



Environmental and Social Management Plan Update

Kabanga Nickel Mine

Tembo Nickel Corporation Limited



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20 June 2025

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Status	Final
Report No.	01
SLR Company	SLR Consulting (Africa) (Pty) Ltd

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
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Appendix I: Vulnerable Peoples Management Plan

Appendix J: Waste Management Plan

Appendix K: Chemical and Hazardous Waste Management Plan

Appendix L: Human Rights Management Plan

Appendix M: Community Health and Safety Management Plan



Acronyms and Abbreviations

Abbreviation	Acronyms
AIDS	Acquired Immunodeficiency Syndrome
ALS	Advanced Life Support
ASM	Artisanal and Small scale Miners
BCM	Business Continuity Management
BHP	BHP Billiton (UK) DDS Limited
CECL	City Engineering Company Limited
CHA	Community Health Assessment
dB	Decibels
EBV	Ebola Virus Disease
ECMS	Environmental Compliance Monitoring System
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
EPRP	Emergency Preparedness and Response
ER	Emergency Room
ERM	Environmental Resources Management
ERT	Emergency Response Team
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GoT	Government of Tanzania
HIA	Health Impact Assessment
HIV	Human Immunodeficiency Virus
IEC	Information, Education and Communication
IFC	International Finance Corporation
KNL	Kabanga Nickel Limited
LTBI	Latent TB Infection
LZM	Lifeline Metals Limited



Abbreviation	Acronyms
MIA	mine infrastructure area
MMPF	Multi-Metals Processing Facility
MVD	Marburg Virus Disease
NCD	Non-Communicable Disease
NEMC	National Environment Management Council
NEP	National Environmental Policy
NIA	Noise Impact Assessment
NGO	Non-Governmental Organisation
NOx	Nitrogen Oxides
NSR	Noise Sensitive Receptor
OHL	Overhead Line
OHRA	Occupational Health Risk Assessment
OHSRA	Occupational Health and Safety Risk Assessment
PCD	Pollution Control Dam
ROM	Run of Mine
SEP	Stakeholder Engagement Plan
SEZ	Special Economic Zone
SLR	SLR Consulting (Africa) (Pty) Ltd
SML	Special Mining Licence
STI	Sexually Transmitted Infection
TAA	Tanzanian Aviation Authority
TANESCO	Tanzania Electric Supply Company Limited
TB	Tuberculosis
TNCL	Tembo Nickel Corporation Limited
TSF	Tailings Storage Facility



1. Introduction and Background

1.1 Introduction

Tembo Nickel Corporation Limited (TNCL) is a local private mining company which was formed on January 19, 2021, after the signing of the joint-venture Framework Agreement between the Government of the United Republic of Tanzania and the Kabanga Nickel Company Limited for the development of the proposed Kabanga Mine (**hereafter referred to as the proposed Project**). The proposed Project is located in the northwest of the United Republic of Tanzania in the Ngara District, 42 km south of the town of Rulenge, 5 km southeast of the nearest town of Bugarama, and close to the border with Burundi (Refer to Figure 1-1). The proposed Project area is a greenfield site that will produce nickel, sulphide concentrate.

In broad terms, the mining operations at the Kabanga Mine will involve underground works accessed via two separate decline systems, named the North and Tembo mining areas (Refer to Figure 1-2). Run-of-mine (ROM) ore will be processed in a dual stream 3.4 Mtpa concentrator plant to produce nickel sulphide concentrate. This concentrate will be trucked 340 km via the B3 road to the Kahama Multi-metal Processing Facility (MMPF) for refining. From there, it will be further trucked to the Isaka dry port, approximately 40 km from the Kahama MMPF, and transported by an existing rail system to Dar es Salaam, Tanzania's principal city and largest seaport. Dar es Salaam has the port facilities to import equipment and materials for the proposed Project and ship the final products for export.

An initial Environmental and Social Impact Assessment (ESIA) for the proposed Project was conducted between 2007 and 2013 through a joint venture between Golder Associates (Current WSP), an international ESIA consulting firm, and MTL Consulting, a local ESIA consulting company. The baseline study adhered to both local and international standards and received approval and certification from the National Environmental Management Council (NEMC) in September 2013. However, the project did not advance to the development stage due to global economic conditions and a decline in nickel prices in 2013/14. Since then, several changes have occurred in mining designs, components, the biophysical environment, and social and regulatory compliance. According to Regulation 41 of the Environmental Impact Assessment (EIA) and Audit Regulations, 2005, and its subsequent amendments in 2018, any project approved and certified but not commenced within three years must be re-registered by the project proponent. In June 2021, the EIA certificate was transferred from Kabanga Nickel Limited.¹ to TNCL due to a change of proponent. During this transfer, NEMC required TNCL to update the Environmental Impact Statement (EIS) and associated Environmental Management Plan (EMP) to reflect the changes between 2007 and 2022 and capture the current baseline conditions at the project location. In 2022, TNCL commissioned MTL (a local ESIA consulting company) to update the EIS & EMP to meet local Tanzanian legislation primarily. NEMC approved the updated EMP in June 2023.

TNCL is committed to implementing the proposed Project in line with International Standards. To ensure compliance, TNCL has appointed SLR Consulting (Africa) Proprietary Limited (SLR) in association with City Engineering Company Limited (CECL) to update the

¹ Under the Framework Agreement terms, a joint stock company, namely TNCL, was formally established. TNCL is owned 84% by Kabanga Nickel Limited and 16% by the Government of Tanzania. The company is dedicated to the mining, processing, and refining of high-grade nickel, with cobalt and copper as co-products.



approved ESIA and Environmental and Social Management Plan (ESMP) for the Kabanga Mine to meet lender standards.

1.2 Project Overview

The mining operations at the proposed Project site will comprise underground mining works, which are proposed to be accessed via two separate box-cut areas, namely the North and Tembo mining areas. The infrastructure for the proposed Project site will be developed in two phases. (DRA (A), 2024) starting with the construction of the North Mine boxcut and mine infrastructure area (MIA), including the concentrator plant, workshops, explosives magazine and offices needed for underground mine development (Refer to Figure 1-2) The first phase of construction also includes the Tembo boxcut and MIA, tailings storage facility (TSF), various pollution control dams (PCDs), as well as waste rock dumps (WRDs), borrow pits, temporary stockpiles and an airstrip (Figure 1-2). On-site roads will link these facilities. Existing infrastructure will be initially utilised, including the exploration camp, an existing 33 kV electrical connection, offices and water supply from local boreholes. As the project progresses, however, the bulk water supply will need to be supplemented by constructing a pump station and a buried pipeline (approximately 15 km in length) to deliver water to the concentrator from the Ruvubu River. In addition, Tanzania Electric Supply Company Limited (TANESCO) will construct a 220 kV overhead line (OHL) as part of the proposed Project to connect the proposed Project to the national grid.

The proposed Project's second phase will see the expansion of the concentrator plant to increase throughput from 1.7 Mtpa to 3.4 Mtpa ROM in line with the ramp-up of the mine's underground production. Phase 2 also includes expanding the truck staging area and water storage capacity and constructing the permanent camp.

As discussed, the concentrator will be established in a phased manner (2 × 1.7 Mtpa units) to produce a nickel sulphide concentrate that will be trucked 340 km to the Kahama MMPF for further processing (part of a separate ESIA process). The MMPF will produce refined nickel, copper and cobalt, which will be transported from the MMPF via road (40 km) to a dry dock at Isaka in Shinyanga region, from where it will be transported via rail to Dar es Salaam. Dar es Salaam, Tanzania's principal city and largest seaport, has the requisite port facilities to enable the equipment and materials for the proposed Project to be imported and the final products to be shipped for export.

1.3 Project Location

The proposed Project is a greenfield site located in the northwest of the United Republic of Tanzania (Tanzania). The proposed Project site is approximately 1 320 km west of the main port of Dar-es-Salaam and about 130 km southwest of Lake Victoria (Figure 1-1).

The site is located in the Ngara District, 42 km south of the town of Rulenge, 5 km southeast of the nearest town of Bugarama, and close to the border with Burundi (Figure 1-1). The geographical position of the proposed Project site is at latitude -2° 52' 59.99"S and longitude 30° 32' 59.99"E and falls within the villages of Bugarama and Rwinyana in the Ward of Bugarama; Nyabihanga in Bukiro Ward and Mukubu and Muganza in the Muganza Ward.

The Special Mining Licence (SML) covers an area of approximately 202 square kilometres (km²) of land, with the proposed Project footprint requiring an area of approximately 41.79 km² for the development of the proposed mining infrastructure (Figure 1-2).

The proposed Project site can be accessed through either the North Access Road or the South Access Road. The North Access Road is 30 km from Ngara via Rulenge, and the



South Access Road is 70 km from Nyakahura centre to the Kabanga site. Both accesses are unpaved and fall under the Tanzanian National Roads Agency (TANROADS) and the Ngara District as part of the public road network within the Kagera Region. These public roads will require regular improvements before being used to service the mine activities.

The Kabanga Mine infrastructure will predominantly be developed within the Nyamwongo River catchment area. The Nyamwongo River, a tributary of the Muruhama River, flows through the centre of the proposed site. Meanwhile, the Muruhamba River, which runs along the southern boundary of the SML area, merges with the Ruvubu River. The Ruvubu River, forming the natural border between Tanzania and Burundi, continues its journey north-eastward towards Lake Victoria.



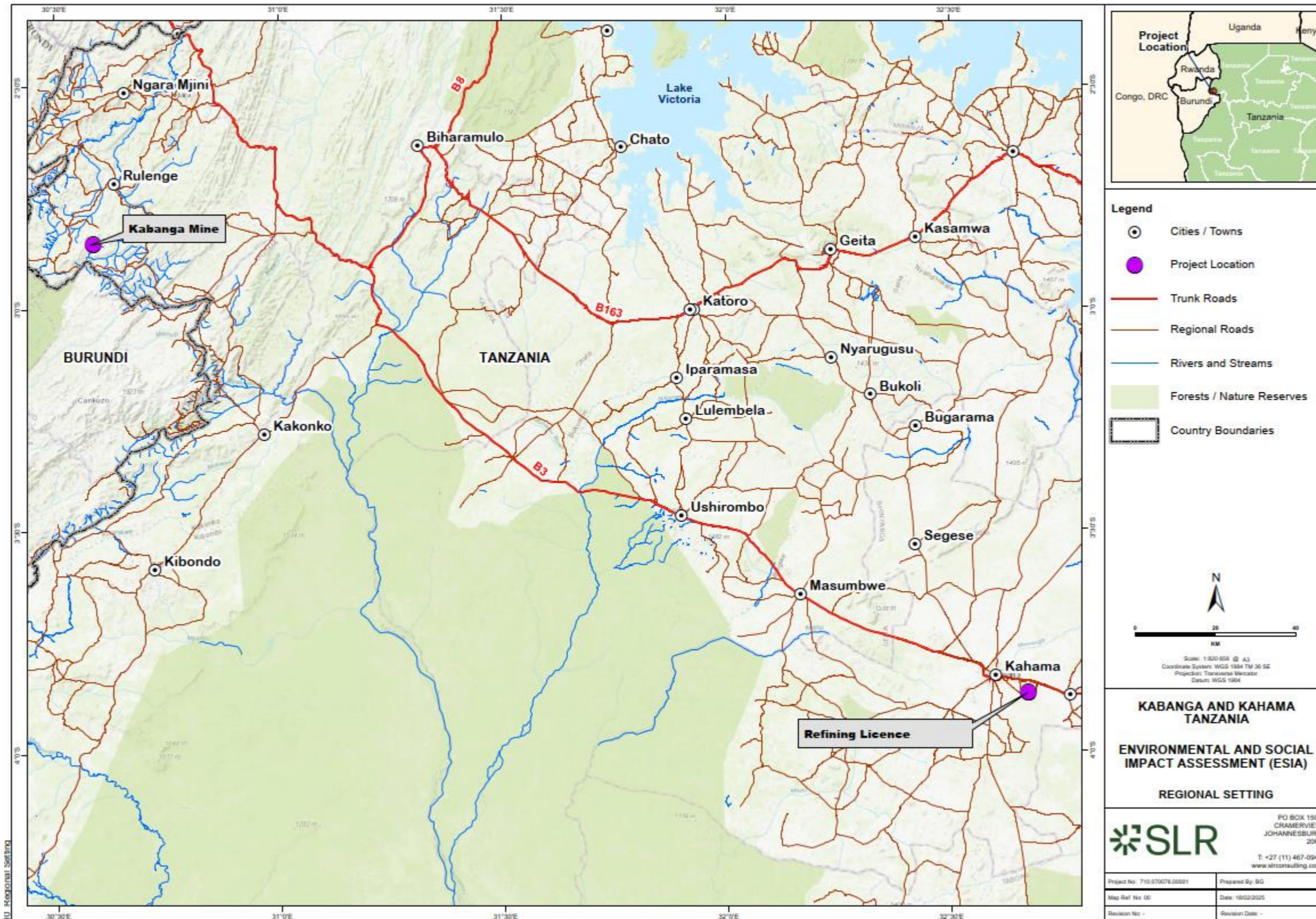


Figure 1-1: Regional Setting



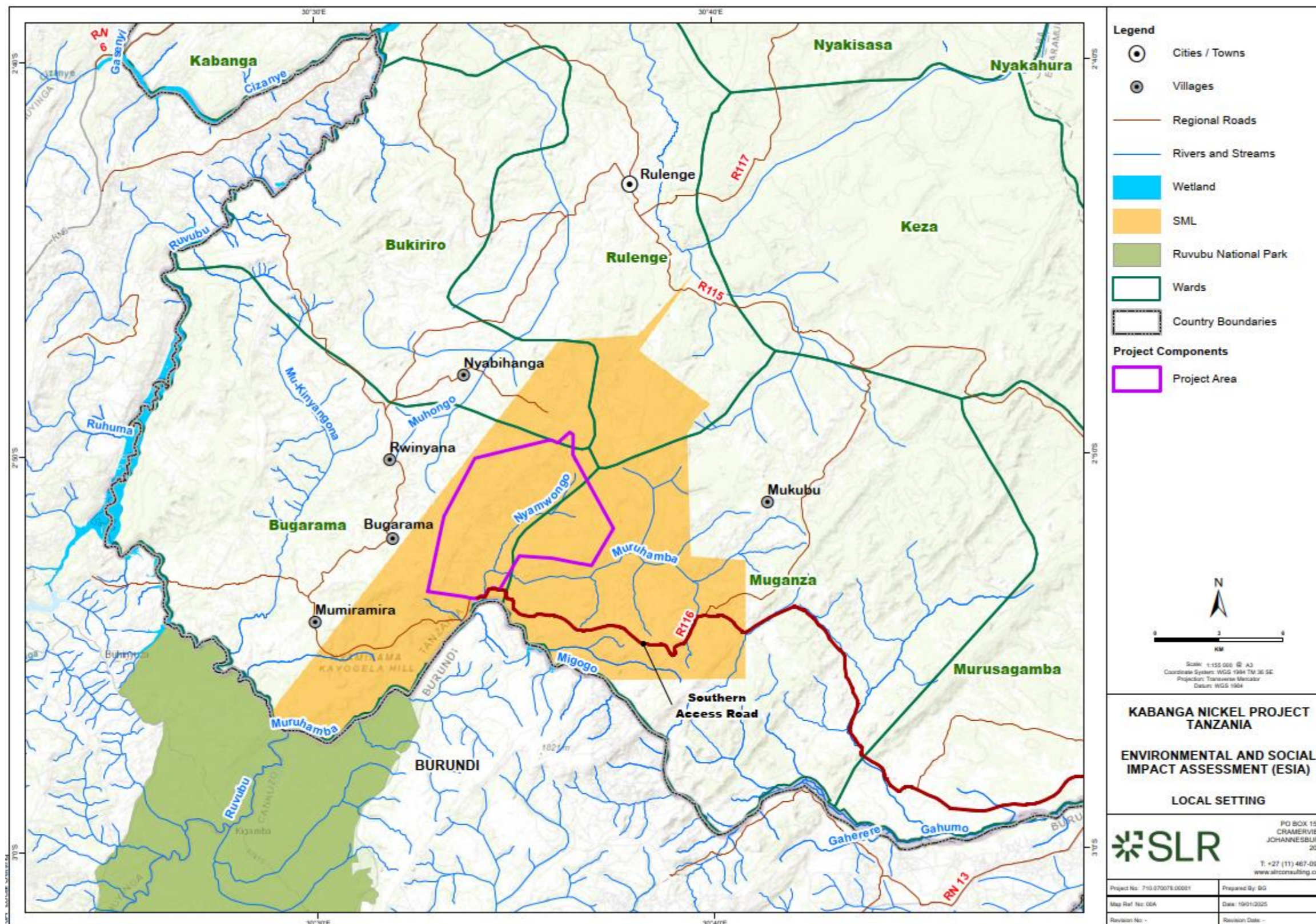


Figure 1-2: Local Setting



1.4 Project Developer

Kabanga Nickel Limited is owned by Lifezone Metals Limited and BHP Billiton (UK) DDS Limited (BHP). As of February 2023, BHP held a 17% share, and Lifezone Metals Limited held the balance of 83%.

The proposed Project was acquired by Lifezone Metals Limited in 2021. On 25 October 2021, when the Government of Tanzania granted an SML to TNCL. Kabanga Nickel Limited owns 84% of TNCL, and as required by law, the Government of Tanzania holds a 16% share.

BHP initially invested in the project in January 2022 by acquiring an 8.9% stake, which was extended to a 17% stake in February 2023.

TNCL and its subsidiary companies called the Tembo Nickel Mining Company Ltd and the Tembo Nickel Refining Company Ltd (part of a separate process for the Kahama Refinery), are companies owned by Kabanga Nickel Limited as majority shareholder, with the Government of Tanzania holding a minority share. The overall ownership structure of these companies is graphically demonstrated in Figure 1-3.

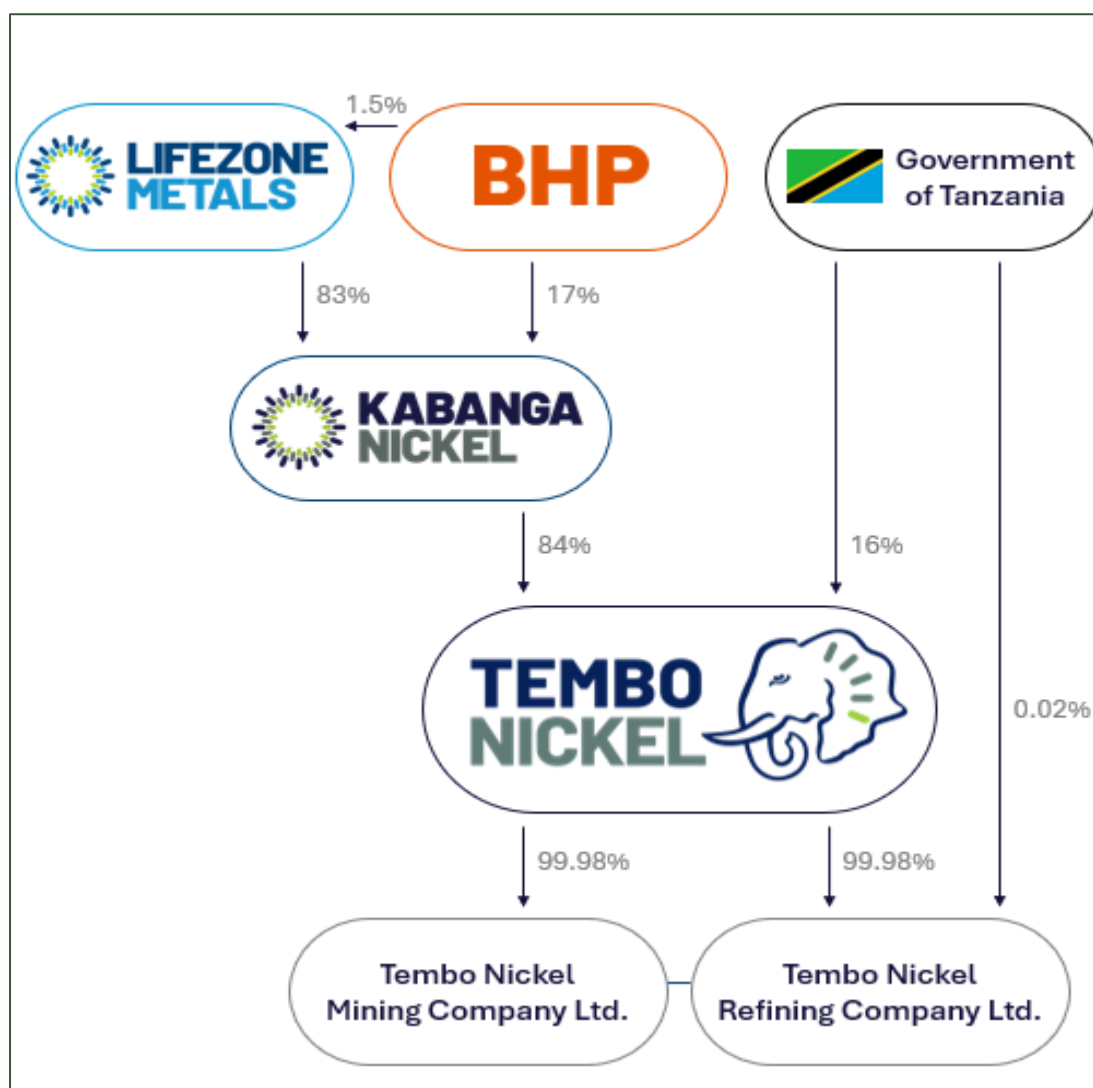
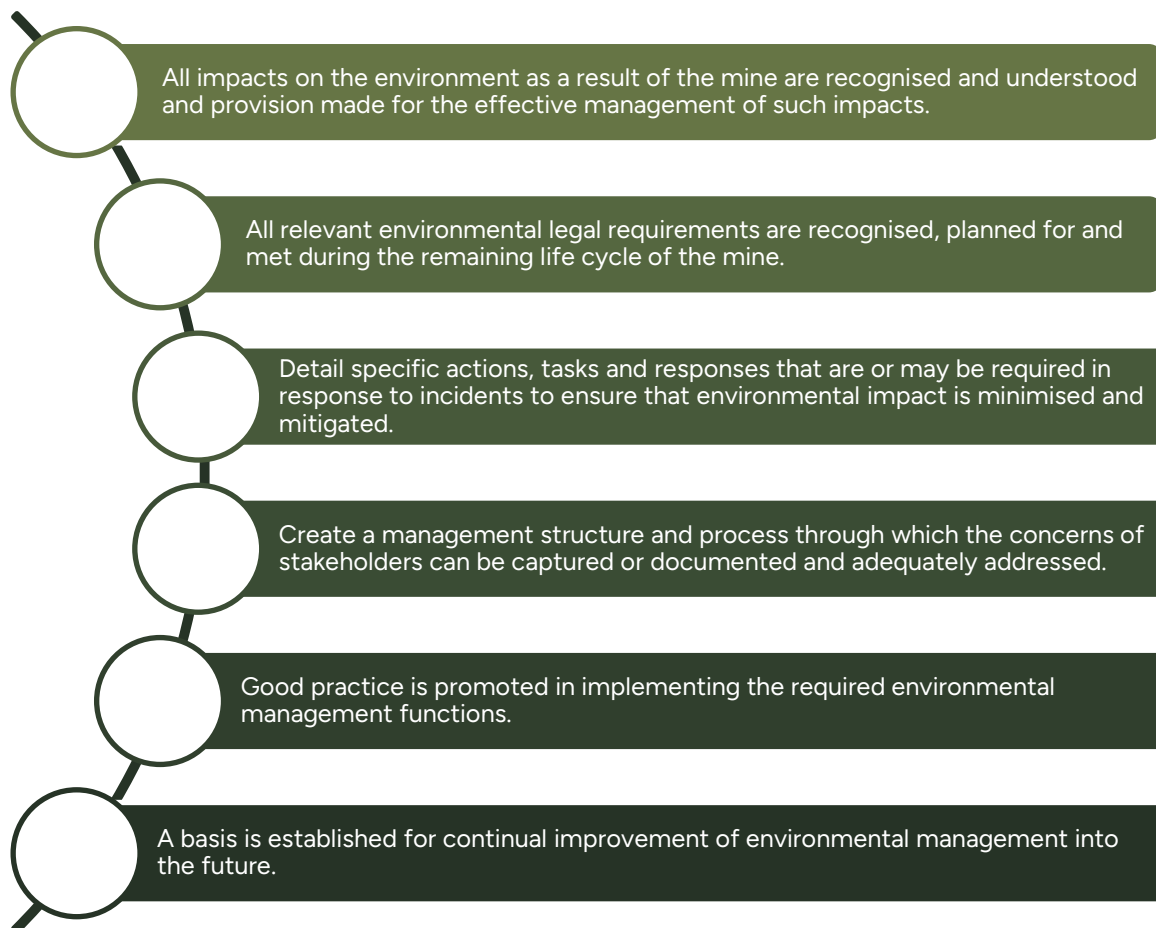


Figure 1-3: Ownership of Tembo Nickel Mining Company and Tembo Nickel Refining Company



1.5 Purpose of the Environmental and Social Management Plan

The purpose of an ESMP is to outline how the environmental and social impacts identified during the ESIA process will be managed, mitigated, and monitored throughout the lifecycle of a project. The ESMP is a practical tool that guides project developers, operators, and stakeholders in ensuring that the project's adverse impacts are minimised and positive outcomes are enhanced. The purpose of the ESMP is as follows:



2. Legal Framework, Guidelines, and International Requirements

2.1 International Finance Corporation Performance Standards

The International Finance Corporation (IFC)² is part of the World Bank Group but has its own Environmental and Social Sustainability Policy. The IFC Sustainability Framework articulates a strategic commitment to sustainable development and is integral to risk management. It promotes sound environmental and social practices, encourages transparency and accountability, and positively impacts development.

The IFC has Performance Standards, a set of eight standards (published in 2012) that outline the requirements that projects and companies must meet to be eligible for financing. The IFC's Performance Standards have become globally recognised as a benchmark for environmental and social impact management in the private sector. Table 2-1 provides a summary of the eight (8) IFC PSs and their applicability to this ESMP.

The IFC also provides a range of Good Practice Handbooks and Notes to support private sector businesses and financial institutions in meeting the environmental, social, and governance standards required for sustainable development. These resources offer guidance on implementing best practices across various industries and projects. Table 2-2 provides a summary of the Good Practice Handbooks and Notes which were considered in the compilation of this ESMP.

² International Finance Corporation. (2012). Policy on Environmental and Social Sustainability. Washington, D.C.: IFC. Retrieved from <https://www.ifc.org/en/insights-reports/2012/publications-policy-sustainability-2012>
IFC



Table 2-1: Summary of International Finance Corporation Performance Standards and relevant to this ESMP

IFC PS	Purpose	Relevance to this ESMP
<p>Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts</p>	<p>Performance Standard 1 emphasises the importance of managing environmental and social performance throughout a project's lifecycle. It advocates for an effective Environmental and Social Management System (ESMS), which is a dynamic and continuous process supported by management and involving engagement with workers, local communities directly affected by the project, and other stakeholders. The ESMS follows a "plan, do, check, and act" methodology to systematically manage environmental and social risks and impacts.</p>	<ul style="list-style-type: none"> • Adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimise, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment. • Promote improved environmental and social performance through effective management systems. • Ensure that grievances from affected communities and external communications from other stakeholders are handled appropriately. • Promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them.
<p>Performance Standard 2: Labour and Working Conditions</p>	<p>Performance Standard 2 recognises that the protection of the fundamental rights of workers should accompany the pursuit of economic growth through employment creation and income generation. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in a company's sustainability. Failure to establish and foster a sound worker-management relationship can undermine worker commitment and retention and can jeopardise a project. Conversely, through a constructive worker-management relationship, and by treating the workers fairly and providing them with safe and healthy working conditions, clients may create tangible benefits, such as enhancement of the efficiency and productivity of their operations. These standards set expectations for global companies to protect workers' health, well-being and fundamental rights and to ensure their workforces are free from forced labour, child labour and human trafficking.</p>	<ul style="list-style-type: none"> • Promote fair treatment, non-discrimination and equal opportunity for workers. • Establish, maintain and improve the worker-management relationship. • Promote compliance with national employment and labour laws. • Protect workers, including vulnerable categories such as children, migrant workers, workers engaged by third parties, and workers in the supply chain. • Promote safe and healthy working conditions and workers' health and avoid using forced labour.



IFC PS	Purpose	Relevance to this ESMP
<p>Performance Standard 3: Resource Efficiency and Pollution Prevention</p>	<p>Performance Standard 3 recognises that economic growth and urbanisation often lead to increased pollution and consumption of finite resources, posing threats to people and the environment locally, regionally, and globally. It acknowledges the global consensus on the dangers of current and projected greenhouse gas (GHG) concentrations to public health and welfare. Performance Standard 3 highlights that efficient resource use, pollution prevention, and GHG emission mitigation technologies and practices are increasingly accessible and achievable worldwide. These practices often use continuous improvement methodologies familiar to many industries. Performance Standard 3 outlines a project-level approach to resource efficiency and pollution prevention aligned with international technologies and practices. It also encourages private sector companies to adopt these technologies and practices as long as they are feasible within the context of the project and rely on commercially available skills and resources.</p>	<ul style="list-style-type: none"> • Avoid or minimise pollution from project activities. • Implement strategies to reduce GHG emissions through energy efficiency and other mitigation measures. • Regularly monitor and report GHG emissions to ensure compliance with international standards and local regulations. • Adopt waste minimisation practices, including the reuse and recycling of materials, to reduce the project's waste volume. • Implement waste management plans that prioritise safe disposal and the reduction of hazardous waste. • Promote using low-carbon technologies to reduce the project's carbon footprint. • Conduct regular audits of waste and emissions to identify opportunities for improvement and ensure continuous compliance. • Engage with stakeholders to promote awareness and transparency regarding GHG and waste management efforts.
<p>Performance Standard 4: Community Health, Safety, and Security</p>	<p>Performance Standard 4 recognises that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities already subjected to climate change impacts may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimise the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.</p>	<ul style="list-style-type: none"> • To anticipate and avoid adverse impacts on the health and safety of the Affected Communities during the project life from both routine and non-routine circumstances. • To ensure that personnel and property are safeguarded in accordance with relevant human rights principles and in a manner that avoids or minimises risks to the Affected Communities.



IFC PS	Purpose	Relevance to this ESMP
<p>Performance Standard 5: Land Acquisition and Involuntary Resettlement</p>	<p>Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can adversely impact communities and the people who use this land.</p>	<ul style="list-style-type: none"> • Avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. • Avoid forced eviction. • Anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected. • Improve or restore the livelihoods and standards of living of displaced persons.
<p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</p>	<p>Performance Standard 6 emphasises the importance of protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources for sustainable development. Guided by the Convention on Biological Diversity defines biodiversity as the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems.</p> <p>Ecosystem services, the benefits people and businesses derive from ecosystems, are categorised into four types: provisioning services (products obtained from ecosystems), regulating services (benefits from ecosystem process regulation), cultural services (nonmaterial benefits from ecosystems), and supporting services (natural processes that maintain other services).</p> <p>Since ecosystem services are often underpinned by biodiversity, impacts on biodiversity can adversely affect these services. This Performance Standard outlines how clients can sustainably manage and</p>	<ul style="list-style-type: none"> • Protect and conserve biodiversity. • Maintain the benefits from ecosystem services. • Promote the sustainable management of living natural resources by adopting practices that integrate conservation needs and development priorities.



IFC PS	Purpose	Relevance to this ESMP
	mitigate impacts on biodiversity and ecosystem services throughout the project's lifecycle.	
Performance Standard 7: Indigenous People	<p>Performance Standard 7 seeks to ensure that projects respect and promote Indigenous Peoples' rights, culture, and traditions and recognise their distinct circumstances and vulnerabilities. This standard fosters respect for Indigenous Peoples' human rights, aspirations, livelihoods, and natural resources. It encourages project proponents to engage with Indigenous Peoples meaningfully and consider their unique conditions significantly when projects impact their lands, resources, or cultural heritage.</p> <p>The standard ensures projects are developed inclusively, avoids adverse impacts on Indigenous Peoples, and promotes sustainable and culturally appropriate benefits. Where adverse impacts are unavoidable, Performance Standard 7 provides guidance for obtaining Free, Prior, and Informed Consent from Indigenous Peoples, outlining measures for mitigation and compensation to support their well-being and preserve their cultural heritage.</p>	<ul style="list-style-type: none"> • Ensuring projects are inclusive and respect the rights and dignity of Indigenous Peoples. • Avoiding adverse impacts on Indigenous Peoples, and where avoidance is not possible, ensuring appropriate mitigation and compensation measures. • Obtaining Free, Prior, and Informed Consent where required, particularly in cases of displacement, significant impact on resources, or impacts on cultural heritage. • Promoting culturally appropriate and sustainable benefits for Indigenous Peoples.
Performance Standard 8: Cultural Heritage	<p>Performance Standard 8 recognises the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard ensures that clients protect cultural heritage during their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.</p>	<ul style="list-style-type: none"> • To protect cultural heritage from the adverse impacts of project activities and support its preservation. • To promote the equitable sharing of benefits from the use of cultural heritage.



Table 2-2: Relevant IFC Good Practice Handbooks and Notes

Legislation	Objectives	Relevance to this report
<p>IFC Good Practice Note Addressing Grievances from Project-Affected Communities</p>	<p>Companies across sectors and through all stages of project development can benefit from understanding and addressing village concerns and complaints. This Good Practice Note guides basic principles and process steps that organisations should consider when creating and implementing grievance mechanisms. Together, these principles and steps constitute a baseline set of considerations and good strategies for designing and implementing procedures appropriate to the project scale and impact.</p>	<p>The guideline was considered in developing the grievance mechanism for Kabanga Mine.</p>
<p>IFC Environmental and Social Management System Implementation Handbook</p>	<p>The handbook provides practical guidance on establishing and implementing ESMS that meet IFC's Performance Standards. It outlines the processes, procedures, and tools to manage environmental and social risks throughout the project lifecycle effectively.</p>	<p>This handbook was considered in developing this ESMP and took cognisance of guidelines pertaining to organisational capacity and competency, emergency preparedness and response, the development of a Stakeholder Engagement Plan (SEP), external communication and grievance mechanisms, monitoring and reporting.</p>
<p>IFC Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets</p>	<p>This handbook guides the assessment and management of cumulative impacts, which are the combined impacts of multiple projects and activities in a given area. It emphasises the importance of considering these impacts early in the project planning to prevent significant environmental and social consequences.</p>	<p>This handbook was considered when identifying mitigation measures to manage cumulative impacts.</p>
<p>IFC Good Practice Note: Addressing Gender-Based Violence and Harassment in Projects Supported by the IFC</p>	<p>The objective of the IFC Good Practice Note: Addressing Gender-Based Violence and Harassment (GBVH) in Projects Supported by the IFC is to provide practical guidance to IFC clients on how to identify, prevent, and respond to risks of GBVH—including sexual exploitation, abuse, and harassment (SEAH)—within the context of private sector projects.</p>	<p>This handbook was considered when identifying mitigation measures for GBVH. The measures identified are included in Section 4.3.4.</p>



2.2 World Bank Group Environment, Health the Safety Guidelines

The World Bank Group Environmental, Health and Safety (EHS Guidelines) are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) applicable to Performance Standard 3 (Resource Efficiency and Pollution Prevention). The EHS Guidelines provide a series of performance benchmarks that can be used during the assessment process, representing, as they do, performance that is typically acceptable to the IFC.

The General EHS Guidelines apply to all mining sectors and contain information on cross-cutting environmental, health, and safety issues and performance prescriptions. Various specialist teams considered the guidelines when preparing their reports.

The World Bank Group EHS Guidelines include industry-specific guidelines for the General EHS Guideline documents. The EHS Guidelines for Mining provide a comprehensive framework for maintaining environmental, health, and safety standards in mining operations. Applicable to various mining activities, including exploration, development, extraction, and closure, these guidelines are intended for mining companies' use to promote best practices and mitigate potential negative impacts.

The primary purpose of these guidelines is to safeguard the environment, protect public health, and ensure the safety of workers and surrounding communities. They aim to minimise the environmental footprint of mining activities through practical resource and waste management, emission control, and pollution prevention. This includes managing water use and quality, controlling air emissions, and handling hazardous materials responsibly. Additionally, the guidelines emphasise health and safety in mining operations by providing detailed recommendations for managing occupational health risks, ensuring safe working conditions, and implementing emergency preparedness and response plans. They also stress the need for continuous monitoring and assessment to ensure regulatory compliance and adapt to emerging challenges in the mining sector.

The following EHS Guidelines were taken into account during the preparation of this ESMP:

- EHS Guidelines Environmental – Air Emissions and Ambient Air Quality (IFCa, 2007)
- EHS Guidelines Environmental – Wastewater and Ambient Water Quality (IFC(b), 2007)
- EHS Guidelines Environmental – Noise Management (IFC(c), 2007)
- EHS Guidelines – Community Health and Safety (IFC(d), 2007)
- EHS Guidelines – Construction and Decommissioning (IFC(e), 2007)
- EHS Guidelines Environmental – Water Conservation (IFC(f), 2007)
- EHS Guidelines – Mining (IFC(g), 2007)

2.3 Equator Principles

The Equator Principles (EP)³ is a risk management framework financial institutions adopt for determining, assessing and managing environmental and social risk in projects. The EPs serve to provide a minimum standard for due diligence assessments to support responsible

³ Equator Principles Association. (2020). The Equator Principles: EP4 – June 2020. Retrieved from <https://equator-principles.com/wp-content/uploads/2020/05/The-Equator-Principles-July-2020-v2.pdf>



decision-making for financial institutions. The EPs have been adopted by 84 financial institutions in 35 countries, including some 70% of international project finance in emerging markets. Financial Institutions that have adopted the EP are referred to as Equator Principles Financial Institutions (EPFIs). The EPFI commits to implementing the EP and will not finance clients who are unwilling or unable to comply with the EP. The principles themselves are listed below and briefly described.

Principle 4 of the Equator Principles mandates that the client must establish and maintain an ESMS and an ESMP to ensure compliance with relevant environmental and social standards. The ESMS serves as an overarching framework that guides the ongoing management of environmental and social risks throughout the project's lifecycle. At the same time, the ESMP outlines specific actions, mitigation measures, and monitoring activities required to address identified impacts. Additionally, an Equator Principles Action Plan may be developed to identify any gaps in compliance with the Equator Principles and outline commitments to address these gaps. However, developing a comprehensive ESMS typically extends beyond the scope of an ESIA and ESMP, as it requires detailed planning and implementation that aligns with the project's operational phase. **This ESMP, therefore, serves as a foundational framework that informs the later development and implementation of the ESMS, ensuring that the project's environmental and social management is robust and comprehensive.**

Principle 5 of the Equator Principles emphasises the importance of establishing and maintaining effective stakeholder engagement in a structured and culturally appropriate manner throughout the project's lifecycle. This engagement process must be tailored to reflect the specific impacts of the project, as well as the language preferences, decision-making processes, and needs of disadvantaged and vulnerable groups. Consultations must be conducted free from external manipulation, interference, coercion, and intimidation. Furthermore, appropriate assessment documentation should be made readily available to stakeholders in their local language and in a culturally appropriate format. The outcomes of the stakeholder engagement process must be documented and addressed, with consultations occurring early in the assessment process and maintained throughout the project. **This ESMP outlines the framework for developing the Stakeholder Engagement Plan (SEP) for the Kabanga Mine.**

Principle 6 of the Equator Principles requires that the client establish a grievance mechanism to receive and facilitate the resolution of concerns and grievances related to the project. This mechanism should be accessible to all stakeholders and must not impede their access to judicial or administrative remedies. Additionally, stakeholders must be informed about the existence and function of this grievance mechanism during the stakeholder engagement process. The aim is to ensure that project-affected communities have a formal avenue to express concerns and seek redress without fear of retaliation or obstruction. **In the context of this ESMP, the requirements for developing a comprehensive grievance mechanism are provided.**

2.4 International Council on Mining and Metals

The International Council on Mining and Metals (ICMM) is a global industry association that brings together leading mining and metals companies to promote sustainable development in the sector. Established in 2001, ICMM works to improve environmental, social, and governance (ESG) performance through the development of good practice guidance, performance expectations, and reporting frameworks. ICMM member companies commit to implementing its Mining Principles, which align with global standards such as the UN Sustainable Development Goals (SDGs), OECD Guidelines, and IFC Performance Standards.



Water management is a critical ESG issue in the mining industry, given the sector's reliance on water resources and the potential for adverse impacts on local communities and ecosystems. Recognising this, ICMM developed the Water Reporting: Good Practice Guide, which provides a globally consistent approach to measuring and disclosing water-related performance.

The Water Reporting: Good Practice Guide (2nd edition, 2021) (ICCM, 2021) was developed to improve the quality, comparability, and transparency of water-related disclosures across the mining and metals sector. It supports companies in aligning their water reporting with stakeholder expectations and international best practice.

The guide provides:

- Standardised water accounting metrics, including water withdrawal, consumption, discharge, and recycling.
- A framework for context-based water risk assessment, incorporating local water availability, quality, and competing uses.
- Guidance on data disaggregation by source type (e.g., surface water, groundwater, third-party supply) and water quality (e.g., potable, non-potable, brackish).
- A focus on performance trends, targets, and stakeholder engagement.

TNCL is committed to ensuring the ICMM guidance on Water Reporting is implemented.

2.5 Tanzanian National Legal Framework, Guidelines and Policies

Tanzania has established a comprehensive legal and institutional framework to regulate environmental and social impacts arising from development projects. The country's environmental legislation aims to balance economic growth with sustainable development by requiring project proponents to implement mitigation measures, conduct impact assessments, and ensure continuous environmental monitoring. Key laws and policies mandate Environmental Impact Assessments (EIAs), Environmental Management Plans (EMPs), pollution control, biodiversity conservation, and occupational health and safety measures. Compliance with these regulations minimises negative environmental and social impacts while promoting responsible resource management. The following table outlines the key Tanzanian legislation relevant to impact management, mitigation, and monitoring for development projects.



Table 2-3: Tanzanian National Legal Framework, Guidelines and Policies

Legislation	Objectives	Relevance to this project
<p>The National Environmental Policy (NEP) (2021) (United Republic of Tanzania, 2021)</p>	<p>The National Environmental Policy (NEP) highlights critical environmental issues requiring urgent attention, including land degradation, deforestation, pollution, and inadequate waste management. It mandates Environmental EIAs for major projects, especially in ecologically sensitive areas, to balance development needs with environmental sustainability. The policy stresses integrating environmental considerations into planning and decision-making processes rather than treating them as afterthoughts. It also emphasises public involvement in EIAs and Strategic Environmental Assessments, reflecting a commitment to sustainable development in Tanzania.</p>	<p>TNCL will consider measures to combat environmental pollution during all project phases to ensure efficient production in a well-managed and sustainable environment.</p>
<p>The Environmental Management Act, No. 20 of 2004 (United Republic of Tanzania, 2004)</p>	<p>The Act establishes legal and institutional frameworks for sustainable environmental management. It requires EIAs and EMPs for projects likely to cause significant environmental impacts. The Act also emphasises the need for pollution control, waste management, and compliance monitoring.</p>	<p>This report outlines the mitigation measures required to manage the identified environmental and social impacts associated with the proposed Project throughout its life cycle. It also details compliance monitoring and reporting throughout the project lifecycle.</p>
<p>The Environmental Impact Assessment and Audit Regulations, 2005 (United Republic of Tanzania, 2005)</p>	<p>It provides detailed procedures for conducting EIAs, including public consultation requirements, impact mitigation, and environmental monitoring. It also mandates regular environmental audits to ensure compliance.</p>	<p>The report outlines mitigation measures and environmental monitoring to comply with Tanzanian regulations.</p>
<p>The Mining Act, No. 14 of 2010 (as amended in 2017) (United Republic of Tanzania, 2010)</p>	<p>Regulates mining activities, including environmental and social obligations for mining companies. Requires mine closure and rehabilitation plans, along with environmental monitoring and reporting.</p>	<p>This report outlines TNCL’s roles, responsibilities, and obligations in managing environmental and social impacts. Compliance monitoring and reporting throughout the project lifecycle are also detailed in this report.</p>



Legislation	Objectives	Relevance to this project
<p>The Occupational Health and Safety Act, No. 5 of 2003 (United Republic of Tanzania, 2003)</p>	<p>It aims to ensure safe working conditions by preventing occupational hazards, reducing workplace risks, and enforcing health and safety standards.</p>	<p>TNCL must develop a comprehensive health and safety policy outlining how to protect workers' health and safety. It must conduct ongoing risk assessments and update safety measures regularly to address new or emerging hazards during the project lifecycle. TNCL must ensure a straightforward procedure for reporting and investigating workplace accidents or near-miss incidents. All accidents should be recorded and analysed to prevent recurrence. TNCL must establish and maintain emergency response plans, including evacuation procedures, fire drills, and responses to medical emergencies.</p>
<p>The Water Resources Management Act, No. 11 of 2009 (United Republic of Tanzania, 2009)</p>	<p>It provides for the sustainable management and conservation of water resources and regulates activities that may affect water quality and availability. It requires permits for water abstraction and effluent discharge.</p>	<p>TNCL must obtain necessary permits for water, implement measures to prevent water pollution and monitor water quality regularly.</p>
<p>The Water Supply and Sanitation Act, No.12 of 2009 (United Republic of Tanzania, 2009)</p>	<p>Regulates the provision and management of water supply and sanitation services to ensure clean and safe water access. Establishes measures to prevent water contamination and promote proper sanitation.</p>	<p>TNCL must ensure proper wastewater management measures, comply with sanitation standards, and prevent contamination of water sources through effective pollution control measures. In addition, TNCL needs to prepare an emergency preparedness plan for emergencies, such as water supply interruptions or contamination incidents.</p>
<p>The Wildlife Conservation Act, No. 5 of 2009 (United Republic of Tanzania(b), 2009)</p>	<p>It aims to protect wildlife and biodiversity, particularly in sensitive ecological areas. It regulates activities that may impact protected species or habitats.</p>	<p>Biodiversity monitoring will need to form part of the mitigation measures for the proposed Project.</p>
<p>The Land Act, No. 4 of 1999 and the Village Land Act, No. 5 of 1999 (United Republic of Tanzania, 1999)</p>	<p>Governs land tenure, acquisition, and use. Requires fair compensation and resettlement plans for affected communities.</p>	<p>TNCL must comply with land acquisition regulations, ensure fair compensation, and implement social impact mitigation measures for affected communities.</p>



Legislation	Objectives	Relevance to this project
<p>The Forest Act, No. 14 of 2002 (United Republic of Tanzania, 2002)</p>	<p>It regulates sustainable forest management, including conservation, afforestation, and restrictions on deforestation. It requires permits for logging and mandates reforestation efforts.</p>	<p>TNCL must minimise deforestation, acquire necessary permits for land clearing, and implement reforestation programs to mitigate impacts on forest resources.</p>
<p>Municipal and Industrial Wastewaters – General Tolerance Limits (Tanzania Bureau of Standards. , 2006)</p>	<p>The main objective of TZS 860:2006 is to safeguard environmental and public health by setting permissible limits for various pollutants in wastewater discharges. Specifically, the standard aims to:</p> <ul style="list-style-type: none"> • Prevent pollution of surface and groundwater resources by controlling the quality of effluents from municipal and industrial sources. • Protect aquatic ecosystems by limiting the introduction of harmful substances that can degrade water quality and harm aquatic life. • Ensure public health safety by minimizing exposure to hazardous substances through contaminated water sources. • Promote sustainable industrial and municipal practices by encouraging the treatment of wastewater to acceptable standards before discharge. 	<p>TNCL must ensure that any water discharged to the receiving environment meets the targets set in the Municipal and Industrial Wastewaters – General Tolerance Limits</p>
<p>The Mining (Environmental Protection for Small Scale Mining) Regulations, 2010, made under The Mining Act, 1998 (as amended) (United Republic of Tanzania, 2010)</p>	<p>The 5th Schedule, Regulation 12 of the Mining Act, 1998, establishes environmental protection standards for small-scale mining operations in Tanzania. Its primary objective is to ensure that mining activities are conducted in an environmentally responsible manner, minimizing adverse impacts on natural resources and public health.</p>	<p>TNCL must ensure that the water monitoring programmes makes provision for compliance with targets set out in these Regulations.</p>
<p>Drinking (potable) water – Specification (TZS 789:2008) (Tanzania Bureau of Standards, 2008)</p>	<p>TZS 789:2008 specifies the quality requirements for potable water in Tanzania. The standard aims to ensure that water intended for human consumption is safe, palatable, and free from contaminants that could pose health risks. It serves as a benchmark for water suppliers</p>	<p>TNCL must ensure that the water monitoring programme compares results to the Drinking (potable) water – Specification (TZS 789:2008)</p>



Legislation	Objectives	Relevance to this project
	and regulators to maintain and monitor drinking water quality across the country.	



3. Environmental and Social Management and Framework

3.1 Environmental Management Philosophy

The environmental management philosophy consists of five broad components (Figure 3-1).



Figure 3-1: Environmental Management Philosophy

3.1.1 Environmental and Social Policy

IFC Performance Standard 1 requires a developer to establish an overarching policy defining the environmental and social (E&S) objectives and principles that guide the project to achieve sound environmental and social performance. The policy provides a framework for the environmental and social assessment and management process. It specifies that the project will comply with the applicable laws and regulations of the jurisdictions in which it is being undertaken, including those laws implementing host country obligations under international law. Under some circumstances, clients may also subscribe to other internationally recognised standards, certification schemes, or codes of practice, which should also be included in the policy. The policy will indicate who, within the client’s organisation, will ensure conformance with the policy and be responsible for its execution. The developer will also communicate the policy to all levels of its organisation.

TNCL has an existing E&S policy in place. In this regard, TNCL is committed to the goal of sustainable development and is working towards being a producer of sustainably sourced Class 1 nickel, copper and cobalt through processing technology which reduces emissions of carbon dioxide and sulphur dioxide to the environment.

Tembo Nickel believes that operating to leading standards of environmental sustainability by reducing our environmental footprint and impact is an integral part of our corporate responsibility. This approach enables us to: Maintain our social license to operate, attract



and retain the best people, identify, and act upon business opportunities, and optimize our management of risks.

TNCL values are based on SAFETY, RESPECT, HONESTY, and INTEGRITY.

TNCL recognises that environmental excellence is an integral part of any efficient, successful, and sustainable business. We are aware that our activities may cause a negative impact to the living environment and therefore Tembo Nickel and all its management, will work to respect and protect the environment before, during and after our operations. We will strive for minimal environmental footprint and to be a sustainable operation.

To achieve this TNCL will:

- Establish, document, and maintain an environmental management system with clearly defined objectives and targets.
- Ensure that the Environmental and Social Impact Statement commitments and principles are adhered to throughout the project's engineering, construction and start-up phases and closure.
- Minimise land, air and water impacts and conserve biodiversity through systematic environmental programs based on environmental risk minimization and adoption during normal, abnormal, and emergency conditions.
- Integrate environmental issues into the decision-making process of all aspects of exploration, mine planning, development, operation, and closure, respecting the heritage and cultural values of the TNCL community.
- Comply with all applicable laws, regulations, and international standards by regularly monitoring and auditing our performance and maintain an environmental management system based on continuous improvement.
- Involve, educate, and train our employees, contractors, partners and neighbouring communities in all aspects of the environment, monitoring and its management.
- Work with government and local authorities together with environmental-focused groups to develop a mutual understanding of the environmental challenges and their best solutions.
- Progressively rehabilitate all the disturbed area to minimise the mine footprint.
- Empower our employees to demonstrate their commitment to sustainability and respect of the environment daily through their actions and involvement in their work.

While TNCL has an E&S policy in place, the policy must be updated to:

- Provide a framework for the E&S policy assessment and management process, and specify that the project (or business activities, as appropriate) will comply with the applicable laws and regulations of the jurisdictions in which it is being undertaken, including those laws implementing host country obligations under international law.
- Indicating who, within the TNCLs organisation, will ensure conformance with the policy and be responsible for its execution (with reference to an appropriate responsible government agency or third party, as necessary).
- Ensuring communicating the policy to all levels of the company.
- Update the overarching E&S policy that forms a Sustainable Framework for TNCL along with the development and implementation a formal ESMS.



- The E&S policy must include objectives to cover (in addition to general E&S and ISO14001) also human resources (workforce), ILO, gender equality, health and safety (communities and workforce), quality of technical aspects, third parties / contractors and supply chain.

3.1.2 Planning

The planning phase of an ESMP is a critical component of ensuring that a project is executed in a manner that responsibly addresses potential adverse environmental, cultural and social impacts. This phase is about compliance with regulatory requirements and aligning the project with international best practices, such as the IFC Performance Standards. The planning process involves a systematic approach to setting clear objectives, developing mitigation measures, and establishing performance indicators. These elements work together to guide the implementation and monitoring of the project, ensuring that E&S risks are effectively managed throughout the project's lifecycle. The outputs of the planning phase of this ESMP are included in Section 4.

3.1.2.1 Setting Objectives

The first step of the planning phase lies in developing objectives for each of the biophysical, cultural, and social impacts identified during the ESIA. This process, known as objective-based planning, is essential for translating the project's broad E&S goals into specific, actionable outcomes. Objectives are designed to be outcome-focused, meaning they are intended to achieve specific, measurable results that directly address the impacts identified in the ESIA. For example, if the ESIA highlights potential impacts on local water quality, an objective might be to ensure that water quality remains within safe limits for human consumption and ecosystem health throughout the project's operation. Each objective serves as a clear statement of what the Project aims to achieve in terms of E&S performance.

3.1.2.2 Setting Indicators and Targets

Once objectives are established, the next step is to define indicators and set targets.

Indicators: Indicators are quantifiable metrics that clearly measure progress toward meeting each objective. They are chosen based on their ability to reliably track performance and provide early warning signs if objectives are not being met. For instance, if an objective is to maintain air quality standards, an indicator might be the concentration of specific pollutants in the air, measured at regular intervals.

Targets: Targets are specific benchmarks set for each indicator. They represent the desired level of performance and serve as a benchmark against which actual performance can be compared. Targets should be SMART—Specific, Measurable, Achievable, Relevant, and Time-bound—to ensure they are realistic and aligned with the overall project goals. For example, a target might be to reduce the emission of a particular pollutant by 20% within the first year of operation.

Together, objectives, indicators, and targets form a comprehensive framework for monitoring and evaluating the effectiveness of the E&S management strategies implemented as part of the project. This framework allows for continuous improvement by providing a basis for making informed adjustments to the ESMS as the Project progresses.

3.1.2.3 Mitigation Measures

Mitigation Measures are the practical steps taken to address the impacts identified in the ESIA, structured around the mitigation hierarchy. This hierarchy provides a sequential



approach to managing E&S impacts, prioritising the most effective actions to minimise harm. The mitigation hierarchy includes the following:

- **Avoidance:** The first step in the hierarchy is to avoid adverse impacts altogether wherever possible. This might involve altering the project design, changing the location of certain activities, or adopting alternative technologies that have a lower environmental footprint.
- **Minimisation:** If avoidance is not feasible, mitigation measures to reduce and/or manage impacts on the biophysical, cultural, and socio-economic environments must be identified and implemented throughout a project's life cycle.
- **Restoration/Rehabilitation:** Most rehabilitation requirements are linked to the rehabilitation of unavoidable impacts. Restoration/rehabilitation refers to measures to return impacted areas to a near-natural state during the project life cycle (concurrent rehabilitation) or at closure.
- **Offset/Compensation:** If impacts cannot be avoided, minimised, or fully restored, compensatory measures are implemented as a last resort to offset the residual impacts. This could involve creating new habitats elsewhere, providing alternative livelihoods to affected communities, or investing in conservation projects that provide broader environmental benefits.

By following the mitigation hierarchy, the ESMP ensures that E&S impacts are managed in a structured, prioritised way, emphasising avoiding and minimising harm before considering restoration or compensation. This approach aligns with IFC guidelines and demonstrates a commitment to sustainable development and responsible project management. The mitigation measures that have been identified for the Kabanga Mine are included in Section 4.

3.1.2.4 Management Plans

One key output of mitigation measures in E&S management is the development of comprehensive site-specific and phase-specific management plans. These plans integrate various mitigation measures into a structured framework and provide a roadmap for their implementation. Where management plans are required, these have been developed and included as appendices to this report. Section 7.1 outlines which management plans still need to be developed by TNCL. The management plans will interface with the broader ESMS to ensure continuous improvement, compliance tracking, corrective actions, and adaptive management across the Project lifecycle.

3.1.3 Implementation and Operation

Implementation and operation serve to define how the mitigation measures will be implemented (Refer to Section 5). Roles, responsibilities and training play an essential role in ensuring implementation.

3.1.3.1 Roles and Responsibilities

The first and most important mechanism for implementing environmental management requirements is clearly articulating the roles and responsibilities with respect to the various environmental management requirements. It is important to note that roles and responsibilities include dedicated environmental management roles and establishing roles and responsibilities for all company personnel.



A key element of any large-scale project is ensuring that employees on-site understand and adequately implement the environmental management requirements as part of their contracted activities.

3.1.3.2 Training

Together with defining the roles and responsibilities, it is necessary to develop an overarching training programme that will serve to equip project personnel to fulfil their roles and responsibilities whilst both sustaining and then advancing the overall levels of capability. Training may, and should, extend across awareness building, dedicated task-specific training, 'out of the box' training that serves to find new and innovative ways of improving performance and training that ensures that personnel who are required to fulfil an environmental management function understand the requirement, believe in the importance of the requirement and have the necessary skills and capacity to fulfil that function.

3.1.4 Checking and Corrective Action

3.1.4.1 Monitoring

Checking and corrective actions are critical components that ensure the environmental policy's objectives are met. Checking involves regular inspections, audits, and assessments to verify that all environmental management activities are implemented according to the ESMP and relevant legislation. If any discrepancies or non-compliance issues are identified, corrective actions are initiated to rectify these issues. Corrective actions are not only about fixing problems but also about preventing them in the future. Monitoring is intrinsically linked to the checking and corrective action processes. It involves systematically observing and measuring environmental parameters to track the impact of the organisation's activities on the environment. The monitoring programme is outlined in Section 5.

3.1.4.2 Reporting

The findings of all of the above need to be structured into instructive reporting that provides information to all required parties on environmental management performance, together with clearly defined corrective action where this is seen to be required. All of the above must be conducted systematically, continuously, and preferably independently of the activity or facility. Records of the information must be maintained and protected, but the information itself must be readily and easily accessible on an ongoing basis. Within the reporting structure, it is necessary to create a review function that continuously assesses the reporting and prescribes the necessary corrective action. Reporting must also include providing information on environmental performance to external stakeholders and surrounding communities.

3.1.5 Management Review

The final component of the ESMP is a formal management review (refer to Section 6.2) that takes place at defined intervals. The purpose of the management review is for senior management to review the environmental management performance and to propose measures for continual improvement. An essential part of the management review process is ensuring that senior personnel appreciate their responsibilities and obligations in ensuring that the environmental management performance is commensurate with the nature of the business and that the spirit of continual improvement is both supported and promoted.



4. Planning: Mitigation Measures, Indicators and Targets Risks

The mitigation measures outlined in the sections below provide for responsible parties and specify the timing. In this regard, the responsibility section refers to one of the following:

- **Ongoing:** This category refers to mitigation measures that must be implemented continuously throughout the project’s lifecycle. These are typically day-to-day actions or protocols that ensure consistent E&S performance, such as routine monitoring, regular maintenance, etc.
- **As Required:** These are mitigation measures that are not implemented routinely but are triggered by specific events, conditions, or thresholds. For example, certain emergency response actions or corrective measures may only be necessary in the event of a spill, equipment failure, or community complaint.
- **Specific Date/Phase:** These mitigation measures are tied to defined project milestones or timeframes. They may be required during a particular phase of the project (e.g., operation, decommissioning or closure) or must be completed by a set date or year.

For completeness purposes, mitigation measures provided in the Environmental and Social Management Plan Update (ESMPU) prepared by MTL (MTL, 2023) have been incorporated into this section (reference in blue text). Additional mitigation measures identified as part of the ESIA update, being managed by SLR, are included in “black” text.

4.1 Biophysical Environmental Mitigation Measures

4.1.1 Soils and Land Capability

The mitigation measures required to manage the loss of soil and land capability are outlined in the table below. Information provided in the section below was sourced from the ESMPU (MTL, 2023) and the SLR project team.

Table 4-1: Mitigation Measures: Loss of Soil and Land Capability Through Physical Disturbance and Contamination

Loss of Soil and Land Capability Through Physical Disturbance and Contamination	
Management Outcome	<ul style="list-style-type: none"> • Conservation of soil resources.
Performance Indicator	<ul style="list-style-type: none"> • No visible evidence of spillages and leaks. • No visible evidence of erosion and compaction. • Presence of topsoil stockpiles.



Loss of Soil and Land Capability Through Physical Disturbance and Contamination							
Performance Target	<ul style="list-style-type: none"> 100 % compliance with the Soil Management Plan. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Major spill incidents will be managed in line with the emergency response procedure outlined in Section 8. 						
Monitoring Programme	<ul style="list-style-type: none"> Not applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	CI		
<p>Where Project activities require the disturbance of soils, TNCL must ensure that soil resources are carefully stripped, stored, maintained, and ultimately replaced in accordance with an approved Soil Management Plan (SMP). The purpose of the SMP is to protect the integrity of soil resources, minimise degradation, and ensure that disturbed areas can be effectively rehabilitated to restore ecological functionality and land use potential. This commitment is consistent with the requirements of IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources, as well as relevant national legislation and international best practices for soil conservation and land rehabilitation. The Soil Management Plan must, at a minimum, include the following components:</p> <ul style="list-style-type: none"> Purpose and Scope: Provide an overview of the Project activities that will involve soil disturbance and clearly state the objectives of the Soil Management Plan, which are to preserve soil quality, ensure sustainable land rehabilitation, and prevent environmental degradation. Regulatory and Standards Framework: Outline the applicable local, national, and international regulations and standards governing soil management, including Tanzanian environmental regulations, IFC Performance Standards, ISO 14001 requirements for environmental management systems, and Good International Industry Practice (GIIP) guidelines. Soil Stripping Procedures: Identify and delineate areas where soil stripping is required. Specify stripping depths and criteria (e.g., minimum topsoil layer thickness to be stripped) based on soil surveys and soil profile assessments. Implement stripping methods that minimise mixing of topsoil with subsoil and prevent soil contamination. Soil Stockpiling and Storage Requirements: Identify and map designated soil stockpile areas located as close as practical to the source areas to minimise transport distances and soil handling. Set management specifications for stockpiles, including: <ul style="list-style-type: none"> Maximum stockpile height and slope angles to minimise erosion and compaction. Vegetation establishment on stockpiles to stabilise soil and reduce dust generation and erosion. 	✓	✓	✓	✓		Environmental manager	Established prior to construction and implemented in all project phases prior to closure.



Loss of Soil and Land Capability Through Physical Disturbance and Contamination							
<ul style="list-style-type: none"> ○ Installation of stormwater controls, such as berms, silt fences, and drainage channels, to protect stockpiles from runoff and erosion. ○ Restriction of vehicle movement over topsoil stockpiles to avoid compaction and degradation. ● Soil Maintenance During Storage: Monitor soil stockpiles regularly for erosion, vegetation cover, compaction, and contamination. Implement corrective actions where issues are detected (e.g., replanting vegetation, re-shaping stockpiles, repairing stormwater controls). ● Rehabilitation and Soil Replacement Procedures: Develop detailed procedures for the use of stored soil during land rehabilitation activities, including: <ul style="list-style-type: none"> ○ Correct reapplication of topsoil to disturbed areas. ○ Application of soil amendments (e.g., fertilisers, organic matter) where necessary to restore soil fertility. ○ Stabilisation and erosion control measures to protect replaced soil until vegetation is re-established. ○ Measures to restore original land use or agreed post-mining land use. ● Monitoring and Adaptive Management: <ul style="list-style-type: none"> ○ Include soil quality monitoring programs to assess soil condition pre- and post-disturbance. ○ Review the effectiveness of soil management measures during construction, operations, and rehabilitation phases. ○ Update the Soil Management Plan as needed based on monitoring results, changes in project activities, or new regulatory requirements. ● Soil Management Procedures which must be included as part of the Soil Management Plan are included in the Table 4-2 below. 							
Limit soil disturbance to what is necessary for earthworks, ongoing activities, infrastructure footprints, and vehicle use.		✓	✓	✓		All contractors	Ongoing
Ensure vehicles and equipment are well-maintained and that servicing is carried out in dedicated areas with pollution control systems.		✓	✓	✓		All contractors	Ongoing
Pollution prevention through education and training of permanent employees and subcontractors.	✓	✓	✓	✓		Environmental Manager	Ongoing
The required steps to enable fast reaction to contain and remediate pollution incidents. In this regard, the remediation options include containment and in situ treatment or disposal of contaminated soils as hazardous waste. In-situ treatment is generally considered to be the	✓	✓	✓	✓		All contractors	As required



Loss of Soil and Land Capability Through Physical Disturbance and Contamination							
preferred option because, with successful in-situ remediation, the soil resource will be retained in the correct place. The in-situ options include bioremediation at the point of pollution or removal of soils for washing and/or bioremediation at a designated area, after which the soils are returned.							
Specifications for post-rehabilitation audit criteria to ascertain whether the remediation of any polluted soils and re-establishment of soil functionality has been successful and, if not, to recommend and implement further measures.				✓	✓	Environmental Manager	As required: Commence during decommissioning phase
The designs of any permanent and potentially polluting structures (tailings and waste rock stockpiles) will consider the requirements for long-term soil pollution prevention, land function, and confirmatory monitoring.				✓	✓	Environmental Manager	
The designs of any permanent landforms will consider the requirements for land function, long-term erosion prevention, and confirmatory monitoring as part of closure planning.				✓	✓	Environmental Manager	

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and CI (Closure phase)

Table 4-2: Soil Management Procedures

Steps	Factors to consider	Detail
Delineation of areas to be stripped		Stripping will only occur where soils are to be disturbed by activities, and where a clearly defined end rehabilitation use for the stripped soil has been identified. Soil stripping should be conducted a suitable period ahead of mining.
Reference to biodiversity action plan		All requirements for moving and preserving fauna and flora according to the Biodiversity Management Plan will be adhered to.
Stripping		As a general requirement, a minimum of 500 mm topsoil will be stripped from all mine areas. Stripping of soil from the other areas and the linear infrastructure footprints (pipelines, powerlines, and roads) can be reduced or eliminated on the advice of a suitable specialist. Consideration can also be given to GIS-based soil disturbance tracking.
Delineation of stockpiling areas	Location	Stockpiling areas will be identified in close proximity to the source of the soil to limit handling and to promote reuse of soils in the correct areas. In this regard, topsoil should only be stockpiled at the designated topsoil stockpile area.
Stockpile management	Vegetation establishment and erosion control	Rapid growth of vegetation on the topsoil stockpile will be promoted (e.g. by means of watering or fertilisation). The purpose of this exercise will be to encourage vegetation growth on soil stockpiles and to combat erosion by water and wind.
	Storm water controls	The topsoil stockpile will be established with storm water diversion berms to prevent run off erosion.
	Height and slope	The topsoil stockpile height will be controlled to avoid compaction and damage to the underlying soils. The topsoil stockpile side slopes should be flat enough to promote vegetation growth and reduce run-off related erosion.



Steps	Factors to consider	Detail
	Waste	No waste material will be placed on the soil stockpiles.
	Vehicles	Equipment movement on top of the soil stockpiles will be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank.
	Mixing	Ensure soils from different areas are not mixed in stockpiles.
	General waste and chemical management	Store all chemicals and fuel in bunded areas with 110% storage capacity of the maximum capacity of the largest tank or drum, or 25% of the total volume, whichever is larger. Store chemicals in appropriately bunded areas. Clean up spillages as soon as possible. Oil and chemical spillage control management plan will be established and implemented on site and along the access road so as to reduce the soil and water contamination which may threaten the health of the surrounding community.
Rehabilitation of disturbed land: restoration of land capability	Placement of soil	Soils will be replaced as per the stripping depth unless a soils expert advises otherwise.
	Fertilisation	Samples of stripped soils will be analysed to determine the nutrient status of the soil before rehabilitation commences. As a minimum, the following elements will be tested for cation exchange capacity, pH and phosphate. These elements provide the basis for determining the fertility of soil. Based on the analysis, fertilisers will be applied if necessary.
	Erosion control	Erosion control measures will be implemented to ensure that the topsoil is not washed away and that erosion gullies do not develop prior to vegetation establishment.
	Restore land function and capability	Where the land function and capability has not been effectively restored, apply landscape function analysis and restoration interventions. Rehabilitate disturbed areas as soon as practicable. Infrastructure not required in post-closure will be dismantled and the ground surface will be contoured to restore natural drainage, as much as practicable, and planted with native vegetation.

4.1.2 Terrestrial Biodiversity

The mitigation measures required to manage terrestrial biodiversity are outlined in Table 4-3 and Table 4-4 below. Information provided in the section below was sourced from the Terrestrial Biodiversity Assessment (STS, 2025), Critical Habitat Assessment (SLR(f), 2025) and ESMPU (MTL, 2023).

Table 4-3: Mitigation Measures: Impacts to Indigenous Flora

Impacts to Indigenous Flora	
Management Outcome	<ul style="list-style-type: none"> Conserve biodiversity and ecosystem functioning during and after project development.



Impacts to Indigenous Flora											
Performance Indicator	<ul style="list-style-type: none"> Limit the loss of medicinal plants and thatching materials due to vegetation clearing and stripping. Establishment of a community focused indigenous nursesey. Restricted movement of vehicles. Undertaking of environmental awareness programs. Protection of conservation species. 										
Performance Target	<ul style="list-style-type: none"> Number of indigenous species relocated. Number of community members involved in nursesey activities. Number of staff trained in fauna relocation and vegetation management. 										
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 										
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 										
Mitigation Measures						Project Phase*			Responsibility	Timing	
						PC	C	O			D
Minimise clearance of vegetation, with vegetation clearance to be conducted in phases.						✓	✓			Environmental Manager	Ongoing
Establish a nursery of indigenous trees for planting in areas to be rehabilitated.						✓	✓			TNCL	As required
Involve community members in the preparation of the trees to be grown at the indigenous nursery and provide them with trees to plant in their own land and farms.						✓	✓			TNCL	As required
Administer training programs with site staff, on the importance of flora and fauna conservation.						✓	✓			Environmental Manager	Ongoing
Limit vehicles and machinery movement to permitted zones only.						✓	✓			Environmental Manager	Ongoing
Implement speed control measures on the roads within the project footprint and along the mine access road.						✓	✓	✓	✓	Environmental Manager	Ongoing
Establish fire breaks within the natural forests existing in the Project area.						✓	✓	✓		Environmental Manager	Ongoing



Impacts to Indigenous Flora							
All pits are to be fenced to prevent entry of fauna.				✓	✓	Environmental Manager	Once-off
Environmental attendants will be trained on the relocation of fauna including bees, mammals, reptiles, lizards and amphibians.	✓	✓				Environmental Manager	Ongoing
All species of conservation importance will not be cleared or will be, where necessary, relocated to a similar protected habitat within the Project area. Minimum vegetation clearance will be ensured by clearing only those areas that are utilised for infrastructure construction, mining areas and waste dumping activities.	✓	✓				Environmental Manager	Ongoing
A "permit to clear" procedure will be established in order to control and monitor vegetation clearance.	✓	✓				Environmental Manager	Ongoing
Progressive rehabilitation of the WRDs and all disturbed land surfaces within the project area will be carried out ensure minimum impacts to the ecosystem function. Indigenous tree seeds will be collected and germinated in order to obtain seedlings for rehabilitation. The target for rehabilitation will be the utilisation of indigenous trees where possible.	✓			✓	✓	Environmental Manager	Ongoing
Undertake a further survey of the grassland / open savannah habitat to confirm the presence of <i>Ocimum urundense</i> in order to confirm if this habitat should be classified as a Critical Habitat or not. The survey needs to be undertaken at an optimal time of the year when the <i>Ocimum urundense</i> is likely to be in flower (August / September). The survey should be undertaken by an experienced botanist with previous experience in such habitats and with species in this genus.	✓					Experienced botanist	To be undertaken in the flowering season (August / September) prior to construction
A Biodiversity Action Plan (BAP) must be developed to provide a mitigation strategy for achieving at least a "no net loss of biodiversity" outcome, or more likely a "net biodiversity gain" outcome if critical habitat is impacted. The BAP will need to demonstrate appropriate implementation of the mitigation hierarchy, with actions that are feasible and implementable, and should provide justification for whether the residual impact will require a biodiversity offset or not. Stakeholder engagement will be an important aspect of the BAP, particularly if biodiversity offsets are going to be required. A Biodiversity Offset Management Plan (BOMP) will be required for the implementation of a biodiversity offset if this is a recommendation from the BAP. The BAP must also include the host sites.	✓					Biodiversity specialist	To be undertaken prior to construction
Develop and implement a Biodiversity Monitoring and Evaluation Plan (BMEP).	✓	✓	✓	✓		Biodiversity specialist	To be undertaken prior to construction
Prepare a detailed Buffer Zone Management Plan for areas bordering sensitive habitats to mitigate edge effects and restrict encroachment.	✓					Environmental Manager	To be undertaken



Impacts to Indigenous Flora							
							prior to construction
Define ecological performance thresholds (e.g. IAP cover, SCC sightings) to trigger adaptive management interventions.	✓					Environmental Manager	Ongoing
Involve local communities or conservation NGOs in participatory monitoring (e.g. bird counts, wetland health), enhancing transparency and stewardship.	✓					Environmental Manager	Ongoing
Strengthen environmental induction programmes to include SCC identification, biosecurity, and fire prevention.	✓					Environmental Manager	Ongoing
Construction footprints must be clearly demarcated to ensure that impacts from clearance activities remain within the authorised areas only.		✓				Environmental Manager	Ongoing
It is recommended that alternatives for the TSF and WRDs be explored, as their current positions place sensitive habitat and species at risk, both within the footprint areas and further downstream.		✓				TNCL	Ongoing
Only authorised personnel must be allowed into the Ruvubu riparian area and human presence must be kept to a minimum to protect SCC species.		✓	✓			Environmental Manager	Ongoing
All currently disturbed areas where no development is planned must be suitably rehabilitated using indigenous plant species, so as to try to minimise carrying capacity loss within the proposed project area.		✓				Environmental Manager	Ongoing
All translocation or propagation activities (successes, failures, exact number of species rescued and replanted) must be documented and monitored until it is evident that the species have successfully been established within the relocated areas. A suitably trained ECO with ecological expertise must be appointed to routinely conduct monitoring activities. Where possible, relocation of these species or propagation of these species must be done within suitable habitat outside of the project footprint areas or used in current or proposed rehabilitation areas.		✓				Environmental Manager	Ongoing
No unplanned and uncontrolled fires are allowed within the proposed project area.		✓	✓			Environmental Manager	Ongoing
No dumping of construction rubble or related waste is allowed to occur outside of designated dumping / refuse areas.		✓	✓			Environmental Manager	Ongoing
Manage the spread of alien vegetation, which may affect the remaining natural habitat within surrounding areas. Prior to the commencement of construction related activities, alien invasive species mapping will need to be undertaken within the Project Area and along the Ruvubu pipeline route to monitor the presence of alien invasive species.		✓				Environmental Manager	Ongoing
Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area.		✓	✓			Environmental Manager	Ongoing



Impacts to Indigenous Flora						
Erosion must be suitably managed to ensure that further impacts to adjacent natural areas does not take place. Erosion monitoring must be commensurate with the seasons, with more frequent monitoring taking place during the wet season when rainfall events are more frequent and subsequently decreasing in the dry months.		✓			Environmental Manager	Ongoing
No unauthorised harvesting of trees/wood resources is allowed.		✓			Environmental Manager	Ongoing
Harvesting of floral SCC by operational and maintenance personnel must be strictly prohibited, including collection of floral material by such personnel			✓		Environmental Manager	Ongoing
Monitoring programmes for floral endemic and VU species must be implemented during the operational phase and 3 years post-closure to ensure species re-establishment.			✓		Environmental Manager	Ongoing
All operational areas are to be strictly monitored for edge effects on a bi-monthly basis. Where edge effects are observed, the appropriate measures are to be taken.			✓		Environmental Manager	Ongoing
All operational footprint areas are to be monitored for erosion. Where areas of erosion are identified, they need to be appropriately rectified, notably addressing the cause of the erosion.			✓		Environmental Manager	Ongoing
Areas where no development is planned should be managed as open space areas and access by staff to these areas must be limited to what is absolutely necessary (fence patrols, monitoring activities etc). No new roads are to be developed herein.			✓		Environmental Manager	Ongoing
Rehabilitation of disturbed areas is to continue to ensure that new habitat opportunities are made available/further developed for faunal species in order to compensate for those lost.			✓		Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-4: Mitigation Measures: Impacts to Indigenous Fauna

Impacts to Indigenous Fauna	
Management Outcome	<ul style="list-style-type: none"> Safeguard faunal biodiversity by minimising disturbance and maintaining secure habitats.
Performance Indicator	<ul style="list-style-type: none"> Prevent hunting and unauthorised access to protected areas, Minimise behavioural disturbance to fauna from noise, light, and vehicle movement. Provide and maintain functional refuge areas and access to natural resources for fauna Promote awareness of fauna conservation among staff and local communities. Reduce the likelihood of faunal injury or mortality from operational activities.



Impacts to Indigenous Fauna							
Performance Target	<ul style="list-style-type: none"> Number of protected areas / refuges and their condition. Frequency of noise and light level monitoring within sensitive areas. Recorded presence or signs of fauna within protected areas. Number of training sessions conducted and attendees recorded. Number of incidents of vehicle or machinery outside designated areas. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Enforce security within the lease area to inhibit hunting activities.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Undertake faunal conservation programs and training with the surrounding communities and mining staff.	✓	✓	✓	✓		Environmental Manager	Ongoing
Establish exclusion zones to provide refuges for fauna. Ensure features such as water holes are available within the refuges.	✓	✓	✓			Environmental Manager	Ongoing
To ensure noise impacts do not disturb fauna to the extent that they experience behavioural changes, injury or even death, all noise generating activities will be mitigated to within legal noise limits. Disturbance levels will be kept to a minimum and restricted to operational areas. Strict measures for speed control will be instituted on all roads within the lease area and along the mine access road.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Should activities be undertaken at night, then lighting intensity from machinery, plant etc. should be designed to limit impacts on surrounding fauna.	✓	✓	✓			Environmental Manager	Ongoing
Enhance biodiversity of the identified secure areas.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Strict measures for speed control will be instituted on all roads within the lease area and along the mine access roads from the Kabanga mine site to the Kahama MMPF. Movement of machinery must be restricted to only within the permitted zones.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing



Impacts to Indigenous Fauna							
Implement a pre-construction faunal rescue and exclusion procedure for low-mobility or burrowing species.	✓					Environmental Manager	Ongoing
Prepare a detailed Buffer Zone Management Plan for areas bordering sensitive habitats to mitigate edge effects and restrict encroachment.	✓					Environmental Manager	To be undertaken prior to construction
Define ecological performance thresholds (e.g. IAP cover, SCC sightings) to trigger adaptive management interventions.	✓					Environmental Manager	Ongoing
Involve local communities or conservation NGOs in participatory monitoring (e.g. bird counts, wetland health), enhancing transparency and stewardship.	✓					Environmental Manager	Ongoing
Strengthen environmental induction programmes to include SCC identification, biosecurity, and fire prevention.	✓					Environmental Manager	Ongoing
Only authorised personal must be allowed into the Ruvubu riparian area and human presence must be kept to a minimum to protect SCC species.		✓	✓			Environmental Manager	Ongoing
As far as possible, movement corridors must be maintained or where necessary, recreated through rehabilitation activities adjacent disturbance footprints. In this regard, the proposed pipeline should be designed in such a way that it allows for small – medium sized mammals to move under it, thereby limiting the loss of species movement patterns and habitat connectivity.		✓				Environmental Manager	Ongoing
All vegetation clearance activities should be undertaken in a phased manner, starting from one side of the footprint and moving to the other. This way, faunal species within those areas will not be driven and trapped within the footprint area.		✓				Environmental Manager	Ongoing
Vegetation clearance activities must be undertaken in the dry season, when breeding / nesting activity is at its lowest.		✓				Environmental Manager	Ongoing
Lighting must be minimised to what is necessary, with all light being inward and downward facing. It is recommended that low frequency red and yellow lighting be used for external lights, and harsh white LEDs be avoided.		✓	✓			Environmental Manager	Ongoing
No hunting/trapping/snaring of faunal species by project staff, contractors or community members is to be allowed to take place within the proposed project area.		✓	✓			Environmental Manager	Ongoing
Implement wildlife-road interaction controls such as signage, speed limits, and fauna underpasses at key points.		✓				Environmental Manager	Ongoing
It is recommended that a faunal monitoring program be implemented in order to ascertain which species are persisting in the proposed project area during the operational phase and where, so as to best adapt operational management practices to ensure their continued survival.			✓			Environmental Manager	Ongoing



Impacts to Indigenous Fauna							
Operational noise levels are to be minimised so as not to impact upon surrounding habitats and faunal species.			✓			Environmental Manager	Ongoing
As part of community support programmes, TNCL must investigate the establishment of initiatives in the surrounding communities regarding the safety from potential harmful animals.	✓					Environmental Manager	As required
Specific focus should be monthly drone surveys of the surrounding natural habitat, on random days so that it is unpredictable for people moving through the area and also provides a way of following up on infringements.	✓	✓	✓	✓		Environmental Manager	Monthly

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.1.3 Aquatic Biodiversity

The mitigation measures required to manage aquatic biodiversity impacts are outlined in Table 4-5 to Table 4-8 below. Information provided in the section below was sourced from the Freshwater Ecological Assessment (SAS, 2025) and ESMPU (MTL, 2023).

Table 4-5: Mitigation Measures: Impact on Aquatic Habit, Biodiversity and Water Quality

Impact on Aquatic Habit, Biodiversity and Water Quality	
Management Outcome	<ul style="list-style-type: none"> Ensure the protection of water resources and sensitive wetland habitats.
Performance Indicator	<ul style="list-style-type: none"> Prevent the mixing of clean and dirty water. Implement erosion and sediment control. Limit water pollution and contamination. Establish and implement integrated stormwater and wastewater management systems. Ensure continuous environmental monitoring, prior to and throughout construction and operational phases
Performance Target	<ul style="list-style-type: none"> Implementation of clean and dirty water separation systems prior to construction commencing. Compilation of Stormwater Management Plan prior to construction commencing. Implementation of energy dissipation measures. Number of water quality tests undertaken. Locations at which water quality tests are taken. Types of water quality testing undertaken.



Impact on Aquatic Habit, Biodiversity and Water Quality								
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 							
Monitoring Programme	<ul style="list-style-type: none"> See Section 7 regarding the Stormwater Management Plan. See Section 6.1.3 regarding the Water Quality Monitoring Plan. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Minimise the clearing of vegetation to prevent the formation of gullies. Whenever vegetation is cleared for construction, the topsoil should be separated and stored in a way that favours top soils' biological activity including the establishment of indigenous species seed banks to encourage re-use during rehabilitation operations.	✓	✓	✓			Environmental Manager	Ongoing	
A preconstruction physicochemical water quality assessment must be undertaken for all the water resources associated with the study area.	✓					Aquatic specialist	To be undertaken prior to construction	
A baseline diatom assessment should be undertaken for biological sites that coincide with the fish and aquatic macroinvertebrate sites. Diatom community structures should be monitored for throughout the construction, operations and decommissioning phases of the project.	✓	✓	✓	✓		Aquatic specialist	Ongoing	
Prioritise avoidance during final layout optimisation by observing a 60 m conservation buffer around all surface water ecosystems as far as possible.		✓				Environmental Manager	Ongoing	
Where loss is unavoidable, minimise impacts by shifting infrastructure footprints away from the most intact wetland arms.		✓				Environmental Manager	Ongoing	
The Implementation of wetland offsets through restoration of degraded systems elsewhere in the catchment should be considered.		✓				Environmental Manager	Ongoing	
Establish pre-clearance biodiversity surveys to translocate vulnerable flora and fauna.		✓				Environmental Manager	Ongoing	
Integrate long-term wetland monitoring into the mine's environmental performance commitments.		✓				Environmental Manager	Ongoing	
In the event of a TSF failure, ensure best-practice TSF design using conservative stability factors, seismic design criteria, and drainage control. Implement real-time seepage, pore pressure, and deformation monitoring, with early-warning thresholds and automated alarms. Develop and test a TSF Emergency Preparedness and Response Plan that includes rapid containment and ecological first-response actions. Establish a riparian protection and restoration fund, to be		✓				General Manager and engineers	Ongoing	



Impact on Aquatic Habit, Biodiversity and Water Quality						
triggered in the event of TSF compromise or breach. Maintain an independent tailings review board to provide oversight and verification of structural integrity throughout operations.						
Implement dust suppression using water carts or dust-binding agents along all high-traffic routes near wetlands.	✓				Environmental Manager	Ongoing
Stabilise exposed soils and stockpiles with mulch, geofabric, or fast-growing cover crops, especially upslope of riparian features.	✓				Environmental Manager	Ongoing
Install silt fences, sediment basins, and stormwater traps to intercept runoff before it reaches sensitive ecosystems.	✓				Environmental Manager	Ongoing
Store chemicals and fuels in lined, bunded, and covered containment areas, with emergency response plans for spills.	✓				Environmental Manager	Ongoing
Define and enforce no-go buffer zones (typically ≥30 m) around all wetland and riparian areas during the full construction period. Maintain 30–50 m vegetated buffers around all wetlands. Limit access into buffer zones through fencing, signage, and patrols.	✓	✓			Environmental Manager	Ongoing
A stormwater management plan must be designed for the site that is aimed at separating clean water systems (environmental runoff) from dirty water systems (processing water, runoff from areas that include sources of contamination, processing facilities, etc). Only clean water should be allowed to be discharged to the environment whereas dirty water must be contained and processed to required standards before being released.	✓				General Manager and engineers	Ongoing
Use elevated causeways and bottomless culverts at wetland crossings to maintain flow and faunal passage	✓				Environmental Manager	Ongoing
Establish a code of conduct for workers regarding environmental protection, with specific reference to wetlands and rivers.	✓				Environmental Manager	Ongoing
Provide controlled access to water points and fuelwood, reducing the need for unsanctioned wetland use.	✓				Environmental Manager	Ongoing
Work with local government to zone informal activity areas away from sensitive wetlands.	✓				Environmental Manager	Ongoing
Implement community outreach and environmental education campaigns addressing the value of wetland systems.	✓				Environmental Manager	Ongoing
Regarding water abstraction and pump station construction (Ruvubu River), site pump infrastructure away from active channels and major riparian trees. Construct during low-flow season to reduce risk of sediment mobilisation. Use prefabricated structures and minimal excavation methods to reduce footprint. Maintain open communication with	✓				Environmental Manager	Ongoing



Impact on Aquatic Habit, Biodiversity and Water Quality						
regional authorities, including Burundi's park and water departments, to ensure transparency and avoid diplomatic friction.						
In terms of deep excavations and borrow pits, conduct a hydrogeological risk assessment prior to excavation to identify critical groundwater flow paths. Position borrow pits up-gradient of key wetland systems and avoid known recharge zones. Restore excavated areas with low-permeability material and backfill grading to prevent continued water loss. Monitor wetland hydroperiod and groundwater levels before, during, and after construction.		✓			Environmental Manager	Ongoing
Integrate wetlands into the mine water balance model to ensure operational water management supports downstream recharge. Use passive recharge basins to mimic lost hydrological inputs. Design culverts and infrastructure crossings to preserve lateral and vertical flow paths			✓		General Manager and engineers	Ongoing
Construct seepage containment and recovery trenches around the TSF and WRDs.			✓		General Manager and engineers	Ongoing
Operate real-time effluent quality monitoring, with automated shutoff valves.			✓		Environmental Manager	Ongoing
Maintain buffer wetlands for passive filtration.			✓		Environmental Manager	Ongoing
Engage in transboundary water quality data sharing with Burundi's environmental authorities.			✓		Environmental Manager	Ongoing
Use low-glare, downward-directed lighting near wetland margins.			✓		Environmental Manager	Ongoing
Monitor species presence and abundance to detect biodiversity shifts and adaptively manage.			✓		Environmental Manager	Ongoing
Stabilise disturbed areas with vegetation, rock armouring, or geotextiles. Design stormwater controls to slow and disperse runoff (e.g., swales, sediment ponds). Maintain and monitor silt fences, berms, and check dams at runoff hotspots. Include sediment load monitoring in routine compliance sampling.			✓		Environmental Manager	Ongoing
The develop and implementation of a wetland offset programme during the operations phase to replace lost ecosystem function elsewhere in the catchment should be considered.				✓	Wetland specialist	Ongoing
Design WRD and TSF closure plans to retain surface water where possible, mimicking pre-existing wetland hydrology. Use reshaped WRDs and TSF capping zones to create wetland-analogue habitats where feasible.				✓	General Manager and engineers	Ongoing



Impact on Aquatic Habit, Biodiversity and Water Quality						
Restore adjacent buffer zones using native wetland vegetation, even if full ecosystem restoration is unfeasible. Reconnect adjacent wetland arms through hydrological corridors or surface channels.				✓	✓	Environmental Manager Ongoing
Monitor wetland use and biodiversity trends post-closure to assess long-term effectiveness of offsets and rehabilitation. Incorporate wetland function targets (e.g., water retention time, species richness) into long-term success criteria				✓	✓	Environmental Manager Ongoing
Apply immediate erosion control techniques such as hydroseeding, geofabric placement, and mulching on disturbed slopes. Dismantle roads using cross-ripping and contouring to restore natural flow dispersion. Maintain sediment basins and check dams for at least three years post-closure. Monitor rainfall events and inspect rehabilitated surfaces for signs of erosion or instability.				✓		Environmental Manager Ongoing
Develop a post-closure monitoring plan with defined timeframes, indicators, and responsible institutions. Secure a financial guarantee or trust fund dedicated to long-term wetland and water monitoring, and management of the wetland offset.				✓		TNCL Ongoing
Engage local universities or NGOs to provide independent wetland assessments. Establish an oversight committee to review monitoring data annually and recommend adaptive actions.				✓		TNCL Ongoing
Conduct a long-term geochemical stability assessment of TSF and WRD materials. Design and maintain passive treatment systems, such as subsurface wetlands or reactive barriers. Implement a 20+ year post-closure water quality monitoring programme, with periodic reviews and adaptive management. Install early warning monitoring bores between infrastructure and wetlands to detect plume migration.					✓	TNCL Ongoing
Model cumulative and transboundary impacts as part of the final closure plan. Engage with Burundian authorities and park managers on shared monitoring goals. Maintain downstream hydrological and water quality monitoring for a minimum of 10 years. Incorporate findings into a public reporting system to maintain transparency and accountability.					✓	TNCL Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-6: Mitigation Measures: Works Within Watercourses

Works Within Watercourses	
Management Outcome	<ul style="list-style-type: none"> Ensure environmentally responsible design, construction, and operation of works within watercourses.
Performance Indicator	<ul style="list-style-type: none"> Ensure watercourse diversions maintain ecological and hydraulic functioning. Prevent erosion and sedimentation during and after construction. Restrict construction activities in riparian zones to essential work only. Maintain unimpeded fish movement and natural flow through crossings.



Works Within Watercourses							
	<ul style="list-style-type: none"> Ensure compliance with environmental management requirements. 						
Performance Target	<ul style="list-style-type: none"> Diversion channels should match original stream dimensions, substrate, and habitat types No visible erosion, sediment plumes, or bank instability at or downstream of construction sites. Implementation of erosion and sediment control measures. Non-compliance incidents documented, corrected, and reported by the Environmental Officer. Buffer zones demarcated. No unauthorized activities recorded within riparian areas. No flow restriction or fish passage barriers. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Any watercourse diversions must be adequately sized to allow high flows to pass without damming and without inundating riparian vegetation. Cut and fill slopes should not exceed 1:3 (V:H), where possible. Stream banks should be protected to ensure that they do not erode.	✓	✓				General Manager and engineers	Ongoing
All diverted watercourses should aim to have the same mix of hydraulic habitats as the un-diverted watercourse (i.e., depth, width and substrate composition). Construction of diversions should be undertaken in the dry season (i.e., May to October). Site-specific objectives and work procedures should be developed for the design, construction, and operation each watercourse diversion to assist staff, contractors and regulators for approval, construction and monitoring.	✓	✓				General Manager and engineers	Ongoing
The ECO should establish and maintain a digital database of fixed-point photographs taken before each diversion, as well as during operation and rehabilitation. The initial baseline photographs are intended to provide baseline data on riparian vegetation structure, bank condition and bed composition be for construction starts Subsequent photographs are intended to monitor habitat conditions and assess rehabilitation success.	✓	✓		✓		Environmental Manager	Ongoing
The number of waterway crossings (bridges, causeways and drifts) should be minimized, and existing crossings should be followed rather than creating new crossings. Crossings should be located where the risks of erosion are low (i.e., hard substrate and few or no bends in the watercourse). Crossings should be designed with sufficient capacity to ensure that they do not restrict flows and do not cause damming.		✓				General Manager and engineers	Ongoing



Works Within Watercourses							
Bridges and culverts should be at least 1.2 times the width of the natural active channel to ensure that high flows are not restricted.		✓				General Manager and engineers	Ongoing
Crossings should not restrict the upstream mitigation of fish at any flows.		✓				Environmental Manager	Ongoing
Pipe culverts should be laid parallel to the stream bed so as not to cause a hydraulic jump.		✓				General Manager and engineers	Ongoing
During construction a buffer zone of at least 50 m should be adopted for all activities that are not compulsory within the riparian zone.		✓				Environmental Manager	Ongoing
Construction of bridges and stream crossings should be limited to the dry season (i.e., May to October).		✓				Environmental Manager	Ongoing
The duration of activities within the stream bed and riparian zone should be minimized.		✓				Environmental Manager	Ongoing
Approach roads should not exceed a gradient of 1:3 (V:H). Approach roads should have humps to divert silt-laden stormwater from entering directly into the watercourse.		✓				General Manager and engineers	Ongoing
Existing culverts (e.g., Nguzi River), should be upgraded to ensure that they have sufficient capacity to allow the free flow of stormwaters.		✓				Environmental Manager	Ongoing
Site-specific objectives and work procedures should be developed for the design, construction and operation of each stream crossing to assist staff, contractors and regulators for approval, construction and monitoring.	✓	✓	✓			General Manager and engineers	Ongoing
Sedimentation control measures should be implemented during construction at each crossing, for example, using sandbags, straw bales, grass fences or geotextile fences.		✓				Environmental Manager	Ongoing
During construction, activities within riparian zones and watercourses must be minimised, but those activities that need to take place within these areas, such as stream crossings, should be restricted to zones that are clearly marked and demarcated with red tape. Activities that do not need to take place within riparian zones, such as mixing of concrete, storage of equipment etc., should be conducted outside these sensitive areas.		✓				Environmental Manager	Ongoing
Use of heavy machinery within watercourses and riparian zones should be minimized as far as possible. Access into seasonally wet areas and / or turf soils during and immediately after rainy periods should be avoided until such a time that the soil has dried out. All drivers of heavy machinery must have a basic level of environmental awareness training.	✓	✓	✓			Environmental Manager	Ongoing



Works Within Watercourses							
Collection of firewood from riparian areas by workers should be restricted.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Littering and dumping of waste of any nature into watercourses should not be tolerated.		✓	✓	✓	✓	Environmental Manager	Ongoing
All sites should be kept tidy and litter free at all times. Litter bins equipped with a closing mechanism for the collection of domestic and industrial wastes should be made available, where appropriate.	✓	✓	✓	✓		Environmental Manager	Ongoing
Unless otherwise specified by the responsible personnel, all domestic and industrial waste should be moved to the solid waste disposal facility. No solid waste should be burned on site or dumped into watercourses.	✓	✓	✓	✓		Environmental Manager	Ongoing
Contractors must be contractually bound and appropriately trained to meet the requirements of the ESMP.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
The upper edge (soffit) of bridges and culverts should be greater than the natural bank height, and the openness ratio should be at least 0.5 to allow sufficient free board for the passage of large woody debris and riparian fauna. The openness ratio is (height x width) / length.	✓	✓	✓			General Manager and engineers	Ongoing
Bridge and culvert aprons, foundations and/or pipelines must be buried below the stream bed and constructed in such a way that the upstream migration of fish is not restricted under any flow conditions.	✓	✓	✓			Environmental Manager	Ongoing
The riverbed below each channel should be made of natural substrate and have no hydraulic jumps that could cause bed erosion or create a barrier for the upstream migration of fish.	✓	✓				Environmental Manager	Ongoing
Locate water storage facility(s) on off-channel tributaries only, preferably in areas that are already disturbed. Appoint an ecologist to evaluate potential sites and ecological sensitivities.	✓	✓				Environmental Manager	Ongoing
Develop site-specific objectives and work procedures for the design, construction and operation of each water storage facility, including downstream environmental flow requirements, where appropriate.	✓	✓	✓			Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-7: Mitigation Measures: General Housekeeping for Aquatic Conservation

General Housekeeping for Aquatic Conservation	
Management Outcome	<ul style="list-style-type: none"> Prevent pollution and degradation of surface and groundwater resources.
Performance Indicator	<ul style="list-style-type: none"> Provide and maintain adequate sanitation and ablution facilities. Prevent hazardous substances from contaminating water resources.



General Housekeeping for Aquatic Conservation							
	<ul style="list-style-type: none"> All spills and leaks are immediately responded to and managed. Ensure wastewater and stormwater are safely managed and treated. Monitor and manage biodiversity, invasive species, and health risks. 						
Performance Target	<ul style="list-style-type: none"> Number and quality of ablution facilities provided. Number of spills recorded on site, and measures implemented. Evidence of wastewater treatment infrastructure and appropriate discharge practices. Incidence of alien invasive clearing activities. Containment of hazardous storage facilities. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Adequate numbers of conveniently located site toilets should be made available on all work sites at all times in quantities related to the number of users (1 toilet per 30 users is the norm). Industry Specific Standards for Water and Sanitation (IFC 2007d) should be adhered to	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Site toilets, septic tanks or French drains should not be located within the 1:100-year flood line, or within a horizontal distance of 100 m (whichever is greater) of a watercourse, drainage line or wetland.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Site toilets should be maintained in good, functional working order and in an acceptable state of hygiene.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
The use of watercourses for cleaning tools, equipment, clothes or bathing should not be tolerated.		✓				Environmental Manager	Ongoing
Drip trays should be provided for generators or any machinery that will be in position for longer than one day. Drip trays should be provided for all emergency repairs required on site.		✓				Environmental Manager	Ongoing
Servicing of vehicles or equipment should not be permitted near or in watercourses.	✓	✓	✓	✓		Environmental Manager	Ongoing



General Housekeeping for Aquatic Conservation							
Fuel depots should not be within the 1:100-year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse, drainage line or wetland. Fuel depots and areas containing hazardous substances must be bunded, or otherwise in a site that is lined, sealed, bunded or otherwise engineered to prevent pollution of surface or groundwaters.	✓	✓	✓	✓		Environmental Manager	Ongoing
Any accidental oil or fuel spills or leakages should be attended to immediately. Small oil or fuel spills should be cleaned with an approved absorbent material, such as Drizit or 'Spill-sorb'. Spill kits should be readily available for accidental spillage of hazardous substances.	✓	✓	✓	✓		Environmental Manager	Ongoing
Accidental spills should be attended to immediately and details should be recorded in an on-site logbook. The details would include date and locality of spill, distance to the nearest watercourse, type of material, estimated quantity of spill, contact details of the people involved, mitigation steps taken and results of any subsequent monitoring.		✓	✓	✓		Environmental Manager	Ongoing
Oil or fuel spills should not be hosed into a storm water drains or sewers, or into the surrounding natural environment.		✓	✓	✓		Environmental Manager	Ongoing
No refuelling should be allowed outside of designated refuelling depots.		✓	✓	✓		Environmental Manager	Ongoing
Water containing visible suspended materials, or any potential contaminants should not be discharged into watercourses.		✓	✓	✓		Environmental Manager	Ongoing
Wastewaters should be treated and reused, where feasible. All polluted surface and groundwater should be treated to nationally acceptable standards.		✓				Environmental Manager	Ongoing
Appropriate facilities for washing equipment, including oil traps and other mechanisms for treating wastewaters, should be provided.	✓	✓	✓			Environmental Manager	Ongoing
Heated wastewaters should be collected before being discharged into receiving watercourses.		✓				Environmental Manager	Ongoing
Basic house-keeping rules should be established and implemented. The rules should include procedures for temporary storage of hazardous material; accidental spills; reporting of leaks and other factors that could lead to water quality deterioration. All workers and sub-contractors should be aware of the house-keeping rules.	✓	✓	✓			Environmental Manager	Ongoing
All construction workers and sub-contractors should know where the spill kits are located, and how they should be used. All workers should have adequate ablution facilities in the areas in which they are working. Establish comprehensive water quality monitoring programme that aims to prevent all surface and groundwater contamination.		✓				Environmental Manager	Ongoing
A comprehensive water budget should be developed, and water quantity monitoring programme that aims to minimise water use should be established. Water losses and water discharges should be minimised. Wastewaters that may be available for reuse should be identified. Water distribution infrastructure should be maintained in good working order.	✓	✓	✓			Environmental Manager	Ongoing



General Housekeeping for Aquatic Conservation							
Raise awareness amongst workers and communities on dangers of alien and invasive species. Dispose spoil material at designated sites. promptly and endlessly monitor and control invasive species introductions. Monitor and assess biodiversity important species and their habitats.		✓	✓			Environmental Manager	Ongoing
Seepage should be minimized by ensuring that all water storage facilities are adequately lined, and that leaking pipes are attended to immediately.			✓	✓	✓	Environmental Manager	Ongoing
Temporary standing water bodies should be minimized through adequate stormwater management and appropriate management of solid waste, particular discarded tires. Malaria and bilharzia cases should be monitored among staff and contractors, and if necessary, appropriate treatment and control programmes developed.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Sales or purchases of aquatic resources from within the development area should be prohibited,	✓	✓	✓			Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-8: Mitigation Measures: Alien Plant Control

Alien Plant Control							
Management Outcome	<ul style="list-style-type: none"> Prevent the proliferation and spread of alien vegetation. 						
Performance Indicator	<ul style="list-style-type: none"> Consistently implement alien vegetation control measures. Educate staff on the correct identification, treatment and eradication of alien plants. 						
Performance Target	<ul style="list-style-type: none"> Frequency of alien vegetation control measures implemented. Number of education sessions undertaken. Number of staff trained in alien control measures. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		



Alien Plant Control							
All employees and contractors should be made aware of the requirements of the ESMP and the relevant prohibitions.	✓	✓	✓			Environmental Manager	Ongoing
Identify, locate and map all exotics and invasive plants to be eradicated, including floating alien macrophytes. Alien plants that colonise areas along the streams, particularly those that are disturbed by construction activities, should be removed immediately.	✓	✓	✓			Environmental Manager	Ongoing
Alien plant monitoring and clearing should be undertaken at least every six months or before plants have a chance to seed.	✓	✓	✓			Environmental Manager	Ongoing
All alien plants, including those that are currently present, should be cleared within riparian zones and buffer zone extending at least 20 m from the edge of the riparian zone.	✓	✓	✓			Environmental Manager	Ongoing
A team should be trained in the correct application and use of herbicides for the target species present in the project area. All personnel tasked to engage in the process of alien invasive vegetation control must receive proper training in the following: methods and control measures; equipment and techniques; types of herbicides and dosages applied; mixing techniques, storage of chemicals and equipment; health and safety issues; plant identification; procedures for equipment washing; equipment maintenance; record keeping etc. Ensure that only properly trained staff handle and make use of chemicals.	✓	✓	✓			Environmental Manager	Ongoing
Conduct baseline alien species mapping prior to construction and establish a site-wide invasive species control plan. Repeat during closure audits.	✓	✓			✓	Environmental Manager	Ongoing
Implement clean vehicle protocols (e.g., wheel-washing stations) to reduce seed transfer between work areas.		✓				Environmental Manager	Ongoing
Rehabilitate cleared areas as early as possible using fast-establishing indigenous cover crops and mulch to reduce colonisation opportunity.		✓			✓	Environmental Manager	Ongoing
Apply manual removal and targeted herbicide treatment as part of routine environmental inspections.		✓			✓	Environmental Manager	Ongoing
Maintain post-construction invasive species surveillance, particularly around wetland buffers, for at least 5 years or until vegetation stabilises.		✓	✓			Environmental Manager	Ongoing
Maintain invasive species surveillance in all rehabilitated wetland and buffer areas for at least 10 years post-closure.					✓	Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



4.1.4 Surface Water Resource

The mitigation measures required to manage surface water risks are outlined in the table below. Information provided in the section below was sourced from the ESMPU (MTL, 2023) and Chapter 14: Hydrology and Hydrogeology (WSP, 2024).

Table 4-9: Mitigation Measures: Contamination of Surface Water Resources Affecting Human Health, Livestock Health and Crop Yields

Contamination of Surface Water Resources Affecting Human Health, Livestock Health and Crop Yields								
Management Outcome	<ul style="list-style-type: none"> Ensure surface water quality remains within acceptable limits. 							
Performance Indicator	<ul style="list-style-type: none"> Monitoring of concentrations of key pollutants in water (Table 6-3). 							
Performance Target	<ul style="list-style-type: none"> Target thresholds for potable water, according to the World Health Organisation (WHO) Guidelines for Drinking Water, 2022. Target thresholds for EHS Guidelines Environmental – Wastewater and Ambient Water Quality. Target thresholds for WHO Guidelines for Drinking Water Quality (4th Edition), 2017. Implementation of ICMM Guidance on Water Reporting. Target thresholds for the Tanzanian Municipal and Industrial wastewater tolerance limits. Target Thresholds for MEM 5th Schedule, Regulation 12 of Mining Act 1998. Target Thresholds for Tanzanian Drinking (Potable) Water Standards. No village complaints. 							
Emergency Response Procedure	<ul style="list-style-type: none"> Major spill and discharge incidents will be managed in line with the emergency response procedure outlined in Section 8. 							
Monitoring Programme	<ul style="list-style-type: none"> Refer to Section 6.1.2 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
<p>TNCL must develop and implement a comprehensive Stormwater Management Plan (SWMP) to manage surface water runoff during all phases of the Project, including construction, operations, and closure. The SWMP will be essential to protect water quality, reduce erosion and sedimentation, manage flood risks, and maintain the stability of Project infrastructure. This commitment aligns with IFC Performance Standard 3: Resource Efficiency and Pollution Prevention, as well as international best practice for sustainable water management in mining and industrial operations.</p> <p>The overarching objective of the SWMP is to ensure that stormwater is effectively controlled, treated where necessary, and safely discharged to minimize adverse impacts on the environment, surrounding communities, and downstream water users. The Stormwater Management Plan must, at a minimum, include the following components:</p>	✓	✓	✓	✓	✓	Environmental Manager	Developed prior to construction and implemented in all project phases	



Contamination of Surface Water Resources Affecting Human Health, Livestock Health and Crop Yields						
<ul style="list-style-type: none"> • Regulatory and Standards Compliance: Summarize applicable Tanzanian legislation governing water and pollution control and align with international standards such as IFC’s EHS Guidelines for Mining and the General EHS Guidelines on Water Conservation and Stormwater Management. • Stormwater Control Design: <ul style="list-style-type: none"> ○ Identify and map all stormwater management infrastructure required for the site (e.g., diversion drains, containment ponds, silt traps, energy dissipaters, culverts). Design stormwater control systems to accommodate expected rainfall events, including allowance for climate change-induced rainfall variability (IFC recommends designing for at least a 1-in-10-year event for operational drainage and 1-in-100-year events for critical infrastructure). ○ Incorporate "clean" water diversion strategies to separate uncontaminated runoff from disturbed or contaminated areas. • Erosion and Sediment Control Measures: <ul style="list-style-type: none"> ○ Implement erosion control measures such as vegetation buffers, geotextiles, sediment traps, silt fences, and riprap channels, particularly during construction when land disturbance is highest. ○ Stabilise exposed soils as soon as possible to reduce runoff and sediment loading. • Stormwater Quality Management: <ul style="list-style-type: none"> ○ Establish water quality monitoring points to routinely test parameters such as Total Suspended Solids (TSS), pH, hydrocarbons, and heavy metals (as applicable). • Monitoring and Inspection Regime: <ul style="list-style-type: none"> ○ Develop a schedule for regular inspections and maintenance of stormwater infrastructure (e.g., before and after rainfall events, monthly inspections during dry seasons). ○ Include triggers for action if infrastructure is damaged or sedimentation exceeds specified thresholds. • Emergency Preparedness and Spill Response: <ul style="list-style-type: none"> ○ Integrate stormwater and flood management into the Project's Emergency Response Plan. ○ Prepare contingency measures for extreme rainfall events, dam overflows, or system failures. • Roles and Responsibilities: <ul style="list-style-type: none"> ○ Clearly define responsibilities for stormwater infrastructure design, construction oversight, routine maintenance, monitoring, and emergency response. ○ Data Management and Reporting: ○ Maintain records of all monitoring data, inspections, maintenance activities, and incidents. ○ Provide summary reports to Project management and regulatory authorities as required, highlighting compliance status and any corrective actions taken. • Continuous Improvement and Adaptive Management: 						



Contamination of Surface Water Resources Affecting Human Health, Livestock Health and Crop Yields							
<ul style="list-style-type: none"> Review and update the SWMP at least every three (3) years, or more frequently if significant changes in site conditions, operations, or rainfall patterns are observed. <p>Incorporate lessons learned from monitoring, audits, and inspections into SWMP updates.</p>							
Regular monitoring of all diverted channels will be carried out to ensure baseline water quality standards are met.		✓	✓	✓	Environmental Manager	Ongoing	
Install and maintain sediment control structures to manage runoff prior to discharge to receiving surface water bodies.	✓	✓	✓		Environmental Manager	Ongoing	
All stormwater from the uncontaminated catchments will be diverted to avoid mixing with contaminated areas and directed to the natural drainages channel which will drain into the receiving water sources such as the Muruhamba and Ruvubu Rivers.		✓	✓	✓	Environmental Manager	Ongoing	
All surface runoff from contaminated areas will be managed in line with the SWMP.		✓	✓	✓	Environmental Manager	Ongoing	
Regular maintenance of all equipment and close monitoring of their movements to minimize any discharges of hydrocarbon from mining, vehicle and machineries.		✓	✓	✓	Environmental Manager	Ongoing	
Ensure vehicles and equipment are well maintained and servicing is carried out in dedicated areas, built with concrete floors and pollution control system.		✓	✓	✓	Environmental Manager	Ongoing	
Store chemicals in appropriately bunded areas		✓	✓	✓	Environmental Manager	Ongoing	
Implement the surface water monitoring programme as outlined in Section 6.1.1.		✓	✓	✓	✓	General Manager	Ongoing
Undertake regular maintenance and monitoring of all equipment on site to minimise any discharges of hydrocarbons from machinery. Cleanup spillages as soon as practicable.		✓	✓	✓	TNCL contractors	As required	
Collaborative water monitoring committees will be set-up with each of the surrounding communities to ensure water monitoring results are transparently disseminated to improve confidence in water supplies.		✓	✓	✓	TNCL contractors	Ongoing	
The project discharges water from the HDS neutralisation plant, potable water treatment plants, RO treatment plant and the sewage treatment plants. The plants must be operated and designed to ensure that discharge water quality concentrations as outlined in Section 6.1.2.3 are achieved.	✓	✓	✓	✓	TNCL contractors	Ongoing	
Implement the Waste Management Plans included in Appendix I and Appendix J.		✓	✓	✓	TNCL contractors	Ongoing	



Contamination of Surface Water Resources Affecting Human Health, Livestock Health and Crop Yields							
The proposed Project will require the establishment of two modular containerised water treatment plants which will treat water abstracted from the boreholes and the Ruvubu River to produce drinking quality water. The plants must be operated and designed to ensure that drinking water concentrations as outlined in Section 6.1.2.4 are achieved.	✓	✓	✓	✓		TNCL contractors	Ongoing
The spring water transfer system for the collection and diversion of spring water beneath the TSF must be implemented.	✓	✓	✓	✓	✓	General Manager and engineers	Ongoing
All liner systems identified in the ESIA for the TSF, waste rock dumps and PCDs must be implemented.	✓	✓	✓	✓		General Manager and engineers	Ongoing
A permit to discharge water back to the Ruvubu River needs to be obtained prior to any discharge activities from the Lake Victoria Basin Water Board.	✓					Environmental Manager	Prior to construction
The water management requirements outlined in the Closure Plan must be fully implemented to ensure the protection of surface water resources during and after the closure of the mine. These requirements are critical for supporting the restoration of natural hydrological functions across the site.					✓	Environmental Manager	As Required
TNCL must register its premises and obtain chemical handling certificates for the transportation, import, storage, and use of chemicals. In cases involving expired chemicals, GCLA should be consulted for disposal guidance. Chemical disposal facilities (e.g., TSF, incinerator, landfill) must be registered if in use. Overall compliance with the Industrial and Consumer Chemicals (Management and Control) Act, 2003 and its 2020 regulations is required.	✓					Environmental Manager	As Required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-10: Mitigation Measures: Alteration of Natural Drainage Patterns Affecting Natural Run-off to the Catchment and Third-Party Users

Alteration of Natural Drainage Patterns Affecting Natural Run-off to the Catchment and Third-Party Users	
Management Outcome	<ul style="list-style-type: none"> Ensure that the reduction of the volume of runoff into the downstream catchment is limited to what is necessary and that natural drainage patterns are re-established as part of rehabilitation in order to prevent unacceptable alteration of drainage patterns and related reduction of downstream surface water flow.
Performance Indicator	<ul style="list-style-type: none"> Site-wide Water Balance Stability. Volume of water abstracted from the river. Volume of water passing through a defined cross-section, calculated using flow depth and rating curves. Measurement of water depth at the monitoring structure (e.g., Broad Crested or V-Notch Weir).



Alteration of Natural Drainage Patterns Affecting Natural Run-off to the Catchment and Third-Party Users							
Performance Target	<ul style="list-style-type: none"> Maintain natural hydrological patterns as much as possible. Must not exceed permitted limit for abstraction from the Ruvubu River. Accurate flow data within ±5% deviation of the known rating curve values for each weir/structure. Continuous monitoring with remote data logging; No community complaints. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Refer to Section 6.1.2.5 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
<p>TNCL must develop and implement a comprehensive Water Conservation and Demand Management Plan (WCDMP) to ensure sustainable water use, protect local water resources, and minimise project-related water demand and consumption throughout all phases of construction, operations, and closure. The WCDMP must be aligned with IFC Performance Standard 3: Resource Efficiency and Pollution Prevention, national water use regulations, and international best practices for sustainable water management in mining and industrial projects. It should support the responsible and efficient use of water resources, recognising the importance of water security for both the Project and surrounding communities. The overarching objective of the WCDMP is to minimise water abstraction and consumption, reduce water-related environmental impacts, ensure equitable access to water resources, and contribute to long-term water sustainability within the Project area and its broader area of influence.</p> <p>The Water Conservation and Demand Management Plan must, at a minimum, include the following components:</p> <ul style="list-style-type: none"> Applicable Regulatory and Standards Framework: Summarise applicable Tanzanian water use and conservation regulations and licensing requirements. Reference relevant international standards, including IFC's Environmental, EHS Guidelines for Water Conservation and the Global Reporting Initiative (GRI) guidelines on water stewardship. Water Use Forecast and Targets: <ul style="list-style-type: none"> Estimate Project water demand across construction, operation, and closure phases. Set water conservation targets to progressively reduce water consumption (e.g., litres per tonne of ore processed, litres per employee/day). Water Conservation Measures: Identify and implement measures to minimise water use, including: <ul style="list-style-type: none"> Water recycling and reuse strategies (e.g., within processing plants, dust suppression, vehicle washing). 	✓	✓	✓	✓	✓	Environmental Manager	Ongoing



Alteration of Natural Drainage Patterns Affecting Natural Run-off to the Catchment and Third-Party Users							
<ul style="list-style-type: none"> ○ Use of water-efficient technologies and equipment. ○ Leak detection and repair programs for pipelines and storage facilities. ● Demand Management Strategies: <ul style="list-style-type: none"> ○ Implement operational controls to manage and prioritise water use (e.g., scheduling non-essential water activities during low-demand periods). ○ Establish water rationing protocols in the event of supply shortages. ○ Promote behavioural change through employee awareness campaigns on water conservation. ● Monitoring and Metering: <ul style="list-style-type: none"> ○ Install water meters at key abstraction, transfer, usage, and discharge points to track water use accurately. ○ Monitor water use performance against established targets on a monthly basis. ● Risk Management: <ul style="list-style-type: none"> ○ Identify potential water supply risks (e.g., droughts, reduced surface water availability) and develop contingency plans. ○ Include measures to prevent the over-abstraction of groundwater or surface water sources to avoid depletion of community resources. ● Stakeholder Engagement and Community Water Stewardship: <ul style="list-style-type: none"> ○ Engage with local communities, water authorities, and other stakeholders to promote shared water stewardship principles. ○ Support community water conservation initiatives where feasible, aligning with broader regional water management strategies. ● Roles and Responsibilities: <ul style="list-style-type: none"> ○ Define clear roles and responsibilities for water use monitoring, conservation initiative implementation, data management, and reporting within TNCL’s operational structure. ● Reporting and Continuous Improvement: <ul style="list-style-type: none"> ○ Report water consumption data and conservation achievements internally and externally (e.g., to regulators, financiers, sustainability reports). ○ Review and update the WCDMP at least every three (3) years or when significant changes to operations, technology, or regulatory requirements occur. ○ Integrate lessons learned into water management practices to drive continuous improvement. 							
Installation of flow meter along the Ruvubu pipeline to monitor the abstraction volumes. Abstraction volumes should not exceed 7,000 m ³ /d.			ü	ü	ü	Environmental Manager	Ongoing



Alteration of Natural Drainage Patterns Affecting Natural Run-off to the Catchment and Third-Party Users							
A permit to abstract and use water from Ruvubu River needs to be obtained prior to any abstraction activities from the Lake Victoria Basin Water Board under Ministry of Water.	✓					Environmental Manager	Prior to construction
Implement the surface water monitoring programme included in Section 6.1.2.		✓	✓	✓	✓	Environmental Manager	Ongoing
An operational water balance will need to be developed for the mine and updated on an annual basis in line with Section 6.1.2.5. The water balance must be reviewed once the operations manual for the TSF becomes available.	✓	✓	✓	✓		Environmental Manager	Ongoing
The Waste Rock stored in the WRDs will be used in the backfill which will change the WRD footprint and height. The impact of the depletion in the waste rock mass in the WRDs on runoff and seepage quality must be assessed and updated in the water and salt balance modelling.			✓			Environmental Manager	As required
Government institutions relevant to the project should be involved in community sensitisation to build public trust and avoid duplication of engagement efforts.	✓					Environmental Manager	As required
The source term for the WRDs needs to be re-evaluated based on the depletion of the WRD. The water and salt balance model needs to be updated and applied to assess the impact of the reduced volumes and improved water quality on PCD sizes and water treatment requirements.			✓			Environmental Manager	As required
The closure water volumes requiring treatment need to be re-assessed once the WRD footprints have been finalised and the detailed cover design and seepage modelling has been completed for the TSF and WRD.				✓	✓	Environmental Manager	As required
Monitoring of the boreholes west and north of the TSF must continue. Water levels should (and are presently) being monitored monthly, and quality monitored quarterly. The quality and water level results should be regularly evaluated against the modelling to confirm the groundwater model simulations. Should it be found that the drains are ineffective, mitigation strategies will need to be introduced to reduce the concentration loads to the receiving environment.		✓	✓	✓		Environmental Manager	Ongoing
The SEP should include procedures for communicating results and addressing water quality challenges should they arrive.	✓	✓	✓	✓		Environmental Manager	Ongoing
The Grievance Redress Mechanism should include procedures to enable community members to report water-related issues and incidents.	✓	✓	✓	✓		Environmental Manager	Ongoing
Establishment of a formal complaints register.	✓	✓	✓	✓		Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



4.1.5 Hydrogeology

The mitigation measures required to manage hydrogeological risks are outlined in the table below. Information provided in the section below was sourced from the ESMPU (MTL, 2023) and Chapter 14: Hydrology and Hydrogeology (WSP, 2024).

Table 4-11: Mitigation Measures: Lowering and Contamination of Groundwater that Could Influence Availability for Third-Party Supply

Lowering and Contamination of Groundwater that Could Influence Availability for Third-Party Supply								
Management Outcome	<ul style="list-style-type: none"> Ensure groundwater quality remains within acceptable limits and third party use is not compromised. 							
Performance Indicator	<ul style="list-style-type: none"> Monitoring of concentrations of key pollutants in water in Section 6.1.3. Monitoring of groundwater levels to detect any significant drawdown that might impact third-party supplies or baseflow. 							
Performance Target	<ul style="list-style-type: none"> Frequency and results of groundwater monitoring. Target thresholds for EHS Guidelines Environmental – Wastewater and Ambient Water Quality. Target thresholds for WHO Guidelines for Drinking Water Quality (4th Edition), 2017. Target Thresholds for Tanzanian Drinking (Potable) Water Standards. No village complaints. 							
Emergency Response Procedure	<ul style="list-style-type: none"> Discharge incidents of contaminated water that may result in pollution of groundwater resources will be managed in line with the emergency response procedure outlined in Section 8. 							
Monitoring Programme	<ul style="list-style-type: none"> Refer to Section 6.1.3. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Establish and maintain an effective groundwater monitoring programme (Section 6.1.3).		✓	✓	✓	✓	Environmental Manager	Ongoing	
Ensure vehicles and equipment are well maintained and servicing is carried out in dedicated areas, built with concrete floors and pollution control system.		✓	✓	✓		Environmental Manager	Ongoing	
Install oil collection pans in or under workshop.		✓	✓	✓		Environmental Manager	Ongoing	
Construct a boundary around hydrocarbon storage facilities.		✓	✓	✓		Environmental Manager	Ongoing	
Implement the Acid Mine Drainage and Acid Rock Drainage Management Plan included in Appendix B.		✓	✓	✓	✓	Environmental Manager	Ongoing	



Lowering and Contamination of Groundwater that Could Influence Availability for Third-Party Supply							
Update the groundwater model annually to maintain an up-to-date understanding of groundwater drawdown, recharge, and potential contamination. These updates should be informed by the most recent groundwater monitoring data collected across all project phases—construction, operation, and closure. Regular updates will ensure that the model reflects current site conditions, supports adaptive water management, and enables early identification of emerging risks to groundwater quality or availability.		✓	✓	✓	✓	Environmental Manager	Ongoing
All liner systems identified in the ESIA for the TSF, waste rock dumps and PCDs must be implemented.	✓	✓	✓	✓		General Manager and engineers	Ongoing
Implement the waste management Plans included in Appendix I and Appendix J.		✓	✓	✓		TNCL contractors	Ongoing
The SEP should include procedures for communicating results and addressing water quality challenges should they arrive.	✓	✓	✓	✓		Environmental Manager	Ongoing
The Grievance Redress Mechanism should include procedures to enable community members to report water-related issues and incidents.	✓	✓	✓	✓		Environmental Manager	Ongoing
Establish a formal complaints registers.	✓	✓	✓	✓		Environmental Manager	Ongoing
Identify additional water sources (such as boreholes) for community surrounding the Project Area.	✓					Environmental Manager	As required
If boreholes for community water supply need to be relocated and constructed, appropriate measures, such as grouting the pit to limit water infiltration, must be implemented.		✓	✓	✓		Environmental Manager	Ongoing
Establish and maintain an effective groundwater monitoring system. Provide access to alternative water sources for those needed, in the event that mine related activities have impacted on third party supply.			✓	✓	✓	Environmental Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.1.6 Air Quality

The mitigation measures required to manage air quality risks are outlined in Table 4-12 below. Information provided in the section below was sourced from the Air Quality Assessment (SLR(e), 2025) and the ESMPU (MTL, 2023).



Table 4-12: Mitigation Measures: Increase in Ambient Particulates Affecting Human Health

Increase in Ambient Particulates Affecting Human Health								
Management Outcome	<ul style="list-style-type: none"> Maintain ambient air quality within acceptable limits. 							
Performance Indicator	<ul style="list-style-type: none"> Monitoring of ambient concentrations of air pollutants (Dust fallout, PM10, PM2.5, NOx, SO2) in ambient air. 							
Performance Target	<ul style="list-style-type: none"> Target threshold as per the World Health Organisation Air Quality Guidelines for PM10, PM2.5, NOx, SO2 (Table 6 5). Target threshold for dust fallout in accordance with the Air Quality Specification of the Eastern African Standard (Table 6 5). 							
Emergency Response Procedure	<ul style="list-style-type: none"> Not applicable. 							
Monitoring Programme	<ul style="list-style-type: none"> Refer to Section 6.1.4. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
General management measures								
Maintain appropriate operational controls (e.g. adhere to repair and maintenance requirements for all equipment, including vehicles).		✓	✓	✓		Environmental Manager	Ongoing	
Conduct workforce training at all levels (workers, foremen, managers, contractors) on air emissions awareness. This can be included in site induction courses and should focus on promoting understanding as to why operational controls are in place and should be adhered to.	✓	✓	✓	✓		Environmental Manager	Ongoing	
Develop protocols and emergency response procedure to manage emission incidents such as fires or spills or other upset conditions resulting in uncontrolled / abnormal releases. This should include the management of complaints, identification of operations at the time, weather conditions, procedures for communicating with complainants, and incident reporting to the relevant authority, etc.	✓	✓	✓	✓		Environmental Manager	As required	
TNCL must develop a comprehensive Air Quality Management Plan (AQMP) to ensure ongoing compliance with national air quality standards and international best practice requirements. The AQMP must serve as a critical operational tool to proactively manage air emissions, monitor ambient air quality, and maintain environmental and community health standards. In accordance with IFC Performance Standard 3: Resource Efficiency and Pollution Prevention, the IFC Environmental, Health, and Safety (EHS) Guidelines, and World Health Organization (WHO) Air Quality Guidelines, the AQMP must be reviewed and updated at least every three (3) years to refine or adapt mitigation, management, and monitoring strategies based on operational changes, monitoring results, regulatory updates, or evolving best practice. At a minimum, the AQMP must include the following components: <ul style="list-style-type: none"> Applicable Regulatory and Standards Framework: Summarise all relevant Tanzanian air quality regulations, standards, and permitting requirements. Identify and reference applicable international benchmarks, 	✓	✓	✓	✓		Environmental Manager	Established prior to the commencement of construction and implemented in all mine phases prior to closure	



Increase in Ambient Particulates Affecting Human Health						
<p>including the WHO Ambient Air Quality Guidelines and the IFC General EHS Guidelines for Air Emissions and Ambient Air Quality.</p> <ul style="list-style-type: none"> • Emission and Ambient Air Quality Thresholds: Clearly define the pollutant concentration limits for emissions and ambient air quality. These thresholds should align with the more stringent of national or international standards, following the IFC’s guidance on good international industry practice. • Pollutant Identification and Justification: Identify the key air pollutants (e.g., particulate matter (PM₁₀, PM_{2.5}), nitrogen oxides (NO_x), sulphur dioxide (SO₂), carbon monoxide (CO), volatile organic compounds (VOCs)) to be monitored. Justify the selection based on potential emission sources, environmental sensitivity, and health risks. • Monitoring Approach: Specify sampling methods, analytical techniques, monitoring frequency, and monitoring locations based on a risk-based approach and considering sensitive receptors (e.g., nearby communities, schools, water bodies). Define stationary, mobile, and fugitive emission sources and develop specific monitoring protocols for each. • Emission Sources Inventory: List and characterise all potential air emission sources associated with the Project, including stationary sources (e.g., generators, processing plants), mobile sources (e.g., vehicles, equipment), and fugitive emissions (e.g., dust from roads and stockpiles). • Calibration and Data Validation Procedures: Describe calibration requirements for all monitoring equipment to ensure accuracy and precision of results. Include data validation protocols to detect errors or inconsistencies. • Data Management: Outline how air quality data will be securely stored, analysed, interpreted, and reported. Include procedures for trend analysis and performance tracking over time. • Reporting Frequency and Protocols: Define reporting intervals (e.g., monthly internal reports, quarterly external reports) and specify reporting requirements to regulatory authorities, lenders, and, where applicable, affected communities. • Comparison to Standards: Include methods for comparing monitoring results against applicable national and international air quality standards, highlighting any exceedances or trends of concern. • Exceedance Response Actions: Define clear triggers for action if air quality thresholds are exceeded (e.g., operational modifications, additional controls, shutdown procedures). Outline immediate and longer-term corrective measures, responsibilities, and timelines for implementation. • Stakeholder Engagement on Air Quality Issues: Where monitoring occurs near communities or sensitive areas, describe procedures for disclosing air quality results to stakeholders in an understandable format. Define mechanisms for addressing stakeholder concerns, complaints, and feedback related to air quality. • Roles and Responsibilities: Clearly assign roles and responsibilities for all aspects of air quality management, including monitoring, data management, equipment maintenance, review of results, reporting, and corrective action implementation. 						



Increase in Ambient Particulates Affecting Human Health							
Routine reporting and record keeping							
Maintain a complaints register. Complaints and any actions arising from a complaint must be recorded and investigated by site management. The outcomes thereof must be recorded for inspection by the authorities.	✓	✓	✓	✓		Environmental manager	Ongoing
Maintain meticulous record keeping of site activities including throughputs, blasting activities, fuel usage, vehicle fleets, etc, to allow for a more accurate accounting of site activities and emission inventory updates should future assessment be required.		✓	✓	✓		Environmental manager	Ongoing
Dust control							
Implement water-based dust suppression measures on haul roads.		✓	✓	✓		Environmental manager	Ongoing
Maintain and sweep internal paved roads, machinery, and their surrounding areas to remove deposited dust and minimise the load available for entrainment during high wind speed events.	✓	✓	✓	✓		Environmental manager	Ongoing
Limit land clearing and vegetation removal to the minimum necessary. New areas should be cleared and opened up only when absolutely necessary.	✓	✓				Environmental manager	As required
Utilise windbreaks, contouring and material covers or enclosures for exposed soils and stockpiles of erodible material. Install porous windbreaks / fencing around the facility or at a minimum alongside areas of high erosion potential. As the air moves through the windbreak, its velocity is decreased, which in turn decreases the energy available to transport dust particles (encouraging deposition near to source). It is estimated that the ideal porosity for a windbreak is 40-50% (where 0% would be a solid wall).		✓	✓	✓		Environmental manager	As required
Initiate or increase the frequency (as applicable) of water sprays and consider the addition of surfactants / chemical suppressants (e.g. lignosulfonates, calcium chloride, or polymer-based sealants) for areas / activities of concern (i.e. drilling, blasting, material handling, etc.), along unpaved roads and exposed surfaces (using water trucks with spray bars). Additional spraying may be required during high wind speed (> 5.4 m/s) or gusty conditions. 50% emission reduction efficiency is achievable using level 1 watering (2 litres/m ² /hr) and up to 75% emission reduction efficiency using level 2 watering (> 2 litres/m ² /hr) ⁴ .		✓	✓	✓		Environmental manager	Ongoing
Ensure ventilation shafts are installed with fabric filters (~83 – 99% emission control efficiency).	✓	✓	✓			Environmental manager	As required
Initiate progressive rehabilitation (e.g. revegetation with appropriate species, in line with the surrounding landscape, or coarse material covers) to stabilise disturbed areas and reduce entrainment. Surfaces should be revegetated or otherwise rendered non-dust forming when inactive.		✓	✓			Environmental manager	As required

⁴ NPI (2012):Emission Estimation Technique Manual for Mining (v 3.1)



Increase in Ambient Particulates Affecting Human Health							
Cover open-bodied trucks when the truck is carrying materials that can be released into the air.		✓	✓			Environmental manager	As required
Adhere to minimum practical drop heights when offloading materials. The handling of friable materials should be halted during high wind speed (>5.4 m/s) or gusty conditions or alternatively wetted prior to handling.		✓	✓			Environmental manager	As required
Reduce speed limits, truck weights and the number of vehicles using unpaved roads / surfaces as far as practicable. Speed limits should be below 20 km/h onsite. Speed limits should also be controlled on unpaved access roads. For example a speed reduction from 64 km/h to 32 km/h reduces dust emissions by up to 65% ⁵ .		✓	✓	✓		Environmental manager	Ongoing
Enclose dust-generating equipment, such as crushers and conveyors, to prevent dust escape with measures for cleaning return belts. Where practicable, capture dust from crushing, grinding, and conveying processes using baghouse filters.	✓	✓	✓			Environmental manager	As required
Combustion gases							
Restrict idling times for vehicles and heavy machinery through efficient work planning to reduce fuel consumption and emissions.		✓	✓	✓	✓	Environmental manager	Ongoing
Install abatement equipment (e.g. adsorption using activated carbon) for reducing PCDD/F emitted from the waste incinerator.		✓				Environmental manager	Ongoing
Application of cleaner production practices, including using good quality fuels and lubricants.		✓	✓	✓		Environmental manager	As required
Use catalytic converters on vehicle exhausts (where available).		✓	✓	✓		Environmental manager	As required
Monitoring							
Install an onsite weather station to collect site-specific meteorological data, aiding in the interpretation of monitoring results and source identification for air quality investigations and complaints.		✓				Environmental manager	As required
Maintain a fence-line DFO monitoring network to assess fugitive dust impacts, using IRMA as a guideline. If non-compliances are recorded, develop a detailed dust management plan to establish and implement emission reduction strategies.		✓	✓	✓		Environmental manager	Ongoing
Continuously monitor ambient air quality in real time, focusing on fine particulates (PM ₁₀₀ , PM ₁₀ , and PM _{2.5}) and gases (SO ₂ , NO ₂ , and VOCs). At a minimum, monitoring should occur simultaneously at two locations: onsite and	✓	✓	✓	✓		Environmental manager	Ongoing

⁵ State of Alaska (2024): Top Ten Dust Control Techniques List. URL: dec.alaska.gov (date accessed: 28/06/2024)



Increase in Ambient Particulates Affecting Human Health							
at a proximate sensitive receptor (such as SR2). Should results indicate negligible to very low impact, monitoring requirements and the frequency thereof can be revised (e.g. reduced monitoring network).							
Undertake annual isokinetic stack emissions testing of the waste incinerator to measure compliance with national emission limits (as applicable).			✓			Environmental manager	Ongoing
Community support							
Implement a community air quality monitoring program to provide real-time data and transparency.	✓	✓	✓	✓		Environmental manager	Ongoing
Provide free environmental health screenings for vulnerable groups.	✓	✓	✓	✓		Environmental manager	Ongoing
Provide dust mitigation support (e.g. tree planting, home sealing assistance) in high-exposure areas.	✓	✓	✓	✓		Environmental manager	Ongoing
General							
Given the uncertainty in equipment, schedules, and activity intensities, a qualitative assessment following international best practices was undertaken for the construction, decommissioning and closure phases. Once this information becomes available, during the pre-construction phase, the air dispersion model must be updated to include this information. Any additional mitigation measures need to form part of the AQMP.	✓					Environmental manager	Completed prior to construction
Additional modelling is required for the mitigated scenario for the operational phase of the Mine which needs to be completed before construction commences.	✓					Environmental manager	Completed prior to construction

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.1.7 Climate Change

The mitigation measures required to manage the impacts of climate change risks are outlined in the tables below. Information provided in the section below was sourced from the Climate Change Risk Assessment (SLR(c), 2025).

Table 4-13: Mitigation Measures: Changing Climate on the Project, Affected Communities and GHG Emissions

Changing Climate on the Project, Affected Communities and GHG Emissions	
Management Outcome	<ul style="list-style-type: none"> Effective management of GHG emissions to minimise climate-related risks and capitalise on opportunities associated with the transition to a lower-carbon economy.



Changing Climate on the Project, Affected Communities and GHG Emissions												
Performance Indicator	<ul style="list-style-type: none"> GHG emissions intensity (e.g., tonnes of CO₂e per unit of production). Progress on implementing energy efficiency and carbon reduction measures. 											
Performance Target	<ul style="list-style-type: none"> Report on both scope 1 and scope 2 GHG emissions (more than 25 000 tonnes of carbon dioxide equivalent (“tCO₂e”) annually). Ensure that all climate resilience measures are fully integrated into operational and infrastructure planning. 											
Emergency Response Procedure	<ul style="list-style-type: none"> Wildfires, landslides, extreme heat, and flooding will be managed in line with the emergency response procedure outlined in Section 7. 											
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 											
Mitigation Measures						Project Phase*		Responsibility	Timing			
						PC	C	O	D	C		
Emergency Response and Preparedness Plan must be updated to include measures to prevent and control wildfires spreading to the Project site. This plan must be reviewed and updated on an annual basis to ensure that it takes into consideration future shifts in weather patterns and fuel load due to changes in climate.						✓	✓	✓			Environmental Manager	Annually
Both the design and management of the stormwater infrastructure, PCDs and TSF, must take into account forward-looking climate projections (i.e., not only based on historical data).						✓	✓	✓			Environmental Manager	Annually
An employee health awareness program must be developed and implemented to educate employees (and contractors) about the risks of heat stroke/dehydration and how to prevent the same.						✓	✓	✓	✓		Environmental manager	Ongoing
If temperatures are high (i.e., >35°C), work should be rescheduled to cooler parts of the day, employees should be provided with more frequent rest breaks, and/or employees should be provided with shaded rest areas.							✓	✓	✓		Environmental Manager	As required
The Natural Resource Efficiency Plan included in Appendix F must be implemented to reduce water and energy consumption and promote water and energy efficiency.						✓	✓	✓	✓		Environmental Manager	Ongoing
The Greenhouse Gas Management Plan included in Appendix G, must be developed and implemented to reduce the Project’s GHG emissions.						✓	✓	✓			Environmental Manager	Ongoing
Undertake strategic planning and investment in capacity expansion.						✓	✓	✓			Environmental Manager	As required
Site water balance to be updated to consider forward-looking climate projects in determining the reduced flows to downstream valley bottom wetlands, and to restore, where possible, such flows.							✓	✓	✓		Environmental Manager	Annually



Changing Climate on the Project, Affected Communities and GHG Emissions							
TNCL should initiate a tree planting program to help reduce carbon dioxide emissions before the commencement of the project.	✓					Environmental Manager	Prior to construction

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.1.8 Noise

The mitigation measures required to manage noise impacts are outlined in Table 4-14 below. Information provided in the Section below was sourced from the Noise Impact Assessment (SLR(d), 2025) and the ESMPU (MTL, 2023).

Table 4-14: Mitigation Measures: Increase in disturbing noise levels affecting sensitive receptors

Increase in disturbing noise levels affecting sensitive receptors							
Management Outcome	<ul style="list-style-type: none"> Minimise noise levels within acceptable limits. 						
Performance Indicator	<ul style="list-style-type: none"> Number of noise complaints received and resolved. 						
Performance Target	<ul style="list-style-type: none"> No noise levels exceeding legal limits at sensitive receptors (55 dBA for day-time and 45 dBA for night-time, in accordance with EHS Guidelines: General (2007): Environmental Health and Safety Guidelines. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> See Section 6.1.5 for Noise Monitoring Plan. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Ensure all vehicles equipment and machinery are properly maintained to minimise noise generated by worn parts or loose components.		✓	✓	✓		Environmental manager	Ongoing
Consider the use of broadband “buzzer”, not tonal “beeper”, reversing alarms.		✓	✓	✓		Environmental manager	Ongoing
Choose machinery specifically designed to operate at lower noise levels, where practicable.	✓	✓	✓	✓		Environmental manager	Ongoing
Operate equipment within its specification and capacity, i.e., ensure machines are not overloaded.		✓	✓	✓		Environmental manager	Ongoing



Increase in disturbing noise levels affecting sensitive receptors							
Equipment must be used as intended. The operators should be trained and certified by external or internal program to qualify.		✓	✓	✓		Environmental manager	Ongoing
Engine exhausts should be fitted with appropriate quality silencers. Silencers as supplied by Original Equipment Manufacturers (OEMs) are generally deemed acceptable. Consider retrofitting existing equipment / plant with additional acoustic measures (e.g., silencers on exhausts).		✓	✓	✓		Environmental manager	Ongoing
Engine or radiator maintenance access panels should be kept closed during operation.		✓	✓	✓		Environmental manager	Ongoing
Avoid unnecessary manoeuvring on site.		✓	✓	✓		Environmental manager	Ongoing
Limit earthworks activity to daytime hours (construction phase only).		✓				Environmental manager	Ongoing
Construction of berms and work on top of berms or dumps should be limited to daytime only.		✓	✓	✓		Environmental manager	Ongoing
Locate noisy equipment behind structures that act as barriers.		✓	✓	✓		Environmental manager	Ongoing
Orient equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise, preferably using site obstacles or topography to enable shielding of the source/s.		✓	✓	✓		Environmental manager	Ongoing
Any equipment idling or not in use should be turned off.		✓	✓	✓		Environmental manager	Ongoing
All equipment and vehicles (excluding vehicles that need to make use of the northern and southern access roads) should not operate beyond the mine site boundaries. As such it is required that all personnel are aware of mine boundary extents.		✓	✓	✓		Environmental manager	Ongoing
Withdraw equipment from service immediately for maintenance if a change in noise emission characteristics is noticeable.		✓	✓	✓		Environmental manager	Ongoing
Concentrator plant equipment							
Crushers and mills should be enclosed as far as practically possible. Appropriate structures include brick buildings or panel cladding which must result in acceptable noise levels at NSRs.		✓	✓			Environmental manager	Ongoing
Keep doors and windows closed, repair buildings, and keep covers on machinery, where practicable.			✓			Environmental manager	Ongoing



Increase in disturbing noise levels affecting sensitive receptors							
It is preferable to shutdown equipment when not in use, if possible.			✓			Environmental manager	Ongoing
During planning and maintenance upgrades, select equipment/ plant with lower sound power levels where possible.	✓					Environmental manager	Ongoing
Install silencers for fans where possible or for new fans install lower sound power. This is achieved by design of system including airflow velocities, fan and blade types, and equipment selected appropriately for system duty.	✓	✓				Environmental manager	Ongoing
Install suitable mufflers at points where compressed air is intentionally discharged.	✓	✓				Environmental manager	Ongoing
Hauling and handling of material							
Consider rubber linings in dumper buckets for example, to reduce impact noise.	✓	✓				Environmental manager	Ongoing
Enforce strict speed limits for vehicles travelling along haulage roads. Speed limits along the southern and northern access roads are limited to 40 km/hour.		✓	✓			Environmental manager	Ongoing
Dumpers and materials to be handled in a manner that minimises noise, e.g., minimisation of drop heights, no unnecessary revving of engines.		✓	✓			Environmental manager	Ongoing
Keep internal roads well maintained to reduce noise generation from uneven terrain.		✓	✓			Environmental manager	Ongoing
During mine planning, increase distance between planned haul routes and NSRs where possible.	✓					Environmental manager	Ongoing
Workshops / Maintenance / Site Power on open sites							
Temporary screens or mobile acoustic shelters must be used to screen generators and other noisy equipment where existing structures do not provide any benefit. Note that this will only be effective to an extent for receptors at a similar or lower elevation to the source, depending on the distance from source. Screens should be free from gaps and provide a combined surface density of at least 15 kg/m ² . They should be placed as close to the source as possible.	✓	✓	✓			Environmental manager	Ongoing
Avoid as far as reasonably practicable night-time maintenance involving power tools or highly impulsive noise generating activities such as hammering.			✓			Environmental manager	Ongoing
Install electrical infrastructure (if available) to avoid reliance on remote / exposed generators.		✓	✓			Environmental manager	Ongoing



Increase in disturbing noise levels affecting sensitive receptors							
Remote maintenance work if absolutely necessary during nighttime should be surrounded by temporary acoustic screen barriers between works and nearest receptors.			✓			Environmental manager	Ongoing
Permanent maintenance workshop areas should comprise of an enclosure or enclosures in which any noise intensive activity must occur. Any openings and windows should be directed away from any proximate sensitive receptors. During noisy activities, doors and windows must be closed.	✓	✓	✓			Environmental manager	Ongoing
Any generators or compressors must be situated inside the enclosure/s and be further screened (acoustically) from maintenance personnel.	✓	✓	✓			Environmental manager	Ongoing
Keep doors and windows closed when undertaking heavy maintenance activities within workshops where possible.		✓	✓			Environmental manager	Ongoing
Improve the acoustic performance of workshop buildings, apply sound insulation where possible.	✓					Environmental manager	Ongoing
River pump station							
Enclosure or soundproofing of pump station.	✓	✓	✓			Environmental manager	Ongoing
Using rubber mounts or dampers to reduce vibration noise.	✓	✓	✓			Environmental manager	Ongoing
Erecting noise barriers or vegetation buffers.	✓	✓	✓			Environmental manager	Ongoing
Reducing pump speed during non-sensitive hours, where possible.	✓	✓	✓			Environmental manager	Ongoing
Access road							
Enforce speed limits to minimise engine and tire noise.		✓	✓	✓		Environmental manager	Ongoing
Ensure trucks and heavy equipment are well-maintained to minimize exhaust and engine noise.		✓	✓	✓		Environmental manager	Ongoing
Avoid convoys to prevent cumulative noise effects, by staggering truck movements.		✓	✓	✓		Environmental manager	Ongoing
Conduct regular noise assessments to identify high-noise areas and take corrective action.		✓	✓	✓		Environmental manager	Ongoing



Increase in disturbing noise levels affecting sensitive receptors							
General miscellaneous measures							
Following a noise related community complaint/ grievance, undertake observational monitoring and noise checks of the identified noise source, to assess the effectiveness of control measures.			✓			Environmental manager	As required
Engage communities around upcoming potential noisy activities associated with future works to inform them of control measures to minimise adverse impacts.			✓			Environmental manager	As required
Given the uncertainty in equipment, schedules, and activity intensities, a qualitative assessment following international best practices was undertaken for the construction, decommissioning and closure phases. Once this information becomes available, during the pre-construction phase, the noise simulation model must be updated to include this information.	✓					Environmental manager	Completed prior to construction
Additional modelling is required for the mitigated scenario for the operational phase of the Mine which needs to be completed before construction commences.	✓					Environmental manager	Completed prior to construction
Implement the noise monitoring programme included in Section 6.1.5		✓	✓	✓		Environmental manager	Completed prior to construction

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.2 Cultural Heritage Mitigation Measures

The mitigation measures required to manage cultural heritage impacts are outlined in the table below. Information provided in the Section below was sourced from the Cultural Heritage Impact Assessment (PGS, 2025) and ESMPU (MTL, 2023).

Table 4-15: Mitigation Measures: Direct and Indirect Loss or Disturbance of Tangible Cultural Heritage Resources

Direct and Indirect Loss or Disturbance of Tangible Cultural Heritage Resources	
Management Outcome	<ul style="list-style-type: none"> Ensure the preservation, protection, and respectful management of both tangible and intangible cultural heritage resources
Performance Indicator	<ul style="list-style-type: none"> Number of heritage sites with established and maintained protective buffers. Granting of removal permits. Successful implementation of the Change Find Procedure.
Performance Target	<ul style="list-style-type: none"> No loss or damage to identified significant cultural heritage sites other than those authorised for removal.



Direct and Indirect Loss or Disturbance of Tangible Cultural Heritage Resources							
Emergency Response Procedure	• Not Applicable.						
Monitoring Programme	• Not applicable						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
TNCL must implement the Cultural Heritage Management Plan (CHMP) included in Appendix E.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
<p>It is essential to meaningfully involve key stakeholders in the management of cultural heritage impacts associated with the Project, particularly those responsible for safeguarding cultural resources and the local communities residing within the Project area and across the border in Burundi (specifically those communities engaged in cross-border trade and intangible heritage practices). This need to be incorporated into the SEP. This approach aligns with the requirements set out in the Operational Guidelines of UNESCO and the IFC Performance Standards, particularly Performance Standard 8 on Cultural Heritage and Performance Standard 1 on Stakeholder Engagement.</p> <p>Ongoing stakeholder engagement will be critical and should include activities such as a detailed community needs assessment, the establishment of collaborative governance structures, delivery of cultural sensitivity training for project personnel, and the identification of additional proactive mitigation measures to protect and promote cultural heritage. Furthermore, community-led heritage initiatives should be supported to empower affected populations and preserve traditional practices. A robust monitoring and evaluation framework must also be developed to track the effectiveness of these initiatives and adjust interventions where needed. The CHMP provides the necessary details.</p> <p>The CHMP must be treated as a living document and updated continuously to reflect the evolving dynamics within both affected Tanzanian and Burundian communities. This will ensure that all affected stakeholders are appropriately recognised, their heritage values respected, and that cross-border cultural interactions, are sustained.</p>	✓	✓	✓			Environmental Manager and Community Relations Manager	Ongoing
Develop and implement the change find procedure as outlined in the CHMP included in Appendix E for unexpectedly discovered archaeological and cultural heritage resources during mining activities.	✓	✓	✓	✓	✓	Environmental Manager	As required
Where cultural heritage resources need to be removed due to the location of mining related infrastructure, the necessary removal permits from the Division of Antiquities must be obtained prior to any construction activities commencing. The details of this process are outlined in the CHMP included in Appendix E.	✓					Environmental Manager	As required



Direct and Indirect Loss or Disturbance of Tangible Cultural Heritage Resources							
Only cultural heritage resources which need to be removed for the placement of mining related infrastructure should be physically removed. Any cultural heritage resources within the project area, which do not need to be physically removed for mining infrastructure should remain undisturbed, and no-go buffers should be established around these sites.	✓	✓	✓	✓	✓	Environmental Manager	As required
Further consultation is required with the affected communities which will be relocated to properly map and identify the intangible heritage sites within the Project Area. This needs to be done prior to the establishment of any infrastructure. The CHMP must be updated to incorporate any new information and recommendations and mitigation measures designed in consultation with affected communities.	✓					Environmental Manager	As required
TNCL must inform communities once land clearance activities are likely to commence and provide those communities with the opportunity to collect and harvest medicinal plants pre-construction.	✓					Environmental Manager	As required
TNCL must engage with the affected community pre-construction and mark all culturally important trees. Depending on the location of these trees, consideration must be given to potentially providing controlled access to these trees.	✓					Environmental Manager	As required
TNCL together with the affected communities will identify important cultural trees such as the <i>Mrumba</i> , <i>Minyaa</i> , <i>Nganigani</i> , and <i>Jatropha</i> together with important medicinal plants and establish a propagation programme which will cater for planned efforts to grow new plants, either from seeds, cutting or relocated plants. As part of this programme consideration should be given to the identification of alternative tree species for medicinal use and food production to ensure the survival of traditional knowledge systems. A suitable area outside of the Project area needs to be identified within input from the community. The cost associated with the establishment and maintenance of the propagation programme will be for the cost of TNCL.	✓	✓	✓	✓		Environmental Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3 Socio-Economic Environment Mitigation Measures

4.3.1 Blasting and Vibrations

The mitigation measures required to manage blasting and vibration impacts are outlined in the table below. Information provided in the Section below was sourced from the Blast Impact Assessment (Zeeman, 2025) and ESMPU (MTL, 2023).



Table 4-16: Mitigation Measures: Potential Impacts of Blasting in Construction Phase

Potential Impacts of Blasting in Construction Phase							
Management Outcome	<ul style="list-style-type: none"> Avoid the environmental and social impacts of blasting activities to ensure the safety and well-being of workers and nearby communities. 						
Performance Indicator	<ul style="list-style-type: none"> Ground Vibration (Peak Particle Velocity - PPV) - Measured ground vibration intensity at sensitive receptors or structures (mm/s). Air Overpressure (dB) - Air shock wave caused by blasting, measured in decibels. Frequency of Exceedances - Number of times vibration or airblast limits are exceeded. Number of formal complaints received from the community regarding blasting impacts. Adherence to planned blast times communicated to stakeholders and scheduled for minimal disruption. Instances where fragmented rock travels beyond the blast area. 						
Performance Target	<ul style="list-style-type: none"> Number of notifications sent to neighbouring communities before blasting. Compliance with 200 m blast zone. Ground vibration at sensitive sites will be below 5mm/s (ppv) at all times, and air blast at sensitive sites will be below 120dB at all times. 0 exceedances of regulatory or project-specific thresholds per reporting period. Timely resolved complaints. 100% compliance with approved blasting schedule and notification protocols. Zero incidents of flyrock leaving the controlled blast zone. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Refer to Section 6.1.6. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Proper and appropriate communication with communities about blasting, monitoring and actions undertaken for proper control will be required.		✓				Environmental Manager	As required
The potential for Sulphide Dust Ignition (SDI) exists when blasting in the ore zone, necessitating careful management of sulphide dust to ensure safety in mining operations. Ammonium Nitrate Emulsion (ANE)-based explosives will be used (both development and production) to minimise the interaction of ammonium nitrate with sulphides, which could create an explosive environment.		✓				Environmental Manager	As required



Potential Impacts of Blasting in Construction Phase							
It is recommended to conduct a first test blast to confirm levels, ground vibration and air blast. A test blast can be used to detail monitoring done and used to help define blasting operations going forward. The test blast can be based on the existing design following which it may be necessary to define if changes are required or not.		✓				Environmental Manager	As required
The current proposed stemming lengths used provide for some control of fly rock. Consideration can be given to increasing this length for better control of fly rock. Specific designs where distances between blast and point of concern are known should be considered. Recommended stemming length should range between 20 and 30 times the blast hole diameter. For better fly control this should range between 30 and 34 times the blast holes diameter. Increased stemming lengths will also contribute to more acceptable air blast levels.		✓				Environmental Manager	As required
The calculated minimum safe distance for blasting is 200 m. The final blast designs used will determine the final decision on safe distance to evacuate people and animals. This distance may be greater pending the final code of practice of the mine and responsible blaster's decision on safe distance. TNCL has a legal obligation to determine the safe distance.		✓				Environmental Manager	As required
It is recommended that photographic survey of the closest structures to the mining area be undertaken. This entails survey of the structures in the Nyabihanga Village (the closest village to the quarry, at 767 m) to ensure a record of pre-blasting status of the structures. The ground vibration levels expected at Nyabihanga Village when blasting is undertaken at the granite quarry, is close to the 5 mm/s limits and will thus be perceptible. This process should be done in conjunction with a proper monitoring program.	✓	✓				Environmental Manager	As required
Weather conditions should be taken into consideration when blasting as weather may alter the blast pattern, the impact of which is difficult to manage. The following recommendations should be considered: <ul style="list-style-type: none"> Do not blast too early in the morning when it is still cool or when there is a possibility of atmospheric inversion or too late in the afternoon in winter. Do not blast in fog / with low overcast clouds. Do not blast in the dark. Refrain from blasting when wind is blowing strongly in the direction of an outside receptor. It is recommended that a standard blasting time is fixed and blasting notice boards setup at various routes around the project area that will inform the community of blasting dates and times.		✓				Environmental Manager	As required
Inform the communities in advance of blasting activities.		✓				Environmental Manager	As required



Potential Impacts of Blasting in Construction Phase							
Video monitoring of each blast will help to define if fly rock occurred and origin of fly rock. Immediate mitigation measures can then be applied if necessary. The video will also provide a record of blast conditions.		✓				Environmental Manager	As required
Ground vibration at sensitive sites will be below 5mm/s (ppv*) at all times, and air blast at sensitive sites will be below 120dB at all times.		✓				Environmental Manager	As required
Drilling should be carried out with sharp drill bits which help in reducing noise, secondary blasting should be totally avoided.		✓				Environmental Manager	As required
Use, handle and transport explosives in accordance with local and / or national explosives safety regulations.		✓				Environmental Manager	As required
Assigning certified blasters or explosives experts to conduct blasts.		✓				Environmental Manager	As required
Actively manage blasting activities in terms of loading, priming, and firing explosives, drilling near explosives, misfired shots and disposal.		✓				Environmental Manager	As required
Adopt consistent blasting schedules, minimizing blast-time changes.		✓				Environmental Manager	As required
Specific warning devices (e.g. horn signals, flashing lights) and procedures should be implemented before each blasting activity to alert all workers and third parties in the surrounding areas (e.g. the resident population). Warning procedures may need to include traffic limitation along local roadways and railways.		✓				Environmental Manager	As required
Specific personnel training on explosives handling and safety management should be conducted.		✓				Environmental Manager	As required
Blasting-permit procedures should be implemented for all personnel involved with explosives (handling, transport, storage, charging, blasting, and destruction of unused or surplus explosives).		✓				Environmental Manager	As required
Blasting sites should be checked post-blast by qualified personnel for malfunctions and unexploded blasting agents, prior to resumption of work.		✓				Environmental Manager	As required
Specific audited procedures should be implemented for all activities related to explosives (handling, transport, storage, charging, blasting, and destruction of unused or surplus explosives) in accordance with relevant national or internationally recognized fire and safety codes.		✓				Environmental Manager	As required
Qualified security personnel should be used to control transport, store, and use explosives on site.		✓				Environmental Manager	As required



Potential Impacts of Blasting in Construction Phase							
Undertake a house crack survey prior to construction.	✓					Environmental Manager	As required
Blasting designs has to be carried out to take advantage of the rock mass structures in order to minimize vibrations.		✓				Environmental Manager	As required
Soft and controlled blasting techniques will be employed as practicable as possible in order to limit blasting vibrations as directed by the Standard Operating Procedures,		✓				Environmental Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.2 Visual

The mitigation measures required to manage socio-economic impacts are outlined in Table 4-17 below. Information provided in the Section below was sourced from the Visual Impact Assessment (SLR(b), 2025) and ESMPU (MTL, 2023).

Table 4-17: Mitigation Measures: Potential Impact on Receptors, Visual Character and Sense of Place

Potential Impact on Receptors, Visual Character and Sense of Place							
Management Outcome	• Prevent the generation of negative visual views that can alter the sense of place for sensitive visual receptors.						
Performance Indicator	• Number of visual complaints received from the community.						
Performance Target	• Achieve zero community complaints related to visual impacts.						
Emergency Response Procedure	• Not applicable.						
Monitoring Programme	• Not applicable.						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Carefully plan to minimise the construction period and avoid construction delays.	✓	✓				Environmental Manager	As required
Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.		✓	✓			Environmental Manager	As required
Retain and maintain natural vegetation adjacent to the development footprint.			✓			Environmental manager	Ongoing



Potential Impact on Receptors, Visual Character and Sense of Place							
Ensure that visual management measures are monitored by an Environmental Officer. This will include monitoring activities associated with visual impacts such as the siting and management of storage / stockpiles of construction materials, screening, dust suppression, management of waste materials / rubble, control of signage and lighting, dust suppression techniques and ensure that the approved mine design is adhered to.		✓				Environmental Officer	Ongoing
Ensure that visual management measures are monitored by an Environmental Officer. This will include monitoring activities associated with visual impacts such as the control of signage and lighting, dust suppression techniques, concurrent rehabilitation and revegetation of disturbed areas and ensure that the approved mine design is adhered to.			✓			Environmental Officer	Ongoing
Ensure concurrent rehabilitation and revegetation of all disturbed areas occurs during operational phase to ensure development site blends into the surrounding landscape and reduce dust generation.			✓			Environmental manager	Ongoing
All areas that are to be visited by persons not employed at the plant (i.e offices, workshops areas) as well as any residential quarters should be landscaped to improve visual quality. Vegetation screens should be established around the perimeter of these areas.			✓			Environmental manager	Ongoing
Tree's will be introduced to the landscape at strategic locations to break full exposure of the mine.		✓	✓	✓		Environmental manager	Ongoing
Maintain a neat construction site by removing rubble and waste materials regularly.		✓				Environmental manager	Ongoing
During construction, selective lighting for the construction camps and other secured areas should be employed.		✓				Environmental manager	Ongoing
Position storage / stockpile areas in unobtrusive positions on the site, where possible.	✓	✓	✓			Environmental manager	Ongoing
Designated areas for material storage, waste sorting and temporary storage, batching and other potentially intrusive activities will be screened off wherever feasible.	✓	✓	✓			Environmental manager	Ongoing
Make use of existing access roads as far as possible.		✓				Environmental manager	Ongoing
Limit the number of vehicles and trucks travelling to and from the construction site, where possible.		✓				Environmental manager	Ongoing
Ensure that dust suppression techniques are implemented on surface infrastructure, access roads, stockpiles and excavated areas.		✓	✓			Environmental manager	Ongoing



Potential Impact on Receptors, Visual Character and Sense of Place							
Regular reporting to an environmental management team must also take place during the construction phase.		✓				Environmental manager	Ongoing
Ensure that surface infrastructure does not exceed the proposed final footprint sizes and heights.		✓	✓			Environmental manager	Ongoing
Stabilise, shape and contour steep side slopes of stockpiles, WRDs and TSF to facilitate drainage of surface water, and to prevent erosion and slope failure.	✓	✓	✓			Environmental manager	Ongoing
Restrict the movement of maintenance and service vehicles to access roads.		✓	✓			Environmental manager	Ongoing
As far as possible, limit the amount of security and operational lighting present on site.		✓	✓	✓		Environmental manager	Ongoing
Light fittings for security at night should reflect the light toward the ground and prevent light spill.		✓	✓			Environmental manager	Ongoing
Illumination area lighting on tall masts will be confined to the lower landform elevations.		✓	✓			Environmental manager	Ongoing
Lighting fixtures should make use of minimum lumen or wattage.		✓	✓			Environmental manager	Ongoing
Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.		✓	✓			Environmental manager	Ongoing
If economically and technically feasible, make use of motion detectors on security lighting.		✓	✓			Environmental manager	Ongoing
Buildings that are typically not used at night such as offices and workshops should be fitted with sensors that automatically switch off lights in empty rooms after a certain time, to prevent them from inadvertently being left on.		✓	✓			Environmental manager	Ongoing
Buildings on the site should be painted with natural tones that fit with the surrounding environment.	✓	✓	✓			Environmental manager	Ongoing
Non-reflective surfaces should be utilised where possible.	✓	✓	✓			Environmental manager	Ongoing
All infrastructure that is not required post-decommissioning should be removed.				✓		Environmental manager	Ongoing



Potential Impact on Receptors, Visual Character and Sense of Place							
Carefully plan to minimize the decommissioning period and avoid delays.				✓		Environmental manager	Ongoing
Maintain a neat decommissioning site by removing rubble and waste materials regularly.				✓		Environmental manager	Ongoing
Shape and contour remaining TSF and WRDs to be congruent with the surrounding landform.				✓		Environmental manager	Ongoing
Cover the remaining TSF and WRDs with a topsoil layer and revegetate the area.				✓		Environmental manager	Ongoing
Ensure all the mitigation/management actions outlined in the Closure and Rehabilitation reports are conducted.				✓		Environmental manager	Ongoing
Closure activities will be oriented towards returning the site to as natural a state as possible as quickly as practicable.				✓		Environmental manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.3 Social - Socio-Economic

The mitigation measures required to manage socio-economic impacts are tabulated below. Information provided in the Section below was sourced from the Social Impact Assessment (SLR(a), 2025) and ESMPU (MTL, 2023).

Table 4-18: Mitigation Measures: Capital Investment Contributing to the National, Regional and Local Economy, including Local Spend

Capital Investment Contributing to the National, Regional and Local Economy, Including Local Spend	
Management Outcome	<ul style="list-style-type: none"> Maximise socio-economic benefits to the local, regional and national economy through job creation
Performance Indicator	<ul style="list-style-type: none"> Number of local businesses engaged as service providers. Number of community development projects initiated.
Performance Target	<ul style="list-style-type: none"> Enhance local business opportunities through increased participation in the mine's procurement processes. Set targets for number of local businesses to be utilised and monitor these targets. 100% compliance with Procurement Policy. Successful implementation of business training programme.
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable.



Capital Investment Contributing to the National, Regional and Local Economy, Including Local Spend							
Monitoring Programme	• Not applicable.						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Undertake a skills and local business audit during construction, within the Kagera Region. The audit will allow for the identification of locally based services providers with the potential to provide the required services. This should be undertaken in conjunction with the local authorities and civil society groups and NGOs.		✓				Environmental manager	As required
Develop a project specific Procurement Policy. The policy is to include a clear commitment to local-first procurement, where local suppliers, contractors, and labour are preferred if they meet the required HSE, quality, cost, and technical specifications. Local content requirements should be included in the policy that encourages suppliers to use local materials, employ local labour, and partner with local businesses, as far as practically possible.	✓					Procurement Lead	Developed prior to the commencement of construction activities
Review and update the project specific Procurement Policy developed during construction.		✓				Procurement Lead	As required
Source as many goods and services as far as possible from the local and regional economy (e.g. use local contractors and accommodation and equipment suppliers as far as possible and purchase perishable goods locally).	✓	✓	✓	✓	✓	Environmental manager	As required
Provide suitable training to service providers, where possible and practicable.	✓	✓	✓			Environmental manager	As required
Provide training to staff and service providers on how to position themselves for other employment opportunities once construction ends.		✓				Environmental manager	Six months prior to the completion of the construction phase
Develop and implement a business training course for businesses and entrepreneurs within the region as part of the CSR program. The course should cover basic financial literacy and business planning and include mentorship, practical workshops and ongoing support.	✓	✓	✓			Environmental manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



Table 4-19: Mitigation Measures: Increased Employment Opportunities

Increased Employment Opportunities							
Management Outcome	<ul style="list-style-type: none"> Maximise employment opportunities for local communities. 						
Performance Indicator	<ul style="list-style-type: none"> Number of local community members employed. 						
Performance Target	<ul style="list-style-type: none"> 100% compliance with Procurement Policy and gender inclusive performance targets. 100% successful implementation of the Training and Skills Development Programme 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Maximise use of local skills and resources through preferential employment of locals where practicable.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Develop, communicate and implement a fair and transparent labour and Recruitment Policy.	✓	✓	✓	✓		Environmental Manager	Ongoing
Ensure diversity and gender equality in recruitment, as far as possible.	✓	✓	✓	✓		Environmental Manager	Ongoing
Establish and maintain gender inclusive employment targets.	✓	✓	✓	✓		Environmental Manager	Ongoing
Every job application will include a disclaimer to explicitly encourage women to apply.	✓	✓	✓	✓		Environmental Manager	Ongoing
Develop and implement a training and skills development program. The program should provide for the development of foundational skills to enable workers to contribute effectively and should include basic technical training in areas such as construction support, equipment handling, and safety protocols (e.g., working at heights, using protective gear). The program should include hands-on training with experienced supervisors, offering practical, on-the-job experience. The goal is to transition unskilled workers into semi-skilled roles, creating pathways for long-term employment and further skill advancement. As far as possible training provided should be accredited. This programme should be gender inclusive.	✓	✓	✓	✓		Procurement Lead	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



Table 4-20: Mitigation Measures: Increased Local Spend

Increased Local Spend								
Management Outcome	<ul style="list-style-type: none"> Maximise employment opportunities for local communities. 							
Performance Indicator	<ul style="list-style-type: none"> Number of local community members employed. Number of local businesses engaged as service providers. Percentage of women employed in the workforce. Transparent recruitment process. 							
Performance Target	<ul style="list-style-type: none"> Achieve a high percentage of local employment in low and semi-skilled positions. Achieve diversity and gender equality in recruitment process. Successfully implement training and skills development programs aimed at local community members. 							
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 							
Monitoring Programme	<ul style="list-style-type: none"> Not applicable. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Maximise use of local skills and resources through preferential employment of locals where practicable.	✓	✓	✓			Procurement Lead	Ongoing	
Develop, communicate and implement a fair and transparent labour and recruitment policy.	✓	✓	✓			Procurement Lead	Ongoing	
Ensure diversity and gender equality in recruitment, as far as possible.	✓	✓	✓			Procurement Lead	Ongoing	
Develop and implement a training and skills development program. The program should provide for the development of foundational skills to enable workers to contribute effectively and should include basic technical training in areas such as construction support, equipment handling, and safety protocols (e.g., working at heights, using protective gear). The program should include hands-on training with experienced supervisors, offering practical, on-the-job experience. The goal is to transition unskilled workers into semi-skilled roles, creating pathways for long-term employment and further skill advancement. As far as possible training provided should be accredited.	✓	✓	✓	✓		Procurement Lead	Ongoing	

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



Table 4-21: Mitigation Measures: Loss and Sterilisation of Mineral Resources

Loss and Sterilisation of Mineral Resources						
Management Outcome	<ul style="list-style-type: none"> Minimise the loss and sterilisation of economically valuable mineral resources to ensure optimal resource recovery and long-term economic benefits. 					
Performance Indicator	<ul style="list-style-type: none"> Reduction in valuable ore particles found in tailings and waste rock. 					
Performance Target	<ul style="list-style-type: none"> Annual reduction in the amount of economically valuable minerals found in tailings and waste rock. 					
Emergency Response Procedure	<ul style="list-style-type: none"> Not applicable. 					
Monitoring Programme	<ul style="list-style-type: none"> Not applicable. 					
Mitigation Measures	Project Phase*				Responsibility	Timing
	PC	O	D	C		
Regularly monitor and test tailings for remaining valuable minerals, adjusting processing methods as needed to minimise resource loss.		✓			General Manager	Annually
Engage with mining engineers and metallurgists to optimise current processing methods, focusing on reducing the discard rate of valuable ore.		✓			General Manager	Annually

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.4 Social – Social Structures and Well Being

The mitigation measures required to manage social structures and wellbeing are tabulated below. Information provided in the Section below was sourced from the Social Impact Assessment (SLR(a), 2025) and ESMPU (MTL, 2023).

Table 4-22: Mitigation Measures: Increased Incidence of Anti-Social Behaviour, Community Tension and Conflict

Increased Incidence of Anti-Social Behaviour, Community Tension and Conflict	
Management Outcome	<ul style="list-style-type: none"> Minimise negative social impacts associated with the influx of job seekers.
Performance Indicator	<ul style="list-style-type: none"> Strengthened community safety and well-being through proactive management of anti-social behaviours.
Performance Target	<ul style="list-style-type: none"> Successful implementation of the Project-Induced In-Migration (PIIM) Management Plan and Community Health Management Plan.
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable.



Increased Incidence of Anti-Social Behaviour, Community Tension and Conflict								
Monitoring Programme	• Not applicable							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Implementation of the Project-Induced In-Migration (PIIM) Management Plan outlined in Table 4-35 and the implementation of the Community Health Management Plan included in Appendix L.	✓	✓	✓	✓		Environmental manager	Ongoing	
Revise the Community Health Management Plan annually based on the operation phase of the project, which must include measures to prevent potential conflict in the community during the operational phase of the project.		✓	✓	✓		Environmental manager	Annual updates	
Implement a 'locals first' policy with regard to construction labour needs.	✓	✓				Environmental manager	As required	
Develop, communicate and implement a fair and transparent labour and recruitment policy.	✓	✓	✓	✓		Environmental manager	Ongoing	
Develop a Workers Accommodation Management Plan in compliance with IFC guidance on workers' accommodation. The Worker Accommodation Management Plan as a minimum must include the following: <ul style="list-style-type: none"> • Protection of Worker Health, Safety, and Well-being: The management plan must aim to ensure that all accommodation provided to workers meets internationally accepted health and safety standards, including access to clean water, sanitation, adequate space, ventilation, and medical services. • Respect for Human Dignity, Privacy, and Cultural Norms: It should ensure living conditions that respect the dignity and privacy of workers, and consider gender, cultural, and religious sensitivities. • Alignment with IFC PS2 Requirements and International Good Practice: The management plan must explicitly seek to align with the IFC Performance Standards, particularly PS2, and relevant international guidelines such as the IFC/EBRD Workers' Accommodation Guidance Note. • Management of Third-Party Providers and Contractors: It must outline the responsibilities of all parties, including contractors and accommodation service providers, to ensure that standards are consistently implemented and monitored. • Establishment of Monitoring Measures: The management plan must include mechanisms regarding regular auditing, monitoring, and improvement of accommodation conditions (where needed). • Minimisation of Negative Community Impacts: The management plan should aim to prevent or mitigate adverse social impacts on surrounding communities due to the establishment of worker housing (e.g., social tension, pressure on local services). 	✓	✓	✓			Environmental manager	As required	
Engage regularly with local authorities, village development committee and local police force to identify and manage any potential conflict or tension within the community.	✓	✓	✓	✓		Environmental manager	As required	



Increased Incidence of Anti-Social Behaviour, Community Tension and Conflict							
Consult with the local police force to establish standard operating procedures for the control and /or removal of loiterers.	✓	✓	✓	✓		Environmental manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-23: Mitigation Measures: Increased Incidence of Gender Based Violence and Harassment (GBVH)

Increased Incidence of GBVH							
Management Outcome	<ul style="list-style-type: none"> Reduce incidence of GBVH in the workplace and local communities. 						
Performance Indicator	<ul style="list-style-type: none"> Strengthened institutional and community response mechanisms to prevent and address GBVH cases. Improved collaboration with local authorities and support systems for GBVH victims. 						
Performance Target	<ul style="list-style-type: none"> Successful implementation of the PIIM Management Plan and GBVH Management Plan. 100% achievement of annual GBVH awareness training for all workers. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Implementation of the Project-Induced In-Migration (PIIM) Management Plan outlined in Table 4-35 .	✓	✓	✓	✓		Environmental manager	Ongoing
<p>TNCL must develop a comprehensive GBVH Management Plan prior to the commencement of any construction activities. The GBVH Management Plan will serve as a structured framework to proactively prevent, address, and respond to GBVH risks, and to foster a safe, respectful, and inclusive environment for all workers, PAPs, and surrounding communities and must be reviewed annually. This commitment aligns with the requirements of IFC Performance Standard 2: Labour and Working Conditions, Performance Standard 4: Community Health, Safety and Security, and the IFC Good Practice Note: Addressing Gender-Based Violence and Harassment in Projects Supported by the IFC (2020). The development of a GBVH Management Plan is a critical component of TNCL’s ESMS and human rights due diligence processes. The GBVH Management Plan must include the following key elements:</p> <ul style="list-style-type: none"> GBVH Risk Assessment: Conduct a comprehensive assessment to identify potential GBVH risks associated with the Project’s workforce, contractors, and the interaction 	✓	✓	✓	✓		Environmental Manager	Developed prior to construction and implemented in all phases prior to closure



Increased Incidence of GBVH							
<p>between Project workers and Project-affected communities (PAPs), with a particular focus on vulnerable groups. The assessment must consider social, cultural, economic, and security contexts that could exacerbate GBVH risks.</p> <ul style="list-style-type: none"> • Mitigation and Management Measures: Develop and implement specific mitigation measures to prevent and address identified GBVH risks, including: <ul style="list-style-type: none"> ○ Zero-tolerance policies on sexual exploitation, abuse, and harassment (SEAH). ○ Worker codes of conduct that include explicit prohibitions against GBVH, mandatory for all employees and contractors. ○ Mandatory GBVH prevention training for all Project personnel (including contractors and subcontractors). ○ Measures to manage risks associated with worker accommodation camps, worker-community interactions, and community engagement processes. ○ Integration of GBVH considerations into labour recruitment, human resources procedures, and contractor management processes. ○ Measures to protect women on-site (separate accommodation, lockable toilets, good lighting, etc.) • Grievance Mechanisms: Establish confidential, survivor-centred grievance mechanisms for reporting GBVH incidents. These mechanisms must be accessible to both workers and community members, and ensure that complaints are handled sensitively, confidentially, and without retaliation • Response and Support Services: Define clear procedures for responding to GBVH allegations, including survivor support pathways (medical, psychosocial, legal), internal and external reporting requirements, disciplinary procedures, and collaboration with specialised service providers and local authorities. • Annual Review and Adaptive Management: The GBVH Management Plan must be reviewed at least annually and updated based on reported incidents, monitoring results, stakeholder feedback, and lessons learned. A specific update must also be undertaken at the transition from construction to operations to adapt the plan to the operational phase risks and realities. • Monitoring and Reporting: Implement GBVH-specific monitoring indicators (e.g., number of reported cases, number of GBVH trainings conducted, grievance mechanism usage rates) and report internally and externally as appropriate while maintaining confidentiality and survivor protection. • Stakeholder Engagement: Engage with PAPs, local organisations, and service providers to raise awareness about GBVH risks, available grievance mechanisms, and support 							



Increased Incidence of GBVH							
<p>services. Community sensitisation campaigns should be culturally appropriate and inclusive of vulnerable and marginalised groups</p> <ul style="list-style-type: none"> Roles and Responsibilities: Clearly define responsibilities for GBVH management across TNCL departments, contractors, and third-party providers, including HR, security teams, and community liaison officers. 							
Revise the GBVH Management Plan for the operational phase of the project. The plan should be reviewed annually and revised based on reported cases and lessons learned.		✓	✓	✓		Environmental manager	Ongoing
<p>Implement a GBV awareness programme for all workers at the outset of the construction phase. The GBVH training should as a minimum include:</p> <ul style="list-style-type: none"> The importance of understanding and respecting gender differences in the workplace and community. Common gender stereotypes and the harmful effects of such stereotypes. Defining GBVH and its forms (physical, emotional, economic, sexual violence). How GBVH affects individuals, families, and communities. The link between GBVH, poverty and substance abuse. The availability of local resources and support systems of GBVH victims. Project policy regarding GBVH. 	✓	✓	✓	✓		Environmental manager	Ongoing
Undertake annual GBVH awareness training for all workers.			✓			Environmental manager	Ongoing
Work with local authorities including the 'Gender Desk' at local police stations to monitor GBVH cases in the local communities.	✓	✓	✓			Environmental manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-24: Mitigation Measures: Hazardous Excavations and Infrastructure Resulting in Safety Risks to Third Parties and Animals

Hazardous Excavations and Infrastructure Resulting in Safety Risks to Third Parties and Animals	
Management Outcome	<ul style="list-style-type: none"> Ensure the safety of third parties and animals by mitigating risks related to hazardous excavations and mining infrastructure.
Performance Indicator	<ul style="list-style-type: none"> Specific indicators related to reduced incidents of injury or death among third parties and animals.
Performance Target	<ul style="list-style-type: none"> Zero incidents of injury or death among third parties and animals. Completion of safety assessments and implementation of risk mitigation measures within the set timeframe.



Hazardous Excavations and Infrastructure Resulting in Safety Risks to Third Parties and Animals								
Emergency Response Procedure	<ul style="list-style-type: none"> Injury or death of animals or third parties will be managed in line with the emergency response procedure outlined in Section 8. 							
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Prohibit community members from entering the mine area by clearly marking the project boundaries.		✓	✓	✓		Environmental Manager	Ongoing	
Provide a community awareness programs for workers and local community members regarding mine hazards.		✓	✓	✓		Environmental Manager	As required	
Erect signage in English and Swahili as well as pictorially warning of dangers in Project areas.		✓	✓	✓		Environmental Manager	As required	
Build, operate, monitor and close the tailings facility according to the design intent at all phases of the tailings facility lifecycle, using qualified personnel and appropriate methodology, equipment and procedures, data acquisition methods, the Tailings Management System and the overall for the mine and associated infrastructure in line with the Global Industry Standard on Tailings Management (GISTM).	✓	✓	✓	✓	✓	General Manager	Ongoing	

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.5 Social – Quality of Living Environment

The mitigation measures required to manage the social living environment are tabulated below. Information provided in the Section below was sourced from the Social Impact Assessment (SLR(a), 2025) and ESMPU (MTL, 2023)

Table 4-25: Mitigation Measures: Improved Access to Services through CSR Spend

Improved Access to Services Through CSR Spend	
Management Outcome	<ul style="list-style-type: none"> Ensure CSR spend is implemented ethically and sustainably so that local communities benefit from it
Performance Indicator	<ul style="list-style-type: none"> Identification of key community development priorities through structured needs assessments.
Performance Target	<ul style="list-style-type: none"> Regular and meaningful engagement with community stakeholders to align CSR initiatives with local needs. Number of community members benefiting from CSR.
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable.



Improved Access to Services Through CSR Spend								
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Undertake a community needs assessment to understand the key areas of development within each community and develop a Community Development Program for each of the directly affected communities.	✓	✓	✓			Environmental Manager	As required	
It is recommended that TNCL collaborate with the government to enhance key social infrastructure, including health facilities, schools, and roads, for the benefit of the local community and communities along the southern access road.	✓	✓	✓			TNCL	Ongoing	
Regularly engage with community stakeholders to develop meaningful strategies for community development.	✓	✓	✓	✓		Environmental Manager	As required	
Consider future funding requirements for each project so that projects are viable and sustainable into the future.	✓	✓	✓			Environmental Manager	As required	

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-26: Mitigation Measures: Increased Criminal Activity

Increased Criminal Activity								
Management Outcome	<ul style="list-style-type: none"> Reduce criminal activity through collaboration with local authorities, community engagement, and strict enforcement of project policies. 							
Performance Indicator	<ul style="list-style-type: none"> Implementation of the Zero-tolerance Criminal Policy. 							
Performance Target	<ul style="list-style-type: none"> Zero incidents of worker misconduct off-site. 							
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 							
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Work with local authorities to monitor criminal activity in the area.	✓	✓	✓	✓		Environmental Manager	As required	



Increased Criminal Activity							
Establish reporting mechanisms whereby communities can be supported in reporting criminal activity.		✓	✓	✓		Environmental Manager	As required
Establish a community policing forum in each community to assist with monitoring and reporting of criminal activity.	✓	✓	✓	✓		Environmental Manager	As required
Implement a zero-tolerance policy for any project related employees found to be involved with criminal activity.	✓	✓	✓	✓		Environmental Manager	As required
The Project proponent will cooperate with security committees within the surrounding villages to manage security of the area.	✓	✓	✓	✓		Environmental Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.6 Health

The mitigation measures required to manage various health related impacts are outlined in the tables below. Information provided in the Section below was sourced from the Health Impact Assessment (Barnes, 2025).

Table 4-27: Mitigation Measures: Influx of Job Seekers Resulting in an Increased Spread of Disease

Influx of Job Seekers Resulting in an Increased Spread of Disease	
Management Outcome	<ul style="list-style-type: none"> Reduce the risk of transmission of HIV/AIDS, STDs, among project workers and surrounding communities.
Performance Indicator	<ul style="list-style-type: none"> PIIM Management Plan implemented. Number of awareness sessions conducted annually. Availability of pamphlets and posters at key site locations. Number of staff tested voluntarily per year
Performance Target	<ul style="list-style-type: none"> Full implementation of PIIM Management Plan throughout project phases. At least 1 HIV/AIDS and STI awareness programme per year starting in construction phase. Minimum of 2 targeted training sessions for women per year. HIV/AIDS information materials distributed to all workers and displayed in public common areas.
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable.
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable.



Influx of Job Seekers Resulting in an Increased Spread of Disease							
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Implementation of the PIIM Management Plan outlined in Table 4-35.	✓	✓	✓	✓	✓	Safety Manager	Ongoing
Implement an annual HIV/Aids and STI awareness programme for all workers at the outset of the construction phase.	✓	✓	✓	✓		Safety Manager	Ongoing
Provide training sessions to women on protection from STDs, including the provision of female condoms in partnership with local health centres to increase women’s empowerment and independence for the protection of STDs.	✓	✓	✓	✓		Safety Manager	Ongoing
Work with schools to raise awareness on sexual health and prevention of unwanted pregnancies and STD transmission, especially targeting young girls.	✓	✓	✓	✓		CR Manager	Ongoing
Make condoms freely available to employees and all workers.	✓	✓	✓	✓		CR Manager	Ongoing
Issue information pamphlets regarding HIV/Aids to construction staff at the project site office and provide information posters at public spaces within the project site (e.g. common rooms, mess halls, etc.).	✓	✓	✓	✓		CR Manager	Ongoing
Assist construction staff, including long distance truck drivers, with free voluntary HIV testing and counselling.	✓	✓	✓	✓		CR Manager	Ongoing
Revise the Community Health Management Plan annually based on the operation phase of the project.		✓	✓	✓		CR Manager	Ongoing
Continue to ensure that the Kabanga Mine has an up-to-date HIV/AIDS, STI and TB Policy in place which is regularly revised to take into account changing epidemiology of these diseases.	✓	✓	✓	✓		CR Manager	Ongoing
Implement robust information, education, and communication (IEC) programs at contractor and employee induction and regularly at toolbox talks. Organise IEC campaigns for HIV/AIDS, STI and TB. Ensure that IEC programs focus on the prevalence of infections in vulnerable groups (including women and adolescent girls) and the need to provide protection to these groups. Development and implementation of these IEC programs should be in partnership with Kabanga District and Tanzanian practice, to ensure programme alignment.	✓	✓	✓	✓		CR Manager	Ongoing
The current site clinic should continue to offer HIV counselling and testing and referral of those who test positive, for further investigation and treatment initiation at their local community health centre.	✓	✓	✓	✓		CR Manager	Ongoing
Kabanga Mine should consider making arrangements with local HIV/AIDS treatment and care facilities so that treatment and care for HIV/AIDS may be provided on site.	✓	✓	✓	✓		CR Manager	Ongoing



Influx of Job Seekers Resulting in an Increased Spread of Disease							
The site clinic should continue to treat STI (syndromically ⁶) as per Ministry of Health practice.	✓	✓	✓	✓		CR Manager	Ongoing
Support workplace and community-based condom distribution centres.	✓	✓	✓	✓		CR Manager	Ongoing
Support peer educator programs in the workplace. Use locally acceptable tools.	✓	✓	✓	✓		CR Manager	Ongoing
Support equal employment opportunities for women and livelihood programs, to reduce the risk of opportunistic sexual encounters.	✓	✓	✓	✓		CR Manager	Ongoing
The truck stop must provide HIV/AIDS and STI treatment / counselling.			✓			CR Manager	Ongoing
<p>TNCL must develop and implement a comprehensive Employee Health Awareness Program as part of its commitment to promoting worker wellbeing, occupational health, and operational resilience. The Program will align with the requirements of IFC Performance Standard 2: Labour and Working Conditions and Performance Standard 4: Community Health, Safety, and Security, as well as GPIP related to workplace health management.</p> <p>The primary objective of the Employee Health Awareness Program is to promote health education, disease prevention, and wellness initiatives among employees and contractors. It aims to support early detection of health issues, improve health outcomes, reduce absenteeism and occupational health risks, and ensure alignment with broader community health strategies where workforce health intersects with surrounding communities.</p> <p>The Employee Health Awareness Program must include the following components:</p> <ul style="list-style-type: none"> • Health Risk Identification and Education: Provide ongoing education on workplace health risks relevant to the Project's context, including: <ul style="list-style-type: none"> ○ Heat-related illnesses (heat stroke, dehydration, heat exhaustion). ○ Communicable diseases (e.g., HIV/AIDS, tuberculosis, COVID-19, malaria). ○ Non-communicable diseases (e.g., hypertension, diabetes, respiratory conditions). ○ Mental health awareness, including stress management and psychosocial support. Awareness initiatives should use multiple communication channels (e.g., posters, toolbox talks, training workshops, digital communication) and be accessible, culturally appropriate, and regularly updated. • Prevention Strategies and Wellness Initiatives: <ul style="list-style-type: none"> ○ Promote personal hygiene practices and infection prevention measures (especially in communal living areas, such as accommodation camps). ○ Encourage healthy lifestyle choices, including nutrition, exercise, and smoking cessation. 	✓	✓	✓	✓		Safety Manager	Developed prior to the commencement of the project and implemented during all mine phases prior to closure.

⁶ Referring to a group of signs and symptoms that consistently occur together and suggest a specific disease or condition.



Influx of Job Seekers Resulting in an Increased Spread of Disease						
<ul style="list-style-type: none"> ○ Implement hydration campaigns and safe work practices to prevent heat-related illnesses. ○ Conduct targeted campaigns during relevant health calendar dates (e.g., World AIDS Day, World Mental Health Day). • Monitoring and Early Detection Initiatives: <ul style="list-style-type: none"> ○ Integrate routine health screenings for early identification of common occupational and community health risks (e.g., blood pressure checks, blood sugar screenings, respiratory health assessments). ○ Offer voluntary health checks through onsite or partnered mobile clinics at regular intervals. • Emergency Response Training: Train workers and supervisors on how to recognize signs of common workplace illnesses and respond appropriately (e.g., first aid for heat stroke, isolation protocols for communicable diseases) • Mental Health and Psychosocial Support: <ul style="list-style-type: none"> ○ Raise awareness on the importance of mental wellbeing. ○ Provide access to psychosocial support services or referrals. ○ Train supervisors to recognize early signs of mental health distress and support workers confidentially. • Extension to Contractors: Require all contractors and subcontractors to implement or participate in the Employee Health Awareness Program to ensure consistent health standards across all site personnel. • Program Monitoring, Evaluation, and Continuous Improvement: <ul style="list-style-type: none"> ○ Develop health-related key performance indicators (KPIs) such as number of awareness sessions held, attendance rates, number of health screenings conducted, and rates of reported occupational health incidents. ○ Conduct regular evaluations of program effectiveness based on feedback, health surveillance data, and incident reporting, and adjust the program as needed to achieve continual improvement. • Integration into Broader Management Systems: <ul style="list-style-type: none"> ○ Integrate the Employee Health Awareness Program into TNCL’s wider Occupational Health, Safety and Environmental Management System. <p>Where feasible, align program activities with local and national community health strategies and initiatives to promote consistency and maximise social development outcomes.</p>						

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



Table 4-28: Mitigation Measures: Ore Transport Route Health and Safety Affecting Worker Health

Ore Transport Route Health and Safety Affecting Worker Health							
Management Outcome	<ul style="list-style-type: none"> To limit the spread of communicable diseases and ensure the safety and wellbeing of third parties and transport personnel along the concentrate transport route between Kabanga Mine and the Kahama Refinery. 						
Performance Indicator	<ul style="list-style-type: none"> Emergency Preparedness and Response Plan developed and implemented. Health clinic and ALS-equipped ambulance operational at halfway stop. No night driving policy enforced. Health awareness sessions conducted for transport drivers and workers. Availability of free condoms and HIV/STI information at rest points and clinics. 						
Performance Target	<ul style="list-style-type: none"> Emergency Preparedness and Response Plan approved and operational prior to commencement of concentrate transport. Clinic fully staffed and equipped before start of transport; ambulance available 24/7. 100% compliance with night driving restriction throughout project duration. Minimum of 2 awareness sessions held annually. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Road traffic accidents managed in line with the emergency response procedure outlined in Section 7. Development of a Transport Specific Emergency Response Procedure. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Assess the emergency response capability (including medical emergency response) of the Districts and Regions through which ore will be transported in the trucks. Assessment should be undertaken by a team experienced in fatal accident review.		✓				Safety Manager	As required
Compile an ore transport specific emergency preparedness and response plan, including medical emergency response in cooperation with District and Regional authorities, on the route from Kabanga to the Kahama Refinery.	✓	✓	✓	✓		Safety Manager	As required
No night driving should be allowed. Acceptable accommodations (to IFC standards), including ablutions, sleeping facilities and a canteen, should be provided at the halfway stop, for truck drivers.			✓			Safety Manager	As required
Establish a site clinic at the halfway stop. The clinic should staff a primary health care trained nurse and an ALS equipped and staffed ambulance. The clinic should also address primary health care (including HIV/AIDS and STI) and other minor illness and injury. The provision of emergency response measures (including ALS ambulance) at other points along the ore route, should also be considered.		✓	✓			Safety Manager	As required



Ore Transport Route Health and Safety Affecting Worker Health							
Efforts are to be made to prevent the spread of infectious disease from one region to another.			✓			Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-29: Mitigation Measures: Emergency Response Capability of Local Services Affecting Worker Health

Emergency Response Capability of Local Services Affecting Worker Health							
Management Outcome	<ul style="list-style-type: none"> To ensure a safe and healthy working environment at the Kabanga Mine and ore concentrator by strengthening occupational health and safety risk management, emergency preparedness, medical response capacity, and hygiene standards, in alignment with national regulations and IFC Performance Standards. 						
Performance Indicator	<ul style="list-style-type: none"> Completion and implementation of the Occupational Health and Safety Risk Assessment (OHSRA). Emergency and Crisis Management Plan (ECMP) revised based on OHSRA findings. Advanced Life Support (ALS) ambulance available on site 24/7. Food handler medical screenings and hygiene standards implemented. Medical Emergency Response Plan (MERP) developed, including road accident scenarios 						
Performance Target	<ul style="list-style-type: none"> OHSRA finalised prior to construction and reviewed annually to reflect evolving site risks. ECMP updated and aligned with district and regional emergency services before operational phase. Fully staffed and equipped ambulance operational at all times. 100% of food handlers undergo six-monthly medicals and daily health checks; hygiene facilities and training in place MERP integrated into emergency procedures and tested at least twice annually. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Occupational Health and Safety Risk Assessment (OHSRA) is to be completed for the Kabanga Mine and ore concentrator.	✓					Safety Manager	As required
Undertake an investigation into the current emergency response capability of the Nyamiaga District and the Kagera Region.	✓					Safety Manager	As required



Emergency Response Capability of Local Services Affecting Worker Health							
The OHSRA should be updated to take account of future mine construction (concentrator plant, box cut development and mining) and include work accident (underground and concentrator), road accident, fire, fuel spill, reagent spill, tailings failure and others. The OHSRA should then inform a review of the Emergency and Crisis Management Plan and detail the equipment and staff required for plan implementation. Plan revisions should be done in cooperation with Nyamiaga District, Rulenge District and the Ngara Region authorities responsible for emergency response, ensuring a robust emergency response capability for the Kabanga Mine site and for any Kabanga Mine-related off-site emergencies.	✓	✓	✓			Safety Manager	As required
Kabanga Mine should work with Nyamiaga District, Rulenge District and the Ngara Region authorities to help improve non-Kabanga Mine related emergency response capability.	✓					Safety Manager	As required
The Emergency and Crisis Management Plan must include a medical emergency response plan (MERP) and a revised Medical Emergency Evacuation Procedure.	✓					Safety Manager	As required
The MERP must take account of road accident risk, including commuting staff, construction vehicles, vehicles transporting equipment to and from site and trucks carrying ore concentrate leaving site.	✓	✓				Safety Manager	As required
Further Advanced Life Support (ALS) equipment and ambulances required at the Kabanga Mine site clinic.	✓					Safety Manager	As required
Kabanga Mine should consider working with the Nyamiaga District, Rulenge District and Biharamulo District hospitals to improve emergency care delivery. This will be particularly important in the event of multiple casualties, which will overwhelm Kabanga Mine site clinic emergency medical care response and require cooperation with other hospitals.	✓	✓				Safety Manager	As required
Appropriate medical emergency and evacuation insurance and worker compensation cover must be in place for everyone (including visitors, short-term contractors and non-Tanzanian residents) working at or visiting the site.	✓	✓	✓	✓		Safety Manager	As required
The onsite Kabanga Mine ALS ambulance should be available 24/7 to provide an emergency medical response for the mine and offsite mine related accidents.	✓	✓	✓	✓		Safety Manager	As required
Any new canteen facilities and day canteens (lunches) should be safe and hygienic and meet IFC standards	✓	✓	✓	✓		Vector Control Officer	As required
All persons working as food handlers should have a six-monthly occupational medical examination. Food handlers should also have a daily check by their supervisor for infectious illness (records thereof to be kept). Food handlers should be provided with training programs for hygienic food handling.		✓	✓	✓		Vector Control Officer	As required
A change house with showers should be available on-site for all food handlers, so they may shower before commencing work. Food handlers should be provided with freshly laundered work clothes, every day.		✓	✓	✓		Vector Control Officer	As required



Emergency Response Capability of Local Services Affecting Worker Health							
All aspects of canteens (accommodation camp, contractors camps and any day-canteens established at mine or concentrator site) should be managed under competent supervision.		✓	✓	✓		Safety Manager	Ongoing
Ensure kitchen and dining rooms are adequately spacious.	✓					Safety Manager	Ongoing
Implement vector and rodent control programs on site.	✓	✓	✓	✓		Vector Control Officer	Ongoing
Regular cleaning of all canteen surfaces (chairs, tables, door handles) and any other frequently touched surfaces. Provision of clean cutlery and crockery (to be washed in a dishwasher).	✓	✓	✓	✓		Vector Control Officer	Ongoing
Hand wash facility situated at the entrance of the canteen with elbow tap, for use by all before entering.	✓	✓	✓	✓		Vector Control Officer	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-30: Mitigation Measures: Kabanga Mine Medical Capability Affecting Worker Health

Kabanga Mine Medical Capability Affecting Worker Health	
Management Outcome	<ul style="list-style-type: none"> To provide comprehensive, responsive, and professional on-site medical services that support emergency response, occupational health, primary care, and gender-based violence (GBV) support, ensuring the health and safety of all personnel at the Kabanga Mine.
Performance Indicator	<ul style="list-style-type: none"> On-site clinic equipped and staffed for emergency and primary health care. Occupational medical surveillance programme implemented. Availability of diagnostic equipment, including digital X-ray. Electronic medical record system in use. GBV response and employee support services in place
Performance Target	<ul style="list-style-type: none"> Clinic fully operational with ALS ambulance, ATLS/ACLS-trained staff, and 24/7 coverage by project commissioning. 100% of employees enrolled in a surveillance programme managed by an occupational health practitioner. Digital X-ray operational at clinic for use in both surveillance and emergency diagnostics by first year of operations. Secure, accessible system established prior to operations with mobile-enabled access for emergency response team. 100% of reported GBV cases handled confidentially with access to counselling; support services available to all employees.
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable



Kabanga Mine Medical Capability Affecting Worker Health							
Monitoring Programme	• Not Applicable						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
The clinic should have the following functions: • Emergency medical response (accident and medical emergency); • Advanced life support (ALS) ambulance and ALS paramedics on site; and • Doctors trained to Advanced Trauma Life Support (ATLS) and Advanced Cardiac Life Support (ACLS) standards (ALS, ATLS and ACLS capability is always available at large mines and metallurgical plants).	✓	✓	✓	✓		Safety Manager	As required
Primary health care, including minor injury and minor medical issues (colds, 'flu) which may be treated and early return to work made possible. Occupational medical practitioners (doctor trained in occupational health) and primary health care trained nurses would staff the clinic.	✓	✓	✓	✓		Safety Manager	As required
Occupational medical surveillance, done by onsite occupational medical practitioners and staff.		✓	✓	✓		Safety Manager	As required
Equipment for the new site clinic should include a digital X-ray (erect bucky and table) for use in occupational medical surveillance, primary care (including TB) and accidents.	✓					Safety Manager	As required
Medical record storage (electronic), required in terms of occupational medicine and primary care but also useful in the event of medical emergencies as this would allow instant access to medical records (mobile phone) at the emergency site (diabetes, asthma, hypertension, other).		✓	✓	✓		Database Administrator	Ongoing
Caring and appropriate response must be provided to all GBV incidents reported at both work and outside of work (when related to mine employees). Confidential employee assistance and counselling should be easily accessible.		✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-31: Mitigation Measures: Occupational Medical Surveillance

Occupational Medical Surveillance	
Management Outcome	• To ensure comprehensive, risk-based occupational medical surveillance is in place for all employees and contractors to protect worker health and support emergency medical response.
Performance Indicator	• Occupational medical surveillance programme implemented based on OHS risk assessments.



Occupational Medical Surveillance							
	<ul style="list-style-type: none"> Digital X-ray unit procured and operational at site clinic. Medical records stored and accessible electronically. Surveillance includes special risk exposures and fungal infection screening 						
Performance Target	<ul style="list-style-type: none"> 100% of employees and contractors enrolled in appropriate level of surveillance prior to site access. Fully functional digital X-ray in place by start of operations. Secure, centralised medical record system operational with access for emergency responders. Surveillance protocols updated to include all relevant occupational exposures and infection checks. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
All employees and contractors to have some form of occupational medical surveillance (depending on risk and time to be spent on site). The extent of occupational medical examinations and surveillance required should be determined by occupational health and safety (OHS) staff, based on the individual work risk from the OHSRA (OREP for each worker). Occupational medical surveillance could vary from a questionnaire administered by OHS staff on site, through to referral for a full occupational medical examination administered from the site clinic.	✓	✓	✓	✓		Safety Manager	As required
A digital X-ray unit should be acquired for the proposed new site clinic. This will save referral for occupational medical surveillance and TB X-rays and also allow x-rays for injury (and other indications) to be taken and read on site.	✓					Safety Manager	As required
Special risks, such as that of underground work, dust (including respirable crystalline silica), noise, heat, radiation, ergonomic, vibration, ore concentrator reagents, nickel, cobalt, lead, arsenic, mercury or other must be identified and subject to risk assessment and (if required and as part of the hierarchy of controls) considered in occupational medical surveillance.	✓	✓	✓	✓		Safety Manager	As required
Occupational medical surveillance (and primary health care) records would be kept in the site clinic (electronic) and available to emergency health care providers in the event of an accident or medical emergency (health issues, treatment etc) on site or off site.	✓	✓	✓	✓		Safety Manager	As required
Motivation that the dual system of occupational medical examinations by OSHA and the mine be changed to one where OSHA audits that done on the mine.	✓	✓	✓	✓		Safety Manager	As required



Occupational Medical Surveillance							
Ensure that medical surveillance includes examination for fungal infections.	✓	✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-32: Mine Related Infrastructure Providing Breeding Grounds for Mosquitos Increasing the Risk of Malaria

Mine Related Infrastructure Providing Breeding Grounds for Mosquitos Increasing the Risk of Malaria							
Management Outcome	<ul style="list-style-type: none"> To minimise malaria transmission among site personnel and surrounding communities through targeted prevention, monitoring, and entomology-informed control measures. 						
Performance Indicator	<ul style="list-style-type: none"> Malaria control programme developed and implemented based on entomology guidance; includes education during induction/toolbox talks, accommodation safeguards, clinic data monitoring, district collaboration, and prophylaxis provision. 						
Performance Target	<ul style="list-style-type: none"> Programme in place before construction begins; 100% of workers trained, all accommodation protected, monthly data reviewed, at least two engagements with health authorities annually, and prophylaxis provided to all at-risk personnel. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Seek entomology guidance for malaria control initiatives, including mosquito species, mosquito insecticide resistance, parasite resistance etc. in the camp.	✓					Safety Manager	As required
Site induction and at toolbox talks must include Information, education and communication on malaria.		✓	✓	✓		Safety Manager	As required
Ensure that any temporary accommodation that may be built during construction has an effective malaria control programme in place.	✓	✓				Safety Manager	As required
As far as possible cooperate with and assist District malaria control initiatives.	✓	✓	✓	✓		Safety Manager	As required
Disaggregate mine site clinic data to allow for monitoring of camp malaria control effectiveness and to identify hot spots in the community from site clinic diagnosis of malaria in those living outside of camp.	✓	✓	✓	✓		Safety Manager	As required



Mine Related Infrastructure Providing Breeding Grounds for Mosquitos Increasing the Risk of Malaria							
Ensure that employees and contractors living off site benefit as much as possible form malaria control initiatives such as insecticide treated nets and other initiatives as per entomology guidance.	✓	✓	✓	✓		Safety Manager	As required
Continue to effect malaria control at the Kabanga Mine site (but with regular with entomology advice) which should include: <ul style="list-style-type: none"> Prevent pooling and stagnation of fresh water during construction, commissioning, operation. Larvaciding where pooling is not preventable. Fogging (if recommended). Indoor residual spraying. Long-lasting insecticide treated bed nets. Mosquito screening of all buildings. 	✓	✓	✓	✓		Safety Manager	As required
Provision of malaria prophylaxis to employees and contractors considered at risk, e.g. from low malaria risk areas of Tanzania and countries with no or low malaria risk. Prophylaxis should be started before travel to site (travel doctor advice in country of origin) and continued based on discussion with the site clinic doctor.	✓	✓	✓	✓		Safety Manager	As required
Continual awareness by the site clinic staff on the potential threat of changing malaria risk (introduction of new mosquito species/sub-species / drug resistant malaria etc).	✓	✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-33: Mitigation Measures: Underground Workings Causing an Increase in Tuberculosis

Underground Workings Causing an Increase in Tuberculosis	
Management Outcome	<ul style="list-style-type: none"> To prevent, detect, and manage tuberculosis and related communicable diseases among employees and contractors through risk-based medical surveillance, diagnostic capacity, and integrated health programmes in alignment with national and international standards.
Performance Indicator	<ul style="list-style-type: none"> TB control programme in place including IEC, risk-based screening, digital X-ray and sputum testing access at site clinic, mandatory TB questionnaires, and collaboration with regional and district health teams.
Performance Target	<ul style="list-style-type: none"> Programme operational before major construction. 100% of workers enrolled, TB screenings conducted as per individual risk, IEC delivered at induction and toolbox talks, and off-site contractor medicals assessed before mobilisation.



Underground Workings Causing an Increase in Tuberculosis							
Emergency Response Procedure	• Not Applicable						
Monitoring Programme	• Not Applicable						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
A digital X-ray unit is required at the Kabanga Mine site clinic.	✓					Safety Manager	As required
Specific TB control efforts at Kabanga Mine should include IEC, initial, annual and exit medical chest X-rays.	✓	✓	✓	✓		Safety Manager	As required
A TB symptom questionnaire should be used at every visit to the site clinic. There should be easy referral for chest X-ray and sputum testing (Xpert Ultra) (both should be available at the mine clinic).	✓	✓	✓	✓		Safety Manager	As required
Kabanga Mine site clinic should initiate discussion with the Region and District health teams to be able to offer TB investigation, diagnosis, treatment and care of employees and contractors.	✓	✓	✓	✓		Safety Manager	As required
All employees and contractors should be individually assigned to an active TB control programme based on their individual risk. Those with higher TB risk are examined and tested more frequently.	✓	✓	✓	✓		Safety Manager	As required
Contractors from other countries should be medically examined at approved occupational health centres (OHC) before they travel to site. The medical examinations should be done on a format provided by the Kabanga Mine site clinic. The results of the medical examination should be sent to the site clinic for fitness to be assessed by the Occupational Medical Practitioner and feedback provided before the contractor leaves for site. Medical confidentiality issues must be maintained throughout this process.	✓	✓	✓	✓		Safety Manager	As required
Ensure that contractors (and sub-contractors) have similar access to occupational health, basic primary health care and HIV/AIDS, STI and TB programmes as other employees.	✓	✓	✓	✓		Safety Manager	Ongoing
Local employment will help mitigate HIV/AIDS, STI and TB risk from in-migration.	✓	✓	✓	✓		Safety Manager	As required
Ensure that any temporary contractor housing (if built) meets IFC guidelines, is adequately ventilated and that rooms are not crowded.	✓	✓	✓	✓		Safety Manager	As required
Continue to ensure that the Kabanga Mine has an up-to-date HIV/AIDS, STI and TB Policy in place which is regularly revised to take into account changing epidemiology of these diseases.	✓	✓	✓	✓		Safety Manager	Ongoing
Implement robust information, education, and communication (IEC) programs at contractor and employee induction and regularly at toolbox talks. Organise IEC campaigns for HIV/AIDS, STI and TB.	✓	✓	✓	✓		Safety Manager	Ongoing



Underground Workings Causing an Increase in Tuberculosis							
Development and implementation of these IEC programs should be in partnership with Kagera Region and local District TB control initiatives.							
Establish an active TB case finding program at Kabanga Mine site clinic, including x-rays and implementation of a mandatory TB questionnaire at every health visit. This should be applicable to all employees and contractors.	✓	✓	✓	✓		Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-34: Mitigation Measures: Occupational Health and Safety Risk Assessment

Occupational Health and Safety Risk Assessment							
Management Outcome	<ul style="list-style-type: none"> To ensure effective identification, monitoring, and management of occupational health and safety risks for all employees and contractors through a risk-based approach aligned with best practice and regulatory requirements. 						
Performance Indicator	<ul style="list-style-type: none"> Baseline and updated OHSRAs completed for all project phases. Occupational risk exposure profile OREPs developed for all workers. Contractor OHS systems reviewed and aligned with site standards. 						
Performance Target	<ul style="list-style-type: none"> OHSRA and OREPs in place before construction. 100% of employees and contractors covered by medical surveillance informed by OREP. All contractors submit compliant management systems prior to mobilisation. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
A baseline Occupational Health and Safety Risk Assessment should be conducted for the Kabanga Mine and Concentrator.	✓					Safety Manager	As required
Implement continuous and issue based Occupational Health and Safety Risk Assessment.	✓	✓	✓	✓		Safety Manager	Ongoing
Revise OHSRA to reflect the construction and operation of the Kabanga Mine and concentrator.	✓					Safety Manager	Ongoing
Produce an occupational risk exposure profile (OREP) for every employee and contractor.	✓	✓	✓	✓		Safety Manager	As required
Use the OREP to inform the content and frequency of occupational medical surveillance.	✓	✓	✓	✓		Safety Manager	As required



Occupational Health and Safety Risk Assessment							
Contractors should be required to present a Contractor Management System to Kabanga Mine. This should include		✓	✓	✓		Safety Manager	As required
<ul style="list-style-type: none"> Occupational Health and Safety Risk Assessment. Occupational Risk Exposure Profiles (includes man-job specifications and work exposures). Initial (pre-employment) medical examinations to ensure fitness for work; periodic, transfer, post-illness/injury and exit medical examination. Medical insurance for illness and injury. Medical evacuation insurance. Worker compensation insurance. 							

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-35: Mitigation Measures: Population In-Migration, Accommodation and Overcrowding

Population In-Migration and Overcrowding of Accommodation							
Management Outcome	<ul style="list-style-type: none"> To proactively manage and mitigate the social, environmental, health, and infrastructure-related risks associated with PIIM, ensuring the wellbeing of host communities and alignment with IFC Performance Standards. 						
Performance Indicator	<ul style="list-style-type: none"> PIIM Management Plan developed and implemented before construction; includes influx monitoring, community health and housing measures, local recruitment strategies, and coordination with local authorities. 						
Performance Target	<ul style="list-style-type: none"> PIIM in place and operational pre-construction. 100% of accommodation meets IFC standards. Local employment prioritised. Influx risks regularly monitored and mitigation adapted as needed. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Prior to the commencement of any construction activities, TNCL must develop a comprehensive PIIM Management Plan. This Plan is critical for proactively identifying, managing, and mitigating the risks and	✓	✓	✓	✓	✓	Safety Manager	Developed Prior to construction and



Population In-Migration and Overcrowding of Accommodation						
<p>impacts associated with the movement of people into the Project area, driven by real or perceived economic opportunities related to the development and operation of the Project.</p> <p>Project-Induced In-Migration can result in significant environmental, social, economic, and health-related impacts if not properly anticipated and managed. In alignment with IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts, and Performance Standard 4: Community Health, Safety, and Security, the PIIM Plan must form an integral part of TNCL’s broader ESMS and risk management framework. The PIIM Plan should include strategies to:</p> <ul style="list-style-type: none"> • Prevent and Discourage Influx: Implement measures to limit spontaneous influx as much as possible by promoting local recruitment policies, developing clear communication strategies to manage community expectations, and controlling access to construction sites and worker accommodation areas. • Mitigate Environmental, Social, and Economic Impacts: Identify potential impacts on land use, housing availability, access to natural resources, pressure on local infrastructure and services, and risks to vulnerable groups, and spread of communicable diseases and develop measures to mitigate these impacts. • Protect Community Health: Incorporate a robust Community Health Management Strategy within the PIIM Plan to manage the risks associated with communicable diseases (e.g., HIV/AIDS, COVID-19, malaria, respiratory illnesses) that can arise from increased population movement and workforce interactions. • Enhance Community Relations: Develop culturally appropriate communication and grievance mechanisms to engage with both host and migrant communities, promote peaceful coexistence, and prevent potential social conflicts. • Strengthen Governance and Institutional Capacity: Where possible, collaborate with local authorities and community-based organisations to enhance their capacity to manage the additional pressures brought about by in-migration. <p>Key components of the PIIM Plan should include:</p> <ul style="list-style-type: none"> • Baseline data on existing migration patterns and demographic conditions. • Predictive modelling of anticipated influx volumes and areas of settlement. • Clear procedures for monitoring, managing, and responding to influx-related risks throughout the Project lifecycle. • Emergency response measures in case of rapid or unexpected influx events. • A formal monitoring and evaluation framework to assess the effectiveness of PIIM measures and allow for adaptive management. <p>The development and implementation of the PIIM Plan must commence well before construction begins, ensuring that preventive and mitigation strategies are operational during the critical early stages of Project</p>						<p>implemented in all project phases.</p>



Population In-Migration and Overcrowding of Accommodation							
mobilisation. TNCL's commitment to the proactive management of Project-Induced In-Migration is essential to safeguarding the wellbeing of local communities, maintaining the Project's social license to operate, and meeting international lender and stakeholder expectations.							
Kabanga Mine to ensure that sufficient acceptable accommodation is available for employees, contractors and sub-contractors.		✓	✓	✓	✓	Safety Manager	Ongoing
Consider providing for some accommodation on or near site for construction staff to ensure that conditions are better than what might be available in the local housing market. This should be to IFC standard (similar to that currently on site).		✓	✓	✓	✓	Safety Manager	As required
Human Resource practices should discourage work-seeking influx.			✓	✓	✓	Safety Manager	Ongoing
Encourage local employment, wherever possible.			✓	✓	✓	Safety Manager	Ongoing
Mitigate the potential for population influx (job seekers) which could further stress water, sanitation and solid waste removal in villages near the mine, where most may have to live.			✓	✓	✓	Safety Manager	Ongoing
Overcrowding of accommodation, especially during construction, must be avoided (TB and respiratory virus risk).			✓	✓	✓	Safety Manager	Ongoing
Implement vector and rodent control programs on site.			✓	✓	✓	Vector Control Officer	Ongoing
Housing should include the following: <ul style="list-style-type: none"> • Mosquito screen all windows and doors. • Ensure adequate through ventilation of all rooms. • Ensure hygienic canteen and ablution facilities. • Provide laundry facilities. 			✓	✓	✓	Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-36: Mitigation Measures: Possible Future Epidemics and Pandemics

Possible Future Epidemics and Pandemics	
Management Outcome	<ul style="list-style-type: none"> • To ensure operational resilience and safeguard worker and community health during outbreaks, epidemics, and pandemics through a dynamic, preventive, and coordinated Business Continuity Management approach aligned with IFC Performance Standards.
Performance Indicator	<ul style="list-style-type: none"> • Business Continuity Management Plan developed prior to construction; includes outbreak-specific Code of Practice, emergency response protocols, occupational wellness programmes, vaccination campaigns, and coordination with health authorities.



Possible Future Epidemics and Pandemics							
Performance Target	<ul style="list-style-type: none"> • BCM Plan in place pre-construction. • 100% of employees covered by health screening and wellness programmes. • Infectious disease protocols and vaccination schedules implemented in line with national guidance. 						
Emergency Response Procedure	<ul style="list-style-type: none"> • Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> • Not applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
<p>A comprehensive Business Continuity Management (BCM) Plan must be developed by TNCL prior to the commencement of construction activities. The BCM Plan should place particular emphasis on outbreak, epidemic, and pandemic preparedness and response, given the heightened global and regional health risks and their potential to disrupt operations, threaten worker and community health, and undermine project sustainability. In alignment with IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts and Performance Standard 4: Community Health, Safety, and Security, the BCM Plan must ensure that the Project can maintain or rapidly resume critical operations in the event of a significant public health event, while protecting the wellbeing of employees, contractors, and surrounding communities. The BCM Plan should include the following key components:</p> <ul style="list-style-type: none"> • Business Continuity Policy: A formal policy statement should be developed, either as a standalone document or integrated into the broader Health, Safety, and Environment (HSE) Policy. The policy must articulate the Project’s commitment to maintaining operational resilience, protecting worker and community health, and ensuring compliance with national and international health standards during health emergencies. • Code of Practice (COP) for Outbreak, Epidemic, and Pandemic Management: A detailed COP must be developed outlining preventive and response measures for managing communicable disease risks within the workplace and Project area. The COP should: <ul style="list-style-type: none"> ○ Be compliant with prevailing guidelines and regulations issued by the Tanzania Ministry of Health and other relevant authorities. ○ Encourage active collaboration and information sharing with District and Regional Health Authorities. ○ Include protocols for early detection, case management, contact tracing, quarantine and isolation procedures, vaccination campaigns (where applicable), workforce education, and health screening practices. 	✓	✓	✓	✓		Safety Manager	Developed Prior to construction and implemented in all project phases prior to closure.



Possible Future Epidemics and Pandemics							
<ul style="list-style-type: none"> ○ Establish clear communication protocols internally (with employees and contractors) and externally (with communities and authorities) during health emergencies. ● Emergency Preparedness and Response Procedures: The BCM Plan must integrate emergency preparedness procedures, including scenario planning, emergency drills, and contingency measures to minimize disruption to critical operations while safeguarding health and safety. ● Monitoring, Reporting, and Review Mechanisms: Regular monitoring of disease risks, incident reporting, and periodic reviews of the BCM Plan must be undertaken to ensure ongoing relevance, effectiveness, and alignment with evolving public health guidance and project conditions. <p>The BCM Plan must be dynamic, regularly updated based on lessons learned, epidemiological developments, and stakeholder feedback. Its implementation is crucial to ensuring operational resilience, maintaining worker confidence, protecting community health, and preserving TNCL's social license to operate in the event of local, regional, or global public health emergencies.</p>							
<p>Provide Occupational Health and Wellness programmes. These programmes should:</p> <ul style="list-style-type: none"> ● Encourage prevention, early diagnosis and treatment adherence in employees who have HIV, TB, & NCD; and ● Implement programmes encouraging healthy living, dietary advice, exercise, prevention of alcohol and substance misuse and cessation of smoking. 	✓	✓	✓	✓		Safety Manager	Ongoing
<p>Employees and contractors should have annual influenza vaccinations and vaccinations for any future infectious disease, as per prevailing Tanzanian policy.</p>	✓	✓	✓	✓		Safety Manager	As required – annually
<p>Overcrowding of accommodation, especially during construction, must be avoided. Construction labour may choose to live in more cheaply available nearby housing. Conditions in such housing may be poor (especially, from an overcrowding, water and sanitation perspective) which increases the risk of infectious disease transmission. As far as possible, labour recruited from outside of the Ngara District must be screened for infectious illness before arrival on site.</p>		✓	✓			Safety Manager	Ongoing
<p>Continual awareness by the Kabanga Mine site clinic staff and liaison with the District and Region Hospitals on the possibility of acute respiratory infections, meningitis, measles, polio, cholera, typhoid, arbovirus or other outbreaks, especially noting the risk that these diseases may be imported from neighbouring countries.</p>	✓	✓	✓	✓		Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)



Table 4-37: Mitigation Measures: Vaccine Preventable Diseases

Vaccine Preventable Diseases							
Management Outcome	<ul style="list-style-type: none"> To protect employee and contractor health and reduce the risk of communicable disease outbreaks through appropriate, risk-based vaccination and immunisation protocols. 						
Performance Indicator	<ul style="list-style-type: none"> Vaccination status verified during initial medical surveillance. Required immunisations provided per Tanzanian Ministry of Health guidelines and international travel health advice. 						
Performance Target	<ul style="list-style-type: none"> 100% of employees and contractors screened at entry. Relevant vaccinations (e.g., Yellow Fever, rabies, influenza, COVID-19) provided based on role, origin, and risk assessment. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Employees and contractors to have their vaccination profiles checked at initial occupational medical surveillance and updated, if needed.		✓	✓	✓		Safety Manager	As required
Travellers from outside of Tanzania should seek medical advice on what vaccinations (e.g. Yellow Fever) or booster vaccinations (such as for diphtheria, polio, tetanus, pertussis) are required before travel, depending on risk assessment.		✓	✓	✓		Safety Manager	As required
Rabies immunoglobulin does not appear to be readily available in Tanzania. Therefore, a rabies vaccination is a recommendation for those who may work or venture off site.		✓	✓	✓		Safety Manager	As required
Consider providing annual influenza vaccination for employees and contractors		✓	✓	✓		Safety Manager	As required
Appropriate vaccinations for employees and contractors as per prevailing Tanzania Ministry of Health advice.		✓	✓	✓		Safety Manager	As required
Recommend vaccination of the expatriates coming to site, as per prevailing COVID-19, influenza (and other) vaccination policies in their country of origin.		✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-38: Mitigation Measures: Alcohol and Substance Misuse



Alcohol and Substance Misuse							
Management Outcome	<ul style="list-style-type: none"> To prevent workplace incidents and protect worker health and safety through the enforcement of a strict alcohol and substance misuse policy, supported by testing, education, and awareness. 						
Performance Indicator	<ul style="list-style-type: none"> Policy in place including random, post-incident, and for-cause testing. Risk-based testing for safety-critical roles; education included in induction/toolbox talks. Awareness materials displayed on site. 						
Performance Target	<ul style="list-style-type: none"> Policy implemented before construction. 100% of safety-critical workers subject to regular testing. Awareness programme delivered site-wide. Educational materials available at all key locations. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Ensure that an up-to-date alcohol and substance misuse policy is in place which provides for random, post incident and on-suspicion testing.	✓	✓	✓	✓		Safety Manager	As required – developed prior to construction
As part of risk based medical surveillance, safety critical occupations should be identified and regular substance testing (including cannabis) for certain occupations (driver, machinery operators, working at height etc) be required.		✓	✓	✓		Safety Manager	As required
Develop and implement specific alcohol and substance education and awareness programs for induction and toolbox talks.	✓	✓	✓	✓		Safety Manager	As required
Information posters (from Ministry of Health and NGOs) should be available on the work site and at the site clinic.		✓	✓	✓		Safety Manager	As required
Implement strict alcohol and substance misuse policy and practice.		✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-39: Mitigation Measures: Smoking



Smoking								
Management Outcome	<ul style="list-style-type: none"> To protect worker health and promote a smoke-free working environment through a clear non-smoking policy, designated areas (if applicable), and ongoing awareness. 							
Performance Indicator	<ul style="list-style-type: none"> Non-smoking policy developed and enforced; designated smoking areas established (if applicable); smoking risks addressed in induction, toolbox talks, and site signage. 							
Performance Target	<ul style="list-style-type: none"> Policy in place before construction. 100% of workers informed during induction. Safe smoking areas clearly marked. Awareness materials displayed at key locations on site. 							
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 							
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
Develop and implement a non-smoking policy for the Kabanga Mine.	✓	✓	✓	✓		Safety Manager	As required – developed prior to construction	
In as far as this is necessary (if smoking allowed on site) demarcate safe smoking areas.	✓	✓	✓	✓		Safety Manager	Ongoing	
Undertake education and awareness programmes about smoking as part of induction and ongoing toolbox talks.		✓	✓	✓		Safety Manager	As required	
Implement strict alcohol and substance misuse policy and practice.		✓	✓	✓		Safety Manager	Ongoing	
Information posters (from Ministry of Health and NGOs) should be available on the work site and at the site clinic.		✓	✓	✓		Safety Manager	As required	

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-40: Mitigation Measures: Local Health Service Infrastructure and Capability

Local Health Service Infrastructure and Capability	
Management Outcome	<ul style="list-style-type: none"> To ensure informed health planning and adequate medical response by collecting baseline health data, assessing local health system capacity, and establishing a fully operational site clinic prior to construction.



Local Health Service Infrastructure and Capability							
Performance Indicator	<ul style="list-style-type: none"> Baseline health data collected. Local health facility and emergency response assessments completed. Site clinic constructed, equipped, and staffed. Clinic access ensured for all workers. 						
Performance Target	<ul style="list-style-type: none"> Completion of Comprehensive Health Impact Assessment. Clinic operational before site works commence. 100% of employees and contractors have access to site medical services. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Baseline health data (as per the IFC Principles) should be collected before construction begins (part of a Comprehensive Health Impact Assessment). Particular focus should be on HIV/AIDS, TB, STI, malaria, diarrhoeal disease (including cholera), GBVH, non-communicable disease, alcohol and substance misuse, rabies and others flagged in the Health Impact Assessment.	✓					Safety Manager	Prior to the commencement of the construction phase.
A better understanding of the population served, buildings, equipment and staffing of the local health facilities is required. This will assist Kabanga Mine in determining assistance that may be provided to help mitigate impacts of population in-migration related to mine construction and operation.	✓					Safety Manager	Prior to the commencement of the construction phase.
An assessment is required of medical emergency response capability in the area, including stabilisation and transfer to definitive care. The first section of the ore transport route should be included in the assessment, as emergency response would most likely have to be from/involve Kabanga Mine. Concerns identified should be addressed.	✓					Safety Manager	Prior to the commencement of the construction phase.
Outbreak, epidemic and pandemic response capability of the District and Region (understanding that this will be with Ministry of Health help), should be assessed and areas where Kabanga Mine may be able to assist identified.	✓					Safety Manager	Prior to the commencement of the construction phase.
Ensure that the new Kabanga Mine site clinic is built, equipped and staffed before construction activities begin. This will then deliver emergency care, primary health care	✓	✓				Safety Manager	Ongoing



Local Health Service Infrastructure and Capability							
and occupational medical surveillance on site and off site in the case of mine related accidents.							
Ensure that employees and contractors working at Kabanga Mine during construction and operation are able to utilise the site clinic. This will help prevent possible overload of local health facilities and also ensure a good standard of medical care.		✓	✓			Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-41: Mitigation Measures: Primary Health Care in the Community

Primary Health Care in the Community							
Management Outcome	<ul style="list-style-type: none"> To reduce health system strain and social risks by promoting local employment, managing recruitment, and supporting local health services through clinic expansion and coordination. 						
Performance Indicator	<ul style="list-style-type: none"> Liaison with District health team maintained; recruitment controlled to limit unsolicited job-seeker influx; local hiring prioritised; site clinic capacity expanded. 						
Performance Target	<ul style="list-style-type: none"> Ongoing engagement with Ngara District health team. 100% of contractor recruitment channelled through approved processes. Local hires prioritised where feasible. Clinic expansion completed before construction peak. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
There may be a large in-migration of work seekers and local health facilities may consequently be impacted. Continuous liaison with the Ngara District health team is required so as to provide assistance where possible.		✓	✓			Safety Manager	As required
Ensure that recruitment processes (contractors, subcontractors) are managed so as to reduce the number of workers arriving in the area without work offers from Engineering Procurement and Construction (EPC) contractors and subcontractors.		✓	✓	✓		Procurement Lead	Ongoing



Primary Health Care in the Community							
Make effort to employ local residents, as far as possible.		✓	✓	✓		Procurement Lead	Ongoing
The current Kabanga Mine site clinic should be expanded, including building, equipment and staff		✓				Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-42: Mitigation Measures: Non-Communicable, Food and Nutrition Related Diseases

Non-Communicable, Food and Nutrition Related Diseases							
Management Outcome	<ul style="list-style-type: none"> To reduce obesity-related health risks by promoting healthy lifestyles through nutrition, education, workplace wellness programmes, and collaboration with local health services. 						
Performance Indicator	<ul style="list-style-type: none"> Obesity education integrated into inductions and toolbox talks; healthy food options provided in canteens. Wellness and surveillance programmes include non-communicable diseases screening and counselling. 						
Performance Target	<ul style="list-style-type: none"> 100% of workers receive obesity awareness during induction. Nutritious meals available at all canteens; health promotion materials displayed at key locations. Wellness checks conducted annually. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
Manage obesity in employees and contractors.		✓	✓	✓		Safety Manager	As required
Information, education and communication on obesity should be included at induction and toolbox talks.		✓	✓	✓		Safety Manager	As required
Canteen food should be healthy and nutritious.	✓	✓	✓	✓		Safety Manager	Ongoing
Posters (including calorific values of certain foods) should be displayed in canteens.		✓	✓	✓		Safety Manager	Ongoing



Non-Communicable, Food and Nutrition Related Diseases							
Display information, education and communication material in prominent places on site such as canteens, change houses and the Kabanga site clinic.		✓	✓	✓		Safety Manager	Ongoing
Site clinic staff are often in an influential position to discuss eating habits and to emphasise the increased risks that non-communicable diseases / chronic diseases such as obesity, present.		✓	✓	✓		Safety Manager	Ongoing
Work with the district and local health centre and dispensary health teams in efforts to influence lifestyle choices that lead to increased rates of non-communicable disease.		✓	✓	✓		Safety Manager	As required
Use good occupational medical surveillance and wellness programmes for employees and contractors to encourage healthy lifestyles which have benefits beyond the workplace.		✓	✓	✓		Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-43: Mitigation Measures: Veterinary Medicine and Zoonotic Diseases

Veterinary Medicine and Zoonotic Diseases			
Management Outcome	<ul style="list-style-type: none"> To prevent and manage zoonotic disease transmission, vector-related risks, and envenomation incidents through proactive surveillance, awareness, risk-based vaccination, and coordinated emergency response. 		
Performance Indicator	<ul style="list-style-type: none"> Liaison with local health authorities maintained; Disease risks (e.g. Ebola, Marburg, Mpox, rabies) integrated into BCM and MERP; Awareness training and IEC materials provided; Site and accommodation areas secured and treated. Risk-based vaccinations administered. 		
Performance Target	<ul style="list-style-type: none"> Surveillance and contingency planning in place pre-construction. 100% of relevant workers trained during induction. High-risk staff vaccinated as required. Site secured against stray animals and pest breeding. Antivenom availability monitored and referral plans established. 		
Emergency Response Procedure	<ul style="list-style-type: none"> Medical Emergencies for snakes, scorpions and spider bites should be managed in line with the emergency response procedure included in Section 8. 		
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 		
Mitigation Measures	Project Phase*	Responsibility	Timing



Veterinary Medicine and Zoonotic Diseases							
	PC	C	O	D	C		
Continual liaison with local health authorities so as to be informed of Ebola, Marburg, Mpox risk in the area.	✓	✓	✓	✓		Safety Manager	As required
Cooperation with local authorities on controls that may be required in the event of Ebola, Marburg, Mpox outbreak.	✓	✓	✓	✓		Safety Manager	As required
Business continuity management plan to take Ebola, Marburg, Mpox risk into account.	✓	✓	✓	✓		Safety Manager	As required
Assist local and National authorities in their implementation of the National Marburg Virus Disease (MVD) Contingency Plan, in the event of local MVD outbreak.	✓	✓	✓	✓		Safety Manager	As required
Kabanga Mine to ensure that fencing is sufficient to keep out dogs and other animals that may carry rabies, especially near accommodation/canteens.		✓	✓	✓		Safety Manager	Ongoing
Rabies may pose be a significant risk to those whose work (or housing or recreation) takes them outside of fenced mine areas. Risk assessment should determine the need for rabies pre-exposure prophylaxis vaccination of such employees and contractors.		✓	✓	✓		Safety Manager	As required
Information, education and communication must be undertaken at induction and tool box talks. Topics must include: <ul style="list-style-type: none"> • Rabies • Brucellosis (and the risk of becoming infected by eating bush meat and drinking unpasteurised milk) • Tumbu fly • Awareness and prevention of bites/stings from snakes, spiders and scorpions. 		✓	✓	✓		Safety Manager	As required
Regarding rabies, in the event of any animal bite, patients must immediately be referred to site clinic, for assessment and onward referral for vaccination (including immunoglobulin, if indicated).		✓	✓	✓		Safety Manager	As required
Prevent infestation of Tumbu fly through ironing of clothes (or drying clothes indoors).		✓	✓	✓		Safety Manager	As required
Bush in the immediate vicinity of work, accommodation and canteens should be cleared.		✓	✓	✓		Safety Manager	As required
Medical Emergency Response Plan to take snake, scorpion and spider envenomation risk into account, knowing what to do and where to take a bite or sting victim.		✓	✓	✓		Safety Manager	As required
All snake bite victims must be admitted to a hospital that has a stock of and capability to administer antivenom and deal with any side effects, such as anaphylaxis.		✓	✓	✓		Safety Manager	As required



Veterinary Medicine and Zoonotic Diseases							
The site clinic should be continually aware of whether local hospitals have antivenom and must have contingency plans in place if antivenom is not available locally.		✓	✓	✓		Safety Manager	Ongoing
A variety of courses including Snake Awareness, Scorpion Awareness and Venomous Snake Handling are available online (African Snakebite Institute) and it is recommended that Kabanga Mine arrange for certain employees (team leaders, supervisors, health and safety) have such training. An onsite course should be considered.		✓	✓	✓		Safety Manager	As required
Special attention must be paid to ensure that any timber used underground is properly treated to prevent fungal growth and consequent possible fungal infections.		✓	✓	✓		Safety Manager	As required
Fumigation will be periodically conducted to control vectors and pest infestations.		✓	✓	✓		Safety Manager	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

Table 4-44: Mitigation Measures: Nickel, Cobalt, Lead, Arsenic and Silica

Nickel, Cobalt, Lead, Arsenic and Silica							
Management Outcome	<ul style="list-style-type: none"> To identify and manage occupational and community health risks associated with exposure to nickel, cobalt, lead, arsenic, and respirable crystalline silica (RCS) through risk-based assessment, monitoring, and medical surveillance. 						
Performance Indicator	<ul style="list-style-type: none"> Occupational Hygiene and Community Health Risk Assessment conducted. Control measures (ventilation, PPE, dust suppression) implemented. Medical surveillance programme established for exposed workers. 						
Performance Target	<ul style="list-style-type: none"> Occupational Hygiene and Community Health Risk Assessment completed prior to construction; 100% of exposed workers receive initial, annual, and exit medical exams including lead testing, X-rays, and lung function tests as required. 						
Emergency Response Procedure	<ul style="list-style-type: none"> Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> Not Applicable. 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
A formal Occupational Hygiene and Community Health Risk Assessment should be undertaken for the mine and ore concentrator. This will assess occupational hygiene	✓					Safety Manager	Implemented prior to construction



Nickel, Cobalt, Lead, Arsenic and Silica							
risks generally and more specifically for nickel, cobalt, lead, arsenic and respirable crystalline silica (RCS). Such assessment will inform controls that may be needed.							
The Occupational Hygiene and Community Health Risk Assessment should measure baseline nickel, cobalt, lead and arsenic that may already be in the environment as well as that which may be expected from mining, ore concentrating and discharge to storage facilities.	✓					Safety Manager	Implemented prior to construction
The Occupational Hygiene and Community Health Risk Assessment must consider RCS associated with mining (ventilation discharge), ore concentrating processes and of RCS discharge to waste rock dumps and other storage facilities.	✓					Safety Manager	Implemented prior to construction
Controls will likely include, ventilation, watering down and respiratory protective equipment for exposed workers.		✓	✓	✓		Safety Manager	Ongoing
Initial (pre-employment), periodical (annual, due to TB risk) and exit medical examinations are required for miners and ore concentrator workers exposed to nickel, cobalt, nickel compounds, cobalt compounds and lead. Medical examinations might include lead blood testing (if required from the risk assessment), chest X-rays and lung function testing.		✓	✓	✓		Safety Manager	Ongoing

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.7 Traffic

The mitigation measures required to manage traffic impacts are outlined in the table below. Information provided in the Section below was sourced from the Traffic Impact Assessment (Siyazi, 2025).

Table 4-45: Mitigation Measures: Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users

Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users	
Management Outcome	<ul style="list-style-type: none"> Prevent the risk and impact of road disturbances on the safety of third parties and animals and road deterioration.
Performance Indicator	<ul style="list-style-type: none"> Number of transport-related incidents involving third parties or animals. Compliance with established speed limits and Transport Management Plan.
Performance Target	<ul style="list-style-type: none"> Zero transport-related incidents involving third parties or animals. 100% compliance with speed limits and Traffic Management Plan. 100% compliance with no driving at night.



Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users							
Emergency Response Procedure	• Transport-related incidents will be managed in line with the emergency response procedure outlined in Section 8.						
Monitoring Programme	• Not applicable.						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
<p>TNCL must develop, with input from TANSROADS, and implement a Traffic Management Plan for the Mine. The primary objective of a Traffic Management Plan is to ensure the safe, efficient, and sustainable movement of vehicles and people associated with the mine, while minimising risks to workers, local communities, infrastructure, and the environment. It serves to control project-related traffic, reduce road safety hazards, mitigate disruptions to public transport networks, and ensure compliance with regulatory and permit conditions. The must align with the IFC Performance Standards, particularly Performance Standard 4 on Community Health, Safety, and Security, which requires the identification and management of risks to communities arising from project activities, including road traffic. It also supports the broader environmental and social risk management framework outlined in IFC Performance Standard 1 and aligns with the IFC Environmental, Health, and Safety (EHS) Guidelines on Community Health and Safety by promoting best practices in road safety, driver training, vehicle maintenance, and stakeholder engagement. As a minimum, the Traffic Management Plan must include the following:</p> <ul style="list-style-type: none"> • Designated Transport Routes: Approved access and haul routes should be clearly defined and mapped. Routes should avoid sensitive areas such as schools, health centres, and residential zones wherever possible, and must be communicated to all drivers and contractors. • Speed and Access Control: Speed limits, signage, and restricted access areas must be implemented to enhance road safety. Traffic calming measures may be needed near communities, including speed humps, crossing zones, and no-go areas • Driver and Vehicle Safety: All drivers must be trained in defensive driving, fatigue management, and traffic protocols. Vehicles must be regularly inspected and maintained to meet national safety standards and project-specific requirements. • Community Protection Measures: Measures must be put in place to reduce risks to local communities, especially vulnerable groups such as children and pedestrians. This may include buffer zones, safe crossings, public awareness campaigns, and adjusted haul schedules during peak movement times. • Emergency Response Planning: The management plan must include traffic-related emergency procedures aligned with the project’s overall Emergency Response Plan. This should cover accident response, first aid, evacuation routes, and communication protocols. • Stakeholder Engagement and Communication: Local communities and authorities must be engaged throughout project implementation regarding traffic impacts. Advance notice of heavy vehicle movements, road closures, and risk mitigation efforts should be provided 	✓	✓	✓	✓		Environmental manager	Developed prior to construction and implemented in all phase prior to closure



Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users							
<ul style="list-style-type: none"> Monitoring and Reporting: The management plan must include monitoring of key indicators such as vehicle counts, traffic incidents, near misses, and community complaints. Results must be reviewed periodically and corrective actions implemented where necessary. Grievance Mechanism: A dedicated channel for reporting traffic-related concerns must be in place. Complaints must be documented, acknowledged, investigated, and addressed in a timely and transparent manner. Compliance with Legal and Lender Requirements: The Management plan must comply with national traffic regulations and align with IFC Performance Standard 4 and applicable EHS Guidelines. This ensures that traffic risks are managed in a way that protects both people and infrastructure. 							
Ongoing engagement with TANROADS is recommended to ensure the suitability and timely execution of the upgrades for the southern access road. This will ensure operational sustainability and mitigation of road safety risks.	✓	✓				CR manager	As required
Tembo Nickel must obtain necessary transport permits from TANROADS before operations begin. TNCL must register the construction and operation sites with OSHA in compliance with workplace safety standards. OSHA is committed to supporting TNCL through site inspections, including hygiene, electrical, and medical inspections, to ensure full compliance with health and safety regulations.	✓	✓	✓	✓		Environmental Manager	As required
Upgrading of the Southern Access Road should be implemented during the construction phase of Phase 1.	✓	✓				General manager	As required
A "No travelling at night" approach should be enforced for concentrate transport heavy vehicles, for gravel road sections, to reduce the road safety risks associated with heavy vehicles travelling at night time.		✓	✓	✓		General manager	As required
Planning should include allowance for drivers of concentrate transport vehicles stopping and resting at the Nyakanazi truck stop, 140 km from the Proposed Project site.			✓			General manager	As required
A Road Safety Awareness Programs will need to be prepared to educate road users at the Proposed Project and towns and villages along the planned concentrate transport route. It is recommended to collaborate with TANROADS. The program should be rolled out at schools in the communities surrounding the project site as well as the communities that the trucks transporting concentrate between the mine and Kahama will travel.	✓	✓	✓	✓		CR manager	As required
All drivers responsible for transporting nickel sulphide concentrate to the Kahama Refinery will undergo mandatory, project-specific road safety training prior to mobilisation. This training will cover advanced driving techniques, fatigue management, adherence to designated speed limits, emergency response procedures, and safe navigation through community-sensitive and high-risk areas identified along the transport corridor. The training will also include modules on pedestrian awareness, animal avoidance, and the importance of respectful driving behaviour near schools, health facilities, and market zones. Refresher	✓	✓	✓	✓		Environmental manager	As required



Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users							
training will be conducted at regular intervals throughout the life-of-mine to maintain high safety standards and ensure compliance with road safety protocols.							
<p>With specific reference to vulnerable groups (elderly, schools, hospitals and market areas), the following needs to be implemented:</p> <ul style="list-style-type: none"> • Installation of Signage in High-Sensitivity Areas: Erect clear and durable road signage near schools, health facilities, pedestrian crossings, and market areas warning drivers of vulnerable road users and speed reduction requirements. • Designated and Upgraded Pedestrian Crossings: Construct raised pedestrian crossings, speed humps, or zebra crossings with reflective paint and signage in villages, near schools, and along sections with observed high foot traffic. • Provision of Community Safety Infrastructure: Where feasible, provide: <ul style="list-style-type: none"> ○ Sidewalks or demarcated pedestrian pathway ○ Waiting bays or shelters for tuk-tuk/motorcycle users ○ Traffic calming infrastructure (e.g., rumble strips) at community access points • Safe School Access Initiative: Time vehicle movements (particularly concentrate trucks) to avoid school arrival and dismissal times. • Driver Training on Vulnerable Group Sensitivities: As part of the targeted driver training programme, include specific modules on recognising and yielding to vulnerable users, understanding pedestrian behaviour, and safely navigating community-dense areas. • Coordination with Local Traffic Authorities: Work with TANROADS and local police to support enforcement of speed limits and road safety rules in hotspot areas, and to ensure local input into mitigation implementation. • Monitoring and Incident Reporting Mechanism: Establish a community-accessible grievance and incident reporting system that allows residents to report near misses, unsafe driving behaviour, or infrastructure concerns. This data should be used to adjust mitigation strategies over time. 	✓	✓	✓	✓		Environmental manager	As required
Affected persons and structures within the existing road reserves should be relocated, prior to the use of the southern access road.	✓					CR manager	As required
Further investigation needs to be conducted by TANROADS regarding the heavy vehicle weigh bridge located at Mizani (has pedestrian activity) at the existing intersection of Roads T003 (B) and R115: during busy times, heavy vehicles must park within the road reserve of Road T003 (B3) to wait for access to the weigh bridge site. This results in a road safety risk for other vehicles making use of Road T003 (B3).	✓					Environmental manager	As required



Increase in Traffic Volumes Affecting Road Conditions and Safety of Road Users							
To adhere to intersection spacing requirements of 500 meters (as prescribed in the Tanzania Ministry of Works: Road Geometric Design Manual 2011 Edition), the existing Kabanga Site Access Road would need to be closed off to vehicle access should the proposed southern access road be constructed.	✓					Environmental manager	As required
The proposed intersection must be designed according to Tanzania Ministry of Works: Road Geometric Design Manual 2011 Edition requirements.	✓					Environmental manager	As required
All vehicles are to be kept in roadworthy condition.		✓	✓	✓		Environmental manager	As required
All trucks should be fitted with live monitoring equipment that can be monitored remotely.		✓	✓	✓		Environmental manager	As required
Implement a policy of zero tolerance for persons found to be exceeding speed limits, driving in a reckless manner and / or being found under the influence of alcohol / drugs.		✓	✓	✓		Environmental manager	As required
Road safety signs (including speed limits, speed trapping and speed humps) either side of the villages will be established on the access route and within the mine site.	✓	✓	✓	✓		Environmental manager	As required
Speed monitors to be placed in site vehicles. Speed trapping of vehicles on site.		✓	✓	✓		Environmental manager	As required
TNCL must develop a Compensation Plan to manage any impacts arising from road use, including accidents. TNCL must take accountability and ensure fair compensation is provided to the affected individuals.	✓					TNCL	To be developed prior to construction

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.8 Land Use

The mitigation measures required to manage land use impacts are outlined in the tables below. Information provided in the Section below was sourced from the Social Impact Assessment (SLR(a), 2025).

Table 4-46: Mitigation Measures: Economic Displacement and Loss of Access to Natural Resources (incl. Temporary Displacement due to Pipeline) and Physical Displacement

Economic Displacement and Loss of Access to Natural Resources and Temporary Displacement Due to Pipeline and Physical Displacement	
Management Outcome	<ul style="list-style-type: none"> No loss of access to resources and livelihood strategies for affected communities.



Economic Displacement and Loss of Access to Natural Resources and Temporary Displacement Due to Pipeline and Physical Displacement							
Performance Indicator	<ul style="list-style-type: none"> • Easy and fair access to natural resources. • Income equal to or greater than current household income. 						
Performance Target	<ul style="list-style-type: none"> • Successful implementation of the RAP inclusive of the Livelihoods Restoration Plan (LRP). 						
Emergency Response Procedure	<ul style="list-style-type: none"> • Not Applicable. 						
Monitoring Programme	<ul style="list-style-type: none"> • Not applicable 						
Mitigation Measures	Project Phase*					Responsibility	Timing
	PC	C	O	D	C		
TNCL should collaborate with the government to develop a program that helps the local community obtain land ownership documents. This initiative will help safeguard community-owned land from encroachment by newcomers who relocate to the area for employment opportunities.	✓					Environmental Manager	To be developed prior to construction
The project must collaborate with Caritas when developing the Vulnerable Persons Management Plan, as Caritas has extensive experience in this area and works with various vulnerable groups in Ngara.	✓					Environmental Manager	To be developed prior to construction
Community initiatives must be developed with input from the communities and vulnerable people, to support surrounding communities with farming practices. The initiative will include focusing on safeguarding current farming practices from a potential influx of job seekers.	✓	✓	✓	✓	✓	Environmental Manager	Ongoing
Implementation of the approved RAP and livelihood restoration measures.	✓					TNCL RAP Team	Prior to construction commences
Ongoing monitoring of project affected households until such time as livelihoods are restored to pre-project levels.	✓	✓	✓	✓	✓	TNCL RAP Team	Ongoing
Provide access to the project areas which are going to be cleared, for community members to harvest the medicinal plants and rootstock prior to construction for self-cultivation.	✓					TNCL RAP Team	As required
Donate trees and resource species to be cleared during construction to surrounding communities for use as fuel wood to reduce pressure on surrounding natural forests/woodlands.	✓					TNCL RAP Team	As required
Provide alternative livelihood training for persons whose livelihoods are affected by displacement.	✓					TNCL RAP Team	As required



Economic Displacement and Loss of Access to Natural Resources and Temporary Displacement Due to Pipeline and Physical Displacement							
Encourage participation in skills development programs by vulnerable sectors of the community to engage in alternative livelihood programmes.	✓					TNCL RAP Team	As required
Consult with affected communities to determine appropriate location for new churches.	✓					TNCL RAP Team	As required
Construct and commission new churches before demolishing existing churches.	✓					TNCL RAP Team	As required
Relocate churches in a location which is accessible to communities.	✓					TNCL RAP Team	As required
Skills share and transfer must promote sustainable small business enterprise opportunity and reduce reliance upon the project. This will help to ensure independence and longevity for businesses upon mine closure and the future withdrawal of support from the mine.	✓	✓	✓	✓	✓	TNCL RAP Team	As required

* PC (Pre-Construction), C (Construction Phase), O (Operational phase), D (Decommissioning phase) and C (Closure phase)

4.3.9 Transboundary Mitigation Measures

The mitigation measures required to manage of transboundary impacts are outlined in Table 4-46 below.

Table 4-47: Mitigation Measures: Transboundary

Transboundary Mitigation Measures								
Management Outcome	<ul style="list-style-type: none"> Responsible management of transboundary impacts 							
Performance Indicator	<ul style="list-style-type: none"> Number of formal cross-border meetings, agreements, or engagement activities conducted annually. Number of Transboundary Management Plan updates based on monitoring results or stakeholder feedback. 							
Performance Target	<ul style="list-style-type: none"> 100% successful implementation of Transboundary Management Plan 							
Emergency Response Procedure	<ul style="list-style-type: none"> Not applicable 							
Monitoring Programme	<ul style="list-style-type: none"> Not applicable 							
Mitigation Measures	Project Phase*					Responsibility	Timing	
	PC	C	O	D	C			
<ul style="list-style-type: none"> Prior to the commencement of any construction related activities, TNCL must develop a Transboundary Management Plan and implemented in all project phases prior to closure. The Transboundary Management Plan aims to proactively identify, manage, and mitigate environmental, social, and cultural impacts that may extend across to Burundi as a result of the Project’s activities. The overarching objectives of the Plan, consistent with the requirements of 	✓	✓	✓	✓		Environmental Manager	Established prior to construction and implemented in	



Transboundary Mitigation Measures							
<p>the IFC Performance Standards, particularly Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts), Performance Standard 4 (Community Health, Safety, and Security), and Performance Standard 8 (Cultural Heritage), are as follows:</p> <ul style="list-style-type: none"> ○ Promote Cross-Border Cooperation: Facilitate structured, transparent, and ongoing engagement between affected communities, traditional authorities, and governmental institutions on both sides of the border to manage shared environmental, social, and cultural concerns. ○ Safeguard Transboundary Cultural Heritage and Social Practices: Identify and protect intangible and tangible cultural heritage, recognising the cultural interdependence of communities and respecting traditional practices, trade, and spiritual linkages. ○ Manage Shared Environmental Resources Responsibly: Ensure that environmental resources such as water, and biodiversity that are transboundary in nature are protected and managed sustainably, minimising adverse impacts across national jurisdictions. ○ Strengthen Community Health, Safety, and Security Across Borders: Mitigate potential health, safety, and security risks arising from Project activities that may affect cross-border populations, with particular attention to communicable diseases, migration dynamics, and emergency preparedness. ○ Promote Inclusive Stakeholder Engagement: Establish grievance mechanisms, information sharing platforms, and participatory processes that are accessible to stakeholders on both sides of the border, ensuring that all affected or interested parties are informed, consulted, and able to participate meaningfully in decision-making. ○ Align with International Standards and Legal Obligations: Ensure compliance with international best practices, bilateral agreements, national laws, and lender requirements related to transboundary impacts, contributing to the Project’s overall sustainability and social license to operate. ○ Foster Adaptive Management and Continuous Improvement: Embed monitoring, evaluation, and adaptive management systems to review and respond to transboundary issues dynamically, allowing the Plan to evolve in response to changing circumstances and stakeholder feedback. 							all project phases prior to closure.
<p>The Project area is located close to the border with Burundi and the project’s study area and cumulative viewshed (zone of visibility) extend into Burundi thereby posing visual impacts to residents in Kigaga, Rujunga, Mashiga, Saswe and Shinge in the neighbouring country. Since the Kabanga Mine would be the first mining facility to be developed in the area and has the potential to cause large-scale visual impacts, resulting in a degraded sense of place and visual character within the broader region, consideration needs to be given to lessen the visual impact of the development</p>	✓	✓	✓			Environmental Manager	Ongoing



Transboundary Mitigation Measures							
on a transboundary scale. To mitigate the transboundary visual impacts to the communities in Burundi, the unique landscape and visual character of Burundi would need to be retained as far as possible in order to minimize visual intrusion and maintain the overall visual integrity of the affected areas. This can be achieved with the mitigation measures as proposed, most importantly by vegetating the prominent mine infrastructure and all disturbed areas to better blend with the surrounding natural landscape and ensuring on-going monitoring and maintenance of the rehabilitated and vegetated areas to ensure that the vegetation establishes successfully, and that erosion does not occur. While this will not necessarily reduce the visibility of the mine infrastructure, it would reduce the level of perceived intrusion and ultimately reduce the transboundary visual impacts.							
TNCL will establish a Water User Association for the Ruvubu River to facilitate joint resource management among users, including farmers and other stakeholders.	✓	✓	✓	✓		Environmental Manager	Ongoing



4.3.10 Residual Impacts: Mitigation Measures

Mitigation Measures identified to manage residual impacts includes:

- To address loss of job opportunities once the mine closes, comprehensive mine closure planning must be integrated from the early stages project and continuously updated throughout its lifecycle. This planning must involve consideration of several key components:
 - **Economic Diversification:** A central focus of mine closure planning should be developing strategies to diversify the local economy. This may include identifying and investing in alternative economic activities that can provide new sources of income for affected communities. For example, post-closure land use can be planned to support agriculture, tourism, or small-scale industries, creating new job opportunities and reducing dependency on mining.
 - **Community Engagement:** Engaging with the community throughout the closure planning process is vital to addressing their needs and concerns. Stakeholder consultations can help identify local priorities and preferences for post-closure land use, ensuring that the planned activities align with the community's aspirations and capabilities.
 - **Infrastructure and Support Services:** The closure planning process should also consider developing infrastructure and support services that facilitate economic transition. This could involve improving transportation links, establishing business support services, and enhancing access to education and training resources.
 - **Long-Term Monitoring and Evaluation:** Post-closure plans should include mechanisms for ongoing monitoring and evaluation to assess the effectiveness of the implemented strategies. This ensures that any unforeseen challenges can be addressed promptly and that the community continues to benefit from the planned interventions.
- To manage such residual impacts associated with groundwater contamination the following applies:
 - To prevent seepage and associated environmental impacts the TSF is lined with a geomembrane and includes an underdrain system.
 - Development of a post closure groundwater model to predict both water table recovery, decant potential and quality trends in order to develop dynamic mitigation measures that can be adopted for the management of such risk, thus minimising the associated impacts.
 - Implementation of a water treatment systems to treat water to meet environmental quality standards and not pose a contamination risk. It is anticipated that over time the water quality should improve, however the treatment system would need to be in operation until such time and predictive groundwater modelling and monitoring will aid in making management designs with respect to how water is treated and when cessation of these activities.
 - Ensure residue facilities are designed with closure in mind and that appropriate contaminate facilities are constructed to capture any decanting water that may emanate from such facilities.

- Ensure specialist recommendations are implemented with respect to closure and rehabilitation and that rehabilitation is done in accordance with the regulations, standards and best practice guidelines.
- Implementation of site wide stormwater control measures at closure.
- Maintain buffer zones around water resources preventing third party access.
- Undertake concurrent rehabilitation activities.
- Ensure capping of facilities such as the TSF and WRD's are done according to designed closure specifications and that ongoing monitoring is undertaken which will allow for adaptive management strategies to be implemented in the event monitoring indicates changes that could cause significant impacts to manifest.
- Establishment of groundwater monitoring programmes as an early detection system.
- Continuous monitoring to be implemented particularly around the TSF to assess liner integrity, stability and underdrain effectiveness.
- To manage potential residual surface water impacts during and after closure, a comprehensive set of mitigation measures must be implemented to ensure long-term protection of downstream ecosystems and compliance with international good practice as follows:
 - The cumulative and transboundary impacts should be modelled and assessed as part of the final closure planning process, particularly given the Project's proximity to international boundaries and ecologically sensitive areas. This modelling will inform the design of post-closure water management interventions and ensure that all downstream receptors, including transboundary ecosystems, are adequately considered.
 - Proactive engagement with Burundian authorities, as well as relevant park managers, must be undertaken to align on shared water quality objectives, monitoring responsibilities, and potential cross-border concerns. Such collaboration will help foster joint stewardship of water resources and promote regional cooperation.
 - During post-closure, prior to being discharged to the Ruvubu River, the water pumped from the closed underground workings as part of the hydraulic containment system will be treated. Discharge to the Ruvubu River must only be permitted once the treated water meets applicable water quality standards and is deemed safe to contribute to the natural baseflow. Treatment activities must continue until this condition is consistently met. In addition, a seepage collection system downstream of the TSF will continue to capture seepage. This system will remain in place until monitoring indicates that the seepage water meets applicable water quality standards.
 - During closure, the installation of drainage infrastructure, including erosion control and sediment interception measures, will be critical for managing runoff from access roads that will remain for ongoing maintenance activities. These features will help reduce sediment loading to nearby watercourses and maintain the integrity of surface water systems during the post-closure phase.
 - Long-term monitoring of hydrology and water quality downstream of the Project area must be maintained for as long as required. This will ensure early

detection of any delayed contaminant migration or water quality deterioration, enabling timely corrective actions.

- The findings from these monitoring activities must be incorporated into a transparent public reporting system, which will serve as a platform for accountability to regulators, local communities, and other stakeholders. This approach will support trust-building and informed decision-making throughout the closure and post-closure periods.

5. Implementation and Operation: Organisation Structure, Capacity and Competency

The implementation and operation phase is crucial to the success of the ESMP. This phase involves ensuring that the planned mitigation measures are effectively executed, which requires clearly defined responsibilities, a strong implementation structure, and robust operational controls.

Key roles and responsibilities must be clearly outlined, including those of dedicated environmental management personnel and general staff. Everyone involved has a role in ensuring effective environmental management. Operational controls are essential to ensure the environmental management requirements are implemented as planned.

The effectiveness of the ESMP depends on integrating environmental management requirements into the mine processes. This section outlines the roles and responsibilities of all involved parties and the training and awareness programs to be implemented.

With reference to Section 2.3, this ESMP, serves as a foundational framework that informs the later development and implementation of the ESMS, ensuring that the project's E&S management is robust and comprehensive.

5.1 Roles and Responsibilities

The existing Safety, Health, Environmental, and Community (SHEC) structure for TNCL is illustrated in Figure 5-1 below. The information provided in the sections below is based on what is currently available and as such is a high-level overview which needs to be updated prior to the commencement of the project and prior to the implementation of the ESMS. In this regard, the organisation structure needs to be updated to make provision for the following:

- Clearly define roles, responsibilities, and authority to implement TNCL's E&S performance. Clear lines of responsibility and authority must be designated. The personnel must have the appropriate knowledge, skills and experience to implement actions required under the ESMS.
- The competent E&S personnel must on an ongoing basis manage the updating of the Project E&S risks and impacts to ensure that they are adequate and accurate.
- Sufficient management sponsorship and human and financial resources must be provided on an ongoing basis to achieve effective and continuous E&S performance.
- Develop an overarching training programme that will serve to equip project personnel to fulfil their roles and responsibilities whilst both sustaining and then advancing the overall levels of capability. Training may, and should, extend across awareness building, dedicated task-specific training, 'out of the box' training that serves to find new and innovative ways of improving performance and training that ensures that personnel who are required to fulfil an environmental management function understand the requirement, believe in the importance of the requirement and have the necessary skills and capacity to fulfil that function. General steps and guidance regarding the development of an environmental awareness plan and training is included in Section 5.2.



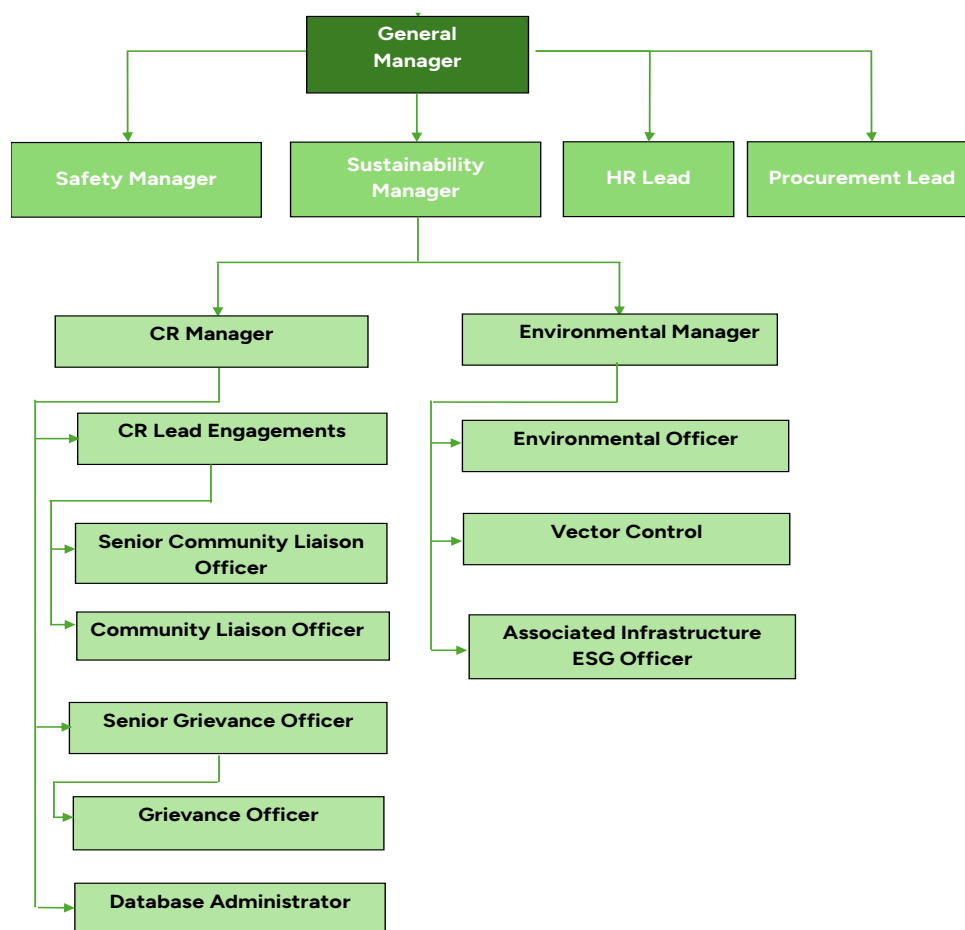


Figure 5-1: Site Organisation for Environmental and Social Team

The existing roles and responsibilities of each position are discussed in more detail below.

5.1.1 General Manager

The General Manager is responsible for overseeing the implementation of operational plans and ensuring that production targets are met efficiently and safely, aligning daily operations with strategic plans. This role involves the following responsibilities:

- **Operational Management:** Oversee the daily operations of the company, ensuring that production targets are met efficiently and safely. Lead and coordinate site-wide operational activities to achieve production, safety, and cost-efficiency targets. Translate corporate strategy into effective operational plans and performance targets. Ensure operations have a strong focus on SHEC and ESG.
- **Resource Allocation:** Manage the allocation of resources, including personnel and equipment, to optimize operational demands and efficiency. Oversee the implementation of local hiring, procurement, and social investment initiatives.
- **Safety and Compliance:** Ensure that all operations comply with occupational health, safety, and environmental laws and company standards. Ensure that safety systems, audits, and corrective actions are robust. Champion a zero-harm culture, ensuring safety is embedded in every level of operation.



- **Performance Monitoring:** Monitor and evaluate the performance of operational teams, implementing improvements as necessary.
- **Stakeholder Communication:** Maintain timely, transparent and respectful communication with stakeholders, including employees, contractors, and local communities.

5.1.2 Safety Manager

The Safety Manager is responsible for leading the development, implementation, and continuous improvement of the company's health and safety management systems, ensuring a safe and compliant working environment across all operations. This role ensures that all activities are conducted in alignment with national legislation, international standards (e.g. IFC PS2, PS4), and company safety policies.

- **Health and Safety Leadership:** Provide strategic direction and operational leadership in occupational health and safety (OHS), cultivating a safety-first culture across all levels of the organisation. Promote visible safety leadership and empower all staff to take ownership of safety performance.
- **Safety Management System (SMS):** Develop, implement, and maintain a robust Safety Management System in line with ISO 45001 or equivalent standards. Ensure site-specific risk registers, procedures, and permit-to-work systems are in place and regularly updated.
- **Risk Assessment and Hazard Control:** Lead the development and review of risk assessments, including the Occupational Health and Safety Risk Assessment (OHSRA). Ensure implementation of appropriate hazard identification, risk control measures, and compliance with the hierarchy of controls.
- **Incident Management and Reporting:** Oversee the incident reporting and investigation process, ensuring root cause analysis is conducted and corrective/preventive actions are implemented. Maintain incident registers and report safety performance to executive management and regulators as required.
- **Training and Competency:** Ensure all personnel (including contractors and visitors) receive appropriate safety inductions, ongoing training, and job-specific safety instruction. Maintain records of competency assessments and refresher training.
- **Emergency Preparedness and Response:** Develop and maintain the site's Emergency and Crisis Management Plan, including the MERP. Lead emergency drills and ensure coordination with external emergency services and district/regional authorities.
- **Health and Wellbeing:** Promote worker health and wellbeing by coordinating with the medical and OHS teams to ensure medical surveillance, mental health support, and wellness initiatives are implemented.
- **Monitoring and Compliance:** Conduct regular site inspections, audits, and behavioural safety observations to monitor compliance with safety procedures and identify continuous improvement opportunities. Ensure legal compliance with occupational health and safety legislation and mining regulations.
- **Reporting and Continuous Improvement:** Compile and present monthly safety reports, highlighting trends, leading and lagging indicators, non-conformances, and improvement initiatives. Facilitate lessons learned processes and continuous improvement in safety performance.



5.1.3 Human Resources (HR) Lead

The Human Resources Lead is responsible for overseeing the strategic and operational management of all human resource functions across the company, ensuring workforce stability, legal compliance, and alignment with the organisation's values and objectives. This role is central to promoting a safe, inclusive, and high-performance workplace. Key responsibilities include:

- **Workforce Planning and Talent Management: Lead** workforce planning initiatives to ensure the organisation is adequately staffed with skilled personnel. Oversee recruitment, onboarding, succession planning, and talent retention strategies aligned with operational needs and diversity goals.
- **Policy Development and Compliance:** Develop and implement HR policies and procedures in line with national labour legislation, international standards (e.g., IFC PS2), and company values. Ensure ongoing compliance with employment laws, wage regulations, working hour restrictions, and contractor management requirements.
- **Employee Relations and Performance Management:** Foster a positive employee relations environment by managing grievance mechanisms, conflict resolution processes, and disciplinary procedures. Oversee performance appraisal systems to promote accountability, productivity, and continuous improvement.
- **Training and Capacity Building:** Develop and implement training programmes focused on employee development, compliance (e.g., OHS, Code of Conduct, GBV prevention), and upskilling. Coordinate ongoing capacity-building initiatives tailored to site-specific roles and responsibilities.
- **Diversity, Equity, and Inclusion (DEI):** Promote inclusive hiring practices, gender equality, and equal opportunity in the workplace. Monitor and report on DEI metrics and support implementation of gender-sensitive grievance mechanisms and workplace accommodations.
- **HR Risk and Compliance Reporting:** Regularly report to executive management on HR performance, staffing risks, labour issues, and compliance with HR-related standards. Provide data to support ESG and sustainability reporting, particularly in relation to workforce demographics, local employment, and training outcomes.

5.1.4 Procurement Lead

The Procurement Lead is responsible for overseeing the sourcing, contracting, and acquisition of goods and services required for company operations. This role ensures that procurement activities are conducted transparently, cost-effectively, and in compliance with company policies, legal requirements, and international best practices, including IFC Performance Standards.

- **Procurement Strategy and Planning:** Lead the development and execution of procurement strategies aligned with project timelines, budget constraints, and operational needs. Ensure procurement planning is integrated with project execution schedules to avoid delays and cost overruns.
- **Contract and Supplier Management:** Oversee the preparation, negotiation, and management of supplier and service contracts. Ensure contracts include appropriate terms related to quality, delivery, warranties, ESG compliance, and performance monitoring.



- **Local Content and Community Development:** Promote local procurement by prioritising qualified local suppliers, contractors, and service providers where feasible. Support enterprise development initiatives and align procurement practices with the project's social responsibility and local content commitments.
- **Compliance and Governance:** Ensure all procurement activities comply with national laws, internal controls, anti-corruption policies, and international financing requirements (e.g., IFC, Equator Principles). Uphold transparency, traceability, and accountability in the procurement process.
- **ESG Risk Management:** Identify and manage environmental, social, and governance risks within the supply chain. Ensure suppliers meet standards on labour practices, occupational safety, environmental compliance, and ethical sourcing.
- **Procurement Systems and Reporting:** Maintain accurate procurement records and utilise procurement software or ERP systems to manage workflows. Prepare regular procurement reports highlighting key metrics, local procurement ratios, contract status, and risk areas.
- **Stakeholder Coordination:** Collaborate with technical, legal, financial, ESG, and project management teams to ensure procurement needs are fully defined and integrated. Act as a key liaison between internal departments and external vendors.

5.1.5 Sustainability Manager

The Sustainability Manager plays a critical role in embedding sustainability within all of Tembo Nickel's operations, driving initiatives that enhance environmental performance and stewardship, social responsibility, and long-term economic viability. This role involves the following key responsibilities:

- **Sustainability Strategy Development:** Develop and implement sustainability strategies that align with the company's goals and objectives, focusing on reducing environmental impact and promoting social responsibility. Integrate ESG principles into corporate policies, planning, and operations.
- **Compliance and Reporting:** Monitor compliance with sustainability-related regulations and standards, preparing reports on the company's sustainability performance for internal and external stakeholders. Ensure transparency and accuracy in ESG disclosures to stakeholders and regulators.
- **Cross-functional Collaboration:** Work closely with various departments to integrate sustainable practices into all aspects of the company's operations.
- **Initiative Implementation:** Lead the implementation of key sustainability initiatives, such as energy efficiency programs, waste reduction strategies, and community development projects.
- **Stakeholder Engagement:** Engage with external stakeholders, including government agencies, non-governmental organisations, and the local community, to ensure that the company's sustainability efforts are transparent and aligned with broader societal expectations. Support social impact programs, human rights due diligence, and inclusive business practices.
- **Climate Change and Environmental Management:** Develop and manage decarbonization, climate risk, and resilience strategies. Promote circular economy principles and environmental best practices. Oversee initiatives related to energy efficiency, emissions reduction, water stewardship, and waste management.



- **Sustainable Supply Chain and Procurement:** Promote responsible sourcing and supplier ESG compliance. Collaborate with procurement and operations to embed sustainability into supply chain practices.
- **Innovation and Continuous Improvement:** Drive innovation in sustainable technologies, materials, and business models. Benchmark sustainability performance against peers and global standards. Promote a culture of sustainability and continuous improvement across the organisation.

5.1.6 Community Relations (CR) Manager

The Community Relations Manager is responsible for managing the mine's interactions with local communities, ensuring that the company maintains positive and constructive relationships with its neighbours. This role involves the following key responsibilities:

- **Community Engagement:** Develop and implement strategies for engaging with local communities, traditional leaders, local government and civil society, ensuring that their concerns and expectations are addressed. Facilitate inclusive engagement and regular dialogue and information sharing between the mine and affected communities.
- **Community Development:** Implement community development programs that support local economic and social development. Coordinate with local partners, NGOs, and government for program implementation. Monitor and evaluate project outcomes to ensure sustainable community benefits.
- **Conflict Resolution:** Act as the primary point of contact for resolving conflicts between the mine and the community. Ensure grievances are documented, addressed promptly, and resolved transparently. Support crisis response planning and community-related incident investigations.
- **Communication:** Ensure clear and transparent communication of the company's activities to the community. Liaise with local stakeholders to communicate opportunities and manage expectations.
- **Cultural Sensitivity:** Promote cultural sensitivity and awareness within the company, ensuring respectful interactions with the community. Promote ethical practices, transparency, and respect for human rights in all community interactions.

5.1.7 Community Relations (CR) Lead Engagement

The Chief Relations CR Engagement is a multifaceted role focused on building and maintaining strong connections between an organization and the community it serves. This role involves the following key responsibilities:

- **Strategic Planning:** Developing and implementing community engagement plans that align with organizational goals.
- **Community Outreach:** Identifying and engaging with key community stakeholders, including local leaders, organizations, and residents.
- **Communication:** Effectively communicating project information, updates, and seeking feedback from the community.
- **Collaboration:** Facilitating partnerships and collaborations with community organizations and other stakeholders.
- **Feedback and Evaluation:** Gathering feedback from the community, assessing project impacts, and making adjustments as needed.
- **Advocacy:** Representing the organization's interests and advocating for community needs.



- **Event Planning and Facilitation:** Organizing and facilitating community events, meetings, and workshops.
- **Resource Management:** Identifying and connecting residents with relevant community resources and services.
- **Building Relationships:** Fostering long-term relationships with community members and stakeholders.

5.1.8 Senior Community Liaison Officer

The Senior Community Liaison Officer is responsible for leading community engagement efforts and implementing community development programs. This role involves the following key responsibilities:

- **Community Engagement:** Lead community engagement efforts, ensuring that the company maintains positive relationships with local communities. Facilitate regular meetings and communication channels to address community concerns and provide updates on mining activities.
- **Development Programs:** Implement community development programs that support local economic and social development. Monitor and evaluate the impact of these projects to ensure they are meeting their objectives and providing sustainable benefits.
- **Conflict Resolution:** Act as a point of contact for resolving conflicts between the mine and the community. Provide training and support to staff members on conflict resolution and community engagement techniques.

5.1.9 Community Liaison Officer

The Community Relations Officer is responsible for serving as a liaison between the company and local communities, ensuring effective communication and engagement. This role involves the following key responsibilities:

- **Community Liaison:** Serve as a liaison between the company and local communities, ensuring effective communication and engagement.
- **Development Support:** Support the implementation of community development programs. Assist with monitoring and evaluating the impact of projects to ensure they are meeting their objectives and providing sustainable benefits.
- **Conflict Resolution:** Assist in resolving conflicts between the mine and the community. Assist with providing training and support to staff members on conflict resolution and community engagement techniques.

5.1.10 Senior Grievance Officer

The Senior Grievance Officer is responsible for managing the grievance mechanism, ensuring that all grievances are addressed in a timely and effective manner. This role involves the following key responsibilities:

- **Grievance Management:** Manage the grievance mechanism, ensuring that all grievances are addressed in a timely, fair and effective manner.
- **Complaints Handling:** Receive, screen, and register complaints and grievances from affected communities and stakeholders. Acknowledge receipt of complaints within a specified timeframe and provide regular updates on the status of the grievance.
- **Stakeholder Communication:** Maintain open communication with stakeholders to address their concerns and expectations.



- **Reporting and Documentation:** Maintain accurate records of all grievances and complaints, including actions taken and resolutions achieved.
- **Conflict Resolution:** Work to resolve conflicts between the company and stakeholders, finding mutually beneficial solutions.

5.1.11 Grievance Officer

The Grievance Officer helps to mediate and resolve disputes between individuals and the organization, identify systematic issues and improve process to prevent future problems. This role involves the following key responsibilities:

- **Receive grievances:** Grievance Officers are responsible for receiving and documenting complaints.
- **Investigate:** They investigate the validity of the grievance and gather relevant information.
- **Mediating:** They can mediate between parties to find a resolution.
- **Make recommendations:** They may make recommendations for resolution to higher authorities.
- **Provide updates:** They keep the complainant informed of the progress of their grievance.

5.1.12 Database Administrator

The database administrator designs and implements database structures, schemas, and queries to meet the needs of the organization and its users. This role involves the following key responsibilities:

- **Maintenance and Optimization:** They ensure databases are running optimally, troubleshooting performance issues and implementing performance improvements.
- **Security:** They implement security measures to protect sensitive data from unauthorized access and ensure compliance with relevant regulations.
- **Backup and Recovery:** They manage backup and recovery procedures to prevent data loss in case of system failures or other disasters.
- **Performance Monitoring:** They monitor database performance, identify potential bottlenecks, and implement solutions to improve efficiency.
- **Data Migration:** They may be involved in migrating data from one database system to another.
- **Troubleshooting and Support:** They troubleshoot database problems and provide support to users and other IT staff.
- **Documentation:** They maintain accurate documentation of database structures, procedures, and security protocols.

5.1.13 Environmental Manager

The Environmental Manager is responsible for leading the implementation of the company's Air Quality, Water, Waste, and Chemicals Management Standards, ensuring compliance with environmental regulations and driving sustainability initiatives. This role involves the following key responsibilities:



- **Environmental Management:** Lead the implementation of the company's Air Quality, Water, Waste, and Chemicals Management Standards.
- **Compliance:** Ensure compliance with national, regional, and local environmental laws and mining regulations. Drive compliance with mine closure plans and other legal requirements, ensuring that all operations adhere to environmental regulations. Maintain environmental permits, licenses, and approvals.
- **Environmental Planning and Management:** Develop and update the Environmental Management Plan (EMP) and Mine Closure Plan, ensuring full compliance with Tembo Nickel's environmental management system. Ensure continuous implementation and updating of waste and pollution management strategies. Lead progressive rehabilitation. Monitor success criteria for land rehabilitation and biodiversity offsets. Coordinate mine closure planning and post-closure environmental strategies.
- **Monitoring and Reporting:** Oversee environmental monitoring programs, ensuring accurate data collection and analysis. Report on environmental performance and compliance.
- **Incident Management:** Maintain the environmental incidents register and ensure timely reporting and resolution of incidents.
- **Training and Awareness:** Ensure that all staff and contractors are trained on environmental issues and responsibilities.
- **Stakeholder Engagement:** Liaise with environmental regulators to ensure full compliance with environmental legislation in Tanzania. Support community engagement processes regarding environmental performance and concerns. Manage grievance mechanisms related to environmental impacts.
- **Risk Management:** Identify, assess and mitigate environmental risks Undertake a proactive approach to environmental risk.
- **Training, Awareness and Collaboration:** Deliver environmental training and awareness programs to mine personnel and contractors. Promote a culture of environmental responsibility across all departments. Integrate environmental objectives into daily operations.

5.1.14 Environmental Officer

The Environmental Officer is responsible for supervising data collection and analysis, ensuring compliance with environmental regulations, and managing environmental risks. This role involves the following key responsibilities:

- **Data Collection and Analysis:** Supervise and assist with data collection and ensure quality control. Analyse data to derive accurate information. Ensure timely and accurate environmental data collection and reporting.
- **Environmental Monitoring:** Conduct regular environmental monitoring to ensure compliance with environmental standards.
- **Compliance Review:** Engage with environmental consultants for external compliance reviews and oversee the implementation of corrective actions.
- **Regulatory Compliance:** Ensure compliance with environmental regulations, permits and internal policies by conducting regular audits and inspections. Update policies and management plan where required.
- **Risk Management:** Identify new risks and update existing risk details in the risk management database. Contribute to risk mitigating planning.



- **Incident Reporting:** Lead the reporting of environmental incidents and oversee the implementation of corrective actions. Support development of annual environmental reports and sustainability disclosures. Maintain records of monitoring, inspections, incidents, and compliance actions.
- **Waste and Water Management:** Develop and implement waste and water management control measures to minimize environmental impact.
- **Sustainability Initiatives:** Support the implementation of innovation and sustainability initiatives within the mine.
- **Training and Awareness:** Deliver high quality, consistent and accurate toolbox talks and site-level environmental training. Promote environmental awareness and good practices among operational teams. Promote a culture of environmental responsibility among employees and contractors.

5.1.15 Vector Control Officer

The Vector Control Officer is responsible for developing and implementing vector control programs to manage and reduce the impact of vectors on the mine and surrounding communities. This role involves the following key responsibilities:

- **Vector Control Programs:** Develop and implement vector control programs to manage and reduce the impact of vectors on the mine and surrounding communities. Ensure safe and effective application of vector control measures, adhering to environmental and health regulations.
- **Surveillance, Monitoring and Reporting:** Conduct regular inspections, monitor vector populations and report on the effectiveness of control measures. Maintain records of vector control activities and report findings to relevant authorities.
- **Stakeholder Engagement:** Work with local communities and health authorities to coordinate vector control efforts.
- **Collaboration and Coordination:** Work closely with other departments to coordinate vector control efforts. Liaise with external agencies and stakeholders to ensure comprehensive vector control strategies.

5.1.16 Associate Infrastructure ESG Officer

The Associate Infrastructure ESG Officer is responsible for the incorporation of environmental, social, and governance factors into the planning, design, construction, and operation of infrastructure projects. This role involves the following key responsibilities:

- **ESG Strategy Development and Implementation:** The Associate Infrastructure ESG Officer would be responsible for developing and implementing the organization's ESG strategy for infrastructure projects, ensuring alignment with sustainability goals and industry best practices.
- **Impact Assessment:** Conducting environmental and social impact assessments (ESIAs) to evaluate the potential effects of infrastructure projects on the environment, communities, and stakeholders.
- **Risk Management:** Identifying and mitigating ESG risks related to projects, such as environmental pollution, social conflicts, and governance issues.
- **Stakeholder Engagement:** Engaging with stakeholders, including local communities, government agencies, and investors, to address their concerns and ensure their participation in decision-making.



- **Compliance and Reporting:** Ensuring compliance with relevant environmental, social, and governance regulations and standards, and preparing ESG reports to demonstrate performance and accountability.
- **Monitoring and Evaluation:** Monitoring the performance of ESG initiatives and evaluating their effectiveness in achieving sustainability goals.
- **Training and Awareness:** Developing and delivering training programs on ESG policies and compliance requirements for employees at all levels, promoting a culture of sustainability.

5.2 Environmental Awareness Plan and Training

TNCL must develop an Environmental Awareness Plan. The plan must describe how employees will be informed of environmental risks that may result from their work, how the risk must be dealt with to avoid pollution or degradation of the environment and the training required for general environmental awareness.

The ESMP content binds all employees and subcontractors who conduct work on behalf of TNCL, and a contractual condition to this effect will be included in all such contracts entered into by the mine. If contractors are used, the responsibility for ensuring compliance with the ESMP will remain with TNCL.

The Environmental Awareness Plan aims to ensure that all personnel and management understand the site's general environmental requirements. In addition, greater environmental awareness must be communicated to personnel involved in specific activities that can significantly impact the environment and ensure they are competent to carry out their tasks based on appropriate education, training, and/or experience. The Environmental Awareness Plan must enable TNCL to achieve the objectives of the environmental policy.

5.2.1 Steps to Achieve the E&S Policy Objectives

TNCL's environmental policy will be realised by setting specific and measurable objectives. It is proposed that objectives are set throughout the life of mine, but initial objectives are as follows:

- Management of environmental responsibilities:
 - TNCL will establish and appoint an Environmental Manager and a Community Relations Manager at the senior mine management level, who will be provided with all necessary resources to carry out the management of all environmental aspects of the site irrespective of other responsibilities, for example:
 - Compliance with environmental legislation and ESMP commitments.
 - Implementing and maintaining an ESMS.
 - Developing environmental emergency response procedures and coordinating personnel during incidents.
 - Develop and implement management plans.
 - Manage routine environmental monitoring and data interpretation.
 - Environmental troubleshooting and implementation of remediation strategies.
- Communication of environmental issues and information:
 - The Environmental Manager, in conjunction with the Community Relations Manager, will carry out meetings, consultations and progress reviews and will:



- Set the discussion of environmental issues and feedback on environmental projects as an agenda item at all company board meetings.
- Provide progress reports to the NEMC on the achievement of policy objectives and the level of compliance with the ESMP.
- The Environmental Manager will:
 - Ensure environmental issues are raised at monthly mine management executive committee meetings and all relevant mine wide meetings at all levels.
 - Ensure that the Community Relations Manager coordinates discussions on environmental issues at all general liaison meetings with local communities and other interested and affected parties.
- Environmental awareness training:
 - TNCL will provide environmental awareness training to individuals at a level of detail specific to the requirements of their job, but will generally comprise:
 - Basic awareness training will be provided for all prior to granting access to the site (e.g., a short video presentation that requires registration once completed). Employees and subcontractors who have not attended the training will not be allowed on-site.
 - General environmental awareness training will be given to all employees and contractors as part of the Safety, Health and Environment induction programme. All non-TNCL personnel who will be on-site for more than three days must undergo the SHE induction training.
 - Specific environmental awareness training will be provided to personnel whose work activities can have a significant impact on the environment (e.g. workshops, waste handling and disposal, sanitation, etc.).
 - Review and update the environmental plans already identified in the ESMP.
 - All mine projects will be designed to minimise impact on the environment and to accomplish closure/rehabilitation objectives.
 - TNCL will maintain records of all environmental training, monitoring, incidents, corrective actions and reports.

5.2.2 Training Objectives of the Environmental Awareness Plan

The environmental awareness plan ensures that training needs are identified, and that appropriate training is provided. The environmental awareness plan must communicate the following:

- The importance of conformance with the E&S policy, procedures and other requirements of good environmental management.
- The significant environmental impacts and risks of individuals work activities and explain the environmental benefits of improved performance.
- Individuals' roles and responsibilities in achieving the aims and objectives of the E&S policy.
- The potential consequences of not complying with environmental procedures.

5.2.3 General Contents of the Environmental Awareness Plan

To achieve the objectives of E&S awareness, the general contents of the training plans could include the following:

- Module 1 – Basic training plan applicable to all personnel entering the site:



- Short presentation to indicate the site layout and activities at specific locations, together with their environmental aspects and potential impacts.
- Individuals to sign off with site security on completion in order to gain access to the site.
- Module 2 – General training plan applicable to all personnel at the site for longer than three days:
 - General understanding of the environmental setting of the mine (e.g. local communities and industries and proximity to natural resources);
 - Understanding the environmental impact of individuals activities on site (e.g. excessive production of waste, poor housekeeping, energy consumption, water use, noise, etc.);
 - Indicate potential site-specific environmental aspects and their impacts;
 - TNCL’s environmental management strategy;
 - Identifying poor environmental management and stopping work which presents significant risks;
 - Reporting incidents;
 - Examples of poor environmental management and environmental incidents; and
 - Procedures for emergency response and cleaning up minor leaks and spills.
- Module 3 – Specific training plan:
 - Environmental setting of the workplace (e.g. proximity of watercourses, vulnerability of groundwater, proximity of local communities, etc.);
 - Specific environmental aspects such as:
 - Spillage of hydrocarbons at workshops.
 - Poor waste management, such as mixing hazardous and general wastes, inappropriate storage and stockpiling substantial amounts of waste.
 - Poor housekeeping practices.
 - Poor working practices (e.g. not conducting oil changes in designated bunded areas).
 - Excessive noise generation and unnecessary use of hooters.
 - Protection of heritage resources (including palaeontological resources).
 - Impact of environmental aspects, for example:
 - Hydrocarbon contamination resulting in loss of resources (soil, water) to downstream users.
 - Dust impacts on local communities (nuisance and health implications).
 - TNCL’s duty of care (specifically with respect to waste management).
 - Purpose and function of TNCL’s environmental management system.

Individuals required to complete Module 3 (the Specific training module) will need to complete Modules 1 and 2 first. On completion of Module 3, individuals will be subject to a short test (written or verbal) to ensure the level of competence has been achieved. Individuals who fail the test will be allowed to re-sit the test after further training by the training department.

The actual contents of the training modules will be developed based on a training needs analysis.



Key personnel will be required to undergo formal, external environmental management training (e.g. how to operate the ESMS and legal compliance).

In addition to the above, TNCL will:

- Conduct refresher training/presentations on environmental issues at regular intervals for mine employees (permanent and subcontractors).
- Promote environmental awareness using relevant environmental topic posters displayed at strategic locations on the mine.
- Participate and organise events which promote environmental awareness, some of which will be tied to national initiatives.



6. Checking and Correction

6.1 Checking and Correction Actions

6.1.1 Terrestrial and Aquatic Biodiversity Monitoring Programme

The monitoring programme is designed to ensure effective implementation of mitigation measures, enable adaptive management, and provide early warning of potential biodiversity degradation especially in areas supporting SCC or classified as high ecological sensitivity.

Monitoring is structured across multiple environmental receptors and aligned with the IFC Performance Standards and national best practices. A combination of pre-construction baseline confirmation, construction-phase compliance checks, and long-term operational tracking has been incorporated. Priority is placed on ecosystems with high residual impact potential, such as riparian forests, wetlands, and Miombo woodlands.

Key monitoring elements include:

- Hydrological and water quality metrics to detect changes in wetland functioning and downstream impacts.
- Macroinvertebrate, diatom, and fish community assessments as bioindicators of aquatic ecosystem health.
- Faunal and floral SCC presence monitoring, using targeted surveys, camera traps, and fixed-point repeat observations.
- Alien invasive plant (AIP) surveillance, particularly along edges and disturbed zones.
- Erosion and rehabilitation success tracking, including vegetation recovery and edge effect containment.

Monitoring results must feed into a transparent Environmental Management System (EMS) with defined Key Performance Indicators (KPIs), trigger thresholds, and corrective action protocols. Where thresholds are exceeded or trends indicate ecological decline, management responses including altered operational practices or offset activation must be implemented without delay.

The monitoring schedule outlined below provides initial guidance and must be refined annually in consultation with the ECO and biodiversity specialists, based on evolving site conditions and monitoring results.



Table 6-1: Kabanga Mine Terrestrial Biodiversity Monitoring Programme

Monitoring Parameter	Sampling Method	Frequency of Monitoring	Responsibility	Location/Scope	KPI / Index	Relevant Project Phases
Watercourse Crossings & Stormwater Infrastructure	Visual inspections after storm events	Post-major rainfall and annually	Environmental Manager	All stormwater and watercourse crossings	No erosion or infrastructure failure	Construction, Operation
Long-Term Habitat Condition (SEI)	Habitat integrity mapping and repeat site assessments	Annually	Environmental Manager	All mapped SEI zones	Habitat integrity scores stable or improved	Construction, Operation, Closure
Alien Invasive Plant Spread	Transect and edge inspections	Bi-annually	Environmental Manager	Disturbed edges and cleared areas	IAP cover ≤ 10% in rehabilitation zones	All Phases
Faunal SCC Presence (e.g., Ashy Red Colobus, Crowned Crane)	Direct observation, camera traps, and opportunistic sightings	Quarterly surveys; triggered follow-up	Environmental Manager	Riparian forests, Miombo woodlands, wetland buffers	Presence confirmed or stable use of habitat	Construction, Operation
Rehabilitation Effectiveness	Vegetation plots, cover analysis, species composition	Annually	Environmental Manager	Rehabilitation areas and buffers	Native species dominance > 80%, cover > 60%	Construction, Operation, Closure

Table 6-2: Kabanga Mine Aquatic Biodiversity Monitoring Programme

Monitoring Parameter	Sampling Method	Frequency of Monitoring	Responsibility	Location/Scope	KPI / Index	Relevant Project Phases
Watercourse Crossings & Stormwater Infrastructure	Visual inspection of structural integrity, erosion, and sediment accumulation	After each major high-flow event and at least annually for the Life of Mine (LoM)	Environmental Manager	Watercourse crossings and stormwater drainage channels	No observable structural damage or erosion post-event	Construction, Operation



Monitoring Parameter	Sampling Method	Frequency of Monitoring	Responsibility	Location/Scope	KPI / Index	Relevant Project Phases
Surface Water Quality (pH, conductivity, turbidity, TSS)	In-situ field measurement using Extech EC400 (pH, conductivity) and TB400 (turbidity); grab samples for TSS	Monthly at key discharge points for the LoM	Environmental Manager	Key discharge points from mine infrastructure	pH: 6.5–8.5; conductivity, turbidity, and TSS within site-specific baseline range	Pre-Construction, Construction, Operation, Decommissioning
Benthic Diatoms	Sample collection and analysis at an accredited laboratory; SPI scoring	Annually at the end of the wet season for the LoM	Environmental Manager	Mainstream wetland zones and flowing rivers	SPI Index \geq Moderate (e.g., SPI > threshold for mesotrophic condition); no significant decline from baseline	Pre-Construction, Construction, Operation, Decommissioning
Macroinvertebrates	Physical capture using net; identification and scoring using TARISS Total Score, ASPT, PSI	Bi-annually during wet season for the LoM	Environmental Manager	Wetland margins, slow-flowing channels	TARISS ASPT score \geq Moderate; at least 5 aquatic macroinvertebrate families per site	Pre-Construction, Construction, Operation, Decommissioning
Fish Communities	Electrofishing using battery-operated Samus 725M unit where feasible	Annually or as triggered by ecological risk or major disturbance	Environmental Manager	Key aquatic habitats and flowing streams	CPUE within $\pm 20\%$ of baseline; presence of native fish assemblage maintained	Pre-Construction, Construction, Operation, Decommissioning
Long-Term Ecological State	Habitat condition surveys using repeat assessments and trend analysis	Annually during late wet season with periodic review	Environmental Manager	All major aquatic habitat types across project area	Habitat integrity index maintained or improved over time	Pre-Construction, Construction, Operation, Decommissioning
Dam Safety	Visual and stability assessments conducted by certified dam engineers	At least once per year	Dam Safety Engineer	Dams and adjacent downstream areas	No signs of structural failure, seepage, or significant erosion;	Operation, Decommissioning



Monitoring Parameter	Sampling Method	Frequency of Monitoring	Responsibility	Location/Scope	KPI / Index	Relevant Project Phases
					engineering sign-off compliant	
Riparian Vegetation Integrity (VEGRAI)	Standardised field-based VEGRAI protocol (DWAFF 2008) and scoring	Annually at end of wet season; protocol reviewed every 4 years	Environmental Manager/ Vegetation Specialist	Designated aquatic biomonitoring sites	VEGRAI Category C or better (Moderately modified or higher); no loss in species richness	Pre-Construction, Construction, Operation, Decommissioning
Wetland Vegetation Condition	Fixed-point photography and floristic composition monitoring	Annually during growing season	Environmental Manager/ Wetland Specialist	Wetland basins and lowland catchment areas	Inundation extent and species composition consistent with historical wet season conditions	Pre-Construction, Construction, Operation, Decommissioning
Whole Effluent Toxicity Testing (WETT)	Laboratory-based WET testing on effluent samples (e.g., LC50, NOEC)	Triggered if significant decline in aquatic biomonitoring indicators is detected	Environmental Manager/ Water Quality Consultant	Effluent discharge points into aquatic environment	Toxicity parameters within regulatory thresholds (e.g., LC50 \geq 100% effluent); no acute toxicity	Construction, Operation



6.1.2 Surface Water Monitoring Programme

Surface water monitoring involves the systematic collection of data on surface water quality and flow rates at key locations within and surrounding the mine site. Monitoring points are strategically positioned upstream and downstream of discharge points, watercourse crossings, and other areas of potential impact to assess baseline conditions, detect changes due to mining activities, and inform water management decisions. The data gathered supports compliance with regulatory and lender requirements, evaluates the effectiveness of mitigation measures, and informs adaptive management strategies during operations and at closure (WSP(e), 2023).

The primary objectives of the surface water monitoring programme are to:

- Assess the impact of mining activities on surface water quality and flow within the Project Area and downstream receiving environments.
- Detect potential contamination from process water, runoff, or accidental discharges.
- Monitor seasonal and event-based flow variations to inform stormwater and sediment control strategies.
- Serve as an early warning system for potential off-site impacts on aquatic ecosystems or downstream users.
- Evaluate the effectiveness of surface water management and pollution control measures.
- Support regulatory compliance, environmental reporting, and closure and rehabilitation planning.

6.1.2.1 Monitoring of Surface Water Resource Quality

Surface Water Quality Standards

All monitoring data must be undertaken and interpreted in accordance with the following standards and guidelines (WSP(c), 2023):

- IFC Discharge Guidelines (PS 1 and PS 3).
- WHO Guidelines for Drinking Water Quality (4th Edition), 2017.
- ICMG Guidance on Water Reporting.
- Tanzanian Municipal and Industrial wastewater tolerance limits.
- MEM 5th Schedule, Regulation 12 of Mining Act 1998.
- Tanzanian Drinking (Potable) Water Standards.
- Tanzanian Water Utilisation (Control and Regulation) Act (UR 1981).
- Tanzanian Environmental Management & Protection Regulations (URT 1981).
- Tanzanian Packaged/ bottled drinking water specification.
- ISO 1438:2008 Hydrometry: Open channel flow measurement using thin-plate weirs.

Neither Tanzanian legislation nor IFC standards provide specific information on sediment guidelines or limits. Therefore, the following international guidelines for sediment apply:



- Canadian Sediment Quality Guidelines for the Protection of Aquatic Life: Freshwater PEL (Probable Effect Level) (CCME, 2002).
- Canadian Sediment Quality Guidelines for the Protection of Aquatic Life: Freshwater ISQG (Interim Sediment Quality Guidelines) (CCME 2002).
- (No CCME value exists. US National and Atmospheric Administration (NOAA) (dry basis) included (US NOAA 2006) (mg/kg: milligrams per kilogram).

Monitoring Parameters

The water quality parameters provided in Table 6-3 must be monitored at the pre-set locations provided in Figure 6-1. TNCL currently has an established monitoring programme in place. As part of the proposed Project some additional monitoring points have been identified. TNCL must review the locations of the current monitoring programme at the onset of construction, as adjustments to monitoring points will be necessary to account for the establishment of various infrastructure components. Bacteriological analyses however can only be conducted at community springs located outside the site perimeter or at sampling points at risk of bacteriological contamination.

Table 6-3: Required Monitoring Parameters – Surface Water

Parameter	Unit	Parameter	Unit
pH*		Iron (total)	mg/l
Temperature*	°C	Lead (Pb)	mg/l
Colour	TCU	Lithium (Li)	mg/l
Turbidity	NTU	Manganese (Mn)	mg/l
Electrical Conductivity (EC)	mS/m	Magnesium (Mg)	mg/l
Total Dissolved Solids (TDS)	mg/l	Mercury (Hg)	mg/l
Total Suspended Solids (TSS)	mg/l	Molybdenum (Mo)	mg/l
T-Alk	mg/l	Nickel (Ni)	mg/l
Bicarbonate	mg/l	Potassium (K)	mg/l
Carbonate	mg/l	Selenium (Se)	mg/l
Total Hardness (CaCO ₃)	mg/l	Silver (Ag)	mg/l
Chlorine	mg/l	Sodium (Na)	mg/l
Chloride	mg/l	Strontium (Sr)	mg/l
Fluoride	mg/l	Thallium (Tl)	mg/l
T-Phosphate	mg/l	Tin (Sn)	mg/l
Phosphate	mg/l	Uranium (U)	mg/l
Sulphate (SO ₄)	mg/l	Vanadium (V)	mg/l
Sulphides	mg/l	Zinc (Zn)	mg/l
Nitrates as NO ₃	mg/l	Arsenic (As)	mg/l
Nitrates as N	mg/l	Cyanide – Free (F-CN)	mg/l



Parameter	Unit	Parameter	Unit
Ammonia (NH ₃)	mg/l	Cyanide – WAD (WAD-CN)	mg/l
Aluminium (Al)	mg/l	Cyanide – Total (T-CN)	mg/l
Antimony (Sb)	mg/l	Chemical Oxygen Demand (COD)	mg/l
Argon (Ar)	mg/l	Biological Oxygen Demand (BOD)	mg/l
Barium (Ba)	mg/l	Oil and Grease	mg/l
Beryllium (Be)	mg/l	Phenols	mg/l
Boron (B)	mg/l	Total Coliforms	Count 100ml
Cadmium (Cd)	mg/l	Escherichia coli	Count 100ml
Calcium (Ca)	Mg/l	Enterococci	Count 100ml
Chromium (Cr)	mg/l	Kjedahl Nitrogen	mg/l
Chromium VI (Cr(VI))	mg/l	Phosphorous	mg/l
Cobalt (Co)	mg/l	Faecal coliforms	Count 100ml
Copper (Cu)	mg/l		

***Field measurements**

The requirement monitoring parameters listed in Table 6-3 can be categorised into several profiles as indicated in Table 6-4.

Table 6-4: Required Monitoring Parameters -Profiles

Profile	Description of Requirement Monitoring Parameters
Profile A	pH, EC, TDS, TSS, T-Alk, B'Carbonate, Carbonate, Hardness, Chlorine, Chloride, Fluoride, T-Phosphate, Phosphate, Sulphate, Sulphides, Nitrate, Nitrite, Ammonia, Kjeldahl Nitrogen, Phosphorus
Profile B	<i>Dissolved:</i> Al, Sb, Ar, Ba, Be, B, Cd, Ca, Cr, Cr(VI), Co, Cu, Fe, Pb, Li, Mn, Mg, Hg, Mo, Ni, K, Se, Ag, Na, Sr, Tl, Sn, U, V, Zn, As
Profile C	<i>Total:</i> Al, Sb, Ar, Ba, Be, B, Cd, Ca, Cr, Cr(VI), Co, Cu, Fe, Pb, Li, Mn, Mg, Hg, Mo, Ni, K, Se, Ag, Na, Sr, Tl, Sn, U, V, Zn, As
Profile D	F-CN, WAD CN, T-CN
Profile E	COD, BOD
Profile F	Oil & Grease, Phenol
Profile G	Total Coliform, <i>E-Coli</i> , Enterococci, Faecal coliforms

6.1.2.2 Flow Monitoring

Flow Monitoring- Quantity

Quantitative flow monitoring focuses on measuring and monitoring hydraulic parameters such as flow depth, flow velocity, and/or flow area within the streams relevant to the Project Area. Table 6-5 below provides a list of the monitoring flow points and frequency.



Table 6-5: Summary of Kabanga Mine Surface Water Flow Monitoring Programme

Monitoring Point	New / Existing	Coordinates (ARC 1960 UTM Zone 36S)		Measurement Type and Monitoring Frequency		Community Water Sources	Comment / Description
		Northing	Easting	Flow Rate	Quality		
SF-R1	Existing	9682242	230535	Continuous	Field Parameters Measurements: Monthly	-	Lower reaches of the Nyamwongo River, upstream of the confluence with the Muruhamba River
					Full Sampling: Quarterly		
SF-R2	Existing	9681348	229933	None	Field Parameters Measurements: Monthly	-	Immediately downstream of the confluence of the Nyamwongo River and the Muruhamba River
					Full Sampling: Quarterly		
SF-R4	New	9680275	229812	Weekly	N/A	-	On the Muruhamba River, upstream of the confluence with the Mgasenyi River
SF-K3	Existing	9682037	227134	Weekly	Field Parameters Measurements: Monthly	-	Small tributary of the Mu-Kinyangona River, upstream of Bugarama, and draining the southwestern portion of the ridge on which the Project is located
					Full Sampling: Quarterly		
SF-H4	Existing	9684381	228886	Weekly	Field Parameters Measurements: Weekly	Feeds Runyana Village and sub village associated with Rynuna	A small tributary feeding the Muhongo River and draining the western portion of the ridge on which the Project is located.
					Full Sampling: Quarterly		
SF-R5	Existing	9680134	229317	Weekly	Field Parameters Measurements: Monthly	-	Small tributary feeding the Muruhamba River, relatively undisturbed watershed with the AWS weather station located at the top of it.
					Full Sampling: Quarterly		
SF-R6	Existing	9684599	233403	None	Field Parameters Measurements: Monthly	-	On the Nyamwongo River, upstream of the small tributary with S-R1 and upstream of the TDF.
					Full Sampling: Quarterly		
SF-R7	Existing	9681902	229168	Weekly	Field Parameters Measurements: Monthly	-	Small tributary draining the south-eastern flank of the ridge, on which the Project is located, into the Nyamwongo River, downstream of the proposed plant site and portal.
					Full Sampling: Quarterly		
SF-R8	Existing	9682193	229969	Weekly	Field Parameters Measurements: Monthly	-	Small tributary draining the south-eastern blank of the ridge, on which the Project is located, into the Nyamwongo River, downstream of the proposed plant site and portal.
					Full Sampling: Quarterly		



Monitoring Point	New / Existing	Coordinates (ARC 1960 UTM Zone 36S)		Measurement Type and Monitoring Frequency		Community Water Sources	Comment / Description
		Northing	Easting	Flow Rate	Quality		
SF-K9	Existing	9677842	224687	Weekly	Field Parameters Measurements: Weekly	-	Tributary of the Ruvubu River, relatively undisturbed watershed to the southwest of the project
					Full Sampling: Quarterly		
SF-R10	Existing	9679185	228686	Weekly	Field Parameters Measurements: Weekly	-	Small tributary feeding the Muruhamba River, relatively undisturbed watershed with the AWS weather station located at the top of it.
					Full Sampling: Quarterly		
S-R1	Existing	9685186	232206	None	Field Parameters Measurements: Weekly	-	Densely vegetated valley, in a small tributary feeding the upper reaches of the Nyamwongo River
					Full Sampling: Quarterly		
S-R2	Existing	9683438	231226	None	Field Parameters Measurements: Weekly	-	On the Nyamwongo River, downstream of the proposed TDF location
					Full Sampling: Quarterly		
S-R3	Existing	9681412	230430	None	Field Parameters Measurements: Weekly	-	Lower reaches of the Muruhamba River before the confluence with the Nyamwongo River
					Full Sampling: Quarterly		
S-R4	Existing	9680275	229816	None	Field Parameters Measurements: Weekly	-	On the Muruhamba River, upstream of the confluence with the Mgasenyi River
					Full Sampling: Quarterly		
S-R5	Existing	9678897	228802	None	Field Parameters Measurements: Weekly	-	On the Muruhamba River, downstream of the confluence with the Mgasenyi River
					Full Sampling: Quarterly		
S-R6	Existing	9679602	230879	None	Field Parameters Measurements: Weekly	-	On the Mgasenyi River, upstream of the confluence with the Muruhamba River
					Full Sampling: Quarterly		
S-K7	Existing	230879	221091	None	Field Parameters Measurements: Weekly	-	Downstream of Bugarama on a small tributary before the confluence with the Mu-Kinyangona River
					Full Sampling: Quarterly		
S-K8	Existing	9681213	220255	None	Field Parameters Measurements: Weekly	-	On the Mu-Kinyangona River, upstream of the tributary on which S-K7 is located



Monitoring Point	New / Existing	Coordinates (ARC 1960 UTM Zone 36S)		Measurement Type and Monitoring Frequency		Community Water Sources	Comment / Description
		Northing	Easting	Flow Rate	Quality		
					Full Sampling: Quarterly		
S-K9	Existing	9683956	225680	None	Field Parameters Measurements: Weekly	-	Stream at access road crossing downstream just north of Bugarama town center
					Full Sampling: Quarterly		
S-K10	Existing	9682647	225458	Weekly	Field Parameters Measurements: Weekly	Flowing stream used by Bugarama	Stream at access road crossing just south of Bugarama
					Full Sampling: Quarterly		
S-V11	Existing	9709215	228426	None	Field Parameters Measurements: Weekly	-	Access road crossing at Ruvubu River north of camp
					Full Sampling: Quarterly		
S-V12	Existing	9677561	217893	None	Field Parameters Measurements: Weekly	-	Approximate intake of proposed water intake pipe on Ruvubu River, downstream of the confluence with the Muruhamba River
					Full Sampling: Quarterly		
S-R13	Existing	9689486	234371	None	Field Parameters Measurements: Weekly	-	The upper reaches of the Nyamwongo River, upstream of the TDF
					Full Sampling: Quarterly		
GSP	Existing	9690767	229789	None	Field Parameters Measurements: Weekly	-	Located downstream of the proposed GSP sand pit and upstream of the confluence with the Muhongo River.
					Full Sampling: Quarterly		
Mchanga	Existing	9688766	231298	None	Field Parameters Measurements: Weekly	-	Located east of the GSP sand pit and southwest and downstream of the Mchanga sand pit, between Kahororo and Rubanga subvillages. Mchanga and Mchanga 2 sample locations are considered the same when assessing existing conditions.
					Full Sampling: Quarterly		
Mchanga 2	Existing	9691115	231272	None	Field Parameters Measurements: Weekly	-	Located downstream of the proposed Mchanga sand pit and upstream of the confluence with the Muhongo River, just downstream of the SDC monitoring locations. Mchanga and Mchanga 2 sample location are considered the same when assessing existing conditions.
					Full Sampling: Quarterly		



Monitoring Point	New / Existing	Coordinates (ARC 1960 UTM Zone 36S)		Measurement Type and Monitoring Frequency		Community Water Sources	Comment / Description
		Northing	Easting	Flow Rate	Quality		
Q1	Existing	9686321	230270	None	Field Parameters Measurements: Weekly	Murukende village	Water collection point located at the proposed granite quarry which flows into the Muhongo River
					Full Sampling: Quarterly		
Q2	Existing	9686556	230454	None	Field Parameters Measurements: Weekly	-	Located downstream of the proposed granite quarry which flows into the Muhongo River
					Full Sampling: Quarterly		
QS	Existing	9686171	233211	None	Field Parameters Measurements: Weekly	-	Located in a valley southeast of the proposed quartzite quarry and which flows into the Nyamwongo River
					Full Sampling: Quarterly		
SDB	Existing	9691775	229042	None	Field Parameters Measurements: Weekly	-	Measures the quality of water flowing in a tributary to the Muhongo River
					Full Sampling: Quarterly		
SDC	Existing	9691960	230769	None	Field Parameters Measurements: Weekly	-	Measures the quality of water flowing in the Muhongo River downstream of the GSP
					Full Sampling: Quarterly		
SDUN	Existing	9688079	233652	None	Field Parameters Measurements: Weekly	-	Measures the water quality in the upper Nyamwongo River
					Full Sampling: Quarterly		
WSP	Existing	9677376	222875	None	Field Parameters Measurements: Weekly	-	A monitoring location in the area of the proposed water supply/discharge pipeline in a tributary that flows into the Ruvubu River
					Full Sampling: Quarterly		
MOS		9680748	228748	None	Full Sampling: Quarterly	-	Mess oil-Water separator
WB		9680748	228748	None	Full Sampling: Quarterly	-	Oil- Water Separator
Springs							
SP-R1		9680172	227100	None	Full Sampling: Quarterly	Mtobu Village	Springs located on the southern ridge, on which the Project is located, in the Muruhamba sub watershed, historically used as a source of drill water.



Monitoring Point	New / Existing	Coordinates (ARC 1960 UTM Zone 36S)		Measurement Type and Monitoring Frequency		Community Water Sources	Comment / Description
		Northing	Easting	Flow Rate	Quality		
SP-R2		9681890	228333	None	Full Sampling: Quarterly	-	Near the G-R6, upslope of SF-R7 in the Muruhamba sub watershed
SP-R3		9685536	231849	None	Full Sampling: Quarterly	-	Densely vegetated valley upslope of S-R1 in the Nyamwongo sub watershed.
SP-H4		9684355	229290	None	Full Sampling: Quarterly	-	A spring located on the western flank of the ridge, on which the Project, is located, in the Muhongo subwatershed.
SP-R5		9684383	230311	None	Full Sampling: Quarterly	-	A spring located on the eastern flank of the ridge, on which the Project is located, in the Nyamwongo sub watershed.
SP-K6		9682036	227155	None	Full Sampling: Quarterly	Bugarama Village (Feeding the whole of Bugarama)	Located upstream of Bugarama, adjacent to SF-K3
SP-K7		9682719	225618	None	Full Sampling: Quarterly	Bugarama Village.	The tap at Mosque near to the Bugarama market.
HEMBE-DP		9682302	225074	None	Full Sampling: Quarterly	Hembe Village Water Source.	The DP tap at Bugarama Sourced from Hembe Spring
SP-TSF01		9683201,36	234952	None	Full Sampling: Quarterly	-	Located within the TSF Valley
SP-TSF02		9683991,26	234364	None	Full Sampling: Quarterly	-	Located within the TSF Valley
SF-TSF01		9683637	234617	None	Full Sampling: Quarterly	-	V-notch at TSF close to TSF spring
SF-TSF02		9683734	234024	None	Full Sampling: Quarterly	-	V-notch at TSF close to community well
SF-TSF03		9684766	235277	None	Full Sampling: Quarterly	-	V-notch at TSF near to Borehole-TDF03
KPTADM01(G-R7)		9680803	228848	None	Full Sampling: Quarterly	-	Kabanga Potable Admin sample 01
KPT01(G-R7)		9680912	228748	None	Full Sampling: Quarterly	-	Kabanga Potable sample01 (Kitchen)
KPTADMIN2		9680748	228748	None	Full Sampling: Quarterly	-	Environmental Potable water tap
				None			



6.1.2.3 Quality Monitoring -Discharged Water

The Proposed project will generate multiple effluent streams from key water treatment infrastructure, including the High Density Sludge neutralisation plant, potable water treatment plants, reverse osmosis treatment plant, and sewage treatment plants. All discharges from these systems must comply with the effluent quality requirements presented in the table below, which reflect the most stringent values between Tanzanian national standards and IFC EHS discharge guidelines.

The concentrations listed in the table below represent the maximum permissible limits for discharge into the receiving environment. These thresholds are designed to prevent degradation of surface water quality and to protect downstream ecosystems and users. However, these standards must not be applied in isolation. Effluent quality parameters must be re-evaluated and revised if the environmental risk associated with the discharge is determined to be unacceptable.

Table 6-6: Proposed Water Quality Requirements for Discharge Water

Parameter	Unit	Discharge		Proposed Project Discharge Water Quality
		Tanzanian Municipal & Industrial Wastewater Tolerance Limits Active	Effluent Discharge Guideline IFC Guidelines for Mining Active	
pH	min	6.5	6	6.5
pH	max	8.5	9	8.5
Total Dissolved Solids	mg/l	1 200	-	1 200
Total Suspended Solids	mg/l	100	50	50
Temperature	°C	20-35	<3° differential	<3° differential
Biological Oxygen Demand	mg/l	30	50	30
Chemical Oxygen Demand	mg/l	60	150	60
Total Hardness (CaCO ₃)	mg/l		-	-
Colour	TCU	50	-	50
Turbidity	NTU	30	-	30
Sulphate	mg/l	500	-	500
Sulphides	mg/l	4	-	4
Chlorine	mg/l	5	-	5
Chloride	mg/l	200	-	200
Fluoride	mg/l	4	-	4
Cyanide - Total	mg/l	0.05	-	0.05
Cyanide - WAD	mg/l	-	0.5	0.5
Cyanide - Free	mg/l	-	0.1	0.1



Parameter	Unit	Discharge	Effluent Discharge Guideline	Proposed Project Discharge Water Quality
		Tanzanian Municipal & Industrial Wastewater Tolerance Limits Active	IFC Guidelines for Mining Active	
Aluminium	mg/l	2	-	2
Arsenic	mg/l	0.2	0.1	0.1
Barium	mg/l	1.5	-	1.5
Cadmium	mg/l	0.01	0.05	0.01
Chromium VI	mg/l	0.1	0.1	0.1
Copper	mg/l	0.5	0.3	0.3
Iron (total)	mg/l	5	2 (total)	2
Lead	mg/l	0.01	0.2	0.01
Manganese	mg/l	5	-	5
Mercury	mg/l	0.001	0.002	0.001
Nickel	mg/l	0.5	0.5	0.5
Selenium	mg/l	0.02	-	0.02
Silver	mg/l	0.1	-	0.1
Tin	mg/l	2	-	2
Vanadium	mg/l	1	-	1
Zinc	mg/l	5	0.5	0.5
Nitrates as NO ₃	mg/l	20	-	20
Nitrates as N	mg/l	4.5	-	4.5
Kjedahl Nitrogen	mg/l	15	-	15
Oil and Grease	mg/l	10	10	10
Phenols	mg/l	0.002	0.5	0.002
Total Coliforms	count /100 ml	10 000	-	10,000
<i>Escherichia coli</i>	count /100 ml	400	-	400
Faecal coliforms	count /100 ml	1 000	-	1 000

6.1.2.4 Potable Water Requirements

The proposed Project will include the establishment of two modular, containerised water treatment plants designed to treat raw water abstracted from both the Ruvubu River and



onsite boreholes. These treatment plants will ensure that water supplied for domestic use across the mine site meets drinking water standards.

The water quality required for potable water consumption on site is based on the strictest water quality requirements of the WHO and Tanzanian Regulatory Requirements. The post-treatment water quality targets are detailed in the table below and these serve as the compliance benchmarks for treated water used for drinking and domestic purposes onsite.

Routine monitoring of the treated water (discharged) is essential to verify the effectiveness of the treatment process and ensure ongoing compliance with potable water standards. This will include daily field monitoring for physical parameters will be ideal to be done with onsite lab. including parameters like pH, EC, TDS, TSS and Chlorine, weekly measurement for bacteria Total Coliform, E-Coli and quarterly testing. Monitoring must include microbiological, chemical, and physical parameters, and should be carried out at defined intervals in accordance with national and international drinking water quality guidelines. This is particularly critical in remote or high-risk environments such as mining operations, where waterborne illnesses or exposure to contaminants could have serious health and safety implications for workers.

Table 6-7: Proposed project water quality requirements for drinking water, after treatment

Parameter	Unit	Drinking water (Tanzanian Drinking (potable) water standard <i>Active</i>	Drinking water WHO: Guidelines for Drinking-water Quality. 4th Edition. 201) <i>Reference</i>	Tanzanian Regulatory Requirements Water Utilization Law <i>MPC - 1(c)</i>	Proposed Project Drinking Water Quality
pH	min	6.5	-	6.5	6.5
pH	max	9.2	-	8.5	8.5
Total Dissolved Solids	mg/l	-	-	2 000	2 000
Biological Oxygen Demand	mg/l	6	-	5	5
Total Hardness (CaCO ₃)	mg/l	600	-	-	600
Colour	TCU	50	-	-	50
Turbidity	NTU	25	-	-	25
Calcium	mg/l	300	-	-	300
Sodium	mg/l	-	-	-	-
Magnesium	mg/l	100	-	-	100
Sulphate	mg/l	600	-	600	600
Chlorine	mg/l	-	5	-	5
Chloride	mg/l	800	-	200	200
Fluoride	mg/l		1.5	8	1.5



Parameter	Unit	Drinking water (Tanzanian Drinking (potable) water standard Active	Drinking water WHO: Guidelines for Drinking-water Quality. 4th Edition. 201) Reference	Tanzanian Regulatory Requirements Water Utilization Law MPC - 1(c)	Proposed Project Drinking Water Quality
Cyanide - Total	mg/l	0.2	-	0.05	0.05
Aluminium (Total)	mg/l	-	-	0.3	0.3
Arsenic	mg/l	0.05	0.01	0.05	0.01
Barium	mg/l	-	0.7	-	0.7
Boron	mg/l	-	2.4	1.15	1.15
Cadmium	mg/l	0.05	0.003	0.03	0.003
Chromium VI	mg/l	0.05	-	0.05	0.05
Chromium Total	mg/l	-	-	0.05	0.05
Cobalt	mg/l	-	-	0.1	0.1
Copper	mg/l	3	2	3	2
Iron (total)	mg/l	1	-	1	1
Lead	mg/l	0.1	0.01	0.1	0.01
Manganese	mg/l	0.5	-	0.5	0.5
Mercury	mg/l	0.001	0.006	0.001	0.001
Nickel	mg/l	0.07	-	0.05	0.05
Selenium	mg/l	0.05	0.04	0.05	0.05
Silver	mg/l	-	-	0.05	0.05
Tin	mg/l	-	-	0.5	0.5
Vanadium	mg/l	-	-	0.005	0.005
Zinc	mg/l	15	-	0.2	0.2
Nitrates as NO ₃	mg/l	75	50	-	50
Nitrates as N	mg/l	17	11	50 ⁷	11
Nitrite as NO ₂	mg/l	-	3	-	3
Ammonia - N (as NH ₃ +NH ₄)	mg/l	1	-	0.5	0.5
Phenols	mg/l	0.002	-	0.002	0.002

⁷ To be confirmed with the relevant regulatory authority before adopting them as the nitrate values appear very high.



Parameter	Unit	Drinking water (Tanzanian Drinking (potable) water standard Active	Drinking water WHO: Guidelines for Drinking-water Quality. 4th Edition. 201) Reference	Tanzanian Regulatory Requirements Water Utilization Law MPC - 1(c)	Proposed Project Drinking Water Quality
Total Coliforms	count/100 ml	-	0	-	0
<i>Escherichia coli</i>	count/100 ml	-	0	-	0
Faecal coliforms	count/100 ml	-	0	-	0

6.1.2.5 Operational Water Balance

An operational water balance quantifies and tracks the flow of water into and out of the mine. It helps identify potential losses, wastage, and inefficient usage, aiding in optimizing water management for sustainability and cost reduction. By understanding the current water usage, operational water balances enable informed decision-making for better water resource allocation and conservation. A water balance needs to be developed for the Project and updated on an annual basis.

6.1.3 Groundwater Monitoring Programme

Groundwater monitoring involves the systematic collection of data on groundwater levels, quality, and abstraction rates through a network of strategically located monitoring boreholes across the area of interest. These data are used to assess the impact of mining activities on local groundwater resources, identify potential sources of contamination, track groundwater abstraction or dewatering rates, and provide early warning of environmental risks. Additionally, monitoring results help evaluate the effectiveness of implemented mitigation measures and support planning for project closure and site rehabilitation (WSP(e), 2023).

The primary objectives of the groundwater monitoring programme are to:

- Assess the impact of mining activities on surrounding aquifers and groundwater users by monitoring groundwater levels and quality within the Project Area and at selected community wells and boreholes beyond the site boundary.
- Detect potential sources of groundwater pollution.
- Monitor abstraction and dewatering rates.
- Serve as an early warning system for emerging environmental impacts.
- Evaluate the effectiveness of implemented mitigation measures.
- Support long-term project closure and rehabilitation planning.

6.1.3.1 Groundwater Quality Standards

The analytical results of the groundwater samples are compared to the following standards:

- The EHS Mining Effluent Guidelines, 2007.
- World Health Organisation, 2022 (WHO, 2022), and



- Tanzanian Drinking (potable), drinking water standards (TZS 789:2008).

6.1.3.2 **Groundwater Monitoring Network**

The groundwater monitoring network design is guided by a risk-based source-pathway-receptor (SPR) principle. The SPR principle is used to assess and mitigate the risks associated with contaminant transport in groundwater systems. A groundwater monitoring network contains monitoring positions which can assess the groundwater status at certain areas. Both the impact on water quality and water quantity are catered for in the monitoring system. The boreholes in the network cover source monitoring, plume/pathway monitoring, receptor / impact monitoring and monitoring of background water quality levels.

The current Project monitoring network is listed in Table 6-8 and indicated in Figure 6-2.



Table 6-8: Kabanga Mine Groundwater Monitoring Points

Site Name	Rearranged / Renamed	Ycoord	Xcoord	Site Type	Community Water Sources
G-K1	N/A	9679661	222459	Well	Mumiramira Village
G-K2	N/A	9682235	223282	Well	Bugarama Village
G-H3	N/A	9690922	226370	Well	Nyabihanga Village
G-H4	N/A	9686870	225747	Well	Rwinyana Village
G-K5	N/A	9684678	226212	Well	Mpigi Village
KN-98-82	N/A	9682629	229437	Borehole	-
G-R7	N/A	9681749	228202	Well	Kabanga Camp
G-K8	N/A	9682924	228181	Borehole	-
G-H9 (KN-06-47B)	N/A	9683862	228289	Borehole	-
GT08-03	N/A	9685336	230997	Borehole	-
TDF-BH9-1(b)	N/A	9684180	233246	Borehole	-
TDF-BH9-2(b)	N/A	9684181	233252	Borehole	-
BH-UN6-2(b)	N/A	9683478	228731	Borehole	-
BH-UN6-4(b)	N/A	9683476	228735	Borehole	-
PS-BH2-1(b)	N/A	9683088	229266	Borehole	-
PS-BH4(b)	N/A	9683139	229544	Borehole	-
TEM-P1-2(b)	N/A	9684252	230491	Borehole	-
TEM-P1-3(b)	N/A	9684243	230485	Borehole	-
OSMW-1	N/A	9682039,4	228588	Borehole	-
OSMW-3	N/A	9684047	227815	Borehole	-



Site Name	Rearranged / Renamed	Ycoord	Xcoord	Site Type	Community Water Sources
OSMW-4	N/A	9687122	233165	Borehole	-
OW-2	N/A	9683002	229002	Borehole	-
PW-1A	N/A	9683346	228899	Borehole	-
GT08-PW4	N/A	9685164	230604	Borehole	-
GT08-PW3	N/A	9683172	228748	Borehole	-
TPW23-01	N/A	9683346,9	228899	Borehole	-
TPW23-02	TMW23-01	9681456,9	227938	Borehole	-
TMW23-01	TMW23-02	9686335,5	230566	Borehole	-
TMW23-02	TMW23-03	9682658,3	235383	Borehole	-
TMW23-03	TMW23-04	9684377,4	235169	Borehole	-
TMW23-04	TMW23-05	9684170	233255	Borehole	-
TMW23-05	TMW23-06	9683817,5	233664	Borehole	-
TMW23-06	TMW23-07	9683571,9	231316	Borehole	-
TPW23-03	TPW23-02	9683730,4	231793	Borehole	-
TMW23-07	TMW23-08	9680893,5	229688	Borehole	-
TMW23-08	TMW23-09	9684415,5	228397	Borehole	-
TMW23-09	TMW23-10	9685291,1	233559	Borehole	-
TMW23-10	TMW23-11	9682429,8	230492	Borehole	-
TPW23-04	TPW23-03	9683178	228746	Borehole	-
TMW23-11D	TMW23-13D	9684200,8	233777	Borehole	-
TMW23-11S	TMW23-13S	9684197,3	233781	Borehole	-
TMW23-12D	TMW23-14D	9684152,5	233881	Borehole	-
TMW23-12S	TMW23-14S	9684147,3	233883	Borehole	-
TMW23-13D	TMW23-15D	9684103	233448	Borehole	-



Site Name	Rearranged / Renamed	Ycoord	Xcoord	Site Type	Community Water Sources
TMW23-13S	TMW23-15S	9684103,8	233453	Borehole	-
TMW23-14D	TMW24-16D	9683908	231208	Borehole	-
TMW23-14S	TMW24-16S	9683911	231207	Borehole	-
TMW23-16D	TMW24-17D	9681823	230244	Borehole	-
TMW23-16S	TMW24-17S	9681830	230245	Borehole	-
TPW23-05	TMW23-12	9686592,9	232593	Borehole	-



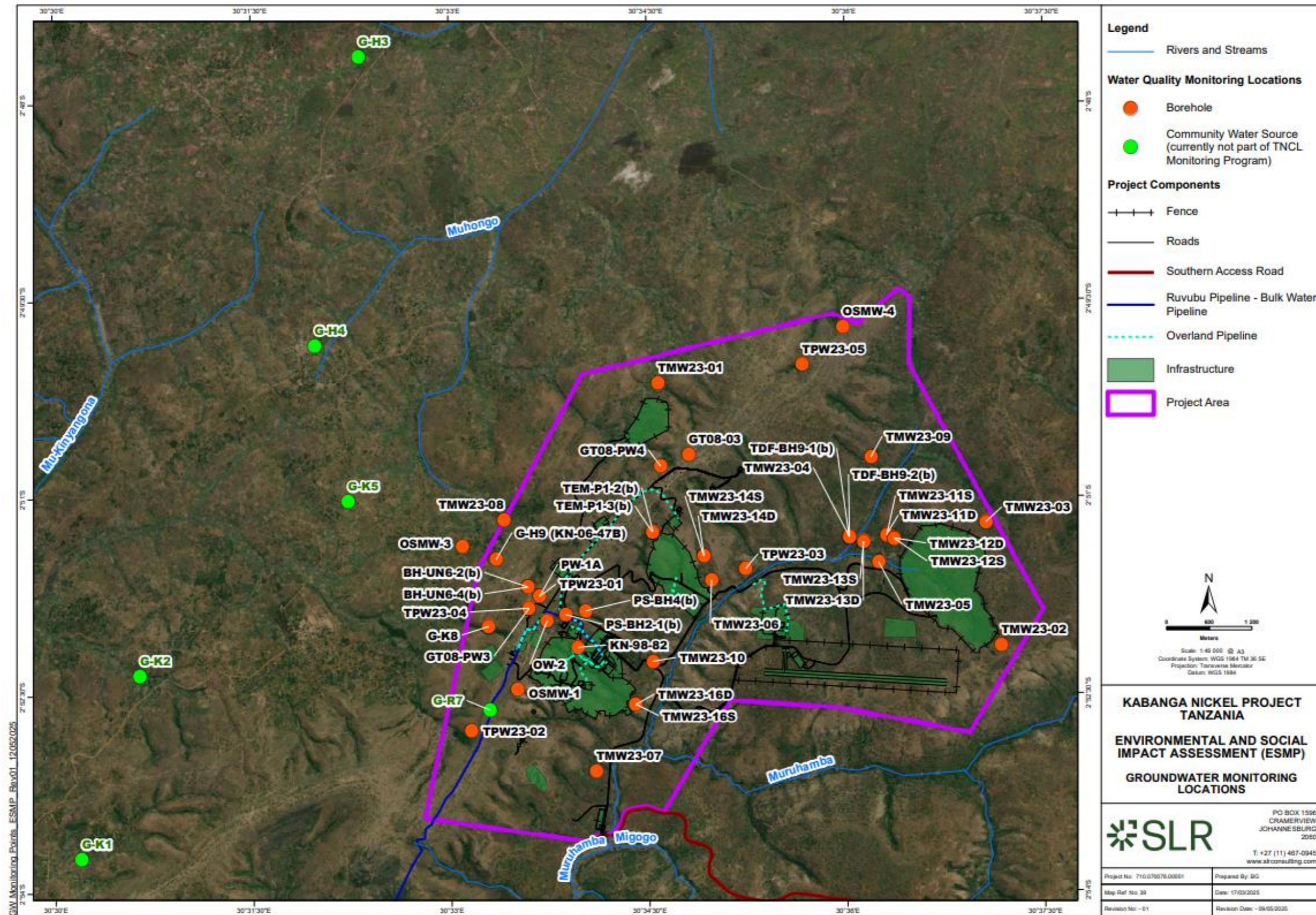


Figure 6-2: Kabanga Mine Groundwater Monitoring Points



6.1.3.3 Monitoring Frequency

Groundwater monitoring of physical parameters will take place on a monthly basis, with all other parameters monitored on a quarterly basis.

Groundwater samples must be submitted to and analysed at an accredited laboratory in Mwanza, Tanzania. Quality control must be adhered to, and foreign laboratories will be considered when quality control requirements are not met from local laboratories.

Automated data loggers for continuous measurements of water levels, temperature, and other parameters can be considered and installed at selected monitoring boreholes across the area of interest. This option however is expensive and exposed to vandalism if installed in areas outside the site perimeter.

6.1.3.4 Monitoring Parameters

Quarterly groundwater quality determinants to be analysed as listed in the table below or as per regulatory requirements. Bacteriological analyses however can only be conducted at community monitoring boreholes located outside the site perimeter or at sampling points at risk of bacteriological contamination.

Table 6-9: Groundwater Monitoring Determinants

Analyses Profiles	Groundwater Determinants
Profile A	pH, EC, TDS, TSS, T-Alk, B 'Carbonate, Carbonate, Hardness, Chloride, Fluoride, T-Phosphate, Phosphate, Sulphate, Nitrate, Nitrite, Ammonia
Profile B	<i>Dissolved:</i> Al, Sb, Ar, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mn, Mg, Hg, Mo, Ni, K, Se, Ag, Na, Sr, Tl, Sn, U, V, Zn, As
Profile C	<i>Total:</i> Al, Sb, Ar, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mn, Mg, Hg, Mo, Ni, K, Se, Ag, Na, Sr, Tl, Sn, U, V, Zn, As
Profile D	F-CN, WAD CN, T-CN
Profile E	COD, BOD
Profile F	Oil & Grease, Phenol
Profile G	Total Coliform, E-Coli, Enterococci

6.1.3.5 Abstraction Rates

Monitoring groundwater abstraction rates involves tracking the amount of water extracted from underground sources over time. Monthly measurements with installed flow meters (m³/hour), will assess usage patterns and manage water resources effectively. These measurements should be reported in cubic meters (m³) per month to provide a detailed understanding of demand fluctuations throughout the year.

6.1.3.6 System Response Monitoring

Groundwater System Response Monitoring is the systematic observation and analysis of how groundwater systems react and adapt to changes in their environment or human activities. Various parameters are monitored, including groundwater levels, quality, flow/abstraction rates, and hydrological dynamics to understand the performance of groundwater systems over time and in response to external influences. Implementing alert systems or trigger notifications is crucial for promptly responding to situations where



groundwater quality or quantity thresholds are exceeded. By implementing alert systems or trigger notifications, TNCL can swiftly respond to deviations from desired groundwater quality or quantity levels, mitigating risks, protecting public health, and ensuring the sustainable management of groundwater resources.

Implementing alert systems or trigger notifications is crucial for promptly responding to situations where groundwater quantity or quality thresholds are exceeded. These systems typically involve:

- **Threshold Definition:** Establishing specific thresholds for groundwater quality parameters (e.g. contaminated concentrations and quantity indicators (e.g. groundwater levels)).
- **Continuous Monitoring:** utilising sensors and monitoring equipment (automated data loggers) to continuously track groundwater quality and quantity in real-time.
- **Automated Alert Generation:** Setting up automated algorithms or rules within monitoring systems to detect when monitored parameters exceed predefined thresholds.
- **Notification Mechanisms:** Implementing notification mechanisms such as email alerts, SMS messages, or mobile app notifications to inform relevant stakeholders (e.g. water managers, authorities, or the public) when thresholds are exceeded, and
- **Response Protocols:** Developing clear response protocols outlining the actions to be taken when alerts are triggered, including investigating the cause of exceedance, implementing corrective measures and communicating with stakeholder.

Implementing alert systems or trigger notifications will allow stakeholder to swiftly respond to deviations from desired groundwater quality or quantity levels, mitigating risks, protecting public health and ensuring the sustainable management of groundwater resources.

6.1.3.7 Groundwater Abstraction and Dewatering

When mining commences and dewatering is required, groundwater abstraction/dewatering rates and volumes should be tracked. Monthly measurements with installed flow meters (m^3/hour), help assess usage and dewatering patterns and manage water resources effectively. Measurements should be reported in cubic meters (m^3) per month to provide a detailed understanding of demand fluctuations throughout the year.

6.1.3.8 Groundwater Database

Effective groundwater management entails organising and storing the collected monitoring data in a centralised database such as EQulS, currently being implemented. This ensures easy access, retrieval, and sharing of information among stakeholders such as water authorities, researchers, and policymakers.

6.1.3.9 Analysis and Reporting

Analysis of groundwater monitoring data involves applying various statistical and modelling techniques to interpret the data. This includes trend analysis to identify long-term changes, spatial analysis to understand distribution patterns, and predictive modelling to forecast future trends and potential impacts.

Quarterly groundwater monitoring reports must be prepared to provide a comprehensive overview of groundwater conditions and trends over a three-month period. Reports should include:



- **Groundwater Levels:** Summaries of water level measurements from monitoring boreholes/wells, indicating fluctuations and trends in groundwater table elevations.
- **Water Quality:** Analysis of key water quality parameters such as pH, electrical conductivity, dissolved oxygen, and concentrations of contaminants such as nitrates, sulphate, metals, and organic compounds.
- **Pumping Data:** Information on groundwater abstraction rates, including volumes pumped and locations of extraction wells.
- **Trend Analysis:** Identification of any notable trends or changes observed in groundwater levels, quality, or pumping rates compared to previous quarters or historical data, and
- **Interpretation and Recommendations:** Interpretation of monitoring results, assessment of groundwater conditions, and recommendations for management actions or further investigation if warranted.

6.1.4 Air Quality Monitoring Programme

This section presents a proposed preliminary air monitoring programme. Monitoring points are located close to the sensitive receptors associated with the mine.

The objectives of the air monitoring programme are to ensure that:

- The Air Quality Management Plan is implemented as expected.
- Air quality is maintained to an acceptable quality in compliance with all applicable legislation, as far as practicable.
- Any potential impacts to air quality are identified, and
- Changes in air quality that may be directly related to the project activities are detected early to allow for appropriate mitigation measures to be implemented.

6.1.4.1 Frequency, Standards and Guidelines

The monitoring of PM₁₀ and PM_{2.5} will be done in the identified five (5) sampling points using an appropriate mobile monitor e.g. Micro-dust Por Cell 712, which could be moved between monitoring points for a period of 1 or 24 hours on a monthly basis.

NO_x, NO₂ and SO₂ will be monitored within the major facilities i.e. camp with generator, mining site and at the monitoring locations as per Figure 6-3 on a monthly basis.

The air quality monitoring data will be analysed by an appropriately qualified professional and the results will be reported on a regular basis, as determined by management. Data from the nearby weather station recorded continuously, will be bought and summarised in monthly reports, unless more frequent data is required by operational needs.

The regulatory standards relevant to air quality include:

- Tanzania Bureau of Standards -TZS 845:2005, Air Quality – Specification.
- Tanzania Bureau of Standards – EMDC 2 (1758), Air Quality – Vehicular Exhaust Emission Limits.
- Environmental Management (Air Quality Standards) Regulations, 2007:
 - First Schedule, Permissible Weight Concentration of Emission Limits from the Atmosphere to a Receptor and Respective test methods.
 - Second Schedule, Highest Permissible Quantity of Emission and Test Methods.



- Fourth Schedule, Emission Limits for Motor Vehicles.

In addition to the above standards and regulations the following guidelines also need to be followed:

- Eastern African Standard Organisation, 2010. Air Quality Specification Guideline (CD/T/66/2010).
- East African Community (2010): Air Quality Specification (CD/T/66/2010).
- East African Community (2021): Air Quality Specification 2nd Ed. (DEAS 751:2021).
- World Health Organisation Air Quality Guidelines (WHO AQG), 2021.
- IFC EHS Guidelines for Air Quality, and
- The Initiative for Responsible Mining Assurance (IRMA).

Ambient air quality must be continuously monitored in real time, focusing on fine particulates (PM₁₀ and PM_{2.5}), gases (SO₂, NO₂, and VOCs) and Lead. The parameters and guidelines values/limits for the project are included in Table 6-10 Compliance criteria have been adopted from several guidelines as no single guideline/standard contains limit concentrations for all parameters.

Table 6-10: Air Quality Monitoring Parameters and Guidelines Values/Limits

Parameter	Units of Measure	Tanzania Bureau of Standards TZS 845: 2005. Air Quality – Specification First Schedule. Permissible Weight Concentration of Emission Limits from the Atmosphere to a Receptor	Second Schedule. Highest Permissible Quantity of Emission	WHO – Air Quality Guidelines 2005
Inhalable particulate matter (PM10)	µg/m ³	Emission limit 60 - 90	Annual limit - 250	Annual mean – 20 24 Hours mean - 50
Inhalable particulate matter (PM10)	µg/m ³			Annual mean – 10 24 Hours mean - 25
Sulphur dioxide (SO ₂)	µg/m ³	24 hours mean – 20 10 minutes mean - 500	Not applicable	24 hours mean – 20 10 minutes mean - 500
Lead (Pb)	µg/m ³	Annual mean –0.5 24 Hours mean – 1.5	Not to exceed 5 tonnes/year of lead or lead compounds by a stationary source.	-
Nitrogen oxide (NO _x)	µg/m ³	Annual mean – 0.1 24 Hours mean – 150	Not applicable	Annual mean – 40 1 Hour mean – 200
Carbon monoxide (CO)	µg/m ³	Time-weighted exposures at the following levels: ▪ 00mg/Nm ³ for 15 minutes ▪ 60mg/Nm ³ for 30 minutes	Not to exceed 175 at diesel generators	-



Parameter	Units of Measure	Tanzania Bureau of Standards TZS 845: 2005. Air Quality – Specification First Schedule. Permissible Weight Concentration of Emission Limits from the Atmosphere to a Receptor	Second Schedule. Highest Permissible Quantity of Emission	WHO – Air Quality Guidelines 2005
		<ul style="list-style-type: none"> ▪ 30mg/Nm³ for 60 minutes ▪ 10mg/Nm³ for 8 hours Daily average of hourly vales shall not exceed 10 mg/kg and average of hourly values in eight consecutive hours shall not exceed 20mg/kg		
Ozone	µg/m ³	8 hours mean -120	-	8 hours mean -100

Results from monitoring will be compared to the Tanzanian Air Quality Specification. The aim of the air quality analysis is to determine any changes in concentration of particular parameters which may be as a result of mining activities.

Exceedance of guideline criteria at any of the monitoring points will be identified, reported to management and relevant regulatory authorities and corrective actions taken where required.



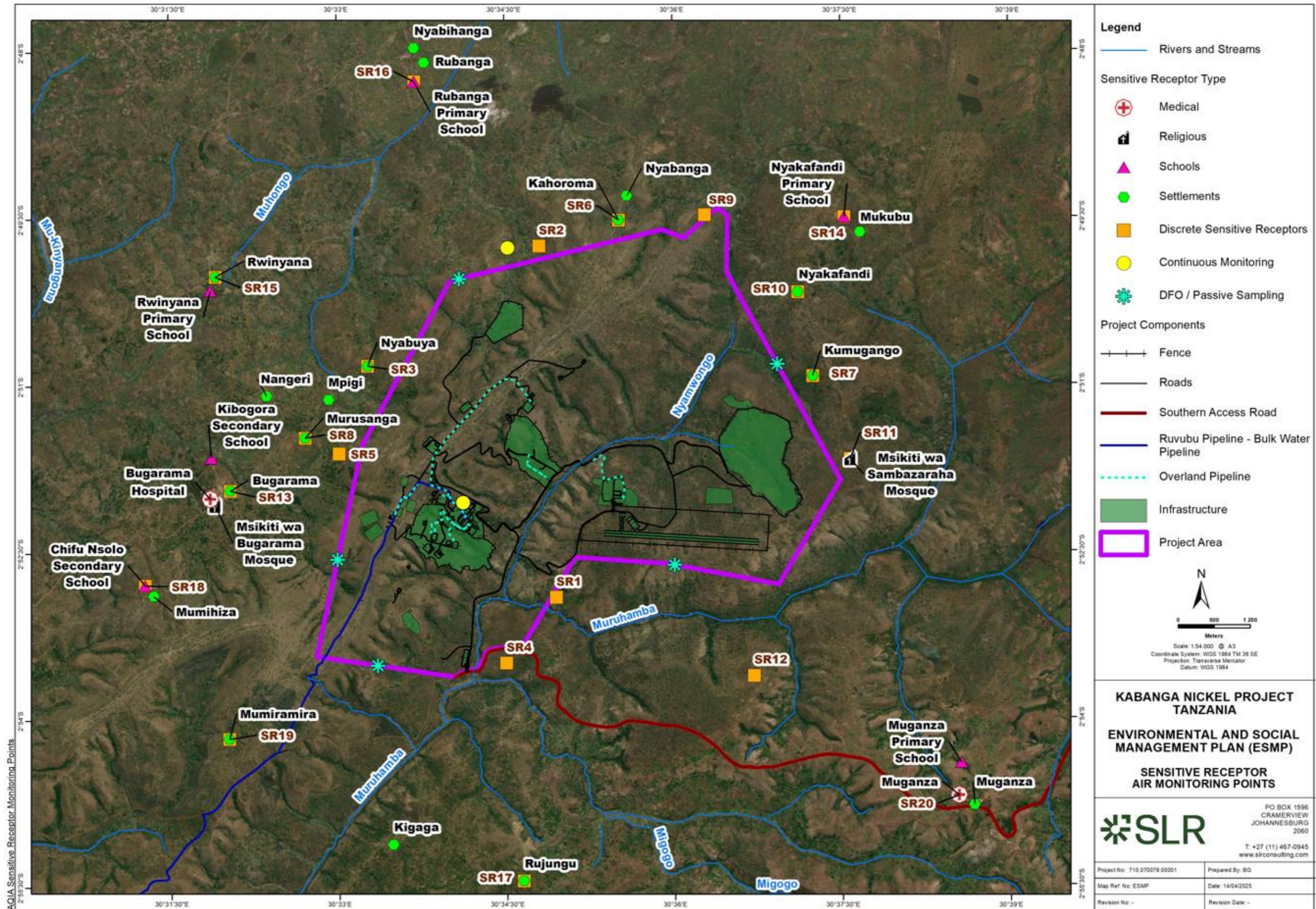


Figure 6-3: Air Quality Monitoring Points



6.1.5 Noise Monitoring Plan

A noise monitoring plan is a structured approach to measure, manage, and mitigate noise levels in and around mining operations. The plan helps ensure compliance with regulations and minimizes environmental and community impacts (SLR(d), 2025).

The objectives of a noise monitoring plan include the following:

- To ensure that the objectives of the Noise Management Plan are being met.
- Ambient noise does not exceed applicable noise criteria at sensitive receptors outside of the project Area.
- To gather data such as potential noise impacts are identified and appropriate mitigation measures are put in place.

6.1.5.1 Standards and Guidelines

The IFC does not have specific criteria for construction noise, the Tanzania EMA is considered sufficient in assessing construction related noise. All monitoring data must be undertaken and interpreted in accordance with the following standards and guidelines:

- Tanzanian EMA for the Control of Noise & Vibration Pollution (2015)
- Tanzanian Environmental Management Act (EMA), 2004 (No. 20 of 2004)
- Tanzania Bureau of Standards – EMDC 6 (1733) P2: Acoustics – general Tolerance limits for Environmental Noise
- IFC EHS guidelines (2007)
- The Equator Principles version 4 (EP4)
- World Bank Group Environmental, Health and Safety (EHS) Guidelines
- Initiative for Responsible Mining Assurance (IRMA), Standard for Responsible Mining and Mineral Processing, 2018 (Chapter 4.4)
- Good International Industry Practices (GIIP)
- World Health Organisation guidelines for Community Noise, 1999

6.1.5.2 Measurement Locations

Noise monitoring locations are indicated in Figure 6-4. Further locations, if necessary, will be established as drilling and blasting activities commence.

6.1.5.3 Noise Guideline Value/Limits

Noise monitoring parameters have been selected based on legislative requirements and international standards relevant to the project. Table 6-11 list the noise guideline values/limits applicable to the Project. Compliance criteria have been adopted from several guidelines and standards as no single guidelines/standard contains limit concentrations for all parameters.

Results from monitoring will be compared to the baseline data previously collected from the sampling location and evaluated against the Tanzanian General Tolerance Limits for Environmental Noise. The aim of the noise monitoring is to determine any significant changes in ambient noise at sensitive receptors, which may be as a result of mining activities.



Exceedance of guideline criteria at any of the monitoring points will be identified, reported to management and relevant regulatory authorities and corrective actions taken where required.

Table 6-11: Noise Monitoring Criteria Guidelines

Area	WHO Guidelines for Community Noise		Tanzania General Tolerance Limits for Environmental Noise	
	Daytime (dBA)	Night time (dBA)	Daytime (dBA)	Night time (dBA)
Residential	55	45	55	45
Industrial	70	70	70	60

6.1.5.4 Noise Monitoring Frequency

Noise and Vibration monitoring will be conducted during the Life of Mine during all project phases. There are two options with regard to monitoring:

- Option 1 (Attended 1-hour Monitoring)
 - In line with good international industry practice, monitoring will comprise 1-hour attended readings during the daytime (07:00 to 22:00) and 1-hour attended readings during the night-time (22:00 to 07:00) at each identified monitoring location.
- Option 2 (Unattended 24-hour Monitoring)
 - If site work is not possible during night-time hours, it is recommended that 24-hour measurements are conducted at each monitoring location, with measurements preferably commencing at the start of the daytime period (07:00).
 - It is noted that 24-hour measurements provide more reliable baseline data because the sample period is longer.

6.1.5.5 Acoustic Indicators and Parameters

The following indices will be measured:

- LAeq8, LA109, LA9010, and LAmax11.
- Time constant will be set to 'Fast.'
- Profiles to include Linear (Z) and A-weighted results.
- Logging of measured data will be in 1-minute intervals to allow for result filtering if required.
- Simultaneous logging and storing of 1/3 octave band data (Linear (no) weighting), and
- Audio recording to supplement the data for review if required.

⁸ LAeq: A-weighted equivalent continuous sound level

⁹ LA10: A-weighted noise level that is exceeded 10% of the time (dBA)

¹⁰ LA90: A-weighted background noise level (dBA)

¹¹ LAF, max: A-weighted maximum instantaneous noise level, time constant 'fast'



6.1.5.6 Noise Source Identification

The process / machinery /equipment identified with the highest noise potential include drilling, crushing and rock breaking. As per the NIA, noise sources include concentrator plant equipment, hauling and handling of material, river pump station, access roads etc.



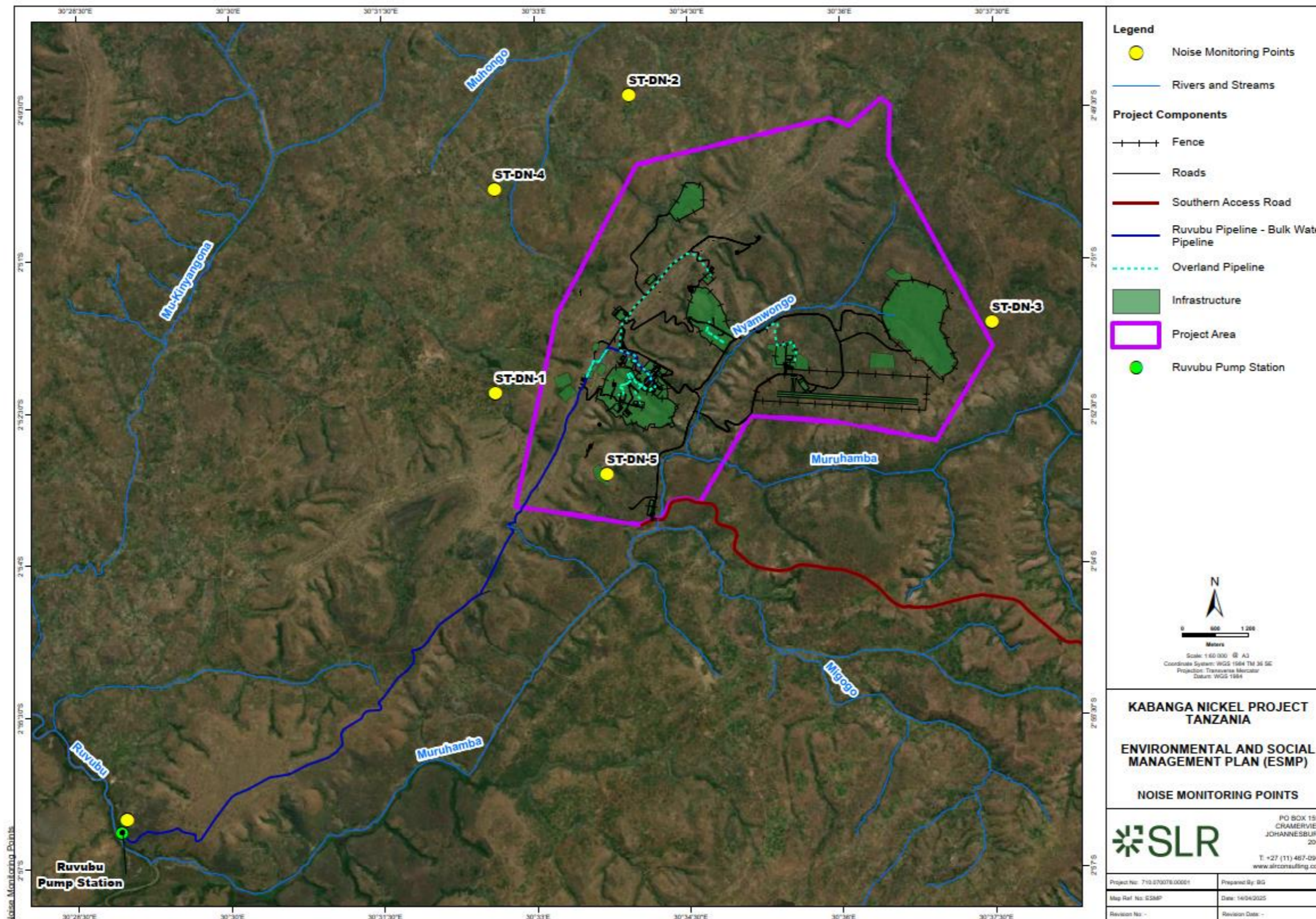


Figure 6-4: Noise Monitoring Points



6.1.5.7 Noise Monitoring Data Analysis and Reporting

Data analysis will be overseen by exceptionally qualified professional and the results will be reported on a regular basis determined by management.

The report format will include:

- Equipment calibration certificates.
- KMZ file of monitored locations.
- Legible map of monitored locations.
- All field data collected (raw and summarized).
- LAeq, LA10, LA90, and LAmax values for the full measurement period from each location.
- Measurement methodology (aligned with regulatory requirements as applicable).
- Digitized field sheets (MS Word) for legibility and archiving purposes (and field sheets for reference).
- Data logging graphs of LAeq vs time for each location at 1 minute interval resolution in excel format.
- Description of any constraints / challenges experienced during the survey and if / why any locations could not be surveyed.
- Any other information that may influence the interpretation of the survey results, and
- Photos of the equipment in situ for each location.

6.1.6 Blasting Operations Monitoring Programme

A monitoring programme for recording blasting operations during the construction phase is recommended. The following elements should be part of such a monitoring program:

- Ground vibration and air blast results.
- Blast Information summary.
- Meteorological information at time of the blast.
- Fly rock observations.

Most of the above aspects do not require specific locations of monitoring. Ground vibration and air blast monitoring requires identified locations for monitoring. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Proposed positions were selected to indicate the nearest points of interest at which levels of ground vibration and air blast should be within the accepted norms and standards as proposed in this report. The monitoring of ground vibration will also qualify the expected ground vibration and air blast levels and assist in mitigating these aspects properly. This will also contribute to proper relationships with the neighbours.

Three monitoring points were identified as possible locations that will need to be considered when conducting initial blasting. These are located at the Nyabihanga Village surrounding the Granite Quarry operations. Monitoring positions are indicated in Table 6-12 and Figure 6-5 lists the positions with coordinates. These points will need to be re-defined after the first blasts are done and the monitoring programme defined.



Table 6-12: Possible Blast Monitoring Positions

Tag	Description	Y	X
8	Village Houses	9686120.99	228896.00
9	Village Houses	9686619.99	229616.00
45	Village Houses	9686808.99	230844.00

The Environmental Management (Standards for the Control of noise and Vibration Pollution) Regulations, 2015 classifies excessive vibration as that which exceeds 5mm/s beyond any source property boundary. This tolerance limit applies to sensitive sites, which has been classified as land within 10 meters of a residence, hospital, school, or other premises in which people could reasonably expect to be free from undue annoyance and nuisance caused by vibration. The 10 meters will be measured from the boundaries of the property.

In addition, to avoid damage to buildings, criteria for vibration were based on the United States of America Standards (USBM R18507) – Ground Vibration Limits, as Tanzanian Regulations do not cite these. These criteria will be considered Project blasting operations. The recommended ground vibration levels should not exceed 10 mm/s for clay huts and 25mm/s for properly constructed buildings by ground vibration.

The limits stipulated in the Environmental Management (Standards for the Control of noise and Vibration Pollution) Regulations, 2015 for air over pressure (sub-sonic vibration is 120 dBL at all times at sensitive sites. Exceedance of guideline values/limits at any vibration monitoring point will be identified and reported to management and relevant regulatory authorities.



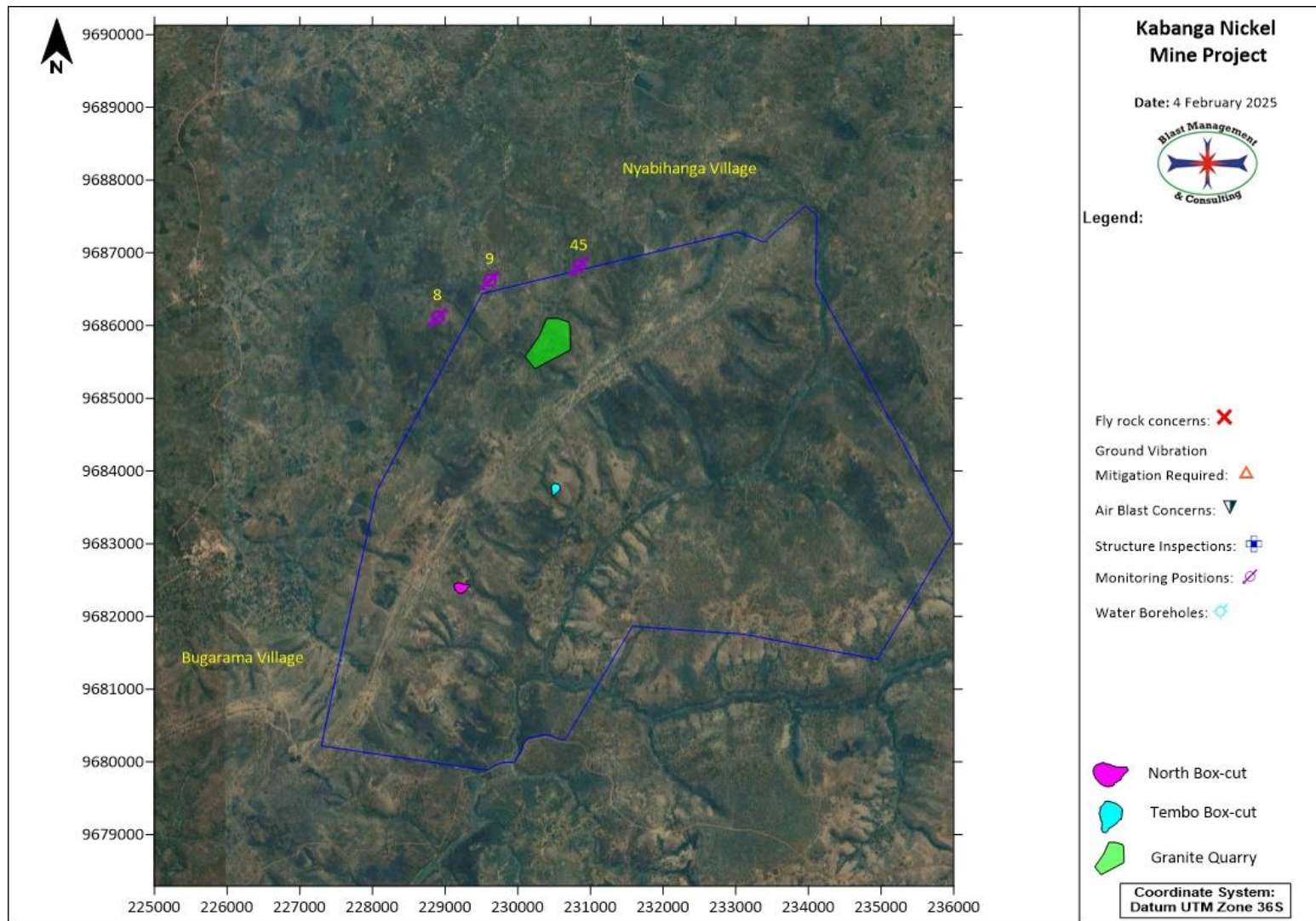


Figure 6-5: Suggested Monitoring Positions



6.1.7 Inspections and Audits

Annual inspections will be the function of the Environmental Leader and Environmental Officer/s, who will spend the bulk of their time on-site conducting inspections to assess compliance with the ESMP. At the same time some potential impacts are difficult to monitor quantitatively, such as soil erosion and waste management, and require physical inspection on an ongoing basis. The inspections will provide valuable qualitative information on effects such as these so that action can be taken to mitigate against further potential effects.

6.1.8 Document and Record Keeping

This ESMP must be readily accessible to all employees and subcontractors. It is the responsibility of TNCL to ensure that the relevant documents are fully understood and that the requirements of those documents are incorporated into the day-to-day mining activities.

The Environmental Manager will keep written and photographic records of the site surroundings before, during and after any construction activities. The photos will be clearly annotated to include a description of the exact date and location when and where they were taken, as well as any specific issues which need to be highlighted. A record must be made of which party was responsible for any damage caused in order to ensure liability for such damage. The subcontractors shall be held liable for all preventable damage to the environment and shall be responsible for the cost and implementation of all remedial actions to be taken.

All records related to the implementation of the ESMP must be maintained in a safe repository and must be easily accessible if required. The following is a list of documentation which must be maintained and available to the Environmental Manager:

- Record any special instructions to employees and subcontractors.
- Record any incident reports, including the actions taken/rehabilitation to address the incidents.
- The complete monitoring record.
- The ESIA and this ESMP.
- Copies of all existing permits and licences.
- Complaints register.

6.1.9 Responding to Complaints

Any complaints received need to be managed in accordance with the mine's grievance mechanism procedure.

6.1.10 Responding to Non-Compliance

When a non-compliance is identified, it is essential to assess the underlying cause and determine the appropriate corrective action. Corrective action can take various forms, but it ultimately involves making changes to some aspect of the overall management approach. Identifying the root cause is crucial, and steps must be taken to address it. Any corrective action decided upon should be documented and formalised, and its implementation closely monitored. This process allows for the creation of a corrective action record that can be referenced for future instances.



Corrective and preventive actions can be communicated through verbal or written instructions. Verbal instructions are often used for minor issues identified during routine site inspections and help raise awareness among employees and subcontractors. These minor issues often arise from a lack of knowledge rather than intentional misconduct. Written instructions, on the other hand, are typically issued after an audit. They detail the sources of the problems and suggest solutions. The effectiveness of these solutions will be evaluated in a follow-up audit, and further written instructions will be provided if necessary.

6.1.11 Work Stoppage

When, in the opinion of the Environmental Manager, an activity will result in environmental damage, the Environmental Lead will issue instructions to halt the activity (if needed) and will assess the severity of the non-compliance and determine the appropriate course of action.

6.1.12 Corrective Action

In order to recommence work after a work stoppage, the Environmental Manager must submit to the General Manager a method statement for rectifying the environmental damage that resulted in the work stoppage instruction, as well as how future incidents will be prevented. This method statement is to be signed off by the General Manager .

6.2 Monitoring Schedule and Methodology

The details of the monitoring schedule and methods are tabulated below.



Table 6-13: Monitoring Schedule for Kabanga Mine

Location of Monitoring Points/ Parameters	Sampling Methods	Frequency of Monitoring	Responsibility
Terrestrial and Aquatic			
Refer to Table 6-1 and Table 6-2.			
Surface Water and Ground Water			
Refer to Sections 6.1.2 and 6.1.3.	<ul style="list-style-type: none"> • Measure and record field parameters at each sampling point using sterile sampling equipment and handling. • The protocols to be followed for the collection of surface water and spring water samples shall be consistent with recognised standard methods including the American Society for Testing Materials (ASTM 2006), the Ontario Ministry of Environment and Energy (MOEE 1996) and the U.S. Environmental Protection Agency (U.S. EPA 1992). • Samples to be submitted to an accredited laboratory. • Field parameter measurements to include pH, redox potential (Eh), temperature, electrical conductivity, dissolved oxygen (DO), alkalinity, metals and metalloids. • Sample filtration: Samples for metals and metalloids shall be collected as follows: <ul style="list-style-type: none"> ○ Unfiltered (total metals), and ○ Field filtered (dissolved metals) with a 0.45 m filter. • Field staff must label samples with unique sample numbers. Field observations such as clarity, turbidity, colour, and odour, as well as the sample collection procedures and techniques must be documented. • Collection of water samples and sent to an accredited laboratory for testing. 	Surface Flow Rate: Weekly: Surface Water Quality: <ul style="list-style-type: none"> • Field Parameters Measurements: Monthly • Full Sampling: Quarterly • Physical parameters will take place on a monthly basis for groundwater. Remaining parameters will be conducted on a quarterly basis. The monitoring frequency. • Once dewatering commences, monthly groundwater abstraction/dewatering rates and volumes should be tracked. 	Environmental Officer
Air Quality			
Refer to Section 6.1.4.	<ul style="list-style-type: none"> • The dust fallout monitoring must be undertaken as described in ASTM D1739-98 (2017): Standard Test Method for Collection and 	<ul style="list-style-type: none"> • Dust Monitoring undertaken on a monthly basis. 	Environmental Officer



Location of Monitoring Points/ Parameters	Sampling Methods	Frequency of Monitoring	Responsibility
	<p>Measurement of Dustfall (Settleable Particulate Matter) . A standardised sampling technique commonly referred to as 'bucket-monitoring' derived from the American Society for Testing and Materials (ASTM) standard method for collection and analysis of DFO (ASTM D1739) is summarised as follows:</p> <ul style="list-style-type: none"> ○ The sampling equipment consists of a non-directional fallout bucket with a circular opening of 19 cm and a depth of 33 cm. The specifications should be as close as possible (with available materials) to those recommended by the ASTM. ○ Deposition of large (>10 µm) solid particles is a function of the airborne concentration and the particle gravitational speed. The monitoring of fugitive dust is therefore conducted principally by passive dust deposition gauges, whereby an open-mouthed container is partially filled with distilled water and exposed for a designated period of time. ○ The container is then collected, and the insoluble particles are removed by filtering the water and weighing, whilst the soluble particle mass is determined after evaporation of a sample of the filtered solution. ○ The ASTM stipulates that the stand which supports the container must be two meters above the ground as there is a large variability in the concentration of particles subject to settling at heights less than two meters. ○ The units are exposed for a predetermined period (30 ± 2 days). 		
Refer to Section 6.1.4.	<p>Passive sampling is a measurement method based on the free flow of analyte molecules from a sample medium (air in this case) to a collection medium (such as activated carbon) due to the difference in chemical potentials between the two media. The net flow of analyte molecules from one medium to the other continues until equilibrium is reached or until the exposure period is terminated .</p>	<ul style="list-style-type: none"> • Passive sampling to be undertaken on a monthly basis. 	Environmental Officer



Location of Monitoring Points/ Parameters	Sampling Methods	Frequency of Monitoring	Responsibility
	<p>The following sampling procedure is recommended for passive gas sampling:</p> <ul style="list-style-type: none"> Assemble the sampling equipment required (Radiello® passive diffusive samplers). A Radiello® passive sampler is a solid sorbent in an inert container into which vapours diffuse. A Radiello® passive sampler consists of a support plate, a diffusive body (varying in permeative properties depending on the target pollutant) and a chemical absorbing cartridge containing a sorbent material. It is recommended that protective outdoor shelters be installed for outdoor environmental air sampling. 		
Refer to Section 6.1.4.	<ul style="list-style-type: none"> Continuous monitoring for ambient particulates and possibly key gases will be undertaken using an Oizom Polludrone or equivalent. An Oizom Polludrone is an ambient air pollution monitoring equipment that provides real-time monitoring data for PM₁₀₀, PM10 and PM2.5, as well as selected gases. Additional features include the capability to run independently on solar power, automatically upgradeable from a central server without any onsite visit, continuous monitoring and real-time data transfer at configurable intervals, calibration, and maintenance, with weatherproofing. Laboratory Calibration: All air quality monitoring systems are calibrated at the ISO/IEC 17025/2017 certified calibration laboratory using standard NIST traceable calibration gas standards as per the international guidelines by USEPA. On-site Calibration: On-site calibration of Oizom® devices can be performed using standard calibration gas cylinders of known concentration or by co-locating with a reference standard. 	<ul style="list-style-type: none"> PM10 and PM2.5 will be monitored continuously. 	Environmental Officer
Waste Incinerator	<ul style="list-style-type: none"> Undertake annual isokinetic stack emissions testing of the on-site waste incinerator to assess compliance with national air emission standards and relevant IFC EHS Guidelines for Thermal Treatment of Waste. Testing must be conducted in accordance with international best practice, such as USEPA Methods 1–5, EN 13284-1 or ISO 9096 for particulate and gaseous pollutant measurement. 	<ul style="list-style-type: none"> Annually, or more frequently if required by permit conditions or following significant upgrades or operational changes to the incinerator. 	



Location of Monitoring Points/ Parameters	Sampling Methods	Frequency of Monitoring	Responsibility
	<ul style="list-style-type: none"> • An isokinetic sampling train will be used to ensure accurate representation of flue gas velocities and particulate loading. • The parameters to be measured typically include: <ul style="list-style-type: none"> ○ Particulate Matter (PM) ○ Carbon Monoxide (CO) ○ Carbon Dioxide (CO₂) ○ Sulphur Dioxide (SO₂) ○ Nitrogen Oxides (NO_x) ○ Total Organic Carbon (TOC) ○ Dioxins and Furans (PCDD/F) ○ Heavy metals (e.g., Cd, Pb, Hg, Cr, As) ○ Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF) if applicable. • Testing must be undertaken by a qualified, third-party service provider accredited to ISO/IEC 17025 for emissions sampling and analysis. All instruments must be calibrated and traceable to national/international standards. 		
Noise			
Refer to Section 4.1.8.	Noise monitoring will be conducted in accordance with international acoustic measurement standards using Class 1 sound level meters. Monitoring will focus on assessing compliance with community noise guidelines, particularly around sensitive receptors and high-noise generating activities. The following indices will be measured: LAeq , LA10 , LA90 , and Lamax: <ul style="list-style-type: none"> • Time constant will be set to 'Fast.' • Profiles to include Linear (Z) and A-weighted results. • Logging of measured data will be in 1-minute intervals to allow for result filtering if required. • Simultaneous logging and storing of 1/3 octave band data (Linear (no) weighting), and 	Sampling can be undertaken as: <ul style="list-style-type: none"> • Attended 1 hour monitoring (1 hour in daytime and 1 hour in nighttime), OR • Unattended 24 hour monitoring (preferred). 	Environmental Officer



Location of Monitoring Points/ Parameters	Sampling Methods	Frequency of Monitoring	Responsibility
	<ul style="list-style-type: none"> Audio recordings may be taken during monitoring to support contextual analysis and verification of abnormal noise events. <p>A meteorological station must be installed on site to capture site-specific weather data (wind speed, direction, temperature, humidity), which influences sound propagation and is essential for interpreting noise levels.</p> <p>Sound levels shall be logged in 1-minute intervals to enable filtering and detailed temporal analysis.</p>		
Blasting			
Refer to Section 6.1.6.	<p>The following is to be gathered at each blast:</p> <ul style="list-style-type: none"> Ground vibration and air blast results; Blast Information summary; Meteorological information at time of the blast; Fly rock observations. 	<ul style="list-style-type: none"> To be monitored at every blast. 	Environmental Manager



6.3 Management Review

The mine is committed to developing and implementing a formal ESMS aligned with ISO 14001 standards and the requirements of the IFC Performance Standards, particularly *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*. The establishment of a robust ESMS is essential to effectively manage, monitor, and review the ESMP and to ensure its long-term success.

A well-structured ESMS will provide the foundation for systematically integrating environmental and social responsibilities into the mine's overall operational practices. It will ensure that risks and impacts are identified, assessed, and managed in a proactive and consistent manner throughout the life of the Mine. The ESMS will be designed as a dynamic framework that promotes continuous improvement, adaptive management, and accountability in line with international best practice.

In accordance with ISO 14001 principles, a formal management review process will be instituted and conducted at regular intervals. The purpose of the management review is to critically assess the performance of the ESMP and the broader ESMS, evaluate the effectiveness of implemented measures, and determine necessary modifications to improve environmental and social performance. The process will follow a structured agenda, with formal minutes documented. These records will specifically highlight decisions made regarding continual improvement interventions and corrective actions, ensuring traceability and accountability.

The ESMS will incorporate the following core elements, in line with IFC and ISO 14001 requirements:

- **Policy:** Development of a clear Environmental and Social Policy statement reflecting the mine's commitment to compliance, continual improvement, and stakeholder engagement.
- **Identification of Risks and Impacts:** Systematic identification, annual review and improvement, and prioritization of environmental and social risks and impacts associated with the Project's activities.
- **Management Programs:** Establishment and implementation of specific programs, plans, and procedures to avoid, minimize, mitigate, or offset adverse impacts.
- **Organizational Capacity and Competency:** Allocation of sufficient resources, designation of key roles and responsibilities, and provision of necessary training to ensure effective ESMS implementation.
- **Emergency Preparedness and Response:** Development of comprehensive procedures and resources to respond effectively to environmental, social, and operational emergencies.
- **Stakeholder Engagement:** Ongoing consultation and disclosure processes to maintain transparent and meaningful communication with affected communities and stakeholders throughout the Project lifecycle.
- **Monitoring and Review:** Establishment of monitoring programs to track performance indicators, evaluate the effectiveness of management measures, and identify opportunities for continual improvement.

The mine acknowledges that developing and maintaining a fully functioning ESMS is a progressive process, particularly for junior companies. However, TNCL is committed to aligning systems with international good practice as operations advance, ensuring compliance with lender expectations, regulatory requirements, and community



expectations. The development and implementation of the ESMS will be prioritised as a key component of the Project's broader environmental and social risk management strategy.



7. Management Plans and Policies

7.1 Management Plans

As part of developing this ESMP, a number of Management Plans have been developed. These include the following:

- Acid Rock Drainage and Acid Mine Drainage Management Plan (Appendix B);
- Biodiversity Management Plan and Action Plan (Appendix C);
- Stakeholder Engagement Plan (Appendix D);
- Cultural Heritage Management Plan (Appendix E);
- Resource Efficiency Management Plan (Appendix F);
- Green House Gas Management Plan (Appendix G);
- Vulnerable Peoples Management Plan (Appendix H);
- Waste Management Plan (Appendix I);
- Chemical and Hazardous Waste Management Plan (Appendix J).
- Human Rights Management Plan (Appendix K); and
- Community Health and Safety management Plan (Appendix L).

The following Management Plans will be developed by TNCL prior to the commencement of any construction related activities:

Table 7-1: Management Plans Still to be Developed

Management Plan	Overarching Purpose	Reference in this ESMP
Air Quality Management Plan	To outline measures for managing and mitigating air emissions associated with project activities, including dust and gaseous pollutants. The plan aims to ensure compliance with national standards and IFC Performance Standard 3, while safeguarding community and worker health.	Refer to Table 4-12.
Project Induced In-Migration (PIIM) Management Plan	To manage and mitigate the social, environmental, and health impacts associated with the movement of people into the project area, in line with IFC Performance Standard 1. The plan promotes coordinated stakeholder engagement, land use planning, and service delivery.	Refer to Table 4-35.
Business Continuity Management Plan	To ensure that the project can continue operating during and after unexpected events or disruptions by identifying key risks, establishing recovery strategies, and maintaining critical functions.	Refer to Table 4-36.
Gender Based Violence Management Plan	To prevent, monitor, and respond to incidents of gender based violence related to project activities, in alignment with IFC Performance Standards 2 and 4. The plan promotes awareness, reporting	Refer to Table 4-23.



Management Plan	Overarching Purpose	Reference in this ESMP
	mechanisms, survivor support, and accountability across the workforce and communities.	
Employee Health Awareness Plan	To promote health education, disease prevention, and wellness initiatives among employees. The plan supports early detection, improved health outcomes, and alignment with broader community health strategies.	Refer to Table 4-27.
Stormwater Management Plan	To control and manage surface runoff to prevent erosion, flooding, and contamination of nearby water bodies. The plan includes design standards, operational controls, and compliance with national water regulations and IFC Performance Standard 3.	Refer to Table 4-9.
Water Conservation and Demand Management Plan	To promote the sustainable use of water resources by reducing demand, improving efficiency, and reusing water where feasible. The plan aligns with IFC Performance Standard 3 and supports the project's broader resource efficiency goals.	Refer to Table 4-10.
Soil Management Plan	The Soil Management Plan will define procedures for topsoil stockpiling, including optimal locations, erosion and stormwater control measures, stockpile design, and restricted access. The plan will also detail rehabilitation measures for disturbed land, addressing soil replacement, fertilisation, erosion prevention, and restoration of land functionality.	Refer to Table 4-1.
Transboundary Management Plan	The Transboundary Management Plan is designed to proactively manage environmental, social, and cultural impacts that cross national borders, in alignment with IFC Performance Standards. Its overarching objectives are to promote cross-border cooperation, safeguard transboundary cultural heritage and social practices, manage shared environmental resources responsibly, strengthen community health, safety, and security, and ensure inclusive stakeholder engagement. The Plan also seeks to align with international standards and national legal frameworks, while embedding adaptive management and continuous improvement processes. Through these measures, the Project aims to protect shared resources and cultural ties, minimise transboundary risks, and maintain its social license to operate across both Tanzanian and Burundian communities.	Refer to Table 4-47
Accommodation Management Plan	The purpose of an Accommodation Management Plan is to ensure that any worker housing provided, arranged, or managed by a project meets internationally accepted standards for health, safety, dignity, and welfare, while also preventing negative social and environmental impacts.	Refer to Table 4-22
Traffic Management Plan	The purpose of a Traffic Management Plan is to outline measures and procedures to safely and	Refer to Table 4-45.



Management Plan	Overarching Purpose	Reference in this ESMP
	efficiently manage traffic associated with a projects, during all phases of development, while minimising risks to workers, local communities, road users, and the environment.	

7.2 Policies

TNCL currently has an E&S policy in place as documented in Section 3.1.1, as well several additional polices including a Group Code of Conduct, Human Rights Policy Statement, Procurement Policy, Occupational Health and Safety Policy, Harassment and Discrimination Policy, Alcohol and other Drugs Policy, HIV/AIDS and STD Policy, Mental Health and Management Policy, Management of Tuberculosis Policy and a Corporate Social Responsibility Policy.

The full suite of policies still needs to be developed by TNCL. Additional policies which need to be developed include:

- Biodiversity and Ecosystem Services Policy:** Designed to manage and mitigate project impacts on biodiversity, particularly when operating near ecologically sensitive areas. The policy aligns with IFC Performance Standard 6 to support no net loss or net gain outcomes.
- Climate Change Policy:** Sets out the company’s approach to managing climate-related risks, including adaptation planning, GHG emissions reduction, and the transition to low-carbon operations.
- Tailings Management Policy:** The Board of Directors shall adopt and publish a policy that formalises the company’s commitment to the safe design, operation, and closure of tailings facilities. It also addresses emergency preparedness, response mechanisms, and recovery in the event of failure.
- Gender-Based Violence and Harassment (GBVH) Policy:** Defines the organisation’s zero-tolerance approach to GBVH, outlines prevention measures, reporting mechanisms, and support systems, and ensures compliance with international human rights and workplace safety standards.
- Zero-Tolerance Criminal Policy:** Outlines the organisation’s strict stance against all forms of criminal activity, including theft, fraud, corruption, violence, and illicit substance use. The policy aims to foster a safe, lawful, and ethical working environment by establishing clear disciplinary consequences and reporting procedures for criminal behaviour on-site or within

8. Emergency Preparedness and Response Plan

Emergency procedures apply to unexpected and sudden incidents that could lead to serious danger to employees/subcontractors, the public and/or potentially serious pollution of, or detriment to the environment (immediate and delayed). TNCL has an existing Emergency Preparedness and Response Plan EPRP (TNCL-OHS-PLN-0006). This plan will need to be reviewed and updated, to ensure alignment with IFC PS1 and cater for the safety of both occupational workers and community health and safety. The update of the Emergency Preparedness and Response Plan must be updated in collaboration with potentially affected communities, the local government and third parties. A copy of the existing plan is included in Appendix A.



8.1 General Procedures

The update of the EPRP should take into account the general procedure listed below in the event of any emergency:

- **Notification:** Applicable incident controller defined in emergency plans must be notified of an incident upon discovery.
- **Alert System:** Reliable alert systems, such as alarm bells and visual alarms, will notify workers (and the community where applicable) of the emergency. Alert Systems will clearly indicate evacuation routes and emergency assembly points.
- **Access Control:** Area to be cordoned off to prevent unauthorised access and tampering of evidence.
- **Emergency Actions:** Undertake actions defined in the emergency plan to limit/contain the impact of the emergency. This includes instructing workers to the relevant emergency assembly areas and medical stations, where applicable.
- **Incident Reporting:** Report the incident immediately to the relevant responsible team members.
- **Authority, Local Community and Emergency Response Agencies Notification:** Immediately notify the relevant Tanzanian authorities, local government officials, and any other relevant agencies, as well as potentially affected communities, relevant emergency response agencies and any persons whose health may be affected, about:
 - The nature of the incident;
 - Any risks posed to public health, safety, and property;
 - The toxicity of the substances or by-products released by the incident and
 - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
 - TNCL to install a back-up system for communications on-site with off-site resources, such as fire departments, in the event that normal communication methods may be inoperable during an emergency.
- **Incident Response:** As soon as possible after the incident, TNCL must:
 - Take all reasonable measures to contain and minimise the effects of the incident, including its impact on the environment and any risks posed to the health, safety, and property of persons;
 - Undertake clean-up procedures;
 - Remedy the effects of the incident; and
 - Assess the immediate and long-term effects of the incident on the environment and public health.
- **Reporting:** TNCL must provide a report to the relevant Tanzanian authorities, and local government officials. The report should include:
 - The nature of the incident;
 - The substances involved and an estimation of the quantity released;



- The possible acute effects of the substances on people and the environment (including data needed to assess these effects);
- Initial measures taken to minimise the impacts;
- Causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
- Measures taken to prevent a recurrence of the incident.

8.2 Other Technical and Management Requirements

Technical and management options will be put into place to deal with the remediation of impacts in cases of environmental emergencies. Consideration must be given to the following:

- TNCL will appoint a competent management team with the appropriate skills to develop and manage a mine of this scale and nature.
- Periodic training and review of emergency preparedness and response activities will be conducted to ensure all personnel are familiar with the procedures and any updates to equipment, personnel, and/or facilities.
 - Training sessions will be held at least annually, and after any significant changes to the emergency plans.
 - Alert systems (visual and sound) will be tested at least annually to ensure functionality.
 - Emergency equipment will be inspected and maintained regularly.
- TNCL will develop emergency plans in close collaboration with affected communities and stakeholders to safeguard the health and safety of workers and the community in the event of an emergency.
- TNCL will ensure that an Occupational Health and Safety Risk Assessment (OHSRA) is to be completed for the Kabanga Mine and ore concentrator. The OHSRA should be updated to take account of future mine construction (concentrator plant, box cut development and mining) and work accidents. This OHSRA should then inform a review of the Emergency and Crisis Management Plan and detail the equipment and staff required for plan implementation. Plan revisions should be done in cooperation with Nyamiaga District, Rulenge District and the Ngara Region authorities responsible for emergency response. This is intended to ensure that emergencies can be addressed at a local level, and that not all emergency cases need to be referred to medical facilities at a regional / national level.
- TNCL must ensure that the Emergency Preparedness and Response Plan must include the use of physical hazards (landslides, face slumping, rock falls or land collapse above and underground mining areas, working at heights, moving machinery / vehicles, lifting equipment) electrical safety and isolation, ionizing radiation, fitness for work (mining operation activities commonly cause fatigue), remote site health and specific hazards for underground mining (ventilation, dust, illumination, refuge bays and self-rescuers, explosions, confined spaces and oxygen deficient atmospheres).
- TNCL must develop a list of contact information for all internal and external resources and personnel. The list should include the name, description, location, and



contact details (telephone, email) for each of the resources, and be maintained annually.

- To prevent emergencies, TNCL will implement the mine mitigation measures included in this ESMP.
- Kabanga Mine will develop an Environmental Management System in which all emergencies and incidents are identified, reported, addressed, and closed out.
- As part of its annual budget, Kabanga Mine will allow a contingency for handling any risks identified and/or emergencies, ensuring adequate resources are available for effective response.
 - This contingency will cover first responder resources, including firefighters, first aiders, and their necessary equipment, to ensure prompt action in the event of fires or injuries.
 - Where appropriate, mutual aid agreements should be maintained with other organizations to allow for sharing of personnel and specialized equipment for emergency response.
- Where required, Kabanga Mine will seek input from appropriately qualified people.
- TNCL will maintain a list of equipment, personnel, facilities, funding, expert knowledge, and materials required for emergency response. This list will be made easily accessible to all workers. This list includes permanently stationed and external personnel with specialized expertise for spill clean-up, flood control, and other emergency functions.
- TNCL will ensure that there are permanently stationed emergency equipment and facilities (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams) and that such facilities will be functioning and accessible to workers where applicable.
- TNCL will ensure that separate and independent emergency light sources will be provided at all places where a hazard could be caused by a failure of the normal lighting system.
- TNCL will maintain a role and action list in an easily accessible area to ensure that workers are aware of the different roles and actions applicable in different emergency situations.
- A gender-sensitive grievance mechanism will be established to ensure that all workers and community members, particularly women and other vulnerable groups, can safely and confidentially raise concerns or complaints without fear of retaliation. The mechanism will include multiple accessible reporting channels (e.g., anonymous complaint boxes, gender-balanced hotlines, digital platforms), and will be supported by trained female grievance officers or gender focal points. Procedures will follow a survivor-centred approach, ensuring dignity, confidentiality, informed consent, and access to appropriate support services. Information about the mechanism will be widely communicated through culturally appropriate methods, and data will be monitored with gender disaggregation to evaluate accessibility and effectiveness.
- TNCL must compile a ore transport specific emergency preparedness and response plan, including medical emergency response in cooperation with District and Regional authorities, on the route from Kabanga to the Kahama Refinery.



- TNCL must develop a site-specific tailings facility EPRP based on the credible flow failure scenarios and the assessment of potential consequences, which should include the following in order to ensure compliance with GISTM:
 - Test and update the EPRP at all phases of the tailings facility lifecycle at a frequency established in the plan, or more frequently if triggered by a material change either to the tailing’s facility or to the social, environmental and local economic context. Meaningfully engage with employees and contractors to inform the EPRP and co-develop community-focused emergency preparedness measures with project-affected people.
 - Include procedures to engage with public sector agencies, first responders, local authorities and institutions and take reasonable steps to assess the capability of emergency response services to address the hazards identified in the tailings facility EPRP, identify gaps in capability and use this information to support the development of a collaborative plan to improve preparedness.
 - TNCL shall take all reasonable steps to maintain a shared state of readiness for tailings facility credible flow failure scenarios by securing resources and carrying out annual training and exercises. The Operator shall conduct emergency response simulations at a frequency established in the EPRP but at least every 3 years for tailings facilities with potential loss of life.
 - In the case of a catastrophic tailings facility failure, TNCL must provide immediate response to save lives, supply humanitarian aid and minimise environmental harm.

TNCL will implement measures to ensure business continuity following an emergency. This includes identifying replacement supplies or facilities and maintaining backups of critical information in a secure location.

8.3 Identified Emergency Situations

The following table (Table 8-1) outlines the project-specific emergencies that have been identified to date during the preparation of the ESIA, along with the corresponding emergency response procedures tailored to manage each scenario effectively. These procedures are designed to ensure swift and appropriate action in the event of emergencies, minimising the potential impact on personnel, the environment, and surrounding villages. The table provides an overview of the necessary responses in addition to the general emergency protocols, ensuring that all potential risks are addressed with specific and targeted measures. The table below includes a combination of emergency response procedures already included in the existing TNCL preparedness plan (indicated in green filled table cells) and additional emergency responses which need to be added to the existing plan (indicated in blue filled table cells or text). The additional emergency responses tabulated below are those which have been flagged as part of the compilation of the ESIA and is by no means the complete list. TNCL will need to ensure that all occupational health and safety aspects are also catered for.



Table 8-1: Emergency Response Procedures

Item	Emergency Situation	Response in addition to general procedures
1.	Spillage of chemicals	<ul style="list-style-type: none"> • Chemical spills can be categorised as major or minor spills. This classification will determine the relevant emergency response to the situation. • People are to be moved away from the immediate area of the spill (minimum distance of 50 m upwind) • Smoking and all ignition sources should be excluded from this area. • Where significant hazard levels are present, much greater distances will be required for evacuation: <ul style="list-style-type: none"> ○ In the case of flammable materials, radiant heat can be avoided by evacuating distances greater than 200 m. ○ Where the risk of explosion can generate a fireball / large fragment, an evacuation distance of 500 m is recommended. ○ If LPG gas cylinders are involved, an evacuation distance of over 1 km should be exercised. • When a spill or uncontrolled release of hazardous substances occurs, never attempt to clean the spill unless the hazardous properties of the substance are known, and it is safe to do so. • Decontamination procedures and means to proceed with urgent remedial measures to contain, limit and reduce pollution within the physical boundaries of the project property and assets must be undertaken to the greatest extent possible.
2.	Fire and wildfire	<p>Surface Structural Fire</p> <ul style="list-style-type: none"> • Attempt to extinguish the fire with locally available equipment. • If the fire is too large, immediately report it to security via the radio system (the Emergency Response Coordinator, Department Head and General Manager will be informed). • If evacuation is required, sirens will be activated. • All personnel will proceed to the nearest safe Emergency Assembly Area. • The Emergency Response Team will be assembled, and the missing persons will be searched for (if necessary). • Backup from neighbouring mines or external aid agencies will be sourced if necessary. <p>Bush or Grass Fire</p> <ul style="list-style-type: none"> • Immediately notify the Security Control / Emergency Response Coordinator. • The size, location, direction, rate of spread and threat to the mining operation and/or accommodation will be assessed.



Item	Emergency Situation	Response in addition to general procedures
		<ul style="list-style-type: none"> • If the fire threatens any area of the operation, the Emergency Plan (including search and rescue, controlling the spread of the fire, protecting operations and extinguishing the fire) may be activated. • Evacuation sirens for the area/s affected will be activated. • All personnel will proceed to the nearest safe Emergency Assembly Area. • The Emergency Response Team will be assembled and respond to the fire. • Backup from neighbouring mines or external aid agencies will be sourced if necessary. <p>Tyre Fire Explosion</p> <ul style="list-style-type: none"> • An Emergency Park Area with a cordoned-off zone with a minimum radius of 500 m (for tyres that have the potential to explode) must be nominated. • Standard firefighting procedures using handheld extinguishers or fire hoses might be used for Category A and B tyres. • Leave the vehicles where it is and evacuate on foot to the front or the rear of the vehicles. • Once the driver has been evacuated, a roadblock with a minimum exclusion zone of 500 m should be set up. • Except for firefighting, the vehicle should not be approached for 48 hours. • In the case of a known fire, the vehicle may be approached 24 hours after the last signs of a visible fire. • Firefighting should only be attempted if the safety of the personnel can be guaranteed. • Personnel should be shielded using heavy equipment. In a secured area. • If fire is observed or suspected, the quarantine period should be repeated for 24 hours. • Evacuate mine employees from areas at risk. • Assist those in imminent danger/less able individuals to evacuate until danger has passed. • Provide emergency firefighting assistance with available trained mine personnel and equipment.
3.	Road traffic accidents (on-site or including mine vehicles on public roads)	<ul style="list-style-type: none"> • The vehicle should be turned off and isolated, all fires extinguished, casualties attended to, and the alarm raised. • Casualties shall not be moved unless it is safe to do so. • Spilled/leaking diesel/petrol to be covered with sand. • Should powerlines be touching the vehicles, all persons must stay well away. • Emergency Response Team (ERT) to render first aid. • Report the incident over the radio system.



Item	Emergency Situation	Response in addition to general procedures
		<ul style="list-style-type: none"> If the incident has occurred on a public road, the local police are to be informed. The vehicles are not to be moved unless to aid in extracting casualties. In case of fire, firefighting protocols are to be followed for emergency incidents, heavy vehicle fires, and tyre fires (where applicable). The individual discovering the accident (be it a bystander or able casualty) must raise the alarm, giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. Access to the area should be restricted and access roads cleared for the emergency response team. Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). Casualties will be moved to safety by trained professionals and provided with medical assistance. If multiple seriously injured casualties are expected, medical centres in the vicinity with appropriate medical capabilities will be notified. A nearby vet should be consulted in the case of animal injury. Traffic flow management must be undertaken until the accident obstructing the normal flow of traffic is cleared safely.
4.	Aviation (Aeroplane and Helicopter) Accident / Incident	<ul style="list-style-type: none"> The ERT personnel and manager shall immediately be informed. The respective airport manager and Tanzanian Aviation Authority (TAA) will be immediately informed. ERT personnel are to administer aid. For aeroplane incidents, the Emergency Response Plan is to be implemented. For helicopter incidents, the Crises Management Plan is to be implemented
5.	Explosion	<ul style="list-style-type: none"> If an unplanned explosion occurs, the alarm must be raised, and all personnel are to evacuate to the nearest Assembly Point. The relevant Emergency Response Plan shall be implemented, including inspection of the affected area, location size and effect of the explosion, search and rescue and identification of hazards.
6.	Severe weather conditions / Inundations	<ul style="list-style-type: none"> Department heads shall alert personnel who may be affected. All work in open areas should be ceased. Sites must be cleared of loose material that may become airborne during strong winds. All personnel must be in safe locations such as hardtop vehicles/buildings). Prepare for possible power failures.



Item	Emergency Situation	Response in addition to general procedures
		<ul style="list-style-type: none"> If rubber tyre equipment is struck by lightning, it must be parked in a secure area for 48 hours.
7.	Bomb / terrorist attack	<ul style="list-style-type: none"> If a person receives a bomb threat via telephone, they must remain calm and attempt to gather as much information as possible. Bomb threats can also be delivered via written threats and suspect objects. The Bomb Threat Checklist is to be completed. Activate the appropriate evacuation method. Send the responsible personnel to control access points under threat. Attend to casualties. Assist the police as required. The use of electronic devices should be avoided until the site is declared safe.
8.	Civil Unrest	<ul style="list-style-type: none"> The Security Operator and police will protect employees, contractors and critical assets. Action may include shutting down operations, demobilising non-essential personnel, securing critical assets, evacuating expatriate staff, ceasing deliveries and activating Emergency and Crises Management (ECMS) teams.
9.	Kidnapping	<ul style="list-style-type: none"> If you encounter a kidnapped person, stay calm and report to security with details about the incident, such as the location, a description of the victim and kidnapper, and vehicle information. If kidnapped, remain calm, be respectful to the kidnapper, ask permission to speak, do not argue or make suggestions and gather information and behaviour of the kidnappers.
10.	Missing person	<ul style="list-style-type: none"> If the missing person is within the TNCL footprint, a search will be initiated. If the missing person is outside of the TNCL footprint, the police will be contacted to assist in searching. A description of the missing person and their last known location should be available. The area must be secured. Only designated personnel are to communicate with the family, media etc. All parties are to be debriefed after the incident. Counselling and support are to be provided for any affected individuals.
11.	Spillage of engineering	<p>Where there is a risk that the land could be contaminated (leading to a loss of resources), soil, surface water and/or groundwater, Kabanga Mine will:</p> <ul style="list-style-type: none"> Notify residents/users downstream of the pollution incident.



Item	Emergency Situation	Response in addition to general procedures
	substances and discharges	<ul style="list-style-type: none"> • Identify and provide alternative resources should contamination adversely impact the existing environment. • Cut off the source of the spill originates from a pump, pipeline or valve (e.g. refuelling tanker) and the infrastructure is 'made safe'. • Contain the spill (e.g. construct a temporary earth bund around the source, such as a road tanker). • Pump excess hazardous liquids on the surface to temporary containers (e.g. 210-litre drums, mobile tanker, etc.) for appropriate disposal. • Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired.
12	Discharge of dirty water to the environment	<ul style="list-style-type: none"> • Apply the principles listed for Item 1 above. • To stop spillage from the dirty water system, the mine will: <ul style="list-style-type: none"> ○ Redirect excess water to other dirty water facilities where possible. ○ Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system. ○ Carry out an emergency clean water discharge and redirect the spillage to the emptied facility. ○ Apply for emergency discharge as a last resort.
13	Pollution of surface water	<ul style="list-style-type: none"> • Personnel discovering the incident must inform the emergency response team of the location and contaminant source. • Apply the principles listed for Item 1 above. • Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants. • Contamination entering the surface water drainage system should be redirected into the dirty water system. • The Environment department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination.
14	Groundwater contamination	<ul style="list-style-type: none"> • Use the groundwater monitoring boreholes as scavenger wells to pump out the polluted groundwater for re-use in the process water circuit (hence containing the contamination and preventing further migration). • Investigate the source of contamination and implement control/mitigation measures.
15	Flooding from failure of surface water control	<p>Flooding from stormwater control failure:</p> <ul style="list-style-type: none"> • Evacuate the area downstream of the failure. • Using the emergency response team, rescue/recover and medically treat any injured personnel.



Item	Emergency Situation	Response in addition to general procedures
	infrastructure and flood risks	<ul style="list-style-type: none"> • Temporarily reinstate/repair stormwater diversions during the storm event (e.g. emergency supply of sandbags). • Close the roads affected by localised flooding or where a stormwater surge has destroyed crossings or bridges. <p>Flooding from climate change risks:</p> <ul style="list-style-type: none"> • Develop clear evacuation routes and assembly points located outside identified flood-prone areas. • Conduct regular flood-specific emergency drills for all site personnel and contractors. • Pre-position sandbags, and emergency kits at strategic locations. • Establish a rapid internal communication chain (SMS, radio, alarms) for activating flood response. • Notify local authorities, emergency services, and nearby communities immediately in the event of flooding. • Conduct immediate structural inspections. • Record and report all flood-related incidents, damages, and environmental impacts.
16	Burst water pipes (loss of resources and erosion)	<ul style="list-style-type: none"> • Notify the authority responsible for the pipeline (if not mine responsibility). • Shut off the water flowing through the damaged area and repair the damage. • Apply the principles listed for Item 1 above if the spill is from the dirty/processed water circuit.
17	Risk of drowning from falling into water dams	<ul style="list-style-type: none"> • Attempt rescue of individuals from land. • Get the assistance of the emergency response team whilst attempting rescue or carry out rescue of animals and/or people as relevant. • Ensure medical assistance is available to recovered individuals.
18	Falling into or off hazardous excavations and infrastructure	<ul style="list-style-type: none"> • Personnel discovering the fallen individual or animal must mobilise the emergency response team to the location of the incident and provide a general appraisal of the situation (e.g. human or animal, conscious or unconscious, etc.). • Trained professionals such as the mine emergency response team should recover the injured party. • A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport the individual to the hospital.
19	Uncovering of tangible cultural heritage sites	<ul style="list-style-type: none"> • Personnel discovering the grave or site must inform the emergency response team immediately. • Prior to damaging or destroying any of the identified cultural heritage resources, permission for the exhumation and relocation must be obtained from the relevant descendants (if known), and national departments.



Item	Emergency Situation	Response in addition to general procedures
20	Uncovering of fossils	<ul style="list-style-type: none"> Personnel discovering the fossil or potential site must inform the emergency response team immediately. Should any fossils be uncovered during the site's development, a palaeontologist or paleoanthropologist will be consulted to identify the possibility for research.
21	Medical Emergencies (snakes, scorpions and spider bites)	<p>In the event of a snake, scorpion or spider bite the following should be implemented:</p> <ul style="list-style-type: none"> Immediate action: Reassure the victim and keep them as calm and still as possible to slow the spread of venom. Safely remove the victim (if needed) from immediate danger (e.g., away from the snake or insect). Call for first aid assistance and notify the Emergency Response Team immediately via. While waiting for the first aid assistance to arrive, in the case of a snake bite, immobilise the bitten limb and keep the limb at or slightly below heart level. For scorpion and spider bites, elevate the affected limb if possible. Treat the victim at the onsite clinic, by carefully moving the victim with minimal movement. Assess vital signs and overall condition. Begin symptomatic treatment if necessary If the victim shows signs of serious envenomation (e.g., difficulty breathing, severe pain, altered consciousness), activate immediate medical evacuation to the nearest healthcare facility.
22	Landslides	<ul style="list-style-type: none"> Alert the emergency response team and relevant authorities about the landslide incident, providing details on the affected area and the number of casualties. Ensure that personnel are evacuated from the affected zone to prevent further injuries or fatalities. Deploy trained personnel to search for and rescue individuals trapped or injured by the landslide. Use specialised equipment and techniques as needed to retrieve victims safely. Have medical professionals on-site to administer first aid and assess the condition of injured individuals. Arrange for immediate transportation to medical facilities if necessary. Assess the stability of the surrounding area to prevent additional landslides or mudslides. Implement temporary measures such as shoring up unstable slopes or redirecting water flow to mitigate further risks.
23	Extreme heat	<ul style="list-style-type: none"> Monitor on-site temperatures and activate heat alerts when thresholds are exceeded (e.g., $\geq 35^{\circ}\text{C}$). Adjust work schedules to cooler periods (e.g., early morning/night shifts). Provide shaded rest areas and hydration stations. Enforce frequent rest breaks and reduced physical exertion.



Item	Emergency Situation	Response in addition to general procedures
		<ul style="list-style-type: none"> • Train staff in recognising and responding to heat stress. • Ensure access to medical treatment and emergency evacuation if heatstroke is suspected.
24	Vector breeding sites	<ul style="list-style-type: none"> • Declare a Health Emergency following site emergency protocols. • Notify the Emergency Response Team, medical staff, site management, and relevant health authorities immediately. • Confirm suspected cases through onsite medical screening or laboratory testing if available. • Establish whether it is an isolated case or a cluster indicating an outbreak. • Provide immediate medical care to infected individuals. • Isolate serious cases where necessary to prevent further spread. • Arrange for evacuation to higher-level medical facilities if advanced treatment is needed. • Emergency indoor and outdoor insecticide spraying (approved and authorised insecticides). • Drainage and elimination of standing water. • Deployment of larvicides in water bodies. • Distribute repellents, protective clothing (e.g., long sleeves), and insecticide-treated nets to all employees and contractors. • Increase awareness and training on personal protection methods. • Monitor and record symptoms among workforce and contractors. • Conduct temperature checks and symptom reporting. • Coordinate closely with district or regional health departments for outbreak investigation, reporting, and further control measures.



9. Grievance Redress Mechanism

A Grievance Redress Mechanism (GRM) is a requirement of IFC Performance Standard 1 as follows: ***“Where there are Affected Communities, the client will establish a grievance mechanism to receive and facilitate resolution of Affected Communities’ concerns and grievances about the client’s environmental and social performance”.***

TNCL have an existing GRM in place. The GRM needs to be reviewed and updated, where necessary, to make provision for the following key terminology (Table 9-1).

Table 9-1: Key Terminology

Term	Definition
Complaint	A complaint is a communication received from a stakeholder that includes an allegation that the stakeholder was negatively impacted. A complaint could be about a site-related issue (for example, the procurement policy), in which case it is screened as a credible issue and discussed verbally and logged in the grievance register as a screened-out grievance. A complaint could also relate to a site-related or potential incident, in which case it is a credible grievance and should be logged in the grievance register as a screened-in grievance. A complaint can also be an allegation unrelated to the site and the responsibility of another entity (for example, electricity supply to communities). In that case, the complaint should be discussed, and the stakeholder should refer to the responsible entity. It should be logged in the grievance register as a screened-out grievance (general dissatisfaction).
Credible grievance	A credible grievance is an allegation/complaint that has been screened and classified as such. It concerns real or perceived impacts caused by the Project’s activities, policies, or the behaviour of its employees or contractors. A credible grievance can result from an actual or potential incident and should be logged.
Credible issue	A credible issue is an allegation/complaint that has been screened and classified as credible. The definition of a credible issue is an allegation regarding real or perceived impacts resulting from policies and/or procedures. It is not related to an actual or potential incident but rather an expression of dissatisfaction regarding a specific topic (such as recruitment or employment). A credible issue must be logged as a screened-out grievance.
General dissatisfaction	A general dissatisfaction is an allegation/complaint that has been screened and classified as an allegation regarding real or perceived impacts resulting from the performance and/or non-performance of an entity other than the Project owner/operator (for example, the local or district council). A general dissatisfaction must be logged as a screened-out grievance, and the stakeholder should be referred to the right entity to voice their complaint.
Grievance	A specific allegation or complaint relating to the site, its policies, activities, real or perceived impacts or the behaviour of its employees or contractors. Grievances express dissatisfaction with the company on the part of stakeholders. Grievances can be expressed through physical action (e.g. protests, road blockages, land invasions), verbally (during discussions with site staff, etc.), or in writing. All screened-in grievances should be recorded as both a grievance and an (actual or potential) incident and should be. Some grievances, such as protests or road blockages, may have financial, legal, and/or reputational consequences for the site. These should not be classified as an incident with social consequences but as incidents with financial, legal, and/or reputational consequences as appropriate and should also be investigated.



Term	Definition
Issues	Issues are questions, requests for information, or general perceptions. If not addressed well, issues may become grievances. Issues must be recorded as screened-out grievances so that emerging trends can be identified and addressed before they escalate.
Legacy grievances	Legacy grievances are complaints/allegations related to logged or un-logged incidents over three years ago.

As part of reviewing and updating the GRM, TNCL must ensure that grievances raised by villages will be managed through a transparent process which is culturally appropriate, understandable, readily acceptable to all segments of affected villages, and at no cost and without retribution. The mechanism will be appropriate to the project’s scale of impacts and risks and beneficial for Kabanga Mine and village members. It will allow access to other judicial or administrative remedies. All grievances received will be recorded in the grievance register. To ensure the GRM mechanism is available and stakeholders are aware of how to use it, the project team will publicise it during stakeholder engagement meetings, sensitising stakeholders on how to use it and lodge complaints. The TNCL GRM process comprises five stages, as shown below:

- Publicising grievance procedures.
- Receiving and recording the grievances (acknowledge receipt and keeping track of grievances).
- Reviewing and investigating the grievances.
- Developing resolution options and preparing responses.
- Monitoring, reporting, and evaluating.

The grievance mechanism process is summarised in the figure below:



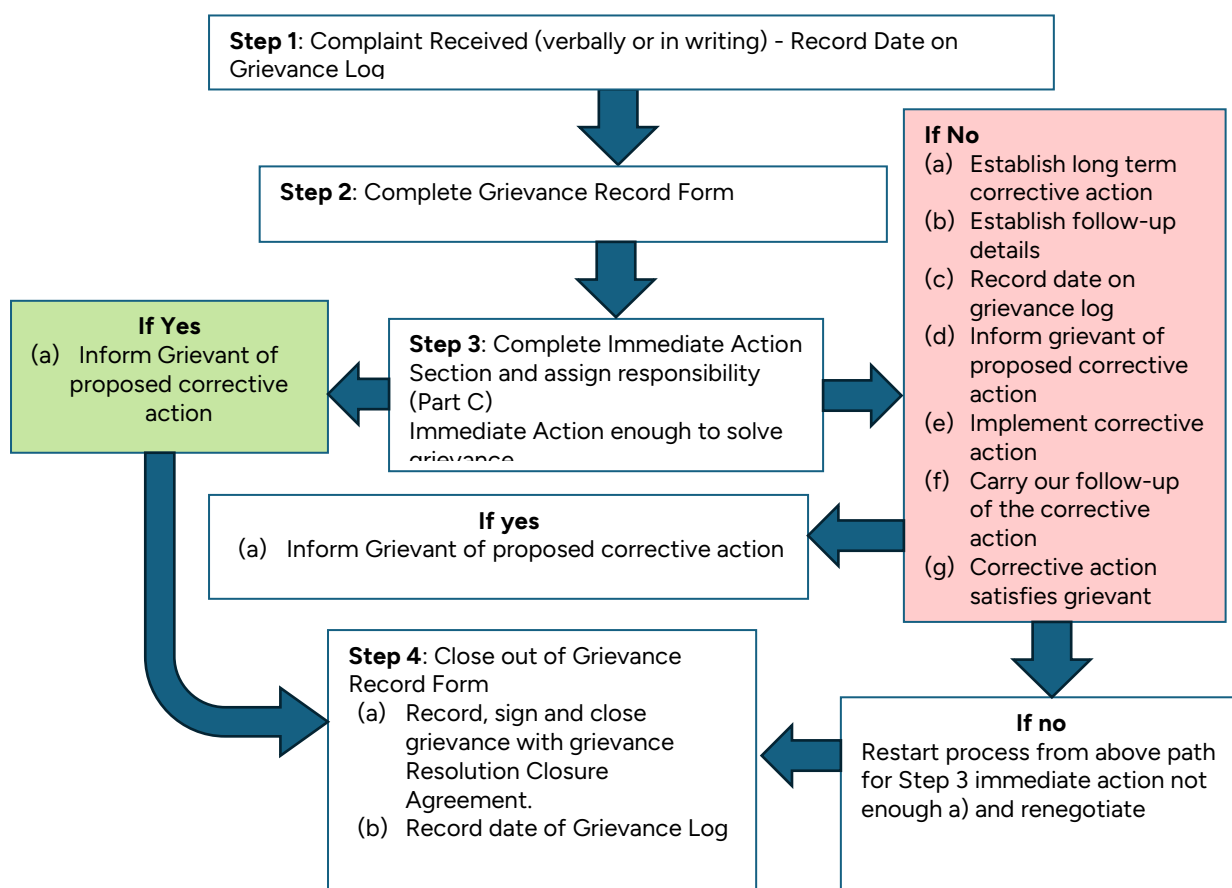


Figure 9-1: Grievance Redress Mechanism Process

9.1 Aim and Scope of TNCL GRM

The aims and scope of the TNCL Grievance Management Systems are as follows:

- To inform and involve project management so decisive action can be taken to prevent dispute escalation.
- To provide project management with early warning of complaints that cannot be satisfactorily resolved through this mechanism and may result in legal challenges and/or other negative action toward the company.
- To respond only to complaints within the direct social influence area directly related to the Tembo Nickel project or employee activities, and to direct those outside this influence to the appropriate authorities.
- To involve only the appropriate authorities in managing grievances and local conflicts directly or indirectly affecting project activities.
- To lessen or eliminate negative impacts on individuals or groups in the community due to project activities.
- To contribute to positive management of the social and cultural change of the community through fair and transparent resolution of grievances.



9.2 Monitoring Indicators

Grievance monitoring will be done through environmental and social audits on-site. As required, Kabanga Mine must undertake ongoing monitoring.

It is anticipated that Tembo Nickel will open an Information centre outside of the mine, which will also serve as a complaint filing centre. The centre will have blank complaint forms and a locked Dropbox, ensuring that people have the opportunity to record their complaints outside of centre hours.

Grievances may be submitted verbally, in writing, in person, telephonically, or through the village or District Authorities. If requested, they may be submitted anonymously.

9.3 Feedback to Stakeholders

TNCL will determine appropriate feedback mechanisms for communities, as required. Such methods may include meetings, newsletters, etc.

All complaints must be responded to within four weeks (30 days) of being received, even if the response is just a summary of what is planned and when it is likely to be implemented. It is advised that all responses are conducted in person to ensure the individual grievant receives and understands the response and can raise potential questions. When resolution is delayed, the grievant is provided with regular updates on progress.



10. Occupational Health Risk Assessment

10.1 Ore Transport Route: Health and Safety Risk Assessment and Emergency Preparedness and Response

Road Traffic Safety is addressed in another specialist report currently being undertaken and that is referred. A World Health Organisation (WHO) report in 2020 describes the particularly high road accident death rate in Tanzania, with road accidents being the sixth most common cause of death (6.12% of all deaths). Transport of large quantities of ore concentrate from Kabanga Mine to the Kahama Refinery (220 000 tonnes per annum, which will require an estimated 48 ore transporters each day) will increase significantly the risk of road traffic accident (and spill) on the 340 km of road between Kabanga Mine and the MMPF. The Kabanga Mine has in place a Medical Emergency Evacuation Procedure and an Emergency and Crisis Management Plan which provide for emergencies arising on the Kabanga Mine site but not (yet) on the proposed ore route.

Current considerations include the establishment of a truck stop between Kabanga and the MMPF. Although this may help mitigate the effects of fatigue on drivers and lessen road accident risk, this would mean that more than 48 trucks (both ways) may overnight at the stop, which presents a new set of health risks for both drivers and the community including, HIV/AIDS, sexually transmitted infections, malaria, diarrhoeal disease and others. Truck movement may also enhance the spread of other infectious illness.

The emergency response capability (including medical) available within the Kagera Region was not assessed however, an assessment of the Kahama Municipal Hospital Emergency Room (ER) for the Kahama MMPF rapid appraisal HIA, raised questions regarding the capability of the hospital to address serious injury or multiple casualties. Discussions with key informants at both Kahama and Kabanga flag the poor emergency response capability generally and poor medical emergency response in particular, along the ore route.

10.2 Kabanga Mine Site Emergency Preparedness and Response Plan

An Occupational Health and Safety Risk Assessment (OHSRA) has been done for current surface operations at Kabanga (exploration drilling, core collection etc) but an OHSRA is still to be completed for the Kabanga Mine and ore concentrator, noting that construction (especially) and operation of the mine and concentrator will present a significantly higher risk to current. The current OHSRA helped inform the Medical Emergency Evacuation Procedure and an Emergency and Crisis Management Plan at Kabanga.

An investigation into the current emergency response capability of the Nyamiaga District and the Kagera Region is beyond the scope of this rapid appraisal work. However, it is noted that in other work done for the MMPF at Kahama, the Kahama Municipal (District) Hospital ER would have been unable to address serious injury or multiple casualties. In fact, the Kabanga Medical Emergency Evacuation Procedure specifically excludes referral to local health services except for relatively minor injury and illness. Rather, referral is to either Mwanza (Bugando Hospital or Kamanga Medics) or to the Aga Khan Hospital in Dar es Salaam. It is therefore likely that the non-medical emergency response capability (fire, spills, extrication, other) is similarly constrained in the Nyamiaga District and the Ngara Region.



10.3 Kabanga Mine Site Medical Emergency Response Plan (MERP)

Kabanga Mine has a Medical Emergency Evacuation Procedure in place, based on current OHSRA. The Kabanga Mine site clinic has an Advanced Life Support (ALS) equipped Emergency Room (ER) and an ALS ambulance. Doctor staff are trained in Advanced Cardiac Life Support (ACLS) but not Advanced Trauma Life Support (ATLS). There is no ALS paramedic. There is no blood kept on site. The procedure describes referral of all but minor injury and illness to either Mwanza or Dar es Salaam for definitive treatment. There is not yet a functional air strip on site. There is an airstrip at Ngara. Of note, after-hours air evacuation is only available from Mwanza, which is an 8 hour drive from site.

The current OHSRA was done to assess and control risk when there was exploration and drilling activity on site. Construction and operation of the Kabanga Mine and concentrator will result in an increased risk of work-related accidents, road traffic accidents (on site and in the community) and non-accident medical emergencies amongst site workers. Over and above the planned construction staff on site (peak numbers will be 1 285 in Q2 of 2027), there will be short term contractors/sub-contractors, visitors and consultants all of whom could require emergency medical attention.

10.4 Kabanga Mine Site Clinic

During construction up to 1 285 contractors will be working on site. About 830 of these construction workers will be from outside of District. Some (about 200) construction and operations workers could be accommodated on site but most will reside in villages near site. Workers not accommodated on site will likely use local health facilities (health centres and dispensaries) which raises the risk of overloading.

Site-based health facilities contribute to employee health, safety, and productivity. There is currently a clinic on site which was adequate for drilling, core sampling and other activities being undertaken to date. A new and larger site clinic is planned. Staffing and equipping of the clinic should be based on both risk assessment (emergency medical response) and decisions made by Kabanga Mine management regarding delivery of primary health care for employees and contractors. Occupational medical surveillance is required in terms of Tanzania legislation, and this should also be available from the site clinic.

HIV/AIDS, STI, TB and NCDs are prevalent in Tanzania. Provision of onsite primary healthcare will contribute significantly to the impact that these diseases have on worker health, safety and productivity and also on the health of the community (HIV, STI, TB). In addition, on site primary health care availability is convenient for employees and contractors and minimises time lost (through off site Health Centre or Dispensary attendance). Occupational medical surveillance would be undertaken at the site clinic. Medical emergency response would be located at (ALS ambulance) and respond from the site clinic.

10.5 Occupational Medical Surveillance

Occupational medical surveillance is a requirement of Tanzanian legislation (Occupational Health and Safety Act (No.5), 2003) and should be undertaken for two reasons: To determine fitness for the inherent requirements of the job (vision, hearing, physical capability etc.) and to assess and monitor health in the light of occupational environmental risks (dust, noise, other respiratory, heat, etc.). Risk-based medical surveillance (comprising initial, periodical, transfer, post illness/injury and exit medical examinations) is dependent on OREP and is key to helping ensure health, safety, and productivity. There is currently a dual system operating at Kabanga Mine (and other Tanzania mines); the Tanzania



Occupational Safety and Health Authority (OSHA) requires annual medical examinations of miners and sends equipment and staff to site to do this. A charge of 75 000 shillings (\$30) is levied per person. However, the equipment used and quality of results are reported to be poor (especially audiometry and lung function testing) so the tests done on by the mine site clinic are shared. X-rays are not done by OSHA.

Robust occupational medical surveillance is especially important at Kabanga Mine given the relatively high prevalence of background illness in the community (HIV/AIDS, TB and NCD) as well as work risks. An occupational medical examination is also an ideal time to review vaccination status (influenza, other viruses, other pathogens and prophylaxis – especially in the light of epidemic potential) and update, where necessary. HIV and VCT, TB, STI and non-communicable disease (NCD) prevention and management would also be included during occupational medical examinations, as part of the Kabanga Mine Wellness Programme. In addition to the alcohol and substance misuse policy and procedures on the Kabanga Mine, employee and contractor alcohol and substance misuse should also be addressed at site clinic level (requirement to test for certain occupations).

Staffing will include up to 1 285 contractors at peak construction. Many contractors will stay a short time, and this will mean that numbers attending for initial examination and then soon after, an exit medical examination, will be much higher than that compared with steady state employment. Current practice at the site clinic is that audiometry (noise exposed) and spirometry (respiratory risk exposed) are done on site but referral to Nyamiaga Hospital is required for chest X-ray.

10.6 HIV/AIDS and STI

The estimated population HIV prevalence rate amongst adults in Tanzania is 4.4%. Regional prevalence ranges from 0.5% in Zanzibar to 11.4% in Njombe (Southern Tanzania). Women and girls are disproportionately affected and 80% of new infections occur in young women and adolescent girls. Urban prevalence is higher than in rural areas.

HIV prevalence in the Kagera Region is estimated to be 5.7 %. No disaggregation to District level is easily available.

The Nyamiaga District Hospital serves a population of 9 080 and currently has 865 people on anti-retroviral treatment (ART) which would translate to an HIV prevalence of 9.5%. This denominator (9 080) is unlikely to be correct (some may be from other areas) but the number does serve to flag HIV risk in the Kabanga community. Nyamiaga Hospital staff reported that commercial sex work was common in the area, mostly involving young women from Burundi. Sexually transmitted infections (STI) are regularly treated by the health facilities visited and the incidence was said to be increasing (Nyamiaga Hospital). More robust data is needed for baseline purposes.

Project related in-migration of labour, especially “men with money”, has the potential to exacerbate the HIV/AIDS and STI rates in nearby villages. This risk will be particularly high during construction when as many as 1 285 (Q2 2027) will be working on site of whom about 830 will come from outside the District. Work seekers also present a risk in this regard.

The Kabanga Mine site clinic treats STI and provides counselling and testing for HIV but not treatment – referral is made to local health facilities for HIV/AIDS treatment and care. HIV/AIDS information, education and communication (IEC) campaigns on site are reported to be robust.

A special HIV/AIDS and STI risk could arise if there is a truck stop established on the ore transport route from Kabanga to Kahama.



10.7 Malaria

Kabanga Mine is in a high-risk malaria area and malaria is prevalent year-round, with seasonal peaks. Interviews at the health facilities describe malaria as being the commonest reason for attendance. At the Nyamiaga District Hospital, there were 1 092 cases of malaria treated during 2024, comprising 27% of reasons for attendance. The Bugarama Dispensary (serving a population of about 9 000) reported that malaria is the most common presenting diagnosis and that they treat about 200 cases every month. An example was that on the 17th of January there were 18 cases diagnosed and treated and a further 16 on the day of the visit to Bugarama (24th January).

Data kept at the Kabanga Mine site clinic confirms year-round malaria risk with peaks in December and January, during which time (2024/2025) there were 31 malaria cases diagnosed amongst a staff of about 240. The camp malaria control programme comprises breeding site drainage, indoor residual spraying of an organophosphate compound each quarter, insecticide treated nets in rooms, mosquito screening of buildings, long sleeved clothing at night and provision of repellents to night workers.

Mosquito control initiatives, whether for malaria (anopheles species), dengue, zika, chikungunya (aedes species) or West Nile virus (culex), reduce the risk of all diseases carried by these vectors.

10.8 Tuberculosis

Tanzania is listed by the WHO as being amongst the top 30 “high TB burden countries”. In 2023, there were 122 000 new TB cases in Tanzania – an incidence rate of 183 per 100 000. Many people in east and southern Africa with TB remain undiagnosed (perhaps up to 40%), so this is an underrepresentation of TB prevalence. Most of the Tanzanian population has been exposed to TB and this infection remains latent (LTBI). A person with LTBI, who is also HIV positive (and untreated) has a 32 times increased risk of developing TB than someone who is LTBI negative and HIV negative. It is estimated that people who are HIV positive have a 10% risk of developing TB each year compared with a 10% lifetime risk in a person who is HIV negative.

The Nyamiaga Hospital had had 48 people on TB treatment at the time of the site visit. The correct denominator for the hospital is unknown however, the TB incidence rate does appear to be higher than national TB incidence rates. The TB trend was reported by hospital staff to be increasing due to enhanced efforts at contact tracing and active case finding in the community.

TB incidence in mining (especially underground mines with respirable crystalline silica exposure) is noted to be much higher than in the general community. The Kabanga Mine site clinic is not registered as a TB service provider with the Ministry of Health. Noted that the clinic does not have an X-ray facility and refers to Nyamiaga District Hospital. Chest X-rays are one of the mainstays of active TB case finding and assist in diagnosis and follow-up during treatment. Chest X-rays are required as part of occupational medical surveillance for mine workers, especially underground miners and in areas of high TB incidence miners and HIV/AIDS prevalence.

Currently, if an employee or contractor has signs or symptoms of TB then they are referred to local health facilities for investigation, diagnosis, treatment and care. The risk of TB on an underground mine in a country with high HIV and TB prevalence is such that this should be a function of the mine site clinic.



10.9 Occupational Health and Safety Risk Assessment

Potential hazards in the workplace may be categorized into: Physical, Chemical, Biological, Ergonomic and Psychological. These hazards need to be identified, assessed and (where needed) controls implemented. Occupational Health and Safety Risk Assessment (OHSRA) determines not only the hierarchy of controls required but also, through providing a robust OREP, the OHSRA determines the content and frequency of medical examinations) and is the basis of risk based medical surveillance.

10.10 Contractor Accommodation and Canteens

Approximately 1 285 workers are expected to be on site during construction. Construction is expected to take place over about 24 months, with a peak of on-site worker numbers over about 12 months. Approximately 830 of the construction staff will be from outside of District. Current plans are that most construction staff would be required to find accommodation in surrounding villages and towns which will result in overcrowding, with resultant respiratory, water, sanitation and solid waste management issues. This in-migration will also impact local health facilities.

Job seekers (and their families) moving into the area may put further pressure on housing and health facilities especially if they have scant means and nowhere to live.

10.11 Possible Future Epidemics and Pandemics

The COVID-19 pandemic experience (both internationally and within Tanzania) has led to an understanding of what should inform preparation for future health epidemics and pandemics. The presence of certain co-morbidities increased the risk of COVID-19 morbidity and mortality. These included, advancing age, obesity, diabetes, hypertension, chronic respiratory illness, HIV/AIDS and TB. Many of these risk factors are manageable and their control should be included in preparations for future epidemics and pandemics.

The Tanzania response to COVID-19 did not include the strict lockdowns implemented by other countries, perhaps due to the recognition that lockdowns would have greater socioeconomic impact than the disease itself. As of 5 January 2025, Tanzania had reported a total of 43 365 cases and 846 deaths from COVID-19.

A future epidemic or pandemic (due to a COVID-19 variant, influenza, another respiratory virus, or other pathogen) is not improbable. As of January 2025, the Avian Influenza H5N1 virus presents concern. The risk of morbidity and mortality will likely be greater amongst people with co-morbidities, especially the non-communicable diseases (NCD) of hypertension, diabetes and obesity which underlines the importance of preventing and managing these illnesses.

Regional epidemic risk: The risk of epidemics due to disease arising with Tanzania or being imported from neighbouring countries (such as Kenya and Uganda to the north, Rwanda, Burundi and the Democratic Republic of the Congo to the west, and Zambia, Malawi and Mozambique to the south) is ever present. Ebola, dengue, yellow fever, Marburg and other viruses, cholera, typhoid fever, norovirus and other infectious diseases are not uncommon in these countries. The current epidemic of Mpox in the DRC which involves a new clade (variant) of that virus, is of particular concern. International trucking operations and movement of people may bring these risks closer to the Kabanga Mine. On 21st January 2025 the Tanzanian Government declared an outbreak of Marburg Viral Disease (MVD) in the Biharamulo District of the Kagera Region and issued a Travel Advisory in terms of International Health Regulations in an effort to prevent local and international spread.



There has been a previous outbreak of MVD in Kagera and another in Rwanda during 2024.

10.12 Vaccine Preventable Diseases

Many communicable diseases may be prevented by vaccination and are usually dealt with in childhood vaccination programmes (measles, mumps, polio, diphtheria etc.). However, some remain important into adult life (tetanus, polio, yellow fever, meningitis etc.). The topic is more fully explored in section 8 (community health impact assessment). An assessment of employee and contractor vaccination status would normally be part of the initial examination of an occupational medical surveillance programme. Certain vaccinations may be considered at that time – depending on personal and local community risk profiles. This may become more important if there is another pandemic.

10.13 Alcohol and Substance Misuse

Alcohol may be an important contributor to accident causation, poor health and poor productivity. Alcohol also increases the risk of TB (up to four times in regular drinkers). Alcohol misuse was reported to be relatively common, especially amongst contractors at Kabanga. Local brews are usually drunk and the alcohol content may be high.

Most companies have well developed and implemented alcohol and substance misuse policies and there is one in place at Kabanga Mine, however there is no regular substance screening done for safety critical occupations. Testing for alcohol and substance misuse is usually divided into: Safety/disciplinary (random, on suspicion and post incident) and medical/confidential (surveillance, rehabilitation.)

10.14 Smoking

Smoking contributes significantly to ill health. In mining and concentrating there is added respiratory risk and smoking should be discouraged as far as possible. Smoking increases the risk of TB (between 2 to 4 times). An estimated 14% of male Tanzanians smoke but smoking was reported to be relatively uncommon in the Kabanga community, compared with other areas in Tanzania.

10.15 Further Work

Following the completion of the ESIA, and prior to construction commencing, TNCL is required to undertake the following, additional assessments:

- **Occupational Hygiene and Community Health Risk Assessment:** A formal Occupational Hygiene and Community Health Risk Assessment should be undertaken for the mine and ore concentrator. This will assess occupational hygiene risks generally and more specifically for nickel, cobalt, lead, arsenic and respirable crystalline silica (RCS). Such assessment will inform controls that may be needed. The assessment should measure baseline nickel, cobalt, lead and arsenic that may already be in the environment as well as that which may be expected from mining, ore concentrating and discharge to storage facilities. The assessment must consider RCS associated with mining (ventilation discharge), ore concentrating processes and of RCS discharge to waste rock dumps and other storage facilities.

Following the completion of the ESIA, TNCL has identified various initiatives to implement which include:

- TNCL to pursue accreditation for its training programs.



- TNCL to continue stakeholder engagement and communication on environmental and social impacts and mitigation measures.
- TNCL to develop and implement monitoring and evaluation programs linked to UN Sustainable Development Goals.
- TNCL to explore funding partnerships for community development projects.
- TNCL to develop alternative livelihood programs for affected communities.
- TNCL to implement continued skills development and training programs.
- Qualitative analysis is required of the predicted DFO, SPM, PM10 or PM 2.5. Qualitative analysis will allow an understanding of source apportionment, health impact and controls required both at the Kabanga Mine and concentrator and during transport of ore concentrate to the Kahama Refinery.



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