

## FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME INFORMATION

<b>PROJECT:</b>	<b>VALLEY SILTS PROJECT</b>
<b>Report Title:</b>	Final Environmental Management Programme Report: Valley Silts Project in Johannesburg, Gauteng Province.
<b>Applicant:</b>	Ergo Mining (Pty) Limited
<b>Project No:</b>	DRDG#008
<b>Compilation Date:</b>	14 September 2020
<b>Status of Report:</b>	<b>Final EIA and EMPr reports for authority review</b>

VERIFICATION	CAPACITY	NAME	SIGNATURE	DATE
<b>By Author</b>	The EAP	Ashleigh Blackwell		25 May 2020
<b>Reviewed by</b>	Technical Director	Gerlinde Wilreker		25 May 2020
<b>Reviewed by:</b>	Legal Director	Michael Hennessy		25 May 2020
<b>Authorised by</b>	Chief Executive	Bradly Thornton		12 September 2020

**Copyright © 2020 Kongiwe Environmental (Pty) Ltd**

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

This report is to be used for the sole purpose intended and should not be used for any other purpose without prior written permission

## SECTION 1:

### EXTRACTED FROM THE ENVIRONMENTAL IMPACT ASSESSMENT

## Executive Summary

**Kongiwe Environmental (Pty) Ltd** ('Kongiwe') has been appointed as the Independent Environmental Service Provider, 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 **Valley Silts Project** (hereafter the Proposed Project).

### Public Review Information

The Application for Environmental Authorisation (EA) was submitted to the Department of Mineral Resources and Energy (DMRE), as the Competent Authority (CA), on **Monday, 22 July 2019**. The Draft Scoping Report (DSR) was made available for public review from **26 July 2019 – 26 August 2019**. The Final Scoping Report (FSR) was submitted to the DMRE for consideration and comment on **4 September 2019**.

The Draft Environmental Impact Assessment / Environmental Management Program Report (EIR/EMPr) was available for a 30-day public review period from **Monday, 9 December 2019 to Friday, 31 January 2020** and an open day was held on **Saturday, 18 January 2020**. Queries relating to radiation levels of the project site were raised during the public participation process, and a radiological study was requested by stakeholders during the Draft EIA/EMPr review period. In view of this, Ergo commissioned a Radiological Study to be included in the EIA/EMPr. In terms of Regulation 23 (1) (b) of the NEMA EIA Regulations, 2014 (as amended), a notification letter was submitted to the DMRE on the 20 February 2020 informing them as the Competent Authority (CA) that Kongiwe will be extending the EIA phase by a further 50 days. The Draft EIA/EMPr public review period was then extended for a further 30 day comment period from **12 March 2020 to 14 April 2020**.

On 1 April 2020, stakeholders were informed that the Revised Draft EIA/EMPr review period would be further extended until Thursday, 7 May 2020 due to the COVID-19 pandemic. A further two-week lock down was announced by the President on 9 April 2020. Accordingly, the public review period of the revised draft EIA/EMPr was extended for a further 14 days and ended on Thursday, 21 May 2020. On 16 April 2020, Stakeholders were informed that an extension of the lockdown period meant that the public participation period would again be extended until 21 May 2020.

In accordance with Regulation GN R439 of 31 March 2020, the Minister of Forestry, Fisheries and the Environment, acting in terms of the Regulations issued in terms of section 27(2) of the Disaster Management Act, 2002, extended the timeframes prescribed in terms of the Environmental Impact Assessment Regulations 2014, the National Environmental Management: Waste Act, 2008 and National Environmental Management: Air Quality Act, 2004, by the number of days of the duration of the lockdown period of the national state of disaster declared for the COVID-19 pandemic, including any extensions to such duration, with effect from 27 March 2020 until the termination of the lockdown period.

On 1 June 2020, the EIAR/EMPr was submitted to the DMRE for a decision and I&APs were advised accordingly.

This process was followed because the Repealed Directions had linked the suspension of time periods contained in the Environmental Impact Assessment Regulations, 2014 (“the EIA Regulations”) to the period of lockdown which was later defined in the Regulations published by the Minister of Cooperative Governance and Traditional Affairs on 29 April 2020, to mean the period between 23H59 on 26 March 2020, until 23H59 on 30 April 2020 when Alert Levels were introduced.

However, when the Permitting Directions were published just over a month later on 5 June 2020, it appears that the time periods contained in the EIA Regulations had in fact remained suspended for a period of at least twenty one (21) days (i.e. until 29 June 2020) and that public participation could not recommence until a public participation plan had been agreed between the applicant and the DMRE case officer.

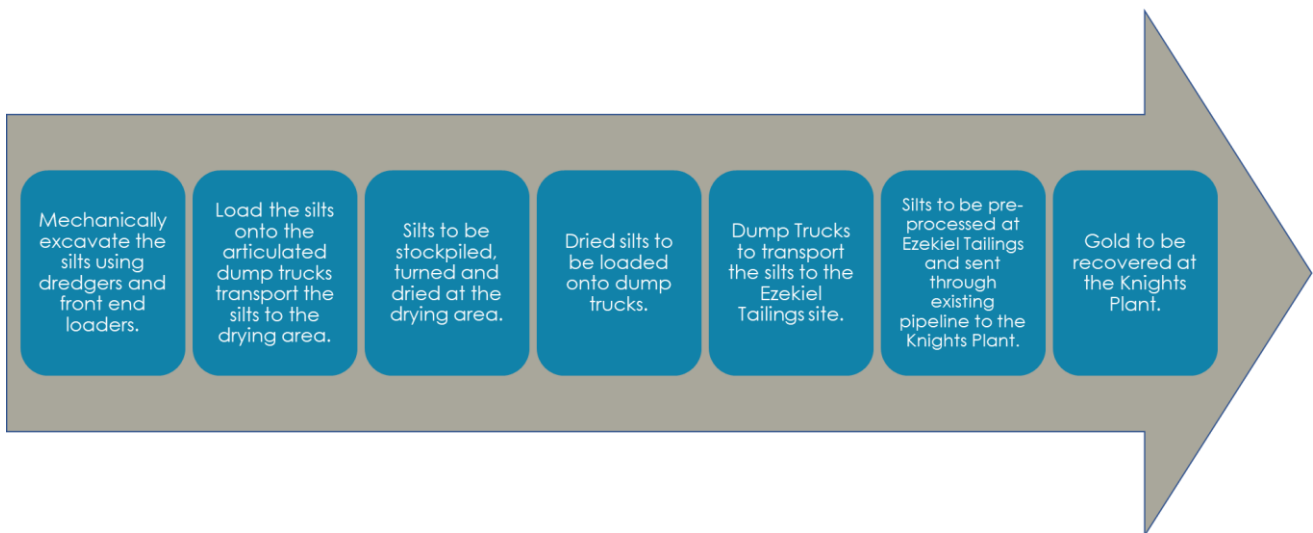
Against the background set out above, the public participation process was re-opened for a twenty-one (21) day period from **Friday, 21 August 2020 to Friday, 11 September 2020**.

---

## Project Intentions

---

Ergo Mining (Pty) Ltd (Ergo) intends to mechanically excavate gold bearing silts from a 37 Ha area adjacent to the Russell Stream, north of the Soweto Highway, between Crownwood road and Nasrec Road. The project area is situated immediately north of Booyens Reserve, and immediately south of Crown. Ergo intends to conduct the project in accordance with the summary flow diagram below:



### A short summary of the Proposed Project process

The gold bearing silts will be mechanically excavated from the Proposed Project area. The removed silts will be stockpiled and dried on old tailings footprints (dump 3/L/12) directly north of the project site, before being hauled by truck to a tailings dam footprint known as the Ezekiel dump (dump 4/A/18).

At the Ezekiel dump, the dried silt will move through a scrubber for pre-processing. The scrubber allows for de-agglomeration of the silt to expose gold residues. Water will then be added to create a slurry which will then be pumped to the Knights Plant for beneficiation. At the Knights Plant the material will be reprocessed as authorised in terms of the Knights Mining Right (GP187MR), and gold will be recovered. From the Knights Plant, the waste slurry will move through existing pipelines to the Brakpan/Withok Tailings Storage Facility (TSF) for ultimate deposition.

Kongiwe reports independently on the positive and negative social and environmental impacts of the Valley Silts project, as well as provides mitigation measures to reduce the negative impacts and enhance the positive impacts of the project.

---

## Project Alternatives

---

The following sections below provide a short summary of the project alternatives that were assessed within this EIA.

**The location of the proposed project:** The initial development area earmarked for silt removal will be undertaken on the Remaining Extent of Portion 11 of the Farm Langlaagte 224-IQ. This land is owned by Industrial Properties (Pty) Ltd, otherwise known as iProp.

The right authorising the removal of silts from the proposed area, falls within a Mining Right (GP 184 MR). No additional properties outside of the Mining Right will be considered. The silts can only be removed in areas where they have accumulated.

**The type of activity to be undertaken:** The only optional activity considered is for Ergo is to excavate and reclaim gold bearing silts from an area in the Russell Stream as per the approved Mining Right (MR).

**The technology to be used:** Mechanical excavation is preferred. In this setting, hydraulically removing the silts can cause water contamination and is not preferred. Backhoes and excavators will be used to excavate the gold bearing silts mechanically from an area in the Russell Stream. An independent contractor, with the relevant knowledge and expertise, will be responsible for the removal of silt and rehabilitation of the stream. This will be overseen and monitored by Ergo.

Dump trucks will haul the dried silts to the dirty TSF footprint known as Ezekiel Dump (4/A/18) for pre-processing. Ergo intends to make use of its existing infrastructure for this project with minimal impact.

**Operational Alternatives:** The only operational option for the project is the **removal of silts as well as gold recovery.**

As mentioned, the secondary operations of this project (using existing infrastructure) include hauling the dried silts to the Ezekiel site. Once at the Ezekiel site, the dried silts will move through a scrubber (known as pre-processing) and water will be added to create a slurry. From the Ezekiel site the slurry will be pumped via existing pipelines to the Knights Plant for beneficiation. At the Knights Plant the material will be reprocessed

through the Knights Mining Right (GP 187 MR), and gold will be recovered. From the Knights Plant, the unwanted slurry (not containing gold) will move through existing pipelines to the Brakpan/Withok TSF for ultimate deposition.

**Hauling Route Alternatives:** One access to the site is proposed directly off Crownwood Street. This access to the site is proposed approximately 440 m to the south of the intersection with Jupiter Road. The access must be 10 m wide, with one lane 'IN' and one lane 'OUT'. Traffic from Crownwood Road (M17) will have the right of way and a 'STOP' condition will be implemented for the proposed access.

**The No-Go Alternative:** 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 removal, economic development, and the rehabilitation works in the Russell Stream would not occur. The only alternative option to this project (the No-Go option) is to leave the polluting silts within the stream; there is no other potential use.

The "No-Go" Option also assumes the continuation of the current land use, implying the absence of any rehabilitation activities and associated infrastructures. This means that the attraction of the gold reserves located within the stream could potentially enhance illegal mining, and if left as is, population settlement on or around the stream could occur. In addition, without the removal of silts from the initial development area, the Russell Stream will continue to follow its current path – meaning that flooding risks to residents will remain.

The 'No Project' alternative is not preferred due to the expected benefits of the proposed project. The expected indirect benefits resulting from the Valley Silts Project include:

- ❖ Removal of a source of pollution in the area;
- ❖ The rehabilitation of target areas in the Russell Stream;
- ❖ Enhanced ecosystem functioning, including attraction of fauna, flora and improved water quality;
- ❖ Continued supply of gold to the local and international markets, and therefore contribution to the local, provincial and national economy;
- ❖ Liberating land for future development;
- ❖ Continued employment for staff and contractors of Ergo;
- ❖ Potential to ameliorate flooding in the area; and
- ❖ Benefit's from Ergo's SLP Programmes.

Overall, the Proposed Project is in line with the objectives of the Gauteng Mine Residue Area Strategy (2012), as well as the GDARD, the City of Johannesburg Strategic Development Framework. Moreover, removing the silts is directly aligned to future development plans for the area.

---

## Project Rehabilitation and Closure

---

Ergo intends to rehabilitate the Valley Silts project area by adequately shaping the 37 Ha, grassing and planting appropriate species to stabilise the soils. The drying areas will be worked down to red earth, and all contaminated soils of the drying area will be removed. All existing infrastructure and equipment will be removed, and the footprints will be scarified. The existing internal haul roads and access infrastructure will be scarified and returned to their previous status.

The EIA found that the Proposed Project area was once a mine wastewater dam with a dam wall and spillway. It was concluded that this dam was used to service the many historical mines that were operational in the early to mid 1900's. Kongiwe expects that with the removal of the silts from the project area, the area may fill with water once again. Given the age and therefore the reduced structural integrity of the dam wall, the EIA concluded that a practical and feasible solution to managing the water in the project area would be to reduce height of the dam wall so that the end landowner (iProp) can access the remaining dam core, which should still have its integrity intact. This will need to be proved and tested as well as managed by the City of Johannesburg, the Department of Human Resources, Water and Sanitation, the Johannesburg Roads Agency, Ergo and iProp. The end land use is at iProp's discretion.

---

### **Future Land Use**

---

In terms of future land uses, iProp intends to undertake similar land use developments as seen in Crown, Crown City and Booyens Reserve over portions of Langlaagte 224 – IQ and Mooifontein 225 – IQ. iProp intends to construct both commercial and industrial developments for increased employment opportunity in and around the city centre and near where the communities reside.

End use of the project area for a recreational or attenuation dam may be considered by iProp once Ergo has completed rehabilitation.

---

### **Project Need and Desirability**

---

The following sections will discuss the needs and desirability of the proposed project.

#### **Economic Benefits of Silt Removal**

South Africa has undergone a long-term decline in gold output with the share of South Africa's world gold production decreasing in recent years from 14% to about 5%. This trend continued in 2018. The overall decrease of gold production may be because of unreliable electricity-supply constraints, rising administered prices, labour issues, as well as waning productivity rates impeding its operational performance. The Valley Silts Project will retrieve gold from the gold bearing silts near the Russell Stream. The revival of gold processing and recovery will add valuable tonnage into a declining market and promote economic growth and sustainability for the local economy.

The proposed project would directly and indirectly contribute to the Country's Gross Domestic Product (GDP), as well as enhance and further support workers and contractors employed or contracted to Ergo, as well as enable the Knights plant to remain operational.

---

### **Social Benefits of the Silt Removal**

The land being cleared could be a secondary or consequential product. It is envisioned that the removal of these silts could significantly reduce a source of water and land pollution. Additionally, the removal of the silts will also aid in the flow of the stream and help with flooding that occurs sporadically, in the wet seasons in the Riverlea area, 2.5 km west of the centre of the project area.

Through consultations with various stakeholders, it was stated that the silts contained in the project area are an allure for illegal elements, like *Zama-Zamas* (informal miners). As informal miners settle into the area, crime becomes a concern for community members due to the level of uncontrollability and lawlessness of these individuals. The removal of these silts from the historical dam may help alleviate the levels of crime and lawlessness found within the area.

Overall, the Proposed Project is in line with the objectives of the Gauteng Mine Residue Area Strategy (2012), which is to reclaim and/or rehabilitate areas that have been affected by the mine dumps to the point where they become safe for adjacent communities. This strategy also aims at making previously unavailable land, available for use or future development.

### **Environmental Benefits of Silts Removal**

The status quo of the project area is such that it is a source of pollution that is unmanaged.

Specialist reports found that through carefully planned rehabilitation efforts the system could potentially be reinstated to where it represents a valuable open space asset, that is actively utilised for commercial or industrial development purposes. However, the in-stream water quality is severely impacted by raw sewerage input, an impact whose rectification is pivotal to the success of the rehabilitation efforts but is likely to remain one of the most challenging issues.

Post decommissioning, the following positive benefits are expected:

- ❖ Skills Development for those employed for the project;
- ❖ Economic growth and contribution to the economy;
- ❖ Potential attenuation of stream flow;
- ❖ Improved surface water quality over time;
- ❖ Improved groundwater quality over time; and
- ❖ Improved ecosystem health and functioning over time.

---

### **Environmental Impacts of the Valley Silts Project**

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

**Risk Matrix of Assessed Project Impacts**

IMPACT	RATING PRE-MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING	RATING POST MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING
Positive (+)	Major (high)				❖ Monitoring	Major (high)	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved aquifer yield</li> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Economic growth</li> <li>❖ Amelioration of flooding potentially</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved aquifer yield</li> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Economic growth</li> <li>❖ Amelioration of flooding potentially</li> </ul>
Positive (+)	Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>			Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Improved water quality and drinking water</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved water quality and drinking water</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved surface water quality</li> <li>❖ Improved groundwater quality</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved surface water quality</li> <li>❖ Improved groundwater quality</li> </ul>
Positive (+)	Minor (low)					Minor (low)			<ul style="list-style-type: none"> <li>❖ Improved ecosystem health and functioning</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved ecosystem health and functioning</li> </ul>
No Impact	No Impact					No Impact				
Negative (-)	Minor (low)	<ul style="list-style-type: none"> <li>❖ Groundwater quality impacts</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Groundwater quality impacts</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>			Minor (low)	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Russell Stream</li> <li>❖ Water Quality impacts</li> <li>❖ Groundwater quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement patterns</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Russell Stream</li> <li>❖ Water Quality impacts</li> <li>❖ Groundwater quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement patterns</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Encroachment of alien species</li> <li>❖ Faunal mortalities</li> <li>❖ Safety impacts for community members and employees</li> </ul>	
Negative (-)	Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Russell Stream</li> <li>❖ Sedimentation</li> <li>❖ Water Quality impacts</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement</li> </ul>	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Russell Stream</li> <li>❖ Sedimentation</li> <li>❖ Water Quality impacts</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement</li> </ul>	<ul style="list-style-type: none"> <li>❖ Encroachment of alien species</li> <li>❖ Faunal mortalities</li> <li>❖ Safety impacts for community members and employees</li> </ul>		Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Sedimentation</li> <li>❖ Air quality impacts</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Sedimentation</li> <li>❖ Air quality impacts</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>		



IMPACT	RATING PRE-MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING	RATING POST MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING
		patterns	patterns							
Negative (-)	Major (high)	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Air quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>	<ul style="list-style-type: none"> <li>❖ Direst Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Air quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>			Major (high)				

---

## Conclusions

---

An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to mitigate and better manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed. As a final option, offset strategies should be investigated, if feasible.

The findings of the impact assessment have shown that the Valley Silts Project would conclusively result in certain negative impacts during the operational phase to the environment. However, none of the specialist studies objected to the project. Impacts are largely Moderate (negative) in significance, being mitigated to Low (negative) Significance. During the decommissioning and post-decommissioning phases, the majority of the impact are expected to be Moderate – High (positive) in significance after mitigation.

The scientific specialist mitigations measures have been included into this EIA and EMPr report to reduce the significance of all the identified negative impacts. Most of the negative impacts from the proposed project can be reduced through the implementation of mitigation measures. Based on the information contained in this report, it is the opinion of Kongiwe that the negative environmental impacts resulting from the Valley Silts Project can be mitigated to within acceptable limits and that the **project should be authorised**. This opinion holds provided all the recommendations proposed in the specialist studies and the EIA and EMPr report as well as legislative requirements are implemented and adhered to.

Although Riverlea is not a directly affected community, it must be stressed that a collective effort needs to be made by relevant Government Departments to address the current municipal issues experienced in Riverlea, to ensure that the end result of this project is positive in the long-term and is aligned to future development plans for the site.

## Contents

<b>CHAPTER 1: INTRODUCTION .....</b>	<b>1</b>
1.1 Historical Project Background .....	1
1.2 Valley Silts Project Location Description .....	3
1.3 Water use exemption .....	10
1.4 Description of the current Land Uses Applicable .....	10
1.4.1 Future Land Use Proposals .....	11
1.5 Known Mining Rights held in the Area .....	11
<b>CHAPTER 2: DETAILS OF THE EAP .....</b>	<b>13</b>
2.1.1 Contact Person and Corresponding Address .....	13
2.1.2 Expertise of the EAP .....	13
2.1.3 Summary of the EAP’s Past Experience .....	13
2.1.4 Additional Project Team Members.....	14
2.1.5 Independent Specialist Team Members.....	14
<b>CHAPTER 3: DESCRIPTION OF THE ASPECTS OF THE ACTIVITY .....</b>	<b>16</b>
<b>CHAPTER 4: DESCRIPTION OF THE BASELINE ENVIRONMENT .....</b>	<b>17</b>
<b>CHAPTER 5: COMPOSITE MAP .....</b>	<b>18</b>
<b>CHAPTER 6: IMPACT MANAGEMENT OBJECTIVES.....</b>	<b>21</b>
6.1 Aspects for Inclusions as Considerations of the Environmental Authorisation .....	22
6.2 Determination of Rehabilitation Objectives.....	23
6.2.1 Rehabilitation principles.....	23
6.2.2 Closure and Rehabilitation Actions .....	24
6.2.3 Rehabilitation Actions and Management Plans .....	24
6.2.4 Rehabilitation, Decommissioning and Closure Phase .....	25
<b>CHAPTER 7: ROLES AND RESPONSIBILITIES.....</b>	<b>28</b>
7.1 Government Departments .....	28
7.2 Site Manager.....	28
7.3 Contractors .....	28
7.4 Environmental Officer .....	28
7.5 Environmental Control Officer .....	29
<b>CHAPTER 8: IMPACT MITIGATION PER PHASE .....</b>	<b>30</b>
8.1 Pre-Construction Phase Mitigation Measures.....	31
8.2 Construction Phase Mitigation Measures .....	35
8.3 Operational Phase Mitigation Measures.....	45
8.4 Decommissioning Mitigation Measures.....	51
8.5 Post-Decommissioning Mitigation Measures.....	55
<b>CHAPTER 9: SPECIFIC IMPACT MANAGEMENT PLANS .....</b>	<b>57</b>
9.1 Environmental Awareness Plan.....	57
9.1.1 Communication Chain .....	57
9.1.2 Management Sector .....	57
9.1.3 Construction Workers Sector .....	58
9.1.4 Contractors .....	58

9.1.5	Environmental Control Officer .....	59
9.2	Strategic Communication Plan .....	59
9.2.1	Environmental Communication Strategies.....	59
9.3	Emergency Response Plan.....	63
9.3.1	Intent .....	63
9.3.2	Planning .....	64
9.4	Conceptual Stormwater Management Plan.....	67
9.4.1	Surface Water Quality Monitoring .....	67
9.5	Groundwater Monitoring and Seepage Prevention .....	68
9.5.1	Groundwater Management Measures.....	68
9.5.2	Groundwater Monitoring .....	70
9.6	Dust Fallout Monitoring Plan.....	74
9.7	Heritage Management Plans .....	75
9.7.1	Chance find procedure .....	75
9.7.2	Possible finds during construction and operation (desilting activities) .....	76
9.7.3	Timeframes.....	76
9.8	Social Management Plans.....	79
9.8.1	Stakeholder Engagement Plan.....	79
9.8.2	Grievance Mechanism .....	79
9.8.3	Human Rights .....	80
9.9	Socio Economic Monitoring Programme.....	81
9.10	Radiological Monitoring Plan.....	83
9.10.1	General .....	83
9.10.2	Baseline Characterisation .....	83
9.10.3	Monitoring Programme .....	83
9.10.4	Proposed Monitoring Points.....	84
9.11	Waste Management Plan .....	85
9.11.1	Waste Management Principles.....	85
9.11.2	Project Phase Waste Management .....	85
9.12	Rehabilitation Plan .....	87
9.12.1	Successful Decommissioning Vision and Objectives .....	87
9.12.2	Considering Decommissioning Options.....	88
9.12.3	Decommissioning Options Research .....	88
9.12.4	Decommissioning Assumptions.....	89
9.12.5	Rehabilitation Actions and Management Plans .....	89
9.13	Financial Provisioning .....	91
9.14	Action Schedule .....	91
9.15	Monitoring, Auditing and Reporting Requirements.....	91
<b>CHAPTER 10: COMPLIANCE MONITORING MECHANISM .....</b>		<b>93</b>
<b>CHAPTER 11: OATH UNDERTAKING.....</b>		<b>95</b>

## LIST OF FIGURES

Figure 1-1: Plan of Central section of the Witwatersrand : showing properties in which the Consolidated Gold Fields of South Africa, Limited were interested - (Afrique du Sud) Survey Department – 1903. <a href="http://1886.u-bordeaux-montaigne.fr/items/show/9796">http://1886.u-bordeaux-montaigne.fr/items/show/9796</a> .....	2
Figure 1-2: 1st Edition 1943 Topographic Map (2627BB) showing the western section of the proposed study area (purple polygon) and the heritage sites in close proximity.....	2
Figure 1-3: Diagram indicating the Valley Silts deposits in Dam A, Dam B and Dam C on the Russell Stream. ....	3
Figure 1-4: Diagram indicating the location of the initial development area (purple) within the study area .....	4
Figure 1-5 FNB Stadium (Soccer City) .....	5
Figure 1-6: Infrastructure found in the project area including pipelines and powerlines. ....	5
Figure 1-7: A portion of the Russell Stream which will be excavated. This image was taken at the following location: 26°13'46.58"S; 27°59'43.03"E .....	6
Figure 1-8: The Project Site. This image was taken at the following location: 26°13'47.87"S; 27°59'32.28"E ...	6
Figure 1-9: Land Tenure Map for the Valley Silts Project.....	9
Figure 5-1: Valley Silts Project .....	19
Figure 5-2: Valley Silts Initial Development area – Proposed Site Plan (*These timeframes are adjustable) ..	20
Figure 9-1 Proposed new monitoring borehole locations.....	72

## LIST OF TABLES

Table 1-1: Property Details of the Valley Silts Project.....	7
Table 1-2 Inactive mines and structures in the project area. Source: Witwatersrand Mining Survey Contents. Accessed at: <a href="http://joburgheritage.org.za/docs/Witwatersrand%20Mining%20Survey%20Listing.pdf">http://joburgheritage.org.za/docs/Witwatersrand%20Mining%20Survey%20Listing.pdf</a> .....	11
Table 2-1: Details of the EAP .....	13
Table 2-2: Details of the Kongiwe Project Team .....	14
Table 2-3: Details of the Specialist Team .....	14
Table 8-1: Summary table of the Activities associated with the construction phase of the project .....	31
Table 8-2: Pre-Construction Phase Mitigation Measures.....	31
Table 8-3: Summary table of the Activities associated with the construction phase of the project .....	35
Table 8-4: Construction Phase Mitigation Measures .....	35
Table 8-5: Summary table of the Activities associated with the operational phase of the project.....	45
Table 8-6: Operational Phase Mitigation Measures.....	45
Table 8-7: Summary table of the Activities associated with this decommissioning phase of the project.....	51
Table 8-8: Closure and Decommissioning Phase Mitigation Measures .....	51
Table 8-9: Summary table of the Activities associated with this post-closure phase of the project.....	55
Table 8-10: Post-Closure Phase Mitigation Measures.....	55
Table 9-1: Emergency Scenario Contingency Planning .....	65
Table 9-2: General groundwater management measures .....	68
Table 9-3: Proposed groundwater monitoring positions .....	71
Table 9-4: Groundwater monitoring requirements .....	71
Table 9-5: National Dust Control Regulations (Government Notice No. R827, 2013). .....	74
Table 9-6: Lead times for permitting and mobilisation .....	76

---

Table 9-7 Lead times for permitting and mobilisation .....	77
Table 9-8: Proposed Socio-Economic Programme .....	81
Table 9-9: Summary of the environmental monitoring programme proposed for the project aimed at public radiation protection. ....	84
Table 10-1: Monitoring and Management Plan .....	93

---

## CHAPTER 1: INTRODUCTION

---

**Kongiwe Environmental (Pty) Ltd** ('Kongiwe') has been appointed as the Independent Environmental Service Provider, 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 **Valley Silts Project** (hereafter the Proposed Project).

### 1.1 Historical Project Background

When mining was at its peak, up to the mid 1900's, it was known practice to design tailings dumps within the immediate floodline, even within watercourses. At the same time dams were built on the Klipspruit, approximately 5.5 km east of New Canada and Fleurhof Dams, these were called the Russell Stream dam (also known as the No. 12 Shaft dam) and the Golf Meer Lake (Figure 1-2). Both the Russell Stream Dam and the Golf Meer Lake were utilised as wastewater dams / mine dams to service the several mines in the area. Mining operations were not regulated and once mining had ceased around the project area, these tailing were left unmanaged.

Over time tailings materials have accumulated in the Russell Stream Dam and the Golf Meer Lake due to erosion from the Rand Leases, Crown Mines, Bantjies and other old tailings dumps in the area. This has formed a thick layer of sediment, averaging 2 m thick, but up to 12 m in some areas. As a result of the silt build-up in the valley, the Russell Stream has a reduced stream velocity and has become displaced northward toward the areas of Riverlea and Crown Industrial.

For this Valley Silts Project, Ergo Mining (Pty) Ltd (Ergo) intends to reclaim the area where these silts have been deposited at the Gold Meer Lake (referred to as Dam B Figure 1-3). With the upturn of the gold price, and the ease of which silts can be accessed, Ergo will aim to remove the silt from the valley in specific target areas, thereby potentially improving the water flow dynamics, which could assist in ameliorating current flooding issues experienced in the area of Riverlea. After removal of the silt from the target areas, Ergo aims to rehabilitate the target areas within the Valley area by shaping the areas where silt was removed and make the area free draining. Thereafter, appropriate species will be planted to stabilise the soil.

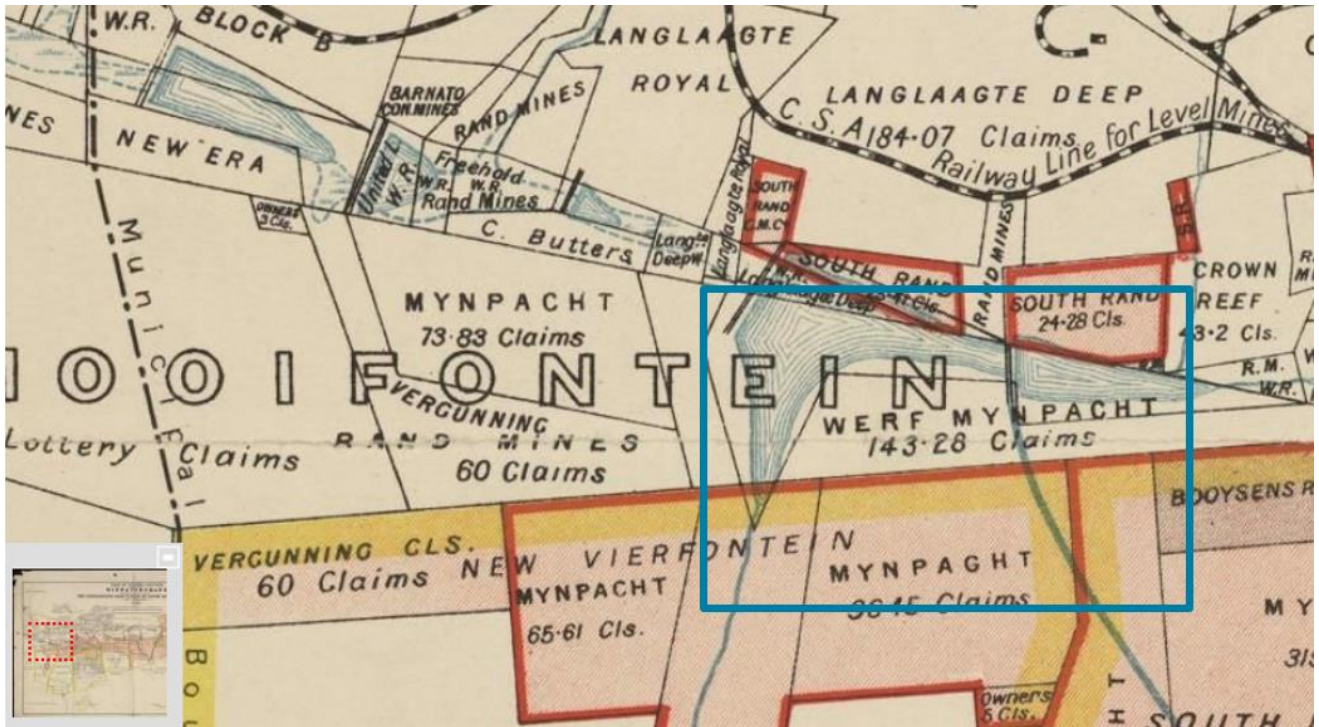


Figure 1-1: Plan of Central section of the Witwatersrand : showing properties in which the Consolidated Gold Fields of South Africa, Limited were interested - (Afrique du Sud) Survey Department – 1903. <http://1886.u-bordeaux-montaigne.fr/items/show/9796>

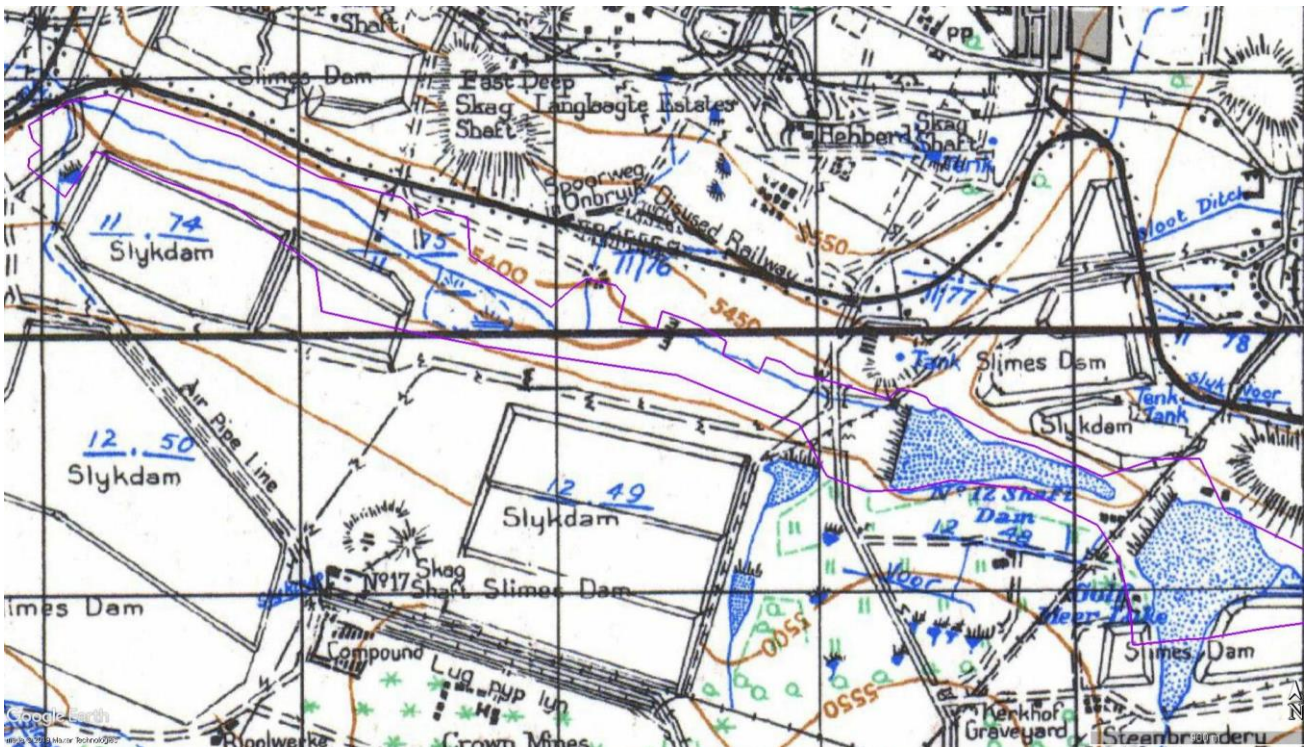


Figure 1-2: 1st Edition 1943 Topographic Map (2627BB) showing the western section of the proposed study area (purple polygon) and the heritage sites in close proximity.

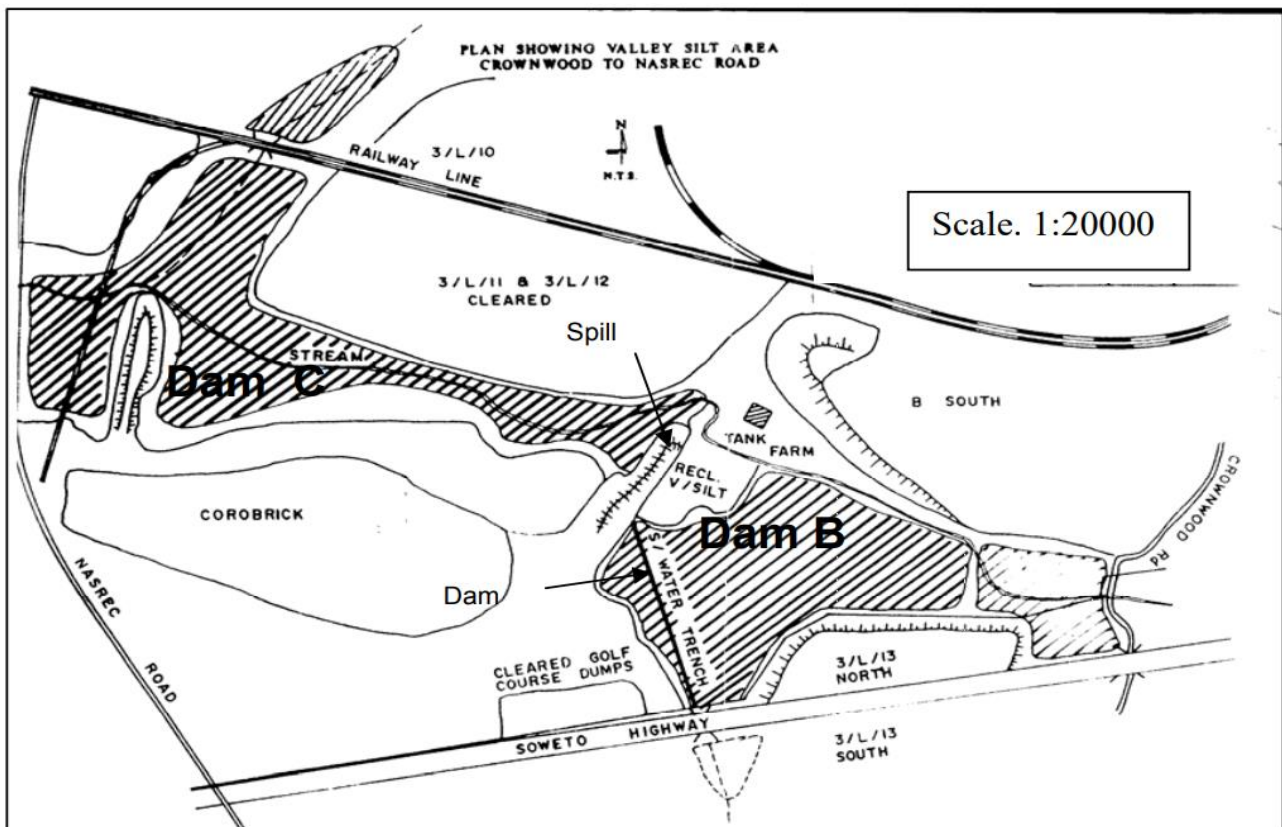


## 1.2 Valley Silts Project Location Description

The Russell Stream flows in an east – west direction to the south of Crown treatment plant and north of Gold Reef City on Crown Mines. The mean annual precipitation of the Gauteng Highveld is about 700 mm, falling mainly during the summer months in the form of heavy thunderstorms. A windy season from August to October precedes the summer rains and is responsible for considerable erosion from exposed tailings dumps and serious air pollution (Ndasi, 2007).

The feasibility of removing silts from other areas within the approved MR area will be assessed in terms of prevailing economics and may be subject to further Environmental Authorisations.

The EIA concluded that a leakage of sediments from the Golf Course dumps resulted in the siltation of the Golf Meer Lake (Dam B) (Figure 1-3), adjacent to the Soweto Highway (Ndasi, 2007). Due to the sediment infill, the original river channel has diverted at the river mouth around the dam wall. Since there are not many distributaries seen here, it is assumed that gold bearing sediments were then washed down into Dam C.



**Figure 1-3: Diagram indicating the Valley Silts deposits in Dam A, Dam B and Dam C on the Russell Stream.**

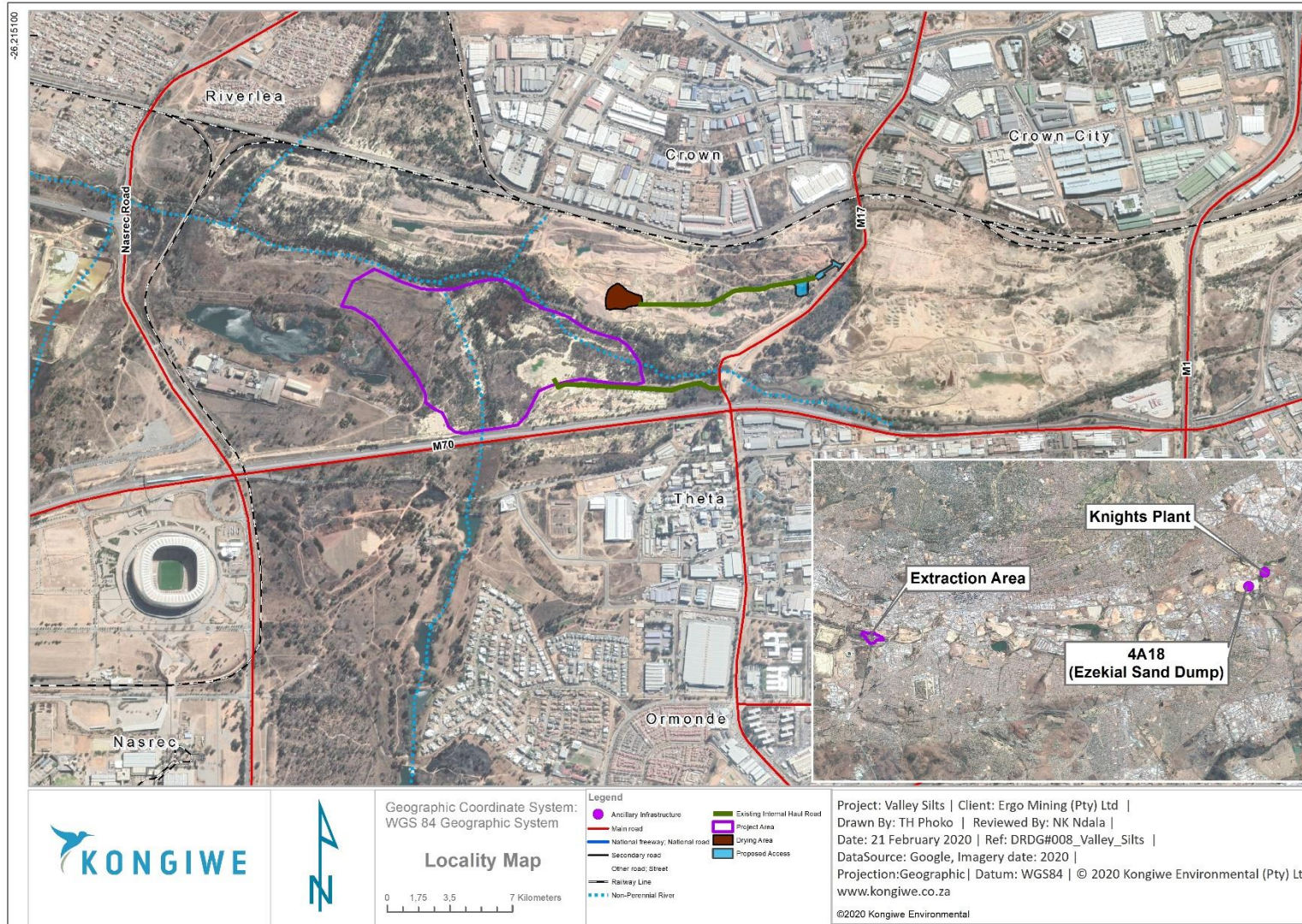


Figure 1-4: Diagram indicating the location of the initial development area (purple) within the study area

Ndasi (2007) found that dam sediments are trap sites for heavy metals entrained from surrounding tailings dumps. High concentrations of gold in these sediments have been proven to be economically viable in the Russell Stream dams. Reserve calculations on the Russell Stream sediments (still unmined) gave a total estimated gold content of 6.4 tons (206,452 ounces) at an average grade of 0.8 g/t Au.

In terms of locality, the Proposed Project is located within the Russell Stream valley, near Booyens Reserve. The project area stretches from New Canada Road, following the valley south east, past the Nasrec Road bridge and past Crownwood Road until the stream meets the M1. This area is known as Valley Silts. The Proposed Project is situated within Ward 124 of the City of Johannesburg Metropolitan Municipality (CoJMM). The Russell Stream (also referred to as the Klipspruit) is surrounded by industrial, commercial, residential and undeveloped land. The closest residential area to the project is Booyens Reserve and Crown.

The following infrastructure is encountered in the area (Figure 1-5 and Figure 1-6):

- ❖ National and provincial roads (M70, M17, N17, N1);
- ❖ Residential and commercial properties;
- ❖ Industrial properties;
- ❖ FNB Soccer City Sports Centre;
- ❖ Power lines;
- ❖ Sewer lines;
- ❖ Railway line;
- ❖ Water reticulation systems; and
- ❖ Historic Mine Dumps.



**Figure 1-5 FNB Stadium (Soccer City)**



**Figure 1-6: Infrastructure found in the project area including pipelines and powerlines.**



**Figure 1-7: A portion of the Russell Stream which will be excavated. This image was taken at the following location: 26°13'46.58"S; 27°59'43.03"E**



**Figure 1-8: The Project Site. This image was taken at the following location: 26°13'47.87"S; 27°59'32.28"E**

The properties of interest for the Valley Silts Project are illustrated by the tables below.

**Table 1-1: Property Details of the Valley Silts Project**

FARM NAMES	FARM NAME:	FARM ID	PORTION	LANDOWNER <sup>1</sup>			
		Paardekraal	226 IQ	8	South African Corporation	Rail	Commuter
	Paardekraal	226 IQ	9 (RE)	South African Corporation	Rail	Commuter	
	Paardekraal	226 IQ	252	Undetermined			
	Langlaagte	224 IQ	211 (RE)	City of Johannesburg Metropolitan Municipality			
	Langlaagte	224 IQ	379	Undetermined			
	Langlaagte	224 IQ	364	South African National Roads Agency SOC Ltd			
	Langlaagte	224 IQ	380	Undetermined			
	Langlaagte	224 IQ	212	This property is under the responsibility of the City of Johannesburg.			
	Langlaagte	224 IQ	3 (RE)	Industrial Zone (Pty) Ltd			
	Langlaagte	224 IQ	381	South African National Roads Agency SOC Ltd			
	Langlaagte	224 IQ	296	South African Corporation Ltd	Rail	Commuter	
	Langlaagte	224 IQ	298	South African Corporation Ltd	Rail	Commuter	
	Langlaagte	224 IQ	8 (RE)	Industrial Zone (Pty) Ltd			
	Langlaagte	224 IQ	11 (RE)	Industrial Zone (Pty) Ltd			
	Langlaagte	224 IQ	9	Industrial Zone (Pty) Ltd			
	Mooifontein	225 IQ	10	South African Corporation Ltd	Rail	Commuter	
	Mooifontein	225 IQ	(RE)	Industrial Zone (Pty) Ltd			
	Turffontein	96 IR	4 (RE)	Industrial Zone (Pty) Ltd			
<b>APPLICATION AREA (HA)</b>	The Valley Silts approved Mining Right covers an approximate area of 122 Hectares (ha).						
<b>MAGISTERIAL DISTRICT</b>	The project site is located in Ward 124 within the City of Johannesburg Metropolitan Municipality (CoJ).						
<b>DISTANCE AND DIRECTION FROM NEAREST TOWN</b>	The site is within the City of Johannesburg. Booyens Reserve, Theta and Crown are located in close proximity to the Russell stream and the Valley Silts area.						

<sup>1</sup> Properties/Farms which remain Undetermined: Research at the Surveyor General's office found that these properties are currently not registered. In addition there is no Deeds Office information. Refer to Appendix C of this EIA for proof of correspondence from site visits to the undetermined properties, deeds office searches as well as correspondence from the Surveyor Generals office. These landowners cannot be identified.

21-DIGIT SURVEYOR GENERAL CODE FOR EACH FARM PORTION	FARM NAME:	FARM ID	PORTION	21 DIGIT SG-CODE
		Paardekraal	226 IQ	8
	Paardekraal	226 IQ	9 (RE)	TOIQ000000002260009
	Paardekraal	226 IQ	252	TOIQ0000000022600252
	Langlaagte	224 IQ	211 (RE)	TOIQ0000000022400211
	Langlaagte	224 IQ	379	TOIQ0000000022400379
	Langlaagte	224 IQ	364	TOIQ0000000022400364
	Langlaagte	224 IQ	380	TOIQ0000000022400380
	Langlaagte	224 IQ	212	TOIQ0000000022400212
	Langlaagte	224 IQ	3 (RE)	TOIQ000000002240003
	Langlaagte	224 IQ	381	TOIQ0000000022400381
	Langlaagte	224 IQ	296	TOIQ0000000022400296
	Langlaagte	224 IQ	298	TOIQ0000000022400298
	Langlaagte	224 IQ	8 (RE)	TOIQ000000002240008
	Langlaagte	224 IQ	11 (RE)	TOIQ000000002240011
	Langlaagte	224 IQ	9	TOIQ000000002240009
	Mooifontein	225 IQ	10	TOIQ000000002250010
	Mooifontein	225 IQ	(RE)	TOIQ000000002250000
	Turffontein	96 IR	4 (RE)	TOIR000000000960004

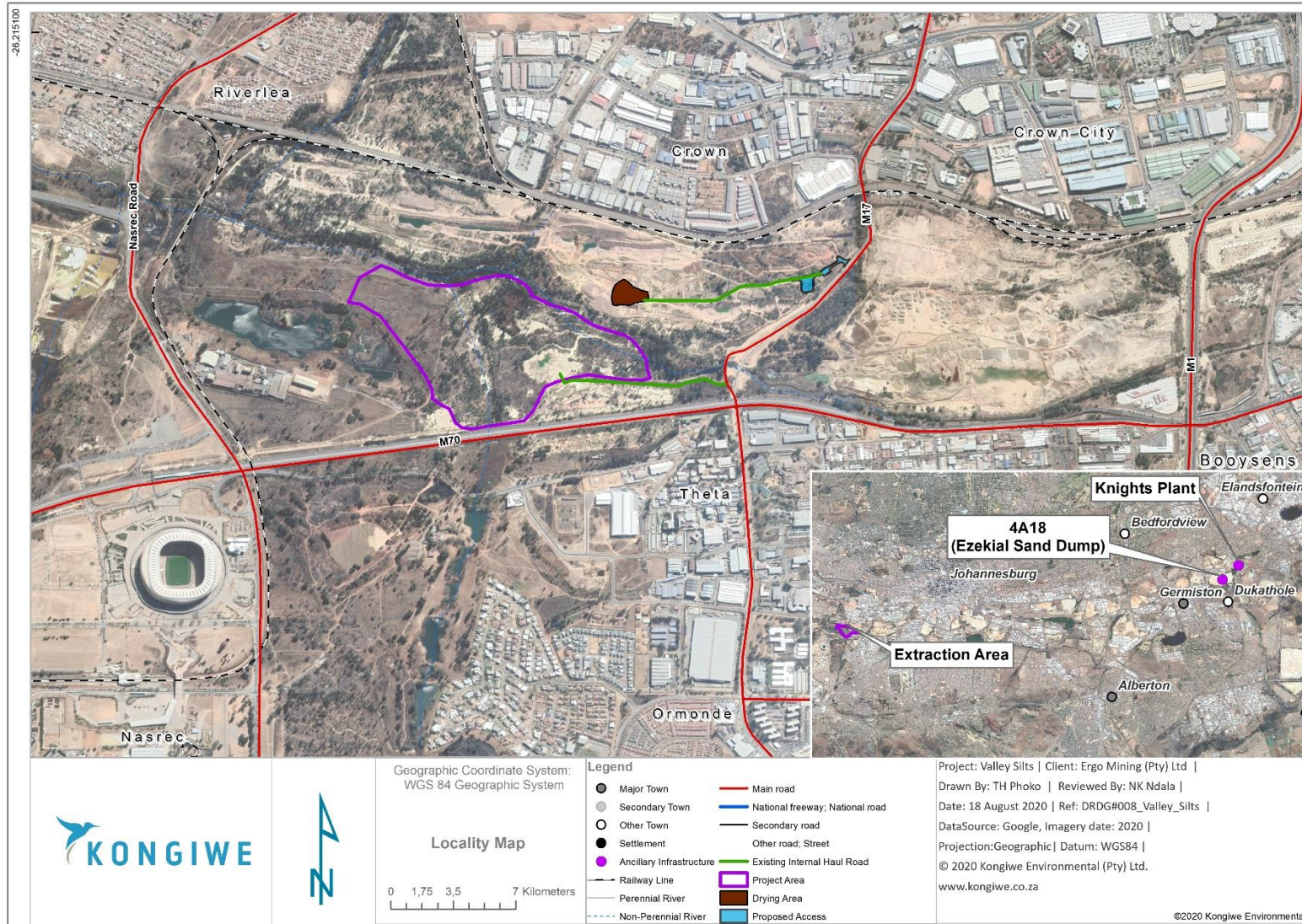


Figure 1-9: Land Tenure Map for the Valley Silts Project

### 1.3 Water use exemption

The project falls within the 1:50 year floodline. Exemption from Government Notice No. 704 of the National Water Act, 1998 (Act 36 of 1998) (NWA) will need to be applied for. Ergo will apply for water use licences in terms of Sections 21 (c) and (i) of the same Act.

Generally, the natural bed and flow of the stream will be used to prevent potentially diverse impacts that could result from a fifty-year storm event, therefore during the silt removal activities, minimal disruption of the stream will take place.

### 1.4 Description of the current Land Uses Applicable

The Valley Silts is situated in an urban and industrial area of Johannesburg. The communities directly adjacent to the Valley Silts Mining Right area are:

- ❖ Crown;
- ❖ Booyens Reserve; and
- ❖ Theta.

The Valley Silts project area is classified in the Gauteng Provincial Environmental Management Framework (GPEMF) (2014) as Zone 1 (Urban Development Zone), Zone 2 (High Control Zone within the urban development zone) and Zone 5 (Industrial and large commercial development zone).

A site visit was undertaken by Kongiwe on the 18<sup>th</sup> September 2019 and photographs were taken by the project team to illustrate the current site conditions. Refer to Appendix B for photographic evidence of the site visit. The following community activities and infrastructure include (but are not limited to):

- ❖ Illegal mining operations;
- ❖ Places of worship;
- ❖ Schools;
- ❖ Grocery Stores, Supermarkets, Butcheries and Spaza Shops;
- ❖ Health facilities and Recreation facilities;
- ❖ ATMs and banking facilities;
- ❖ An oil and cake mill;
- ❖ Crown TSF's
- ❖ A soccer stadium;
- ❖ Gold Reef City; and
- ❖ The Industrial centre of Crown and Business Park of Booyens Reserve

An old dam wall and sluice gate system which is no longer functional is in the centre of the project area and a pipeline which is no longer in use can be found to the south of the site belonging to IProperty (Pty) Ltd (iProp).



#### 1.4.1 Future Land Use Proposals

To the knowledge of the EAP, iProp will undertake similar land use developments as seen in Crown, Crown City and Booyens Reserve over portions of Langlaagte 224 – IQ and Mooifontein 225 – IQ. iProp intends to construct both commercial and industrial developments for increased employment opportunity in and around the city centre and near where the communities reside.

Ergo intends to rehabilitate the Valley Silts project area by adequately shaping the 37 Ha, grassing and planting appropriate species to stabilise the soils. The drying areas will be worked down to red earth, and all contaminated soils of the drying area will be removed. All existing infrastructure and equipment will be removed, and the footprints will be scarified. The existing internal haul roads and access infrastructure will be scarified and returned to their previous status.

Given the age and therefore the reduced structural integrity of the dam wall, it was the EIA concluded that a practical and feasible solution to managing the water in the project area would be to reduce height of the dam wall so that the end landowner (iProp) can access the remaining dam core, which should still have its integrity intact. This will need to be proved and tested as well as managed by the City of Johannesburg, the Department of Water and Sanitation, the Johannesburg Roads Agency, Ergo and iProp.

#### 1.5 Known Mining Rights held in the Area

There are several unrelated mine dumps scattered around the Proposed Project site, bearing testament to the historical mining that took place in Johannesburg. The Valley Silts project area is north east of the Crown Tailings Dams.

In terms of active mining in the area, both Ergo Mining (Pty) Ltd and Crown Gold Recoveries (Pty) Ltd have resources that are being processed and removed. In addition to this, other activities vary in ownership and are primarily associated with quarries for sand and silica mining, as well as surface and underground gold mining.

There is an abandoned open cast gold mine belonging to Central Rand Gold, east of the project area. This mine was opened in 2010 and went bankrupt in February 2019. The mine now lies unregulated and unrehabilitated within the community.

Other inactive mines and mining structures in the project area are indicted in Table 1-2:

**Table 1-2 Inactive mines and structures in the project area. Source: Witwatersrand Mining Survey Contents. Accessed at: <http://joburgheritage.org.za/docs/Witwatersrand%20Mining%20Survey%20Listing.pdf>**

COMPANY	LOCATION	HISTORICAL INFRASTRUCTURE	CURRENT SERVICE
3 Langlaagte Estate & G M Co Limited	Corner Main Reef Road and Avon Street.	Historical gold mining village and shafts	Residential hall, Workshops and remnant structures
<i>Historic Mining Activity</i>	Off Aalwyn Road to east of		

COMPANY	LOCATION	HISTORICAL INFRASTRUCTURE	CURRENT SERVICE
	Riverlea Ext 2		
Crown Mines  <i>Historic Mining Activity</i>	Corner of Main Reef Road and Nasrec Road	Church and Manse and inclined shaft headgear to South of George Harrison Park	Services a church, residential use, some mining activity remaining
	Nasrec Road south of George Harrison Park, Crown Mines.	Mining Houses south of George Harrison Park	Residential Housing
	Old Crown Mines Golf Course off Booyens Reserve Road.	Cemetery at Crown Mines Golf Course	Cemetery
	George Harrison Park, Main Reef Road, Crown Mines.	George Harrison Park where the Main reef was discovered.	Museum plaque, and Museum.
Central Rand Gold  <i>Liquidated</i>	Behind the T.C. Esterhuysen Primary School	None	Not operational due to liquidation

## CHAPTER 2: DETAILS OF THE EAP

Kongiwe Environmental (Pty) Ltd (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’*.

Based in Johannesburg, 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 various 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.

### 2.1.1 Contact Person and Corresponding Address

Details of the Environmental Assessment Practitioner (EAP) who prepared the report are presented below

**Table 2-1: Details of the EAP**

<b>NAME OF PRACTITIONER</b>	Ashleigh Blackwell
<b>TEL NO</b>	+27 (10) 140 6508
<b>FAX NO</b>	086 476 6438
<b>E-MAIL ADDRESS</b>	stakeholders@kongiwe.co.za

### 2.1.2 Expertise of the EAP

Ashleigh Blackwell has an B.Sc. (Hons) in Conservation Ecology from the University of Stellenbosch and is a registered Natural Scientist with the South African Council for Natural Science (SACNASP) (Environmental Scientist) (Registration No: 117167). She has 4 years’ work experience, predominantly in the renewable energy and mining industry. Her qualifications can be found in Appendix A.

### 2.1.3 Summary of the EAP’s Past Experience

Ashleigh Blackwell has 4 years’ work experience as an environmental consultant, predominantly in the renewable energy and 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 expertise in relation to Environmental Authorisation Processes in terms of the South

African legal framework. In addition, Ashleigh has attended various training courses in Environmental Law and is currently completing her M.Sc in Soil Science through the University of Pretoria.

#### 2.1.4 Additional Project Team Members

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

**Table 2-2: Details of the Kongiwe Project Team**

TEAM MEMBER	POSITION IN THE COMPANY	ROLE AND RESPONSIBILITIES
Bradly Thornton	Chief Executive	High-Level project management and report review.
Gerlinde Wilreker	Technical Director (Pr.Sci.Nat / EAPASA)	Report review and Authorisation
Michael Hennessy	Legal Director	Legal review of report documentation
Sibongile Bambisa	Stakeholder Engagement and Social Consultant	Stakeholder Engagement and all other Public Participation requirements Social Impact Assessment
Vanessa Viljoen	Social Consultant	Assistance with Stakeholder Engagement and all other Public Participation requirements
Nokuthula Ndala	GIS Consultant	GIS Mapping
Foord Ceronio	Environmental Consultant	Scoping phase report compilation
Siphesihle Dambuza	Environmental Consultant	Compilation of the IWULA and Water Use Licence process.

#### 2.1.5 Independent Specialist Team Members

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

**Table 2-3: Details of the Specialist Team**

SPECIALIST STUDY	SPECIALIST COMPANY	SPECIALIST NAME	PEER REVIEWER
Biodiversity (Fauna, Flora, Wetlands and Aquatics)	The Biodiversity Company	Andrew Husted (Pr.Sci.Nat)	Anita Rautenbach (Pr.Sci.Nat)
Surface Water	HydroSpatial	Andy Pirie (Pr.Sci.Nat)	Sivan Daher (Pr.Sci.Nat)
Groundwater	Groundwater Abstract	Lucas Smith (Pr.Sci.Nat)	Irene Lea (Pr.Sci.Nat)
Air Quality	Gondwana Environmental Solutions	Anja van Basten	Dr Martin van Nierop
Heritage	PGS Heritage	Wouter Fourie (APASA) (APHP)	Jaco van der Walt (ASAPA) (SAHRA) (AMAFA)

---

SPECIALIST STUDY	SPECIALIST COMPANY	SPECIALIST NAME	PEER REVIEWER
Social	Kongiwe Environmental	Sibongile Bambisa	Gerlinde Wilreker (Pr.Sci.Nat)
Traffic	EDL Consulting Engineers	John v Rooyen	Eben D. Kotze (Pr.Tech.Eng)
Health	Kongiwe Environmental	Natasha Taylor-Meyer	Gerlinde Wilreker (Pr.Sci.Nat)
Radiation	Aquisim	Japie van Blerk	N/A

---

## **CHAPTER 3: DESCRIPTION OF THE ASPECTS OF THE ACTIVITY**

---

This document must be read in conjunction with the EIA. To minimise repetition throughout the documentation, the EAP refers the reader to Chapter 2 and Chapter 3 of the EIA.

## **CHAPTER 4: DESCRIPTION OF THE BASELINE ENVIRONMENT**

---

This document is kept as concise as possible. For an overview of the baseline environment of this project please refer to Chapter 7 of the EIAr.

## CHAPTER 5: COMPOSITE MAP

---

The figures below illustrate the preferred Layouts for the Valley Silts Project:

- ❖ Figure 5-1: Valley Silts Project area and infrastructure
- ❖ Figure 5-2: Valley Silts Initial Development area – Proposed Site Plan (\*These timeframes are adjustable)



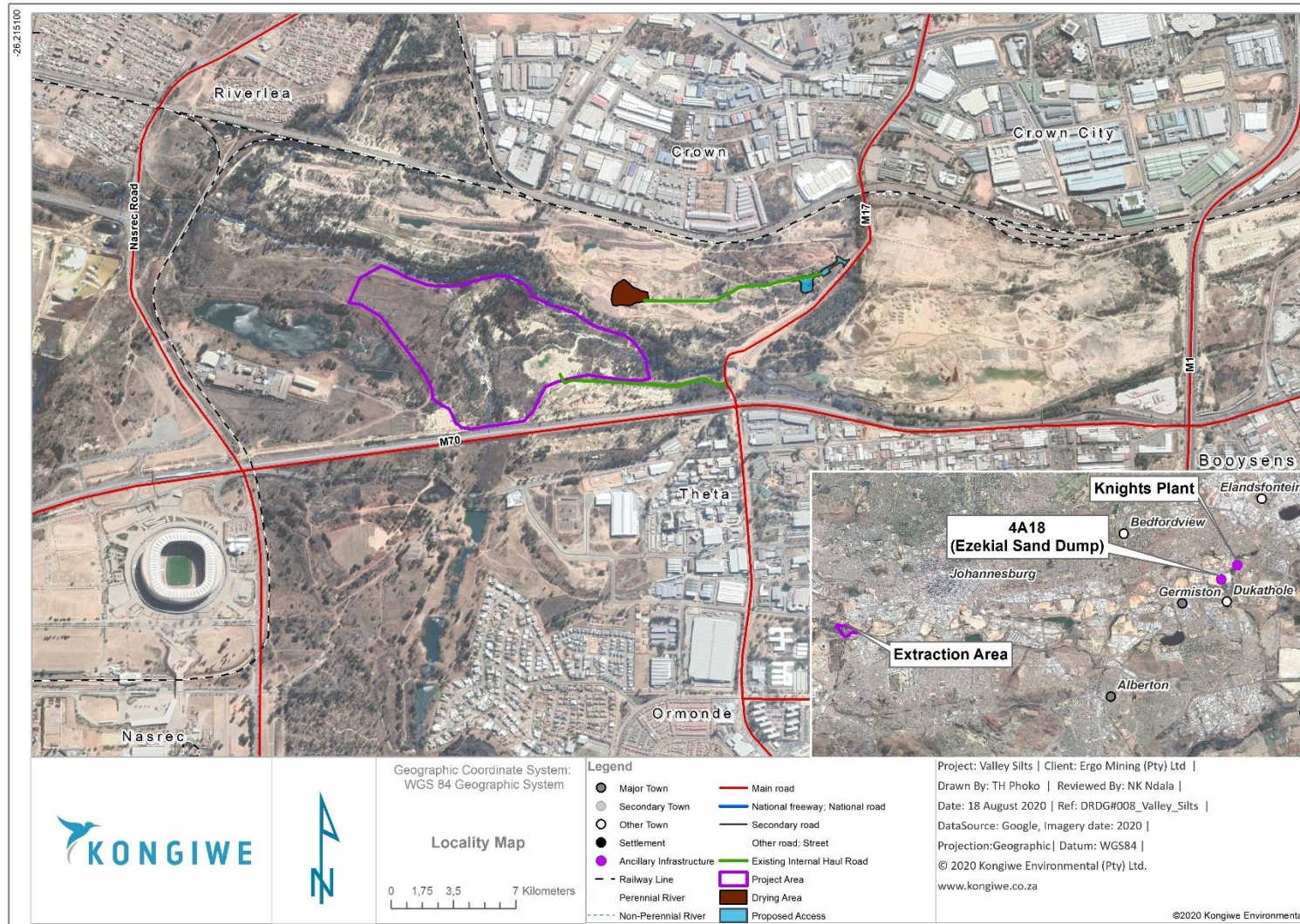


Figure 5-1: Valley Silts Project

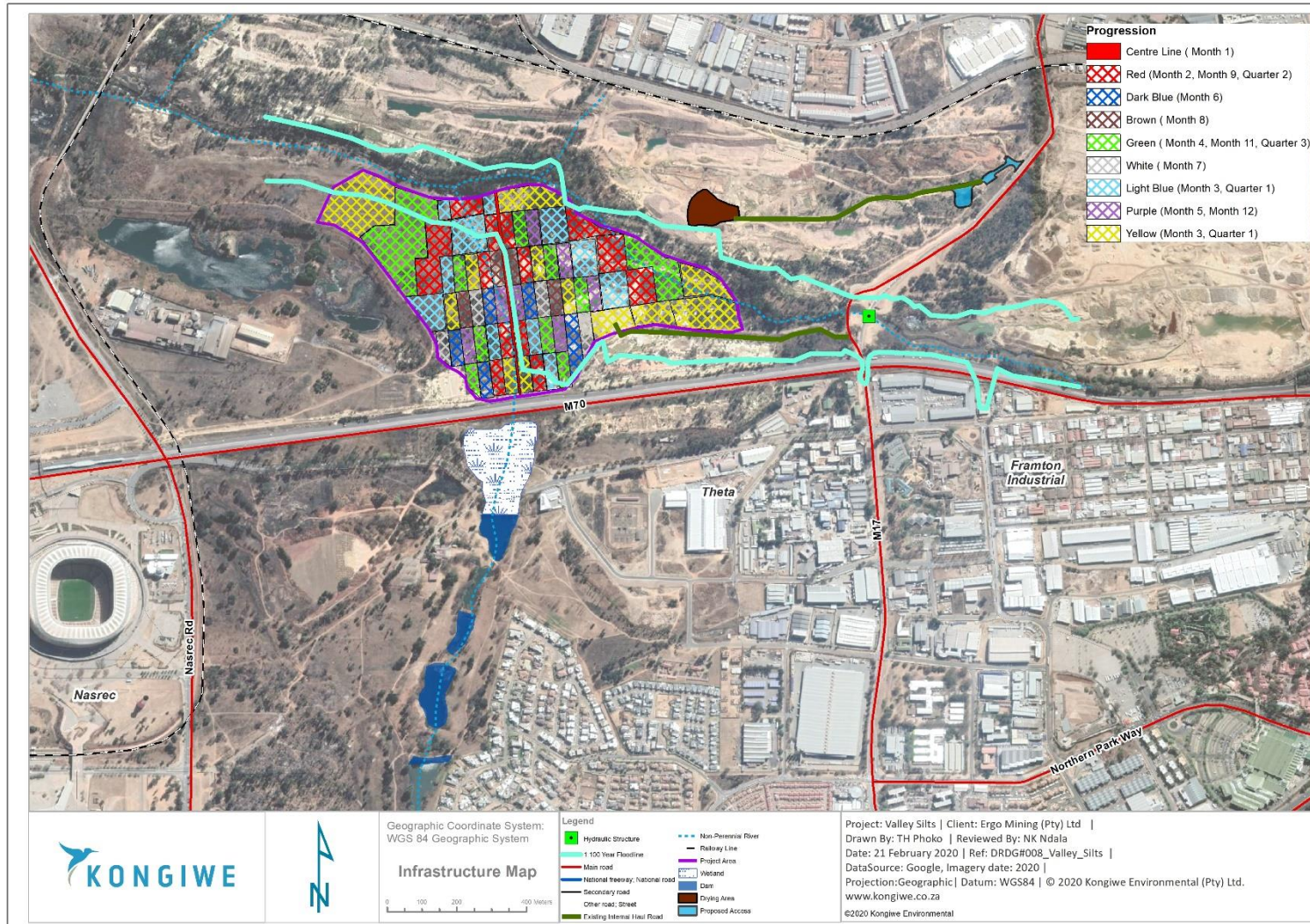


Figure 5-2: Valley Silts Initial Development area – Proposed Site Plan (\*These timeframes are adjustable)

---

## CHAPTER 6: IMPACT MANAGEMENT OBJECTIVES

---

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

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

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

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

The impacts identified in the EIA for the project are mostly medium to high in nature and occur during the construction and operational phases. With the proper implementation of the mitigation measures proposed, these impacts can be further reduced to avoid long term damage to the economical, ecological and social environment. Both positive and negative impacts have been identified.

The management and mitigation measures identified within the EIA process are systematically addressed in this EMPr and ensure the minimisation of adverse environmental impacts to an acceptable level.

Ergo must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits and obligations emanating from relevant environmental legislation.

Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation (EA) (once issued), the stipulations in the EA shall supersede those of this EMPr, unless otherwise agreed by the Competent Authority (CA) in writing. Similarly, any provisions in the legislation overrule any provisions or interpretations within this EMPr. Moreover, this EMPr shall be binding on all parties involved in the operational phase and shall be enforceable at all levels of operational management.

This document must be adhered to and updated as relevant throughout the project life cycle.

## 6.1 Aspects for Inclusions as Considerations of the Environmental Authorisation

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

- ❖ The project may not commence prior to the EA being issued;
- ❖ The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements;
- ❖ The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Ergo management to provide guidance and instructions to employees and contractors;
- ❖ Ergo should conduct annual internal auditing of environmental performance and annual reporting to the DMRE;
- ❖ Ergo must undertake external auditing of the environmental performance as per the conditions of the Environmental Authorisation and provide the DMRE with a copy of the auditing report;
- ❖ Ergo must report to the Department, with reason, if requirements of the EA have not been met.
- ❖ Stakeholder engagement must be maintained during the construction, operational and decommissioning/rehabilitation phases of the project, with the emphasis on the continuing provision of information;
- ❖ A community forum should be implemented by Ergo, with the aim of engaging Stakeholders and the public;
- ❖ All laydown, storage areas etc should be restricted to transformed areas close to the preferred option and existing roads should be used as far as possible;
- ❖ Keep storm water away from the working/mining areas;
- ❖ Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion;
- ❖ Prevent dust pollution during dry, windy conditions.
- ❖ All necessary authorisation must be in place prior to commencement of the project activities.
- ❖ Ergo must adhere to the Rehabilitation Plan contained in the EMPr.
- ❖ The Applicant must maintain all financial responsibility throughout all phases of the project lifespan, including monitoring.
- ❖ Should the economic gold price diminish and not be seen as favourable to continue reclamation activities, Ergo must continue to implement monitoring and rehabilitation requirements as set out in this EMPr.
- ❖ Ergo must ensure that there are sufficient funds set aside to complete the project fully. Partial reclamation and partial rehabilitation should not be accepted.
- ❖ Exemption from GN R704 is obtained for mining activities and infrastructure proposed to be undertaken within the 1:100 year floodline or within 100 m of a watercourse.
- ❖ Management and Monitoring plans contained in the EMPr must be strictly adhered to.
- ❖ A Chance Find procedure for heritage resources and artefacts needs to be in place.

## 6.2 Determination of Rehabilitation Objectives

Ergo intends to rehabilitate the Valley Silts project area by adequately shaping the 37 Ha, grassing and planting appropriate species to stabilise the soils. The drying areas will be worked down to red earth, and all contaminated soils of the drying area will be removed. All existing infrastructure and equipment will be removed, and the footprints will be scarified. The existing internal haul roads and access infrastructure will be scarified and returned to their previous status.

The EIA found that the Proposed project area was once a mine wastewater dam with a dam wall and spillway. It was concluded that this dam was used to service the many historical mines that were operational in the early to mid 1900's. Kongiwe anticipates that with the removal of the silts from the project area, the area will fill with water once again. Given the age and therefore the reduced structural integrity of the dam wall, it was the EIA concluded that a practical and feasible solution to managing the water in the project area would be to reduce height of the dam wall so that the end landowner (iProp) can access the remaining dam core, which should still have its integrity intact. This will need to be proved and tested as well as managed by the City of Johannesburg, the Department of Water and Sanitation, the Johannesburg Roads Agency, Ergo and iProp.

The Applicant must maintain all financial responsibility throughout all phases of the project lifespan, including monitoring. The Applicant must ensure that there are sufficient funds set aside to complete the project fully. Partial reclamation and partial rehabilitation must not be accepted. Should the economic gold price diminish and not be seen as favourable to continue reclamation activities, Ergo must continue to implement monitoring and rehabilitation requirements as set out in this EMPr.

This section **MUST** be read in conjunction with the EIA as well as follow the recommendations proposed by independent specialists.

### 6.2.1 Rehabilitation principles

Final rehabilitation will be carried out once the Valley Silts Project goes into its decommissioning phase. The principles for proper rehabilitation, which should be followed, are:

- ❖ Preparing a comprehensive rehabilitation plan prior to the commencement of any activities on site;
- ❖ Stormwater management must be in place at the site prior to commencing with any activities, including Improving the existing dam wall;
- ❖ Removal of all contaminated soils and replacement with uncontaminated soils;
- ❖ Landform design (shaping, re-grassing);
- ❖ Maintenance management and eradication of invader species;
- ❖ A plan which negates how waste will be managed on site;
- ❖ Upgrading/reinstating the historic dam wall to attenuate water flow; and
- ❖ An Emergency Preparedness/Response plan.

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

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

Mitigation / Management and Monitoring measures are proposed in the EMPr in Section 7.

#### 6.2.2 Closure and Rehabilitation Actions

The closure and rehabilitation actions that Ergo intends on implementing at the end of the Life of the operation are described below. These actions are planned to comply with the requirements of the vision and objectives detailed in Section 8.2 of the closure report, in addition to these the detailed risk mitigation closure strategies identified during the risk assessment are addressed.

The aim in developing the Final Rehabilitation, Decommissioning and Closure Plan is to minimise and mitigate the impacts caused by the reclamation activities and the removal of the silts and to restore land back to a satisfactory standard. It is best practice to develop the Plan as early as possible to ensure the optimal management of rehabilitation and closure issues that may arise. It is critical that a final rehabilitation, decommissioning and closure plan is defined and understood from before the commencement of the operation and that it is complimentary to the objectives and goals set. Rehabilitation and closure objectives need to be tailored to the project at hand and be aligned with the Environmental Management Programme Report (EMPr).

The Final Rehabilitation, Decommissioning and Closure Plan aims to inform on the actions required to rehabilitate the project to ensure that the area is socially and environmentally, safely and sustainably closed. Importantly, the Rehabilitation Plan consists of direct activities associated with rehabilitation of various infrastructure components. This Plan should inform how Ergo's infrastructure is either handed over legally or removed from site. During the operational phase, it is recommended that an assessment be undertaken of the infrastructure to determine if some of the infrastructure can be utilised post closure.

The rehabilitation and closure actions for the infrastructure are detailed below and separated into phases.

#### 6.2.3 Rehabilitation Actions and Management Plans

The area from which the silts were excavated, dried and loaded for transportation, will need to be rehabilitated.

Only temporary infrastructure will be established to support the Reclamation activities for the Project and this infrastructure footprint will need to be rehabilitated. The temporary structures proposed for the project include:

- ❖ Temporary administrative buildings and portable ablution facilities.

#### 6.2.4 Rehabilitation, Decommissioning and Closure Phase

Project closure is an ongoing programme designed to restore the physical, chemical and biological quality or potential of air, land and water regimes disturbed by the operation to a state acceptable to the regulators and to post operation land users. The activities associated with closure are designed to prevent or minimise adverse long-term environmental impacts, and to create a self-sustaining natural ecosystem or alternate land use based on an agreed set of objectives. The objective of closure is to obtain legal (government) and community agreement that the condition of the closed operation meets the requirements of those entities, whereupon the companies' legal liability is terminated. For closure of the proposed site a certificate stating that the site is safe for use will also be required from the NNR.

Closure will include some form of rehabilitation. Rehabilitation can be divided into two different phases, namely concurrent rehabilitation and final rehabilitation. Concurrent rehabilitation must be carried out along with the reclamation operations on site and will decrease the final liability that Ergo will carry at the time of closure. This concurrent rehabilitation will be carried out within the context of the approved EMP. In the case of this project, the reclamation of the silts from the stream can be considered as concurrent rehabilitation. Final rehabilitation will be carried out once the operation goes into its closure phase. This final rehabilitation will be carried out within the context of a closure plan and will include the stream area, the drying areas as well as any other active area on the proposed project site.

The operation will obtain a closure certificate only once it can prove that rehabilitation is satisfactory, and that if any residual pollution effects exist, it can be adequately managed. It is recommended that, whatever form of rehabilitation is used, a post-closure monitoring programme is implemented before Ergo applies for closure. The institution of this monitoring programme will enable Ergo to identify and rectify any residual pollution impacts.

Due to the nature of the reclamation method (mechanical reclamation), most actions will take place in the decommissioning phase when all silts have been removed and the drainage of the stream has been restored.

Closure actions are provided for the each of the infrastructure areas.

##### 6.2.4.1 Access and Service Roads

Roads that can and will be used for rehabilitation/ monitoring or by other users' post-closure should be left *in situ* provided this is agreed upon by all parties concerned. If there is no future use for roads onsite, they will require the following actions:

- ❖ Soil should be tested for contamination. If contamination is discovered, this soil should be removed and disposed of at the appropriate waste disposal facility;
- ❖ Appropriate topsoil should be replaced to a minimum of 300 mm thick in all rehabilitated areas. This must be included in the monitoring programme;
- ❖ Remove alien invasive plants; and
- ❖ Ensure that robust care and maintenance plans are in place.

#### 6.2.4.2 Groundwater

To restrict the impacts post closure on the groundwater environment (quality) and mitigate the loss of groundwater from the catchment, the following is recommended:

- ❖ Use the results of the monitoring programme to validate the predicted impacts on groundwater quality after closure every five years;
- ❖ Update existing predictive tools to verify long-term impacts on groundwater;
- ❖ Maintain sound surface runoff to ensure that all dirty runoff is contained and diverted away from the Russell Stream.
- ❖ Present the results to Government on an annual basis to determine compliance with the closure objectives set during the Decommissioning Phase;
- ❖ Continue the groundwater quality monitoring until the site has been fully rehabilitated, and closure has been awarded. This will help establish post-closure groundwater quality trends. If required, the monitoring information will be used to update, verify and recalibrate the predictive tools used during the study.

#### 6.2.4.3 Stormwater (Surface Water)

Prior to closure a final stormwater management plan will be prepared to identify at closure where water can be designed to flow freely from the site and away from potential areas of contamination. All berms and trenches will be flattened to a functioning topography to assist with the functionality of the stream, except where they have been positioned to prevent additional water flowing onto rehabilitated areas. Structures which may potentially remain onsite will have a stormwater management plan which will ensure that any potential impact to surface water is managed.

To restrict the impact post closure on the surface water environment (quality, flow and functionality) and to mitigate the stagnation and degradation of the stream, the following is recommended:

- ❖ The implemented spill management plan must be continually implemented throughout closure and rehabilitation;
- ❖ Use the results of the monitoring programme to validate the predicted impacts on the surface water post closure;
- ❖ Present the results to the government on an annual basis to determine compliance with the closure objectives set during the decommissioning phase;



- ❖ Monitoring of surface water quality must continue both upstream and downstream until the site has been fully rehabilitated, and closure has been awarded. This will help establish post-closure surface water quality trends. This data should be used to update, verify and recalibrate the predictive tools used during this study.

#### 6.2.4.4 Biodiversity and Ecosystem

Prior to closure a biodiversity management plan will be prepared to identify at closure the functionality of the stream as well as the fauna and flora present on site. The required monitoring programme will need to be created and put in place to monitor and evaluate the development of the ecological function of the stream. It is advised that the site be monitored for five years to ensure that the mitigation measures proposed at closure and for rehabilitation are effective. It is also crucial to ensure that the areas is revegetated accordingly to the specialists assessment to ensure that the required habitats are restored and that indigenous fauna and flora can flourish. It is also advised that an invasive plant species removal and management plan is implemented during decommissioning and closure to ensure that only indigenous flora establishes on the proposed site at closure.

#### 6.2.4.5 NNR Certificate

An assessment of the final rehabilitated area under the NNRA. National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) must be undertaken and a closure certificate obtained.

#### 6.2.4.6 Removal of Infrastructure

Prior to closure and rehabilitation all of the equipment and infrastructure will need to be removed from site and the designated areas, where these infrastructures, machinery and activities occurred or were housed, will need to be rehabilitated. A list of the infrastructure and equipment expected to be used on site is as follows:

- ❖ Mechanical excavation equipment (Backhoes or Excavators);
- ❖ 6 x 30 ton Articulated Dump Trucks (ADT's);
- ❖ 25 x 30 ton Dump Trucks;
- ❖ Water Bowser Truck;
- ❖ Temporary administration buildings, ablution facilities; and
- ❖ The drying areas.

---

## CHAPTER 7: ROLES AND RESPONSIBILITIES

---

To ensure the success of the EMPr, it is important to assign definite roles and responsibilities. Compulsory adherence to the EMPr is required. The obligations of the EMPr create a legally binding document in terms of environmental legislation and civil law. It is important that Ergo, its contractors and sub-contractors ensure that all relevant aspects of the EMPr are communicated to all of their employees. It is the duty of Ergo, its contractors, sub-contractors and their employees to fulfil the project objectives with specific reference to the prevention and mitigation of impacts caused by the project development activities. It is the responsibility of the DMRE to ensure that the development takes place in accordance with relevant legislation.

### 7.1 Government Departments

As the responsibility for the protection of our natural heritage lies with the government departments, they have the power to conduct site inspections to ensure that the development complies with all legislation, regulations and standards. They may enforce penalties where non-compliance occurs.

### 7.2 Site Manager

The Site Manager will oversee all the activities. He will be responsible for the activities on site and see to the implementation of the EMPr and will establish a communication network between the different components conducting the work. All incidents and reports will be made to the Site Manager. Ultimate responsibility in terms of compliance to the EMPr lies with the Site Manager.

### 7.3 Contractors

Where contractors are used during the life of the project, the on-site responsibility for environmental and social matters lies with the Contractor Engineer. He will be responsible for the day to day direction and management of the contractor's particular activities on the site throughout the life of the project.

### 7.4 Environmental Officer

An Environmental Officer (EO) or Health, Safety and Environmental (HSE) Officer will be appointed. It will be the responsibility of the EO/ SHEQ Officer to:

- ❖ Oversee that the day to day activities that will take place on site comply with the EMPr and the relevant legislation;
- ❖ To prepare a detailed communication strategy for liaison with I&APs, stakeholders and contractors;
- ❖ Manage and document forward and backward information flows between the Site Manager, the Contractors, the I&APs and Ergo. This includes information pertaining to monitoring and evaluation;
- ❖ Assist Ergo upon request, with project communication with I&APs;
- ❖ Ensure meaningful participation with the I&APs, including capacity building exercises where the need is identified;

- ❖ Give induction and environmental awareness training;
- ❖ Ensure that a record keeping system is maintained; and
- ❖ Promote co-regulation, shared responsibility and a sense of ownership amongst all parties involved.

## 7.5 Environmental Control Officer

To ensure full compliance to the EMPr and in effect the legislation, Ergo must appoint an Environmental Control Officer (ECO).

The responsibilities of the ECO will be:

- ❖ To monitor the activities through monthly site inspections to ensure compliance to the EMPr;
- ❖ To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- ❖ To assess compliance to the EA;
- ❖ To advise the Site Manager, Resident Engineer, Contractors and EO with respect to the activities and their associated impact on the environment;
- ❖ To identify any non-compliances and to advise to the immediate action and remediation;
- ❖ To write monthly compliance reports;
- ❖ To ensure monthly project meetings are undertaken with the contractors and the Site Manager to discuss the findings made during the site visits;
- ❖ To ensure that the best environmental options are followed throughout;
- ❖ To ensure that a proper training, awareness and competence training programme is implemented; and
- ❖ To update, where necessary, the EMPr as new issues may arise.

---

## CHAPTER 8: IMPACT MITIGATION PER PHASE

---

The management measures have been organised in the following project phases:

- ❖ Pre-Construction Phase;
- ❖ Construction Phase;
- ❖ Operational Phase;
- ❖ Decommissioning Phase; and
- ❖ Post-Decommissioning Rehabilitation Phase.

The tables in Section 6.2 provide the management measures (actions) recommended to manage the potential impacts rated during the different phases. In addition to the management measures provided the tables indicate the person responsible to ensure that these commitments are adhered to and implemented as well as specifying the priority of these commitments (either prior to a phase, during a phase and/ or ongoing), and the outcomes.

The construction, operation, decommissioning and where applicable post-closure impacts associated with the Valley Silts Project are discussed for the following environmental aspects:

- ❖ Biodiversity;
- ❖ Wetlands;
- ❖ Surface water;
- ❖ Groundwater;
- ❖ Air quality;
- ❖ Heritage and palaeontology;
- ❖ Traffic;
- ❖ Social; and
- ❖ Community Health.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- ❖ Planned activities change (i.e. in terms of the components and/or layout of the facility);
- ❖ Modification to or addition to environmental objectives and targets;
- ❖ Additional or unforeseen environmental impacts are identified, and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- ❖ Relevant legal or other requirements are changed or introduced; and
- ❖ Significant progress has been made on achieving an objective or target such that it should be modified.

## 8.1 Pre-Construction Phase Mitigation Measures

Prior to initiating the Construction Phase, Ergo needs to ensure that the following is undertaken. Ergo will commence with the pre-construction and construction phase for its project related infrastructure in line with its approved environmental authorisations. During the construction phase the following activities will take place on site:

**Table 8-1: Summary table of the Activities associated with the construction phase of the project**

ACTIVITY	DESCRIPTION
<b>Pre-Construction</b>	
1	Conduct a further pre-construct baseline Radiation walk-over survey
2	Removal of vegetation and site clearance
3	Preparation of access roads should this be required
4	Initiation of a community forum for engagement throughout the project life cycle

**Table 8-2: Pre-Construction Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>1. PRE-CONSTRUCTION</b>								
1.1	❖ All	❖ Permitting	❖ Commencement of activities without relevant authorisations.	❖ Site	❖ Ensure all necessary permits have been obtained prior to commencement of activities.	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</li> <li>❖ National Water Act, 1998 (Act No. 36 of 1998) (NWA)</li> <li>❖ Heritage Resources Act, 1999 (Act No.25 of 1999) (HRA)</li> <li>❖ National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNR)</li> <li>❖ City of Johannesburg Municipality By-Laws</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of undertaking of unauthorised activities.</li> </ul>
1.2	❖ Radiation	<ul style="list-style-type: none"> <li>❖ A walk-over survey</li> <li>❖ A site safety Case</li> </ul>	❖ Baseline surface radiation	❖ Site and local	<ul style="list-style-type: none"> <li>❖ Undertake a radiation walk-over survey to determine the current surface radiation levels</li> <li>❖ Compile and submit a site safety case to the NNR</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNR)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Determine the surface radiation level prior to reclamation</li> </ul>
1.2	<ul style="list-style-type: none"> <li>❖ Biodiversity</li> <li>❖ Wetlands</li> </ul>	❖ Project Design	❖ Project Design and infrastructure / vehicle placement could result in destruction of sensitive habitats of the Russell Stream.	❖ Site	<ul style="list-style-type: none"> <li>❖ The areas planned to be cleared must be kept to a minimum.</li> <li>❖ Work may not be undertaken outside of authorised project boundaries</li> <li>❖ Existing stormwater infrastructure to be maintained and desilted prior to activities commencing on site.</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ NWA</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> <li>❖ Gauteng C-Plan</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Reduced size of footprint.</li> <li>❖ SWMP upgraded</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.3	❖ Contractors	❖ Contractor management	❖ Lack of knowledge of EMPr and procedure could result in environmental degradation.	❖ Site	<ul style="list-style-type: none"> <li>❖ Contractors must be trained and given a copy of the EMPr and of the detailed site layout plans to ensure compliance with the requirements.</li> <li>❖ Contractors must have a plan in place to implement the management measures set out in the EMPr.</li> <li>❖ The EO/ECO is to supervise the contractors to ensure that management measures are being adhered to.</li> </ul>	❖ None	<p><b>When:</b></p> <ul style="list-style-type: none"> <li>❖ At the start of the project.</li> <li>❖ Annually for the LoM.</li> <li>❖ During induction (at the start of the project and annually).</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ EO/ECO</li> </ul>	❖ Raising staff and contractor environmental awareness.
1.4	❖ Biodiversity	❖ Site planning	❖ Vegetation removal as a result of site clearance.	❖ Site	<ul style="list-style-type: none"> <li>❖ Compilation of a plant Search and Rescue Plan for Species of Conservation Concern.</li> <li>❖ Where encountered, permits for removal of protected plant species need to be obtained from the DEFF.</li> <li>❖ Compilation of an Alien and Invasive Species Plan to be implemented for the duration of the life of site.</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ Gauteng C-Plan</li> <li>❖ National Biodiversity Assessment (NBA)</li> <li>❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) Alien and Invasive Species Regulations, 2013</li> <li>❖ NEM:BA Alien and Invasive Species Lists, 2016</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of destruction of biodiversity.</li> <li>❖ Reduced size of footprint.</li> </ul>
1.5	❖ Surface Water ❖ Groundwater	❖ Site planning	❖ Improper planning may lead to surface water and groundwater pollution during construction and operational phases.	❖ Site	<ul style="list-style-type: none"> <li>❖ Design a Stormwater Management Plan taking surface water quality proposed designs into account.</li> <li>❖ Compilation of a Stormwater Management Plan aimed at reducing and/or eliminating adverse impacts on the receptors identified. These include existing private groundwater users, wetlands, rivers and streams. The Water Management Plan is to include the compilation of a Water Quality Monitoring Programme.</li> <li>❖ An Emergency Response Plan to contain spills is required to be in place prior to construction and operation.</li> <li>❖ Implement a groundwater monitoring programme 1 – year before reclamation starts.</li> <li>❖ Ensure that sufficient information is available if private boreholes are identified around the Russell Stream (1 km radius), to quantify</li> </ul>	<ul style="list-style-type: none"> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ License holder</li> </ul>	❖ Reducing negative impacts on surface water resources in the event of spills.

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
					existing groundwater status and use. This information will form the basis for future assessments and pollution claims.			
1.6	❖ Air Quality	❖ Baseline dust fallout monitoring	❖ Air pollution and dustfall	❖ Site	❖ Initiate dust fallout monitoring 2 years, and at a minimum, 1 year, prior to commencement of activities to establish baseline against which to monitor.	❖ National Standards for Ambient Air Quality for PM <sub>10</sub> and for PM <sub>2.5</sub> ❖ National Dust Control Regulations.	<b>When</b> ❖ Prior to commencement of Activities <b>Responsibility:</b> ❖ License holder	❖ Establishing baseline air quality to measure baseline project life-span air quality.
1.7	❖ Heritage	❖ Site clearance	❖ Destruction of heritage sites	❖ Site	❖ A Chance Find Procedure for heritage resources and artefacts needs to be in place as per the EMPr. ❖ Demarcate No-Go areas. ❖ Implement 50 m buffer around site. If buffer zone cannot be maintained, then appropriate mitigation measures will need to be enacted with social consultation. ❖ Should the destruction of historical structures be deemed necessary, Ergo must acquire a Permit from PHRAG prior to construction/commencement of activities. ❖ A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts. ❖ Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.	❖ Recommendations from South African Heritage Resources Agency (SAHRA) under Section 36 and 38 of NHRA	<b>When</b> ❖ Prior to commencement of Activities <b>Responsibility:</b> ❖ License holder ❖ Heritage specialist	❖ Minimise risk of damaging heritage resources.
1.8	❖ Social and Health	❖ Recruitment ❖ Prior to activities	❖ Community complaints ❖ Community engagement	❖ Local ❖ Site	❖ Compilation of a Stakeholder Engagement Plan to be implemented for the life of the project. ❖ Instatement of a community liaison forum for community members to allow community member to participate in the project through engagement. ❖ Compilation of an Emergency Preparedness and Response Plan to be implemented for the life of the project. ❖ Compilation of a Community Development Programme to be implemented through the life of the project.	❖ Ergo Social and Labour Plan ❖ Stakeholder engagement plan ❖ Emergency Preparedness and Response Plan	<b>When</b> ❖ Prior to commencement of activities. <b>Responsibility:</b> ❖ License holder. ❖ ECO	❖ Minimise negative impacts on local communities.

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
					❖ Compilation of Employee Awareness Plans.			
1.9	❖ Rehabilitation	❖ Decommissioning and Rehabilitation	❖ Align to end land use	❖ Site area	<ul style="list-style-type: none"> <li>❖ Compilation of a Rehabilitation Plan to be implemented for the duration of the life of the project.</li> <li>❖ This plan must make provision for continuous rehabilitation (where feasible) as well as the rehabilitation upon decommissioning.</li> <li>❖ The plan must be updated on a regular basis</li> <li>❖ Funds must be set aside in accordance with the Closure Plan for rehabilitation at the beginning of the project</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ Financial Provision Regulations</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Prior to commencement of activities.</li> <li>❖ End land use to be revised as and when required.</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ License holder.</li> <li>❖ Contractors.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ensure suitable end land use in line with the vision for future developments</li> </ul>



## 8.2 Construction Phase Mitigation Measures

Ergo will commence with the pre-construction and construction phase for its project related infrastructure in line with its approved environmental authorisations. During the construction phase the following activities will take place on site:

**Table 8-3: Summary table of the Activities associated with the construction phase of the project**

ACTIVITY	DESCRIPTION
<b>Construction Phase</b>	
1	Employment of workers (minimal)
2	Operation of construction machinery and vehicles
3	Temporary storage of construction materials and hazardous material such as contaminated soil
4	Instatement of waste management and dust control measures on site
5	Desilting of existing facilities
6	Instatement of traffic signage, access, parking bays

**Table 8-4: Construction Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>1. MAIN ACTIVITIES: SITE CLEARANCE AND PREPARATION; ACCESS ROADS; PLACEMENT OF TEMPORARY INFRASTRUCTURE</b>								
<b>Biodiversity and Wetlands</b>								
1.1	❖ Biodiversity	❖ Excavation of Silt	❖ Loss of areas classified as CBA and ESA; Site clearance, compaction of soil with heavy machinery, noise, displacement of fauna and endemic plant species, erosion, loss of animal corridors; Habitat disturbance.	<ul style="list-style-type: none"> <li>❖ Demarcate the project area and avoid surrounding areas;</li> <li>❖ Limit the work to daytime activities;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented. Demarcate the roads using tape, as far as possible restrict the movement into adjacent areas.</li> <li>❖ Install signs restricting the speeds of the vehicles.</li> <li>❖ Compile and implement a spill management plan.</li> <li>❖ Install culverts below the roads to assist with erosion control, leave green corridors for species to move along.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ National Biodiversity Assessment (NBA)</li> <li>❖ Gauteng C-Plan National Spatial Biodiversity Assessment (NSBA)</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>
1.2	❖ Biodiversity	❖ Storing and Drying of Silts	❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement of fauna and endemic plant species	<ul style="list-style-type: none"> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ Alien and Invasive Species Regulations, 2014</li> <li>❖ Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)</li> <li>❖ Mining and Biodiversity Guidelines</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <p><b>Responsibility:</b></p>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>An erosion control plan must be compiled and implemented;</li> <li>Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species.</li> </ul>			<ul style="list-style-type: none"> <li>Contractor</li> </ul>	
1.3	❖ Biodiversity	❖ Hauling of silt on existing and new roads	<ul style="list-style-type: none"> <li>Loss of areas classified as CBA and ESA; Site clearance, compression of soil with heavy machinery, noise, displacement of fauna and endemic plant species; deaths due to vehicle collisions; erosion due to roads, chemical and oil spills for the vehicles, loss of animal corridors</li> </ul>	<ul style="list-style-type: none"> <li>Demarcate the roads using tape, as far as possible restrict the movement into adjacent areas.</li> <li>Install signs restricting the speeds of the vehicles.</li> <li>Compile and implement a spill management plan.</li> <li>Maintain and inspect the culverts below the roads to assist with erosion control, leave green corridors for species to move along.</li> </ul>	<ul style="list-style-type: none"> <li>Site</li> <li>Local</li> </ul>		<p><b>When</b></p> <ul style="list-style-type: none"> <li>Duration of the project</li> <li>construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>Contractor</li> <li>ECO</li> </ul>	<ul style="list-style-type: none"> <li>Minimise negative impacts on Biodiversity</li> </ul>
1.4	❖ Flora	❖ Main Activities	<ul style="list-style-type: none"> <li>Encroachment of alien invasive plant species</li> </ul>	<ul style="list-style-type: none"> <li>An alien invasive plant management plan needs to be compiled and implemented during construction to prevent the growth of invasive plants on cleared areas.</li> </ul>	<ul style="list-style-type: none"> <li>Site</li> </ul>	<ul style="list-style-type: none"> <li>The Environment Conservation Act (Act No. 73 of 1989)</li> <li>Alien and Invasive Species Regulations, 2014</li> <li>The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>Duration of the project</li> <li>construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>Applicant</li> <li>Contractor</li> <li>ECO</li> </ul>	<ul style="list-style-type: none"> <li>Minimise negative impacts on Flora</li> </ul>
1.5	❖ Fauna	❖ Main Activities	<ul style="list-style-type: none"> <li>Loss of habitat for potential SCC</li> </ul>	<ul style="list-style-type: none"> <li>Implement training to ensure that all staff are aware of faunal sensitivity.</li> <li>Put protocols in place to deal with fauna that are encountered during construction.</li> <li>Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species.</li> <li>No illegal hunting or collecting of animal allowed by any personal employed for this project.</li> </ul>	<ul style="list-style-type: none"> <li>Site</li> </ul>	<ul style="list-style-type: none"> <li>The Environment Conservation Act (Act No. 73 of 1989)</li> <li>The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>Duration of the project</li> <li>construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>Contractor</li> <li>ECO</li> </ul>	<ul style="list-style-type: none"> <li>Minimise negative impacts on Fauna</li> </ul>
1.6	❖ Wetlands	❖ Excavation of silts	<ul style="list-style-type: none"> <li>Loss of wetlands and associated organic material and vegetation through site excavation</li> </ul>	<ul style="list-style-type: none"> <li>This should be a temporary impact that will only last the lifetime of the reclamation activities. However, this is entirely contingent on the Ergo to rehabilitation as, due to the nature of the</li> </ul>	<ul style="list-style-type: none"> <li>Local</li> <li>Regional</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>Duration of the project</li> </ul>	<ul style="list-style-type: none"> <li>Minimise the impact of</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				project, mitigation during operation is limited in this regard.			<ul style="list-style-type: none"> <li>❖ construction</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	excavating silts on the wetland system
1.7	<ul style="list-style-type: none"> <li>❖ Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>❖ Excavation of silts</li> </ul>	<ul style="list-style-type: none"> <li>❖ Increased contamination of downstream watercourses through the upheaval and liberation of toxins accumulated / trapped in the sediments.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Excavate a temporary cut-off trench around the active reclamation area to help contain contaminants that are mobilised during the desilting process from ending up in the downstream watercourses.</li> <li>❖ Stay within the active project area and avoid extending earthmoving activities outside of these areas.</li> <li>❖ Assess the implications of rainfall seasons and desilting during the summer rainfall months.</li> <li>❖ Attempt to keep wetting to minimum (i.e. proportional to what can be conveyed through pipelines to the processing facility).</li> <li>❖ Work systematically targeting one area at a time while rehabilitating the recently completed area as the operation progresses. Rehabilitating in this manner will allow for problems or inadequacies to be identified and rectified in the successive rehabilitation phases.</li> <li>❖ Monitor water quality upstream and downstream of the site along the Russell Stream. Begin several months prior to construction commences to establish the pre-construction baseline.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010) National Water Act, 1998 (Act 36 of 1998)</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating silts on the wetland system</li> </ul>
1.8	<ul style="list-style-type: none"> <li>❖ Wetlands</li> </ul>	<ul style="list-style-type: none"> <li>❖ Excavation of silts</li> </ul>	<ul style="list-style-type: none"> <li>❖ Flow concentration leading to increased erosion and scouring downstream of the reclamation activities</li> <li>❖ Flow impediment leading to flooding, backlogging or wetland drowning upstream of the reclamation activities</li> </ul>	<ul style="list-style-type: none"> <li>❖ Within the reclamation areas identify areas of higher soil saturation and the preferential flow paths. Take measures to effectively steer clear of these areas or divert these flows around the reclamation area.</li> <li>❖ Avoid completely blocking off flow paths with excavated material.</li> <li>❖ Water leaving the site should do so via appropriately engineered stormwater structures that serve to spread and dissipate flows to prevent the erosion of downstream watercourses.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010) National Water Act, 1998 (Act 36 of 1998)</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating silts on the wetland system</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.9	❖ Wetlands	❖ Excavation of silts	❖ Sedimentation and increased turbidity in downstream watercourses	<ul style="list-style-type: none"> <li>❖ Silt traps and fences must be placed in the preferential flow paths along the route to prevent sedimentation of the watercourse.</li> <li>❖ Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010) National Water Act, 1998 (Act 36 of 1998</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> </ul> <p>ECO</p>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating silts on the wetland system</li> </ul>
1.10	❖ Wetlands	❖ Drying and Hauling	❖ Potential loss / disturbance of wetland soil and vegetation	<ul style="list-style-type: none"> <li>❖ The proposed drying area (3L12 is situated on an existing "dirty site" that has already been completely transformed by tailings.</li> <li>❖ Restrict drying activities to within the proposed drying footprint area</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010) National Water Act, 1998 (Act 36 of 1998</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> </ul> <p>ECO</p>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating silts on the wetland system</li> </ul>
1.11	❖ Wetlands	❖ Drying and Hauling	❖ Contamination and sedimentation of the Russell Stream with leachate from the drying area	<ul style="list-style-type: none"> <li>❖ Construct a cut-off trench around the proposed drying area.</li> <li>❖ Remove all dried material before closure.</li> <li>❖ Attempt wherever possible to use the same access point and limit truck movement to the assigned haul routes.</li> <li>❖ Haul trucks should have covered loads.</li> <li>❖ Keep haul roads wet or use environmentally friendly dust suppressants.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010) National Water Act, 1998 (Act 36 of 1998</li> <li>❖ National Freshwater Ecosystem Priority Areas (NFEPA's)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Applicant</li> <li>❖ Contractor</li> </ul> <p>ECO</p>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating silts on the wetland system</li> </ul>
<b>Surface Water and Groundwater</b>								
1.12	❖ Surface Water	❖ Main Activities	❖ The removal of vegetation will expose soils to water erosion that may lead to a deterioration in water	<ul style="list-style-type: none"> <li>❖ Clearance of vegetation must be limited as far as possible;</li> <li>❖ The SWMP must be implemented as a first step during the construction phase; and</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project –</li> </ul>	<ul style="list-style-type: none"> <li>❖</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			quality of the Russell Stream	<ul style="list-style-type: none"> <li>❖ Water quality sampling must be implemented upstream and downstream of construction sites. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme.</li> </ul>		aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	<p>specifically construction</p> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	
1.13	<ul style="list-style-type: none"> <li>❖ Groundwater</li> </ul>	<ul style="list-style-type: none"> <li>❖ Main Activities</li> </ul>	<ul style="list-style-type: none"> <li>❖ Impact on local groundwater quality</li> </ul>	<ul style="list-style-type: none"> <li>❖ Implement a groundwater monitoring programme before excavation starts. Dedicated groundwater monitoring boreholes are required along the Russell Stream and downstream to effectively measure the current groundwater status, impact of the activities on the groundwater environment and changes in groundwater qualities and levels post closure.</li> <li>❖ Develop sound surface runoff management plans to ensure that all dirty runoff from the stockpile areas, but also from the adjacent slimes dams and sand dumps are contained and diverted to the cut-off trenches and sumps.</li> <li>❖ No pooling of water on surface allowed.</li> <li>❖ Ensure that cut-off trenches and sumps are designed to contain all dirty water generated during the process, to prevent overflows and spillages.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project – specifically construction</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise soil erosion and prevent deterioration of water quality as a result</li> </ul>
<b>Air Quality</b>								
1.14	<ul style="list-style-type: none"> <li>❖ Air Quality</li> </ul>	<ul style="list-style-type: none"> <li>❖ PM<sub>2.5</sub> and PM<sub>10</sub></li> </ul>	<ul style="list-style-type: none"> <li>❖ Hauling of silt, turning of silt in the drying process and loading of dried silt onto haul trucks causes the emission of particulate matter into the air, thus increasing existing ambient air concentrations of criteria pollutants (both PM<sub>10</sub> and PM<sub>2.5</sub>) at receptors.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Keeping all unpaved haul roads as far from the property boundary as possible and/or wet suppression/chemical stabilization of unpaved haul roads.</li> <li>❖ Keeping drop height for loading of dried silt onto haul trucks to a minimum.</li> <li>❖ Keeping loading and drying areas as far from the northern boundary of the 3L12 footprint as possible</li> <li>❖ Beside the areas ear-marked for site clearance, no other areas may be cleared of vegetation.</li> <li>❖ Keep areas to be cleared as small as possible.</li> <li>❖ Strict speed control on all on-site roads,</li> <li>❖ Restriction of the use of storage piles.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Standards for Ambient Air Quality for PM<sub>10</sub> and for PM<sub>2.5</sub></li> <li>❖ National Dust Control Regulations.</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise generation of PM.</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.15	❖ Air Quality	❖ Vehicle traffic	❖ PM <sub>2.5</sub> and PM <sub>10</sub> generation	<ul style="list-style-type: none"> <li>❖ Implement dust suppression (water or chemical) on dirt roads</li> <li>❖ The current Speed limit will be maintained.</li> <li>❖ In the event of slow-moving vehicles (abnormal sized trucks or loaded trucks) exiting the proposed access, a Flag man will need to warn the traffic of the approaching danger and control the traffic approaching the proposed access to provide a safe and acceptable gap for the truck to enter the traffic.</li> <li>❖ U-turn space will need to be provided on all sites to avoid dangerous movements within the traffic.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Standards for Ambient Air Quality for PM<sub>10</sub> and for PM<sub>2.5</sub></li> <li>❖ National Dust Control Regulations.</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise dust generation</li> </ul>
<b>Heritage</b>								
1.16	❖ Heritage	❖ Main Activities	❖ Destruction of heritage sites VS1, VS2, Possible Burials	<ul style="list-style-type: none"> <li>❖ A Chance Find Procedure for heritage resources and artefacts needs to be in place as per the EMPr.</li> <li>❖ Demarcate No-Go areas.</li> <li>❖ Implement 50 m buffer around site. If buffer zone cannot be maintained, then appropriate mitigation measures will need to be enacted with social consultation.</li> <li>❖ Should the destruction of historical structures be deemed necessary, Ergo must acquire a Permit from PHRAG prior to construction/commencement of activities.</li> <li>❖ A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ Recommendations from South African Heritage Resources Agency (SAHRA) under Section 36 and 38 of NHRA</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Prior to commencement of Activities</li> <li>❖ Duration of the construction phase of the project</li> <li>❖ Duration of the operation phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ License holder</li> <li>❖ Heritage specialist</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise risk of damaging heritage resources.</li> </ul>
<b>Traffic</b>								
1.17	<ul style="list-style-type: none"> <li>❖ Biodiversity</li> <li>❖ Traffic</li> </ul>	❖ Increased traffic on access roads	❖ Loss of species of conservation concern	<ul style="list-style-type: none"> <li>❖ Vehicles to adhere to the speed limit on access roads.</li> <li>❖ Maintain access and site roads, and site access intersections.</li> <li>❖ Implement speed control measures on all roads to prevent road kill.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Road Traffic Act, 1996 (Act No. 93 Of 1996) (NTA), and Regulations</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ Applicant</li> </ul>	<ul style="list-style-type: none"> <li>❖ Reduce risk of animal deaths on access roads.</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.18	❖ Traffic	❖ Hauling of silts	❖ Vehicle impact and damage	<ul style="list-style-type: none"> <li>❖ Adhere to 60km/h speed limit on tar roads, 40km/h speed limit on gravel roads.</li> <li>❖ Sight distances of at least 180m in both directions are available on Crownwood Road (M17). This is more than the minimum sight distances required by COTO TMH1.</li> <li>❖ A Flag Man is proposed in the event of slow-moving vehicles exiting the proposed accesses, a Flag Man will need to regulate traffic and ensure a safe traffic environment with enough space to allow the vehicle to exit.</li> <li>❖ Place all road signage.</li> <li>❖ Sufficient sight distance at access position.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Road Traffic Act, 1996 (Act No. 93 Of 1996) (NTA), and Regulations</li> </ul>	<p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Reduce traffic risks and accidents</li> </ul>
<b>Social and Health</b>								
1.19	❖ Social	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Job Security and Skills Development</li> <li>❖ Stimulation of economic growth</li> <li>❖ Safety Impacts for employees and communities</li> <li>❖ Increased dust levels and rise in associated health impacts</li> <li>❖ Increased traffic due to hauling of silts</li> <li>❖ Disruption of movement patterns</li> </ul>	<ul style="list-style-type: none"> <li>❖ Establish targets for employment and training as per the Social and Labour Plan (SLP)</li> <li>❖ Effective implementation of training and skills development initiatives;</li> <li>❖ It is recommended that as part of the CSI programme, the contractor makes use of local labour as and when required;</li> <li>❖ Equip employees with the required skills and competencies to implement their employment responsibilities effectively and progress to higher levels of employment within Ergo;</li> <li>❖ Comply with the Skills Development Act, (Act No.97 of 1998).</li> <li>❖ Preference should be given to capable subcontractors who based within the local municipal area;</li> <li>❖ Ergo is advised to source local suppliers, HDSAs and Small, Medium and Micro-sized Enterprises (SMME's);</li> <li>❖ Align skills development to build capacity of SMME's;</li> <li>❖ Consider the use of traffic signs to warn construction vehicles of the presence of pedestrian</li> <li>❖ A grievance management mechanism should be in place to receive incident related queries;</li> <li>❖ Appoint competent safety personnel to ensure construction site personnel to comply with their</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>responsibilities for health and safety and to achieve progressive improvement in safety performance.</li> <li>❖ Ergo should keep the residents informed on a continual basis regarding construction progress and when to expect the site to be blocked</li> <li>❖ To ensure effective consultation with community members during construction and operation of the proposed Project, it is advised that Ergo should establish a Community Consultation Forum that will comprise elected community representatives and aims to disseminate project information to community members.</li> <li>❖ Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders</li> </ul>				
1.20	❖ Community Health	❖ Water Pollution (Surface water)	❖ Ingestion of contaminated surface water due to potential of silt contaminating Russell Stream. The stockpiling of silt is in close proximity of the flood plain, during high rainfall potential flooding may arise and impact the water quality. Poor maintenance of stormwater infrastructure could result in spillages and resultant impacts on water quality.	<ul style="list-style-type: none"> <li>❖ Maintain sound surface runoff management to ensure that all dirty runoff is contained and diverted to paddocks. No pooling of water on the surface allowed.</li> <li>❖ Implementation of the proposed Storm Water Management Plan (SWMP). The SWMP will ensure that “dirty” footprints and runoff is contained (As per Surface Water Report and the EIA/EMPr).</li> <li>❖ It is recommended that the existing paddock walls and berms be reinstated to a height above the floodline.</li> <li>❖ The excavated silt and any water must be removed from open and exposed formation surfaces as soon as possible to avoid seepage of contaminated water into the shallow weathered and deeper fractured aquifers.</li> <li>❖ If rainwater is present and does not evaporate within a few weeks, then the paddocks are to be pumped prior to AMD forming.</li> <li>❖ Ensure that sufficient cut-off trenches and berms are implemented to avoid future wash of silt.</li> <li>❖ Regular monitoring reports must be prepared for internal use, as well as for submission to the authorities</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ The National Health Act (Act 61 of 2003)</li> <li>❖ Nuclear Regulatory Framework</li> <li>❖ National Radioactive Waste Management Policy and Strategy</li> <li>❖ National Ambient Air Quality Standards</li> <li>❖ National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended</li> <li>❖ National Water Act, 1998 (Act 36 of 1998)</li> <li>❖ Gauteng Pollution Buffer Zones</li> <li>❖ Atmospheric Pollution Prevention Act (Act 45 of 1965)</li> <li>❖ National Environmental Management: Waste Act (Act 59 of 2008)</li> <li>❖ Water Services Act (No. 108 of 1998)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul> <p>Ergo</p>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative Health impacts</li> <li>❖ Maximise, as far as possible, positive Health impacts</li> </ul>



REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.21	❖ Community Health	❖ Water Pollution (groundwater)	❖ Ingestion of contaminated surface and groundwater. Surface water and groundwater pollution during remediation as a result of AMD water seeping into the aquifers and rivers	❖ Maintain sound surface runoff management to ensure that all dirty runoff is contained and diverted to the paddocks. No pooling of water on surface allowed. ❖ Monitor groundwater quality in all boreholes installed. The groundwater monitoring network efficiency must be assessed, and new monitoring boreholes drilled, if required.	❖ Regional	<ul style="list-style-type: none"> <li>❖ The National Health Act (Act 61 of 2003)</li> <li>❖ Nuclear Regulatory Framework</li> <li>❖ National Radioactive Waste Management Policy and Strategy</li> <li>❖ National Ambient Air Quality Standards</li> <li>❖ National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended</li> <li>❖ National Water Act, 1998 (Act 36 of 1998)</li> <li>❖ Gauteng Pollution Buffer Zones</li> <li>❖ Atmospheric Pollution Prevention Act (Act 45 of 1965)</li> <li>❖ National Environmental Management: Waste Act (Act 59 of 2008)</li> <li>❖ Water Services Act (No. 108 of 1998)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative Health impacts</li> <li>❖ Maximise, as far as possible, positive Health impacts</li> </ul>
1.22	❖ Community Health	❖ Air Quality	❖ Respiratory and other health issues as a result of PM inhalation. Hauling of silt, turning of silt in the drying process and loading of dried silt onto haul trucks causes the emission of PM into the air, thus increasing existing ambient air concentrations of criteria pollutants (both PM10 and for PM2.5) at receptors	<ul style="list-style-type: none"> <li>❖ As per the air quality mitigation measures</li> <li>❖ Keep haul roads as far from the residential areas as possible, preferable more than 175m away.</li> </ul>	❖ Regional	<ul style="list-style-type: none"> <li>❖ The National Health Act (Act 61 of 2003)</li> <li>❖ Nuclear Regulatory Framework</li> <li>❖ National Radioactive Waste Management Policy and Strategy</li> <li>❖ National Ambient Air Quality Standards</li> <li>❖ National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended</li> <li>❖ National Water Act, 1998 (Act 36 of 1998)</li> <li>❖ Gauteng Pollution Buffer Zones</li> <li>❖ Atmospheric Pollution Prevention Act (Act 45 of 1965)</li> <li>❖ National Environmental Management: Waste Act (Act 59 of 2008)</li> <li>❖ Water Services Act (No. 108 of 1998)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative Health impacts</li> <li>❖ Maximise, as far as possible, positive Health impacts</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>2</b>								
<b>INFRASTRUCTURE (OFFICES &amp; WORKSHOPS)</b>								
2.1	❖ Surface water	<ul style="list-style-type: none"> <li>❖ Workshop and office activities.</li> <li>❖ Chemical storage facilities.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The potential incorrect disposal of hazardous wastes, workshop effluent, as well as spills and leaks at the temporary infrastructure.</li> <li>❖ The potential incorrect disposal of domestic waste at the offices and ablutions.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Implement the SWMP to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site.</li> <li>❖ Spill kits must be present on site.</li> <li>❖ Drip trays must be placed under vehicles and equipment parked overnight.</li> <li>❖ Use biodegradable hydraulic fluids where possible.</li> <li>❖ No waste may be disposed at the site. Waste should be segregated and recycled, and non-recyclable waste and hazardous waste is to be disposed of at a registered landfill site.</li> <li>❖ Hazardous chemicals and waste must be stored in an impermeable, fit-for purpose, bunded area.</li> <li>❖ Hazardous chemical spills must be cleaned up immediately.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project.</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Site/Site manager</li> <li>❖ ECO</li> <li>❖ Contractor</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality</li> </ul>

### 8.3 Operational Phase Mitigation Measures

The following activities are planned by the Applicant for the operation phase of the project.

**Table 8-5: Summary table of the Activities associated with the operational phase of the project**

ACTIVITY	DESCRIPTION
Operational Phase	
1	Excavation of Silts
2	Stockpiling and drying of silts
3	Hauling of silts to the Ezekiel Dump for Pre-Processing

**Table 8-6: Operational Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1. MAIN ACTIVITIES: EXCAVATION, DRYING, HAULING								
Biodiversity and Wetlands								
1.1	❖ Biodiversity	❖ Excavation of silt	❖ Erosion, dust, alien invasive plant species encroachment, continued disruption of fauna species.	<ul style="list-style-type: none"> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to.</li> <li>❖ This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.</li> <li>❖ An alien invasive species control plan must also be compiled and implemented for the footprint of the project area, with removal of alien plants on a quarterly basis.</li> <li>❖ Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if required.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ The National Environmental Management Protected Areas Act (Act No. 57 of 2003)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ National Biodiversity Assessment (NBA)</li> <li>❖ Gauteng C-Plan National Spatial Biodiversity Assessment (NSBA) National Freshwater Ecosystem Priority Areas (NFEPA's)</li> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ Alien and Invasive Species Regulations, 2014</li> <li>❖ Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)</li> <li>❖ Mining and Biodiversity Guidelines</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ Operation</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>
1.2	❖ Biodiversity	❖ Storing and Drying of Silt	❖ Erosion, dust, alien invasive plant species encroachment, draining of polluted water into the surrounding area	<ul style="list-style-type: none"> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.</li> <li>❖ An alien invasive species control plan must also be compiled and implemented for the footprint of the project area, with removal of alien plants on a quarterly basis.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ Alien and Invasive Species Regulations, 2014</li> <li>❖ Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)</li> <li>❖ Mining and Biodiversity Guidelines</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ Operation</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.3	❖ Biodiversity	❖ Hauling of silt on existing and new roads	❖ Encroachment of alien invasive plant species, erosion, dust, continued disruption of fauna species.	<ul style="list-style-type: none"> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas.</li> <li>❖ Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if required.</li> <li>❖ Implement speed control measures on all roads to prevent road kill.</li> <li>❖ Implement training to ensure that all staff are aware of faunal sensitivity.</li> <li>❖ Put protocols in place to deal with fauna that are encountered during operation.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>		<b>When</b> <ul style="list-style-type: none"> <li>❖ Duration of the project</li> <li>❖ Operation</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Contractor</li> </ul> ECO	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>
1.4	❖ Wetlands	❖ As read for construction measure above						
<b>Surface Water and Groundwater</b>								
1.5	❖ Surface Water	❖ Main Activities	❖ Excavation of the silt resulting in potential acidic conditions and leaching of salts and metals, impacting on downstream water quality	<ul style="list-style-type: none"> <li>❖ A buffer strip between the Russell Stream and mining area should not be mined. This will to some degree assist in buffering the movement of contaminants from the mining area towards the river. As mining progresses to depths deeper than the riverbed, it is possible that water will move away from the river towards the mining area, which will prevent contamination of the Russell Stream;</li> <li>❖ As mining progresses, paddocks should be established to contain and evaporate water within the reclamation area.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> Site/Site manager	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quality</li> </ul>
1.6	❖ Surface Water	❖ Main Activities	❖ Excavation of silt to levels below the riverbed, could result in water seeping from the Russell Stream into the mining voids, resulting in a loss of water quantity in the river	<ul style="list-style-type: none"> <li>❖ As mining progresses, paddocks should be established to contain and evaporate water within the reclamation area.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> Site/Site manager	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quantity</li> </ul>
1.7	❖ Surface Water	❖ Main Activities	❖ Runoff and moisture from the stockpiled drying silt is expected to have	<ul style="list-style-type: none"> <li>❖ Suitably sized paddocks must be implemented downslope of the stockpiling area to capture, contain and evaporate runoff and seepage from the stockpiles; and</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quantity</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			poor water quality similar to that described above which may impact the downstream water quality	❖ Once the operational phase is complete, any remnants of the stockpiles must be removed.		❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	<b>Responsibility:</b> Site/Site manager	
1.8	❖ Surface Water	❖ Main Activities	❖ Uncontrolled dirty water runoff from the mining and stockpiling areas.	<ul style="list-style-type: none"> <li>❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that stormwater does not spill more than once in 50 years, to be compliant with GN R704 regulations; and</li> <li>❖ Water quality sampling must be implemented upstream and downstream of the mining and stockpiling areas. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> Site/Site manager	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quantity</li> </ul>
1.10	❖ Surface Water	❖ Main Activities	❖ Poor maintenance of stormwater infrastructure and activities within the 1:100 year floodline.	<ul style="list-style-type: none"> <li>❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that they can convey/contain the 50 year runoff, to be compliant with GN R704 regulations; and</li> <li>❖ It is recommended that a flood protection berm is constructed at the mining and stockpiling areas.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> Site/Site manager	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quantity</li> </ul>
1.11	❖ Surface Water	❖ Main Activities	❖ Flooding of the mining and stockpiling area.	<ul style="list-style-type: none"> <li>❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that they can convey/contain the 50 year runoff, to be compliant with GN R704 regulations; and</li> <li>❖ It is recommended that the exiting paddocks and berms are constructed to a height above the floodline.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Site manager</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quantity</li> </ul>
1.12	❖ Groundwater Quality	❖ Main Activities	❖ Groundwater pollution during reclamation as result of AMD water seeping into the aquifers	<ul style="list-style-type: none"> <li>❖ Maintain sound surface runoff management to ensure that all dirty runoff is contained and diverted to the cut-off trenches and sumps. No pooling of water on surface allowed.</li> <li>❖ Monitor groundwater quality in all boreholes installed. The groundwater monitoring network efficiency must be assessed, and new monitoring boreholes drilled, if required.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>❖ Site manager</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of additional AMD generation.</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>❖ Ensure that cut-off trenches with sumps can contain all dirty water generated during the desilting process to prevent overflows and spillages.</li> <li>❖ Ensure that sufficient cut-off trenches and berms are implemented to avoid future wash of silt and slimes from the historical TSF situated adjacent to the Valley Silts project</li> </ul>				
<b>Social and Health</b>								
1.13	❖ Procurement	<ul style="list-style-type: none"> <li>❖ Job Security and Skills Development</li> <li>❖ Economic Growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Employment opportunities</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Establish targets for employment and training;</li> <li>❖ Aim to absorb the youth (as the area has a high dependency ratio);</li> <li>❖ Effective implementation of training and skills development initiatives;</li> <li>❖ It is recommended that as part of the CSI programme, the contractor makes use of local labour as and when required; and</li> <li>❖ Comply with the Skills Development Act, (Act No.97 of 1998);</li> <li>❖ Preference should be given to capable SMMEs who are based within the local municipal area; and</li> <li>❖ Consider measures recommended to maximise benefits from local employment, skills and economic development.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the operation phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impact</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>
1.14	❖ Safety	<ul style="list-style-type: none"> <li>❖ Operational activities</li> </ul>	<ul style="list-style-type: none"> <li>❖ Safety impacts for employees and communities</li> <li>❖ Disruption of Movement Patterns</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site security patrols should monitor the perimeters of the project site thereby providing an increased security presence;</li> <li>❖ All project infrastructure should be contained in a secured area to prevent unauthorized access and therefore potential health and safety risks;</li> <li>❖ A grievance management mechanism should be in place to receive incident related queries;</li> <li>❖ Appoint competent safety personnel to ensure construction site personnel to comply with their responsibilities for health and safety and to achieve progressive improvement in safety performance;</li> <li>❖ Comply with the Site Health and Safety Act;</li> <li>❖ Safety warning and informative signs should be placed in area with potential hazards and risk of accident</li> <li>❖ A grievance management mechanism should be in place to receive incident related queries;</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the operation phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				❖ Safety awareness (especially for school children who might be wandering to the project site) should be considered - the applicant should consider communicating the risks of wandering to site and the safety aspect with the affected communities.				
1.15	❖ Health	Addressed in construction above. Applicable to all project life phases.						
<b>Air Quality</b>								
1.16	Air Quality	❖ Refer to construction mitigation measures as these are applicable to operation as well.						
<b>Heritage</b>								
1.17	❖ Heritage	❖ Refer to construction mitigation measures as these are applicable to operation as well.						
<b>Radiation</b>								
1.18	❖ Radiation	<ul style="list-style-type: none"> <li>❖ Air emissions pathways</li> <li>❖ Groundwater pathways</li> <li>❖ Surface Water Pathways</li> </ul>	❖ Total effective dose to members of the public from the activities during the operational phase of the project	<ul style="list-style-type: none"> <li>❖ Ensure that radiation exposure is below the regulatory compliance criteria (i.e., the dose constraint)</li> <li>❖ Optimise the radiation protection by applying the ALARA principle</li> <li>❖ Implement the radiological monitoring programme</li> <li>❖ Develop a dust management plan for the project, ensuring that unused areas remain covered with available vegetation as far as possible, while areas that are activity reclaimed remain wet as far as possible;</li> <li>❖ While the intent is to transport dry tailings material to the Ezekiel dump, keeping some moisture will reduce the windblown dust from the trucks. Covering the material during transport will further reduce any windblown dust; and</li> <li>❖ Implement the stormwater management plant proposed in the surface water hydrology impact assessment, to ensure that the surface water in the area is contained and that the volume of water leaving the project area is kept to the minimum.</li> </ul>	❖ Local	<ul style="list-style-type: none"> <li>❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999)</li> <li>❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999).</li> <li>❖ Safety Standards (Regulation No. 388 dated 28 April 2006)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the operation phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ Ergo</li> <li>❖ NNR</li> </ul>	❖ Prevent radiological impacts emanating from air, groundwater or surface water pathways
<b>2 INFRASTRUCTURE</b>								
2.1	❖ Surface water	❖ Stormwater infrastructure.	❖ Silted channels, and emergency stormwater dams/paddocks, as well as eroded berms, leading to	❖ Implementation of the stormwater monitoring system detailed in the EMPr.	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAf Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ During operations</li> </ul> <p><b>Responsibility:</b></p>	❖ Prevention of the deterioration of water quality

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			spills into the downslope streams impacting on water quality and sedimentation			Water Resources (GN R704 of 12 February 2010)	<ul style="list-style-type: none"> <li>❖ Site manager</li> <li>❖ ECO</li> </ul>	
<b>3</b>	<b>ACCESS ROADS AND HAULING ROADS</b>							
3.1	❖ Traffic	❖ Refer to construction mitigation measures as these are applicable to operation as well.						



## 8.4 Decommissioning Mitigation Measures

The following activities are planned by the Applicant for the decommissioning phase of the project.

**Table 8-7: Summary table of the Activities associated with this decommissioning phase of the project**

ACTIVITY	DESCRIPTION
<b>Decommissioning Phase</b>	
1	Demolition of temporary infrastructure and Rehabilitation of the project area. Ergo aims to rehabilitate the Valley Silts area by shaping the areas where silt was removed and make the area free draining. Thereafter, appropriate species will be planted to stabilise the soil.
2	Closure forum to be established with key stakeholders.

**Table 8-8: Closure and Decommissioning Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>1. CESSION OF ACTIVITIES REMOVAL OF SITE TEMPORARY INFRASTRUCTURE AND REHABILITATION ACTIVITIES</b>								
<b>Biodiversity</b>								
1.1	❖ Biodiversity	❖ Cession of activities removal of site temporary infrastructure and rehabilitation activities	❖ Encroachment of alien invasive plant species.	❖ Implementation of alien invasive plant management plan needs to be continued during decommissioning to prevent the growth of invasive on rehabilitated areas; ❖ Rehabilitation of site with indigenous vegetation that occurs in the vicinity of project area.	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	<b>When</b> ❖ Duration of the project ❖ rehabilitation  <b>Responsibility:</b> ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
1.2	❖ Biodiversity	❖ Cession of activities removal of site temporary infrastructure and rehabilitation activities	❖ Continued displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust).	❖ All infrastructure that could have a negative impact on faunal species (silt drying area sheeting etc) needs to be decommissioned and removed.	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	<b>When</b> ❖ Duration of the project ❖ rehabilitation  <b>Responsibility:</b> ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.3	❖ Biodiversity	❖ cessation of activities removal of site temporary infrastructure and rehabilitation activities	❖ If rehabilitation is not done correctly erosion and dust dispersal is a major impact as it can result in habitat loss as well as impact the growth and health of both fauna and flora.	❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces.	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	<b>When</b> ❖ Duration of the project ❖ rehabilitation <b>Responsibility:</b> ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
1.4	❖ Wetlands	❖ Rehabilitation	❖ Potential loss or degradation of wetlands or adjoining terrestrial habitat through inappropriate closure.	❖ Develop and implement a rehabilitation and closure plan. ❖ Appropriately rehabilitate the project area by filling, landscaping and re-vegetating with locally indigenous species.	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	<b>When</b> ❖ Duration of the project ❖ rehabilitation <b>Responsibility:</b> ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
1.5	❖ Wetlands	❖ Contamination and sedimentation	❖ Cumulative contamination and sedimentation risk from upstream reclamation projects to downstream users	❖ Effective application of required mitigation and rehabilitation for all reclamation projects in the region.	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	<b>When</b> ❖ Duration of the project ❖ rehabilitation <b>Responsibility:</b> ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
<b>Surface Water and Groundwater</b>								
1.6	❖ Surface Water	❖ Rehabilitation activities	❖ The exposure of soil once all silt has been removed, has the	❖ Stormwater management measures should be in place while rehabilitation is taking place;	❖ Local ❖ Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations	<b>When</b> ❖ During rehabilitation operations	❖ Prevention of the deterioration of water quality

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			potential to be washed into the downslope Russell Stream, impacting on water quality and sedimentation	<ul style="list-style-type: none"> <li>Revegetation of exposed areas should take place as soon as possible; and</li> <li>Water quality monitoring must continue upstream and downstream until the site has been fully rehabilitated.</li> <li>No partial or incomplete rehabilitation is acceptable.</li> <li>Implementation of upstream measures such as constructed wetlands, silt traps and repairing water management infrastructure around old slimes dams.</li> </ul>		<ul style="list-style-type: none"> <li>Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>Responsibility:</b> <ul style="list-style-type: none"> <li>Site manager</li> <li>Contractor</li> <li>ECO</li> </ul>	
1.7	<ul style="list-style-type: none"> <li>Groundwater</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation activities</li> </ul>	<ul style="list-style-type: none"> <li>Water quality impacts when the silts have been removed</li> </ul>	<ul style="list-style-type: none"> <li>Monitor groundwater quality in all boreholes.</li> <li>Maintain sound surface runoff management to ensure that all dirty runoff is contained and diverted away from the Russell Stream</li> <li>Rehabilitation is to be fully completed and all infrastructure to be removed. No partial or incomplete rehabilitation is acceptable.</li> <li>Funds are to be set aside for full rehabilitation according to this EMPr</li> </ul>	<ul style="list-style-type: none"> <li>Site</li> </ul>	<ul style="list-style-type: none"> <li>DWAF Best Practice Guidelines</li> <li>Guideline Document for the Implementation of Regulations</li> <li>Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>During rehabilitation operations</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>Site manager</li> <li>Contractor</li> <li>ECO</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of the formation of AMD.</li> </ul>
1.8	<ul style="list-style-type: none"> <li>Groundwater</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater Quantity</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in Aquifer Yield</li> </ul>	<ul style="list-style-type: none"> <li>Monitor groundwater levels in all boreholes</li> </ul>	<ul style="list-style-type: none"> <li>Site</li> </ul>	<ul style="list-style-type: none"> <li>DWAF Best Practice Guidelines</li> <li>Guideline Document for the Implementation of Regulations</li> <li>Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>During rehabilitation operations</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>Site manager</li> <li>Contractor</li> <li>ECO</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of the formation of AMD.</li> </ul>
<b>Air Quality</b>								
1.9	<ul style="list-style-type: none"> <li>Air Quality</li> </ul>	<ul style="list-style-type: none"> <li>As read in the construction phase.</li> </ul>						
<b>Social and Health</b>								
1.10	<ul style="list-style-type: none"> <li>Social</li> </ul>	<ul style="list-style-type: none"> <li>Job Security and Skills Development</li> <li>Economic Growth</li> </ul>	<ul style="list-style-type: none"> <li>Employment opportunities</li> <li>Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>Offer a post retrenchment programme designed to equip those that have been retrenched with knowledge and skills;</li> <li>Post retrenchment programme can include computer courses, soft skills, construction and moving machinery.</li> </ul>	<ul style="list-style-type: none"> <li>Local</li> <li>Regional</li> </ul>	<ul style="list-style-type: none"> <li>National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>Occupational Health and Safety (Act No. 85 of 1993)</li> <li>National Spatial Development Framework;</li> <li>National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<b>When</b> <ul style="list-style-type: none"> <li>Duration of the construction phase of the project</li> </ul> <b>Responsibility:</b> <ul style="list-style-type: none"> <li>Contractor</li> <li>ECO</li> <li>Ergo</li> </ul>	<ul style="list-style-type: none"> <li>Minimise, as far as possible, Negative social impacts</li> <li>Maximise, as far as possible, positive social impacts</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.11	❖ Social	❖ Safety concerns	❖ Safety impacts for employees and communities	<ul style="list-style-type: none"> <li>❖ Site security patrols should monitor the perimeters of the project site thereby providing an increased security presence;</li> <li>❖ All project infrastructure should be contained in a secured area to prevent unauthorized access and therefore potential health and safety risks;</li> <li>❖ A grievance management mechanism should be in place to receive incident related queries;</li> <li>❖ Appoint competent safety personnel to ensure construction site personnel to comply with their responsibilities for health and safety and to achieve progressive improvement in safety performance;</li> <li>❖ Comply with the Site Health and Safety Act;</li> <li>❖ Safety warning and informative signs should be placed in area with potential hazards and risk of accident.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul> <p>Ergo</p>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>
1.12	❖ Social	❖ Rehabilitation	❖ Ameliorating Flooding	<ul style="list-style-type: none"> <li>❖ Stakeholders must be informed that the rehabilitation of the entire Russell Stream will need to be a collaborative effort between Government Departments, Municipalities and private sector, and therefore changes may not happen almost immediately;</li> <li>❖ Stakeholders' expectation should be managed- this can be done by establishing a community forum where issues/risks/opportunities regarding the proposed project are discussed and addressed.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the construction phase of the project</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul> <p>Ergo</p>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>
13	❖ Health	❖ As read for the construction phase. Applicable to all project phases.						
<b>Traffic</b>								
11.4	❖ Traffic	❖ As read for the construction phase. Applicable to all project phases.						
<b>Radiation</b>								
1.15	❖ Radiation	❖ Implementation of the NNR approved decommissioning plan for the project	❖ To ensure that radiation exposure is below the regulatory compliance criteria (i.e., the dose constraint), and to optimise the radiation	❖ If radiation exposure exceeds regulatory compliance implementation of a passive groundwater remediation system downstream of the extraction area to capture the contaminant plume should be investigated.	❖ Local	<ul style="list-style-type: none"> <li>❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999)</li> <li>❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999).</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Duration of the decommissioning phase of the project</li> </ul>	<ul style="list-style-type: none"> <li>❖ A plan which is in line with what is required by NNR</li> <li>❖ Ensure the site is does not pose a</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			protection by applying the ALARA principle.			❖ Safety Standards (Regulation No. 388 dated 28 April 2006)	<b>Responsibility:</b> ❖ Contractor ❖ Ergo ❖ NNR	human health threat.

### 8.5 Post-Decommissioning Mitigation Measures

The following activities are expected to occur during the post-closure phase of the project.

**Table 8-9: Summary table of the Activities associated with this post-closure phase of the project**

ACTIVITY	DESCRIPTION
Post-Closure	
1	Rehabilitation and Monitoring.

**Table 8-10: Post-Closure Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>1. MONITORING</b>								
1.1	❖ Surface water ❖ Groundwater	❖ Water quality monitoring	❖ Water pollution	❖ Monitor and maintain surface water management structures. ❖ Monitor surface water and groundwater quality. ❖ No pooling of water on surface allowed.	❖ Site	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	<b>When</b> ❖ Post closure timeframe <b>Responsibility:</b> ❖ Site manager ❖ ECO	❖ Water quality improvement
1.2	❖ Radiation	❖ Groundwater pathway of radiation	❖ Total effective dose to members of the public from the associated activities during the post-closure phase of the project (groundwater pathway)	❖ Adhere to the Radiological Monitoring Plan.	❖ Local	❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999) ❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999). ❖ Safety Standards (Regulation No. 388 dated 28 April 2006)	<b>When</b> ❖ Post-closure <b>Responsibility:</b> ❖ Contractor ❖ Ergo ❖ NNR	❖ A plan which is in line with what is required by NNR ❖ Ensure the site is does not pose a human health threat.

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.3	❖ Radiation	❖ Atmospheric Pathway	❖ Total effective dose to members of the public from the associated activities during the post-closure phase of the project (atmospheric pathway).	❖ Adhere to the Radiological Monitoring Plan.	❖ Local	<ul style="list-style-type: none"> <li>❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999)</li> <li>❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999).</li> <li>❖ Safety Standards (Regulation No. 388 dated 28 April 2006)</li> </ul>	<p><b>When</b></p> <ul style="list-style-type: none"> <li>❖ Post-closure</li> </ul> <p><b>Responsibility:</b></p> <ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ Ergo</li> </ul> <p>NNR</p>	<ul style="list-style-type: none"> <li>❖ A plan which is in line with what is required by NNR</li> <li>❖ Ensure the site is does not pose a human health threat.</li> </ul>

---

## CHAPTER 9: SPECIFIC IMPACT MANAGEMENT PLANS

---

The impact management actions per are detailed in Section 6 of this report. The impact management outcomes for the project are as follows:

- ❖ Maintain the footprint of the activities and do not extend the project infrastructure footprint more than 0,5 ha within the project boundary;
- ❖ Protect sensitive areas as far as practicable;
- ❖ Minimise dust fallout during desilting and hauling;
- ❖ Reduce groundwater pollution and seepage;
- ❖ Reduce surface water pollution;
- ❖ Prevent further land and stream contamination;
- ❖ Maintain transparent engagement and communication; and
- ❖ Ensure the full rehabilitation of a site by removing sources of pollution and aligning rehabilitation of the land for its intended future use.

The following compliance mechanisms are required by Ergo on an annual basis:

- ❖ An environmental audit of the EMPr should be undertaken on an annual basis by an independent auditor.
- ❖ An internal audit should be undertaken annually.

### 9.1 Environmental Awareness Plan

#### 9.1.1 Communication Chain

The communication of the environmental risks for each phase of the project will take place for the management, administrative and site worker sectors of the site, as well as contractors and sub-contractors.

#### 9.1.2 Management Sector

A workshop will be conducted to inform all management of the risks associated with the project. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the site reduces any possible environmental risks associated with the project. The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring.

The workshop may be repeated at certain stages during the construction phase, in the case of new employees.

This workshop will seek to explain the following necessary actions:

- ❖ Risks associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.
- ❖ The mitigation of the environmental risk will be elaborated on.
- ❖ It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum.
- ❖ Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the authorisations and licence. Along with data collection, the reporting of findings will be discussed.
- ❖ This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken.
- ❖ The workshop will be repeated at the beginning of the operational phase as part of a handover to the next responsible party.
- ❖ The following communication channels and media will/ can be used to communicate environmental and social issues with Ergo employees during construction:
  - Head of Department (HOD) Meetings: The Site Manager communicates information to senior management on environmental issues and the information is minuted.
  - HSEC Meetings: 'Environmental issues' should be an agenda item on monthly safety, health & environmental meeting agendas.
  - Publications: Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution.
  - EMS Database: Feedback from line management on objectives, targets and actions.
  - Daily/ Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

### 9.1.3 Construction Workers Sector

The workers associated with the activities on site will attend an induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. The environmental risks of each aspect as well as the mitigation will be elaborated on.

A debriefing should take place when the project moves from one phase to the next. A Job Hazard Analysis (JHA) or Issue Base Risk Assessment could also be conducted to identify potential risks associated with the project.

Furthermore, weekly toolbox talks / green meetings must cover topics raising awareness on environmental and social issues relating to the project.

### 9.1.4 Contractors

A Risk Conversancy Training (RCT) is conducted and is applicable to all contractors. Here focus will be on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.



Furthermore, weekly toolbox talks / meetings must cover topics raising awareness on environmental and social issues relating to the project.

#### 9.1.5 Environmental Control Officer

The ECO will oversee environmental awareness induction training to all contractor staff. The ECO will ensure that the necessary environmental induction training takes place and that records of attendance are maintained and up to date.

## 9.2 Strategic Communication Plan

### 9.2.1 Environmental Communication Strategies

Ergo Management are required to establish procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the site, as well as contractors. The organisation shall conduct processes for external communication on its significant environmental aspects and record its decision in line with Ergo communication policy as well as conditions stated in any EA or License.

#### 9.2.1.1 Stakeholder Engagement Plan

A Stakeholder Engagement Plan (SEP) and Grievance Mechanism (GM) must be compiled for a project. The SEP needs to provide guidance for engagement with Stakeholders.

#### 9.2.1.2 Internal Communication

Internal communication is done within the Administrative Sector.

#### 9.2.1.3 External Communication Strategies

The following communication channels and media can be used to communicate environmental issues to individuals who are not employed by Ergo or its subcontractors:

- ❖ **Environmental Stakeholder engagement forum:** An Environmental Stakeholder engagement forum must be established and used to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This forum should preferably be initiated prior to commencing with any activities on site. This is also the forum where interested and affected parties get the opportunity to raise environmental concerns. Records must be kept of all decisions and concerns. The Environmental Stakeholder engagement meetings must be chaired by the personal of Ergo, or another appropriately appointed competent individual.
- ❖ **Publications:** Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.

- ❖ **Communication from External Parties and Employees:** A clear communication point is established within the company through the Ergo communication procedure that determines who is responsible for liaison with the media in respect of any crisis that may arise. A complete procedure for media liaison is available to all employees. Communication from external interested and affected parties may be received by email, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Site Manager, to the respective interested and / or affected party. All telephonic or facsimile correspondence received on the site must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and / or future database.
- ❖ **E-mail:** E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.
- ❖ **Mail:** Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two years. Paper correspondence will be archived in this department.
- ❖ **Storage of Correspondence:** All original correspondence must be retained by the Site Manager for a minimum period of two years.
- ❖ **Environmental Reports:** Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request from an external party by the Site Manager.
- ❖ **Queries from Interested and Affected Parties:** Response to queries about environmental impacts and aspects will be addressed by the relevant department and approved by the Site Manager.
- ❖ **Queries and Requests from the Media:** Requests for articles from the media on environmental issues regarding the road construction will be co-ordinated by the Corporate Communication manager according to the public communication strategy, with input from the relevant department, as approved by the General Manager, in line with the Ergo Public and Community Communication and Liaison Strategy. Due to the environmental awareness generated by induction, on the job training etc., employees are able to identify environmental problems, issues, concerns and pollution timeously.

#### 9.2.1.4 *Evaluation of the Environmental Awareness Plan*

The evaluation of the environmental awareness and training plan will be conducted by Ergo management. This evaluation will entail the auditing of the operation in both the construction and operation phase once activity has commenced. The environmental awareness and training plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimize these risks.

The environmental awareness and training plan indicates that Ergo is serious about the environments well-being and empowerment of the local people. Environmental issue will be highlighted at monthly meetings scheduled at the site.

#### 9.2.1.5 *Emergency Incident Reporting*

Environmental incident reporting is a vital part of communication at the Valley Silts Project. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the incident must be reported according to the Incident Reporting Procedure.

An Emergency Incident Preparedness and Response Plan needs to be developed.

#### 9.2.1.6 *Induction*

All full-time staff and contractors are required to attend an induction session. Employees are inducted when they start on the project. Any contractor, who works on the project is required to undergo Ergo's prescribed induction training. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the project will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session so that all employees gain a suitable understanding of environmental issues and pollution.

The records of all individuals attending induction sessions to be kept; the records to be kept include names, ID, contact details, designation and signature.

#### 9.2.1.7 *On the Job Training*

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees. In addition, contractors working on the project will be subjected to a Risk Conversancy Training (RCT).

The records of all individuals receiving on the job training to be kept; the records to be kept include names, employee number, contact details, designation and signature.

#### 9.2.1.8 *Hazardous Substances*

Individuals dealing with potential hazardous situations and risks that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage should receive appropriate job specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. All these actions will be done in accordance to the Ergo procedures on management of hazardous substances

#### *9.2.1.9 Dust mitigation*

Individuals dealing with potential situations and risks that could lead to excessive dust should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation

#### *9.2.1.10 Fire Incidents*

Individuals dealing with potential hazardous situations and risks that could lead to fire incidents or emergencies should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *9.2.1.11 Pollution Incidents or Forms of Environmental Damage*

Any incident or form of environmental damage must be dealt with in accordance with the Incident management procedure. This document is held with Ergo.

Individuals dealing with potential situations and risks that could lead pollution incidents or other forms of environmental damage to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *9.2.1.12 Waste Management*

Site personnel and contractors responsible for the operation and safe handling of the various waste streams will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. Ergo must ensure that training and awareness programmes cover the safe transportation, handling, storage, transfer, handling, use and disposal of all waste streams, and the location of waste receptacles for each waste stream. All waste management activities must be done in accordance to the Ergo procedures and in terms of registers dealing with storage of waste in specific areas.

Staff awareness training programme will accommodate training, on which bin to use for organic waste and on sealing the lid on the bin once organic waste has been discarded.

#### *9.2.1.13 Water Management*

All persons responsible for active water management will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### 9.2.1.14 Water Consumption and Use

All staff will receive training on minimising water consumption and how to use water sparingly.

### 9.3 Emergency Response Plan

An Environmental Emergency Response Plan defines the process to follow to respond rapidly and effectively to and manage emergency situations that may arise as a result of the Valley Silts Project. This plan must be initiated when an emergency:

- ❖ Cannot be immediately brought under control;
- ❖ Has the potential to extend beyond site boundaries;
- ❖ Has the potential to significantly impact on the environment and/or community; and
- ❖ Requires assistance from External Emergency Services.

Ergo will develop an Emergency Response Plan for the Valley Silts Project.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will ensure that Contractors comply with all procedures described in this document.

#### 9.3.1 Intent

A Work Method Statement should be prepared prior to the commencement of any activities, detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- ❖ Areas where accidents and emergency situations may occur;
- ❖ Communities and individuals that may be impacted, as read in the specialist studies;
- ❖ Response procedure;
- ❖ Provisions of equipment and resources;
- ❖ Designation of responsibilities; and
- ❖ Communication, both internally and externally.

The purpose of this plan is to define the emergency response structure and process of the Valley Silts Project. The objectives of the plan are:

- ❖ To ensure communication of all vital information as soon as possible;
- ❖ To provide clear guidance in the management of emergencies that have the potential to impact on life, property, environment and community;
- ❖ Clearly define roles and responsibilities;

- ❖ To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed;
- ❖ For employees to be able to take prompt effective action to reduce the risk of injury, minimise environmental impact and property damage likely to result from possible emergencies;
- ❖ To specify the emergency communication process necessary to establish links with key site personnel.

The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the Occupational Health and Safety OHSAS 18001, and the Site Health and Safety Act, 1996 (Act No. 29 of 1996).

### 9.3.2 Planning

There are three levels of emergency, these are delineated as follows:

- ❖ Local Emergency: An alert confined to a specific locality.
- ❖ Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- ❖ Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation, and every effort must be made to reduce or stop the cause of any emergency provided it is safe to do so. Factors effecting the success of the emergency response strategy include:

- ❖ The type and scale of incident/accident will govern the type of response.
- ❖ The scale of the incident, accident or emergency will govern the resources required to bring under control.
- ❖ Communications after which an incident or emergency is first reported governs scale, type and resources required to maintain effective control and bring to resolution.

To facilitate the effective implementation of the procedures, copies of the Environmental Emergency Response Plan must be placed in accessible and visible locations around the site.

**Table 9-1: Emergency Scenario Contingency Planning**

INCIDENT	PREVENTION MEASURES	PROCEDURES	DESIGNATION
<p>Spill which would result in the contamination of land, surface or groundwater.</p>	<ul style="list-style-type: none"> <li>❖ All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.</li> <li>❖ No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.</li> <li>❖ Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.</li> <li>❖ A spill must be given the highest priority, and clean-up turn-around time must be as fast as possible,</li> <li>❖ Ensure all paddocks and stormwater systems are desilted prior to commencing with construction.</li> <li>❖ Ensure all paddocks and stormwater systems have sufficient capacity to hold dirty water – especially during rainfall events.</li> <li>❖ Adhere to the stormwater management plan for this EMPr.</li> <li>❖ Signage to be placed around the dams to ensure no persons use the paddocks for recreational purposes.</li> <li>❖ If these activities result in damage or accumulation of contaminated silts on the bare soil, the contaminated soil must be stripped and disposed of as hazardous waste.</li> </ul>	<ol style="list-style-type: none"> <li>1. Spill or release identified.</li> <li>2. Assess person safety, safety of others and environment.</li> <li>3. Stop the spill if safely possible.</li> <li>4. Contain the spill to limit entering surrounding areas.</li> <li>5. Identify the substance spilled.</li> <li>6. Quantify the spill {under or over guideline/threshold levels}.</li> <li>7. Notify the Site Manager and emergency response crew and authorities {in the event of major spill}.</li> <li>8. Inform users {and downstream users} of the potential risk.</li> <li>9. Clean up of the spill as fast as possible.</li> <li>10. Record of the spill incident on company database.</li> </ol>	<p>Contractor and ECO</p>

INCIDENT	PREVENTION MEASURES	PROCEDURES	DESIGNATION
	<ul style="list-style-type: none"> <li>❖ Chemical toilets used during construction must be regularly cleaned. Care and due diligence should be taken at all times.</li> <li>❖ Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.</li> </ul>		

Ergo’s Safety, Health and Environment (SHE) Representative, who is responsible for managing the day-to-day on-site implementation of this Plan, must act as liaison and advisor on all environmental and related issues.

It is necessary to prevent land from becoming sterilised due to a spill. Criteria that may be considered for restoring the affected area include natural biodegradation of oil, replacement of soil and revegetation. Further, a radiation walk-over should be undertaken for spills of a reportable size and affecting large expanses of land which is intended for future use as residential housing or commercial property. Results from the survey must be reported back to the Competent Authority and National Nuclear Regulator.

Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.



## 9.4 Conceptual Stormwater Management Plan

**Please refer to Section 7.6.3 of the EIA for a detailed description of the Stormwater Management Plan.**

### 9.4.1 Surface Water Quality Monitoring

#### 9.4.1.1 *Surface Water Quality*

A surface water quality monitoring programme is essential as a management tool to detect negative water quality impacts as they arise and to ensure that the necessary mitigation measures are implemented. It is recommended that Ergo continues to monitor the upstream, middle and downstream sections of the Russell Stream. It is further recommended that TSS and turbidity are added to the current monitoring programme.

Water quality sampling should be done in accordance with the DHSWS Best Practice Guideline G3: Water Monitoring Systems. Samples must be kept cool (+-4°C), out of direct sunlight, and transported immediately to an accredited laboratory for water quality analysis within 24 hours of sampling: The impacts on water quality should be determined by comparing the monitoring results against the Klip River Catchment guideline limits and SANS 241:2015, and importantly against previous results, to determine any deviations in trends over time. If the trend analysis indicates any deviations to the baseline monitoring, in terms of deteriorating water quality, then an immediate investigation must be undertaken to determine whether the mine may be responsible. If responsible, urgent action must be undertaken to implement mitigation measures to prevent further contamination.

Reporting should continue to be done on a quarterly basis (or as recommended by the DHSWS). It is recommended that monitoring reports include trend analyses. It is further recommended that the water quality from upstream monitoring points is compared to downstream monitoring points.

#### 9.4.1.2 *Stormwater Infrastructure*

Water infrastructure (channels, berms and paddocks) should be monitored on a monthly basis during the dry season, and on a weekly basis during the wet season. They should further be monitored immediately after any large storm events. Should blockages, silted up structures or breaches occur, immediate action should be undertaken to remove debris and repair breaches. Monitoring should be undertaken by the onsite Environmental Control Officer (ECO) or maintenance manager. Inspections must be recorded and should include the following:

- ❖ Date of inspection;
  - ❖ Rainfall amount received;
  - ❖ Photographs of blockages, silted up structures or breaches witnessed;
  - ❖ What action was undertaken to fix issues, and the amount of time taken to address them; and
  - ❖ Photographs post action taken.
- ❖ Inspection reports should be kept ready and supplied to the DWS when requested, or as part of the WUL conditions.

## 9.5 Groundwater Monitoring and Seepage Prevention

### 9.5.1 Groundwater Management Measures

During the desilting, adequate quality control measures are needed to ensure that the methodology conforms to specification and that management targets have been achieved. This requires environmental monitoring while desilting is in progress. In addition, upon completion of the desilting, additional monitoring and management activities may be necessary, in particular, if contamination remains in any form on the site.

The following objectives and targets are proposed for groundwater management during and after the Valley Silts desilting project:

- ❖ Install dedicated groundwater monitoring points along and downstream from the Russell Stream. The current lack of boreholes / groundwater monitoring sites makes it difficult to assess, monitor and manage the groundwater environment.
- ❖ Implement a water management plan aimed at reducing and/or eliminating adverse impacts on the Russell Stream, from adjacent mining, industrial and residential activities.
- ❖ Update the existing model and assess implementation of additional mitigation/management measures, if effective.
- ❖ Implement sufficient monitoring procedures to measure the effectiveness of groundwater management measures at Ergo and private boreholes.
- ❖ Track and record the progress of implementation of all groundwater management measures.
- ❖ Analyse the information obtained from all monitoring programmes against compliance targets, to establish trends and make adjustment if required.
- ❖ Should the trends indicate adverse impacts on groundwater levels and/or quality, implement suitable measures within the shortest possible time to remediate and/or eliminate such adverse impacts identified.

#### 9.5.1.1 Principal Groundwater Management Measures

Several broad, over-arching groundwater management measures should be implemented for the Valley Silts project to minimise impacts on the groundwater environment, during all phases.

**Table 9-2: General groundwater management measures**

CONSTRUCTION PHASE
A dedicated groundwater monitoring network will first have to be established
Make provision for sufficient groundwater level and quality monitoring budget to implement the groundwater monitoring programme, before the excavation starts.
Ensure that sufficient information is available if private boreholes are identified around the Russell Stream (1 km radius), to quantify existing groundwater status and use. This information will form the basis for future assessments and pollution claims.
Develop effective surface runoff management plans to ensure that all dirty runoff is removed of site as soon as possible. Avoid pooling of water.

Ensure that cut-off trenches with sumps are designed to contain all dirty water generated during the desilting to prevent overflows and spillages.
Implement sound house-keeping measures to prevent and clean spills, address leaks and undertake regular inspections. Ensure that the record-keeping procedure is in place and that instructions given are carried out.
Measure rainfall on site.
<b>OPERATIONAL PHASE</b>
Complete regular inspections of trenches and sumps, specifically noting incidences of overflow and leakage. If the latter is identified, measures must be taken to rectify immediately.
Maintain sound house-keeping measures to prevent spills and leaks.
Maintain the groundwater monitoring programme in mine and private boreholes (if identified).
Measure rainfall on site.
Record all groundwater-related complaints and deal with each complaint within the agreed upon timeframe.
<b>DECOMMISSIONING AND CLOSURE PHASE</b>
Complete all rehabilitation to a satisfactory level, focussing specifically on the water drainage and collection system.
Continue with the groundwater monitoring period for a minimum of two years after completion of the rehabilitation. The continued need for groundwater monitoring will depend on the outcome of the final closure assessment.

The following specific groundwater management measures are recommended, based on the outcome of this assessment. The measures are related to two broad impacts, namely the availability of groundwater and the quality of groundwater.

#### 9.5.1.2 Measures to Address Impacts on Groundwater Availability

The following specific measures are recommended to minimise and/or eliminate the impacts on groundwater levels and availability:

- ❖ All boreholes listed in Section 7.7 of the EIA must be included in the groundwater monitoring programme.
- ❖ Feedback must be provided to owners of boreholes within the affected zones regarding progress made with the desilting activities and the outcome of monitoring programmes, on a quarterly basis when groundwater monitoring will take place, to ensure that they are informed of aspects that may be of significance. At this stage groundwater users were not identified.
- ❖ Ensure that an effective surface water collection and retention system is in place to ensure that all flow and collected water is directed towards the cut-off trenches with sumps and not allowed to freely drain away from the various silt holding areas.

#### 9.5.1.3 Measures to Address Impacts on Groundwater Quality

The following specific measures are recommended to minimise and/or eliminate the impacts on groundwater quality:

- ❖ A dedicated groundwater monitoring network will first have to be established.

- ❖ Ensure that clean and dirty water is separated at the excavation and drying areas, and that dirty water is contained. Contain dirty water in adequately sized and lined sumps. Prevent dirty water runoff from leaving the area.
- ❖ All dirty water being pumped from the excavated areas should be taken off site to prevent unnecessary discharge into the natural environment.
- ❖ A monitoring programme must be implemented to establish leachate quality during the life of operations.
- ❖ Implement the necessary cut-off trenches and berms to prevent wash-in of additional silt and slimes from nearby historical TSF.
- ❖ A re-run of the contaminant transport simulations must be undertaken once extra information is available, to improve the confidence levels in long-term predictions. These simulations must be completed at least five years prior to site closure to ensure that effective measures are developed to manage long-term impacts.

#### 9.5.2 Groundwater Monitoring

To monitor and prevent the spread of groundwater contamination, groundwater management procedures and practices have to be implemented that are in line with accepted practices and in accordance with the requirements of the Environmental Management Plan (EMPr). It is recommended to implement the groundwater monitoring programme presented in this report. The key objectives of the groundwater monitoring programme are to:

- ❖ Detect short and long-term trends;
- ❖ Recognise changes in groundwater quality and levels;
- ❖ Measure impacts and define mitigation measures; and
- ❖ Develop improved monitoring systems.

Groundwater monitoring will be undertaken to establish the extent of contamination in the shallow weathered and deeper fractured aquifers, during and after desilting.

##### 9.5.2.1 Monitoring Locations

A preliminary groundwater monitoring network is presented in Table 9-3. If additional private boreholes are identified within a 1 km radius, they must be included in the monitoring programme.

Dedicated monitoring boreholes must be available prior to the commencement of the desilting project – at least 1 year. At the new monitoring targets (BH1 to BH3), a cluster of one shallow and one deep monitoring borehole must be drilled to assess impacts on the shallow weathered and deeper fractured aquifers. The depth of the deeper boreholes must be at least 50 m. The deep monitoring boreholes must be fitted with a seal to the base of the weathered zone to ensure that it measures only the fractured rock aquifer. The depth of the paired shallow borehole, at each monitoring target must be drilled to the depth of weathering,

approximately 20 m below surface. It is recommended that the additional monitoring positions are drilled based on the expected shape and movement of the simulated sulphate plumes.

The locations of the proposed boreholes are indicated on Figure 9-1.

**Table 9-3: Proposed groundwater monitoring positions**

Borehole	X Coordinate (WGS84)	Y Coordinate	Depth (m)
BH1	98969	-2902087	50
BH2	97893	-2901735	50
BH3	95154	-2900580	50

#### 9.5.2.2 Monitoring Requirements

The monitoring requirements are presented in Table 9-4.

**Table 9-4: Groundwater monitoring requirements**

Monitoring parameter	Element for analysis	Monitoring frequency
Depth to groundwater level	Groundwater level	Monthly
Water quality	A full spectrum of heavy metals and salts	Quarterly

All monitoring information must be entered into a spreadsheet for record keeping and analysis. Copies of the certificates of analyses must be kept on file for inspection. If a significant exceedance is recorded during the monitoring programme, the following actions should be taken:

- ❖ Log the exceedances in the incident reporting system within 24-hours of it occurring.
- ❖ Report the exceedances to the Environmental and General Managers, as well as to the regulatory authority.
- ❖ Undertake an investigation to identify causes of the exceedances.
- ❖ Consult with any landowner or affected party that may be impacted by the exceedances to determine their concerns and to negotiate remedial actions.
- ❖ Implement the necessary remedial actions according to the outcome of the investigation and consultation with the affected parties.
- ❖ Track the incident until completion.

Regular monitoring reports must be prepared for internal use, as well as for submission to the authorities.

The length of post-closure monitoring must be negotiated with Government during the decommissioning phase. It is recommended that the monitoring programme be implemented for a minimum period of 2 years post closure to establish trends.

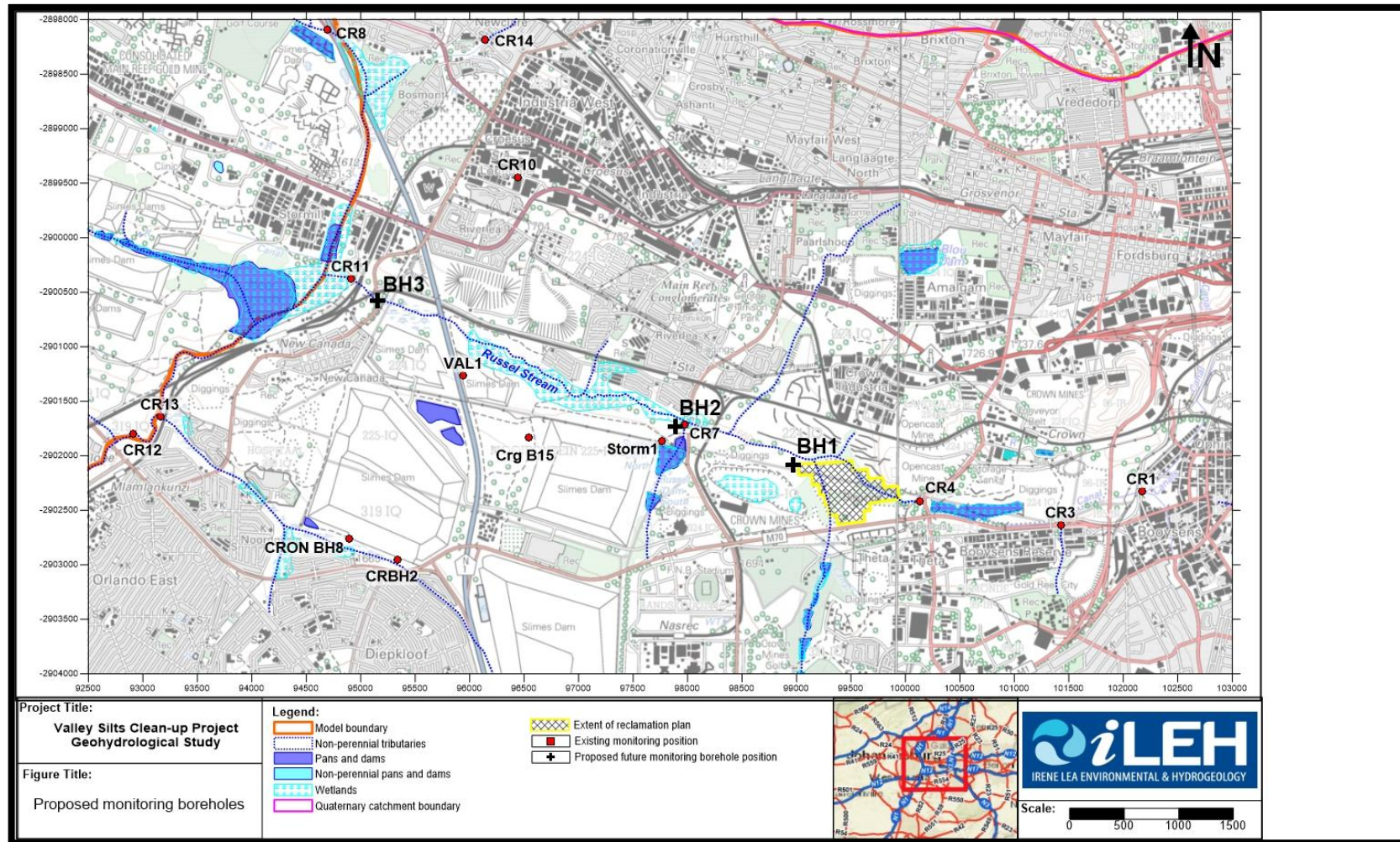


Figure 9-1 Proposed new monitoring borehole locations

### 9.5.2.3 Groundwater Monitoring Reports

Monitoring reports must contain the following information:

- ❖ Monitoring borehole location map;
- ❖ Geology map;
- ❖ All coordinates of the groundwater sampling sites;
- ❖ Certificates of analysis must be included for quality assurance. Monitoring results will be compared to South African National Standards (SANS241) and the Klip River catchment guideline limits;
- ❖ Time-series graphs for key indicator elements (e.g. pH, EC, TDS, Fe, Mn, Al, SO<sub>4</sub> and E. coli);
- ❖ Trilinear or other analytical groundwater plots;
- ❖ A discussion regarding observed trends and potential groundwater contamination; and
- ❖ Recommendations regarding possible amendments or additions to the groundwater monitoring programme, based on trends and other information observed.

### 9.5.2.4 Quality Assessment and Quality Control

Quality assurance means:

- ❖ Developing a system of activities to ensure that measurements meet defined standards of quality with a stated level of confidence;
- ❖ Defining monitoring objectives, quality control procedures to be followed and quality assessment;
- ❖ To define data quality objectives, including accuracy, precision, completeness, representativeness and comparability; and
- ❖ Designing a network, selecting sampling sites, selecting instruments and designing the sampling system, as discussed above.

All monitoring equipment must be maintained as required, and calibration must be undertaken on a regular basis. To ensure that the Groundwater Monitoring Strategy complies with the above, it is important that analytical laboratories used should be accredited for each type of analysis required, to ensure that accurate analytical methods are used.

While only one or two of the common major ions found in waters may be specified as key indicators, it is necessary to analyse for the full suite of common ions for quality control purposes and to detect discrete events and long-term trends in anion composition. Special attention must be paid to sampling methods and to preservation and handling of samples prior to analysis. pH and conductivity must be measured in the field.

Close attention must be given to siting, logging and construction of monitoring boreholes and assessment of their condition must be made quarterly. The following sampling protocol is proposed:

- ❖ Sterilised plastic bottles, with a plastic cap and no liner within the cap are required for the sampling. Sample bottles should be marked clearly with the borehole name, date of sampling, water level depth and the sampler's name;

- ❖ Water levels should be measured prior to taking the sample, using a dip meter (m bgl);
- ❖ Each borehole to be sampled should be purged (to ensure sampling of the aquifer and not stagnant water in the casing) using a submersible pump or a clean disposable polyethylene bailer. At least three borehole volumes of water should be removed through purging; or through continuous water quality monitoring, until the electrical conductivity value stabilizes;
- ❖ The following field measurements should be recorded on a field form for each sampling point: pH, EC and temperature;
- ❖ Samples should be kept cool in a cooler box in the field and kept cool prior to being submitted to the laboratory; and
- ❖ The pH and EC meter used for field measurements should be calibrated daily using standard solutions obtained from the instrument supplier.

## 9.6 Dust Fallout Monitoring Plan

In order to assess the air quality impacts of particulate emissions from the reclamation of the Valley Silts Project, ongoing dust fallout monitoring must be undertaken. Four monitoring stations, approximately equally distant from each other, is the minimum required by ASTM D1739 (ASTM, 2017) for each area or zone to be monitored. The samplers must be operated in accordance with the National Dust Control Regulations (Government Notice No. R827, 2013) and the proposed revised regulations once these are promulgated. This monitoring should be implemented as far prior to the start of the project as possible, but at least one year before the start of the project, to establish a baseline against which the impacts of the reclamation activities can be assessed.

A concern was raised at the public participation meetings regarding cumulative air quality impacts from several projects in the vicinity of Riverlea. The dustfall monitoring should be used as an indicator as to the extent of the impacts from the Valley Silts Project and whether the mitigation measures are sufficiently effective. As part of this monitoring programme, monthly reports must be produced. If the measured dustfall shows a marked increase from pre-operational phase levels, and the new dustfall rates exceed the regulated dustfall rate (Table 9-5) continuous PM<sub>10</sub> monitoring in the residential area may be used to give a direct indication of health impacts experienced by the community. Furthermore, wet suppression or chemical stabilisation of all unpaved roads must be undertaken immediately to further mitigate emissions until dustfall rates are brought back into compliance with the National Dust Control Regulations. This emphasises the importance of monitoring (both in summer and in winter) prior to commencement of reclamation activities, as the development of a baseline will make it possible to more accurately evaluate the project’s actual contribution to dustfall levels and by inference to ambient concentrations of PM

**Table 9-5: National Dust Control Regulations (Government Notice No. R827, 2013).**

LEVEL	DUSTFALL RATE (D) (MG/M <sup>2</sup> /DAY)  (30-DAYS AVERAGE)	PERMITTED FREQUENCY OF EXCEEDING DUSTFALL RATE
Residential area	D < 600	Two within a year, not sequential months.



Non-residential area	600 < D < 1 200	Two within a year, not sequential months.
----------------------	-----------------	---

\*The method to be used for measuring dustfall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method approved by any internationally recognised body.

## 9.7 Heritage Management Plans

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

### 9.7.1 Chance find procedure

- ❖ A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- ❖ An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- ❖ Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated and construction activities halted.
- ❖ The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- ❖ The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- ❖ Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### 9.7.2 Possible finds during construction and operation (desilting activities)

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- ❖ Stone foundations;
- ❖ Ash middens associated with the historical structures that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives; and
- ❖ Unmarked graves

### 9.7.3 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. Table 9-6 gives guidelines for lead times on permitting.

**Table 9-6: Lead times for permitting and mobilisation**

ACTION	RESPONSIBILITY	TIMEFRAME
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 month
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

**Table 9-7 Lead times for permitting and mobilisation**

AREA AND SITE NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)
<b>General project area</b>	Implement chance find procedures in case where possible heritage finds are uncovered	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34, 35,36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>VS1 – historical structure</b>	In the event that the site cannot be excluded from the planned activities, further research into the site must include: <ul style="list-style-type: none"> <li>▪ Exposing the structure through archaeological excavation</li> <li>▪ Archival research on the structure</li> <li>▪ Analysis of any artefacts recovered during the excavations</li> <li>▪ If it is found that after mitigation the site is not conservation worthy an application for destruction must be lodged under s35 of the NHRA.</li> </ul>	Construction through to operation	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under a35 nd 38 of NHRA	ECO Monthly Checklist/Report

AREA AND SITE NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)
	<ul style="list-style-type: none"> <li>If the site is to be retained after mitigation a site-specific heritage management plan for the site must be developed and submitted for approval to the SAHRA.</li> </ul>						
<b>VS2 – informal burial ground</b>	Demarcate site with a 50m buffer and avoid.	Construction through to Operational	Prior to and during construction	Applicant ECO Heritage specialist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Possible graves</b>	Undertake archaeological monitoring at earth clearance stage If any human remains are uncovered, contact SAHRA and appoint a qualified heritage specialist to undertake appropriate mitigation (usually exhumation and relocation).	Construction through to Operational	During Construction and Operation	Applicant Environmental Control Officer (ECO)	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

## 9.8 Social Management Plans

The following chapter sets out the framework for the Social Management Plan which is established to assure that the proposed mitigation measures as included in the SIA are effectively implemented during the life of the project and are continually refined and modified as necessary on the basis of actual field conditions and circumstances which may not have been anticipated at the time of the SIA preparation.

### 9.8.1 Stakeholder Engagement Plan

Social impacts already start in the planning phase of a project and as such it is imperative to start with stakeholder engagement as early in the process as possible. A Stakeholder Engagement Plan (SEP) will assist in outlining the approach on how to effectively communicate with community members. It is recommended that the SEP is updated annually ensure that it stays relevant and that it addresses relevant concerns/comments raised by stakeholders. The following section provides key objectives to be included in the SEP.

The purpose of a SEP:

- ❖ To identify and assess the processes and/or mechanisms that will improve the communication between local communities, the wider community and Ergo Mining;
- ❖ Provide a guideline on how to effectively share information with community members-information must be communicated to stakeholders early in ways that are meaningful and accessible. Communication should be continued throughout the life of the project;
- ❖ Serves as a tool to facilitate grievance management – accessible and responsive means for stakeholders to raise concerns and grievances about the project must be established throughout the life of the project.

### 9.8.2 Grievance Mechanism

A grievance mechanism is a formal, legal or non-legal complaint process that can be used by individuals, workers, communities and/or civil society organisations that are being negatively affected by certain business activities and operations. A grievance mechanism plan aims to prevent, defuse and resolve community complaints and disputes.

The World Bank Group (2005:72) states that a company's grievance procedures should be communicated to all stakeholders, community members should be made aware of the procedures to follow (ie) people should know where to go and whom to talk to if they have a complaint and understand what the process will be for handling the complaint. Communication with stakeholders should be provided in a format and language that will be understood by stakeholders. It is recommended information is communicated orally in areas where literacy levels are low.

A grievance mechanism provides stakeholders with an opportunity to raise their concerns and provides them with confidence that their issues will be addressed- this encourages better community relations and good reputation for the company.

To ensure effective consultation with community members during construction and operation of the proposed Project, it is advised that Ergo should establish a Community Consultation Forum that will comprise elected community representatives and aims to disseminate project information to community members.

Ergo will request communities to democratically elect representatives to voluntarily sit on the Forum, which meets quarterly. Representatives would be responsible for disseminating project information to community members.

It is recommended that the composition of the community forum members represent a good geographic, racial and gender balance, have local standing. The forum could comprise of the following members :

- ❖ Community members from the communities within the Project area;
- ❖ Representatives from the local authority, i.e., City of Johannesburg Metropolitan Municipality, Johannesburg Roads Agency etc ;
- ❖ Ergo Community Liaison.

Committee members would be required to hold meetings with their communities and provide Ergo Mining with copies of the attendance registers and minutes of these meetings.

### 9.8.3 Human Rights

The applicant should establish human rights policy and aim to have zero human rights infringements in the workplace and community throughout the life of the project.

## 9.9 Socio Economic Monitoring Programme

The proposed socio-economic monitoring programme below should be implemented during the construction phase, continue into operations, and throughout the life of the project.

**Table 9-8: Proposed Socio-Economic Programme**

ITEM	PARAMETERS	FREQUENCY	RESPONSIBLE PERSON
Procurement Management Plan	Procurement awards	Ongoing- throughout the life of the project	Ergo Mining: Human Resources Manager/ Finance Manager and the Procurement officer.
Recruitment/retrenchment plan	Number of recruited candidates (sourced locally)  Retrenchment-linked with training programme and continued Professional Development of staff	Ongoing- throughout the life of the project	Ergo Mining: Human Resources Manager/ Finance Manager.
Training programmes/Learnerships/Internships	Number of training programmes offered and the effectiveness	Ongoing- results to be included in the SLP	Ergo Mining: Human Resources Manager/ Finance Manager.
Health and Safety Plan	Number of reported health and safety incidents	Ongoing-Monthly	Ergo Mining: Human Resources Manager/ Finance Manager, Safety, Health, Environment and Quality Officer
Commitments Register	Fulfilling commitments made in EIA, SIA as well as those made throughout the stakeholder engagement process	Ongoing-annual reviews	Ergo Mining: Human Resources Manager/ Finance Manager/Environmental Manager/Stakeholder
Closure and Rehabilitation plan	A closure and rehabilitation plan will be developed during the EIA. This will assist with minimising environmental	On-going	SHEQ Manager/HR Manager/Closure/Rehabilitation specialist

---

ITEM	PARAMETERS	FREQUENCY	RESPONSIBLE PERSON
	and social liabilities associated with project closure.		



## 9.10 Radiological Monitoring Plan

### 9.10.1 General

The NNR regulatory process requires CoR holders to submit a public Radiation Protection Programme (RPP) for approval by the NNR. The basis for the definition of the public RPP is the outcome of the comprehensive radiological public safety assessment and includes a monitoring programme, a surveillance programme and a control programme.

The purpose of this section is to define a radiological monitoring plan for the project. The basis for the definition of the monitoring plan is the outcome of the radiological public impact assessment presented in this report, taken into consideration the radiological information available at present.

### 9.10.2 Baseline Characterisation

Some efforts went into characterising the radiological baseline conditions at the project area. The most significant of these is the gamma radiation and dose rate surveys that were performed over the extraction area.

The radiological impact assessment resulted in a medium impact rating based on the assessment results. These results suggest a low consequence and, therefore, the additional baseline characterisation proposed below should be implemented taking into consideration the graded approach to safety (IAEA, 2009b).

The following proposed characterisation activities will increase the radiological knowledge of the project, resulting in a higher degree of confidence in radiation safety of the associated activities:

- ❖ Collect a representative sample of the material in the extraction area and perform a full spectrum radioanalysis on the sample;
- ❖ Identify appropriate surface water and groundwater monitoring points upstream and downstream of the project area, samples these locations, and perform full spectrum radioanalysis on the collected samples; and
- ❖ Monitor the environmental radon concentration at selected points around the project area and in the nearby communities.

These activities will help to build confidence that the project does not increase the radiation exposure conditions in the area.

### 9.10.3 Monitoring Programme

Table 9-9 summarises the proposed monitoring programme for the project aimed at public radiation protection. The responsibility for the implementation and execution of the monitoring programme lies with the Radiation Protection Function (RP Function) that include legally appointed persons consisting of a Radiation Protection Monitor(s) (RPM), a Radiation Protection Officer (RPO), and a Radiation Protection Specialist (RPS).

**Table 9-9: Summary of the environmental monitoring programme proposed for the project aimed at public radiation protection.**

MONITORING ELEMENT	COMMENT	FREQUENCY
Surface water	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Annually
	Total Uranium and Thorium	Quarterly
Sediments	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Once every two years
	Total Uranium and Thorium	Biannually
Groundwater	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Once every two years
	Total Uranium and Thorium	Biannually
Radon gas	Environmental radon using Radon Gas Monitors (RGMs)	Quarterly for a period of 2 to 3 month

A full-spectrum analysis is suitable for detailed dose analysis but is an expensive procedure with long lead times to perform the analysis, which is why less frequent intervals are proposed. The total uranium and thorium analysis are relatively inexpensive with fast turnaround times. These results will monitor variations in activity concentration over the monitoring period.

Large variations in the activity concentration over a short period are not expected in groundwater, oppose to surface water, for example. Therefore, a less frequent sampling schedule is proposed for groundwater. The same principle applies to the sediment samples at the same locations as the surface water sample.

The RGMs to monitor the variation in radon gas works in monitoring periods of 2 to 3 month, after which the RGMs is replaced with new RGMs for the next monitoring period.

#### 9.10.4 Proposed Monitoring Points

Most of the monitoring points proposed to be part of the monitoring programme coincide with the monitoring programme for the environmental pathways. The following can be noted:

- ❖ The surface water monitoring locations should coincide with the existing surface water monitoring points. The principle to be applied is that the monitoring locations should be upstream and downstream of the project area in potentially affected surface water streams, as well as upstream and downstream of specific discharge points.
- ❖ The sediment monitoring locations should coincide with the surface water monitoring points, applying the same principles.
- ❖ The groundwater monitoring points should coincide with the existing groundwater monitoring points. The principle to be applied is that the monitoring locations should be upstream and downstream of the project area. The exact location will be determined by the availability of water-bearing boreholes in the specific area.
- ❖ The environmental radon monitoring locations do not have to coincide with specific locations. The principle to apply is that it should be around the extraction area and in the dominant wind direction where receptors are located, complemented with monitoring locations in what can be considered as

background. The exact location is often influenced by whether a secured location is available to improve the recovery rate of the RGMs.

## 9.11 Waste Management Plan

Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

This management plan was formulated based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated throughout the life-cycle of the project, as required in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the site should be compiled by the Contractor.

### 9.11.1 Waste Management Principles

An integrated approach to waste management is needed on site. It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- ❖ Reducing volumes of waste is the greatest priority;
- ❖ If reduction is not feasible, the maximum amount of waste is to be recycled; and
- ❖ Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner

### 9.11.2 Project Phase Waste Management

A plan for the management of waste during all phases of the project is detailed below.

#### 9.11.2.1 Waste Inventory

- ❖ The Environmental Control Officer (ECO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during the project life-cycle for both general and hazardous waste streams.
- ❖ Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- ❖ Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.

- ❖ The ECO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

#### 9.11.2.2 *Waste Collection, Handling and Storage*

- ❖ Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- ❖ Septic tanks and portable toilets must be monitored by the ECO or responsible subcontractor and maintained regularly.
- ❖ Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- ❖ A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- ❖ Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- ❖ The SHE Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- ❖ Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- ❖ Recyclable waste must be removed from the waste stream and stored separately.
- ❖ All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
- ❖ Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- ❖ Waste generated on site must be removed on a regular basis throughout the operation phase.
- ❖ Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

#### 9.11.2.3 *Record Keeping*

The success of waste management practices is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

- ❖ Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- ❖ Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

#### 9.11.2.4 Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- ❖ Monthly volumes/ mass of the different waste streams collected;
- ❖ Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- ❖ Monthly volumes/ mass of the waste that is recycled;
- ❖ Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. This report must form part of the ECO's reports on a monthly basis.

### 9.12 Rehabilitation Plan

The project will result in the removal of silts, the levelling of the area, remediating radiation (should exceedances exist) and preparing the land for future development. It is envisioned that the future land use for these sites will be for commercial/industrial/residential development – in line with the City of Johannesburg's Spatial Development Framework and landowners development plans. A similar development as seen at Crown and Booyens is envisioned for the site.

It is proposed that before the Ergo enters the decommissioning phase of the Project, that it should establish a decommissioning forum, which will encompass the following:

- ❖ Preparing a comprehensive rehabilitation plan prior to the commencement of any activities on site;
- ❖ Stormwater management must be in place at the site prior to commencing with any activities, including Improving the existing dam wall;
- ❖ Removal of all contaminated soils and replacement with uncontaminated soils;
- ❖ Landform design (shaping, re-grassing);
- ❖ Maintenance management and eradication of invader species;
- ❖ A plan which negates how waste will be managed on site; and
- ❖ Upgrading/reinstating the historic dam wall to attenuate water flow; and
- ❖ An Emergency Preparedness/Response plan.

#### 9.12.1 Successful Decommissioning Vision and Objectives

The objective of successful decommissioning is based on that which has been developed by Ergo.

*Establish a safe, stable and non-polluting post mining landscape which is self-sustaining, through a collaboration with affected stakeholders, thus leaving a positive legacy for future generations.*

Decommissioning and rehabilitation is a continuous series of activities that begin with planning prior to the Project's design and construction, and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. The implementation of this concept should result in a more satisfactory environmental conclusions in the long term. The vision is underpinned by the objectives listed below:

- ❖ Adhere to all statutory and other legal requirements (National, Provincial and Local);
- ❖ Implement progressive rehabilitation measures where possible to ensure protection of the local environment;
- ❖ Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- ❖ Focus on establishing a functional post-reclamation landscape;
- ❖ Utilise decommissioning strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance; and
- ❖ Creating opportunities for alternative post-reclamation livelihoods by aligning to Integrated Development Plans, Spatial Development Frameworks and other developmental initiatives.

Rehabilitation objectives have been tailored to the project at hand.

#### 9.12.2 Considering Decommissioning Options

Requirements for the beneficial use of the land following reclamation need to be clarified with affected parties. The end land use(s) must be:

- ❖ Relevant to the environment;
- ❖ Achievable in the context of post-mining land capability;
- ❖ Acceptable to key stakeholders (as highlighted below); and
- ❖ Ecologically sustainable in the context of local and regional environment.

The end land use for the site must be agreed on in consultation with relevant stakeholder groups that will include the following, amongst others:

- ❖ Landowners;
- ❖ Government departments, e.g. Department of Water and Sanitation, Department of Environmental Affairs, etc.;
- ❖ Local government councillors;
- ❖ Non-government organisations; and
- ❖ Local communities.

#### 9.12.3 Decommissioning Options Research

During the operational phase, it is advised that continual monitoring of both surface and ground water is conducted. This information needs to be collected and used to update specific water models to monitor and evaluate the impact of the operation. Additionally, it would be advisable to conduct monthly dust fall

monitoring to evaluate the ongoing and probable air pollution. This will allow Ergo to establish the best practicable option to ensure that the minimal impact on both water sources and wetlands occur.

This EMP, including objectives for decommissioning for final rehabilitation is a living document and will be reviewed and amended through the life of the project, any changes due to new research will be incorporated into these amendments.

#### 9.12.4 Decommissioning Assumptions

Information currently available may need to be supplemented during the operational phase of the Project. As additional information will be collected during operations and these assumptions will need to be reviewed and revised.

The assumptions used to prepare this report are the following:

- ❖ The decommissioning period will commence once the last silts have been removed;
- ❖ The life of the operations is estimated at 10 years, including the ramp-up period and decommissioning period. It must be noted that even though the EA applied for is a 10 year period, it may be the case that the project does not begin immediately until all environmental authorisations, surface right permissions, legal matter and favourable economics are in place;
- ❖ At decommissioning, the area will be levelled and prepared to be used for redevelopment;
- ❖ The infrastructure plan, design and layout have been adhered to;
- ❖ There are limited opportunities for post decommissioning infrastructure for community uses. Therefore, all buildings will be demolished;
- ❖ All demolition rubble is considered General Waste as per the definition of Demolition waste in Category B of Schedule 3 of the NEMWA and, based on the classification as 'General Waste', can therefore be incorporated into the backfill;
- ❖ All hazardous and domestic waste will be transported offsite for disposal in licenced landfills; and
- ❖ Access roads to the site will be required for the new land use (development) and will not be closed as part of normal closure actions.

#### 9.12.5 Rehabilitation Actions and Management Plans

The area from which the tailings were removed for reclamation will need to be rehabilitated. Limited surface infrastructure will be established to support the reclamation activities for the Project and this infrastructure footprint will need to be rehabilitated.

The Valley Silts Project is well serviced by existing roads and infrastructure. Existing infrastructure to be utilised at stages during the project includes:

1. The Ezekiel Dump footprint;
2. Drying sites 3L12 and associated infrastructure;
3. Pre-processing infrastructure, scrubber and pump station at Ezekiel;

4. Existing site access roads;
5. The Knights Plant;
6. Existing pipelines;
7. The Brakpan/Withok TSF;
8. Electricity and water reticulation; and
9. Hauling road: access roads and main roads.

The following infrastructure and vehicles will be utilised on site:

1. Backhoes and excavators
2. 30 ton Articulated Dump Trucks (ADT's) and 30 ton Dump Trucks;
3. Water Bowser Truck allocated to the drying sites;
4. Temporary administration buildings, ablution facilities; and
5. Additional site access roads if required.

The following general management practices should be encouraged or strived for:

- ❖ No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- ❖ An independent Radiation Assessment should be undertaken before final closure and rehabilitation is undertaken.
- ❖ The final rehabilitated area should resemble land which is clear of radiation.
- ❖ Concurrent rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
- ❖ Adhere to the SWMP, WMP, Emergency Preparedness Plan
- ❖ The sites must be cleared until the soil is visible.
- ❖ Soils will need to be successfully regressed.
- ❖ If a significant time lapse will be experienced before future land use development commences, indigenous grass species must be established in the footprint areas.
- ❖ Alien species encroachment must be discouraged.
- ❖ Signage must be placed at the rehabilitated sites to prevent anthropogenic influence on the rehabilitated sites.
- ❖ Ergo must complete full rehabilitation. Partial rehabilitation is not tolerated.
- ❖ Certification to NNR following closure must be submitted to the NNR.

#### *9.12.5.1 Monitoring and Follow-up Action*

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the project life span, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring



personnel must be adequately trained.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. Monitoring protocol has been detailed in Chapter 8.

### 9.13 Financial Provisioning

Refer to Chapter 10 of the EIA.

### 9.14 Action Schedule

The closure schedule needs to be linked to the financial provision estimate and forecast that is undertaken for each year of reclamation. The schedule should take into account areas that become available for rehabilitation and costs should be provided to undertake such rehabilitation.

The closure schedule addresses the timing of rehabilitation and closure activities performed during the decommissioning and post-closure phases for a particular operation. As a result of the type of reclamation that is undertaken (mechanical reclamation), it is anticipated that rehabilitation and closure will only be undertaken at the end of the operation.

Based on this assumption and the type of reclamation, it is unlikely that any rehabilitation (annual) will be undertaken during the life of the operation (except for the removal of the silts from the stream).

Presented below is a high-level schedule of closure related aspects that should be undertaken either during the operation and/ or during the decommissioning phase:

- ❖ Annual review and update of the Rehabilitation, Decommissioning and Closure Plan;
- ❖ One (1) year prior to closure start with the closure engagement process with all interested and affected stakeholders and employees;
- ❖ Decommissioning phases are expected to take three years, including a one year ramp down period and a two year rehabilitation; and

Post closure monitoring and maintenance for three years aside from groundwater and surface water which requires five years

### 9.15 Monitoring, Auditing and Reporting Requirements

Monitoring, Auditing and Reporting will be undertaken for future revisions to this plan, which are required annually. Final monitoring and reporting on the monitoring required in achieving the relinquishment criteria will be undertaken.

The following will be undertaken during the operational phases of the project, to ensure compliance with necessary legislations:

- ❖ Annual internal monitoring, auditing and reporting to account for changes in the environment, risk profile and progression of concurrent rehabilitation to ensure that the annual liability assessment reflects the true liability at that point in time.
- ❖ An external review will be undertaken by a specialist and then by the financial auditors as part of the annual financial/ accounting audit to determine that the liability assessment is appropriate, and that the quantum of the liability is included in the operations provisions.
- ❖ Appointment of an external consultant to review and update the rehabilitation, decommissioning and closure plan annually.
- ❖ Other statutory audits required, such as EMPr Environmental Audits, Water Use Licence Audits, GN704 audits and Social and Labour Plan Audits, which will be undertaken as stipulated in accordance with their conditions.

According to the Chamber of Mines/ Coaltech, 2007. Final monitoring and reporting should encompass the following items:

- ❖ Alignment of actual final topography to agreed planned landform.
- ❖ Depth of topsoil stripped and replaced;
- ❖ Chemical, physical and biological status of soils replaced due to erosion;
- ❖ Surface water drainage systems and surface water quality;
- ❖ Groundwater quality at agreed locations;
- ❖ Vegetation basal cover;
- ❖ Vegetation species diversity;
- ❖ Faunal re-colonisation; and
- ❖ Proportion of mined land that has been fully rehabilitated.

To achieve the above an operational monitoring programme as well as a post closure monitoring programme will be developed to track the recovery of the site towards the long-term post-closure land capability goals, in accordance with the overall closure objectives.

The monitoring programme is designed to collect information to prove that the relinquishment criteria have been accomplished. The monitoring programme will include:

- ❖ Groundwater: Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled quarterly for a five-year post-closure period;
- ❖ Surface water monitoring: Quality monitoring of the surrounding surface water against the requirements of the WUL. Sampled quarterly for a five-year post-closure period;
- ❖ Photographic records should be maintained together with findings, follow up actions and close out records as part of the Environmental Management System.

## CHAPTER 10: COMPLIANCE MONITORING MECHANISM

Table 10-1 depicts the monitoring and management plan for the management measures and actions identified in the impact assessment. Where specific monitoring and management plans are required, these are detailed in Section 9.

**Table 10-1: Monitoring and Management Plan**

IMPACT MANAGEMENT ACTION	MONITORING / MANAGEMENT ACTION	MONITORING FREQUENCY	ROLES AND RESPONSIBILITIES	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
<b>GROUNDWATER</b>					
Groundwater level	Depth to groundwater level	Quarterly (Jan, Apr, Jul, Oct)	Project ECO	-	Monthly
Water quality monitoring	<ul style="list-style-type: none"> <li>❖ All existing private boreholes;</li> <li>❖ Monitoring boreholes; and</li> <li>❖ Proposed new boreholes.</li> </ul>	Quarterly (Jan, Apr, Jul, Oct)	Project ECO	SANS: Drinking Water Standards (Recommended EAL)	Quarterly
<b>SURFACE WATER</b>					
Surface water quality monitoring	Surface water sampling and laboratory analysis from 10cm below the water surface at locations identified in the Surface Water Impact Assessment  Monitor upstream, middle and downstream	Quarterly prior to the commencement of construction	Project ECO	<ul style="list-style-type: none"> <li>❖ DWS best practice guidelines G3: Water Monitoring Systems.</li> <li>❖ South African National Accreditation System (SANAS) accredited laboratory for analysis.</li> <li>❖ Compare against baseline quality.</li> </ul>	Quarterly
		Monthly basis during the life of the project	Project ECO		Monthly
		2 years post decommissioning	Project ECO		Monthly
Stormwater infrastructure	Water infrastructure (channels, berms and paddocks)	Monthly Basis during the dry season. Weekly basis during the wet season	Project ECO/Maintenance Manager		Monthly
		Monitored immediately after a stormwater event	Project ECO/Maintenance Manager	Immediately	

IMPACT MANAGEMENT ACTION	MONITORING / MANAGEMENT ACTION	MONITORING FREQUENCY	ROLES AND RESPONSIBILITIES	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
Reporting	monitoring reports to include trend analyses. Sampling of water quality from upstream monitoring points must be compared to downstream monitoring points.	Monitoring reports submitted to DHSWS.	Project ECO		Quarterly (or as recommended by the DHSWS)
<b>AIR QUALITY</b>					
Dust: /Wet suppression/ Chemical stabilization of unpaved roads	Visually	Daily	<ul style="list-style-type: none"> <li>❖ Project Site manager</li> <li>❖ Contractor ECO</li> <li>❖ Contractor EO</li> </ul>	Internal audit by Ergo in house specialists	Monthly
	Dust Fallout Monitoring	Monthly during construction, operational and decommissioning phases	Project ECO	<ul style="list-style-type: none"> <li>❖ Internal audit by Ergo in house specialists</li> <li>❖ National Dust Control Regulations.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prior to the commencement of reclamation.</li> <li>❖ Monthly during the life of the project</li> </ul>
<b>HERITAGE</b>					
Possible finds	Chance find procedure	Prior to site clearance During construction and operation	<ul style="list-style-type: none"> <li>❖ Ergo</li> <li>❖ Project EO</li> <li>❖ Heritage Specialist</li> </ul>	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Monthly Checklist/Report
<b>RADIATION</b>					
Refer to Section 9.10.3 for the radiological monitoring programme					
Other management measures included in Section 9.9					

---

## CHAPTER 11: OATH UNDERTAKING

---

The EAP hereby confirms:

- ❖ The correctness, to the best of their knowledge, of the information provided in the specialist reports and on information provided by Ergo. The information was accepted as being as reliable as information generated during an EIA and a feasibility study, and provided in good faith, can be;
- ❖ The inclusion of comments and inputs from stakeholders and I&APs;
- ❖ The inclusion of inputs and recommendations from the specialist reports where relevant; and
- ❖ The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

KONGIWE ENVIRONMENTAL (PTY) LTD

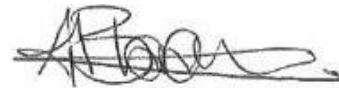
---

**Company Name**

ASHLEIGH BLACKWELL

---

**Name of the Environmental Assessment Practitioner**



---

**Signature**

25 May 2020

---

**Date**