HEMERDON MINERAL PROCESSING FACILITY

Environmental Permit Application
Environmental Risk Assessment
Prepared for: **Drakelands Restoration Ltd**
Ref: EPR/AP3203ML/A001

SLR Ref: 416.10511.00010
Version No: Final v1
November 2022

BASIS OF REPORT

This document has been prepared by SLR Consulting Limited with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Drakelands Restoration Ltd (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

DRAWINGS

1.0 Introduction

Drakelands Restoration Ltd (DRL) has instructed SLR Consulting Limited (SLR) to update the Environmental Risk Assessment (ERA) previously submitted with the Environmental Permit (EP) application (ref: EPR/AP3203ML/A001) for the Mineral Processing Facility (MPF) at Hemerdon Mine, Crownhill Down, Plympton, Devon under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

1.1 Schedule 5 Notice

This update has been prepared in response to the Schedule 5 Notice issued on 08/02/2022 by the Environment Agency (EA). Question 3 of the Schedule 5 Notice requested the following;

Please update and revise your document - H1 Environmental Risk Assessment, TWL-CP-PA-EN-006.2.34, September 21, in particular (table 6) to accurately reflect the risk of noise and dust from the proposed activities.

Reasoning: The Environmental Risk assessment based on the previous application documents submitted by Wolf minerals in February 2014 claims there is a low risk of "noise nuisance at local receptors" (p15, p16). There is no specific mention of low frequency noise, or infrasound emissions within this assessment. The claim is not well justified by the various supporting documents, including the current BS4142 assessment which based on our assessment suggests that there may be a significant adverse impact at some receptor locations. Also note "for dust from crushing" the mitigation is enclosed buildings, which is different to the mobile crusher proposals on the ROM pad. Please also note our guidance on risk assessments has changed since 2014, and is available here Risk assessments for your environmental permit - GOV.UK (www.gov.uk) as provided with your original pre-app advice. Also note the term H1 is used for air quality screening now rather than environmental risk assessments, to avoid potential confusion.

1.2 Methodology

The ERA has been prepared in support of the EP application and has been undertaken in accordance with the EA guidance *Risk assessments for your environmental permit*[1] (2016, updated August 2022). The purpose of the assessment is to identify any significant risks that may affect receptors and demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage these risks.

This ERA uses the following approach, as set out in the EA's guidance, for identifying and assessing the risks from the proposed MPF:

Step One	Identify and consider risks for your Site and the sources of the risks;
Step Two	Identify the receptors at risk from the Site;
Step Three	Identify the possible pathways from the sources of the risks to the receptors;
Step Four	Assess the risks relevant to your specific activity and check they are acceptable and can be screened out;
Step Five	State what you will do to control risks if they are too high; and
Step Six	Submit your risk assessment as part of your application.

Section 2.0 of this document is a screening step to identify the risks requiring consideration as part of this assessment.

Section 3.0 identifies people or parts of the environment that could be harmed (at potentially significant risk) by the activity. The ERA for an EP application requires all receptors that are near the site and could reasonably be affected by the activities to be identified and considered as part of the assessment.

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit accessed November 2022

For the purposes of this ERA a 10km radius from the site's EP boundary has been adopted in reviewing potentially sensitive receptors of international or European ecological importance. A 2km radius has been adopted when reviewing potentially sensitive receptors of national ecological importance along with features such as sites of cultural and natural heritage. A radius of 500m from the site's EP boundary has been adopted for all other potentially sensitive receptors (for example, residential, commercial, industrial, agricultural and surface water receptors).

Section 4.0 of this document presents the assessment and demonstrates that any risks of pollution or harm will be mitigated to manage the risk.

2.0 Identifying the Risks

This section considers the potential risks to the environment listed in the EA's guidance to identify those which will apply to the proposed development and which require further assessment, and to screen out those which are not relevant.

The EA Guidance identifies the potential risks that may require assessment for 'most sites' as follows:

- Any discharge, for example sewage or trade effluent to surface or groundwater;
- Accidents;
- Odour (not for standalone water discharge and groundwater activities);
- Noise and vibration (not for standalone water discharge and groundwater activities);
- Uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that should not be in the discharge;
- Visible emissions, e.g. smoke or visible plumes; and
- Release of bioaerosols, for example from shredding, screening and turning, or from stack or open point source release such as a biofilter.

In addition, the EA guidance identifies risks from specific activities for which additional risk assessments must be completed depending on the activity being carried out and where substances are released or discharged into the environment. The EA guidance *Risk assessment for installations, waste and mining waste operations and landfill sites* indicates that the following additional risk assessments may be required for this Site:

- Risks of air emissions;
- The global warming impact of your air emissions;
- Risks to groundwater; and
- Risks to surface water from hazardous pollutants, sanitary and other pollutants.

Potential risks can be screened out if they are not relevant for the site or by carrying out tests to check whether they are within acceptable limits or environmental standards. If they are, any further assessment of the pollutant is not necessary because the risk to the environment is insignificant. Table 2-1 provides a summary of the risks for this development, identifying those that can be screened out as not relevant (grey shaded) and the type of risk assessment carried out for those that are relevant.

Table 2-1
Scope of Risk Assessment

Risk Type	Relevant	Justification	Type of Risk Assessment
Noise & Vibration	Yes	Use of mechanical equipment	Quantitative Noise and Vibration Impact Assessments.
Fugitive emissions of dust.	Yes	Vehicle movements/crushing and screening	Air Quality Detailed Dispersion Modelling and Impact Assessment.
Air emissions	Yes	Release of combustion products from pre-concentrate dryer,	Air Quality Detailed Dispersion Modelling and Impact Assessment.

Risk Type	Relevant	Justification	Type of Risk Assessment
		reduction kiln and tin concentrate dryer.	
Global Warming Impact	Yes	Direct releases of CO_2 from concentrate dryers. Direct and indirect releases from heat and power requirements.	Quantitative assessment
Odour	Yes	Emissions to air from reagent storage	Qualitative
Fugitive emissions	Yes	Run-off to groundwater and surface water. Emissions of mud and pest infestation	Qualitative
Accidents	Yes	Potential for emissions from equipment failure etc.	Qualitative
Groundwater	No	No direct or indirect releases to groundwater	Not required
Surface Water	No	Surface water discharges will be subject to a separate EP application.	Not applicable to this application
Visible emissions	No	No visible plume	Not required
Bioaerosols	No	None emitted	Not required

3.0 Site Setting and Receptors

3.1 Site Setting

The site is located within the boundary of the wider Hemerdon Mine with the northern part of the site extending into the Mining Waste Facility (MWF) EP boundary. Immediately to the south lies the open face pit. The wider area is characterised by historic and current quarrying and mining operations.

The land surrounding the site is rural with isolated residential properties and farm buildings. A number of previously residential properties within 500m of the site are subject to a Section 52 Agreement[2] and as such cannot be used for residential purposes. Some areas of the surrounding moors and woods are protected habitats and include Special Areas of Conservation, Ancient Woodlands, and County Wildlife Sites. The large city of Plymouth is located approximately 10km to the southwest of the EP boundary, which includes the suburban towns of Plympton, Chaddlewood, Woodford, Longbridge and Leigham. The closest residential receptor is located approximately 875m to the south west, called Galva House. The National Grid Reference (NGR) for the site is SX 56897 58966.

The surrounding land use is detailed further in Table 3-1 below.

Table 3-1
Surrounding Land Uses

Boundary	Description
North	To the north of the EP boundary lies the MWF and areas of the wider mine site controlled by DRL.
East	To the east lies areas of the wider Hemerdon Mine. This is followed by the historical Smallhanger China Clay Works and a series of surface water ditches, ponds and drains associated with the works. Areas of open ground interspersed with wooded areas area also located in this direction.
South	Hemerdon Mine's open face pit is located immediately to the south. This is followed by open/agricultural land and Galva Road.
West	The wider area of Hemerdon Mine lies to the west of the site. Beyond this the area is dominated by open/agricultural land and woodland areas. The access road, B3417, also lies to the west.

The immediate surrounding land uses are described in further detail below.

3.1.1 Residential Properties

There are no residential properties within 500m of the EP boundary.

3.1.2 Mine

The MPF is located within the boundary of the existing Hemerdon Mine and is therefore surrounded by other mine activities in all directions. The open face pit is situated immediately to the south and the MWF is located to the north.

3.1.3 Local Transport Network

Galva Road lies approximately 180m south and the B3417 lies approximately 690m to the west of the site.

[2] Pursuant to planning references: 9/42/49/0542/85/3, granted 1986 and 9/490405/91/3, granted 1991 and the subsequent Modification Order (Planning reference JS/SKC/A0577, issued 2010).

3.1.4 Surface Water Features

Multiple surface water features associated with the wider mine are located within a 500m radius of the site.

Smallhanger Brook runs approximately 125m from the site's southern boundary at its closest.

3.1.5 Open/Agricultural Ground

Areas of open/agricultural ground are located directly adjacent to the southern and western boundary, and approximately 30m east of the site.

3.2 Geology

The Hemerdon Tungsten deposit is hosted within and around a dyke-like body of porphyritic granite known as the Hemerdon Granite. Mineralisation is characterised by sheeted greisen veining and stockwork containing wolframite and cassiterite. The surrounding country rocks comprise a sequence of sedimentary and volcanic rocks, predominantly Upper Devonian slates of the Tavy Formation, altered by thermal metamorphism (locally known as Killas) with some intercalated intrusives.

At the site the Hemerdon Granite outcrops as hard, medium-grained, porphyritic, slightly altered granite, becoming increasingly kaolinised and greisenised as is plunges beneath the shallow Killas cover towards the north. Weathered (and kaolinised) granite extends from surface up to approximately 30 metres below ground level (mbgl). Contacts with the surrounding Killas material are steeply dipping and are believed to be heavily fractured.

At Crownhill Down the Killas are altered to dense, extremely hard, dark grey siliceous hornfels (thermally metamorphosed slate), with prominent white quartz veins and some replacement by fine-grained quartz-tourmaline rock. Towards the south the slates are light grey and micaceous, in places showing the effects of argillic (clay) alteration and of weathering. The effects of pervasive weathering can be seen down to 20m or so below surface. A series of north dipping east-west striking quartz veins penetrate the Killas. The major joint system associated with the Killas is sub parallel to these veined structures. Basic igneous rocks occur within the valley of the Smallhanger Brook and may underlie the Killas on Crownhill Down. The basic igneous rocks are fine-grained or aphanitic basalt. The basalt is hard and fine-grained, with a distinct shear fabric and spotting due to thermal metamorphism.

The surface profile comprises disturbed or made ground, topsoils, residual soils and the bedrock weathering profile. The combined thickness of topsoils, disturbed or made ground, and residual soil is typically 2m to 2.5m with locally deeper zones. The thickest areas of disturbed ground are associated with the historical tin streaming activities on Crownhill Down. The valleys of the Tory Brook and Smallhanger Brook are covered by accumulations of unconsolidated and poorly sorted rock fragments, sand, silt and clay. The thickness of these 'head' deposits is unlikely to exceed beyond 2m to 3m depth in the lower parts of the valleys.

3.3 Hydrogeology

The bedrock units in the area are classified as 'secondary aquifers with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of baseflow to rivers'. These are generally aquifers formerly classified as minor aquifers. At the site the bedrock is considered to exhibit relatively low permeability properties with local zones of enhanced secondary permeability. Zones of enhanced permeability may occur within the granite/killas contact zone, where significant fractures or faults (structure) are present within the rock, at the weathered/fresh rock contact zone (the transition zone), and within the shallow bedrock along the tin streaming area.

Across the site the depth to water ranges from approximately 1 to 40m below ground level, with the depth to groundwater decreasing down slope. Groundwater levels rise significantly in response to rainfall events.

Historically groundwater levels have shown an annual groundwater recession during the summer months with seasonal water table fluctuations of up to 15m observed on the higher ground. A "perched" groundwater body also exists in the topsoil and the fragmented ground above the competent bedrock, at generally less than 2.5m depth. Leakage from the perched groundwater body recharges the "permanent" water table below.

The groundwater flow direction and hydraulic gradient tend to closely mirror surface topography. Local groundwater flow is generally radially from the top of the hills towards the valleys and other topographic low points with groundwater discharging as spring flows and baseflow to surface water features. The regional groundwater flow direction will be in a southerly direction towards the sea.

The EA has defined the groundwater chemical status for the area as poor under the South West river basin management plan (EA, 2016[3]). Locally some parameters are naturally elevated in the groundwater and may have been affected by previous mining activities in the area.

The Multi-Agency Information for the Countryside (MAGIC)[4] map revealed that the site is not located on a Source Protection Zone.

3.4 Hydrology

The key surface water features in the vicinity of the project area are the Tory Brook, the Hooksburry Stream (a tributary of the Tory Brook) and the Smallhanger Brook. Of these, the closest to the MPF is Smallhanger Brook.

Smallhanger Brook has its source 200m above sea level among the historic Smallhanger china clay works to the north of Sparkwell. Smallhanger Brook flows within a valley to the south and southeast of Crownhill Down. The Smallhanger Brook separates the proposed pit to the south of the Brook from the MPF and Crownhill Down to the north.

The current ecological status of the Smallhanger Brook is moderate (EA, 2016). Surface water quality in the area is influenced by the underlying bedrock with potentially elevated concentrations of trace elements occurring naturally. Surface water quality in the area is also influenced by local historical and on-going mining activities.

The MAGIC map identified that the groundwater vulnerability of the site is classified as medium and high and the Flood Map for Planning[5] confirmed that the site is located in a Flood Zone 1, an area with a low probability of flooding.

3.5 Ecology

The MAGIC map website has been assessed in order to determine the ecological site setting. European/International designated sites within 10km have been identified and ecological, cultural and natural heritage receptors within 2km have been identified.

3.5.1 Special Area of Conservation (SAC)

Three SACs are located within 10km of the EP boundary. The closest is Dartmoor SAC which lies approximately 3,630m to the north east. It was designated because it is representative of upland wet heath in south west England as well as containing extensive areas of European dry heaths. South Dartmoor Woods SAC is situated approximately 5,170m north west and was designated because it is representative of old sessile oak woods in south west England. Approximately 7,850m south and extending to the west lies Plymouth Sound and Estuaries. This site was designated for its extensive areas of sublittoral sandbanks, ria estuaries, wide variety of intertidal and subtidal reef biotopes and Atlantic salt meadows.

[3] EA, 2016, South_West_RBD_Part_1_river_basin_management_plan.pdf (publishing.service.gov.uk), accessed November 2022.
[4] Multi-Agency Information for the Countryside – Available at: http://www.magic.gov.uk, accessed November 2022
[5] Gov.uk, Flood Map for Planning, available at https://flood-map-for-planning.service.gov.uk/, accessed in November 2022

3.5.2 Special Protection Areas (SPA)

The Tamar Estuaries Complex lies approximately 10,040 northwest. The estuary system is a large marine inlet on the English Channel coast comprising the estuaries of the rivers Tamar, Lynher and Tavy which collectively drain an extensive part of Devon and Cornwall. The SPA is outside the 10km radius used to assess potentially sensitive receptors of international or European ecological importance. However, it has been acknowledged due to its proximity to the 10km radius but ultimately eliminated from the ERA due to the distance from the EP boundary.

3.5.3 Ancient Woodland (or Replanted)

Five areas of ancient and semi-natural woodland are located within a 2km radius of the EP boundary:

- Hooksbury Wood: 990m northwest;
- Fernhill Wood: 1,255m west;
- Coleland Wood: 1,265m north;
- Newnham Wood: 1,690m southwest; and
- Brockhole / Binicliff Wood: 2,000m west.

3.5.4 Local Wildlife Sites

Several Local Wildlife Sites (LWS) are located within 2km of the EP boundary of which the closest is Crownhill Down LWS which is situated 200m from the northern and eastern EP boundaries. The following LWS also lie within 2km:

- Bottle Hill;
- Brockhole & Binicliff Woods;
- Broomage Woods;
- Elfordleigh Wood;
- Great Shaugh & Cann Woods;
- Headon Down;
- Holly Wood;
- Hooksbury Wood;
- Smallhanger Waste; and
- Torycombe.

The searches on MAGIC confirmed that there are none of the following within 2km of the site's boundary:

- Local Nature Reserves (LNR);
- Sites of Special Scientific Interest (SSSI);
- RAMSAR sites;
- Areas of Outstanding Natural Beauty;
- National Nature Reserves; and
- National Parks.

3.6 Cultural and Heritage

The review of MAGIC revealed that there are several scheduled monuments within 2km of the site's boundary as illustrated on Drawing 005 and listed below:

- Round barrow 950 yards (868m) N of Drakeland Corner: 400m north east;
- Prehistoric barrow cemetery on Crownhill Down, 900m north of Drakelands Farm: 530m north east;
- Barrow cemetery on western slope of Crownhill Down: 650m north;
- Deer park and rabbit warren at Newnham Park: 935m west; and
- Hut circle 1000 yards (915m) E of Coleland Bridge: 1,500m north east.

Thirteen listed buildings lie within 2km of the site's boundary; twelve are Grade 2, with the closest one being the Church of All Saints approximately 1,430m southeast of the site, and one is a Grade 2* listed building called Newnham Park that lies approximately 1,540m southwest of the site.

The search on MAGIC confirmed that the following features do not lie within 2km of the site:

- World Heritage Sites;
- Registered Battlefields; and
- Registered Park and Garden.

3.7 Identified Receptors

Table 3-2 and Drawings 003, 004 and 005 identify the receptors which are considered to be potentially sensitive and could reasonably be affected by activities at the site.

Table 3-2
Identified Receptors

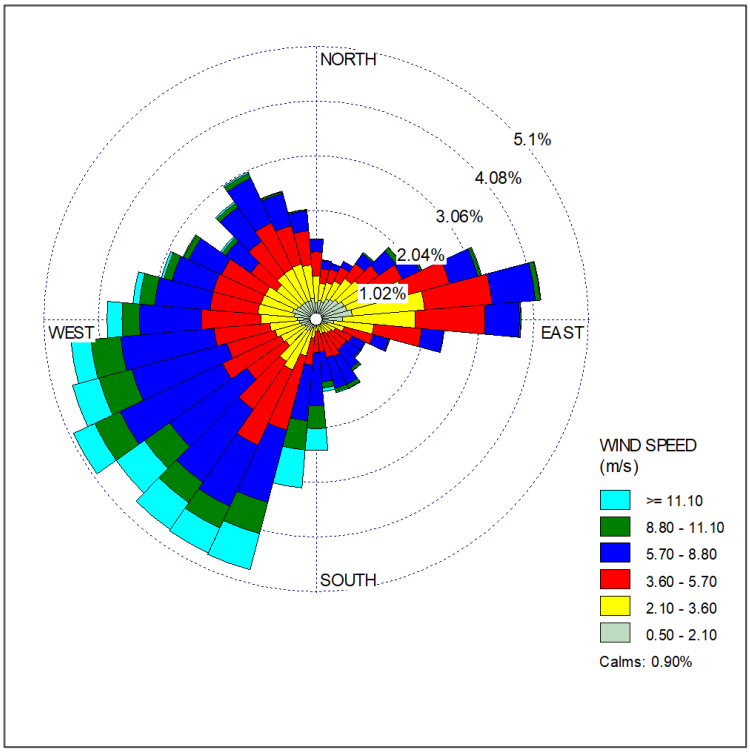
Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (in metres)
Local receptors within 500m as shown on Drawing 003			
Hemerdon Mine	Mine	All directions	Adjacent
Open/Agricultural Land	Open/Agricultural Land	South and southwest	Adjacent
Open/Agricultural Land	Open/Agricultural Land	East	30
Smallhanger Brook	Surface Water Feature	South and west	125
Galva Road	Local Transport Network	South	180
B3417	Local Transport Network	West	690

Receptor Name	Receptor Type	Direction from Site	Approximate Distance from Site Boundary (in metres)
European/International Ecological Designated Receptors within 10km of the EP boundary as shown on Drawing 004			
Dartmoor SAC	SAC	Northeast	3630
South Dartmoor SAC	SAC	Northwest	5170
Plymouth Sound and Estuaries	SAC	Southwest and south	7850
Ecological, cultural and natural heritage receptors located within 2km of the EP boundary as shown on Drawing 005			
Crownhill Down Local Wildlife Site	Local Wildlife Site	North and west	200
Round Barrow 950 Yards (868m) N of Drakeland Corner	Scheduled Monument	Northeast	400
Prehistoric barrow cemetery on Crownhill Down, 900m north of Drakelands Farm	Scheduled Monument	Northeast	530
Barrow cemetery on western slope of Crownhill Down	Scheduled Monument	North	650
Deer park and rabbit warren at Newnham Park	Scheduled Monument	West	935
Hooksbury Wood	Ancient Woodland	Northwest	990
Fernhill Wood	Ancient Woodland	West	1255
Coleland Wood	Ancient Woodland	North	1265
Church of All Saints	Grade 2 Listed Building	Southeast	1430
Hut circle 1000 yards (915m) E of Coleland Bridge	Scheduled Monument	Northeast	1500
Newnham Park	Grade 2* Listed Building	Southwest	1540
Newnham Wood	Ancient Woodland	Southwest	1690
Brockhole/Binicliff Wood	Ancient Woodland	West	2000

3.8 Windrose

A windrose for Plymouth for a 5-year period 2014-2018 (hourly sequential data), providing the frequency of wind speed and direction, is presented in Figure 3-1. The windrose shows winds from the south west are most frequent with winds from the south east least frequent.

Figure 3-1
Windrose for Plymouth Mountbatten Meteorological Station



4.0 Environmental Risk Assessment

The following tables in this section assess the site in terms of potential hazards posed, receptors and pathways, along with management and assessment of the identified risks.

The probability of exposure is the likelihood of the receptors being exposed to the hazard, and is defined as low, medium or high. These terms are qualified as follows;

- Low: exposure is unlikely, barriers in place to mitigate against exposure.
- Medium: exposure is fairly probable, barriers to exposure less controllable.
- High: exposure is probable, direct exposure likely with few barriers.

The methodology outlined in Section 1.2 of this report is the basis on which it is determined whether the proposed operations will lead to significant impacts on the surrounding environment. Where a conclusion of 'not significant' has been reached, it is proposed that the mitigation and management measures that will be in place at the site will be sufficient to ensure that there will be no impact at the surrounding environment.

This section considers the potential pathways between source and receptor and where appropriate, the assessment demonstrates how the risk of pollution or harm can be mitigated by measures to manage these risks and/or block the pathways. An assessment in terms of hazards posed, receptors and pathways, along with management and residual risks for the following hazards is presented in accordance with the risks identified in Table 2-1 of this report.

- Global Warming (Section 4.1)
- Point Source Emissions to Air (Section 4.2)
- Noise and Vibration (Section 4.3)
- Odour (Section 4.4)
- Fugitive Dust (Section 4.5)
- Fugitive Emissions (Section 4.6)
- Accidents (Section 4.7)

4.1 Global Warming

Table 4-1 shows typical energy use and estimated carbon dioxide (greenhouse gas) emissions from the site.

Table 4-1
Energy Use and Global Warming

Energy Source	Process Activity	Annual MWh/y	Release	Estimated CO2e
Electricity from Public Supply	Pumps, Fans, Motors, Drives	36,916	Indirect	14,707
Diesel (Therma 35)	Pre-Dryer, tin-dryer	2088	Direct	31

Power requirements reduce by almost 10% when processing soft granite compared to hard granite.

When DRL enters into full production, it is anticipated that the business will fall within scope of the Streamlined Energy Carbon Reporting (SERC) and Energy Saving Opportunity Scheme (ESOS) Legislation. These pieces of

legislation require businesses to report on both their carbon emissions and energy usage with the overall aim of reducing carbon emissions from business and industry.

4.2 Point Source Emissions to Air

Point source emissions to air have been assessed in the following document:

- Drakelands Restoration Ltd, Hemerdon Mine MPF Environmental Permit Application, Air Emissions Risk Assessment (Sch 5 response), SLR Ref No: 419.00026.00001 November 2022 (hereafter referred to as the AERA).

The AERA considered all point source emissions to air from the MPF, namely:

- Pre-concentrate dryer (A2 point source release);
- Reduction Kiln (A3 point source release);
- Tin concentrate dryer (A4 point source release).

The locations of the point source emissions are illustrated on Drawing 007.

The AERA included an assessment of potential cumulative (or in-combination) impacts with the MWF and other emissions from mine activities.

The objective of the study was to assess the impact of emissions against the relevant Air Quality Standards for the protection of human health and where necessary, deposition for the protection of amenity, soils, and relevant Critical Levels (C_{Le}) and Critical Loads (C_{Lo}) for the protection of designated ecological receptors.

Detailed atmospheric dispersion modelling using the AERMOD model was undertaken using the following staged approach:

- Review of emission to air and derivation of source term;
- Identification of sensitive receptors;
- Compilation of the existing air quality baseline and review of Local Air Quality Management status;
- Dispersion modelling; and
- Calculation of process contribution to ground level concentrations and evaluation against relevant environmental standards for both human and ecological receptors.

The conclusions of the assessment were:

- There are no predicted exceedances of Air Quality Assessment Levels for NO2, SO2, PM10, PM2.5 or arsenic at any of the receptor locations;
- The process contribution to arsenic deposition is predicted to be less than 1% of the benchmark levels for the protection of soils at all receptor locations and impacts can be considered insignificant; and
- The process contribution of nitrogen oxides, sulphur dioxide and arsenic are less than 1% of the relevant Critical Levels and Critical Loads at all sites (including European Sites (SAC's) and their impacts can be considered insignificant.

Further details are contained within the AERA which forms the response to Q7 of the Schedule 5 Notice.

4.3 Noise and Vibration

The potential risk from noise and vibration at the Hemerdon site has been assessed in detail within the following documents:

- Noise and Vibration Impact Assessment. Tungsten West Document: TWL-CP-PA-EN-006.2.23, 18th August. 2021
- Hemerdon Mine Processing Plant, Noise Impact Assessment, SLR Ref: 403.064510.00001, November 2022.

Each report is considered in turn below.

4.3.1 Noise and Vibration Impact Assessment (NVIA)

The NVIA provides a summary of the assessment methodology used to inform the design and implementation of Best available Techniques (BAT), and an understanding of their potential effectiveness with respect to the management of Low Frequency Noise (sound with a frequency below about 200Hz) and Infrasound (sound with a frequency of 20Hz or lower).

DRL developed a method to determine the characteristic sound pressure being emitted by a sizing screen and field tested several infrasound and LFN mitigations to provide confidence in the mitigations developed. The assessment methodology involved the development of an environmental model capable of assessing various screening configurations and mitigations.

The report proposed a range of noise mitigation and control measures that will be implemented at the Hemerdon MPF, presented a Noise Management Plan and an assessment of risk.

Proposed noise mitigation and control measures include the following:

- Introduction of ore sorting to reduce screening requirements within the MPF;
- Selection of screens with operating frequency away from 16Hz;
- Removal of problematic screens;
- Reduction in screening area;
- Screening configuration & screen placement within the MPF;
- Improve scheduled maintenance to reduce tolerances within screening machinery;
- Screen selection and equipment;
- Reduce efficiency of noise generation;
- Under Pan Venting;
- Cancelling Noise at source; and
- Isolating noise.

Based on the foregoing noise control and mitigation measures, DRL's Noise Management Plan includes the following:

- The introduction of ore sorting technology to reduce screening requirements;
- The introduction of ore sorting technology to increases particle size and decreases material bed thicknesses;
- To remove the most problematic screens from within the MPF;
- To replace other problematic screens within the MPF with smaller contemporary equipment;
- To select screens with a lower operating speed;
- To introduce deck venting to all screens within the MPF;

- Implement an improved maintenance schedule to reduce mechanical tolerances in the operation of the screens; and
- Implement a noise monitoring and management scheme, subject to agreement with the regulator.

Having regard to the Noise Management Plan outlined above DRL has assessed the risk from noise and vibration at the MPF using the source, pathway, receptor model. Details are included in Table 4-2.

Table 4-2
Low Frequency Noise and Infrasound Risk Assessment[6]

Hazard	Receptor	Pathway	Risk Management techniques	Probability of exposure	Consequence	Overall Risk
Unquantifiable contributions to infrasound and LFN residual levels at Hemerdon	People living within proximity to the mine	Air borne	As per NMP	Unmitigated the probability of exposure to levels of infrasound and LFN known to cause disturbance is high.	Physical impact (complaints of pressure and bodily sensations) secondary impact (complaints of fixtures and fittings)	Low if techniques outlined in NMP are implemented
Emissions to air (12.5Hz) from DRL Screening Configuration	People living within proximity to the mine	Air borne	As per NMP	Unmitigated the probability of exposure to levels of infrasound and LFN known to cause disturbance is high.	Physical impact (complaints of pressure and bodily sensations) secondary impact (complaints of fixtures and fittings)	Low if techniques outlined in NMP are implemented
Emissions to air (16Hz) from DRL Screening Configuration	People living within proximity to the mine	Air borne	As per NMP	Unmitigated the probability of exposure to levels of infrasound and LFN known to cause disturbance is high.	Physical impact (complaints of pressure and bodily sensations) secondary impact (complaints of fixtures and fittings)	Low if techniques outlined in NMP are implemented

[6] Taken from: Tungsten West, Noise and Vibration Impact Assessment, Document Ref: TWL-SS-RE-EN-001.

Hazard	Receptor	Pathway	Risk Management techniques	Probability of exposure	Consequence	Overall Risk
Emissions to air in the second and third harmonics (32Hz/50Hz) from DRL Screening Configuration	People living within proximity to the mine	Air borne	As per NMP	Unmitigated the probability of exposure to levels of infrasound and LFN known to cause disturbance is high.	Physical impact (complaints of pressure and bodily sensations) secondary impact (complaints of fixtures and fittings); audible noise complaints	Low if techniques outlined in NMP are implemented

DRL draw the following conclusions from their NVIA:

- The results of the modelling exercise have shown that the inherent mitigations within the DRL MPF are sufficient to reduce the specific contribution within the MPF to levels well below the NANR45 assessment criterion. Further analysis also shows that the inherent mitigation including deck venting reduces contributions further;
- Inherent mitigation and deck venting predicts levels at receptor locations below the NANR45 (DEFRA publication 'Procedure for the Assessment of Low Frequency Noise Complaints') Criterion, the Noise Reduction Targets (NRTs) established by the previous operator and industry best practice criteria for assessment of LFN;
- The introduction of cladding to some structures further reduces the risk of LFN emissions at the 32Hz and 47Hz one third octaves; and
- DRL has developed further mitigation measures that can be applied retrospectively to ensure that the assessment criterion be met should further issues arise.

4.3.2 Noise Impact Assessment

The Noise Impact Assessment was carried out in accordance with the guidance contained in British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* as required by the EA Guidance *Noise and vibration management: environmental permits*. British Standard 8233:2014 *Guidance on sound insulation and noise reduction for buildings*, the NPPF, the NPSE and World Health Organisation (WHO) 2018 *Environmental Noise Guidelines for the European Region* were also referred to.

The assessment was based on the results of a baseline sound survey undertaken at nearby noise-sensitive receptors during periods of appropriate weather.

Cumulative sound rating sound levels were predicted at nearest sensitive receptors using noise modelling techniques. The assessment tended towards a worst-case, based on conservative assumptions and following industry standards.

The numerical assessment predicted that the worst-case rating levels would be 6dB above the representative background sound levels, during the weekday night-time period; however, predicted operational noise impacts have been supported as low when considering the context of the site.

It was established that sound from the proposed development would have no effect at distant noise sensitive receptors. In the worst-case and closest receptors, it would be largely unnoticeable, or just perceptible. If it is possible for the sound to be audible, it is not expected to cause any change in behaviour or attitude. The proposed development could marginally affect the acoustic character of the area but not to the extent that there is a perceived change in quality of life.

It was concluded that the range of noise impacts for the proposed development were acceptable with respect to overarching and local requirements for planning and noise.

Further details are contained within the Noise Impact Assessment which forms the response to Q4 of the Schedule 5 Notice.

Table 4-3 outlines the management measures that will be employed at the MPF to manage the risks from noise.

Table 4-3
Noise and Vibration Risk Assessment and Management Plan

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Delivery of mineral ore.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Delivery will be from the adjacent mine working and will not use public highways.	The primary and secondary crusher will be located immediately adjacent to the haul road thereby minimising distance travelled by delivery vehicles. There will be no movement on public highway. Vehicles will be maintained to minimise noise. Site roads will be maintained to minimise noise. Speed limits will be imposed for vehicles travelling on site. Traffic management measures will be implemented to enforce speed limits.	Low	Noise nuisance at local receptors.	Not Significant
Processing of mineral ore – Primary and secondary crushing.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Air, ground	The revised operational layout will move the primary and secondary crushing equipment to the north east of the existing mineral processing building, further away from the nearest noise sensitive receptors. The primary and secondary crushing equipment will be located at a distance of 996m from the nearest noise	Low	Noise nuisance at local receptors.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			sensitive receptor (Galva House, located to the south west). The primary and secondary crushing equipment will be located approximately 4 metres below surrounding ground level, which will result in the attenuation of noise emissions. A 2.4m high acoustic barrier will be installed on the southern and western boundaries of the crusher area. Primary and secondary crushing will be undertaken between the hours of 07.00 – 22.00. During night- time hours there will be no primary and secondary crushing operations. X-Ray transmission ore sorting will ensure that only metalliferous ore is crushed, and barren ore is rejected therefore reducing the total tonnage being crushed. The primary and secondary crusher will include a pre-crushing screen so that only material which is of a particular size is crushed. This will avoid crushing material that is already of a suitable size and will further reduce the total tonnage being crushed.			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			The quantities of ore that will be crushed represent a 70% reduction during the night-time and a 37% reduction during the day-time compared to the previous operation. The plant has been designed to minimise screening requirements and remove problematic screens. Conveyors will be covered and conveyor entries have been designed to mitigate noise. The crushers will be fitted with rubber lined feed hoppers to mitigate noise generation. The site will be managed to minimise start up and shut down as much as possible. A schedule of planned preventative maintenance will be in place to ensure that the plant operates as designed. Site personnel will be trained in the need to minimise site noise and will be responsible for monitoring and reporting excessive noise when carrying out their everyday duties.			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Operation of the MPF within the main processing building, tertiary crusher building and the ore sorter building	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Air, ground	The buildings will benefit from existing and new cladding. Roller shutter doors will be fitted to mitigate the release of noise Building apertures and openings will be designed to mitigate noise emissions. Low noise generating plant have been selected for use in the processing buildings. Plant will be turned down/off when not in use. Plant and equipment will be maintained regularly to minimise noise resulting from deterioration and inefficient operation. If items of plant are found to give rise to unacceptable noise levels, consideration will be given to their replacement with quieter designs. If equipment continues to generate unacceptable noise levels, consideration will be given to modification to incorporate noise suppression equipment or replacement components.	Low	Noise nuisance at local receptors.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			Management Measures The MPF Manager will be responsible for ensuring that nuisance from site noise is minimised. Site personnel will be trained in the need to minimise site noise and will be responsible for monitoring and reporting excessive noise when carrying out their everyday duties. Opening of doors will be kept to a minimum. **Noise Action Plan** In the event that noise is found to be causing a problem, action will be taken to determine the source and to take remedial actions as follows: shut down, replace, service or repair equipment to reduce noise levels; and modify plant to incorporate noise suppression equipment. Records relating to the management and monitoring of noise will be maintained and include: inspections undertaken; noise problems (date, time, duration, weather conditions and cause of the problem); complaints received; and corrective action taken to prevent future occurrences.			

4.4 Odour

The potential risk from odour at the Hemerdon MPF has been assessed in Table 4-4 below. It is considered that due to the nature of the installation the risk of impacts from odour will be low.

Table 4-4
Odour Risk Assessment and Management Plan

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Delivery of mineral ore. Processing of mineral ore (Primary, Secondary and Tertiary Crushing). Operation of the reduction kiln and directly associated activities. Storage of flotation reagents. Storage of waste products prior to removal off site.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Odour release to air.	The majority of the pre-concentration processes and the ore itself are generally considered to be of low/no odour. Subsequent process operations are enclosed within buildings and this prevents the potential for fugitive odour releases. The site will not store significant quantities of flotation reagents. Potentially odorous reagents will be stored internally or within enclosed equipment.	Low	Odour nuisance at local receptors.	Not Significant

4.5 Fugitive Emissions of Dust

The potential risk from dust at the Hemerdon MPF has been assessed in the AERA and in Table 4-5 below.

The scope of the AERA included an assessment of the potential cumulative (or in-combination) impacts of dust emissions from the primary and secondary crushing activities and the run or mine (ROM) pad with potential dust from the MWF and other emissions from mine activities.

The objective of the study was to assess the impact of emissions against the relevant Air Quality Standards for the protection of human health and where necessary, deposition for the protection of amenity, soils, and relevant Critical Levels (C_{Le}) and Critical Loads (C_{Lo}) for the protection of designated ecological receptors

The assessment adopted a hypothetical worst-case scenario for the generation of the dust emissions source term. The hypothetical scenario assumed that each dust emission source was emitting at the maximum simultaneously, specifically:

- The MWF was assumed to be operating with the largest working area with only minimal restoration;
- The full extent of the tailings storage area was assumed to be in place; and
- Mine activity (i.e. truck movements on haul roads, blasting, material handlings) were based upon the MPF operating at capacity after ramp-up, i.e. +3 years from start.

The following dust sources were assessed:

- MPF emissions - Point sources, crushing, stockpiles and material unloading; and
- Other mine and MWF sources – vehicle entrainment of dust from unpaved haul roads, wind erosion, drilling and blasting and materials handling.

Detailed atmospheric dispersion modelling using the AERMOD model was undertaken using the following staged approach:

- Review of emission to air and derivation of source term;
- Identification of sensitive receptors;
- Compilation of the existing air quality baseline and review of Local Air Quality Management status;
- Dispersion modelling; and
- Calculation of process contribution to ground level concentrations and evaluation against relevant environmental standards for both human and ecological receptors.

The conclusions of the assessment in relation to fugitive dust were:

- There are no predicted exceedances of dust deposition benchmarks for the protection of amenity at any receptor locations.

Further details are contained within the AERA which forms the response to Q7 of the Schedule 5 Notice.

Table 4-5 outlines the management measures that will be employed at the MPF to ensure risks from fugitive dust are not significant.

Table 4-5
Dust Risk Assessment and Management Plan

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Dust from delivery of mineral ore.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Air, over ground.	There will be no vehicle movements on public highway. Speed limits will be imposed for vehicles on site. Dust suppression measures will be implemented on internal roads. Roads will be maintained to minimise fugitive emissions from road surfaces which will be graded and compacted rock fill and maintained free of pot-holes. Wheel washing equipment will be provided on the haul road.	Low	Dust nuisance at local receptors.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Dust from Primary and Secondary crushing and associated stockpiles (ROM and Ore Sorter).	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Air, over ground.	The moisture content of the ore to be crushed will consistently be at levels above 3%, and as such is not expected to give rise to significant dust emissions. Moisture content will be monitored regularly by site personnel and continuous water suppression will be provided when required. Multi atomising nozzles will be mounted over the crusher aperture, product conveyor feed and discharge points. Fixed water sprays will be installed on the ROM pad and the ore sorter stockpile. X-ray transmission ore sorting & screening prior to crushing will minimise the quantity of ore being crushed. Chutes will be fitted at belt conveyor transfer points. The primary and secondary crushers will be located at least 996m from potentially sensitive receptors.	Low	Dust nuisance at local receptors.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			The primary and secondary crushers will be located approximately 4m below surrounding ground level and will therefore be protected from wind whipping. Due to revised site design there will be reduced drop heights for vehicle unloading. Conveyors will be of sufficient capacity to handle maximum loads without spillage. Covered conveyors will reduce dust emissions. Site personnel will be trained in the need to minimise dust and will be responsible for monitoring and reporting excessive dust when carrying out their everyday duties. Operatives will be trained to ensure they are aware of responsibilities under the EP, to minimise emissions during shutdown and start up and during abnormal conditions. Visual assessment of emissions shall be made at least 3 times a day. The time location and results will be recorded.			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			Corrective action relating to dust control shall be recorded. There will be a preventative maintenance programme for pollution control equipment.			
Dust from operations within the process buildings.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Air, over ground.	Tertiary crushing will be carried out in an enclosed building, processed wet in sealed plant. Concentrate processing, Milling Screening, etc. will be carried out in enclosed building, processed wet in sealed plant. Particulates from Dryer Exhaust will be discharged through 25m stack, & Baghouse. Reduction Kiln, As_2O_3 & metals, NMVOC, acid gas, particulate -Cyclone will remove & recover product (dust). Oxidiser will reduce CO & VOC. Scrubber will remove acid gas, metals, As_2O_3 etc. via 30m stack.	Low	Dust nuisance at local receptors.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			Fugitive dust and particulates from floors and tailings areas – operations will be carried out in closed building and floors will be regularly cleaned. **Management Measures** The MPF Manager will be responsible for ensuring that nuisance from site dust is minimised. Site personnel will be trained to minimise site dust and will be responsible for monitoring and reporting excessive dust from site duties. **Dust Action Plan** In the event that dust is found to be causing a problem, action will be taken to determine the source and to take remedial actions; as follows: • Inspect equipment;			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			• Give consideration to wind speed and direction; and • Damp down dusty working areas. Records relating to the management and monitoring of dust will be maintained and include: • Inspections undertaken; • Dust problems (date, time, duration, weather conditions and cause of the problem); • Complaints received; and • Corrective action taken to prevent future occurrences.			

4.6 Fugitive Emissions

The potential risk from fugitive emissions to surface water and groundwater, birds vermin and insects and mud on the road at the Hemerdon MPF has been assessed in Table 4-6 below. It is considered that due to the nature and design of the installation the risk of impacts from fugitive emissions will be low.

Table 4-6
Fugitive Emissions Assessment and Management Plan

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Runoff from external areas.	Surface water and groundwater.	Surface water and groundwater.	Surface water from building roofs, car parking areas and areas outside of the buildings will be discharged via oil interceptors to sumps that will then be discharged to the Smallhanger Ponds. Drainage is shown on Drawing 006.	Low	Contamination of surrounding surface water, land and groundwater.	Not Significant
Runoff from inside the building.	Surface water and groundwater.	Surface water and groundwater.	The primary requirement for water is for the transport of mineral through the beneficiation process including hydrosizer, fine gravity middlings circuit, spirals, tables, etc. Other requirements are for general plant cleaning & washdown and welfare facilities.	Low	Contamination of surrounding surface water, land and groundwater.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
			There is a substantial system for recovery and re-use of water. Small amounts of water that cannot be recovered are:- • Water evaporated in the dryer and/or Reduction Kiln; and • Water from Clarifier/Thickener not removed from tailings. The process is a net importer of water. All areas within the building will be served by an impermeable surface and sealed drainage system. Individual process areas will be served by sumps and pumps which will enable spillage and run off to be collected and pumped back to the process. All potentially polluting chemicals used in the process will be stored in bunded areas, in sealed silos, bags or drums and in accordance with the manufacturer's specifications. **Management Measures**			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
			The MPF Manager will be responsible for ensuring that the water collection, management and recirculation system is operating correctly, that the surfacing at the facility is well maintained and that no potentially polluting substances or water will make their way off site.			
Birds, vermin and insects	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Overland.	Mineral ore is not odorous in nature or attractive to birds, vermin and insects.	Insignificant	Nuisance and loss of amenity and harm to human health.	Not Significant
Vehicle movement.	Receptors identified in Table 3-2 and illustrated on Drawings 003, 004 and 005.	Mud on road – overland.	Delivery will be from the adjacent mine workings and will not use public highways. Notwithstanding this, the site will benefit from an access road which will be hard surfaced for a distance of over 200m. A wheelwash will also be provided on the access road for HGVs and site 4x4 vehicles exiting the site.	Very low	Mud on road – nuisance to road users.	Not Significant

4.7 Accidents

The potential consequences from accidents and mitigation of risks at the Hemerdon MPF is provided in Table 4-7. It is considered that the mitigation measures proposed for the MPF will mean that the risk of impacts from accidents on receptors will be low.

Table 4-7
Accidents Risk Assessment and Management Plan

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Loss of containment or spillage of oils and grease used in maintenance activities or raw materials used in the process.	Surface water and groundwater.	Direct run off or percolation.	All areas within the building will be served by an impermeable surface and sealed drainage system. No waste water from inside the buildings will be discharged to the surface water management system. All potentially polluting chemicals used in the process will be stored appropriately in sealed silos, bags, drums or bunded areas and in accordance with the manufacturer's specifications and regulation. **Management Measures**	Low	Possible contamination of land, surface and groundwater.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			The MPF Manager will be responsible for ensuring that the water collection, management and recirculation system is operating correctly, that the surfacing at the facility is well maintained and that no potentially polluting substances or water will make their way off site. DRL's Emergency Preparedness and Response Plan will include a spill response plan, equipment & training.			
Unexpected reactions or runaway reactions.	Humans, groundwater, surface water.	Land, air and runoff to groundwater.	The mineral feedstock is not hazardous or reactive and largely processed wet and not likely to be involved in run-away reaction. Dried concentrate is not considered to be combustible. The concentrate will be stored in sealed bags. Potentially reactive reagents including acids alkalis and oxidising agents will be stored separately within segregated bunded containment bunds or spill trays.	Low	Deterioration of air quality or production of harmful substances which could cause fire or damage health of those exposed.	Not Significant

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			The MPF Manager will be responsible for implementing risk management measures.			
Operator error/failure of equipment.	Humans, groundwater, surface water.	Land, air and runoff to surface and groundwater.	Procedures and action plans will be in place to deal with such an occurrence. All equipment will undergo planned preventative maintenance and be maintained and checked as per manufacturers' instructions. Full training will be given to personnel. Abnormal operations procedure will be implemented. The MPF Manager will be responsible for implementing risk management measures.	Low	Possible contamination of air, land, surface and groundwater.	Not Significant.

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Fire	Air, water and land.	Air transport of smoke, spillages and contaminated firewater by direct run off from site and via surface water drains.	The following fire prevention measures will be in place: • No smoking other than in designated areas; • Planned preventative maintenance of equipment; and • Fire marshals and extinguishers will be present on site In the event of fire, the following actions will be taken: • The Emergency Preparedness and Response Plan will be actioned; • The Fire Rescue Service will be notified immediately and the EA as soon as practicable;	Low	Harm and nuisance to local population, emergency services and site staff.	Not Significant.

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
			• The burning area will be isolated and attempts will be made to extinguish the fire utilising the on-site firefighting systems if safe to do so; • Contaminated site drainage will be prevented, if possible, from entering any unsurfaced ground; and • The site will be evacuated if the fire is not containable. The MPF Manager will be responsible for implementing risk management measures.			

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
Incompatible substances coming into contact/unwanted reactions.	Air, land, surface water, groundwater and humans.	Land, air, ground and surface water.	All potentially polluting substances will be stored correctly and labelled. The MPF Manager will be responsible for implementing risk management measures.	Low	Deterioration of air quality or production of harmful substances which could cause fire or damage health of those exposed.	Not Significant.
Vandalism/unauthorised access causing loss of containment or fire.	Local land quality, surface water and groundwater.	Land, air.	The site will be manned by security guards 24 hours a day. Regular site patrols will be undertaken. The MPF Manager will be responsible for implementing risk management measures.	Low	Harm and nuisance to local population, emergency services and site staff.	Not Significant.

What do you do that can harm and what could be harmed		Managing the Risk		Assessing the Risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	What is the risk that still remains? The balance of probability and consequence
					Contamination of land and surface water.	
Flooding	Land and surface water.	Flood waters over land.	The site does not lie within a flood risk area. Surface water ponds attenuate surface run off to prevent flood risk down-stream of the site.	Very low/insignificant	Contaminated flood waters may contaminate buildings and land/	Not Significant

5.0 Conclusion

This ERA has been undertaken in accordance with EA guidance. The assessment is provided as part of the application for an EP for Hemerdon Mine MPF and has been updated in response to Question 3 of the Schedule 5 Notice dated 8th February 2022.

This qualitative risk assessment has considered global warming, point source emissions to air, noise and vibration (including low frequency noise and infrasound), fugitive dust, odour, fugitive emissions and potential for accidents and incidents.

Detailed quantitative assessments have also been undertaken in relation to point source emissions to air, fugitive emissions of dust, noise, low frequency noise, infrasound and vibration. The results of and conclusions from these assessments have been included where relevant and have informed the risk management methods proposed in this environmental risk assessment.

DRL concludes that with the implementation of the risk management measures described in this report, potential hazards from the MPF are not likely to be significant and no further assessment is required.

EUROPEAN OFFICES

United Kingdom

AYLESBURY
T: +44 (0)1844 337380

BELFAST
T: +44 (0)28 9073 2493

BRADFORD-ON-AVON
T: +44 (0)1225 309400

BRISTOL
T: +44 (0)117 906 4280

CAMBRIDGE
T: + 44 (0)1223 813805

CARDIFF
T: +44 (0)29 2049 1010

CHELMSFORD
T: +44 (0)1245 392170

EDINBURGH
T: +44 (0)131 335 6830

EXETER
T: + 44 (0)1392 490152

GLASGOW
T: +44 (0)141 353 5037

GUILDFORD
T: +44 (0)1483 889800

LEEDS
T: +44 (0)113 258 0650

LONDON
T: +44 (0)203 805 6418

MAIDSTONE
T: +44 (0)1622 609242

MANCHESTER
T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE
T: +44 (0)191 261 1966

NOTTINGHAM
T: +44 (0)115 964 7280

SHEFFIELD
T: +44 (0)114 245 5153

SHREWSBURY
T: +44 (0)1743 23 9250

STIRLING
T: +44 (0)1786 239900

WORCESTER
T: +44 (0)1905 751310

Ireland

DUBLIN
T: + 353 (0)1 296 4667

France

GRENOBLE
T: +33 (0)6 23 37 14 14