- Heritage;
- Social Impact; and
- Noise.

## 10.3 Terms of Reference for Specialist Studies

Table 10-1 outlines the studies proposed during the EIA Phase of the project and the proposed scope of work to be undertaken as part of the S&EIA process:

**Table 10-1*:* Terms of Reference for Specialist Studies.**

| STUDY | TERMS OF REFERENCE |
|---|---|
| **Terrestrial Ecology** | **Impact Assessment**<br><br>1. The terrestrial biodiversity impact assessment report will consist of the following:<br><br>❖ Assess impacts of ongoing and proposed activities on biodiversity of the project area;<br>❖ Assess whether proposed activities are likely to have significant impacts on biodiversity and specifically species of conservation concern;<br>❖ Identify practically implementable mitigation measures to reduce the significance of proposed activities on biodiversity;<br>❖ Assess residual and cumulative impacts after implementation of mitigation measures; and<br>❖ Compilation of biodiversity management and monitoring plan.<br><br>The outcome of the impact assessment phase will be an integrated biodiversity impact assessment report detailing the findings of each of the various sub-specialist studies. The impact assessment report will provide an integrated assessment of the significance of the potential impacts on the biodiversity of the project area with specific emphasis on observed red data species. The report will identify suitable mitigation measures and assess the revised significance of potential impacts on biodiversity post-implementation of mitigation measures. The integrated biodiversity impact assessment report will also include a biodiversity monitoring programme. |
| **Wetland Study** | **Impact Assessment**<br><br>The water resource impact assessment will consist of the following:<br><br>❖ Assess impacts of ongoing and proposed activities on the local water resources;<br>❖ Assess whether proposed activities are likely to have significant impacts on the water resources;<br>❖ Identify practically implementable mitigation measures to reduce the significance of proposed activities on the water resources; and<br>❖ Assess residual and cumulative impacts after implementation of mitigation measures. |

| STUDY | TERMS OF REFERENCE |
|---|---|
| **Surface Water** | A full, detailed hydrological assessment will be undertaken for the EIA Phase of the project.<br><br>**Impact Assessment:**<br><br>1. Flood Lines<br><br>The flood peaks for the 1:50- and 1:100-year return intervals will be calculated for the contributing catchment area associated with each river. Flood peak determination will factor in regional rainfall and relevant catchment characteristics influences. Based on the provided elevations, and utilising the calculated flood peaks, the flood lines for current conditions will be generated using the HEC-RAS one dimensional backwater flow model. The model can simulate the effects of various control points/obstructions located within the watercourse. It assumed that topographical data at an acceptable resolution of the site will be provided.<br><br>2. Conceptual Stormwater Management Plan<br><br>Based on the information gathered during the desktop review and the site walkover, a conceptual stormwater management plan will be developed for the Project. 'Dirty' and 'clean' contributing catchments will be discretised based on topographical fall, associated activities. Furthermore, the discretisation of the catchments will factor in existing stormwater infrastructure and the overall functionality and the most practical and feasible implementation of the final stormwater management plan. Based on the discretised catchments, the required stormwater management drainage elements (including channels, pipes, berms, and pollution control dams) will be defined to ensure appropriate stormwater management according to the management principles outlined in the GN704 and BPGs.<br><br>3. Water and Salt Balance<br><br>An annual average static water balance associated with the mine will be developed using Excel, based on a Process Flow Diagram (PFD) developed in conjunction with Ergo. The PFD will indicate sources and movement of water within the mine and projected volumes. A final project site plan is required to finalise the water balance. The salt balance calculations will be based |

| STUDY | TERMS OF REFERENCE |
|---|---|
| | on the volumes calculated within the water balance and water quality data provided. If available, Total Dissolved Solids (TDS) data will be used to calculate the salt balance.<br><br>4. Water Quality Analysis and Monitoring Data<br><br>A surface water quality analysis will be undertaken, and a monitoring programme will be developed for the mine to allow for the appraisal of impacts to surface water as a result of onsite activities and to allow for the formulation of various management actions associated with the protection of water resources. Sampling locations, methodology, sampling frequency and an analytical programme (i.e. analytes) will be rationalised as part of the assessment. Water quality data obtained from the site will be compared against the relevant DHSWS water quality standard limits. A water quality monitoring plan will be developed to determine key water quality monitoring points, chemical monitoring suites and the frequency of water quality sampling and analysis. |
| **Ground Water Assessment** | **Impact Assessment:**<br><br>The Impact Assessment phase will involve several tasks, as explained below. The results will help characterise the underlying aquifer systems and define potential impacts on the local aquifers, but also groundwater users and sensitive receptors in the Project area<br><br>1. Data Review<br><br>During this task all available data for the project area will be collated and reviewed. This includes geological, hydrogeological, groundwater monitoring, meteorological data and National Groundwater Archive data. A review will be conducted, and interpretations performed to establish a conceptual idea of the hydrogeological nature of the area and what risks currently exists.<br><br>2. Hydrocensus |

| STUDY | TERMS OF REFERENCE |
|---|---|
| | During the hydrocensus important data pertaining to the current groundwater conditions and use will be collected. This will include localities of current groundwater abstraction points (boreholes, hand dug wells or springs), ownership, current usage volumes and types, equipment and groundwater levels; outside Ergo's water monitoring network. Groundwater samples (5 samples) will be taken from selected boreholes. The hydrocensus will include:<br><br>❖ A groundwater use assessment within a 1-kilometre radius of the Marievale TSFs; and<br>❖ Sampling of accessible boreholes and springs. A spectrum of determinants will be analysed, similar to Ergo's current analysis. The samples will be sent to a SANAS accredited laboratory for inorganic analyses.<br>❖ This data together with its spatial distribution will determine the current water resource and environmental status and serve as reference to the proposed reclamation.<br>❖ Data from the Department of Water and Sanitation will be sourced to help define water use and borehole localities in the area.<br><br>3. <u>Reporting</u><br><br>An impact assessment report will present the results and interpretations of the groundwater desktop and hydrocensus assessments, with an indication of potential current impacts. The impact assessment report will include the following:<br><br>❖ Characteristics of the local groundwater environment, including current groundwater use and groundwater qualities;<br>❖ Definition of the local geology and potential roles the structural geology and depth of weathering may play in surface water-groundwater interactions;<br>❖ Identification of potential hydrogeological impacts and sensitive receptors associated with the reclamation activities; and<br>❖ A groundwater monitoring network that will effectively monitor the groundwater quality and level changes during the reclamation phase and after closure. |

| STUDY | TERMS OF REFERENCE |
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| **Air Quality** | **Baseline Assessment**<br><br>The baseline assessment will consist of a desktop assessment. The objective will be to inform the subsequent Air Quality Impact Assessment Study and will include the following:<br><br>❖ Literature review of air pollutant emissions from Tailing Facilities.<br>❖ Literature review of potential health effects associated with these emissions.<br>❖ Outlining of relevant air quality legislation and ambient air quality standards.<br>❖ Description of the site location, topography, general surroundings of the site, as well as the relevant site-specific<br>❖ environment.<br>❖ Establishment of the baseline air quality from Air Quality Management Plans and Air Quality Monitoring Reports in the area.<br>❖ Description of the nature of other major sources of air pollution in the study area.<br>❖ Sourcing and evaluation of local meteorological data to determine the prevailing meteorological conditions.<br>❖ Sourcing and evaluation of Weather and Research Forecasting Model (WRF) meteorological data to facilitate modelling.<br><br>The baseline assessment will include:<br><br>❖ Site Location and Topography<br>❖ Air Quality Legislation and Standards<br>❖ Health Effects of Particulate Pollutants<br>❖ Regional Meteorological Overview<br>❖ Ambient Air Quality<br>❖ Local Meteorology<br><br>**Impact Assessment** |

| STUDY | TERMS OF REFERENCE |
|---|---|
| | Preparation of the Air Quality Impact Assessment will include and be based on the information from the scoping/baseline assessment and will also include:<br><br>❖ Compilation of an emissions inventory – a list of activities which are sources of air pollution in the project.<br>❖ Characterisation of the emission sources and the pollutants emitted from them.<br>❖ Calculations of emission rates from the sources identified in the emissions inventory.<br>❖ Preparation of Met data for modelling.<br><br>Determining and preparing the input parameters for modelling:<br><br>❖ Source type.<br>❖ Source dimensions: lateral, vertical.<br>❖ Source location and orientation.<br>❖ Emission rate.<br>❖ Receptor grid.<br>❖ Dispersion modelling of the emissions, using the AERMOD model, to predict maximum ground level concentrations of particulate pollutants resulting from the activities and to determine the zones of influence around the emission sources accordingly.<br>❖ Presentation of model outputs/results in the form of contour plots and a summary of the results.<br>❖ Evaluation of the results of the air dispersion modelling against NAAQS as set out by the Department of Environment, Forestry and Fisheries (DEFF).<br>❖ Assessment of any potential cumulative impacts in terms of the NAAQS.<br>❖ Provision of practical and implementable mitigation measures by which to manage and reduce the identified impacts where necessary.<br>❖ A recommendation in terms of an air quality monitoring programme if necessary. |
| **Heritage & Palaeontology** | **Impact Assessment:** |

| STUDY | TERMS OF REFERENCE |
|---|---|
| | The Heritage Scoping Report will be compiled in compliance with NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:<br><br>1. Literature Review and initial site analysis:<br><br>The background information to the field survey relies greatly on the Heritage Background Research which was undertaken through archival research and evaluation of aerial photography and topographical maps of the study area.<br><br>2. Physical Survey:<br><br>A physical survey is subsequently conducted on foot through the Proposed Project area by a qualified heritage specialist/s (e.g. an archaeologist and a palaeontologist)) and is aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.<br><br>3. The final step involves the recording and documentation of relevant heritage resources identified in the physical survey, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.<br><br>The significance of heritage sites is based on four main criteria in accordance with site integrity (i.e. primary vs. secondary context), amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures), and density of scatter (dispersed scatter):<br><br>❖ Low - <10/50m2<br>❖ Medium - 10-50/50m2<br>❖ High - >50/50m2 |

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- Uniqueness;

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate development activity position;
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report.

| FIELD RATING | GRADE | SIGNIFICANCE | RECOMMENDED MITIGATION |
|---|---|---|---|
| **National Significance (NS)** | Grade 1 | - | **Conservation; National Site nomination** |
| **Provincial Significance (PS)** | Grade 2 | - | **Conservation; Provincial Site nomination** |
| **Local Significance (LS)** | Grade 3A | High Significance | **Conservation; Mitigation not advised** |
| **Local Significance (LS)** | Grade 3B | High Significance | **Mitigation (Part of site should be retained)** |
| **Generally Protected A (GP. A)** | - | High / Medium Significance | **Mitigation before destruction** |
| **Generally Protected B (GP. B)** | - | Medium Significance | **Recording before destruction** |

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<tr><td>Generally Protected C (GP. A)</td><td>-</td><td>Low Significance</td><td>Destruction</td></tr>
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<tr><td>Social Impact Assessment</td><td>Social Impact Assessment:<br><br>The objective of the Social Impact Assessment (SIA) is to is to:<br><br>❖ Assess the social impacts of the Proposed Project including any impacts on local infrastructure and services;<br>❖ Recommend mitigation measures to minimise adverse impacts and maximise benefits of the Project; and<br>❖ Facilitate the consideration of alternatives.<br><br>The SIA will use both quantitative and qualitative data collection techniques. In terms of the quantitative data, data from Statistics SA was used to understand the local social circumstances of the Proposed Project area. This method was used to gather baseline information for the purposes of the Scoping report. The qualitative method includes focus group meetings and in-depth interviews will be conducted to understand the affected communities' perceptions, how they view themselves and the environment around them. Qualitative date will be collected as the project progresses. The SIA will use the following sets of data to inform the study:<br><br>❖ An investigative site visit;<br>❖ Interviews with Ward Councillors, municipal officials, directly affected land owners/occupiers<br>❖ Statistics South Africa data;</td></tr>
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| STUDY | TERMS OF REFERENCE |
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| | ❖ A literature review of the Integrated Development Plan and the Spatial Development Framework; and<br>❖ Scan and analysis of the Comments and Responses Report and various specialist studies (Compiled by Kongiwe Environmental) |
| **Noise** | **Impact Assessment:**<br><br>A noise impact assessment must be completed for the following reasons:<br><br>❖ If there are potential noise-sensitive receptors staying within 1,000 m from a proposed industrial activity (SANS 10328: 2008)<br>❖ It is a controlled activity in terms of the NEMA regulations and an ENIA is required, because:<br>❖ It may cause a disturbing noise that is prohibited in terms of section 18(1) of the Government Notice 579 of 2010; and<br>❖ It is generally required by the local or district authority as part of the environmental authorization or planning approval in terms of Regulation 2(d) of GN R154 of 1992.<br><br>In addition, the South African National Standard (SANS) 10328:2008 (Edition 2) specifies the methodology to assess the potential noise impacts on the environment due to a proposed activity that might impact on the environment. This standard also stipulates the minimum requirements to be investigated for Scoping purposes. These minimum requirements are:<br><br>❖ The purpose of the investigation;<br>❖ A brief description of the project;<br>❖ A brief description of the existing environment;<br>❖ The identification of the noise sources;<br>❖ The identified noise sources that were not considered and the reasons why they were not investigated;<br>❖ The identified noise-sensitive developments and the estimated impact on them;<br>❖ Any assumptions made with regard to the estimated values used;<br>❖ An explanation, either by a brief description or by reference, of the methods that were used to estimate the existing and predicted rating levels;<br>❖ The location of the measurement or calculation points, i.e. a description, sketch or map; |

| STUDY | TERMS OF REFERENCE |
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| | ❖ Estimation of the environmental noise impact;<br>❖ Alternatives that were considered and the results of those that were investigated;<br>❖ A list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation;<br>❖ A detailed summary of all the comments received from interested or affected parties as well as the procedures and discussions followed to deal with them;<br>❖ Conclusions that were reached;<br>❖ Recommendations, i.e. if there could be a significant impact, or if more information is needed, a recommendation that an environmental noise impact assessment be conducted. |

## 10.4 Methodology proposed

The EIA will be undertaken according to the method detailed below. This methodology is compliant with the NEMA 2014 EIA Regulations, as amended in 2017.

Generally, the impact assessment is divided into three parts:

- **Issue identification** – each specialist will be asked to evaluate the 'aspects' arising from the project description and ensure that all issues in their area of expertise have been identified;
- **Impact definition** – positive and negative impacts associated with these issues (and any others not included) then need to be defined – the definition statement should include the activity (source of impact), aspect and receptor as well as whether the impact is direct, indirect or cumulative. Fatal flaws should also be identified at this stage; and
- **Impact evaluation** – this is not a purely objective and quantitative exercise. It has a subjective element, often using judgement and values as much as science-based criteria and standards. The need therefore exists to clearly explain how impacts have been interpreted so that others can see the weight attached to different factors and can understand the rationale of the assessment.

To understand the impact evaluation, the sensitivity of the receiving environment, the effect on the receiving environment and the significance of the impacts, these three points above need to be clearly described. The impact assessment methodology that will be used during the EIA Phase is described in Chapter 9.

### 10.4.1 Assessment of the Duration of significance

Duration of significance of impacts will be assessed using the following criteria, where the duration of time relates to how long that impact will occur for during that phase of the project. Specific durations will be allocated to each project phase in the EIA document where the detailed impact assessment rating will be undertaken. For example, for the operational phase:

- Short term: Up to 18 months;
- Medium term: 18 months to 5 years; and
- Long term: Longer than 5 years.

### 10.4.2 Stages at which the Competent Authority will be consulted

The DMRE and Commenting Authorities will be consulted at various stages during the EIA process. This includes:

- Pre-application meetings;
- Announcement and Scoping Phase; and
- EIA Phase.

### 10.4.3 Public Participation to be undertaken during the EIA Phase

Stakeholder engagement during the EIA Phase involves a review of the findings of the impact assessment presented in the EIA Report for public comment which will be made available. Stakeholders will be notified using the following:

- Media advertisements in the same newspapers used during the Scoping Phase to announce the availability of the EIA Report for public comment;
- Registered stakeholders will be informed by way of personal letters/ SMS distributed by mail and e-mail in advance of the report being available; and
- Stakeholders will be invited to attend one of two public open days where the contents of the EIA Report will be presented, and stakeholders will have an opportunity to comment. Details of the meetings will be confirmed closer to the time of the meetings.

Following the availability of the EIA Report, meetings with relevant stakeholders will be undertaken. During the EIA Phase, stakeholders will be invited to comment on the EIA Report in any of the following ways:

- By raising comments during key stakeholder/ public meetings where the content of the EIA Report will be presented;
- By completing comments sheets available with the report at public places, and by submitting additional written comments, by email, fax or by telephone, to Kongiwe;
- The EIA Report will be available for comment for a period of 30 days at public places in the project area, sent to stakeholders who request a copy, and placed on the Kongiwe website.

All comments and issues raised during the 30-day public comment period will be incorporated into the final EIA Report to be submitted to the competent and commenting authorities. Description of the information to be provided to stakeholders includes:

- The project description (final site layout, all alternatives investigated) and the surrounding baseline environment;
- Findings from the specialist studies undertaken;
- Potential biophysical and socio-economic impacts during construction, operations, closure and decommissioning phases of the project;
- Management/ mitigation measures developed to address the potential impacts;
- The closure objectives, plan and financial provision; and
- Details on how stakeholders can comment on the EIA Report.

### 10.4.4 Tasks to be undertaken during the Environmental Impact Phase

The plan of study for the EIA Report is set out below for review by the authorities and stakeholders. The rationale for the different levels of study for the various environmental components will be taken from the issues raised by stakeholders, the expected severity of impacts and the level of confidence required in

their prediction. The level of information required to develop adequate, practical management and mitigation measures was also a consideration in determining the terms of reference of studies.

Within the EIA Phase, the EIA Report, IWUL and stakeholder engagement activities will run concurrently. During the EIA Phase, the following will be undertaken:

- Specialists will conduct and complete specialist impact assessments. Workshops will be held with specialists to workshop all potential impacts and integrate specialist studies;
- Stakeholder engagement materials will be prepared (advertisements, notification letters, site notices), and public open days, focused group meetings and consultation with affected landowners will be undertaken;
- An EIA Report will be compiled, and management measures and commitments workshopped with Ergo;
- The EIA Report will be made available for public review and comment; and
- The revised EIA Report, including public comments and responses, will be submitted to authorities for decision-making.

### 10.4.5 Mitigation, Management and Monitoring of Identified Impacts

The summary of potential issues identified during the Scoping Phase of the project have been indicated in Section 9.4.5. These impacts require further investigation during the EIA Phase. Section 9 provides an indication of the independent specialist studies, field surveys and assessments that are required to form part of the EIA Phase. The specialist studies will consider the footprint proposed for the Marievale TSF Reclamation project, including all associated infrastructure. With this information, the Proposed Project will be able to fully assess and investigate the feasible and reasonable alternatives proposed in **Chapter 6**.

The possible mitigation measures that could be applied and the level of risk is depicted as follows:

The potential impacts identified for the reclamation of the Proposed Project have been described below. It is important to note that these impacts have not been ground-truthed or rated for significance. The impacts have been described based on what the current status of the sites, as well as existing information assessed at a desktop level. The below impacts, and other identified impacts, will be fully described during the Environmental Impact Assessment (EIA) phase.

**Table 10-2: High Level Mitigation Measures for Potential Impacts Identified for the Marievale Project.**

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| **CONSTRUCTION** | | | |
| Construction of infrastructure, temporary infrastructure, pipelines and potential roads.<br><br>All necessary activities involved with site preparation including site clearing. | **Socio-economic:**<br><br>❖ Potential to further contractor opportunities;<br>❖ Disruption of movement patterns and other displacement impacts;<br>❖ Project-induced population influx ;<br>❖ Local & regional economic development; and<br>❖ Increase in the availability of land<br><br>**The removal of the dumps will result in a certain short term impacts, however, it is envisaged that the long term impact will be positive.** | | ❖ Attempt to extend goods and services from local businesses who are BBBEE compliant and currently contracted by Ergo's subsidiaries.<br>❖ If jobs are available, Ergo should ensure that local communities are made aware of the employment opportunities by means of a structured stakeholder engagement programme.<br>❖ Develop skills development and training targets for local procurement and include these in contractor management plans;<br>❖ Successfully complete the removal of all Dumps and the rehabilitation of the remaining footprints to prevent the creation of new/more contaminated areas; and<br>❖ Assess end-land uses for each individual rehabilitated site. Rehabilitation must be consistent with the relevant end land-use objectives of closure plans |
| | **Air quality:** Short term air quality impacts could arise from:<br><br>❖ Increased particulate matter ($PM_{10}$ and $PM_{2.5}$) load in the atmosphere leading to deteriorated air quality. | | ❖ Regular, light watering of unpaved roads;<br>❖ Strict speed control on unpaved roads;<br>❖ Wet suppression wherever possible,<br>❖ Wind-speed reduction barriers around construction sites. |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | **The removal/reclamation of the dumps will result in the reduction of current air quality issues. There is a long term positive impact envisaged.** | | |
| | **Noise**: Construction activities will result in a short term increase in noise levels.<br><br>**Noise impacts are anticipated to only contribute to the surrounding ambient sound levels for a short period of time.** | | ❖ Undertake construction operations during working hours only.<br>❖ Construction equipment should be properly maintained and switched off when not operational.<br>❖ Regular planned vehicle services are considered best practise.<br>❖ Comply with the Gauteng Noise Control Regulations |
| | **Surface Water:** Potential pollution from:<br><br>❖ Increase sedimentation on downstream watercourses due to exposed surfaces resulting in siltation of surface water resources.<br>❖ Mixing of upstream clean water runoff with dirty water runoff from cleared site areas.<br>❖ Potential for flooding of pipeline structures at river crossings.<br>❖ Seepages/spillages of excess rainfall stored on the dumps and the existing paddocks. | | ❖ The runoff from the upstream clean water catchment is to be diverted away from the proposed infrastructure.<br>❖ Infrastructure to be established should be outside any modelled flood lines.<br>❖ Surface water quality monitoring must be implemented according to a detailed plan.<br>❖ Dirty water runoff should be captured and contained within the dedicated storage facility such as the existing paddocks.<br>❖ To minimise seepage and the effects of ponding, water volumes should be contained when necessary, pumped out and re-used where required during the construction phase of the project. |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | **The removal/reclamation of the dumps will result in the removal of a source of environmental pollution.** | | |
| | **Groundwater:** Decrease in surface and groundwater quality as a result of water.<br><br>**The removal/reclamation of the dumps will result in the removal of a source of environmental pollution.** | | ❖ Surface water management measures must ensure that runoff and dirty water spills are contained;<br>❖ Implement a detailed groundwater monitoring plan for the project as described in the ground water impact report. |
| | **Wetland:** Potential loss and disturbance of wetland and aquatic habitat due to site preparation and clearing of vegetation. There could also be alien plant infestation due to the disturbance.<br><br>**The removal of the dumps will reduce the current risk of AMD seepage, and the removal of the environmental point source in the long term.** | | ❖ Adhere to any prescribed buffers should any be recommended;<br>❖ Adhere to the recommendations proposed in the surface water and groundwater reports;<br>❖ Minimise the footprint of any areas disturbed during construction;<br>❖ Locate all temporary offices, constructors' camps, laydown areas, ablution facilities etc. a minimum of the prescribed distance from any delineated sensitive watercourse/wetland (should wetlands exist).<br>❖ Develop and implement a construction stormwater management plan prior to the commencement of site clearing activities;<br>❖ A rehabilitation Plan for disturbed wetland must be in place as prescribed by the wetland specialist study. |
| | **Heritage:** | | ❖ Conduct heritage impact assessment to identify heritage sites within the project area |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | ❖ Construction activities could cause damage to or destroy any physical heritage resources that may be present in the development footprint areas;<br>❖ The installation of pipelines and power lines outside of existing servitudes will cause damage to or destroy any physical heritage resources that may be present within the development footprint. | | ❖ If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken. |
| | **Traffic:**<br><br>❖ Increase in traffic volumes on existing traffic network<br>❖ Cumulative impact on the road surface condition<br><br>**This impact is expected to be localised and short term**. | | ❖ Traffic signage at site access points<br>❖ Upgrade gravel roads to tarred roads where required.<br>❖ Road maintenance, on the public road network, is not a responsibility of Ergo. It is therefore recommended that Ergo engages with the planning authorities regarding future maintenance needs of the surrounding road network. |
| | **Fauna and Flora:**<br><br>❖ Direct loss of floral species/vegetation types and biodiversity.<br>❖ Direct habitat loss for species that has established on the dumps<br>❖ Alien vegetation recruitment. | | ❖ Minimise disturbance and destruction of areas that are not going to be directly reclaimed.<br>❖ In the case of plants, if this is not possible relocation permits may be required.<br>❖ The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | | | ❖ The risk of habitat fragmentation must be reduced through preservation of natural corridors.<br>❖ Rehabilitation plans must be initiated during construction to minimise disturbed areas.<br>❖ Follow any local and national policies and plans regulating and protecting biodiversity in the project area. |
| **OPERATION** | | | |
| **Reclamation of the Marievale TSFs by Hydraulic Mining.** | **Socio-economic:** These are anticipated to be the same as those impacts predicted during the construction phase. | | ❖ These should be read with what is proposed as mitigation measures for the Construction Phase. |
| | **Air quality:** These are anticipated to be the same as those impacts predicted during the construction phase. As the dumps will be hydraulically mined, this could create dust fall out. | | ❖ Regular, light watering of unpaved roads;<br>❖ Strict speed control on unpaved roads;<br>❖ Ensuring that all taillings material is removed to 'red earth' before moving on to the next section (this will reduce the area of fine material exposed to wind erosion); |
| | **Noise**: Potential impacts include:<br>❖ Potential for noise disturbance from the operation of the reclamation station and pipelines. | | ❖ Comply with the Gauteng Noise Control Regulations;<br>❖ If complaints are received about the noise from the pump station, then noise barriers could potentially be installed between the pump station and the specific complainant.<br>❖ Regular service maintenance on the pumps and pipelines to mitigate water hammer noise as well as maintaining a constant flow rate during pumping of |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | | | water and slurry.<br>❖ Machines and vehicles used during reclamation must be serviced to ensure noise suppression mechanisms are effective.<br>❖ Machines and vehicles should be switched off when not in use. |
| | **Surface Water:** Potential impacts include:<br>❖ Overflow of the collection sumps to the downstream surface water resources.<br>❖ Overflow dirty of the water collected in the dumps during a severe weather event.<br>❖ Decrease of salt loads reporting to the waterbodies/watercourse in the area due to reduction in discharges | | ❖ The pumps located at each of the sumps should be installed within closed off/bunded areas to contain material spillages.<br>❖ In times of power failure, manual monitoring of the sump associated with the reclamation station should be carried out.<br>❖ Overflow channels should be constructed so as to contain any spillages that do occur into the pollution control area. |
| | **Groundwater:** Seepage from the dumps and existing Paddocks could negatively influence the groundwater quality in the underlying aquifers during the operational phase. | | ❖ These are expected to be the same as the mitigation measures proposed for the Construction phase. Mitigation would thus include:<br>○ Continuous monitoring of groundwater quality. |
| | **Wetlands and Aquatics:** Potential impacts include:<br>❖ Continued loss of water input into | | ❖ Adhere to any prescribed buffers, should any be recommended;<br>❖ Adhere to the recommendations proposed in the surface water and groundwater reports; |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | surrounding watercourses<br>❖ Pipeline could pollute the watercourse if failure of the pipeline occurs;<br>❖ Potential for sedimentation and salt loading in the watercourse<br>❖ Potential to discharge treated water, if required.<br><br>The pipelines are designed to minimise spillages and failure as far as possible. | | ❖ Minimise the footprint of any areas disturbed during construction;<br>❖ Locate all temporary offices, constructors' camps, laydown areas, ablution facilities etc. a minimum of the prescribed distance from any delineated sensitive watercourse/wetland (should wetlands exist).<br>❖ Develop and implement a construction stormwater management plan prior to the commencement of site clearing activities;<br>❖ A rehabilitation plan for disturbed wetland must be in place as prescribed by the wetland specialist study.<br>❖ Dust suppression for the farm roads will decrease the windblown sediments, this should be read with the Air Quality Impact Assessment during the EIA Phase. |
| | **Heritage:** During operation, the sources of risk to heritage resources are primarily restricted to the processes associated with the hydraulic reclamation of the historical dumps.<br><br>This will be confirmed by a Heritage Impact Assessment. | | ❖ Conduct heritage impact assessment to identify heritage sites within the project area<br>❖ If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken |
| | **Traffic:** These are expected to be the same as for construction. | | ❖ Mitigation measures for the construction phase apply here |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | **Fauna and Flora:** The major impacts are expected during construction. During operation, the following impact could occur:<br>❖ Disturbance of local biodiversity during operation and routine maintenance.<br>❖ Potential for windblown particulates to pollute habitat quality. | | ❖ Minimise disturbance and destruction of areas that are not going to be directly reclaimed.<br>❖ Create awareness regarding environmental preservation amongst all personnel involved in the Marievale TSFs reclamation project.<br>❖ Monitor surrounding vegetation to assess the affect the reclamation activities on the said vegetation. |
| **DECOMMISSIONING** | | | |
| **Completed Reclamation of the Marievale TSFs.**<br><br>**Rehabilitation to Red Earth and the removal of infrastructure.** | **Socio-economic:** Potential impacts include:<br>❖ Improved Quality of life.<br>❖ Increased access to land.<br>❖ Potential for dependency on the Project for sustaining the local economy. | | ❖ Appointment of workforce and investment in the local economy where applicable during rehabilitation. |
| | **Air quality:** The final rehabilitation of the dumps will make use of heavy machinery and vehicles similar to the construction phase. The landscaping and transportation of material to and off site will result in fugitive dust generation. It is anticipated that this will be very short term. | | ❖ Monitoring dust levels on site, at upwind and downwind locations preferably at discrete receptors (if identified). |
| | **Noise**: Potential for noise disturbance when rehabilitating. However, with the rehabilitation activities using similar | | ❖ Refer to the construction phase mitigation measures. |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | machinery and vehicles than the construction phase, it is expected that the noise impact during this phase will be similar. | | |
| | **Surface Water:** Potential impacts include:<br>❖ Water pollution from accidental spillages of decommissioned infrastructure.<br>❖ Residual water pollution from rehabilitated infrastructure footprints post closure | | ❖ Ensure that the pipelines are emptied of all residual material before decommissioning.<br>❖ Ensure the consideration of the durability and longevity of water management designs, e.g. provision of erosion protection for long-term control of erosion and potential pollution to water resources during decommissioning.<br>❖ It should be ensured that the potential future impacts from the reclamation of the dumps has been identified.<br>❖ The final topography should be planned, as far as possible, to be free-draining. |
| | **Groundwater:** If Seepage continues, this could negatively influence the groundwater quality in the underlying aquifers | | ❖ These are expected to be the same as the mitigation measures proposed for the Construction and operation phase. |
| | **Wetlands and Aquatics:** Potential impacts include those associated with removing site infrastructure, including pipelines. | | ❖ Rehabilitation of the footprints must be done according to the Rehabilitation Plan.<br>❖ Pipelines must be flushed clean and rendered safe for decommissioning and removal.<br>❖ Decommissioning and rehabilitation should be done in the dry season. However, it is recommended that |

| ACTIVITY | POTENTIAL IMPACT | STAKEHOLDER COMMENT | MITIGATION MEASURES |
|---|---|---|---|
| | | | seeding be done with the first rains. |
| | **Heritage:** No sources of risk to heritage resources are envisaged for the decommissioning phase of the project at this stage. However, if structures older than 60 or 100 years at the time of<br><br>decommissioning exists, these may be impacted upon by decommissioning. | | ❖ Conduct heritage impact assessment to identify heritage sites within the project area<br>❖ If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken |
| | **Traffic:** These are expected to be the same as for construction. | | ❖ Mitigation measures for the construction phase apply here |
| | **Fauna and Flora:** No impacts are envisioned during this stage. | | ❖ Follow a detailed rehabilitation plan.<br>❖ Minimise disturbed areas.<br>❖ Follow any local and national policies and plans regulating and protecting biodiversity in the project area. |

## 10.5 Other Information Requirements

### 10.5.1 Impact on the Socio-economic Conditions of any Directly Affected Parties

A Social Impact Assessment will be undertaken and will be finalised during the EIA Phase. Potential Social impacts have been included in Table 10-2.

### 10.5.2 Impact on any National Estate referred to in Section 3(2) of the National Heritage Resources Act

Heritage Sensitivity

As a historical mining site, several areas containing historical mining and residential structures are likely to be impacted by the Proposed Project. The Marievale TSFs may also represent 'Historical Settlements and Townscapes' as per the NHRA if they were established more than 60 years ago. The dumps and other associated mining infrastructure are integral components of the historical mining townscapes and settlements of the East Rand.

Additionally, a few areas containing graves and burial grounds could also be impacted by the Proposed Project. Heritage sensitivity will be further assessed during the EIA phase.

Palaeontological Sensitivity

The Proposed Project area is underlain by the Malmani Subgroup, (Chuniespoort Group, Transvaal Supergroup), Dwyka Group, Vryheid Formation (Ecca Group) and Karoo Dolerite Suite. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Vryheid Formation is Very High, the Dwyka Group has a Moderate Palaeontological Sensitivity, Malmani Subgroup a High Palaeontological Sensitivity and Karoo Dolerite Suite has a Zero Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). Groenewald and Groenewald (2014) allocated a high Sensitivity to the Malmani Subgroup. Noting that in addition to stromatolites, potentially fossiliferous Late Caenozoic Cave breccias (within the "Transvaal dolomite" outcrop area) could be present on site.

Therefore, the requirement of a palaeontology study, to assess the value and prominence of fossils in the project area and the effect of the proposed development on the palaeontological heritage, will be further assessed in the EIA phase.

# 11 Declaration of Independence

## 11.1 Undertaking Regarding Correctness of Information

I, **Siphesihle Dambuza**, herewith undertake that the information provided in the foregoing report is correct.

Signature of EAP

DATE: 28 November 2019

## 1.6 Undertaking Regarding Level of Agreement

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

Signature of EAP

DATE: 28 November 2019

# 12 References

Ambani, A.E. and Annegarn, H., 2015. A reduction in mining and industrial effluents in the Blesbokspruit Ramsar wetland, South Africa: Has the quality of the surface water in the wetland improved? *Water SA*, *41*(5), pp.648-659.

Barnard, H.C. (2000). An explanation of the 1:500 000 General Hydrogeological Maps, Johannesburg 2526. Department of Water Affairs and Forestry.

"Blesbokspruit - BirdLife South Africa." *BirdLife South Africa*, 5 June 2018, www.birdlife.org.za/iba-directory/blesbokspruit/. Accessed 16 Sept. 2019.

Bosch, D.W., 1987. Retreatment of residues and waste rock. *GG Stanley, The extractive metallurgy of gold in South Africa*, *2*.

Beukes, N. & Nelson, J., 1995. Sea-level fluctuation and basin subsidence controls on the setting of auriferous palaeoplacers in the Archaean Witwatersrand Supergroup: a genetic and sequence stratigraphic approach. pp. 860-863.

Cabanga Environmental, 2016. Scoping Report for The Re-Processing of Tailings, and Associated Expansion of The Kinross DUMPS.

Cambardella, C.A. and Karlen, D.L., 1999. Spatial analysis of soil fertility parameters. *Precision Agriculture*, *1*(1), pp.5-14.

Carr, A. A management Plan for the Blesbokspruit Ramsar Site: Proposals for the implementation of the consultant's recommendations and suggestions for the way forward. Gauteng Department of Agriculture, Conservation and Environment, Johannesburg, South Africa. Unpublished document, 1999.

DEAT. (2006). *Initial State of Air Report.* The National Air Quality Management Programme (NAQMP), Output C.4. Department of Environmental Affairs and Tourism.

Department of Environmental Affairs (2011). *Highveld Priority Area Air Quality Management Plan*. [online] Available at: http://www.saaqis.org.za/documents/HIGHVELD%20PRIORITY%20AREA%20AQMP.pdf [Accessed 6 Aug. 2019].

Department of Water Affairs and Forestry (2002). *Annual Report*. [online] Available at: http://www.dwa.gov.za/documents/AnnualReports/DWAF%20AR%202002.pdf [Accessed 6 Aug. 2019].

Department of Water and Sanitation (DHSWS). (2018). *Proposed reserve determination of water resources*

*for the Vaal catchment.* Pretoria, Department of Water and Sanitation.

Digby Wells, 2015. Final Basic Assessment Report for a Prospecting Right Application for Slimes Dam 7L4, near Nigel, Gauteng Province.

Driver, A., Nel, J.L., Snaddon, K., Murray, K., Roux, D.J., Hill, L., Swartz, E.R., Manuel, J. & Funke, N. (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. Report to the Water Research Commission.

DrdGold.com. (2018). *Ergo| Our business | DRDGOLD*. [online] Available at: http://www.drdgold.com/our-business/Ergo [Accessed 10 Oct. 2019].

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.

Du Plessis, A., Harmse, T., Ahmed, F. Quantifying and Predicting the Water Quality Associated with Land Cover Change: A Case Study of the Blesbok Spruit Catchment, South Africa. *Water* 2014, 6, 2946-2968.

Du Toit, A.J.I., Du Toit, W.H. and Jonck, F., 1998. Hydrogeological map series of the Republic of South Africa. *Pretoria: Department of Water Affairs and Forestry*.

Ekurhuleni Metropolitan Municipality. 2007. Environmental Management Framework for Ekurhuleni. *Kempton Park: EMM*.

Environmental Assurance, 2017. Draft Scoping Report for the Proposed Mining of Clay, Sand and Coal.

Environomics. (2014). *Gauteng Provincial Environmental Management Framework (GPEMF)*. Pretoria, Environomics.

Eriksson, K.A., Turner B.R. and Vos, R.G., 1979. Evidence of Tidal Processes from the Lower Part of the Witwatersrand Supergroup, South Africa. Econ. Geol. Res. Unit. Info. Circ., Volume 140, p17.

Fenger, J. (2002). Urban air quality. In J. Austin, P. Brimblecombe, & W. Sturges (Eds.), *Air Pollution Science for the 21st Century.* Oxford: Elsevier.

Ferrar A.A. and Lötter M.C., 2007. Mpumalanga Biodiversity Conservation Plan Handbook. Mpumalanga Tourism & Parks Agency, Nelspruit.

Gauteng Department of Agriculture and Rural Development, 2012. Gauteng Mine Residue Areas Strategy Final Report.

Gauteng Department of Agriculture and Rural Development - GDARD. (2009). Conceptual study on reclamation of mine residue areas for development purposes. (Authors: P.W. van Deventer, A.M.

Hattingh, F. Botha, F. du Plessis) Prepared by Northwest University for GDARD, Johannesburg, November 2009, pp. 1-103.

Gauteng Department of Agriculture and Rural Development (2018). *Gauteng Provincial Environmental Management Framework*. [online] pp.201-202. Available at: https://sfiler.environment.gov.za:8443/ssf/s/readFile/folderEntry/20461/8afbc1c761d660120161e6c9919f00a2/1519994473000/last/EMF_1%20and%205_260917.png [Accessed 1 Aug. 2019].

Gauteng Department of Agriculture and Rural Development (2014). *Gauteng Provincial Environmental Management Framework*.

GDARD (2011). Feasibility Study on Reclamation of mine Residue Areas for Development Purposes: Phase II Strategy and Implementation Plan, Technical Report, December 2011, 788/06/01/2011, Final, 90 pp & Appendices A-I. [Prepared by Umvoto Africa (Chris Hartnady, Andiswa Mlisa, Oliver Barker, Amanda Fitschen, Harold Annegarn) in association with TouchStone Resources (Anthony Turton), technical editing by R Taviv, GDARD].

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.

Goldfields (2018). *Gold Fields: Mineral Resource and Mineral Reserve Overview 2011 - 4. Geological setting and mineralisation*. [online] Goldfields.com. Available at: https://www.goldfields.com/reports/ar_dec_2011/minerals/ops_sa_kloof_geo.php [Accessed 10 Oct. 2018].

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.

Held, G. (1996). *Air Pollution and its Impacts on the South African Highveld.* (G. Held, B. J. Gore, A. D. Surridge, G. R. Tosen, & R. D. Walmsley, Eds.) Environmental Scientific Association.

Iap2.org. (2017). *2006 Conference Proceedings - International Association for Public Participation*. [online] Available at: https://www.iap2.org/page/170 [Accessed 13 Oct. 2019].

Ilunga, M., 2017. Assessing catchment resilience using entropy associated with mean annual runoff for the Upper Vaal catchment in South Africa. *Entropy*, *19*(5), p.147.

Jordaan, A., 2014. Centre for Environmental Rights and Lawyers for Human Rights. *Mining and your Community: Know your Environmental Rights.* Pg 1-32.

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.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C. & Collins, N.B. (2009). A Technique for rapidly assessing ecosystem services supplied by wetlands. Mondi Wetland Project.

IUCN. (2017). The IUCN Red List of Threatened Species. www.iucnredlist.org (Accessed: November 2017).

Manzi, M.S., Hein, K.A., King, N. and Durrheim, R.J., 2013. Neoarchaean tectonic history of the Witwatersrand Basin and Ventersdorp Supergroup: New constraints from high-resolution 3D seismic reflection data. *Tectonophysics*, *590*, pp.94-105.

McKay, Tracey & Ahmed, A & Welsh Ndlopfu, Vukosi. (2018). The Blesbokspruit wetland, South Africa: A high altitude wetland under threat.

Mucina, L. and Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria South Africa.

Nel, J.L., Roux, D.J., Maree, G., Kleynhans, C.J., Moolman, J., Reyers, B., Rouget, M. and Cowling, R.M., 2007. Rivers in peril inside and outside protected areas: a systematic approach to conservation assessment of river ecosystems. *Diversity and Distributions*, *13*(3), pp.341-352.

Phaleng, D.M. 2009 Anthropogenic Impacts on the Integrity of the Blesbokspruit Catchment: A Case Study of Surface Water Pollution. University of South Africa, Pretoria, South Africa 2009.

Pfab, M.F., Compaan, P., Whittington-Jones, C.A., Engelbrecht, I., Dumalisile, 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.

Pretorius, D.A., 1963. *The geology of the Central Rand goldfield*. University of the Witwatersrand, Economic Geology Research Unit.

Pretorius, D., 1974. The nature of the Witwatersrand Gold-Uranium Deposits. Econ. Geol. Res. Unit Info. Circ. 86, p. 50.

Principles and Guidelines for Social Impact Assessment. *Impact Assessment and Project Appraisal, 21(3)*, 231-250.

SAAQIS. (2018). *Air Quality Monitoring*. Retrieved from South African Air Quality Information System:

http://www.saaqis.org.za/

SABAP2 (Bird Atlas Project). (2017). http://vmus.adu.org.za/. (Accessed: June 2018).

Schwegler, F. (2006). Air quality management: a mining perspective. *WIT Transactions on Ecology and the Environment, 86*.

South African National Standards (SANS), 2011. South African National Standard, Ambient Air Quality – Limits for Common Pollutants. SANS 1929:2011. Standards South Africa, Pretoria.

Studio Republic, 2014. *DRDGold Process* [Online Video] Available at: https://www.youtube.com/watch?v=-dqj10magrk [Accessed 6 October 2018].

Tailings.info. (2018). *Tailings.info ▪ Hydraulic Mining of Tailings*. [online] Available at: http://www.tailings.info/technical/hydraulic.htm [Accessed 10 Oct. 2018].

Tshikovha Green and Climate Change Advocates, 2017. Mining And Processing of Gold Mine Dumps on Portion 1 of Farm Modderfontein 76 Ir In The Magisterial District Of Benoni, Ekurhuleni Metropolitan Municipality, Gauteng Province. Final Report.

SAAQIS. (2018). *Air Quality Monitoring*. Retrieved from South African Air Quality Information System: http://www.saaqis.org.za/

Tucker, R.F., Viljoen, R.P. and Viljoen, M.J., 2016. A review of the Witwatersrand basin—the world's greatest goldfield. *Episodes*, *39*(2), pp.105-134.

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.

Vegter, J.R. (1995). *Groundwater resources of the Republic of South Africa. Sheet1 and 2.* World Health Organisation (WHO).

*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.*

WHO. (2000). *WHO Air Quality Guidelines for Europe, 2nd edition.* WHO Regional Office for Europe. Copenhagen, Denmark: World Health Organization Regional Publications, European Series, No 91.

Winde F, Geipel G, Espina C, Schüz J. Human exposure to uranium in South African gold mining areas using barber-based hair sampling *PLoS One*, Published online 27 June 2019; https://doi.org/10.1371/journal.pone.0219059

World Wildlife Fund. (2018). *Highveld grasslands | Ecoregions | WWF*. [online] Available at: https://www.worldwildlife.org/ecoregions/at1009 [Accessed 11 Oct. 2018].