

# **Draft Environmental Management Plan (EMP) for the Renewal of Mining License (ML) No.91 and Associated Activities on Mansfield Farm 66 near Usakos in the Karibib District, Erongo Region**

**Date:** June 2022 (EMP Amendment date)

**Author:** Fredrika Shagama

**Reviewer:** Rose Mtuleni

**Proponent:** Manger Mining (Pty) Ltd

**CONTENTS PAGE**

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	BACKGROUND .....	1
1.2	AIM OF THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN (EMP) .....	4
1.3	APPOINTMENT OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) .....	5
1.4	ENVIRONMENTAL ASSESSMENT LEGAL REQUIREMENTS .....	5
1.5	DRAFT EMP LIMITATIONS .....	8
<b>2</b>	<b>DRAFT EMP ROLES AND RESPONSIBILITIES .....</b>	<b>8</b>
<b>3</b>	<b>ENVIRONMENTAL MANAGEMENT ACTION PLANS .....</b>	<b>10</b>
3.2	AIM OF THE ENVIRONMENTAL MANAGEMENT ACTIONS .....	10
3.5	REHABILITATION .....	17
3.5.1	<i>Rehabilitation Planning</i> .....	17
<b>4</b>	<b>CONCLUSIONS .....</b>	<b>18</b>

**LIST OF FIGURES**

Figure 1:	Location of the mining license 91 .....	2
-----------	---	---

**LIST OF TABLES**

Table 1:	Applicable legal requirements and permits to the mining activities on ML91 .....	6
Table 2:	Responsibilities assigned to the Proponent's representative for the operation and decommissioning phases .....	8
Table 3:	Summary of key potential environmental impacts per project phase .....	10
Table 4:	Management action plans for the operational and maintenance phase with responsibilities and timeframes .....	11
Table 5:	Management action plans for the decommissioning phase with responsibilities and timeframes	16

# 1 INTRODUCTION

## 1.1 Background

Manger Mining (Pty) Ltd (The *Proponent or Manger Mining* hereafter) is conducting mining activities (extraction of tourmaline specimens) on Mining License 91 (ML91) near Usakos in the Erongo Region. Tourmaline is classified as a 'Semi-precious stone' in the Minerals (Prospecting and Mining) Act 33 of 1992. The Proponent has been extracting (mining) tourmaline for 28 years, since 1994. Manger Mining has submitted their application for the renewal of ML91 (and associated mining activities) with the Ministry of Mines & Energy (MME).

According to the Environmental Management Act (EMA) No. 7 of 2007 and its Environmental Impact Assessment (EIA) Regulations, mining is among the listed activities that that may not be undertaken without an Environmental Clearance Certificate (ECC). Thus, the renewal of the mining license No. 91 is subjected to an ECC, to be issued by the Ministry of Environment, Forestry and Tourism (MEFT). The mining license is located about 4 km outside of Usakos on Mansfield Farm 66, Karibib District in the Erongo Region, and covers a surface area of 41 ha. According to the information provided by the Proponent, mining activities on the site started in 1911 and the mine was originally meant for tin mining. The locality map is shown under **Figure 1**.

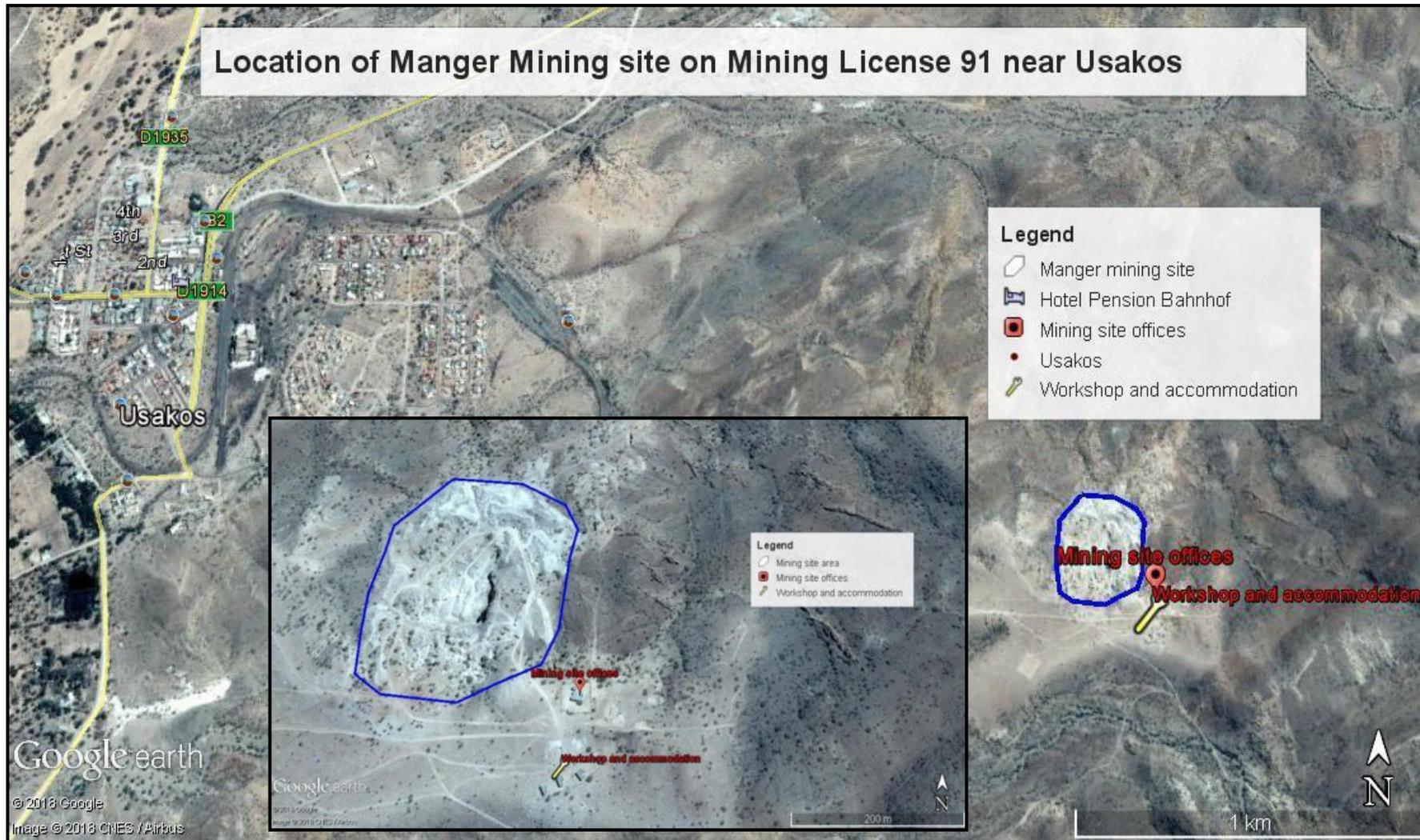


Figure 1: Location of the mining license 91 near Usakos, Karibib District Erongo Region

## 1.2 Aim of the Draft Environmental Management Plan (EMP)

Regulation 8(j) of the Environmental Management Act (EMA) (7 of 2007) Environmental Assessment Regulations (2012) requires that a draft Environmental Management Plan (EMP) be included as part of the Scoping Environmental Assessment (EA) process. A 'management plan' is defined as:

"...a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored."

An EMP is one of the most important outputs of the EA process as it synthesizes all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the EA Process and the required environmental management on the ground during project implementation and operation. It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to adapt to address project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is therefore to guide environmental management throughout the different phases of the proposed development, namely operation and decommissioning phases.

The following phases are addressed in this EMP:

- **Operation and maintenance** - This is the current phase during which operation Manger Mining is extracting tourmaline specimens from the mining pit and undertaking related activities on site. It is also the phase during which maintenance of the mining pit, equipment and machinery is done by Manger Mining themselves.
- **Decommissioning** – this is the phase during which the ore will eventually run out at the site leading to the cessation of mining. The decommissioning of the mining operations may be considered due to declining in the tourmaline specimens (below profitable specimens) and low demand for the mined tourmaline (falling of commodity prices on the market). During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place.

### 1.3 Appointment of the Environmental Assessment Practitioner (EAP)

In order to comply with the legal requirements of the EMA, Manger Mining appointed Excel Dynamic Solutions (Pty) Ltd (EDS), an independent consulting company to conduct the required EA and environmental auditing (monitoring) processes on their (Proponent's) behalf. This draft EMP is submitted as part of the application for an ECC (Renewal) to the Environmental Commissioner at the Department of Environmental Affairs and Forestry.

### 1.4 Environmental Assessment Legal Requirements

The content of the EMP must meet the requirements Section 8 (j) of the EIA Regulations. The EMP must address the potential environmental impacts of the proposed activity on the environment throughout the project life-cycle. It must also include a system for assessment of the effectiveness of monitoring and management arrangements after project implementation.

Manger Mining therefore has the responsibility to ensure that the proposed activities as well as the EA process conforms to the principles of EMA, and must ensure that employees act in accordance with such principles. **Table 1** below lists the requirements of an EMP as stipulated by Section 8 (e) of the EIA Regulations, primarily on specific approvals and permits that may be required for the mining activities.

**Table 1: Applicable legal requirements and permits to the mining activities on ML91**

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27).  Details principles which are to guide all EAs.	The EMA and its regulations should inform and guide this EA process.  Should the ECC be issued to the Proponent, it should be renewed every 3 years, counting from the date of issue.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21).  Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	Contact details at the Department of Environmental Affairs and Forestry (DEAF), Ministry of Environment, Forestry and Tourism (MEFT), Office of the Environmental Commissioner  <b>Mr. Timoteus Mufeti</b>  Tel: +264 61 284 2701
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	Section 48 (3): 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.	The Proponent needs to conduct an EA for their proposed mining operations. Furthermore, the Proponent needs to plan rehabilitation actions for future mine decommissioning.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	Section 54(2): details provisions pertaining to the decommissioning or abandonment of a mine	<p>The Proponent should ensure that all the necessary permits/authorisation for this scale of mining (if any) are obtained from the Ministry of Mines &amp; Energy (MME)</p> <p>Contact person and details at the MME (Mining Commissioner)</p> <p><b>Mr. Erasmus Shivolo</b></p> <p>Tel: +264 61 284 8167</p>
Forestry Act 12 of 2001, Amended Act 13 of 2005	Prohibits the removal of any vegetation within 100 m from a watercourse (Forestry Act S22(1)). The Act prohibits the removal of and transport of various protected plant species.	<p>Should there be protected plant species, which are known to occur within the project sites, these are required to be removed and a permit should be obtained from the <b>nearest Forestry office (Ministry of Environment, Forestry &amp; Tourism (MEFT))</b> prior to removing them.</p> <p>Contact Details at MAWF (Director of Forestry) <b>Mr. Fillemon Kayofa (Acting Director of Forestry Division)</b></p> <p>Tel: +264 61 208 7320</p>
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess or store any fuel except under authority of a license or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area	The Proponent should obtain the necessary authorisation form the MME for the storage of fuel on-site.

		<p><b>Mr. Carlo Mcleod</b> (Ministry of Mines and Energy: Acting Director – Petroleum Affairs)  Tel: +264 61 284 8291</p>
<p>National Heritage Act No. 76 of 1969</p>	<p>Call for the protection and conservation of heritage resources and artefacts</p>	<p>Should any archaeological material, such as bones, old weapons/equipment etc be found on the site, work should stop immediately, and the National Heritage Council of Namibia must be informed as soon as possible. The Heritage Council will then decide to clear the area or decide to conserve the site or material.</p> <p>Contact Details at National Heritage Council of Namibia</p> <p>Ms. Agnes Shiningayamwe (Regional Heritage Officer) – National Heritage Council of Namibia</p> <p>Tel: (06) 301 903</p>

## 1.5 Draft EMP Limitations

This EMP has been drafted with the acknowledgment of the following limitations:

- This EMP has been drafted based on the Environmental Assessment (EA) conducted for the mining activities on Mining License 91.
- The mitigation measures recommended in this EMP document are based on the risks/impacts in the Scoping Report which were identified based on the project description, site investigation and public input. Should the scope of the proposed project change, the risks/impacts will have to be reassessed and mitigation measures provided accordingly.

## 2 EMP ROLES AND RESPONSIBILITIES

The Proponent is ultimately responsible for the implementation of the EMP. However, the Proponent may delegate this responsibility at any time, as they deem necessary during the project phases. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals which may be fulfilled by the same person:

- Proponent's Representative
- Environmental Control Officer

### 2.1 The Proponent's Representative

If the Proponent does not personally manage all aspects and phase activities referred to in this EMP, they should assign this responsibility to a suitably qualified individual referred to in this plan as the Proponent's Representative (PR). The PR may be appointed to manage the EMP aspects for each project phase. The PR's responsibilities may include:

- Managing the implementation of this EMP and updating and maintaining it when necessary.
- Management and monitoring of individuals and/ or equipment on-site in terms of compliance with this EMP.
- Issuing fines for contravening EMP provisions

Alternatively, the Proponent may appoint an Environmental Control Officer to ensure EMP compliance throughout the project life cycle.

## 2.2 Environmental Control Officer

The Proponent may assign the responsibility of ensuring EMP compliance throughout the project life cycle to a designated member of staff or external qualified and experienced person, referred to in this EMP as the Environmental Control Officer (ECO). The ECO has the following responsibilities:

- Management and facilitation of communication between the Proponent, PR and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended frequency is weekly or monthly as recommended) of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP;
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.
- Ensuring that the mining activities on site are conducted in accordance with the International System organization (ISO) standard 14001: 2015

In the case of an archaeologically significant discovery during operations on the site, A Chance Finds Procedure (Appendix 1) would need to be implemented.

### Archaeology: Chance Finds Procedure (CFP) Implementation Roles

The following personnel have been assigned responsibilities as per the Chance Finds procedure (Appendix 1):

- **Operator:** To exercise due caution if archaeology remains are found.
- **Foreman:** To secure site and advise management timeously.
- **Superintendent:** To determine safe working boundary and request inspection.
- **Archaeologist:** To inspect, identify, advise management, and recover remains.

The Proponent should assess these commitments in detail and should acknowledge their obligation to the specific management actions.

### 3 ENVIRONMENTAL MANAGEMENT & MITIGATION MEASURES

#### 3.1 Management of Key Potential Adverse Environmental Impacts

From the scoping assessment conducted, the following key potential negative impacts have been identified per project phase and are summarized in **Table 3** below.

**Table 3: Summary of key potential environmental impacts per project phase**

	Project Phase	Potential impacts identified
1	Operation and maintenance	Loss of biodiversity, health and safety, impact on water resources, soils (land degradation), dust (air quality), vehicular traffic safety, noise, waste generation and visual
2	Decommissioning	Loss of employment, revenue and royalty payments and rehabilitation issues

#### 3.2 Aim of the Environmental Management Actions Plan

The aim of the management actions of the EMP is to avoid potential negative impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

Management actions recommended to manage the potential impacts rated in the EA carried out for the mining activities and based on the two project phases are presented in **Table 4** (operation and maintenance phase) and **Table 5** (decommissioning phase).

The responsible person(s) should assess these commitments in detail and acknowledge their commitment to the specific management actions detailed in the phases given under the following subsections.

#### 3.3 Operational and Maintenance Phase: Management Action Plan

The management action plans recommended for this phase are presented in **Table 4** below.

Table 4: Management action plans for the operational and maintenance phase with responsibilities and timeframes

Environment al Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeframe
EMP implementation and training	Lack of EMP awareness and the implications thereof	<ul style="list-style-type: none"> <li>Employees appointed for operation and maintenance on respective site must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective works.</li> </ul>	Compliance monitoring conducted bi-annually and recorded.	ECO	Ongoing
Monitoring	EMP non-compliance	<ul style="list-style-type: none"> <li>The implementation of this EMP should be monitored</li> <li>The ECO should inspect the site operation throughout the operation on a bi-annual basis (<b>every 6 months</b>).</li> <li>An EMP non-compliance penalty system should be implemented on site.</li> </ul>	Compliance monitoring conducted bi-annually and recorded.	ECO	Ongoing
Biodiversity	Loss of biodiversity	<ul style="list-style-type: none"> <li>The Proponent should avoid unnecessary removal of vegetation, thus promoting a balance between biodiversity and mining works</li> <li>Vegetation found on the site, but not in the targeted mining areas should not be removed, but left to preserve biodiversity on the site.</li> <li>Shrubs or trees found along mining spots on sites, should not be removed. Therefore, care should be taken when extracting mineral species without destroying the vegetation.</li> <li>Workers should refrain from killing or snaring animals' species (big or small) that may be found on the site.</li> </ul>	<ul style="list-style-type: none"> <li>-No disturbance to unmarked areas.</li> <li>-No complaints from locals regarding unauthorised vegetation removal or cutting down of trees.</li> <li>-No complaints of wildlife hunting by the project personnel.</li> <li>-No intentional disturbance and destruction of site vegetation and faunal species</li> <li>-Visible preservation of onsite vegetation</li> </ul>	Proponent ECO Mine workers	Ongoing

		<ul style="list-style-type: none"><li>• Make use of the existing road network as much as possible and avoid off-road driving, thus minimizing onsite floral destruction</li><li>• Environmental awareness on the importance of biodiversity preservation should be provided to the workers</li></ul>			
--	--	--	--	--	--

Environmental Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeframe
Soils	Land degradation	<ul style="list-style-type: none"> <li>• All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures</li> <li>• Spill control preventative measures should be put in place to manage soil contamination, no matter how small the amount of pollution (spill) is.</li> <li>• Site soils should not be disturbed, if not needed or related to the actual mining works.</li> <li>• Overburden material should be handled more efficiently during mining operations to avoid erosion when subjected erosional processes.</li> <li>• Prevent the creation of huge piles of waste rocks by performing sequential backfilling</li> <li>• Project machinery and equipment should be equipped with drip trays to contain possible oil spills when operated on site.</li> <li>• Polluted soil should be removed immediately and put in a designate waste type container for disposal or treatment.</li> </ul>	<p>-No complaints of pollutants on the soils and eventually in the water due to mining activities</p> <p>-No visible oil spills on the ground or pollution spots.</p>	<p>Proponent</p> <p>Mine workers</p> <p>ECO</p>	Ongoing

Environment al Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible person(s)	Timeframe
Air Quality	Dust generation	<ul style="list-style-type: none"> <li>• Mining schedule should be limited to weekdays only and between 08h00 and 17h00. This will keep the vehicle-related dust level minimal in the area.</li> <li>• Since the project site is in an area where due to little vegetation cover, soils are exposed, it is highly probable that more dust will be generated from mining (excavating). It is therefore advisable that in extremely windy days, a reasonable amount of water should be used to suppress dust emanating from certain mining areas on the site.</li> <li>• On extremely windy days, a reasonable amount of water should be used to suppress the dust that may be emanating from certain mining areas on site, where actual work is conducted, on days when mining activities are done.</li> </ul>	<p>-No complaints from the public about vehicle emissions and dust generation.</p> <p>-Visible efforts to curb dust</p>	<p>Proponent</p> <p>ECO</p>	Ongoing
Water Resources	Pollution and over-abstraction	<ul style="list-style-type: none"> <li>• Potential contaminants such as hydrocarbons (diesel) should be contained on site and disposed of in accordance to the nearest municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.</li> <li>• An emergency plan should be available for major / minor hydrocarbon spills during</li> </ul>	-Wastewater management awareness	<p>ECO</p> <p>Proponent</p>	Ongoing

		operation activities and during the transportation of the product(s) to the site.			
--	--	---	--	--	--

Environmental Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible person(s)	Timeframe
Occupational Health and Safety	Health and safety of the workers	<ul style="list-style-type: none"> <li>• As part of their induction, the workers should be provided with an awareness training of the risks of mishandling equipment and materials on site.</li> <li>• The Proponent should commit to make provision for annual full medical check-up for all the workers at site to monitor the impact of mining related activities.</li> <li>• Dust masks, eye protective glasses and other respiratory personal protective equipment (PPE) such as face masks should be provided to the workers on site drilling areas, where they are exposed to dust</li> <li>• When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, safety glasses, etc.</li> <li>• No employee should be allowed to drink alcohol prior to and during working hours as this may lead to mishandling of equipment which results into injuries and other health and safety risks.</li> <li>• Employees should not be allowed on site if under the influence of alcohol or any other intoxicants.</li> </ul>	<ul style="list-style-type: none"> <li>- A Comprehensive health and safety plan for all mining activities is compiled</li> </ul>	<p>ECO</p> <p>Proponent</p> <p>Mine workers</p>	Ongoing

	Accidental fire outbreak	<ul style="list-style-type: none"> <li>• Portable fire extinguishers should be provided on site.</li> <li>• No open fires to be created by project personnel.</li> <li>• Potential flammable areas and structures such as fuel storage tanks should be marked as such with clearly visible signage.</li> </ul>	- No on site or wild fires recorded (due to presence of mining activities)		
Noise	Nuisance	<ul style="list-style-type: none"> <li>□ The mining operational times should be set such that, no mining activity is carried out during the night or very early in the mornings.</li> <li>□ Mining hours should be restricted to between 08h00 and 17h00 to avoid noise generated by mining equipment and the movement of vehicles before or after hours.</li> <li>□ When operating the blasting and drilling machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure.</li> </ul>	- Local complaints about excessive noise.	Proponent  ECO	Ongoing
Vehicular Traffic	Traffic Safety	<ul style="list-style-type: none"> <li>• Drivers of the mining vehicles should be in possession of valid and appropriate driving licenses.</li> </ul>	- No major vehicular accidents/incidents recorded	Proponent	Ongoing

Environmental Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible person(s)	Timeframe
		<ul style="list-style-type: none"> <li data-bbox="660 338 1144 395">☐ Vehicle drivers should adhere to the road safety rules.</li> <li data-bbox="660 427 1144 536">☐ Mining vehicles should be serviced regularly in order to avoid accidents as a result of mechanical faults of vehicles.</li> </ul>		ECO	
Waste generation	Environmental Pollution	<ul style="list-style-type: none"> <li data-bbox="660 553 1167 662">• Workers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li data-bbox="660 678 1167 786">• After each daily works, the Proponent should ensure that there is no waste left at the mining pit and the work site in general.</li> <li data-bbox="660 802 1167 956">• All domestic and general operational waste produced on a daily basis should be contained until such that time it will be transported to designated waste sites.</li> <li data-bbox="660 971 1167 1029">• No waste may be buried or burned on site or anywhere else.</li> <li data-bbox="660 1045 1167 1153">• The mining site should be equipped with separate waste bins for hazardous and general waste/domestic.</li> <li data-bbox="660 1169 1167 1278">• Oil spills should be taken care of by removing and treating soils affected by the spill.</li> <li data-bbox="660 1294 1167 1434">• A penalty system for irresponsible disposal of waste on site and anywhere in the area should implemented.</li> </ul>	<ul style="list-style-type: none"> <li data-bbox="1227 553 1590 611">- No visible litter around the project area</li> <li data-bbox="1227 659 1590 716">- Provision of sufficient waste storage containers</li> <li data-bbox="1227 764 1590 821">- Waste management awareness</li> </ul>	Proponent  ECO  Mine workers	Ongoing

Visual	Visual nuisance	<ul style="list-style-type: none"> <li>Proponent should consider the implementation of continuous rehabilitation programme, by using overburden waste rocks.</li> </ul>		Proponent	Ongoing
--------	-----------------	---	--	-----------	---------

### 3.4 Phase 2: Decommissioning Phase Management Action Plans

The management actions plans for the decommissioning phase are provided in **Table 5** below.

**Table 5: Management action plans for the decommissioning phase with responsibilities and timeframes**

Environment al Feature	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible person(s)	Timeframe
Rehabilitation	Disturbance and damaging of land	<ul style="list-style-type: none"> <li>All drilled boreholes and excavated pits related to the mining activities should be capped and backfilled, respectively.</li> <li>All waste generated and stored on site during mining activities should be disposed of at the nearest solid waste management sites.</li> <li>The stockpiled topsoil should be levelled after completion of works at site.</li> <li>Any temporary setup on site should be dismantled, and the area rehabilitated as far as practicable, to their original state.</li> <li>Excavation sites should be rehabilitated by stockpiling and backfilling.</li> <li>Provision of both financial and technical resources for progressive rehabilitation</li> </ul>	<ul style="list-style-type: none"> <li>Capped boreholes and backfilled pits</li> <li>No sign of waste or littering seen on site and around site areas.</li> <li>Carrying away of waste, and removal of vehicles and equipment from site</li> <li>No stockpiled topsoil (topsoil is levelled)</li> </ul>	Proponent	Decommissioning phase

Employment	Loss of employment	<ul style="list-style-type: none"> <li>• The Proponent should inform the employees on time, of its intentions to cease the mining works and the expected date of such closure. This will provide the employees with enough time to search for workelsewhere.</li> <li>• The Proponent should raise awareness of the possibilities for work in a similar or other industrial sectors.</li> </ul>		Proponent	Pre-decommissioning
------------	--------------------	---	--	-----------	---------------------

### 3.5 Rehabilitation

One of the main challenges faced by the mining industry, which includes small-to-medium scale miners in Namibia and worldwide, is the rehabilitation of mined-out areas. Rehabilitation of mined out areas provides ecological, economic and social benefits to the community, and non-rehabilitated disturbed areas deprive communities from benefiting from their land after mining (Ansaah, 2008). In order for communities to benefit from their land post-mining, it is necessary for miners to rehabilitate the mined out areas to at least bring them close to their pre-mining states. However, this remains a challenge to many small-to-medium scale miners due to lack of rehabilitation knowledge, money and necessary equipment to undertake the required site rehabilitation.

It is believed that rehabilitation has not been done on most mined out areas in Namibia. This will lead to cumulative environmental impacts that may be irreversible or may take long to reverse. To avoid this, it is vital that new rational mitigation measures need to be taken into consideration and effectively implemented by the miners. This could only be achieved through providing awareness training to miners on the environment and progressive rehabilitation of their mined out areas.

#### 3.5.1 Rehabilitation Planning

Each mine has particular characteristics that will influence the procedures adopted in the rehabilitation program. These characteristics may be obvious but critical differences are often only identified by careful investigation. The proposed post mining land-use will also influence the procedure and the plant species used for rehabilitation (Minerals Council of Australia (MCA), 1998).

The following are the basic rehabilitation practices as summarized after the MCA (1998), with appropriate modification, will apply to most disturbed areas.

- **Making Safe:** After planning for rehabilitation, the first step is to clean up and make the area to be rehabilitated, safe.
- **Landform Design:** The re-shaping and grading of a site is an essential aspect of rehabilitation. Unless slopes are stable, the effectiveness of subsequent topsoiling and re-vegetation is greatly reduced and maintenance may be prolonged. When planning the final landform the whole of the mine and associated infrastructure needs to be considered. The final landform should be hydrologically and visually compatible with the surrounding area
- **Erosion Control:** Control of erosion is important, during both mining and rehabilitation. The effects of erosion may require remedial works on sites where soil loss has occurred as well as where the material is deposited as drift, dust or river sediment. Major objective of most

rehabilitation programs is to establish an adequate cover of vegetation so as to stabilise the site and prevent or control erosion to natural levels. Until a vegetation cover has been established, provision to protect against **wind** and **water** erosion will be required.

- **Top Soil Management:** Although re-vegetation may be achieved on various substrates, topsoil is almost always an essential factor in successful rehabilitation programs, particularly during the period of initial plant growth. Subsoil conditions become of more importance in the longer term. Topsoil (or weathered surface material) provides a good microenvironment for seed germination and generally contains seeds, nutrients and microorganisms that are necessary for plant growth. If these are lost then the system will generally take a longer time to re-establish.
- **Soil Properties for Plant Growth:** Maintaining or improving the ability of the soil (or other plant growth media) to supply nutrients, to store and supply water and support root growth should be a major consideration during rehabilitation.

Rehabilitation requires careful consideration of the local ecological context, in combination with rehabilitation goals. The most important steps in undertaking a successful rehabilitation are planning and environmental awareness (environmental education) on the importance of progressive rehabilitation (or post-mining rehabilitation) and its importance to the environment. Furthermore, to successfully implement the planned rehabilitation, practically, this will depend on a number of factors such as the rehabilitation program, characteristics of a mine, nature of disturbance, rehabilitation methods, as well as resources availability.

## 4 CONCLUSION

The risks stemming from the tourmaline mining activities on ML91 were identified, assessed and mitigation measures made thereof. The mitigation measures and recommendations provided in this scoping assessment report and management action plans provided in the EMP, can be deemed sufficient to avoid and/or reduce (where impact avoidance impossible) the risks to acceptable levels. EDS is therefore confident that these measures are sufficient and thus recommends that the Proponent may be issued with the ECC to enable the renewal of ML 91 with the Ministry of Mines and Energy. However, the ECC should be issued on condition that the provided management measures and action plans are implemented and monitored. Furthermore, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing their mining activities.

## APPENDIX 1: CHANCE FINDS PROCEDURE (AFTER KINAHAN, 2020)

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during development work. The procedure set out here covers the reporting and management of such finds.

**Scope:** The “*chance finds*” procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

**Compliance:** The “chance finds” procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): “*a person who discovers any archaeological .... object .....must as soon as practicable report the discovery to the Council*”. The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Manager/Supervisor must report the finding to the following competent authorities:

- National Heritage Council of Namibia (061 244 375)
- National Museum (061 276800),
- National Forensic Laboratory (061 240461).

Archaeological material must NOT be touched. Tempering with the materials is an offence under the heritage act and punishable upon conviction by the law.

### Responsibility:

<b>Operator:</b>	To exercise due caution if archaeological remains are found
<b>Foreman:</b>	To secure site and advise management timeously
<b>Superintendent:</b>	To determine safe working boundary and request inspection
<b>Archaeologist:</b>	To inspect, identify, advise management, and recover remains

### PROCEDURE:

#### Action by person identifying archaeological or heritage material:

- a) If operating machinery or equipment stop work
- b) Identify the site with flag tape

- c) Determine GPS position if possible
- d) Report findings to foreman

**Action by foreman**

- a) Report findings, site location and actions taken to superintendent
- b) Cease any works in immediate vicinity

**Action by superintendent**

- a) Visit site and determine whether work can proceed without damage to findings
- b) Determine and mark exclusion boundary
- c) Site location and details to be added to project GIS for field confirmation by archaeologist

**Action by Archaeologist**

- a) Inspect site and confirm addition to project GIS
- b) Advise NHC and request written permission to remove findings from work area
- c) Recovery, packaging and labelling of findings for transfer to National Museum

**In the event of discovering human remains**

- a) Actions as above
- b) Field inspection by archaeologist to confirm that remains are human
- c) Advise and liaise with NHC and Police
- d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.