EcoWise Environmental Consulting

ONGOPOLO MINING LIMITED'S TSCHUDI COPPER MINE ENVIRONMENTAL MANAGEMENT PLAN (EMP) INCLUDING THE MANAGEMENT AND MITIGATION MEASURES OF THE PROPOSED EXPANSION OF THE HEAP LEACH FACILITY AND DEWATERING OF THE MINE PIT, TSUMEB, OSHIKOTO REGION NAMIBIA

MEFT PROJECT NO.: 230413001292

ONGOPOLO MINING LIMITED

REVISION 2

PREPARED FOR

WEATHERLY MINING NAMIBIA

RENEWAL OF ENVIRONMENTAL CLEARANCE CERTIFICATE AND AMENDMENT OF ONGOPOLO MINING LIMITED'S TSCHUDI COPPER MINE ENVIRONMENTAL MANAGEMENT PLAN (EMP) TO INCLUDE THE MANAGEMENT AND MITIGATION MEASURES OF THE PROPOSED EXPANSION OF THE HEAP LEACH FACILITY AND DEWATERING OF THE MINE PIT, TSUMEB IN THE OSHIKOTO REGION

MEFT PROJECT NO.: 230413001292

ONGOPOLO MINING LIMITED

APRIL 2023

REVISION 2

DOCUMENT INFORMATION

Title	RENEWAL OF ENVIRONMENTAL CLEARANCE CERTIFICATE AND AMENDMENT OF ONGOPOLO MINING LIMITED'S TSCHUDI COPPER MINE ENVIRONMENTAL MANAGEMENT PLAN (EMP) TO INCLUDE THE MANAGEMENT AND MITIGATION MEASURES OF THE PROPOSED EXPANSION OF THE HEAP LEACH FACILITY AND DEWATERING OF THE MINE PIT
Project location	Tsumeb, Oshikoto Region, Namibia
Client	Ongopolo Mining Limited
Postal Address	P.O Box 40791 Ausspannplatz, Windhoek Namibia
Project Manager e-mail	info@ecowiseec.com
Date last printed	
Date last saved	
Comments	
Keywords	TSCHUDI COPPER MINE EMP INCLUDING THE MANAGEMENT AND MITIGATION MEASURES OF THE PROPOSED EXPANSION OF THE HEAP LEACH FACILITY AND DEWATERING OF THE MINE PIT
Project Number	230413001292
Report Number	
Revision Number	2
Status	Draft
Issue Date	April 2023

CONSULTANT CONTACT DETAILS

Project Manager	Professor B. Mapani
E-mail	ben.mapani@gmail.com ruth@ecowiseec.com
Authors	Prof B. Mapani & Ruth Mutyavaviri
Postal address	PO Box 40168 Ausspannplatz, Windhoek Namibia
Phone	+264 813 826460

DOCUMENT AUTHENTICATION

This updated Environmental Management Plan (EMP) report has been prepared by Eco-Wise Environmental Consulting cc in accordance with the Environmental Management Act No 7 of 2007 (EMA) and its regulations of 2012 which requires the holder of the environmental clearance certificate to make an application to the Environment Commissioner if an addendum is being proposed and there is need for a renewal. We the undersigned, certify that the particulars in this amendment are correct and righteous to the best of our knowledge.

ENVIRONMENTAL CONSULTANT:

ECO-WISE ENVIRONMENTAL CONSULTING CC

P.O Box 40168 Windhoek

Cell: +264 813 826460

Email: info@ecowiseec.com/ ecowise@protonmail.com

ENVIRONMENTAL AUTHORIZATION INFORMATION

Please note that the environmental clearance certificate should be issued out to the client. All comments and enquiries during the evaluation of this document must be addressed to the Environmental Consultant. Please forward the clearance certificate to the consultant.

ACKNOWLEDGMENT

Due to its unwavering commitment in maintaining high environmental management standards, Ongopolo Mining Limited has been conducting amendments to its Environmental Management Plan thus through the engagement of various environmental consultants. These consultants include Synergistics Environmental Services which prepared the, "*Amendment to the Environmental Assessment Report and Environmental Management Plan for Mining Below the Water Table and Heap Leaching*", report dated 20 February 2013. SLR conducted the, "*Amendment to Ongopolo Mining (Pty) Ltd.'s Tschudi Copper Mine Environmental Management Plan Including the Management and Mitigation Measures to the General Waste Disposal Facility*", report dated January 2018. Eco-Wise Environmental Consulting cc hereby acknowledge the work done by Synergistics Environmental Services and SLR.

EXECUTIVE SUMMARY

Ongopolo Mining Limited being the Proponent is proposing to renew and amend the Environmental Clearance Certificate (ECC) for Mining License (ML) Number 125 which is located on the farms Tschudi 461 and Uris 481, approximately 20 km west of Tsumeb, in the Oshikoto Region Namibia. ML 125 covers a total area of 729.7871 Hectares (Ha) and the Tschudi copper deposit is mined within the ML. The ML was issued by Ministry of Mines and Energy (MME) on 29 October 2002 (Licence Number: ML125) and it will expire on 28 October 2032. The Environmental Clearance Certificate (ECC) for the operation of Tschudi Mine was issued by the Ministry of Environment and Tourism (MET) on 24 March 2003 (ref. N24/2/2/8). The ECC over the years was successfully renewed and amendments done. The ECC is therefore due for renewal as it will be expiring on 14 May 2023. The Proponent also intends to conduct an amendment by including the following activities:

1. Expansion of the heap leach facility /new leach pads) and its own storm water pond.

2. Dewatering of the mine pit

Ongopolo Mining Limited ceased its mining operations in February 2020 due to diminishing ore reserves, high stripping ratio, decline in copper price and high pumping costs. During the care maintenance phase, exceptionally good rainfall was received in 2020-21 which resulted in recharge and accelerated recovery of groundwater level. The water in the mine pit is now estimated to be 6 million m^3. Therefore, Ongopolo Mine intends to pump out the water so that operations can resume. The amendment is therefore to include, the best management practices during the dewatering process. The coordinate for the mining pit is **19.26570 S and 17.51715 E**.

Dewatering studies during the operation of the mine led to the understanding that the mine is located within an aquifer compartment (Tschudi Compartment) within the Otavi Mountainland karst (Swakop Group rocks). The compartment is bounded by the Tsumeb and Tschudi Dykes to the south and north respectively. Early dewatering activities saw much of the pumped water released within the Compartment that resulted in recirculation and limited drawdown. Following a major inflow event in May 2018, detailed investigations on dewatering of the aquifer began and the Compartment was identified using airborne

geophysics. Discharge of pumped water outside the Compartment started in late 2018 and dewatering rates increased. However, the lowering of the mine pit caused increased flow as more of the main fracture zone was exposed. Dewatering during that time affected neighbouring water supply boreholes inside the Tschudi Compartment thus impacting farming activities. To deal with the problem of excessive water loss in the aquifer Compartment, the Proponent intends to permanently seal the fracture zone. A detailed hydrological report is attached as an Appendix.

In addition, the Proponent also intends to add another new heap leach facility. The area of the proposed leach pad and its storm water pond will be approximately 90 Ha. The coordinate for the proposed leach pad is **19.25608 S and 17.50147 E.**

Ongopolo Mining (Pty) Ltd therefore appointed Eco-Wise Environmental Consulting cc (consultant) to make an application for the amendment of the ECC for ML 125. It is essential to note that, a site visit was conducted by the consultant on 19/10/2022. The period the consultant visited the site, the mine was already on care maintenance. The site where the proposed heap leach facility will be constructed was assessed, the site is an already disturbed area with no vegetation with the exception of the north-west area where there is sparse vegetation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYM AND ABBREVIATIONS

Below is a list of acronyms and abbreviations used in this report

ACRONYM	MEANING
EMP	Environmental Management Plan
ECC	Environmental Clearance Certificate
DWA	Department of Water Affairs
LTD	Limited Company
MEFT	Ministry of Environment Forestry and Tourism
ML	Mining License
MME	Ministry of Mines and Energy
MAWLR	Ministry of Agriculture Water and Land Reform
PTY	Proprietary

AMENDED PAGES/CHANGES TO THE TABLES

No.	Page Number	Section	Implemented Changes
1	Page iv	Document Authentication	Added section
2	Page v	Environmental Authorization Information	Added section
3	Page v	Acknowledgment	Added section
4	Page vi	Executive summary	Added section
5	Page 2	1.1 Proposed amendment	Additional information was added on the proposed activities to be included in the amendment
6	Page 7	Table 2. 1	Added a table of relevant legislation and policies related to the project
7	Page 41-45	Ref 3.51 - 3.70	Additional information on mitigation measures of dewatering
8	Page 59	Table 6.1	Monitoring of the mine pit
9	Page 59	Table 6.1	Recharge calculations
10	Page 66	Table 7.1	Added biannual monitoring
11	Page 70	10.1.2 Dewatering	Added section
12	Page 73	11 Conclusion	Added conclusion
13	Page 73	11.1 Recommendations	Added recommendations
14	Page 74	Bibliography	Added section
15		Attachments	Appendix B -E

1. INTRODUCTION

Ongopolo Mining Limited, which is owned (97.5%) by Weatherly Mining Namibia Ltd (Weatherly), has a licence to mine the Tschudi copper deposit located on the farms Tschudi 461 and Uris 481, approximately 20 km west of Tsumeb, in the Oshikoto Region of Namibia (see Figure 1.1). Environmental Clearance for the operation of Tschudi Mine was issued by the then Ministry of Environment and Tourism (MET) on 24 March 2003 (ref. N24/2/2/8) and the mining licence was issued by the Ministry of Mines and Energy (Licence Number: ML125, 29 October 2002). At that time, the Environmental Assessment (EA) including the Environmental Management Plan (EMP) addressed mining above the water table, and it was assumed that all processing of the ore would take place at the Tsumeb Mine Beneficiation Plant with copper-bearing ore being trucked from Tschudi to Tsumeb for this purpose. In addition to the mining process, a general waste disposal facility was not included in the original mining plan.

The original Environmental Clearance was issued with the following conditions:

1. Should mining continue below the water table it is the responsibility of the Mining Licence Holder to contact the MET and to make the necessary amendment to the EA and Environmental Management Plan.

2. Should heap leaching take place an addendum to the EA must be provided to stipulate all relevant associated activities.

In January 2013, an amendment to the original EMP was done to include management and mitigation measures that were identified and related to the revised mine plan and processing activities including mining below the water table and heap leaching.

Construction of the Tschudi Copper Mine started in January 2014 with the first copper produced in February 2015. The mine became fully operational, with production at 17000 tonnes of copper per annum. On the 31st of August 2016, Tschudi mine successfully renewed their Environmental Clearance Certificate (ECC). During the ECC renewal process, a Change Request addendum document was submitted to MET and included the request to build a suitable on-site general (non-hazardous) Waste Disposal Facility. The application (Change Request addendum) to MET indicated that the proposed facility would be constructed

within the Waste Rock Dump (WRD). The approval was granted and amended to the renewed ECC dated 31st of August 2016. An Environmental Management Plan (EMP) was however not developed as part of the application (and approval) process. On 24 January 2018, Ongopolo Mining (Pty) Ltd then amended the EMP with Mitigation and Management measures to the proposed construction and management of the General Waste Disposal Facility. The background and activities associated with the General Waste Disposal Facility are described in Appendix A of this document.

In addition to the above, Tschudi Copper Mine undertakes Annual independent environmental audits as required in terms of Weatherly International Plc Ongopolo Mining Limited's license conditions and relevant Namibian legislation. The annual independent environmental audits are undertaken to understand the level of compliance and implementation of commitments in the Environmental Management Plan in order to ensure continual improvement in environmental performance.

Ongopolo Mining (Pty) Ltd appointed SLR to conduct the 2015 and 2016 environmental audits to assess compliance with the EMP. Audit findings (i.e., non-conformances to certain commitments) were found and presented in the Audit report. Subsequently, Ongopolo Mining (Pty) Ltd then decided to amend certain commitments in the EMP due to the fact that these were not practical / achievable and were made to fit the current operational practice at Tschudi Mine. The EMP then included the proposed amendments related to:

- Soils contaminated with hydrocarbons

1.1. PROPOSED AMMENDMENT

Ongopolo Mining Limited (Proponent) proposes to undertake the below listed activities on an already assessed and approved mining area:

1. Expansion of the heap leach facility /new leach pads) and its own storm water pond.

2. Dewatering of the mine pit

Figure 1.1 shows the locality map, indicating the proposed heap leach facility and the mine pit. Tschudi Mine already has an existing heap leach facility but the Mine intends to add another new heap leach

facility. The area of the proposed heap leach facility and its storm water pond will be approximately 90 Ha. The coordinate for the proposed heap leach facility is 19.25608 S and 17.50147 E.

In addition, there is a problem which emerged at Tschudi Mine of water which accumulated in the mine pit due to the stoppage of mining activities. Exceptionally good rainfall in 2020-21 resulted in recharge and accelerated recovery of groundwater level. The water is now estimated to be 6 million m^3. Therefore, Tschudi Mine intends to conduct the dewatering process inorder to resume operations. Different alternative infiltration points which can receive the pumped groundwater have been brought forward and these include, Lake Otjikoto, Lake Guinas and Wandelberg Infiltration Site (close to the mine). Lake Guinas and the Wandelberg Infiltration Site were found to have a combined capacity of 34.1 million cubic meter per year that is comparable to the required pumping rate from the Tschudi Mine. However, the Wandelberg Site was found to be the recommended site.

The amendment is therefore to include, the best management practices during the dewatering process. See **Appendix B**, Background Information Document and **Appendix C,** Detailed Hydrological report.

To note, dewatering activity is listed in the EIA Regulation (2012) as an activity that may not be undertaken without an Environmental Clearance Certificate (ECC). Section 8 (Water Resource Development) of the EIA Regulation requires an ECC for the following;

- 8.1 *The abstraction of ground or surface water for industrial or commercial purposes,*
- 8.2 *The abstraction of groundwater at a volume exceeding the threshold authorized in terms of a law relating to water resources.*

Ongopolo Mining Limited therefore appointed Eco-Wise Environmental Consulting cc as an independent environmental consultancy to undertake the application for the amendment to include; dewatering of the mine pit and expansion of the heap leach facility /new leach pads and its own storm water pond. To note, the consultant conducted a site visit on 19/10/2022. Namib Hydrosearch was also appointed as hydrologist specialists.

Additions to this document and additional Mitigation and Management Measures, relating to the dewatering activity and expansion of the heap leach facility, are highlighted in green in this amended EMP. The already existing mitigation measures related to heap leaching in the original (approved) EMP are highlighted in yellow for ease of review.

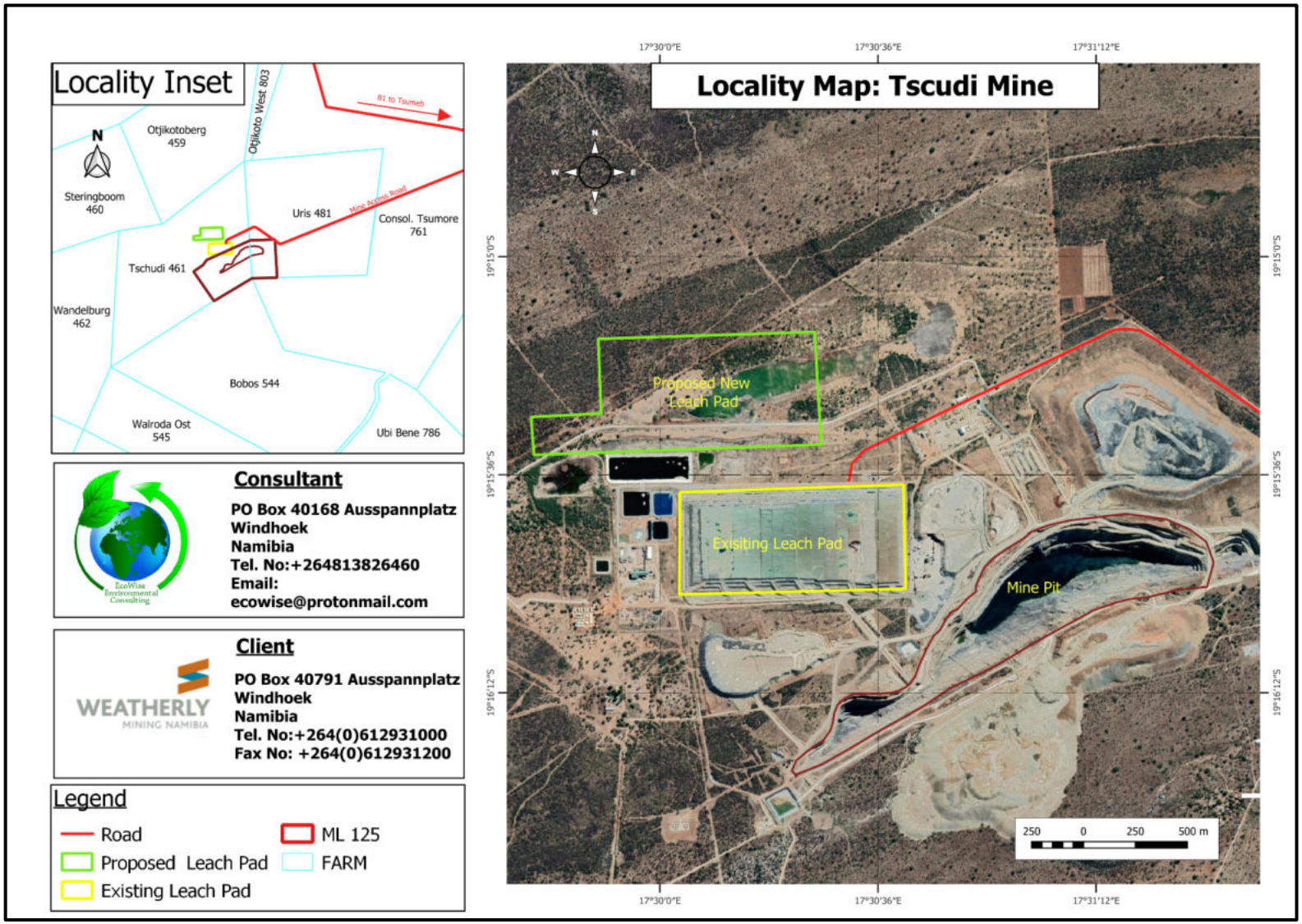

FIGURE 1. 1: LOCALITY MAP SHOWING THE PROPOSED NEW HEAP LEACH AREA AND THE MINE PIT

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The Proponent will be required to abide to legislations relating to the project. All mineral rights, related to mineral mining activities in Namibia, are regulated by the Ministry of Mines and Energy, environmental issues are regulated by the Ministry of Environment Forestry and Tourism and water related issues by Ministry of Agriculture Water and Land Reform. Table 2.1, indicate the relevant legislations related to the project.

TABLE 2. 1: RELEVANT LEGISLATION AND POLICIES RELATED TO THE PROJECT

Aspect	Pertinent Policy / Legislation	Requirements	Implications
General	Constitution of Namibia (1990)	The State is to actively promote and maintain the welfare of the people by adopting policies aimed at maintaining ecosystems, essential ecological processes, the biological diversity of Namibia and the sustainable utilisation of natural resources, for the benefit of all Namibians, both present and future.	Operations at the Tschudi Copper Plant are to aspire to meet the aims of the Constitution.
		South African legislation in place at the time of independence is applicable until replaced by new legislation.	Cognisance to be given to relevant South African legislation.
Environment	Environmental Management Act (2007) Environmental Impact Assessment (2012)	States that, projects with significant environmental impacts are subject to an environmental assessment process (Section 27). EIA Regulation list all activities, which cannot be undertaken without an ECC and dewatering activities are included in section 8 (Water Resource Development) 8.1 The abstraction of ground or surface water for industrial or commercial purposes, 8.2 The abstraction of groundwater at a volume exceeding the threshold authorized in terms of a law relating to water resources.	The ECC should be renewed every 3 years and biannual monitoring reports should be submitted to MEFT as this will facilitate the renewal of the ECC. When there are any amendments, an application should be made to MEFT
Classification & Management of Hazardous Substances	Hazardous Substances Ordinance (No. 14 of 1974)	Any substance or mixture of substances which, in the course of customary or reasonable handling or use, including ingestion, by reason of its toxic, corrosive, irritant, strongly sensitising or flammable nature or because it generates pressure through decomposition, heat or other means, cause injury, ill health or	Hazardous substances at the plant are to be identified.

		death to human beings, to be a Group I or Group II hazardous substance.	
Protection of Surface and Groundwater Environs	Water Act (No. 54 of 1956)	Act makes provision for Water Control Areas. These are areas where the abstraction of naturally occurring groundwater resources may result in the undue depletion of its underground water resources.	Tschudi falls within a Water Control Area.
		No person may use public (borehole) water for industrial purposes without the authority's permission	A permit is required to abstract water from boreholes
		Pollution of public or private water in such a way that it renders less fit for the purposes that it was originally used is an offence.	Measures to be implemented to prevent groundwater pollution. Discharge permit required for sewage effluent
		The Minister may take the necessary action to prevent the pollution of public and private water which results from the seepage or drainage from an area on which mining operations have been undertaken, after the operations have been abandoned. The costs will be recovered from the person responsible.	Rehabilitation is to ensure that future pollution is prevented.
Dewatering	Water Resources Management Act (2004)	The act makes provisions for prohibition to abstract or use water without license 33. (1) A person who wishes to abstract and use water may apply to the Minister for a license to abstract and use water in the prescribed manner and form	To seek consent through applying to the Minister (MAWLR) for a license to abstract and use water
		Review, amendment, suspension and cancellation of license to abstract and use water	Adhere to the license terms and conditions to avoid suspension or cancellation of license

		41 (2) Subject to subsection (3), the Minister may suspend or cancel a license to abstract and use water, in whole or in part, if the licensee (a) fails to abide by any of the terms or conditions of the license; (b) fails to commence the abstraction of water within the period specified in the terms and conditions of such license; or (c) having commenced with the abstraction of water, ceases the abstraction for a continuous period of three years.	
		Wastage of groundwater 50. A person may not cause or allow any groundwater to run to waste from any borehole, except a. if such water interferes or threatens to interfere with the execution of any underground mining operations or any other underground works, and no other method of disposing of such water is reasonably practicable.	Provides permission to be disposed of if it threatens to interfere with the execution of any mining operations.
		Aquifers 51. (1) The Minister has power (a) to determine the safe yield of any aquifer for the purpose of guiding determinations concerning the abstraction and use of water from the aquifer; (b) to require that an aquifer be used on a sustainable basis, including restricting abstractions so that they do not, individually or collectively, exceed the safe yield of the aquifer; (c) to impose special requirements and restrictions with respect to artesian wells, for the purpose of preventing	Restricts unregulated and unsustainable abstraction of water from aquifers.

		wastage or contamination of water, or loss of artesian pressure; and (d) to carry out programmes for the recharge of aquifers. (2) For the purposes of this section, "safe yield" means the amount of water which may be abstracted from an aquifer at a rate that will not reduce the supply to such an extent as would render such abstraction harmful to the aquifer, quality of the water or environment.	
Protection of Human Health	Public Health Act (No. 36 of 1919) Public Health and Environmental Act, 2015	No person may allow the existence of a nuisance or other condition liable to be injurious or dangerous to health, on any land owned or occupied by them.	Waste from construction and operations will be removed and disposed on the municipal waste dump at Tsumeb.
Protection of Air Quality	Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)	No person may carry out a scheduled process, erect and/or alter buildings without a certificate authorizing them. This is issued by the Ministry of Health & Social Services.	No certificates are issued. The Ministry is to be consulted as part of the EIA process
Protection of Soils	Soil Conservation Act (No. 76 of 1969)	Measures are to be implemented to prevent erosion, denudation and disturbance of land.	Management measures are to be put in place to protect soils on site and surrounds.
Protection of Fauna & Flora	Nature Conservation Ordinance (No. 4 of 1975)	Lists species of Conservation Importance. You are not permitted to pick or remove any protected plant, unless you are the landowner.	The Tschudi Mine is a brown fields operation. Should any species of conservation importance occur within the operational complex, these are to be identified and protected where practicable.
	Policy for the Conservation of Biotic	It must be recognized that protection of biological diversity, ecosystems and important landscapes is of national and international importance. All developments are to be	Due cognizance is to be given to the protection of biodiversity and landscapes.

	Diversity and Habitat Protection	sustainable and must be evaluated at an appropriate level by means of an EA.	
Mining	Minerals (Prospecting and Mining) Act, 1992 (Act 33 1 of 1992)	Section 2: All rights to minerals vests in the State Section 48 (3): In order to enable the Minister to consider any application referred to in section 47 the Minister may (b) require the person concerned by notice in writing to (i) carry out or cause to be carried out such environmental impact studies as may be specified in the notice	MME will also be a relevant authority to the project hence applications related to ECC amendments and renewals will be subsequently submitted also to MME.
Labor	Labour Act (No 11 of 2007)	This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labour practices.	The proponent will be obliged to create a safe working environment for the employees.

3. ENVIRONMENTAL MANAGEMENT

3.1. AIM

The aim of the environmental management plan (EMP) is to detail the actions required to effectively implement the mitigation measures identified and recommended in the EIA. These actions are required to minimise negative impacts and enhance positive impacts associated with the Tschudi Copper Project. The EMP actions represent the commitments made by Weatherly to address the impacts of the project.

It is important to note that an EMP is a living document in that it will be updated and amended as new information (e.g., environmental data), policies, authority guidelines and technologies develop.

The EMP identifies management actions that need to be implemented in various phases of the mining project life cycle.

- Feasibility and Design Phase refers to the stage when the feasibility studies are being undertaken, the mine plan developed and processing options finalised. During this phase, the EA (in this case the amendment thereof) is completed and environmental authorisation is applied for.
- Construction Phase is the implementation phase and refers to the stage when the detail design is finalised, earthworks and civil construction of the project infrastructure is completed including the processing facilities, roads, change houses, administration areas, workshops and associated structures.
- Operations includes the commissioning and handover phase when construction has been completed, the equipment is tested and put into operational duty in a phased manner and when mining and processing are in full operation. Operational activities are anticipated to last 11 years.
- Decommissioning phase refers to the time in the mine life when mining operations are reduced in preparation for closure. This phase will occur once the resource has been fully exploited.
- Post-closure phase refers to after the project has been shut down and no further mining or processing activities are undertaken.

3.2. MANAGEMENT ACTIONS

Specific objectives are given for each of the actions described in the EMP. These objectives relate directly to addressing the impacts identified in the EA.

The various actions that need to be implemented to ensure that environmental objectives are met are described in the EMP. Each action is given a reference number. The actions are measurable and are therefore easy to monitor. Compliance with the EMP can be audited.

3.3. ROLES AND RESPONSIBILITIES

It is the responsibility of Weatherly to implement the EMP and to make sure that all the actions are carried out. The successful implementation of the EMP is however dependent on clearly defined roles and responsibilities for each of the management actions given.

Roles have been ascribed to the following parties: Project Manager:	This is the person assigned responsibility for the planning and design of the Tschudi Copper Project including the completion of the Feasibility Study
Environmental Manager:	A member of the workforce delegated the responsibility of environmental management.
Human Resources Manager:	A designated person appointed to deal with recruitment.
Contractor:	These are companies appointed by Weatherly to carry out specific components of the project.
Construction Manager:	Person appointed to manage the construction phase of the project.
Mining Manager:	Person appointed to manage and oversee mining activities during the operational phase of the Tschudi Copper Project.
Plant Manager:	Person appointed to manage and oversee processing operations.
Maintenance Manager:	Engineer appointed to oversee and manage the maintenance of plant, infrastructure and equipment during the operational phase.
Procurement Manager:	The person responsible for procurement during the operation of the mine.

3.4. SCHEDULE

The schedule in the EMP serves to indicate when the various environmental actions are to commence. The successful commencement of the committed action within the specified period is to be monitored.

3.5. REQUIREMENTS FOR IMPLEMENTATION

This component of the EMP details what is required for the action to be implemented successfully. This includes equipment, supplementary documentation, protocols and additional actions that may need to be put into place.

3.6. FEASIBILITY AND DESIGN

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
GEOLOGY					
1.1	To ensure compliance with Namibian legislative requirements.	Obtain permit for additional borehole Drilling	Project Manager	Feasibility Study	Application to DWA
WATER RESOURCE PROTECTION					
1.2	To provide for the protection of groundwater resources in the project design.	Heap leach pads, process water ponds and process storm water ponds are to be provided with a double liner system as per the Queensland Guidelines	Project Manager	Feasibility Study	Engineering Design
		Due to the fact that only non-hazardous materials will be placed in the General Waste Disposal Facility, it will be an earthen, unlined facility. However, it will have a compacted calcrete floor and side walls. All waste containment pits must have the compacted calcrete floor and side walls. Potential acid generation within the	Project Manager	Feasibility Study	Engineering Design

		waste rock is not considered to be a threat to groundwater quality as the waste rocks will be substantially Nett Acid Neutralising because of the large volumes of acid neutralising calcrete and sandstone of which the Waste disposal facility will be constructed.			
1.3	To provide for the separation of run-off from clean and potentially contaminated areas.	Storm water diversion measures to be provided for diversion of clean water around potentially contaminated sites (waste rock dump including the General Waste (Non-Hazardous) Disposal Facility, pit, heap leach pads, process plant, workshops, crusher and ROM stockpile area).	Project Manager	Feasibility Study	Engineering Design for 1 in 50-year storm event
		Waste Rock material of the Waste Rock Dump should be used for construction of embankments/berms around the General Waste (Non			

		Hazardous) Disposal Facility. Waste Disposal Facility must be constructed within the footprint of the Waste Rock Dump and therefore measures relating to clean surface water diversion falls within the Waste Rock Dump perimeter and design requirements.			
		Design all storm water interventions in such a way that storm water can bypass the Waste Rock Dump/ Waste Disposal Facility. And that the design, construction and operation include flood protection measures.	Project Manager	Feasibility Study	Engineering Design for 1 in 50 year storm event.
1.4		Provision is to be made for access to! Uris Lodge and Bobos homestead during flood events.	Project Manager	Feasibility Study	
1.5	To provide for the containment of run-off from potentially contaminated areas.	Run-off from potentially contaminated sites to be contained in pollution control ponds/East Pit.	Project Manager	Feasibility Study	Plant storm water pond Engineering Design for 1 in 20-year storm event (DERM requirements)

1.6	To provide for pollution control measures.	Provide for bunding, impervious surfaces, oil and sediment traps as required to protect soils, groundwater and surface water in the layout planning for the process plant, workshop, process chemicals and hydrocarbons stores.	Project Manager	Feasibility study.	Engineering Design
1.7		Bunded areas for the storage of non-flammable chemicals should have sufficient capacity to contain 110% of the largest tank contained in the bund. Acid proofing to be included for acid storage areas.	Project Manager	Feasibility Study	Engineering Design
1.8		Bunded areas for the storage of flammable chemicals (including oils, fuels and lubricants) should have sufficient capacity to contain 110% of the total volume to be stored in the bund. The additional capacity allows for the containment of fire water.	Project Manager	Feasibility Study	Engineering Design
1.9		Impervious surfaces are to be provided in areas where hazardous	Project Manager	Feasibility Study	Engineering Design

		chemicals (e.g., acids, hydrocarbons, concentrates) are handled.			
1.10	To provide for the management of grey and black water during construction and operation	Sewage treatment works to be provided for.	Project Manager	Feasibility Study	Engineering Design
1.11	To ensure compliance with Namibian legislative requirements.	Obtain discharge permit for operation of sewage treatment works.	Project Manager	Feasibility Study	Application to DWA.
WASTE MANAGEMENT					
1.12	To provide for the safe management of general and hazardous waste.	Temporary storage area (with bunding and roof/lid) to be included in planning for the storage of general and hazardous waste prior to removal from site.	Project Manager	Feasibility study	Engineering Design
1.13		Soil bio-remediation site to be engineered for inclusion in the project.	Project Manager	Feasibility study	Engineering Design
1.14	Waste storage and separation – General waste	As far as practically possible, ensure that all waste that can be recycled gets recycled and not disposed of in the landfill site. Investigate and assist with the development of small and medium size companies in the surrounding towns that are in the business of	Environmental Manager	Through the Life of the Mine	Waste Management Strategy

		recycling waste.			
1.15		Provide the recyclable materials to qualified companies that either directly or indirectly recycle the materials themselves or through third party companies.	Environmental Manager	Through the Life of the Mine	Waste Management Strategy
1.16	The Disposal of waste and general operating requirements of the landfill facility	Construct/ operate the on-site landfill facility in phases, meaning only one or two sections/cells (containment pits) of the facility to be open at any given time. The next section/cell will only be opened when the previous one has almost reached its full capacity. There must be sufficient cell capacity to accommodate at least one week's waste.	Environmental Manager	Through the Life of the Mine	Waste Management Strategy
1.17		Ensure each cell is constructed as per design requirements	Project Manager/ and Environmental Manager	Through the Life of the Mine	Waste Management Strategy

AIR QUALITY MANAGEMENT					
1.18	To provide for dust suppression.	Provide for wet suppression (50% control efficiency), materials handling (50% control efficiency) and in-pit roads (75% control efficiency).	Project Manager	Feasibility Study	Engineering Design
1.19		Chemical dust suppressant to be provided for on main haul and other permanent roads within the mining area.	Project Manager	Feasibility Study	Included in budgeting
1.20	To prevent the dispersion of acid mists	Drip irrigation to be method used for the application of acids to heap leach.	Project Manager	Feasibility Study	Process Design
1.21	To monitor dust emissions	Provision is to be made for an air quality monitoring programme.	Project Manager	Prior to construction	Meterological station 8 single dust fallout buckets 1 PM10 monitor
NOISE MANAGEMENT					
1.22	To reduce noise produced on site	Design philosophy should give cognisance to noise generation.	Project Manager	Feasibility Study	Engineering Design
1.23		Opportunities for enclosure for noise generating equipment to be considered in planning.	Project Manager	Feasibility	Engineering Design
PROTECTION OF HERITAGE RESOURCES					

1.24	To protect heritage sites within the project area.	Confirm the occurrence and location of heritage site potentially under waste rock dump footprint.	Project Manager	Immediate	Historical Survey
1.25		Obtain authorisation for the destruction of the site, if confirmed.	Project Manager	If required	Excavation and documentation of site by historian.
SAFETY RISKS (THESE COMMITMENTS APPLY TO DESIGN, CONSTRUCTION, OPERATION PHASES AND DECOMISSIONING PHASE)					
1.26	Safety	The General Waste Disposal Facility and stockpiles will be rehabilitated in a manner that they present land forms that will be stable, protected from flood damage, and slopes will be re-vegetated where necessary	Project Manager, Mining Manager and Environmental Manager	Throughout the life of Mine	
1.27		The permanent above ground waste facilities will be designed, constructed and operated in a manner that stability is a priority, flood protection is provided and the risk of failure is limited to acceptable levels. This requirement is implemented as per the Waste Rock Dump Design requirements			

3.7. CONSTRUCTION / IMPLEMENTATION

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
SOIL MANAGEMENT					
2.1	To promote the conservation of soils for rehabilitation	Soil material is to be stripped from the footprint areas of the heap leach pad, process plants, ROM stockpile area and all infrastructure areas. Sufficient soil is to be stripped to cover the rehabilitation commitments and the focus should be on soils with moderate to high rehabilitation potential.	Contractor	Prior to construction	Final Project Layout Plan Soil balance calculations.
2.2		Soils required for use in construction rehabilitation are to be stockpiled in berms (<1.5 m in height) alongside the areas where they will be used for rehabilitation.	Contractor	Prior to construction	
2.3		Soils that are not required for use in rehabilitation of construction sites are to be stockpiled at identified operational topsoil stockpile areas.	Construction Manager	Prior to soil stripping	Delineated Soil Stockpile Areas

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
2.4		Operational soil stockpile areas are to be less than 15 m in height and benched to 1.5 m high and 2 m width to reduce erosion and to promote survival of seed banks.	Construction Manager	Prior to soil stripping	Delineated Soil Stockpile Areas
2.5		Ensure the Waste Disposal Facility is within the footprint of the Waste Rock Dump. Construction infrastructure to separate clean and dirty waters. This falls within the design criteria and requirements for the Waste Rock Dump			
POLLUTION CONTROL MANAGEMENT					
2.6	To contain spillages of hazardous Chemicals	All hazardous chemicals including hydrocarbons such as fuel, oils and greases are to be contained in bunded areas with sufficient capacity to contain the quantity stored in the bunded area.	Contractor	On site establishment	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
2.7		Hazardous chemicals including hydrocarbons are to be handled over impervious surfaces. No Hazardous material is to be disposed off in the Waste Disposal Facility at the Waste Rock Dump.	Contractor	On site establishment	Impervious surfaces including concrete slabs, drip trays and the like.
2.8	To manage sewage and effluent.	A sewage treatment works is to be put in place for the treatment of sewage emanating from the construction camp.	Construction Manager	Constructed together with construction village	Sewage Treatment Plant
2.9		Portable chemical toilets are to be provided in remote areas that are not connected to the sewage treatment works. Portable toilets are to be cleaned on a regular basis.	Contractor	On commencement of construction	Supplier of portable toilet service
2.10	To monitor the impact of construction activities on water	Monitoring of effluent discharge	Environmental Manager	On commencement of construction activities	Effluent Monitoring Programme
2.11	To provide for pollution control measures and protection of the groundwater resource	Floor-compaction of Waste Disposal Cells should be done with calcrete material. Filled Waste Disposal Cells			

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		should be covered with a blend of calcrete and waste rock material and then compacted. This will create a dry cell within the WRD to prevent inflow of rain and surface water.			
CONSTRUCTION WASTE MANAGEMENT					
2.12	To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste.	Hazardous and general waste is to be separated at source.	Contractor	On site establishment	Bins for the separation of waste at contractor's laydown areas.
2.13		Soils contaminated with hydrocarbons are to be bio-remediated (in situ or at bio-remediation site) or disposed of as hazardous waste.	Contractor	On site establishment	
2.14		Hazardous and general waste (where required and in absence of the General Waste disposal facility) is to be removed from site for disposal at recognised waste management facilities.	Contractor	As required	Agreement with waste disposal facility
PROTECTION OF BIODIVERSITY					

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
2.15	To minimise disturbance to biodiversity	Areas from which vegetation is to be removed are to be delineated prior to removal and vegetation is only to be removed from these areas.	Contractor	Prior to site clearance	
2.16		Place the food scraps in the landfill (Containment pits) in a distinct area and cover it with earthen fill daily to avoid animals being attracted and scavenging from these food scraps.	Environmental Manager and Contractor	Throughout the operation of the general Waste Disposal Facility	
2.17	To minimise pressure of wood fuel resources	The chopping of wood by persons involved in construction is to be prohibited.	Contractor	On commencement of construction activities	Training and awareness of construction workforce
2.18		Trapping or poaching of animals is to be prohibited.	Contractor	On commencement of construction activities	Training and awareness of construction workforce
AIR QUALITY					
2.19	To minimise the entrainment of dust during construction.	Surface wetting is to be implemented on all construction roads and cleared areas to minimise entrainment of dust.	Construction Manager	On commencement of construction activities	Minimum of 50% control efficiency to be obtained.
2.20	To monitor the effectiveness of dust	Monitoring of PM_{10} and dust fallout.	Environmental	Commence prior to	Dust Monitoring Programme

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
	management during construction and implement improvements as required.		Manager	construction	
NOISE AND VIBRATIONS					
2.21	To minimise disturbance of neighbours due to noise and vibrations	Notice to be given to surrounding communities of blasting events	Environmental Manager	Prior to first blasting event.	Information Boards
RECRUITMENT					
2.22	To promote economic development of local communities	Recruitment of local persons in accordance with Weatherly's recruitment policy by contractors involved in construction.	Contractor	On commencement of construction activities.	Recruitment policy with preference to local persons
2.23		Local procurement of goods and services were available and where practicable to the project.	Contractor	On commencement of construction activities.	Database of local service providers approved by Weatherly
COMMUNITY RELATIONS					
2.24	To minimise disturbance to Neighbours	Trespassing of persons outside of the construction areas are to be prohibited	Contractor	On commencement of construction activities.	Training and awareness of construction workforce
2.25	To promote good relationship with surrounding communities	Environmental forum to be established and to meet on a regular basis.	Environmental Manager	On commencement of construction activities.	Establishment of forum

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
2.26		Grievance mechanism to be established and communicated with communities.	Environmental Manager	On commencement of construction activities	Grievance Mechanism
REHABILITATION OF CONSTRUCTION AREAS					
2.27	To ensure rehabilitation after construction.	All infrastructure including foundations and concrete surfaces that will not be used during mine operations must be removed from site.	Contractor	On completion of construction	
2.28		All temporary access roads, laydown areas and other compacted surfaces are to be ripped (to an average depth of 200 mm) after construction to assist with vegetation growth.	Contractor	On completion of construction	
2.29		All wastes are to be removed from the site for disposal at a recognised site approved by the authorities.	Contractor	On completion of construction	
2.30		Vegetation growth on rehabilitated areas must be monitored until vegetation has reached sustainable growth.	Environmental Manager	On completion of construction	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
2.31		Vegetation growth is to be augmented by seeding and hand planting where it has not successfully established.			

3.8. OPERATIONS

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
SOIL MANAGEMENT					
3.1	To salvage and protect available soil resources.	Soil material is to be stripped from the footprint areas of the waste rock dump and the pit areas. Sufficient soils should be stripped to support rehabilitation requirements.	Mining Manager	Prior to extension of sites.	Soil balance calculations
3.2		Footprint areas are to be delineated and soil is to be stripped from these areas.	Mining Manager	Prior to stripping	
3.3		Soil is to be placed directly on areas requiring rehabilitation or at delineated operation soil stockpile areas are to be less than 15 m in height and benched to 1.5 m high and 2 m width and slope of 1 in 6.	Mining Manager	Ongoing prior to development	Delineated soil stockpile areas
3.4		Topsoil stockpiles are to be vegetated to reduce the potential for erosion.	Mining Manager		Develop a Restoration Strategy
3.5	To salvage soils contaminated with hydrocarbons.	Soils contaminated with hydrocarbon to be disposed off at a hazardous disposal facility	Mining Manager	On commencement of operations	Develop hazardous waste procedure

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
STORAGE AND MANAGEMENT OF HAZARDOUS CHEMICALS					
3.6	To contain spillages of stored hazardous chemicals	Hazardous chemicals are to be stored in bunded areas.	Plant Manager	On commencement of operations	Bunded areas
3.7		Hazardous chemicals (such as fuels and acids) are to be handled over areas provided with impervious	Plant Manager	On commencement of operations	Impervious surfaces in chemical and hydrocarbon handling areas.
3.8		Spills of hazardous chemicals are to be contained and cleaned-up to ensure protection of the environment.	Plant Manager	On commencement of operation	Spill procedures for hazardous substances. Spill kits as appropriate to areas of work. Training on clean-up
PROTECTION OF WATER RESOURCES					
3.9	To assess the effectiveness of pollution control measures.	Monitor water quality near potential pollution sources and the surrounding community boreholes.	Environmental Manager	On commencement of operations (first season)	Groundwater monitoring programme
3.10		Monitor effluent quality from sewage treatment works	Environmental Manager	Continue from construction phase	Effluent monitoring programme
3.11	To monitor impact on groundwater availability.	Groundwater levels are to be monitored.	Environmental Manager	Prior to commissioning of pumping	Groundwater monitoring programme
3.12		Update the numerical model on a regular basis to revise predicted	Environmental Manager	1 year after commencement of mining	Updated groundwater modelling

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		impacts.		and annually thereafter.	
3.13	To ensure continued supplied of water to people currently supplied.	Alternate water supply to be provided in areas where neighbouring boreholes have been found to be unsuitable for drinking or lost due to mining operations.	Environmental Manager	As soon as it is recognised that there will be a problem and on agreement with affected party.	Alternative supply options Agreement with affected party
3.14		Should monitoring indicate that neighbours' boreholes do not provide sufficient water as a result of the lowering of the water table, an alternate water supply is to be made available.	Environmental Manager	As required, but prior to the drying up of the water supply point.	Alternative supply options. Agreement with affected party
WASTE MANAGEMENT					
3.15	To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste.	Waste generated is to be separated at source into recyclable and non-recyclable waste.	Environmental Manager	On commencement of operations	Containers for the separation of waste
3.16		Recyclable waste is to be removed for re-use elsewhere and / or transported to appropriate recycling facilities in Namibia	Environmental Manager	On commencement of operations	Service provider for removal of recyclable waste

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
3.17		Hazardous and general waste is to be separated at source.	Environmental Manager	On commencement of operations	Containers for the separation of waste.
3.18		Soils contaminated with hydrocarbons are to be bioremediated.	Environmental Manager	On commencement of operations	Bio-remediation facility.
3.19		Hazardous waste is to be disposed at a recognised hazardous waste disposal site.	Environmental Manager	On commencement of operations	Agreement with waste disposal facility
3.20		Effective supervision of materials taken to the General Waste (Non-Hazardous) Disposal Facility should be implemented to ensure no hazardous/ toxic dumping is possible.	Environmental Manager, Construction Manager, Contractor, Project Manager	Throughout the life of the Mine	Waste Management Strategy
3.21		The waste management procedure must cover the recycling, re-use, storage, handling, transportation and disposal of waste into the on-site landfill facility. Ensure that the contractors responsible are made aware of these procedures.	Environmental Manager	Throughout the Life of the Mine	Waste Management Strategy

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
3.22		Medical waste is to be removed from site for treatment at a hospital facility.	Environmental Manager	On commencement of operations	Agreement with service provider
AIR QUALITY					
3.23	To reduce dust levels and air pollution produced during mine operations.	Surface wetting is to be carried out on in-pit roads, drilling, crushers and at materials handling points	Mining Manager	On commencement of mining operations	Wet suppression systems.
3.24		Chemical dust suppression to be in place on permanent haul and other roads at the mine should normal wetting not suffice.	Mining Manager	Prior to commencement of operations	Ongoing maintenance and re-application as required.
3.25		Progressively vegetate all areas, especially waste dump areas as these become available.	Mining Manager	Immediate and ongoing	Rehabilitation Programme
3.26		The landfill site (Waste Disposal Facility) should not operate more than two cells at any given time – one operation cell and the next one being excavated/prepared.	Environmental Manager and Mining Manager	Throughout the life of Mine	Waste Management Strategy
3.27		Burning of waste should be avoided.	Environmental Manager and Mining Manager	Throughout the life of Mine	Waste Management Strategy

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
3.28		Where possible, waste should be compacted by passing heavy equipment over the deposited waste.	Environmental Manager and Mining Manager	Throughout the life of Mine	Waste Management Strategy
3.29	To monitor the effectiveness of dust management during operations and implement improvements as required.	Monitoring of PM10 and dust fallout	Environmental Manager	Ongoing from construction phase.	Dust monitoring programme
NOISE					
3.30	To minimise noise generation	Maintenance of equipment	Maintenance Manager	When change in noise is perceived	Monitoring and maintenance of equipment
3.31		Monitor ambient noise levels	Environmental Manager	Immediate on commencement of operations	Noise Monitoring Programme
PROTECTION OF BIODIVERSITY					
3.32	To prevent the proliferation of alien invasive species.	Implement an alien invasive and invasive (bush encroachment) species management programme.	Environmental Manager	Immediate on commencement of operations	Alien and Invasive Species Management Programme
3.33	To minimise pressure of wood fuel resources	The chopping of wood is to be prohibited.	Contractor	Throughout the life of Mine	Training and awareness of workforce
3.34		Trapping or poaching of animals is to be prohibited.	Contractor	Throughout the life of Mine	Training and awareness of workforce

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
VISUAL ENVIRONMENT					
3.35	To minimise disturbance caused by Light	Lights are to be directed towards areas of work and provided with hoods to reduce light spill.	Mining Manager	Throughout operations	
3.36		Use should be made of sodium vapour lights.	Mining Manager	Throughout operations	
3.37	To minimise disturbance caused by mine infrastructure.	Inactive areas of waste rock dump are to be vegetated using naturally occurring species.	Environmental Manager	Immediate and ongoing	
RECRUITMENT AND TRAINING					
3.38	To promote economic development of local communities	Recruitment of local persons in accordance with Weatherly's recruitment policy.	Human Resources Manager	As required	Recruitment Policy which gives preference to local procurement.
3.39		Identify training needs and provide such training to local persons as far as practicable.	Human Resources Manager	Prior to commencement Operations	Training Financial assistance to training institutions
3.40		Local procurement of goods and services where available and where practicable to the project.	Procurement Manager	As required	Database of local service providers
REHABILITATION					

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
3.41	To reduce impacts on air quality and landscape character	Progressively rehabilitate waste rock dump surfaces as they become available. Outer perimeter bunds of the waste rock dump are to be built first and their batters are to be rehabilitated immediately.	Environmental Manager	When site becomes inactive	
3.42	To prevent erosion and promote successful vegetation establishment on waste rock dumps.	Slopes are to be re-shaped to ensure stability (18°), vegetation establishment and erosion control.	Environmental Manager	When site becomes inactive	
3.43		Soil is to be placed over exposed surfaces at a minimum thickness of 300 mm. The top soiled surfaces are then ripped on the contour to a depth of about 1 m at 1.5 m intervals to promote rainwater infiltration and to prevent run-off.	Environmental Manager	When site becomes inactive	
3.44		Surfaces are to be vegetated to resemble the surrounding vegetation.	Environmental Manager	When site becomes inactive	Suitable indigenous seed mix.
3.45		Vegetation establishment and erosion is to be monitored to ensure that vegetation cover resembles that of	Environmental Manager	Rainy season following rehabilitation	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		the surrounding natural landscape.			
3.46		Vegetation establishment is to be augmented by application of additional seeding as required. (Revegetating of the soil stockpile is part of the rehabilitation strategy with emphasis on establishing self-sustaining shrub vegetation." Such vegetation will be established primarily from the seed bank contained in the topsoil used for rehabilitation. The overriding early objective will be to stabilise the new landforms with such vegetation. For conservation reasons, efforts have to be made to increase the establishing species diversity of this vegetation by seeding and if necessary, hand planting select seedlings of a greater range of species, including species of high conservation values)	Environmental Manager	Prior to next rainy season	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
3.47		Erosion of vegetated slopes is to be repaired.	Environmental Manager	As required	
COMMUNITY RELATIONS					
3.48	To minimise disturbance to neighbours	Trespassing of persons involved in operations to areas outside of the mining area is to be prohibited	Mine Manager	On commencement of operations	Training and awareness of workforce.
3.49	To promote good relationship with surrounding communities	Environmental forum to meet on a regular basis.	Environmental Manager	Continued from construction phase	
3.50		Grievance mechanism to be established and communicated with communities.	Environmental Manager	Continued from construction phase	Grievance Mechanism

Ref. No.	Impact	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
EMP AWARENESS AT DEWATERING PHASE						
3.51	Lack of EMP awareness	To ensure EMP implementation and training	EMP training should be provided to all workers on site and they should also be aware of necessary health, safety, and environmental considerations applicable to their respective work. Penalty system should be implemented to non-compliance contractors	Environmental Manager Contractors	Pre-dewatering, Dewatering and when necessary, throughout the life of Mine	Trainings.
3.52			The site should be inspected, and monitoring done throughout the dewatering phase	Environmental Manager	Dewatering	Inspections and monitoring
3.53			The ECC should be renewed on time (at least 3 months prior to expiry date).	Environmental Manager	Throughout the life of Mine	Bi-annual environmental monitoring reporting
3.54	Non- compliance on required permits	To ensure authorizations and compliance	Before commencement of dewatering activities, all the required permits or agreements should be obtained from relevant authorities. The permits and or agreements referred to herein mainly include: (1) Groundwater abstraction & Use / Distribution permit from MAWLR The Namib Hydrosearch 2023 groundwater modelling report should form the basis for the abstraction permit application.	Environmental Manager	Pre-dewatering and when necessary, throughout the life of Mine	Related permits and licenses from relevant authorities.

3.55	Poor designs and subsequent failures	Ensure dewatering systems are up to standard	Dewatering pumps and accompanying systems should be designed and installed to standard pump capacity so as to prevent failures that may cause accidents such as flooding resulting from pump system failures, broken or bursting water pipes.	Mine Manager	Pre-dewatering	Dewatering system should comply with international best practices
3.56	Groundwater levels	To monitor impact on groundwater levels	Before the dewatering phase, groundwater levels should be taken from boreholes on and around the Mine to establish the baseline groundwater information. The results should be well documented in a Groundwater Monitoring Program database and shared with affected communities, when requested.	Environmental Manager/ Mine Manager	Pre-dewatering	Groundwater monitoring programme
RELATIONS WITH THE NEIGHBORING FARMERS						
3.57	Lack of communication between affected water users and Proponent with regards to groundwater pumping	To ensure communication between the Proponent and affected water users (farmers)	The contact details of the Environmental Manager or Community Liaison Officer should be provided to potentially affected /neighbouring farmers for ease of communication and receiving of grievances and complaints.	Environmental Manager	Dewatering and when necessary, throughout the life of the Mine	
3.58			Compile a clear communication procedure / plan which should include a grievance and response mechanism.	Environmental Manager	Dewatering and when necessary, throughout the life of the Mine	Grievance and response mechanism.

Ref. No	Impact	Objective	Action	Responsibility	Time period for implementation	Requirements for implementation
GROUNDWATER DEWATERING						
3.59	Impact on groundwater	To ensure that groundwater is not depleted in the aquifer	Use of grouting method to seal fractures and faults in the rock so as to prevent water from entering the pit mine.	Mine Manger	Dewatering	Grouting
3.60			Regular monitoring of groundwater levels and quality as this will help identify any changes and enable early detection of potential impacts. Therefore, a mine operated ground water monitoring network to monitor the impact of dewatering and possible ground and surface water pollution due to the planned mining operations should be established.	Environmental Manager	Dewatering	Groundwater monitoring Programme for water levels and water quality
3.61			Modeling of groundwater flows and potential seepage pathways as this will help identify potential sources of water and enable effective management of dewatering activities	Mine Manager	Dewatering	Groundwater modeling
3.62			Ensure compliance on the volumes and pumping frequency of water approved by MAWLR (DWA) for instance; stick to the pumping threshold to minimize affecting other water users and the environment.	Environmental Manager	Dewatering	Groundwater abstraction permit
3.63			Within a minimum 2km radius of the Mine, groundwater levels should be recorded every month from the first month of dewatering. The data should be used for comparison with the baseline data and monitoring purposes.	Environmental Manager/Mine Manager	Dewatering	Groundwater monitoring

3.64		To ensure that the neighboring farmers are not affected by dewatering	Continuous monitoring of groundwater and this will allow detection of possible negative impacts of abstraction on neighboring farmers and other surrounding water users. Compensation should be negotiated in cases whereby the farmers' boreholes are greatly affected such that it affects their operations. Drilling of new borehole, deepening of pre-existing boreholes or supply of water by other means e.g., water from the dewatering of the pit can be used as compensation to affected farmers.	Environmental Manager	Dewatering	Monitoring of water levels from boreholes on and around the mine and record in a database for annual auditing and biannual monitoring reporting
3.65	Land subsidence	To ensure that there is no land subsidence	Excessive groundwater pumping can trigger ground movement hence the hydrogeological conditions of the underground workings should be constantly monitored to ensure the balance between mining operations and rock stability. Current aquifer architecture shows that there will be no impact from land subsidence given that the aquifer is fracture controlled	Mine Manager	Dewatering	Hydrogeological monitoring stations
3.66	Water quality	To ensure that water from the Mine pit is not contaminated before disposal/ storage	Water at the mine pit should be periodically tested before disposal	Environmental Manager	Dewatering	Water quality tests
3.67			In the event that water in the pit is contaminated, the water should be pumped to a holding tank so that it is treated before disposal	Environmental Manager	Dewatering	Water treatment

3.68	Occupational Health and safety	To ensure safety of employees working at the mining pit (handling of machinery, equipment and working within the area)	Ensure personnel working at the mine pit are provided with awareness training of the risks associated with their respective tasks. Safety talks should be done every day before commencement of work. An emergency preparedness plan should be compiled, and all personnel appropriately trained.	Mine Manager Contractor	Dewatering	Comprehensive health and safety plan for all activities associated with dewatering phase. Proper trainings for Health and Safety First aid kits
3.69			Ensure adequate and appropriate personal protective equipment (PPE)			Proper PPE
3.70			Working under the influence of alcohol and drugs shall not be allowed			Tests

3.9. DECOMMISSIONING

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
WASTE ROCK DUMPS					
4.1	To complete rehabilitation of waste rock dumps.	Slopes are to be re-shaped to ensure stability (18°), vegetation establishment and erosion control.	Environmental Manager		
4.2		Soil is to be placed over exposed surfaces at a minimum thickness of 300 mm or a thickness effective to promote sustainable vegetation establishment.	Environmental Manager		
4.3		Surfaces are to be vegetated to resemble the surrounding landscape.	Environmental Manager		Suitable indigenous seed mix.
OPEN PITS					
4.4	To protect groundwater resources	No backfilling is to take place into the pit.	Mine Manager		
4.5	To promote safety of livestock, game and communities	The pit areas are to be fenced with warning signage in place.	Environmental Manager		
4.6		The open pit areas are to be	Environmental Manager		

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		protected with a berm and trench constructed on the inside of the fenced area. The first bench wall is to be sloped 18°. Access to the ramp is to be restricted with a berm.			
HEAP LEACH PADS					
4.7	To promote stability of slopes and control erosion	Slopes are to be reshaped to a maximum gradient of 18°.	Environmental Manager		
4.8		Surface of dumps are to be shaped to prevent water draining down the slopes.	Environmental Manager		
4.9	To prevent leachate production and erosion.	A capping with a material that is suitably impermeable after compaction (minimum 300 mm thick) and rock (minimum 500 mm thick) to be used to cover heap leach area.	Environmental Manager		
4.10		Heap leach area to be covered with a minimum of	Environmental Manager		Trials to determine suitable depth of soils to promote sustainable growth

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		300 mm of soil or sufficient growth material to promote the sustainable establishment of vegetation.			
4.11		Surfaces are to be vegetated to resemble the surrounding vegetation.	Environmental Manager		Suitable indigenous seed mix.
4.12		Plant storm water pond is to be left in place in order to collect remaining leachate for evaporation.	Environmental Manager		
PLANT AND INFRASTRUCTURE AREAS					
4.13	To facilitate successful restoration of land capability of infrastructure areas.	All infrastructure is to be demolished and removed.	Environmental Manager		
4.14		All hard standing is to be broken apart and removed.	Environmental Manager		
4.15		All demolished material and footprint areas are to be checked for contamination with hazardous substances and hazardous material to be	Environmental Manager		

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		removed and disposed of as hazardous waste.			
4.16		Footprint areas are to be shaped to blend into the natural terrain followed by ripping to approximately 1 m depth along the contour at no more than 2 m intervals followed by seeding with local vegetation or Covered with topsoil and ripped and seeded to promote an effective rooting depth for sustainable establishment of vegetation.	Environmental Manager		
4.17		Slopes are to be landscaped to ensure that they are stable in the long term.	Environmental Manager		
4.18		Footprint areas are to be rehabilitated using available topsoil (from stripping).	Environmental Manager		Soil balance to check availability of soils

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		Where soil supply is insufficient to promote vegetation establishment compacted surfaces are to be ripped (to a minimum of 200 mm) to provide for an effective rooting depth required to promote sustainable vegetation establishment.			
4.19		Soil is to be fertilised to replace nutrients.	Environmental Manager		Appropriate fertiliser
4.20		Surfaces are to be vegetated to resemble the surrounding vegetation	Environmental Manager		Appropriate indigenous seed mix
WASTE MANAGEMENT					
4.21	To ensure the safe and appropriate disposal of waste generated during decommissioning.	All waste is to be checked for contamination with hazardous chemicals.	Contractor		
4.22		Waste materials are to be separated into salvageable (scrap metal) and non-	Contractor		

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		salvageable materials.			
4.23		Salvageable waste is to be removed from site for recycling.	Contractor		
4.24		General waste (not contaminated with hazardous substances) is to be disposed at the general waste disposal facility.	Contractor		
4.25		Hazardous waste (non-radioactive waste) is to be disposed of at a hazardous waste facility.	Contractor		
GENERAL WASTE DISPOSAL FACILITY					
4.26	To prevent the possibility of pollution after mining operational activities and decommissioning.	Once a cell (containment pit) within the landfill facility has reached capacity, place the permanent earthen fill cover over it. This permanent compacted earthen fill cover will be a minimum of 1.3	Environmental Manager, Project Manager and Mining Manager	Throughout the Life of Mine	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		meters thickness, using the original native earthen materials that were excavated to form the containment pit.			
4.27		Place the permanent compacted earthen such that the final surface will be graded to drain water off of the landfill facility and to minimize any "ponding or collecting".	Environmental Manager, Project Manager and Mining Manager	Throughout the Life of Mine	
4.28	Containment pits of the Waste Disposal Facility	Compact the floor of the containment pits with calcrete and cover filled pits with excavated material (Calcrete or blend of calcrete and waster rock) and compact to prevent inflow of rain water.	Environmental Manager, Project Manager and Mining Manager	Throughout the Life of Mine	
4.29	Safety	The Waste Rock Facility and stockpiles will be rehabilitated in a manner that they present land forms that	Environmental Manager, Project Manager and Mining Manager	Throughout the Life of Mine	

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
		will be stable, protected from flood damage, and slopes will be re-vegetated where necessary			
4.30		The permanent above ground waste facilities will be designed, constructed and operated in a manner that stability is a priority, flood protection is provided and the risk of failure is limited to acceptable levels	Environmental Manager, Project Manager and Mining Manager	Throughout the Life of Mine	

3.10. POST-CLOSURE

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
VEGETATION ESTABLISHMENT					
5.1	To promote successful rehabilitation	Vegetation establishment on rehabilitated areas is to be monitored in terms of species diversity and density to ensure it resembles surrounding natural vegetation cover.	Environmental Manager	After the first rain season following rehabilitation	
5.2		Vegetation establishment is to be augmented where required by seeding and hand planting.	Environmental Manager	Prior to the following rainy season	
5.3		Eroded areas are to be repaired	Environmental Manager	Prior to the following rainy season	
		Ensure the re-vegetation of capped area of the General Waste Disposal Facility to reduce the potential for wind-blown dust	Environmental Manager	Throughout the Life of Mine	
PROTECTION OF WATER RESOURCES					

Ref. No.	Objective	Action	Responsibility	Time period for implementation	Requirements for Implementation
5.4	To monitor risks to surrounding communities associated with contaminants emanating from site.	Ground monitoring is to continue post-closure.	Environmental Manager	Continued for 2 years after mine closure or in accordance with DWA requirements.	
5.5		Effluent emanating from leach area to be monitored to assess effectiveness of capping.	Environmental Manager	Continued for 2 years after mine closure or in accordance with DWA requirements.	

4. CORPORATE SOCIAL RESPONSIBILITY

Weatherly's community and social strategy in Namibia focusses on four core elements, these are described below.

4.1 .1 JOB CREATION

The Tschudi Copper Project will create an estimated 505 direct jobs; and via the multiplier effect a further estimated indirect 2500 jobs.

4.1.2 VALUE ADDITION

The value addition lies in the fact that refined copper will be produced at Tschudi (99.99% pure), and in this form it will open the door for further downstream manufacturing of copper and related products either in the immediate surroundings, or elsewhere in Namibia.

4.1.3 LOCAL PARTICIPATION

The bulk of the labour will be sourced from Tsumeb and surroundings, and Tsumeb will be used as the main base for the operation for accommodation.

4.1.4 SKILLS

On the skills transfer, skills development and skills upliftment, the focus will be to give financial assistance to institutions promoting skills during the duration of the project- and the mine life. Institutions currently identified:

- Oshikoto education and training bursary fund,
- Namibian Institute of Mining and Technology (NIMT),
- Community Skills Development Foundation
- University of Namibia

The main thrust would be to grant bursaries to selected students from the previously disadvantaged communities and to assist children from previously disadvantaged communities to get access to education. Weatherly will also send selected unskilled people for artisan training at NIMT, and the main focus will also be the continual training of the work force.

5. REHABILITATION AND CLOSURE OBJECTIVES

Weatherly needs to plan for sustainable closure by ensuring that every reasonable effort has been made to achieve rehabilitation closure objectives that will give effect to the following principles:

- The safeguarding of people, flora and faunas from hazards resulting from the decommissioned mining operations.
- Environmental damage or residual environmental impacts are minimized to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state or suitable to be handed over as agricultural land for use as grazing.
- The physical and chemical stability of the remaining structures must be such that risk to the environment through naturally occurring forces is eliminated.
- Mine closure is achieved efficiently, cost effectively, and in compliance with the law.
- The social impacts resulting from mine closure are managed in such a way that establishment of a socially stable community in line with the principles of sustainable development is facilitated.

6. GROUNDWATER MONITORING

6.1 OBJECTIVES

A groundwater monitoring programme is to be implemented prior to the commencement of construction activities. This programme is to continue throughout the life of the operations and at least 2 years after closure or in accordance with the requirements of the Department of Water Affairs.

The aim of the groundwater monitoring programme is to assess the impact and legacy issues of contaminants on groundwater quality. The programme will also serve to monitor the impact of pit dewatering on surrounding groundwater users. The monitoring will also serve to improve the confidence in the groundwater modelling.

The rate of recharge can also be estimated with the Chloride Method, which compares the concentration of chloride in groundwater to that of rainwater. For this reason, it is recommended that chloride is analyzed in a composite sample of rainwater twice on a yearly basis during the rainy season.

6.1.1. MONITORING SCHEDULE

- The proposed monitoring programme is summarised in Table 6.1.

6.1.2. MONITORING POSITIONS

6.1.3. THE LOCATION OF THE MONITORING POINTS IS GIVEN IN FIGURE 6.1.

TABLE 6. 1: GROUNDWATER MONITORING PROGRAMME

Monitoring position	Sampling interval	Analysis	Water Quality Standards
Operational Phase: First year of mining **Purpose:** To establish a baseline dataset for at least one wet and one dry season			
All monitoring boreholes	Monthly	Groundwater levels	Not applicable
All monitoring boreholes	Quarterly (April, July, Oct, Jan)	Groundwater quality:	Namibian Water Quality Standards
All hydrocensus boreholes:	Monthly	Groundwater levels	Not applicable
Hydrocensus boreholes: Uris Lodge, Tschudi West, Farmhouse 1, Farmhouse 2 and Farmhouse Uris	Bi-annually (April and Oct)	Groundwater quality:	Namibian Water Quality Standards
Portable	Daily at the operations Composite sample: Quarterly	Analysis for Chloride	Not Applicable
Operational Phase: Remaining life of mine **Purpose: To monitor trends in groundwater levels and quality**			
All monitoring boreholes	Quarterly	Groundwater levels	Not applicable
All monitoring boreholes	Quarterly (April, July, Oct, Jan)	Groundwater quality: Full chemical analysis	Namibian Water Quality Standards

All hydrocensus boreholes	Bi-annually (April and Oct)	Groundwater levels	Not applicable
Hydrocensus boreholes: Uris Lodge, Tschudi West, Farmhouse 1, Farmhouse 2 and Farmhouse Uris	Bi-annually (April and Oct)	Groundwater quality:	Namibian Water Quality Standards
Portable	Daily at the operations	No analysis	Not applicable
Monitoring of the mine pit	Quarterly	Groundwater quality	Namibian Water Quality Standards
Recharge calculations	Twice per year in the rainy season on a composite water sample with chloride	Groundwater levels	Chloride Mass Balance Method
Post-closure Phase (for 2 years after operations ceases)			
All monitoring boreholes	Quarterly (April, July, Oct, Jan)	Groundwater quality: Full chemical analysis Groundwater levels	Namibian Water Quality Standards
Hydrocensus boreholes: Uris Lodge, Tschudi West, Farmhouse 1, Farmhouse 2 and Farmhouse Uris	Bi-annually (April and Oct)	Groundwater levels Groundwater quality:	Namibian Water Quality Standards
Portable	Daily at the operations	No analysis	Not Applicable

Source: Jones & Wagner, November 2012 (Appendix B)

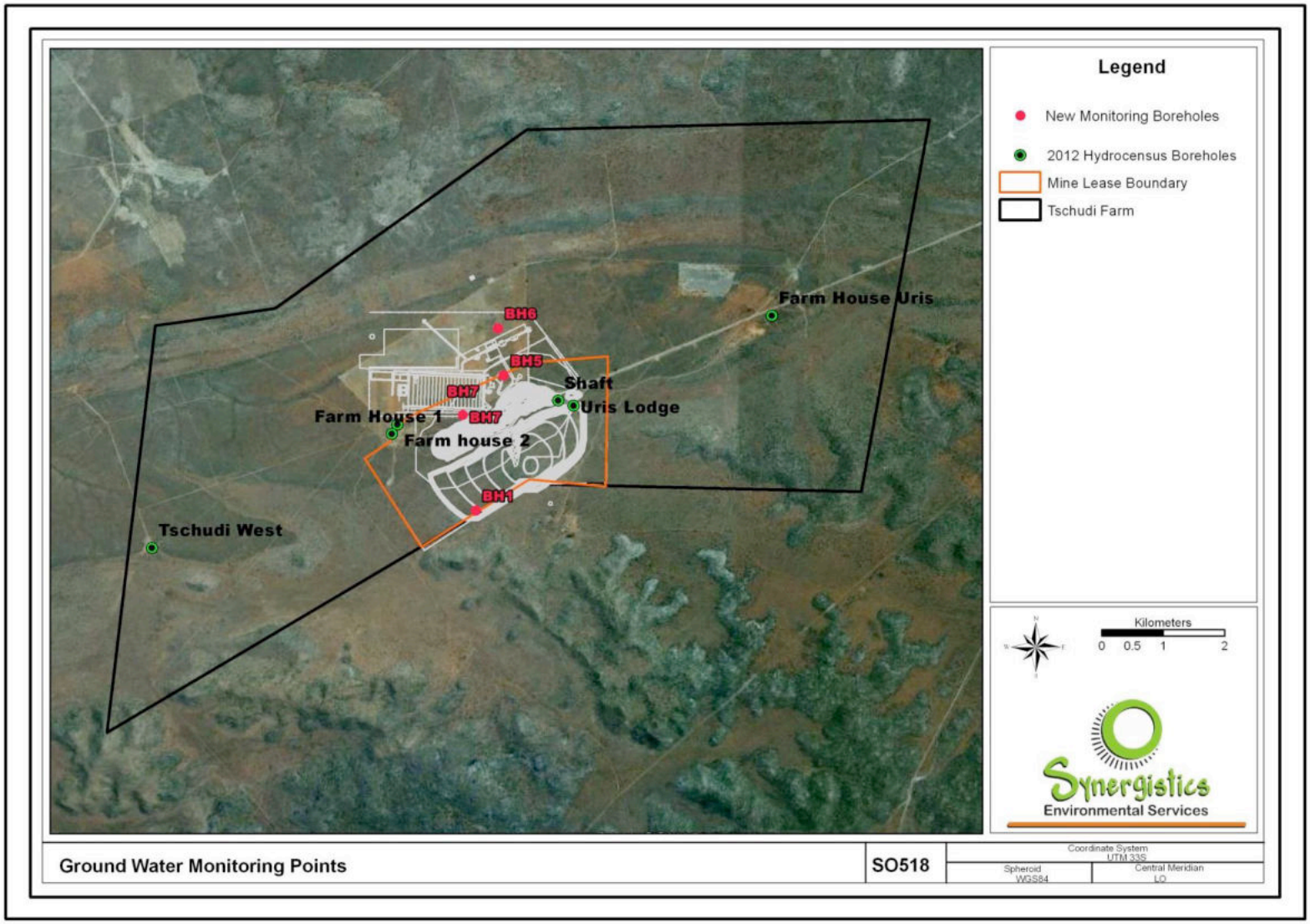

FIGURE 6. 1: GROUNDWATER MONITORING POINTS

6.1.4. MONITORING ANALYTICAL PARAMETERS

Groundwater quality analyses are to include a full suite of parameters as indicated in Table 6.2.

TABLE 6. 2: GROUNDWATER MONITORING PARAMETERS

	Namibian Drinking Water Guidelines			
	Group A	**Group B**	**Group C**	**Group D**
pH – Value at 25°C	6,0 – 9,0	5,5 – 9,5	4,0 – 11,0	4,0 – 11,0
Electrical Conductivity in mS/m at 25°C	150	300	400	400
Total Dissolved Solids at 180°C *				
Suspended Solids at 105°C *				
Total Alkalinity as CaCO3				
Chloride as Cl *	250	600	1200	1200
Sulphate as SO4	200	600	1200	1200
Fluoride as F	1.5	2.0	3.0	3.0
Nitrate as N *	10	20	40	40
Ortho Phosphate as P *				
Free & Saline Ammonia as N *	1.0	2.0	4.0	4.0
Sodium as Na	100	400	800	800
Potassium as K	200	400	800	800
Calcium as Ca	375	500	1000	1000
Magnesium as Mg	70	100	200	200
Total Organic Carbon as C [s]				
Chemical Oxygen Demand as O2 (Total) *				
Aluminium as Al	0.15	0.50	1.0	1.0
Arsenic as As *	0.10	0.30	0.60	0.60
Cadmium as Cd	0.010	0.020	0.040	0.040
Total Chromium as Cr	0.10	0.20	0.40	0.40
Copper as Cu	0.50	1.0	2.0	2.0
Iron as Fe	0.10	1.0	2.0	2.0
Lead as Pb	0.050	0.10	0.20	0.20

Manganese as Mn	0.050	1.0	2.0	2.0
Mercury as Hg *	0.0050	0.010	0.020	0.020
Nickel as Ni	0.25	0.50	1.0	1.0
Uranium as U	0.030 * (WHO, 2011)			
Zinc as Zn	1.0	5.0	10	10

Where:

Group A = Water with an excellent quality

Group B = Water with an acceptable quality

Group C = Water with a low health risk

Group D = Water with a high health risk or unsuitable for human consumption

6.2. SEWAGE EFFLUENT MONITORING

The treated effluent released from the sewage treatment works is to be monitored on a **monthly basis** from the time of commissioning and throughout the life of its operation. The analytical parameters and standards are provided in Table 6.3 (as per the requirements of Namibian legislation).

TABLE 6. 3: GENERAL STANDARDS FOR EFFLUENTS

	Maximum Allowable Level
Arsenic	0.5 mg/l as As
Chemical Oxygen Demand (COD)	75 mg/l as O
Chlorine, residual	0.1 mg/l as Cl2
Copper	1.0 mg/l as Cu
Fats. Oil and Grease (FOG)	2.5 mg/l (gravimetric method)
Fluoride	1.0 mg/l as F
Free and Saline Ammonia	10 mg/l as N
Lead	1.0 mg/l as Pb
pH	5.5 -9.5
Phosphate	1.0 mg/l as P
Sulphide	1.0 mg/l as S
Total Dissolved Solids (TDS)	Not more than 500 mg/l more than influent
Total Suspended Solids (TSS)	25 mg/l
Faecal coli	None per 100ml
Zinc	5.0 mg/l as Zn

6.3. AIR QUALITY MONITORING

It is recommended that a dust monitoring network be established, comprising of a PM10 monitor, weather station and dust fallout network. The dust fallout network should preferably comprise of eight single dust buckets. The suggested locations of the monitoring network's components are shown in Figure 6.2. Dust monitoring is to commence prior to the commencement of construction activities and continue throughout the construction and operational phases.

In the absence of air quality standards in Namibia it is suggested that the following criteria be used as standards for fallout dust levels:

- Dust fallout in the immediate vicinity of the road perimeter be less than 1200 mg/m2/day and less than 600 mg/m2/day outside of the mining licence area.
- Dust fallout in the immediate vicinity of the open pit should be less than 1200 mg/m2/day.
- Dust fallout rates should not exceed 600 mg/m2/day outside the mining licence area.

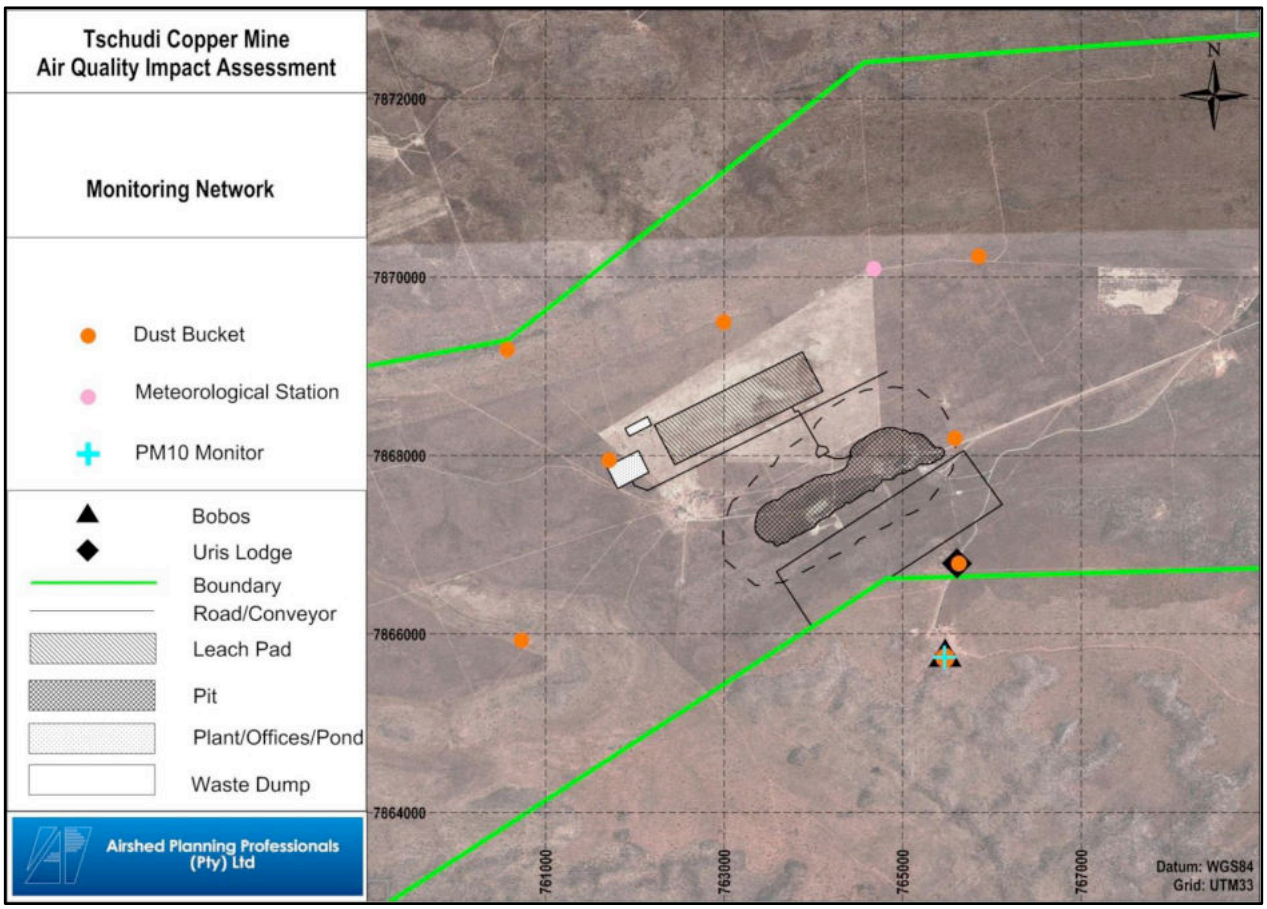

FIGURE 6. 2: DUST MONITORING NETWORK

Source: Airshed Planning Professionals, October 2012 (Appendix C).

The following standards are proposed for PM10 based on the World Health Organisation (WHO guideline value:

- 24-hour average of 75 µg/m3 outside of the mining licence area.
- Annual average of 30 µg/m3 outside of the mining licence area.

6.4 NOISE MONITORING

It is recommended that ambient noise measurements be conducted during the implementation (construction), operational and decommissioning phases to assess and confirm the project's impact area. Noise measurements can also serve to assess the efficiency of implemented management and mitigation measures aimed at reducing noise impacts. Specific attention should be paid to noise levels at! Uris Lodge and Bobos, the closest residences to site.

The frequency of noise monitoring as well as the parameters that should be determined are summarised in Table 6.4. The location of the noise monitoring sites are given in Figure 6.3.

TABLE 6. 4: PROPOSED NOISE MONITORING PROGRAMME

Parameters to be Measured	Frequency
• LAeq(T(a)), during daytime hours (07:00 to 22:00) • LAeq(T(a)), during night-time hours (22:00 to 07:00) • 1/3 Octave band frequency spectrum	• One campaign per year during the construction phase. • One campaign a year during the operational phase. • One campaign per year during the decommissioning phase.

Notes: a) Measurements duration should be selected so as to be representative of noise climate, typically between 15 minutes and an hour.

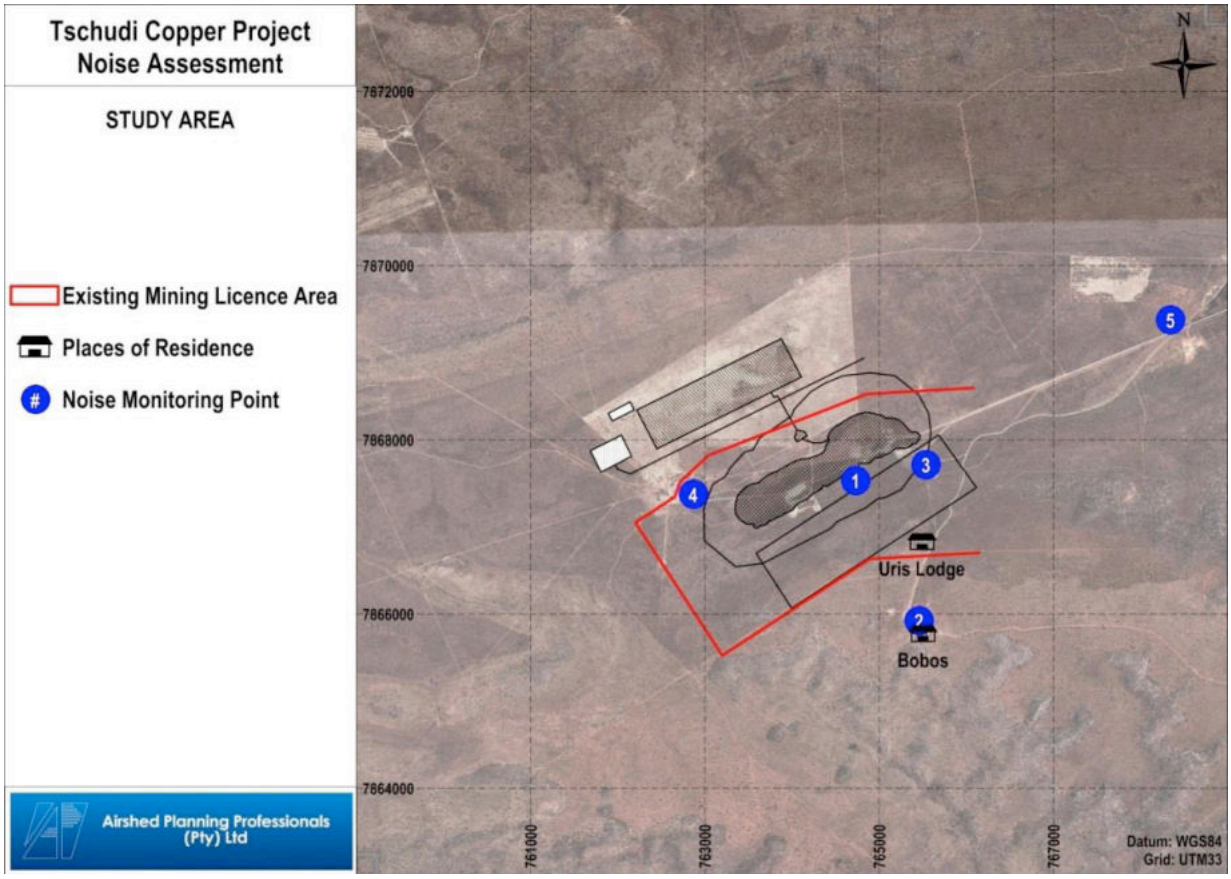

FIGURE 6. 3: NOISE MONITORING NETWORK

Source: Airshed Planning Professionals, October 2012 (Appendix C).

7. ENVIRONMENTAL PERFORMANCE ASSESSMENT

An environmental auditing programme to be implemented at the Tschudi Copper Project is provided in Table 7.1. The programme is to be implemented to assess the level of compliance with environmental legislative requirements and the commitments made in the EMP. Environmental auditing is aimed at ensuring continual improvement in environmental performance.

TABLE 7. 1: ENVIRONMENTAL PERFORMANCE ASSESSMENT PROGRAMME FOR THE TSCHUDI COPPER PROJECT

FREQUENCY OF MONITORING	PERFORMANCE ASSESSMENT	RESPONSIBILITY	REPORTING REQUIREMENTS
CONSTRUCTION			
Daily	Environmental issues to be recorded in daily diary.	Environmental representative of contractor or HSE officer of the mine	Submission to Environmental Manager
Monthly	Internal Environmental compliance audit of contractor work areas.	Environmental Manager	Internal report submitted to contractor for discussion.
Bi-annual (6 months)	External Compliance audit of construction activities.	External Environmental Practitioner	Report to be submitted to environmental authorities.
OPERATION			
Quarterly	Environmental compliance audit of all work areas at Tschudi Copper Project	Environmental Manager	Internal report submitted to managers for discussion.
Bi-annual (6 months)	External Compliance audit.	External Environmental Practitioner	Report to be submitted to environmental authorities.
Annually	External Compliance audit of construction activities.	External Environmental Practitioner	Report to be submitted to environmental authorities.

8 GRIEVANCE MECHANISM

The grievance mechanisms to be implemented by the Tschudi Copper Project are listed below:

8.1.1 ENVIRONMENTAL FORUM

An environmental forum is to be set up which includes:

- Construction Manager / Mine Manager
- Environmental Manager
- Neighbouring Landowners
- Representatives of Tsumeb Municipality
- Representatives of Oshikoto Regional Council
- Representatives of Department of Water Affairs
- Representatives of Ministry of Health
- Representatives of Department of Environmental Affairs
- The forum should meet on a quarterly basis (or as determined in agreement with the forum) by the forum) from the time of the commencement of construction activities.
- The purpose of the forum will be to:
- Discuss current and planned activities at the project;
- Present monitoring results;
- Discuss issues and concerns.

8.1.2 COMPLAINTS REGISTER

A complaints register is to be kept at an agreed point and members of the public are to be encouraged to register their compliments and complaints through the register. The Environmental Manager is to manage the complaints by presenting the issue raised to the relevant manager. Feedback is to be given to the complainant as to how the complaint is being addressed within 21 days of the complaint being lodged.

9 TRAINING AND AWARENESS

Environmental training and awareness are required to:

- Create awareness of environmental issued and sensitivities;
- Create awareness of the environmental commitments made by Weatherly; and
- Facilitate adherence to the commitments by the workforce.

- The followed are to be included as in the training and awareness programme:
- Environmental induction for all persons working on site;
- Job specific environmental training e.g., spill management and waste management
- Safety, Health and Environmental (SHE) meetings held at all levels (from toolbox talks to management meetings) to include environmental topics as a meeting agenda.
- Environmental awareness campaigns – including monthly awareness topics, poster campaigns and the like.

10 EMERGENCY PROCEDURES

The emergency response plan for the Tschudi Copper Project will be based on principals of:

- Risk identification and consequence determination;
- Risk elimination through engineering design or operations planning; and
- Risk management through provision of facilities or resources that can ameliorate either the probability of consequence of the risk.

These emergency response activities will be expanded and developed during the implementation and operating phases into a comprehensive and coherent plan.

10.1.1 WATER

The control of excess water and supply of requirements for the process and personnel is a key part of the study. A comprehensive water balance has been developed that includes both supply and excess management scenario identification.

The supply design is for the critical dry season in year 1 when both the tonnage of ore and its held moisture content are maximum for the project. After this period the make-up requirement decreases as the tonnage and ore types change.

The excess water management plan has been separated into two parts:

- Management of nominally clean water from infiltration to the mine from the local aquifer.
- Management of contaminated water from the heap leach and rain fall into the mine and other minor local catchments.

10.1.1.1 Clean Water

The clean water that infiltrates the pit from the foot wall aquifer will be collected on a bench (higher than the operating bench) and pumped separately to the East Pit. A hanging wall interception system will also be investigated during operations to confirm its feasibility. The interception bench will be moved down the footwall as mining progresses. In any rain event the foot wall catchment will also be diverted along with the infiltration.

In normal operation the mine water will be collected in a sump and pumped directly to the raw water pond for use in:

- Pit haul road watering; and
- Process make up.

As the mine expands the infiltration rate will be such that increasing proportions of the process make up will be supplied from this source.

In rain events the pit bottom pumps will pump to the clean water pond as this water will have appropriate quality. Should an extreme event outside the design envelope be experienced then the pit storm water will be pumped to the clean storm water pond (satellite pit). For the dirty storm water pond the following management plan will be implemented in extreme events:

- The 800 mm free board allowance will be utilised to store additional volume. Should an extreme event encroach on this freeboard, then it will be augmented by sand bagging the spillway to prevent an overflow;
- Once the freeboard volume starts to be used, then the water will be pumped from the dirty stormwater pond to the pit, and from there to the clean storm pit (this will mean that the clean storm water will be contaminated, but the pit has double the required capacity, which means that the contaminated water can be stored, and pumped back to the dirty stormwater pond once the flood has resided, until all the dirty water has been returned);
- The batter of the clean water pond will be stabilised and vegetated as part of the construction so that erosion will be controlled when experiencing the extreme event.

10.1.1.2 Contaminated Water

The contaminated water that will be used in the heap leaching activity is contained within the lined heap drains and process ponds. A heap leach 'storm pond' (dirty storm water pond) is provided to contain all the run off from the same 1: 20-year, 6-month wet season as the dirty storm water pond.

In order to use any water in the storm pond, priority is given to this over any other water source (unless required to dewater the pit to allow production to continue). Evaporation loss from the irrigated part of the heap, and moisture make-up into the ore are large consumers of process water.

To manage the contents of the storm water pond the following activity protocols will be implemented:

- Absolute priority will be given the use of the storm pond waters in the plant make-up;
- Pond level alarm points will be set for January/February each year. These will be at levels that will allow the remaining wet season rainfall to be accommodated;
- Should the pond level be above the alarm point(s) then preparations will be made to implement the following:

1. The 800 mm free board allowance will be utilised to store additional volume. This will be accomplished by sand bagging the spillway to prevent an overflow.

2. From the time that the freeboard allowance is being used, the water will be pumped to the clean stormwater pit for short term storage.

3. Further volume can be created in the pond by lining the higher parts of the walls. The pond is constructed below the natural slope and there is a further approximately 1 000 mm that can be gained using this technique. This will however flood the north western corner of the heap leach with increased risk of stability failure. This is a last resort activity to prevent discharge of contaminated moisture into the environment.

10.1.2 DEWATERING

The risk which might happen include water leakages in the pipe lines. In addition, high recharge of the aquifer will result in increasing the water levels in the pit. This will require additional pumping capacity and the mine should prepare for such an eventuality.

Dewatering strategy

- Baseline measurements: Establish baseline measurements of water level and water quality parameters in the mine pit before dewatering begins.

- Monitoring equipment: Install monitoring equipment such as water level sensors at strategic locations throughout the mine pit to continuously monitor and record water level data.
- Trigger points: Define trigger points for water level and water quality parameters. For example, a trigger point for water level may be set at a level that exceeds the capacity of the dewatering system, or a trigger point for water quality may be set at a level that exceeds regulatory limits. Pumped water from the mine pit will be disposed at Wandelberg however in an event that the water quality exceeds regulatory limits, the water should be pumped to a holding tank, then treated before it is disposed to Wandelberg.
- Real-time monitoring: Set up a real-time monitoring system that alerts mine personnel when trigger points are exceeded and this may include alarms or other forms of communication.
- Data analysis: Regularly analyse the data collected by the monitoring equipment to identify trends and anomalies. This may include daily, weekly, or monthly data reviews to ensure that the dewatering process is operating as intended.
- Maintenance: Conduct regular maintenance of the monitoring equipment to ensure that it is functioning properly and providing accurate data. This may include cleaning sensors, replacing batteries, or calibrating equipment as needed.
- Audits: Conduct periodic audits of the dewatering process to ensure that it is meeting regulatory requirements and operating efficiently. This will include visual inspections and water sampling.

10.1.3 POWER

As part of the water management Emergency Response Plan a standby generator is being provided for the project. This is nominally to provide power to the electrowinning rectifier and electrolyte pumps; to keep the product quality high during power interruptions. The generator is of sufficient capacity that it can operate one or two of the large heap leach pumps.

Operating the pumps will allow a number of scenarios to be implemented should the power be interrupted at the same time as the cumulative extreme event has occurred:

- Continue to irrigate the heap and reduce inventory volume by evaporation;
- Continue to irrigate the heap and achieve a one-off volume reduction from the increased moisture hold-up in the heap; and
- Pump contaminated water to the pit for storage.

10.1.4 FIRE

The majority of the project site is serviced by local extinguishers and a fire water reticulation that meets the required codes and standards. These codes do not cover the solvent extraction (SX) plant. The SX plant has been subjected to a formal risk assessment as to fire initiation and propagation risks. A report has been issued and is the basis of the selected management plan:

- Engineering design to reduce fire initiation risk;
- A focus on personnel safety over firefighting;
- Separation of the SX plant from all other assets to prevent radiation damage to these assets;
- A *no intervention* strategy once the fire is above a size that can be extinguished with local fire extinguishers;
- Plant bunding and overflow management to a remote SX fire pond. Exit from the SX plant bund and entry to the fire pond will be via fire traps to prevent the fire escalating to the pond; and
- Cooling of other assets using the conventional fire water and or raw water supply.

The SX fire pond has been sized to take account of the following volumes:

- The total volume of all vessels in the SX plant bund;
- Four (4) hours of fire water used in cooling other assets;
- 1:50 year 72-hour rain event (this will allow rain water to be pumped from the pond on an 'as required' basis); and
- 800 mm freeboard

Should any further volume be required then the SX fire pond will overflow to the raffinate pond in an extreme situation.

11. CONCLUSION

It is the applicant's responsibility to ensure that this EMP is made binding on the contractor by including the EMP in the contract documentation. The contractors should thoroughly familiarise themselves with the requirements of the EMP. The above Environmental Management Plan, if properly implemented, will help to minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. The Environmental Management Plan should be used as an on-site reference document throughout the life of the mine and monitoring should take place in order to determine compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. Should the Proponent implement all the suggested mitigation measures on the amended section which include the dewatering and the expansion of the heap leach facility, the consultant recommends the issuance of the Environmental Clearance Certificate.

11.1 RECOMMENDATIONS

- Environmental monitoring by an independent environmental consultancy must be carried out to monitor environmental compliance. Bi-annual reports should be written and submitted to MEFT. These monitoring reports are essential in facilitating the ECC renewal after 3 years
- To amend the current abstraction license so as to increase the amount of water volumes.
- To request permission from MAWLR to pump out water from the mine pit and dispose it at the Wandelberg site, since its primarily coming from an aquifer
- Ensure proper functioning of the dewatering system so as to be able to maintain discharge rates, ensure worker safety and avoid burst pipes
- Monitor the stability of pit walls as they may be prone to subsidence due to prolonged exposure to moisture from water in the pit
- Determine water quality for the water in the pit so as to be able to decide the end use or proper disposal of the water.

BIBLIOGRAPHY

1. Constitution of the Republic of Namibia Act No 1 of 1990, Namibia: [Online] Available from: https://nan.gov.na/acts [Accessed 4 July 2022]
2. Environmental Impact Assessment Regulations Act of 2012, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
3. Environmental Management Act of 2007, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
4. Hazardous Substance Ordinance No. 14 of 1974, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
5. Heritage Act No 27 of 2004, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
6. Labour Act No 11 of 2007, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
7. Minerals (Prospecting and Mining) Act No 33 1 of 1992, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
8. Nature Conservation Ordinance No. 4 of 1975, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
9. Public Health and Environmental Act 2015, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
10. Soil Conservation Act 6 of 1969, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
11. Water Act 54 of 1956, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]
12. Water Resources Management Act 24 of 2004, Namibia: [Online] Available from: http://www.lac.org.na/index.php/laws/statutes/ [Accessed 4 July 2022]

APPENDIX A

12.1 BACKGROUND TO THE WASTE DISPOSAL FACILITY

Tschudi Copper Mine proposes the construction of a waste disposal facility on an already assessed and originally approved mining infrastructure, the Waste Rock Dump (WRD) as shown in Figure 12-1. The WRD comprises of overburden and waste rock placed in the designated area measuring about 940 m wide and 2.7 km in length by the end of the Life of Mine (LOM). Currently Tschudi Copper Mine has not developed the WRD to its full extent. At the time the EMP was amended, the following were taken into consideration:

- The proposed Waste Disposal Facility will have a maximum volume of 5,856 m3 (total footprint including the berms will be approximately 72 m X 72 m) and be developed within the approved WRD (Figure 12-1)
- The Waste Disposal Facility will be constructed/operated in phases, meaning only one or two sections/cells (containment pits) of the facility will be open at any given time. The next section/cell will only be opened when the previous one has almost reached its full capacity. The cells that reached full capacity will be continuously rehabilitated by backfilling/ capping the filled cells.
- The facility will increase exponentially in size (up to the maximum volume of 5,856 m3 as the WRD gets further developed.
- No additional footprint for the Waste Disposal Facility is therefore required outside the WRD area.

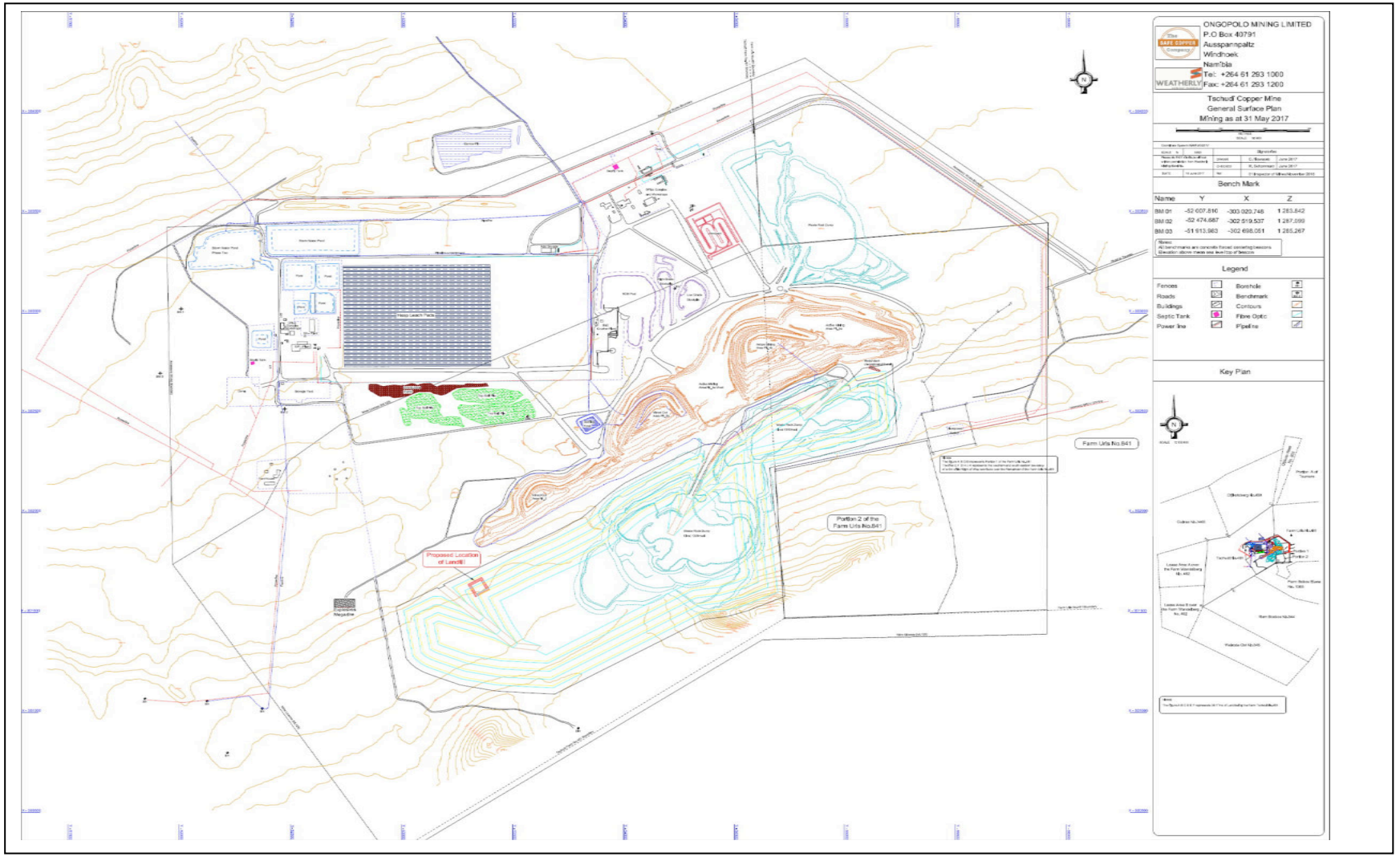

FIGURE 12-1 TSCHUDI COPPER MINE INFRASTRUCTURE DESIGN PLAN WITH THE PROPOSED WASTE DISPOSAL FACILITY ON THE WASTE ROCK DUMP

12.2 WASTE DISPOSAL FACILITY

12.2.1 CONSTRUCTION ACTIVITIES

As indicated above, the Waste Disposal Facility will be constructed/ operated in phases with only one or two sections/cells of the facility being open at the early stages of development. The next section/cell will only be opened or constructed when the previous one has almost reached its full capacity. Therefore, the construction of the landfill site (Waste Facility) will continue throughout the life of mine (LoM) as required and should also be used at decommissioning phase.

Construction of the Waste Disposal Facility will include demarcating the site specific to the design plan requirements suitable for the current size of the WRD. Compaction of the already stockpiled waste ore will be done to create the calcrete floor foundation required for the placement of non- hazardous waste only during operation of the waste facility. The already existent waste ore material in the WRD area will be levelled to berms and raised up to 3 m in height and 5 m in width as indicated in the design plan Figure 12-2.

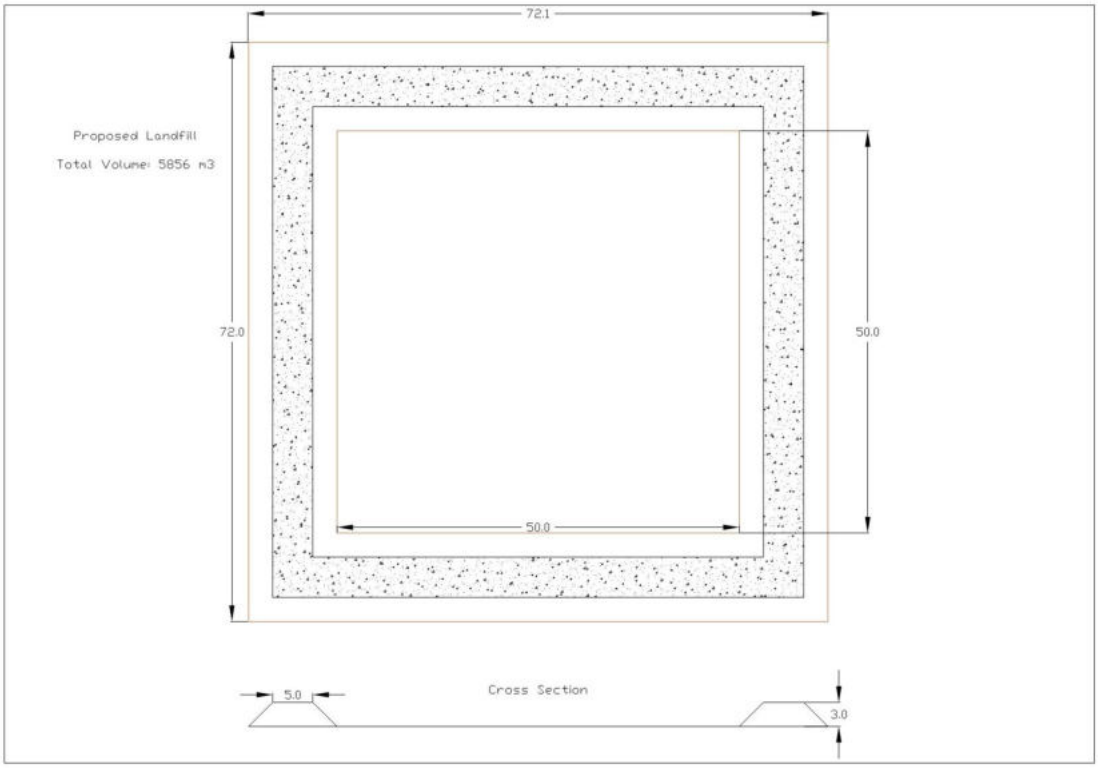

FIGURE 12-2 DESIGN PLAN OF THE PROPOSED WASTE DISPOSAL FACILITY

12.2.2 OPERATIONAL ACTIVITIES

Only non-hazardous materials will be placed in the landfill facility. These materials are expected to be primarily product packaging, wood products, organic materials, glass, plastics, metals and food scraps.

The total capacity of the non-hazardous landfill facility is based on the estimated volumes of waste generated during the life of the mine, including the construction, operations and decommissioning phases of the mine. The proposed maximum capacity of 5,856m3 will be established within the WRD. General waste (non-Hazardous) as defined by Tschudi copper mine is waste that does not pose a significant threat to public health or the environment if properly managed. This includes domestic, commercial, certain industrial wastes and builder's rubble.

The landfill facility will at any given time during the operation, have these visible features:

- Exposed refuse in the containment cell,
- Temporary thin earthen cover over refuse,
- Permanent earthen fill cover over the refuse and
- A fence surrounding the landfill facility.

It has been indicated that food material would not be dumped at the landfill site. However, if operating reasons dictate, the food scraps may be placed in a distinct area and covered with earthen fill daily. This operating procedure, unique to the food scraps, may be performed in order to minimize the potential of attracting and becoming a food source for the wildlife. A thin layer of earthen fill may also be used to temporarily cover material that can become airborne from wind. Additional refuse may be placed on top of the thin earthen fill layer and this sequence may be repeated several times.

Generally, most other refuse may be left exposed in containment cell within the landfill facility until the specific cell has reached its capacity and requires an earthen cover.

The approximate (maximum) volume for each waste type that will be disposed of in the proposed on-site landfill facility (i.e., General Waste Disposal Facility) is provided in Table 12-1 during the operational phase.

TABLE 12-1 MATERIALS AND APPROXIMATE (MAXIMUM) VOLUMES TO BE PLACED IN THE LANDFILL FACILITY DURING THE OPERATIONAL PHASE

Waste type	Approximate volume (kg/day)	Approximate volume (tonnes/year)
Wood Products	29	6032
Rubber Products / Tires	143	29744
Metals	117	24336
Food Scraps	52	10826
Plastics	270	56160
Fabric / Cloth Materials (organic / inorganic materials)	21	4368
Glass	10	2080
Cardboard	113	23504
Tin	10	2080
Styrofoam	3	624
TOTAL	**768**	**159754**

11.2.3 STORMWATER MANAGEMENT

The WRD facility and activities have already been assessed and approved as part of the Tschudi Copper Mine EIA. The design criteria and stormwater management requirements for the WRD would therefore already encompass the stormwater management requirement for the landfill facility which will be established within the footprint of the WRD. As originally assessed, storm water diversion measures are provided for diversion of clean water around potentially contaminated sites including the WRD / Waste Disposal Facility. Waste Rock material will be used for construction of embankments/berms around the Waste Disposal Facility, to divert clean surface water away from the facility.

All design criteria for storm water interventions are in such a way that storm water can bypass the WRD (and therefore also the Waste Disposal Facility) and that the design, construction and operation for the WRD includes flood protection measures. The Waste Disposal Facility falls within this design criteria, due to the fact that it will be incorporated within the WRD.

11.2.4 GROUNDWATER MANAGEMENT

The proposed Waste Disposal Facility within the WRD will only be used for disposal of non-hazardous waste. The measures described below relate to the potential groundwater pollution plume that could result from the Waste Rock Dump (including the Waste disposal Facility) through infiltration / seepage.

With reference to the amendment to the Environmental Assessment Report for mining below the water table and heap leaching of 2013 (Fairley 2013) potential acid generation within the waste rock is not considered to be a threat to groundwater quality as the waste rocks will be substantially Nett Acid Neutralising because of the large volumes of acid neutralising calcrete and sandstone of which the Waste Rock Dump is constructed on.

With regards to the Waste Rock stockpile, Acid generation will be further minimised by scheduling the dumping of wastes in a manner that will ensure that all potentially acid generating wastes are mixed sufficiently with acid neutralising wastes so that acid is immediately neutralised at its source within the dump. In addition, efforts will be made to bury potentially acid forming wastes deep within the dump to minimise exposure to moisture and the atmosphere. In addition, the waste dump is located entirely on dolomite which will ensure that in the unlikely event that some acid is formed or potential ponding in the landfill facility if leached to the floor of the dump, it will be neutralised within the dolomites.

The Main Pit will be left as an open void after mine closure and expected to become a long-term groundwater sink, with groundwater flow gradients remaining towards the pit at all times. This will prevent any potential spread of contamination into the surrounding aquifers. Any contamination from the waste facility will also continue to migrate towards the Main Pit.

12.2.5 DECOMMISSIONING/CLOSURE ACTIVITIES

When a cell within the landfill facility has reached capacity, the permanent earthen fill cover will be placed over the cell. This permanent compacted earthen fill cover will be a minimum of 1.3 meters in thickness. The permanent compacted earthen fill cover will comprise of waste rock materials that is currently stockpiled at the WRD. The permanent compacted earthen fill will be placed such that the final surface will be graded to drain water off of the landfill facility and to minimize any “ponding or collecting” of the precipitation. Then a thin layer of topsoil / organics with vegetation previously stripped for the WRD facility will be placed directly on top of the permanent compacted earthen fill. This sequence provides the final reclaimed landfill facility.

12.2.6 TIME TABLE

It will take approximately 1 month to complete the construction of any one of the containment pits. The landfill site will be used until the end of life of mine.

12.2.7 MATERIALS NOT PLACED WITH IN THE WASTE DISPOSAL FACILITY

Some materials may not be suitable for disposal within the landfill facility. These materials will usually fall within the categories of recyclable materials and hazardous materials.

Any hazardous materials will either be recycled or properly disposed of offsite at a licenced hazardous waste facility. Emphasis should be made that (as far as practically possible) materials that can be recycled will be recycled.

Recyclable materials may include various types of metals, plastics, paper products, some types of electronic equipment and some types of tires. The recyclable materials are to be provided to qualified companies that either directly or indirectly recycle the materials themselves or through third party companies.

Hazardous materials may consist of treated timber crates, printer cartridges, batteries, fluorescent bulbs, paint, solvents, tar, empty hazardous material containers, waste hydrocarbons (oils, grease), etc.

RECORD OF REPORT DISTRIBUTION

SLR Reference:	734.15004.00006
Title:	ONGOPOLO MINING (PTY) LTD's TSCHUDI COPPER MINE ENVIRONMENTAL MANAGEMENT PLAN INCLUDING THE MANAGEMENT AND MITIGATION MEASURES TO THE GENERAL WASTE DISPOSAL FACILITY
Site name:	Tschudi Copper Mine
Report Number:	Doc. no.1
Client:	Ongopolo Mining (Pty) Ltd

Name	Entity	No. of copes	Date issued	Issuer
Arnold Bittner	SLR Environmental Consulting (PTY)Ltd	1	27-09-2017	MS
Raymond Beukes	Tschudi Copper Mine	1	19-10-2017	MS
Raymond Beukes	Tschudi Copper Mine	1	24-01-2018	MS

COPYRIGHT

APPENDIX B

APPENDIX C