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Mt Weld Mining Pty Limited

Mt Weld Rare Earths Project – Life of Mine Proposal Section 38 Referral Supporting Document

Report
FINAL
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Prepared by KASA Consulting for:

Lynas Rare Earths Ltd

VERSION HISTORY

Version	Description	Author	Reviewed By	Date
0	Final for referral.	KASA	MWM	16-Aug-2022

GLOSSARY

Term	Definition
AEP	Annual Exceedance Probability
AER	Annual Environmental Report
AHA	*Aboriginal Heritage Act, 1972*
AHIS	Aboriginal Heritage Inquiry System
AL	Alluvium
ALARP	As Low as Reasonably Practicable
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASRIS	Australian Soil Resource Information System
AWS	Automatic Weather Station
BC Act	*Biodiversity Conservation Act, 2016*
BESS	Battery Energy Storage Systems
BoM	Bureau of Meteorology
CC	Calcrete Limestone
CS Act	*Contaminated Sites Act (WA), 2003*
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DER	Department of Environment Regulation
DMA	Decision Making Authority
DMIRS	Department of Mines, Industry Regulation and Safety
DMP	Department of Mines and Petroleum
DoH	Department of Health
DoW	Department of Water
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EMS	Environmental Management System
EP Act	*Environmental Protection Act, 1986*
EPA	Environmental Protection Authority
EPA/s	Environmental Protection Authority Service Unit
EPBC Act	*Environmental Protection and Biodiversity Conservation Act, 1999*
ESA	Environmentally Sensitive Areas
ESG	Environmental, Social, Governance
GCL	Geosynthetic Clay Liner
GDE	Groundwater Dependent Ecosystem
GGS	Goldfields Granny Smith

Term	Definition
GHG	Greenhouse Gas
GOS	Groundwater Operating Strategy
GSM	Granny Smith Mine
GWL	Ground Water Licence
Ha	Hectares
HDPE	High Density Polyethylene
HV	High Voltage
IP	Iron Phosphate
Km	kilometres
KP	Knight Piesold Pty Ltd
LAMP	Lynas Advanced Materials Plant
LC	Lake Clay
LDWG	ANZECC Livestock Drinking Water Guideline
LOM	Life of Mine
LOR	Limit of Reporting
Lynas	Lynas Rare Earths Limited
MAR	Managed Aquifer Recharge Project
MBR	Membrane Bioreactor
MCP	Mine Closure Plan
Mining Act	*Mining Act, 1978*
MS	Ministerial Statement
MS 290	Ministerial Statement 290
MS 476	Ministerial Statement 476
MS 1181	Ministerial Statement 1181
MSCI	Morgan Stanley Capital International
MSIA	*Mines Safety and Inspections Act, 1994*
Mtpa	Million tonnes per annum
MW	Megawatts
MWM	Mt Weld Mining Pty Ltd
NEPM	National Environment Protection Measure
NGER	National Greenhouse and Energy Reporting
NORM	Naturally Occurring Radioactive Materials
OEPA	Office of the Environmental Protection Authority
PEC	Priority Ecological Communities
PER	Public Environmental Review
PSI	Preliminary Site Investigation
RE	Rare Earth
REPF	Rare Earths Processing Facility
RIA	Radiation Impact Assessment
RMP	Radiation Management Plan

Term	Definition
RIWI Act	*Rights in Water and Irrigation Act, 1914*
RO	Reverse Osmosis
ROM	Run of Mine
RSA	*Radiation Safety Act, 1975*
RSO	Radiation Safety Officer
RWMP	Radioactive Waste Management Plan
RWP	Return Water Pond
SBTi	Science Based Target initiative
SEPFO	Statement of Environmental Principles, Factors and Objectives, December 2016
SRE	Short-range Endemic
SSCHMP	Social Surrounds and Cultural Heritage Management Plan
SVO	Surface Ventilation Officer
SWL	Standing Water Level
SWMP	Surface Water Management Plan
TEC	Threatened Ecological Communities
the Project	Mt Weld Rare Earths Project
TLD	Thermoluminescent Dosemeter
TMP	Transport Management Plan
tpa	Tonnes per annum
TSF	Tailings Storage Facility
TSP	Total Suspended Particulate
WQPN	Water Quality Protection Notice
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Submission Summary

Mt Weld Mining Pty Limited (MWM), a wholly owned subsidiary of Lynas Rare Earths Limited (Lynas), is seeking a streamlined referral under Section 38 of the *Environmental Protection Act, 1986* (EP Act), by providing the Environmental Protection Authority (EPA) with a robust and detailed proposal which sets out MWM's commitment to achieving the EPA's objectives. MWM is confident that this referral can be assessed by the EPA, based on referral information.

Background

Lynas is a publicly listed company incorporated in Australia and headquartered in Perth, Western Australia. Lynas was established as an ethical and environmentally responsible producer of rare earth (RE) materials, and today, the company is the world's only significant producer of separated RE materials outside of China.

The materials Lynas produces are essential inputs to future-facing technologies designed to lower carbon emissions and reduce energy consumption, as well as improve the efficiency, performance, speed, durability, and thermal stability of these emerging technologies. This includes permanent magnet motors for technologies such as electric vehicles and wind turbines.

The key markets for the materials Lynas produces are manufacturing supply chains in Asia, Europe and North America. Lynas aims to be the supplier of choice for its customers and a leader in sustainably produced REs. Provenance matters to Lynas' customers, and Lynas participates in external verification and industry initiatives that provide customers with confidence that materials have been responsibly and ethically produced.

REs are included on the critical mineral lists of a number of countries worldwide, including the Australian Government's "Australia's Critical Mineral Strategy 2022", the United States' "Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals" and the European Union's "2020 List of Critical Raw Materials".

With the global demand for REs, such as Neodymium, Praseodymium, Dysprosium and Terbium, forecast to grow significantly with the electrification of vehicles, Lynas plans to increase production to meet this growing global demand. This will include the expansion of its West Australian and Malaysian Operations and a new enterprise in the United States.

In Western Australia, this expansion includes the construction of a Rare Earths Processing Facility (REPF) at Kalgoorlie. The Kalgoorlie REPF is approved under a separate Ministerial Statement (MS 1181). The REPF will process RE concentrate from the Mt Weld mine to produce a RE carbonate product, which will be transported to Fremantle port for export to Lynas' downstream production facilities in Malaysia and the United States. By-products generated by the process include gypsum and iron phosphate (IP), which are approved to be removed from the REPF to Mt Weld or an alternative approved facility for long-term storage under the conditions of MS 1181, and which will be assessed for compliance under the Department of Water and Environmental Regulation (DWER) approved Compliance Assessment Plan (approved 13 July 2022).

Exploration, mining and processing operations at Mt Weld are a critical and intrinsic component of the overall Lynas value chain. All downstream processes at Kalgoorlie, Malaysia and the United States, as well as the sustainability of global RE markets, are reliant on the systematic and successful expansion of Mt Weld operations to reach the required production capacities to meet global demands.

The Mt Weld expansion, which will enable a 4-fold increase in mining and process rates, is fully scoped, fully funded and is critically important to the State of Western Australia's objectives, set out in the "Battery and Critical Minerals Prospectus[1]", to elevate Western Australia as a global battery and critical minerals hub.

Current Project

MWM operates the Mt Weld Rare Earths Project (the Project), which is located 35 kilometres (km) south-east of Laverton in the Northern Goldfields Region of Western Australia. The beneficiation plant has been operating for over ten years with four mining campaigns completed in that period.

Major components of Mt Weld Rare Earths Project are:

- A RE open pit mine;
- Groundwater extraction bores;
- Beneficiation plant, including power generation and water treatment;
- Tailings Storage Facilities (TSFs);
- Evaporation ponds; and
- Waste / low grade ore stockpiles.

Proposed Life of Mine Expansion

Lynas proposes to increase production to meet the growing global demand for RE products. This will entail expansion of its West Australian operations with the construction of the REPF in Kalgoorlie and expansion of the Mt Weld operations (mining, processing and ancillary activities) to a life of mine (LOM) extent.

MWM has engaged extensively with the Environmental Protection Authority Services division (EPA/s) within DWER, as part of pre-referral consultation.EPA/s has advised that given the nature and scale of the changes proposed as part of the LOM, relative to the original project approved in 1992, the Proposal would require referral under Section 38 of the EP Act, and that potential environmental impacts within the proposed Development Envelope for the foreseeable life of the Project (23 years from now) should be assessed as a Revised Proposal.

[1] Available at: Battery and Critical Minerals_Prospectus-Web.pdf

The expansion relates to the proposed increase to the Development Envelope for the LOM from the currently approved 505 ha to 2,802 ha, to allow for expansion of sustainable infrastructure and activities including:

- A staged transition from diesel-fuelled power generation to gas hybrid renewable power generation, including solar and battery energy storage system, and future wind generation;
- A worker accommodation village;
- Additional borefield and tailings water recycling infrastructure to increase recycling rates from 50% to >90%;
- Tailings, residue and by-product storage facilities designed to allow reclaim and future re-processing of unrecovered REs;
- Larger mine and waste rock landforms designed for progressive rehabilitation;
- An expansion of the existing ROM Pad; and
- Surface water management to capture seasonal rain events and to divert surface water into managed aquifer / ground water recharge that also acts as flood protection infrastructure for climate change resilience.

At this stage of project development, footprints for proposed activities and infrastructure have been generally defined. Additional detailed design will be completed in order to define their specific location and area within the 2,802 ha Development Envelope. It is anticipated that proposed activities and infrastructure will be limited to a combined total Area of Disturbance extent of no more than 2,241.6 ha (which represents approximately 80% of proposed Development Envelope).

Environmental Benefits

A large portion of the expanded Development Envelope is targeted at driving sustainability outcomes at Mt Weld, including:

- **Water management:** surface water management to capture seasonal rain events and divert water into managed aquifer / groundwater recharge that also forms flood protection infrastructure for climate change resilience. Additionally, installation and operation of a state-of-the-art water recycling plant will significantly reduce aquifer abstraction, and new borefields to provide additional brackish water supply to complement fresh water supply.
- **Sustainable power generation:** with a staged transition from diesel fuelled power generation to gas and then hybrid renewable power generation through solar, battery and wind to achieve a significant reduction in $C0_2$ emissions.
- **Tailings management:** Adoption of accelerated mechanical consolidation of tailings, which will result in 50% reduction in land required over the LOM, with further investment in research and development for efficient re-processing, in partnership with Murdoch University, Curtin University and the University of Western Australia.

Commitment to GHG Reduction

Lynas has confirmed its commitment to the Science Based Target initiative (SBTi) in the Lynas 2021 Environmental, Social Governance Report and released a Greenhouse Gas (GHG) Policy to coincide with the announcement. Lynas is now working to develop science-based GHG reduction targets in line with SBTi criteria and the Lynas GHG Policy, with the objective of limiting the global temperature increase to well-below 2°C. Lynas will announce the new targets once they have been officially validated by the SBTi.

Given the proposed initiatives to be implemented at Mt Weld to reduce its GHG footprint through the introduction of renewable electricity sources to its Mt Weld energy portfolio thereby limiting annual greenhouse emissions from the Proposal to below the EPA GHG guidance threshold of 100,000 t CO_2-e per annum, greenhouse gas emissions are not considered to be a key environmental factor.

Due to the critical nature of the materials produced, Lynas is focussed on reducing Scope 4 emissions as an input to green technologies, such as hybrid and electric vehicles, and emission reduction technologies like catalytic converters.

Environmental Regulation of Mt Weld Operations

The Mt Weld mine has been successfully operating with responsible environmental management since 2007, after being approved by the Minister for Environment in May 1998.

Environmental regulation of the Project is administered under:

- Ministerial Statement 476 (MS 476) issued under Part IV of the EP Act, which will be superseded by a new Ministerial Statement subject to approval of this Proposal.
- DWER Licence L8141/2007/2 issued under Part V of the EP Act, which will require amendment by DWER to accommodate prescribed activities under the Mt Weld LOM Proposal.
- Approved Mining Proposals and fourth iteration of Mine Closure Plan (MCP) under the *Mining Act, 1978* (Mining Act). A new Mining Proposal for the Mt Weld LOM Proposal will be submitted to the Department of Mines, Industry, Regulation and Safety (DMIRS).
- Radiological Council of WA requirements under the *Radiation Safety Act, 1975* (RSA). The Radiation Management Plan (RMP) (v10, dated 5 November 2021) for Mt Weld was approved by DMIRS on 21 March 2022. Future updates to the RMP to reflect any changes to activities or improvements in monitoring technology at Mt Weld will continue to be subject to approvals from the Radiological Council and DMIRS.
- Groundwater Licence (GWL) 171310(3) and a Groundwater Operating Strategy (GOS) under the *Rights in Water and Irrigation Act, 1914* (RIWI Act). MWM will seek the appropriate approval under the RIWI Act for any increase above the current GWL allocation limit[2].

[2] MWM proposes to extend the existing borefield in order to optimise raw water availability for expanded operations. New / amended approvals to develop and abstract water from proven resources will be scoped and applied for in consultation with DWER.

It is anticipated that proposed activities covered under the LOM Proposal can continue to be assessed and regulated under the above instruments or amendments thereto. This referral supporting document seeks to demonstrate that there are limited key environmental factors relevant to the Proposal, each of which can be managed to meet the EPA's objectives. MWM considers that a significant number of factors can be adequately assessed and regulated through other Decision-Making processes other than through Part IV of the EP Act.

Comprehensive Site Investigations

MWM has commissioned a comprehensive range of surveys and studies to assess the impacts of this Proposal on the full extent of the Development Envelope, to allow for flexibility within the Development Envelope to accommodate future infrastructure locations.

The surveys and studies listed below have informed the preparation of this referral supporting document, and include:

- Mt Weld Mine TSF Seepage Assessment (AECOM, June 2018)
- Heritage Site Identification (and Work Area Clearance) – Mt Weld Central Lanthanide Deposit (Tenements L38/224, G38/35, G38/34) (Taylor, 2019)
- Long-tailed Dunnart Desktop Assessment (Stantec, January 2019)
- Memorandum- Heritage Advice Australia Pty Ltd: Aboriginal Heritage Surveys – Results Summary (Heritage Advice Australia, October 2019)
- Report on Archaeological Assessment and Site Recording at Mount Weld Concentration Plant (Archae-aus, October 2019)
- Mt Weld Level 1 Subterranean Fauna Assessment (Stantec, November 2019)
- Mt Weld Proposed TSF Expansion Desktop Topsoil Resources Assessment (Stantec, 2019)
- Mt Weld Waste Materials Characterisation (Stantec, 2020b)
- Mt Weld Rare Earths Project: Detailed Flora and Vegetation Survey – Phase 2 (Stantec, February 2021)
- Mt Weld Rare Earth Project Level 2 and Targeted Terrestrial Fauna Survey (Stantec, November 2020)
- Technical Review – Mt Weld Rare Earth Project Level 2 and Targeted Terrestrial Fauna Survey (Onshore Environmental, December 2020)
- Technical Review – Mt Weld Rare Earths Project: Detailed Flora and Vegetation Survey (Onshore Environmental, February 2021)
- Report on Aboriginal Heritage Survey and Consultation for Lynas Mt Weld (Integritat, March 2022)
- Mt Weld Rare Earths Project: Proposed Disturbance Footprint Impact Memorandum (Onshore Environmental, April 2022)

MWM is confident that the studies conducted provide a comprehensive account of the potential environmental impacts associated with the LOM Proposal.

The key environmental factors relevant to the LOM Proposal and which are assessed in this document are summarised below.

Terrestrial Environmental Quality and Landforms

The mine area is located entirely within the BE15 regional soil unit (Stantec, 2019) which is described as gently undulating to low hilly pediments with stony and gravelly pavements and traversed by numerous seasonal streams. Chief soils are shallow earthy loams with shallow red earths, both underlain by red-brown hardpan. The results of the soil surveys previously undertaken for the site indicate that most of the soil materials at Mt Weld are likely to be physically and chemically benign.

At Mt Weld, achieving the objectives of this environmental factor is predominantly defined by:

- Maintenance of waste structure integrity, including the TSF and waste rock landforms.
- Understanding and managing the nature of the materials stored in the waste structures.
- Design, monitoring, and management of waste structures to avoid environmental impacts.

As part of the regulatory requirements of the Mining Act, MWM has prepared a MCP to document how the mine will be closed and decommissioned following the cessation of operations (Appendix G). The MCP presents detailed management actions and remedial strategies which demonstrate how terrestrial environmental quality will be maintained for the post-mining phase to support the agreed post-mining land use. The MCP has been approved by DMIRS and is subject to periodic review whereupon it will be updated to reflect closure of additional LOM components.

On this basis, neither Terrestrial Environmental Quality nor Landforms are considered significant environmental factors. MWM considers that sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

Flora and Vegetation

MWM has committed significant resources to conducting extensive terrestrial flora and vegetation surveys of the Proposal area and its surrounds, since 2003. A two-phase detailed flora and vegetation survey, covering the full extent of the Proposal area was undertaken by Stantec Australia Pty Ltd (Stantec) in 2020. These surveys were peer reviewed and independently assessed by Onshore Environmental to quantify the LOM Disturbance Envelope Impact for the full extent of the Development Envelope (Onshore Environmental, April 2022).

The flora and vegetation of Mt Weld are typical of the region and are dominated by a mulga woodland with some localised mallee and spinifex communities. The area suffers from overgrazing, primarily by cattle, horses, camels and rabbits, and has existing disturbance from historical exploration activities.

No rare or geographically restricted plant species are expected to occur within the Proposal area as no significant flora was recorded during the detailed 2020 survey. One Priority 3 species, *Goodenia lyrata* has previously been recorded within the survey area, in a location that has since been cleared. There is potential for *Goodenia lyrata* to occur following good seasonal rainfall, however, given the extensive representation of the associated vegetation type and known occurrence of *Goodenia lyrata* within multiple bioregions across Western Australia, the potential for any impact on this taxon within the proposed development footprint is considered to be low (Onshore Environmental, April 2022).

Fauna

As for flora and vegetation, MWM has commissioned extensive terrestrial fauna surveys, covering the full extent of the Proposal area with the most recent undertaken by Stantec (November 2020). This survey was peer reviewed and independently assessed to quantify the LOM impact for the full extent of the Development Envelope (Onshore Environmental, April 2022).

Species recorded during the detailed 2020 survey comprised 18 native mammals, five non-native mammals, 52 birds and 20 reptiles. Of these, three significant fauna species were confirmed as occurring during the survey – the Long-tailed Dunnart, Wood Sandpiper, and Common Sandpiper.

Seven broad fauna habitat types were identified within the survey area, and the land systems in which these habitats occur were considered typical of the East Murchison subregion. Within the survey area, the 'stony rise' and 'rocky ridge and outcropping' were the most important habitats on a local scale. These habitats are important to the listed Long-tailed Dunnart but were of limited extent within the survey area. Given that both habitats have been confirmed to extend at least 5 km to the north-west, any impact from clearing within the proposed Development Envelope is considered to be low.

Short-range endemic specimens were predominantly collected from within the 'mulga on clay loam' habitat. The 'mulga on clay loam' habitat is extensive and well connected within and surrounding the survey area, therefore impacts to most SRE taxa occurring withing the Development Envelope are expected to be low. One SRE taxon (*Buddelundia* '103') was recorded from the 'shrub plain' habitat which was classified as having medium SRE potential. A high proportion of the 'shrub plain' habitat represented within the Survey Area occurs within the Disturbance Envelope (82.76%), therefore potential impact to this taxon is determined to be moderate.

MWM is aware of a species of interest in the Goldfields region namely the Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*) which is a Threatened species that is listed as Critically Endangered under the *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act) and the *Biodiversity Conservation Act, 2016* (BC Act). The Arid Bronze Azure Butterfly has an obligate association with a sugar ant *Camponotus sp. nr. terebrans*. Specialist advice received from qualified field ecological consultants indicates that as the vegetation types required to support the host ant are not represented within the Mt Weld Project Area, the butterfly will not occur at the site.

Subterranean Fauna

A terrestrial fauna survey, covering the full extent of the Development Envelope was undertaken by Stantec in 2019. The findings of the subterranean fauna survey show the potential on the MWM site for subterranean fauna is negligible. Specific mitigation actions are not required other than the sound environmental management practices currently adopted at the MWM site through the implementation of Mt Weld's Environmental Management Programme.

Inland Waters

Inland waters occur in the vicinity of the Mt Weld mine, including groundwater resources and natural drainage into nearby surface water features (Lake Carey).

MWM and Goldfields Granny Smith mine site (GSM) have access to the groundwater resources of the Mt Weld carbonatite aquifer via an agreement with separate GWLs issued by DWER, for abstraction of 4 GL per year. The Mt Weld GWL 171310 allows for 2.8 GL with the GSM GWL 59529 allowing for 1.2 GL per year.

Mt Weld are committed to preserving the natural aquifer resource and have identified a process to recycle process water that will significantly reduce aquifer abstraction per unit of ore processed, enabling recycling rates from 20% to 90%; however, the increased ore processing volumes per annum will required additional aquifer abstraction. Mt Weld has identified potential alternate water resources outside of the Mt Weld carbonatite aquifer, but within the Mining and General Purpose Leases, that require further investigation to establish as a borefield. New / amended approvals to develop and abstract water from new borefields will be scoped and applied for in consultation with DWER.

Surface water management is a key consideration to protect site infrastructure from flooding impacts. Current surface water management for the site consists of three separate diversion channels. There is one major diversion channel to the east of the site which is designed to prevent the surface runoff from the large catchment area to the east entering the operational site. The eastern diversion drain has a sump with three water infiltration bores that connect surface runoff to the ground water aquifer creating a managed aquifer recharge (MAR). The other diversion channels are designed to control runoff from rainfall that occurs on the site itself, and northern diversion infrastructure is designed to protect the site from flooding from the north. It is proposed that some surface water flows from the north will be directed to a sump fitted with water infiltration bores to passively recharge the carbonatite aquifer.

A preferential flow path for surface water, which drains water to the south-west, is located on General Purpose Leases adjacent to proposed TSFs. Surface water management controls will be implemented to protect the TSF and waste rock landforms to ensure they are not located within these drainage lines. Initial investigations have identified potential groundwater sources within this area, and further water exploration is proposed to determine the feasibility for the establishment of a western borefield.

The current approved EMP includes a Surface Water Management Plan (SWMP), developed by MWM in accordance with Part V licence conditions, which was approved by DWER and demonstrates how potential surface water impacts associated with activities at the Mt Weld Rare Earths Project are currently mitigated by:

- Identifying areas susceptible to erosion and defining proposed management strategies that can be implemented to mitigate associated impacts; and
- Identifying potential sources of contaminants that require appropriate controls and containment to prevent the risk of an uncontrolled release to the environment.

Overall, ambient groundwater monitoring to date (in accordance with both DWER licence conditions and the GOS) indicates that operational activities at Mt Weld continue to have no significant impact on groundwater quality surrounding the Project, when compared to baseline data. Proposed surface and groundwater management commitments defined in this document, and subsequent applications under Part V of the EP Act and the Mining Act will demonstrate that potential impacts on inland waters as a result of implementing the LOM Proposal will be appropriately mitigated and managed.

On this basis, Inland Waters is not considered a significant environmental factor and that sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

Air Quality

The closest sensitive human receptors to the Mt Weld mine site are located at the Goldfields Granny Smith (GGS) accommodation camp located 10 km to the south-east. Emissions to air originating from the Proposal will be localised and are unlikely to result in any loss in amenity, regional air quality or impacts to biodiversity given the absence of sensitive environmental and human receptors in the vicinity of the Proposal area. The proposed Mt Weld accommodation village, located approximately 2 km to the west of the operational areas of the Mt Weld mine site, is not considered to be a sensitive receptor in the context of this referral as the health, safety and comfort of the MWM workforce will be administered by DMIRS under the *Mines Safety and Inspections Act, 1994* (MSIA). MWM proposes that emissions to air can continue to be regulated under Part V of the EP Act.

On this basis, Air Quality is not considered a significant environmental factor and that sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

Greenhouse Gas

In the worst-case scenario, it is projected that the annual greenhouse gas emissions associated with electricity generation will be 23,500 t CO_2-e/annum, with a further 17,960 t CO_2-e/annum of emissions coming from onsite mobile equipment fleet. Subject to sourcing alternative fuels for this process, diesel will also be combusted via burners for steam generation and concentrate drying with a projected 38,264 t CO_2-e/annum at full processing capacity. The total Scope 1 greenhouse gas emissions are therefore predicted to be approximately 81,357 t CO_2-e/annum, which falls below the EPA GHG guidance threshold of 100,000 t CO_2-e/annum. Furthermore, MWM, through its parent company, Lynas, has confirmed its commitment to the SBTi, and is committed to pursuing an increase in the proportion of renewable energy production to supplement fossil fuel energy consumption over the life of the Proposal and propose to construct a hybrid power station, including a solar array, wind turbines and battery storage.

Greenhouse gas emissions are therefore not considered to be a key environmental factor.

Social Surrounds

It is anticipated that the LOM expansion, will result in approximately 280 containers being transported from Mt Weld to Leonora rail siding each week, which equates to approximately 16 truck dispatches per day over a 6-day week. Including movements returning containers back to Mt Weld, this equates to approximately 31 truck movements over a 12-hour day. This equates to an increase in truck traffic for Laverton of approximately 29% and 14% for Leonora. It should be noted that in absolute numbers, this is represented by an increase of less than 3 trucks per hour in these areas. This represents a moderate traffic increase at a district level, which can readily be accommodated by the district road network, without notable effects on public amenity in terms of traffic volumes.

A robust Transport Management Plan (TMP), supported by an Emergency Response Plan, is currently implemented at the Mt Weld are Earths Project to identify and manage unplanned events such as traffic accidents associated with vehicle movements. Both plans will be revised to reflect changes to Project transport management as a result of the LOM.

The EPA previously considered (Report 646) that noise, dust, atmospheric emissions, and visual impacts resulting from construction and operating activities would have minimal and manageable impacts on the environment at Mt Weld. These issues are presently regulated and managed under the DWER Works Approval and Licence (L8141/2007/2) currently in place.

Heritage

The Mt Weld area has been subject to several Ethnographic and Archaeological surveys dating back to 1983 with a further comprehensive Aboriginal Heritage survey undertaken by heritage consultants Integritat across the LOM Development Envelope between 14 February 2022 and 18 February 2022 (Integritat, March 2022). The survey included a desktop assessment to review existing heritage survey reports, in addition to a comprehensive heritage survey for the Proposal area.

Three registered sites were identified during the desktop review, and it was determined that none of these places will be impacted by Proposal activities. Nine stored data sites were also identified in the broader Development Envelope, in addition to eight previously recorded Aboriginal heritage places adjacent to the survey areas. The 2022 heritage survey was conducted in collaboration with members of the Nyalpa Pirniku Native Title Claimant group, who expressed broad support of the Proposal, and no new heritage sites were identified during the survey (Integritat, March 2022). Three sites, previously recorded in 2019 by Archae-aus, were revisited during the survey.

MWM has committed to establishing a Social Surrounds and Cultural Heritage Management Plan (SSCHMP), in consultation with the Nyalpa Pirniku Native Title Claimant group. The SSCHMP will be implemented to ensure future best-practice management of Aboriginal heritage sites across the Proposal area, to ensure that risks to heritage sites are minimised. With mitigation and management measures in place, the Proposal will have minimal impact on sites of indigenous heritage significance.

Consent to disturb identified registered sites will require further consultation with the Nyalpa Pirniku Native Title Claimant group under Section 18 of the *Aboriginal Heritage Act, 1972* (AHA). On this basis, Heritage is not considered a significant environmental factor and that sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

Human Health

MWM has extensive experience in managing naturally occurring radioactive materials (NORM) likely to be present in the processes and operations of the LOM Proposal. A robust RMP is in place and has been implemented to manage any residual impacts.

The closest sensitive human receptors to the Mt Weld mine site at the GGS accommodation camp is located 10 km to the south-east and beyond the influence of operations.

Previous assessment of operations at Mt Weld have found that radiation impacts are not expected to present a risk to environment and human receptors outside the premises boundary (DWER, 2020).

The LOM Proposal will produce tailings which contain NORM, that is continually monitored. Through the implementation of a thorough, sound, and long-standing management programme, residual impacts will be negligible. Mt Weld's tailings contain a significant grade of REs and with research and process development are likely to be retreated over the LOM before final long-term storage and closure.

Additionally, the Kalgoorlie REPF, which has been approved by the EPA under MS 1181, will process RE concentrate from the Mt Weld mine to produce a RE carbonate product. By-products generated by the REPF include IP, to which the NORM from the Mt Weld concentrate reports, and non-radioactive gypsum.

IP and gypsum by-products may be transported back to Mt Weld, or to an alternative approved facility, for long-term storage. This approach was proposed to the EPA via a Section 43(a) Change to the Proposal During Assessment for the REPF (dated 9 September 2021). In its Notice, the EPA acknowledged this approach, stating that:

> "The by-products will instead be returned and stored in mine waste areas at the Mt Weld mine site, near Laverton. The transport and storage of the by-products is covered by the approval of the Mt Weld Rare Earths Project under Ministerial Statement 476."

The LOM activities include the ability to receive, manage and safely store by-products at Mt Weld.

The RMP (v10, dated 5 November 2021) has been revised to include transport of RE concentrate from Mt Weld to the REPF, and was approved by DMIRS on 21 March 2022. The RMP is revised on an iterative basis and will continue to be revised in consultation with DMIRS and the Radiological Council to incorporate LOM components as required.

While minimal radiation exposures will continue to be detectable as part of Mt Weld operations, MWM is able to demonstrate that neither employees, members of the public, nor the environment would be adversely impacted by radiation from Mt Weld operations under this Proposal. It should be noted that the levels of radionuclides in the ore will decrease across the LOM, in line with the anticipated mining and processing of lower grade ores with lower inherent radioactivity. Exposure of workers and members of the public is therefore not expected to increase over the LOM, despite increases to production volumes.

Notwithstanding, Mt Weld operations will continue to be regulated by the Radiological Council and DMIRS, and managed in accordance with the current RMP, as approved. It is therefore concluded that there are unlikely to be any detrimental effects from the LOM Proposal on the Human Health environmental factor.

On this basis, radiation impacts on human health are not considered a significant environmental factor and that sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

Cumulative Impacts

MWM has considered the potential cumulative impacts of the LOM Proposal relative to relevant environmental factors, specifically the successive, incremental and interactive impacts on the environment of the Proposal with past, present and reasonably foreseeable future activities associated with the LOM Proposal.

Cumulative impacts, as applicable to the following key environmental factors, have been assessed:

- Flora and vegetation;
- Terrestrial fauna; and
- Inland waters.

The potential cumulative impacts on the following environmental factors were also considered, and concluded to present a negligible risk, given the nature and scale of the predicted impact, location of the Project relative to nearest sensitive receptors, existing and proposed mitigation measures and regulatory controls imposed on the Project:

- Air quality;
- Greenhouse gas;
- Heritage; and
- Radiation.

Further discussion is presented under respective environmental factor chapters and Section 16.

Track Record

MWM and its parent company, Lynas, have an exemplary record of environmental management. In Western Australia, MWM, has been operating the Mt Weld mine and RE Concentrator since 2011. In Malaysia, Lynas has been operating the Lynas Advanced Materials Plant (LAMP) since 2013. Both operations are regularly audited, and Lynas has received several awards for the environmental management of the sites with LAMP awarded two Gold Medals in EcoVadis Sustainability Ratings in 2020 and 2021, placing Lynas in top 5% of companies evaluated. In June 2022, MSCI awarded Lynas an 'AA' Environmental, Social, Governance (ESG) rating, which only 8% of companies in the Metals and Mining – Non-Precious Metal industry are rated. As a responsible producer, Lynas honours commitments to the United Nations Global Compact offering mine to magnet traceability participating in Life Cycle Assessments and verification initiatives.

Lynas was recently listed as a finalist for the Golden Gecko Awards for Environmental Excellence[3], administrated by DMIRS, which will be awarded in September 2022. The Golden Gecko Awards recognise leading practice and innovation in environmental management and provide an opportunity to share experiences between government, industry and the community. Lynas' submission is for the adoption of the accelerated mechanical consolidation process for tailings management at Mt Weld, which will result in a 50% reduction in the total tailings footprint over the LOM.

In January 2022, MWM commissioned an independent compliance audit against all environmental legal obligations and commitments relevant to the current Mt Weld Rare Earths Project. No non-compliances were identified in relation to implementation of conditions prescribed in MS 476, DWER licence L8141/2007/2, Tenement Conditions or active Mining Proposals. In addition, the audit concluded that environmental management systems and processes are generally adequate to support substantial compliance and ensure that key environmental risks are appropriately managed.

Management Systems

MWM holds triple ISO certification of its Integrated Management System (Health and Safety, Environment, Quality) in Western Australia. This management programme forms a key part of Mt Weld's Environmental Management System (EMS), with supporting documents developed to implement the objectives outlined within the EMP. The monitoring and management outcomes of the MWM EMP are subject to annual third-party audit and are reported annually in the Annual Environmental Report (AER).

[3] http://www.dmp.wa.gov.au/News/Diverse-resource-projects-30516.aspx

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1 INTRODUCTION

1.1 Existing Mt Weld Operations

Mt Weld Mining Pty Limited (MWM), a subsidiary of Lynas Rare Earths Limited (Lynas), operates the Mt Weld Rare Earths Project (the Project) The Project was originally approved under Ministerial Statement 290 (MS 290) in 1992, which was superseded by Ministerial Statement 476 (MS 476) in May 1998.

The Project is located 35 kilometres (km) south-east of Laverton in the Northern Goldfields Region of Western Australia (Figure 1-1).

The major existing components of the Mt Weld Rare Earths Project (Figure 1-2) as listed in Attachment 7 of MS 476 Schedule 1 are:

- A rare earths (RE) mine pit;
- Infrastructure (water supply, roads, etc.);
- Beneficiation plant (which includes power generation and water treatment);
- Tailings storage facilities (TSFs);
- Evaporation ponds; and
- Waste / low grade ore stockpiles.

Environmental regulation and management of potential environmental impacts from the Project is administered through:

- *Environmental Protection Act, 1986* (EP Act) Part IV Ministerial Statement 476.
- The approved Environmental Management Programme (EMP).
- *Environmental Protection Act* Part V Licence L8141/2007/2.
- An approved Mining Proposal and Mine Closure Plan (MCP) under the *Mining Act, 1978* (Mining Act).
- Radiological Council requirements under the *Radiation Safety Act, 1975* (RSA).
- Department of Water and Environmental Regulation (DWER) Groundwater Licence (GWL) 171310(3) a Groundwater Operating Strategy (GOS) under the *Rights in Water and Irrigation Act, 1914*.

1.2 Global Driver for the Mt Weld Life of Mine Proposal

REs are included on the critical mineral lists of a number of countries worldwide, including the Australian Government's "Australia's Critical Mineral Strategy 2022", the United States' "Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals" and the European Union's "2020 List of Critical Raw Materials".

REs are used in a variety of global industries and are highly valued because of their specific optical, magnetic and catalytic properties. China has historically dominated the global supply of RE materials, however, in recent years, Lynas has become the world's only significant producer of separated RE products outside of China.

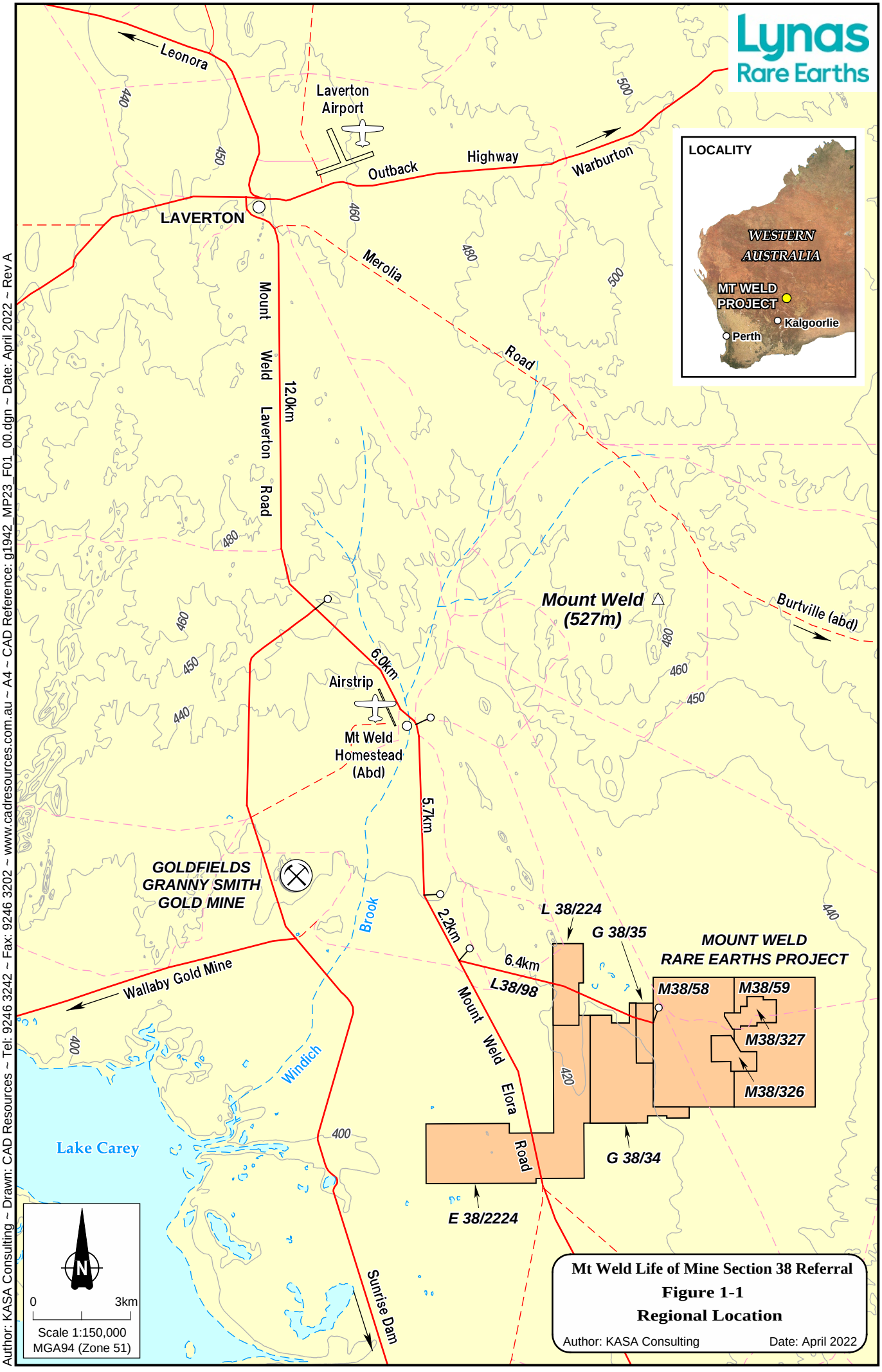
At the global level, the continued use and application of REs from Mt Weld, will yield significant environmental benefit through the innovation and the technological advancements facilitated by the use of RE products. The materials Lynas produces are essential inputs to future-facing technologies designed to lower emissions and reduce energy consumption, as well as improve the efficiency, performance, speed, durability, and thermal stability of these emerging technologies. This includes permanent magnet motors for green technologies, such as electric vehicles and wind turbines.

With the global demand for REs, such as Neodymium, Praseodymium, Dysprosium and Terbium, forecast to grow significantly with the electrification of vehicles, Lynas plans to increase production to meet this growing global demand. This will include the expansion of its West Australian and Malaysian Operations and new enterprise in the United States, subject to finalisation of arrangements with the United States government.

In Western Australia, this expansion includes the construction of a Rare Earths Processing Facility (REPF) at Kalgoorlie, which will necessitate the expansion of Mt Weld operations to a life of mine (LOM) extent.

At the local and regional level, the LOM Proposal has the benefits of providing an economic stimulus to an area that has a demonstrated need for employment opportunities for its residents and an increase in business activity for its industries.

The Mt Weld ore body is recognised as a Tier 1 long life, high grade RE deposit. At current production rates, Mt Weld Ore Reserves are 23 years of supply. At the proposed increased ore processing rates, additional drilling will be required to expand Mineral Resources and to assess the modifying factors for converting Mineral Resources to Ore Reserves, in order to maintain sufficient Ore Reserves for the Project.



Author: KASA Consulting ~ Drawn: CAD Resources ~ Tel: 9246 3242 ~ Fax: 9246 3202 ~ www.cadresources.com.au ~ A4 ~ CAD Reference: g1942_MP23_F01_00.dgn ~ Date: April 2022 ~ Rev A

1.3 Administrative Context

MWM had originally proposed that the LOM Proposal would proceed through a change to the existing approvals under Section 45C, concurrently with a change to contemporise Ministerial Conditions under Section 46 of the EP Act. Most recently, discussions with the Environmental Protection Authority Service division (EPA/s) have concluded that a new referral under Section 38 of the EP Act is a more appropriate process through which to document and assess the environmental impact of the LOM Proposal.

Moreover, commitments defined in MS 476 are considered largely redundant as the majority have been completed or are no longer applicable. In such circumstances, the Environmental Protection Authority (EPA) has preferred to replace any relevant commitments with more contemporary conditions as appropriate to enable effective regulation and auditing.

Based on the Section 45C approval advice received from the EPA on 22 January 2018, the EPA advised that:

> *"As discussed at our meeting on the 24 October 2017, the Mt Weld Mining Project proposal has now undergone six section 45C changes, it would seem likely that any further changes to the proposal would increase impacts significantly beyond those of the original proposal. You are therefore advised that it is unlikely that any further applications to change the proposal will be approved without submission of a revised proposal."*

Due to protracted delays in EPA/s assessing a subsequent proposal from MWM to modify conditions and to expand its operations, the need to commence Mining Campaign 4 became time critical in 2018. The EPA subsequently accepted receipt of and approved a seventh Section 45C application submitted by MWM to increase the Development Envelope and Area of Disturbance to allow mining to continue.

Subsequent meetings with the EPA Chairman (on 5 November 2018 and 30 May 2019) and with officers from EPA/s thereafter (on 21 March 2019 and 6 February 2020), reiterated the 22 January 2018 advice. EPA/s emphasised that the advice was also based on recent legal counsel received by EPA/s, that regardless of the significance or otherwise of potential environmental impacts, progressive and multiple extensions of the Project Area of Disturbance and Development Envelope under various Section 45C approvals could be construed as cumulative changes beyond the original scope and scale assessed and approved under MS 476.

The primary focus of the proposed change relates to an expansion of the Development Envelope and associated Area of Disturbance footprint of the Project to accommodate the LOM activities into the next 23 years of project life. Accordingly, advice from EPA/s to MWM has been to determine the LOM maximum extent and reflect this in a new Section 38 referral, and to refer the project as a Revised Proposal.

This referral supporting document seeks to define a Project Area of Disturbance and Development Envelope for the foreseeable life of the Project (23 years from now). While precise Area of Disturbance boundaries are not able to be defined for all future infrastructure at this stage, MWM has invested significant resources to ensure that all terrestrial surveys, particularly flora, fauna and heritage have encompassed the entire Development Envelope in order to demonstrate that no constraints exist for the Proposal.

MWM considers that while specific detail on Areas of Disturbance will be subject to further technical feasibility and logistical assessments by MWM in the coming years, that the Proposal can be adequately assessed and regulated through progressive approvals under other decision-making processes. Further discussion on the application of other decision-making processes under Sections 38(G4) and 44(2AA) is presented in Section 1.6.9.

1.4 Purpose of this Report

This report has been prepared to support the formal referral of the Proposal under Section 38 of the EP Act. It describes the Proposal, potential environmental impacts, proposed mitigation measures and environmental outcomes associated with the Mt Weld LOM expansion.

This report has been prepared in accordance with *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2021*.

1.5 Proposal Summary

The Mt Weld LOM Proposal is summarised in Table 1-1 below.

Table 1-1: Proposal Summary

Proposal Title:	Mt Weld Rare Earths Project – Life of Mine Proposal
Proponent Name:	Mt Weld Mining Pty Limited
Short Description:	Construction and Operation of a Rare Earths mine and processing plant to its Life of Mine extent.
Development Envelope:	2,802 Development Envelope
Area of Disturbance:	Up to 2,241.6 ha Area of Disturbance within Development Envelope.
Tailings Dam Area:	170 ha Area of Disturbance within Development Envelope.
Major Components	• Pit • Infrastructure (water supply, roads, etc.) • Beneficiation Plant • Tailings Storage Facilities • Evaporation Ponds • Waste / Low-grade Ore Stockpiles • Waste Rock and By-product Landform • Hybrid Power Station • Extended Borefield Network • Accommodation Village

At this stage of project development, footprints for proposed activities and infrastructure have been generally defined. Additional detailed design will be completed in order to define their specific location and area within the Development Envelope. It is anticipated that proposed activities and infrastructure will be limited to a combined total Area of Disturbance extent of no more than 2,241.6 ha (which represents approximately 80% of proposed Development Envelope).

As shown in Figure 1-2, the increased Area of Disturbance will allow for expansions to the Mine Pit, Tailings Storage Areas (including additional TSFs), Waste Rock Landform / By-product Storage and Evaporation Pond Area, expansion of the existing ROM Pad, additional stockpile areas, new infrastructure areas (to incorporate changes to the plant processing area) a worker accommodation camp and extension to the borefield network.

A key component of future operations will be the introduction of significant renewable electricity injection into the site's energy portfolio through solar and wind turbine power generation.

Additional details of the expansion components are set out in Section 2 of this report. The current MS 476 (Attachment 7, September 2020) is attached as Appendix A.

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Lynas Rare Earths

N

0 500m

Scale 1:25,000
MGA94 (Zone 51)

450000mE 452000mE 454000mE 456000mE 458000mE

6810000mN 6808000mN 6806000mN 6804000mN

L 38/224
L 38/093
Main Access Road
G 38/34
G 38/35
E 38/2224
M 38/58
M 38/59
M 38/327
M38/326
L 38/327
E 38/2935
E 38/2935

Indicative Wind Turbines
Indicative Sewage Facility
Indicative Irrigation Area Location
Indicative Access Road
Indicative Village and associated Infrastructure
Indicative Solar Farm
Indicative Waste Rock Landform
Indicative Water Diversion Drain
Indicative Services Corridor
Indicative Waste Rock Landform
Northern Cut Off Drain
Indicative Low Grade Stockpile Area
Indicative MAR Sump Area
Indicative Water Diversion Drain
Indicative Mining Access Road
Indicative Hybrid Power Plant
Indicative Waste Rock Landform
Indicative Waste Rock Landform
Indicative Mining Infrastructure Area
Exploration Shed
Process Plant & Infrastructure Area
Indicative Plant Infrastructure
Concentrator Plant
Plant Run Off Pond
ROM Pad
TSF3
TSF1
TSF2
Turkeys Nest
Alluvium Stockpile Area
Turkeys Nest
Waste Rock Landform
Proposed Pit Shell
Indicative Waste Rock Landform
Flood Control Bund
Indicative Wind Turbines
Indicative Western Borefield
Indicative TSF Area
Indicative Topsoil Stockpiles
Indicative Haul Road
Mining Contractors Yard
Evaporation Ponds
Indicative Water Diversion Drain / Bund
Indicative TSF Area
Indicative Evaporation Pond
Carbonatite
Boundary
Indicative Eastern Palaeochannel Borefield
Indicative Tailings Dry Stack Area
Indicative Alluvium Stockpile Area
Storm Water Diversion Channel
Indicative Evaporation Ponds

LEGEND

- Tenement Boundary
- Proposed LoM Development Envelope
- Approved Area of Disturbance
- Indicative Area of Disturbance Extent (up to 2241 ha within Development Envelope)
- Carbonatite Boundary

Overview

Etora - Mount Weld Road

Mt Weld Life of Mine Section 38 Referral

Figure 1-2

Existing Infrastructure and LOM Proposal

Author: KASA Consulting Date: April 2022

1.6 Legislative Context

1.6.1 Environmental Protection Act, 1986 – Part IV

The amended Proposal will require a new set of contemporary environmental conditions to replace the existing conditions and commitments of MS 476.

It is MWM's view that many of the conditions and commitments of MS 476 are no longer applicable as they:

- Are out-dated and can be addressed through more contemporary administrative conditions.
- Do not reflect the current processes or operational activities at Mt Weld.
- Relate to project components that are no longer applicable.
- Are currently effectively regulated through other government agencies and regulatory instruments, therefore presenting a duplication in regulation of some environmental factors.
- Can be managed through more contemporary conditions like those applied to other projects.

In earlier consultation with EPA/s in 2017, the Department advised that the above changes to Ministerial Conditions and Commitments in MS 476 would need to be assessed under Section 46 of the EP Act (EPA Assessment Number 2114, dated 22 February 2017). In summarising the proposed modifications, MWM conducted a review of each auditable element of MS 476 as detailed in Appendix B of this report. This table formed the basis of the Section 46 request to the EPA and is presented here both as relevant background but also as MWM's position with regard to the application of any new Ministerial Conditions as part of the LOM Revised Proposal. Further discussion on this history is presented in Section 17.

Aside from standard administrative conditions applying to all Ministerial Statements, MWM considers that appropriate conditions should be applied to the Proposal that address the relevant key environmental factors. MWM has proposed a new set of conditions to address EPA and stakeholder objectives, which include the following:

- Surface and Groundwater Management – including a requirement to maintain and implement a Surface and Groundwater Management Plan; and
- Terrestrial Fauna Management – Fauna Management Plan will be revised in consultation with EPA for accommodation facilities on L38/224.

Note that decommissioning and rehabilitation, including a requirement to prepare and implement a Decommissioning and Rehabilitation Plan, will be regulated by the Department of Mines, Industry Regulation and Safety (DMIRS) under the approved MCP and Radiation Management Plan (RMP).

The MCP (v4, dated 30 March 2021) was accepted by DMIRS in July 2021. The RMP (v10, dated 5 November 2021) was approved by DMIRS on 21 March 2022.

Similarly, the transport of RE concentrate from Mt Weld to Kalgoorlie and of by-products from Kalgoorlie to Mt Weld will be addressed in an update to the Mt Weld Transport Management Plan (TMP), regulated by the Radiological Council.

The monitoring regime that is presently in place for the mine operations is detailed in Appendix C.

1.6.2 Environmental Protection Act, 1986 – Part V

EP Act Part V Licence L8141/2007/2 regulates the operations at Mt Weld. This instrument will require amendment over the LOM. Several environmental factors to be dealt with in the LOM Proposal are currently managed under the current Part V licence, including:

- Premises Operation:
  - Production / design capacity
  - Containment infrastructure (and associated inspections)
  - Management of waste (incl. wastewater)
  - Dust suppression
- Process and ambient environmental quality monitoring and reporting.

1.6.3 Rights in Water and Irrigation Act, 1914

DWER GWL 171310(3) is currently in place. The licence does not require amendment to allow MWM to continue to abstract water for construction and operational purposes for the LOM. MWM will apply for a Licence to Take Water for new borefields identified over the LOM, should a new licence be required.

1.6.4 Environmental Protection and Biodiversity Conservation Act, 1999

As part of its expansion strategy, Lynas gained Ministerial approval (MS 1181) to construct a REPF near the town of Kalgoorlie. As there is presence of Naturally Occurring Radioactive Materials (NORM) in the Mt Weld RE concentrate feed and in the iron phosphate (IP) by-product produced by the REPF, the REPF proposal was referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the *Environmental Protection and Biodiversity Conservation Act, 1999 Act* (EPBC Act) to assess whether the Proposal triggered the definition of "Nuclear Action" under the EPBC Act (Section 22(1)(g)) and the EPBC Regulations (Regulation 2.02). Lynas proposed that all potential impacts could be fully managed and regulated through State-based legislation administered by the WA EPA, DWER, Radiological Council of WA and DMIRS.

In response to the EPBC referral, DAWE determined that the REPF is not a controlled action and approval under the EPBC Act was not required.

MWM considers the decision above sets a precedent for the Mt Weld LOM Proposal and consequently has not referred this Proposal to DAWE. Further justification demonstrating that the LOM Proposal does not trigger the need to refer under the EPBC Act is discussed in Section 14.

1.6.5 Mining Act, 1978 – Mining Proposal

A Mining Proposal will be submitted to DMIRS. The key environmental issues to be presented in the Mining Proposal are:

- Materials characterisation
- Hydrology
- Biodiversity, flora, fauna, and ecosystems
- Environmental threats
- Mine operations and closure
- Tailings and by-product management

The extent of land disturbance relative to any approved Development Envelope and Areas of Disturbance outlined within this Proposal will be refined in Mining Proposal applications, to be progressively submitted at each stage of the Project's LOM development.

1.6.6 Radiation Safety Act, 1975 – Radiological Council

The Radiological Council is an independent statutory authority appointed under Section 13 of the RSA to administer the RSA and to advise and assist the Minister for Health to protect public health and to maintain safe practices in the use of radiation. The subsidiary regulations to the RSA are the Radiation Safety (General) Regulations 1983, the Radiation Safety (Transport of Radioactive Substances) Regulations 2002 and the Radiation Safety (Qualifications) Regulations 1980.

The Radiological Council is responsible for regulating the operation, use, manufacture, storage, transport, sale, possession, installation, service, maintenance, repair, or other dealings with any prescribed radioactive substances, irradiating apparatus, or electronic product. This encompasses both ionising and non-ionising radiation.

The registration of certain premises, prescribed radioactive substances, irradiating apparatus and electronic products, and the licensing of individuals (including the licensing of the Radiation Safety Officer (RSO)), are the principal means by which the use of radiation is regulated.

An approved RMP is currently in place for existing operations. The operations will continue to be regulated by the Radiological Council and DMIRS and managed in accordance with the current RMP as approved. This RMP will be revised and extended to incorporate the LOM Proposal and will require approval from the Radiological Council and DMIRS.

1.6.7 Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations, 2007

The LOM Proposal will continue to involve chemical storage on site, managed under Mt Weld's Dangerous Goods Licence (DGS021014) and Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007. Amendments to the Dangerous Goods Licence will be undertaken as required.

1.6.8 Local Government Act, Health Act and Planning Act

An application for installation of a sewage treatment plant to the Shire of Laverton (including a licence from the Department of Health (DoH) through the Shire) will be required for the sewerage treatment facility for the accommodation camp. A Development Application (DA) will also be required from the shire under the *Planning and Development Act, 2005*.

1.6.9 EPA Assessment and Decision Making – Relevant Policy and Guidance

In preparing this Section 38 referral Supporting Document, reference to and consideration of the following key guidance documents has been made to ensure that the assumptions and methodologies applied in the environmental assessments are consistent with approaches prescribed by the EPA, including but not limited to:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2021
- Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual
- Statement of Environmental Principles, Factors and Objectives
- Various EPA Environmental Factor guidelines and technical guidance (as relevant to Land, Water, Air, People)
- Interim Guidance – Taking decision-making processes into account

The purpose of the Interim Guidance is to provide guidance to Decision Making Authorities (DMAs), proponents and the public on matters that the EPA may consider when taking into account other statutory decision-making processes which can mitigate the potential impacts of a proposal on the environment. The Interim Guidance has been provided following amendments to the EP Act in 2021 and is provided as "interim" as the EPA is working with DMAs to develop agreed standard processes for circumstances where the EPA may take into account another DMA process that can mitigate potential environmental impacts.

The Interim Guidance reflects the powers within certain sections of the EP Act that expressly provide for the EPA or Minister for the Environment to take into account other statutory decision-making processes which can mitigate and adequately regulate potential environmental impacts associated with a Proposal.

Specifically:

- Section 38G(4): In making its decision whether to assess a referred proposal, the EPA may take into account other statutory decision-making processes that can mitigate the potential impacts of the Proposal on the environment.
- Section 44(2AA): In considering key environmental factors and any recommendations that may be included in its assessment report on a proposal, the EPA may take into account other statutory decision-making processes that can mitigate the potential impacts of the Proposal on the environment.

MWM considers that the Interim Guidance, which embodies the EPA's ability to rely on Sections 38G(4) and 44(2AA), are specifically relevant to the MWM LOM Proposal for most of the key environmental factors. The Proposal does not introduce new Environmental Factors, with the exception of the Social Surroundings (Heritage) Factor, but may alter the location, nature and scale of the associated impacts. Existing EMPs, which have been prepared in accordance with MS 476 and have been approved by the EPA, will continue to be implemented and revised, where necessary, to ensure that any potential environmental impacts associated with the Proposal will be appropriately managed.

The Key Environmental Factors and recommended decision-making processes are summarised in Table 1-2 below, the basis of which should be considered in the context of information, data and evidence provided for each factor throughout this report. Where applicable, Table 1-2 also summarises how existing regulatory conditions or other statutory decision-making processes, currently imposed on the Mt Weld Rare Earths Project through current instruments, ensure that proposed environmental outcomes are achieved to meet the EPA's objectives. A register of applicable conditions across relevant legal instruments is provided for reference as Appendix D.

Table 1-2: Summary of Key Environmental Factors and Recommended Decision-Making Process for Assessment and Regulation

EPA Factor	Proposal Impact	Alt. Decision-Making Process	Decision-Making Process	DMA	Instrument / Obligation		
Land							
Flora and Vegetation	• No Declared Rare Flora or significant species except one historical P3 (now removed) • No TECs/PECs • Clearing • Weeds • Vegetation types well represented	N	Ministerial Statement Disturbance Envelope and Clearing Limit	EPA	MS 476 to be superseded by Schedule 1 of Revised Proposal Ministerial Statement.		
		Y	Tenement Conditions / Mining Proposals under the Mining Act	DMIRS	**Tenement**	**Condition No.**	**Aspect**
					E38/2224; E38/2395	2; 2	Disturbance / Rehabilitation
					L38/98	3, 12, 22, 23, 26, 27, 31	Disturbance / Landforms / Rehabilitation
					L38/224	10, 13	Fire / /Rehabilitation
					M38/58	2, 5, 7, 8, 11, 23, 24, 25, 27, 32, 35,	Disturbance / Landforms / Rehabilitation
					M38/59	2, 5, 6, 7, 8, 11, 12, 14, 18, 20, 21, 23, 26	Disturbance / Landforms / Rehabilitation
					M38/326	4, 7, 8, 9, 10, 13, 14, 16, 24, 25	Disturbance / Landforms / Rehabilitation
					M38/327	4, 7, 8, 9, 10, 13, 14, 16, 19, 24	Disturbance / Landforms / Rehabilitation
					MCP (Appendix G)		
Landforms	• Construction of waste rock landforms has the potential to alter the landscape and local amenity • Mine Closure	Y	Tenement Conditions / Mining Proposals / Mine Closure Plan under the Mining Act	DMIRS	**Tenement**	**Condition No.**	**Aspect**
					E38/2224; E38/2395	2; 2	Disturbance / Rehabilitation
					L38/98	3, 12, 22, 23, 26, 27, 31	Disturbance / Landforms / Rehabilitation
					L38/224	10, 13	Fire / Rehabilitation
					M38/58	2, 5, 7, 8, 11, 24, 25, 27, 32, 35,	Disturbance / Landforms / Rehabilitation
					M38/59	2, 5, 6, 7, 8, 11, 12, 14, 18, 20, 21, 23, 26	Disturbance / Landforms / Rehabilitation
					M38/326	4, 7, 8, 9, 10, 13, 14, 16, 24, 25	Disturbance / Landforms / Rehabilitation
					M38/327	4, 7, 8, 9, 10, 13, 14, 16, 19, 24	Disturbance / Landforms / Rehabilitation
					MCP (Appendix G)		

<table>
<tr><th>EPA Factor</th><th>Proposal Impact</th><th>Alt. Decision-Making Process</th><th>Decision-Making Process</th><th>DMA</th><th colspan="3">Instrument / Obligation</th></tr>
<tr><td>Subterranean Fauna</td><td>• Project area does not provide prospective habitat for subterranean fauna</td><td>N/A</td><td>N/A</td><td>N/A</td><td colspan="3">N/A</td></tr>
<tr><td rowspan="8">Terrestrial Environment Quality</td><td rowspan="8">• Soil contamination</td><td rowspan="8">Y</td><td>DWER Licence L8141/2007/2 under Part V of EP Act</td><td>DWER</td><td colspan="3">Licence Conditions 1.2.1, 1.3.1, 1.3.3, 1.3.4, 1.3.5, 1.3.7, 1.3.8, 3.2.1, 3.3.1.</td></tr>
<tr><td rowspan="7">Tenement Conditions / Mining Proposals / Mine Closure Plan under the Mining Act</td><td rowspan="7">DMIRS</td><td>Tenement</td><td>Condition No.</td><td>Aspect</td></tr>
<tr><td>E38/2224; E38/2395</td><td>3; 3</td><td>Waste / Rehabilitation</td></tr>
<tr><td>L38/98</td><td>12, 22,</td><td>Waste / Rehabilitation</td></tr>
<tr><td>M38/58</td><td>7, 24, 26, 33,</td><td>Waste / Rehabilitation</td></tr>
<tr><td>M38/59</td><td>6, 8, 21, 22, 24,</td><td>Waste / Rehabilitation</td></tr>
<tr><td>M38/326</td><td>5</td><td>Waste / Rehabilitation</td></tr>
<tr><td>M38/327</td><td>5, 8,10, 23, 24</td><td>Waste / Rehabilitation</td></tr>
<tr><td rowspan="11">Terrestrial Fauna</td><td rowspan="11">• No threatened or significant species
• Habitat clearing
• Direct impact</td><td>N</td><td>Ministerial Statement Disturbance Envelope and Clearing Limit</td><td>EPA</td><td colspan="3">MS 476 to be superseded by Schedule 1 of Revised Proposal Ministerial Statement.</td></tr>
<tr><td rowspan="10">Y</td><td rowspan="10">Tenement Conditions / Mining Proposals under the Mining Act</td><td rowspan="10">DMIRS</td><td>Tenement</td><td>Condition No.</td><td>Aspect</td></tr>
<tr><td>E38/2224; E38/2395</td><td>1, 2; 1, 2</td><td>Fauna / Disturbance / Rehabilitation</td></tr>
<tr><td>L38/98</td><td>3, 12, 22, 23, 26, 27, 31</td><td>Disturbance / Landforms / Rehabilitation</td></tr>
<tr><td>L38/224</td><td>10, 13</td><td>Fire / Rehabilitation</td></tr>
<tr><td>M38/58</td><td>2, 5, 7, 8, 11, 24, 25, 27, 32, 35,</td><td>Disturbance / Landforms / Rehabilitation</td></tr>
<tr><td>M38/59</td><td>2, 5, 6, 7, 8, 11, 12, 14, 18, 20, 21, 23, 26</td><td>Disturbance / Landforms / Rehabilitation</td></tr>
<tr><td>M38/326</td><td>3, 4, 7, 8, 9, 10, 13, 14, 16, 24, 25</td><td>Fauna / Disturbance / Landforms / Rehabilitation</td></tr>
<tr><td>M38/327</td><td>3, 4, 7, 8, 9, 10, 13, 14, 16, 19, 24</td><td>Fauna / Disturbance / Landforms / Rehabilitation</td></tr>
<tr><td colspan="3">MCP (Appendix G)</td></tr>
</table>

<table>
<tr><th>EPA Factor</th><th>Proposal Impact</th><th>Alt. Decision-Making Process</th><th>Decision-Making Process</th><th>DMA</th><th colspan="3">Instrument / Obligation</th></tr>
<tr><td colspan="8">Water</td></tr>
<tr><td rowspan="7">Inland Waters</td><td rowspan="7">• Surface and groundwater contamination
• Consumption of groundwater resource</td><td>Y</td><td>DWER Licence L8141/2007/2 under Part V of EP Act</td><td>DWER</td><td colspan="3">DWER Licence Conditions 1.2.1, 1.3.1, 1.3.3, 1.3.4, 1.3.5, 1.3.7, 1.3.8, 3.2.1, 3.3.1.</td></tr>
<tr><td rowspan="5">Y</td><td rowspan="5">Mining Proposal and Mine Closure Plan under the Mining Act</td><td rowspan="5">DMIRS</td><td>Tenement</td><td>Condition No.</td><td>Aspect</td></tr>
<tr><td>L38/98</td><td>22</td><td>Surface and groundwater management</td></tr>
<tr><td>M38/58</td><td>5, 7, 23, 28</td><td>Surface and groundwater management</td></tr>
<tr><td>M38/59</td><td>5, 6, 14, 16, 20</td><td>Surface and groundwater management</td></tr>
<tr><td>M38/326</td><td>5,7, 8, 16, 17, 18, 22, 27, 28, 29, 32</td><td>Surface and groundwater management</td></tr>
<tr><td>M38/327</td><td>5, 7, 8, 16, 17, 22, 25, 26, 27, 28, 30</td><td>Surface and groundwater management</td></tr>
<tr><td>Y</td><td>26D, 5C licence under Rights in Water and Irrigation Act, 1914</td><td>DWER</td><td colspan="3">GWL17130(3) Conditions 2.
Groundwater Operating Strategy (AECOM, 2019).</td></tr>
<tr><td colspan="8">Air</td></tr>
<tr><td>Air Quality</td><td>• Dust emissions
• Power Station (NOx) emissions
• Closest receptor >10 km away</td><td>Y</td><td>DWER Works Approval W6120/2018/1 and pending licence amendment under Part V of EP Act</td><td>DWER</td><td colspan="3">Works Approval Condition 6, 8.
DWER Licence Conditions 1.3.7, 1.3.8, 4.2.1, 4.3.1.</td></tr>
<tr><td>Greenhouse Gas</td><td>• Scope 1 greenhouse gas emissions up to 81,357 t CO_2-e/yr</td><td>N</td><td>Ministerial Statement</td><td>EPA</td><td colspan="3">-</td></tr>
</table>

EPA Factor	Proposal Impact	Alt. Decision-Making Process	Decision-Making Process	DMA	Instrument / Obligation
People					
Social Surroundings	• Heritage sites • Traditional Owners have expressed support for the Proposal	Y	*Aboriginal Heritage Act, 1972,* with transition arrangements in accordance with *Aboriginal Cultural Heritage Act, 2021*	DPLH	Develop and implement Social Surrounds and Cultural Heritage Management Plan (SSCHMP) in consultation with Traditional Owners.
Human Health	• Radiation Management Plan approved by DMIRS • LOM operations (at Mt Weld and transport activities) will not significantly alter radiation profile or risk • All predicted radiation exposures will remain a fraction of assessment criteria	Y	*Radiation Safety Act, 1975*	DMIRS	Radiation Management Plan (Appendix H).
		Y	Radiation Safety (General) Regulations 1983, the Radiation Safety (Transport of Radioactive Substances) Regulations 2002 and the Radiation Safety (Qualifications) Regulations 1980	DoH / Radiological Council	Radiation Management Plan (Appendix H).

2 PROPOSAL DESCRIPTION

2.1 Life of Mine Proposal

The key characteristics which define the LOM Proposal are summarised below:

- An increase in the Development Envelope
- An increase in the Area of Disturbance to include:
  - Mine Pit expansion.
  - Tailings Storage Areas expansion to accommodate TSF4 and future tailings storage areas and additional TSF infrastructure.
  - Evaporation Pond Area expansion.
  - Additional stockpile areas.
  - Increase to Waste Rock and By-product Landform.
  - Expansion of the existing ROM Pad.
  - New infrastructure areas to incorporate changes to plant processing area.
  - Hybrid power station – including a solar array, wind turbines and battery storage. Power transmission will utilise an 11 kV high voltage (HV) power line corridor transmitting power to the HV power station.
  - Establishment of accommodation village to accommodate workers – including wastewater treatment.
  - Additional borefields outside of the carbonatite aquifer located to the west and east of the Project, within Mt Weld mining tenements.

Changes to operational elements that define the LOM Proposal are summarised below:

- Mt Weld processing (production capacity) – increase in ore processed to 1.3 Mtpa as prescribed under a DWER Part V licence.
- Transport – increase in containers transported to 280 per week from Mt Weld to Leonora / Kalgoorlie REPF using Rotainers.
- Energy (Mt Weld) – 22 MW of installed power supplied by a hybrid solar / wind power station with a thermal baseload supply.
- Option to implement dry stacking of tailings and other by-products as well as, or as an alternative to, current slurry deposition.
- Option to optimise concentrate product moisture content through enhanced drying processes.
- Transport and storage of Kalgoorlie REPF by-products – return of by-products from the Kalgoorlie REPF for long-term storage at Mt Weld[4].

Details of the proposed changes to the physical elements from their current approved extent are shown in Table 2-1.

[4] IP and gypsum by-products may be transported back to Mt Weld, or to an alternative approved facility, for long-term storage. This approach was proposed to the EPA via a Section 43(a) Change to the Proposal During Assessment for the REPF (dated 9 September 2021). In its Notice, the EPA states that "the transport and storage of the by-products is covered by the approval of the Mt Weld Rare Earths Project under Ministerial Statement 476."

Table 2-1: Proposed Changes to Physical and Operational Elements resulting from LOM Proposal

Element	Previously Authorised Extent	Proposed change
Area of Disturbance (including access)	429 ha Area of Disturbance within a 505 ha Development Envelope.	2,241.6 ha Area of Disturbance within a 2,802 ha Development Envelope.
Tailings Dam Area	Tailings Storage Facility 67.3 ha Area of Disturbance within a 505 ha Development Envelope.	Tailings Storage Facility 170 ha Area of Disturbance within a 2,802 ha Development Envelope.
Major Components	• Pit • Infrastructure (water supply, roads, etc.) • Beneficiation Plant • Tailings Storage Facility • Evaporation Ponds • Waste / Low-grade Ore Stockpiles	• Pit • Infrastructure (water supply, roads, etc.) • Beneficiation Plant • Tailings Storage Facilities • Evaporation Ponds • Waste / Low-grade Ore Stockpiles • Waste Rock and By-product Landform • Hybrid Power Station • Extended Borefield Network • Accommodation Village

2.2 Previous Changes Under Section 45C

The Mt Weld Rare Earths Project was approved by the Minister for Environment in May 1998 through approval of MS 476.

As referred, the Mt Weld Rare Earths Project included mining and beneficiation of a RE deposit at Mt Weld, and processing of the beneficiated material to produce various RE oxides at a secondary processing facility at Meenaar.

The proposal for the mining and beneficiation of a rare-earths deposit at Mt Weld, has undergone several Section 45C changes since May 2003. These changes include:

2.2.1 May 2003

- Removal of secondary processing at Meenaar.
- Increased rate of mining and processing.
- Change in transport routes.
- Return of residues to Mt Weld.

2.2.2 February 2005

- Change to transport route to allow transport of concentrate through Fremantle or Esperance.

2.2.3 July 2006

- Inclusion of vegetation clearing for access roads within the Area of Disturbance.

2.2.4 January 2012

- Change to size of ore body.
- Increase of 20 hectares to Area of Disturbance.
- Increase in input and output maximums and solid waste materials.
- Removal of transport element as regulated by other authorities.
- Removal of Energy element as not environmentally significant.
- Increase in carbon dioxide output maximum.

2.2.5 December 2013

- Increase “Life of project” from 20 to 25 years.
- Removal of “Size of ore body”.
- Increase in Area of Disturbance of 100 hectares for mining, Tailings Dam area and Process Water Pond.
- Removal of “Carbon dioxide output maximum” as regulated under other legislation.
- Removal of “Development stages” as not a key characteristic relevant to the environment.

2.2.6 January 2018

- Removal of "Life of project" as not a key characteristic relevant to the environment.
- Removal of "Input maximum", "Output maximum", "Solid waste materials" and "Water supply" as regulated under other legislation.

2.2.7 September 2020

- Area of Disturbance –increase by 59 ha, from<370 ha to <429 ha
- Development Envelope –increase by 50 ha, from 455 ha to 505 ha
- The above disturbance relates to changes in footprint for the following major components:
  - Mine Pit
  - Infrastructure (water supply, roads, etc.)
  - Beneficiation Plant
  - Tailings Storage Facility
  - Evaporation Ponds
  - Waste / Low Grade Ore Stockpiles

2.3 Mining Methodology

Mining at Mt Weld has typically been to extract the ore on a campaign basis. The first campaign was completed in 2008; subsequent campaigns commenced in 2017, 2018 and 2019, with Campaign 4 starting in July 2021. In all campaigns, RE bearing ore is stockpiled adjacent to the open pit on the ROM pad. The ore is then screened in-situ and transported two kilometres west to the blended ore stockpile from where it is processed on site to produce a concentrate that is currently transported to Fremantle, then shipped to Lynas' Advanced Materials Plant (LAMP) located in Kuantan, Malaysia. As RE ore demand increases and technology and mining techniques improve in efficiency, campaign mining may transition to continuous mining to supply ore to the beneficiation plant.

A summary of the Project's historical mining milestones is presented in Table 2-2.

Table 2-2: Mine Development Milestones

Activity	Date
Commencement of 1st Mining Campaign	May 2007
Completion of 1st Mining Campaign	April 2008
Start of Phase 1 construction	November 2008
Phase 1 commissioning complete	May 2011
Start of Phase 2 construction	May 2012
Phase 2 commissioning complete	February 2014
TSF2 clearing and construction	August 2015
TSF2 commissioning complete	October 2016
Commencement of Mining Campaign 1B (pit depth extension)	January 2017
Completion of Mining Campaign 1B	May 2017
Commencement of Mining Campaign 2 (pit cut-back)	September 2017
TSF3 clearing and construction	April 2018

Activity	Date
Completion of Mining Campaign 2	September 2018
TSF3 commissioning complete	November 2018
Commencement of Mining Campaign 3	December 2018
Completion of Mining Campaign 3	February 2020
Commencement of Mining Campaign 4	July 2021

Based on current mineral resource estimates of RE ore types, the current LOM is 23 years.

2.4 Specific Life of Mine Components

2.4.1 Tailings Storage Facilities

Across the operating life of the Mt Weld Rare Earths Project, MWM has continuously sought to improve its knowledge of tailings management at the Project. As current beneficiation techniques are unable to recover all REs, the tailings represent a potential significant RE resource for future retreatment and beneficiation. Since the commencement of tailings deposition at the Project, MWM has significantly improved its tailings management methodologies and is now achieving significant tailings consolidation to maximise storage capacity of the facilities.

During the initial period of operations, tailings were stored in an above-ground facility known as TSF1. The original TSF design was intended to capture all decant and underdrainage for reuse in the plant. Contrary to MWM's recommendations, DWER imposed a requirement to install a high-density polyethylene (HDPE) liner over the base of TSF1 prior to commissioning. This inadvertently led to significant issues with tailings consolidation and water recycling following commissioning and throughout the life of the facility. Additionally, due to pooling of underdrainage against the embankment, as well as substances in the supernatant water affecting ore processing, further infrastructure was required to treat tailings supernatant and maximise decant return thereby increasing solids consolidation at TSF1.

A new tailings facility was required for the Phase 2 expansion to process 242,000 tpa. For the new TSF2, initially a dry stacked tailings proposal was assessed under Works Approval W5645/2014/1. Problems encountered with the tailings filtration system design, together with improved management of the TSF1 tailings to recover tailings supernatant water and treat this water for reuse in the process, led to a change in the TSF2 design to an above ground facility similar to the design of TSF1. Works Approval W5645/2014/1 was amended on 14 March 2016 to permit this change. A geosynthetic clay liner (GCL) as per the original TSF2 design was retained for the slurry-fed TSF2 and was installed over the base of the TSF to restrict the rate of tailings seepage.

For TSF3, the application of an engineered liner (HDPE or GCL) was excluded on the basis of the outcomes of a complete review and detailed analysis of seepage potential and contaminant fate modelling given the current knowledge of tailings characteristics and subsurface conditions (ATC Williams, 2017). The engineering and hydrogeological assessment concluded that the potential for excessive seepage and subsequent adverse impacts on the groundwater (Carbonatite) aquifer given known groundwater gradients was likely to be minor and manageable through a robust monitoring and contingency plan if required.

Following investigation and optimisation of TSF operation, a process of assisted mechanical consolidation (using screw amphirols) the tailings to increase evaporation rates has extended the life of these TSFs by providing additional capacity.

Through these learnings, tailings management at Mt Weld has significantly improved since deposition commenced in 2011 (Coffey, March 2021). Supernatant is able to be treated and reused within the process circuit or have the flexibility to be used in dust suppression activities, if required. The water treatment and tailings management system at Mt Weld is now considered to be state-of-the-art and resents a significant success story for the site.

Notwithstanding, a proposed TSF4 is required to manage the waste outputs from the LOM production levels. TSF4 will adopt the same design parameters as TSF3 using clay sourced from the open mine pit to line the embankments to prevent lateral seepage. The floor of TSF4 will be established using deposited tailings to establish a low permeability liner preventing groundwater seepage. Future TSFs beyond TSF4 will adopt the same design principles as a standard.

2.4.2 Evaporation Ponds

Additional Evaporation Ponds will be required to receive wastewater discharge from MWM operations across the LOM. There are eight current Evaporation Ponds that receive a blend of raffinate from reverse osmosis (RO), clarified and direct raw TSF supernatant (decant) water.

The Evaporation Ponds are licenced to operate under EP Act Part V Licence L8141/2007/2. Evaporation Ponds 1 to 5 are clay lined with an average permeability of 5.33×10^{-9} m/s. Evaporation Ponds 6 to 8 were approved subsequently and have a permeability of less than 1×10^{-8} m/s. The proposed new Evaporation Ponds will follow the same design features as the existing Evaporation Ponds.

The total area identified for LOM Evaporation Ponds is 110 ha (Figure 2-1), located immediately east and south of the existing Evaporation Ponds. Additional Evaporation Pond capacity could be significantly lower per unit of ore processed than the existing operations due to the implementation of a recycle water treatment project, a water treatment plant which will produce significantly lower discharge. Details of the recycle water treatment project are documented in Section 9.4.2. Yet to be proven eastern and western borefields are likely to have a higher salt content than the carbonatite aquifer, thus requiring more area for evaporating of raffinate. A precautionary approach to allocating area for evaporation is therefore preferred, should the recycle water treatment project fail to meet design and new borefields are hypersaline, requiring additional evaporation area.

2.4.3 Dry Stack Tailings Area

MWM wish to retain an option to implement dry stacking of tailings as well as, or as an alternative to, the current slurry deposition. Retaining a dry stacking option is desirable to allow for the retreatment of tailings and by-products. IP and gypsum by-products are proposed to be transported from the REPF and dry stacked at the Mt Weld mine site. Significant REs remain in Mt Weld dry tailings and in the REPF IP by-product, which represent a potential significant RE resource for future retreatment. The concept of dry stacking of tailings was proposed, assessed and approved as a proposed tailings management method for TSF2 by DWER under Works Approval W5645/2014/1, however MWM opted to change the method to conventional sub-aerial deposition following the detailed design process.

2.4.4 Expanded Pit Area

An expansion of the mine pit is proposed. The pit expansion will be in a north and west direction and north-east to a lesser extent. Pit depth and design parameters will be extended as future lateral and depth resource expansion drilling identifies additional mineral resources that through assessment of modifying factors could be converted to ore reserves. Recent exploration drilling beneath the current pit shows RE mineralisation to 1,000 m below ground level.

It is assumed that significant mineralisation is present within the carbonatite boundary (Figure 2-2) which is yet to be fully explored and would be subject to future consultation and relevant approvals. It is therefore MWM's objective to establish all permanent landforms outside of the carbonatite boundary.

2.4.5 REPF By-Products Acceptance and Storage

Approvals granted for the Kalgoorlie REPF as ratified through Ministerial Statement 1181 allowed for the transport of IP and gypsum by-products back to Mt Weld, or to an alternative approved facility, for long-term storage. This approach was proposed to the EPA via a Section 43(a) Change to the Proposal During Assessment for the REPF (dated 9 September 2021). In its Notice, the EPA acknowledged this approach, stating that:

> "The by-products will instead be returned and stored in mine waste areas at the Mt Weld mine site, near Laverton. The transport and storage of the by-products is covered by the approval of the Mt Weld Rare Earths Project under Ministerial Statement 476."

It is anticipated that by-products received and stored at Mt Weld will amount to approximately 285,000 dry tonnes per year of gypsum and 117,000 dry tonnes per year of IP.

In order to avoid any ambiguity regarding the ability for Mt Weld to receive and store by-products, the scope of this Proposal includes the ability to receive, manage and safely store by-products at designated locations within the constructed landforms at Mt Weld.

2.4.6 Hybrid Power Station

As part of the energy supply mix for the LOM Proposal, MWM propose to construct a hybrid power station, including a solar array, battery storage and wind turbines. Power transmission will utilise an 11 kV distribution network, nominally with three 11 kV feeders run from Hybrid Power Plant 11 kV switchboard to processing plant and accommodation village 11 kV switchboards along various service corridors within the Development Envelope.

The location of the hybrid power station is shown on Figure 2-1.

MWM, through its parent company, Lynas, has confirmed its commitment[5] to the Science Based Target initiative (SBTi) in the Lynas 2021 Environmental, Social Governance Report and released a Greenhouse Gas (GHG) Policy[6] to coincide with the announcement. Lynas is now working to develop science-based GHG reduction targets in line with SBTi criteria and the Lynas GHG Policy, with the objective of limiting the global temperature increase to well-below 2°C. Lynas will announce the new targets when validated by the SBTi.

While Lynas refines these greenhouse gas emission targets and resolves the expansion to renewable energy generation, a thermal baseload power supply is required for continuing operations.

2.4.7 Accommodation Village

Currently, rental accommodation for the Mt Weld workforce is located in Laverton provided by a third party. Over the LOM additional temporary accommodation for a construction workforce and permanent accommodation for an operational workforce is required. MWM believes there are benefits of establishing an accommodation village closer to the mine site, which will eliminate 35 km of daily transit and result in reduced safety risks during transit, and reduce GHG transport emissions for the operations. MWM also recognises the Laverton community and the benefits of the socio-economic contribution of workers using the town businesses and facilities.

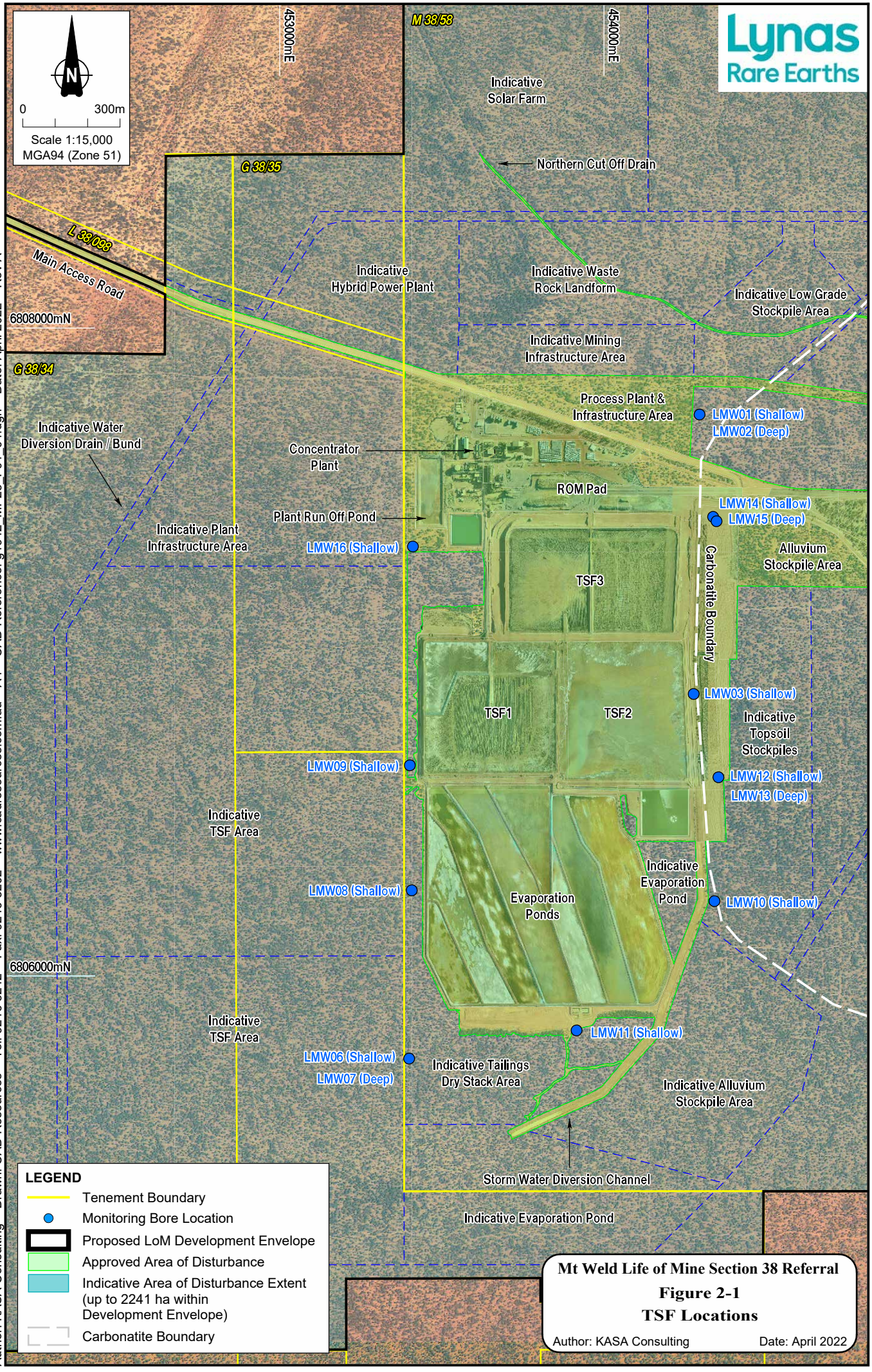
Sewage and wastewater from the camp will be treated to achieve a class A+ quality rating to the final effluent, allowing the option for treated wastewater to be utilised in other activities such as dust suppression, irrigation and/or process water. The adopted sewage treatment system will be developed in accordance with the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974. The facility will be subject to DoH and EP Act Part V approvals.

2.4.8 Extension to Borefield Network

MWM proposes to extend the existing borefield in order to optimise raw water availability for expanded operations. Inclusion of an indicative footprint within the Development Envelope will allow MWM the flexibility to design and implement hydrogeological assessments and installation of the borefield network (specifically to allow clearing for the purposes of access tracks, pipework, pump stations, etc.).

[5] Available at: https://lynasrareearths.com/our-commitment-to-the-science-based-targets-initiative-sbti/

[6] Available at: https://lynasrareearths.com/wp-content/uploads/2021/09/GHG-Policy-September-2021.pdf



Lynas Rare Earths

Mt Weld Life of Mine Section 38 Referral

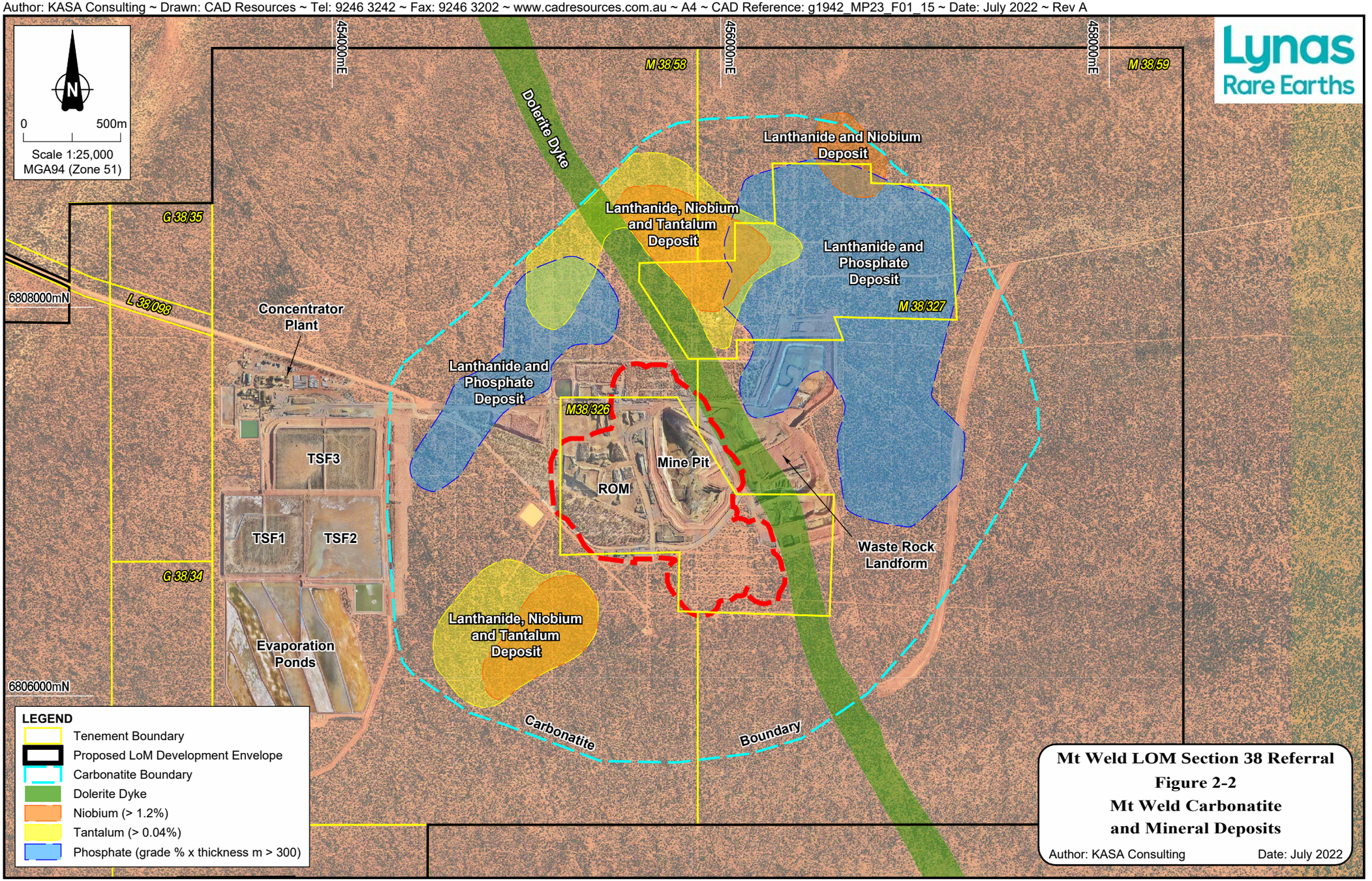
Figure 2-1

TSF Locations

Author: KASA Consulting Date: April 2022

Author: KASA Consulting ~ Drawn: CAD Resources ~ Tel: 9246 3242 ~ Fax: 9246 3202 ~ www.cadresources.com.au ~ A4 ~ CAD Reference: g1942_MP23_F01_04.dgn ~ Date: April 2022 ~ Rev A

Author: KASA Consulting ~ Drawn: CAD Resources ~ Tel: 9246 3242 ~ Fax: 9246 3202 ~ www.cadresources.com.au ~ A4 ~ CAD Reference: g1942_MP23_F01_15 ~ Date: July 2022 ~ Rev A



Lynas Rare Earths

Mt Weld LOM Section 38 Referral

Figure 2-2

Mt Weld Carbonatite and Mineral Deposits

Author: KASA Consulting Date: July 2022

3 STAKEHOLDER ENGAGEMENT

3.1 Overview

MWM is committed to an open, transparent and comprehensive engagement programme for the Mt Weld Rare Earths Project and LOM Proposal at all key stages. MWM's process for stakeholder engagement includes the identification of key stakeholders that MWM would engage with from Federal, State and Local Government, key agencies and regulatory authorities, and the community and interest groups.

The scope and scale of the stakeholder engagement to date has considered the nature and significance of potential environmental factors for the Project, particularly any real or perceived community concerns about activities specific to Mt Weld's operations to date. In light of this, MWM considers that the focus of engagement associated with the proposed LOM should be commensurate with that view and should be at local community level and with key DMAs.

Accordingly, it is MWM's view that the LOM Proposal would not attract the need for a formalised Public Review Period administered through the EPA's assessment process for the Revised Proposal.

Notwithstanding, as with any of its developments in the region, MWM and Lynas acknowledge the need to communicate and engage with the community about the impacts of its proposals.

The Laverton community and the broader Goldfields region is underpinned by the resource sector. With this comes a degree of acknowledgement and acceptance of the sector and the benefits development can bring to the community in terms of prospective employment and economic lift.

3.2 Lynas and Mt Weld Mining in the Goldfields

MWM has been operating in the Goldfields since 2007. Over this period, it has invested significantly in plant and equipment at Mt Weld and provided a significant economic and social benefit to Laverton and the Goldfields region more broadly.

MWM has an excellent track record of working closely with the Laverton community, including:

- Local volunteering for community events and Shire of Laverton activities.
- Ongoing donations to Laverton Crisis Intervention Service for women and children.
- Supporting Laverton Swim Stars learn to swim programme.
- Participating in MEEDAC Employer Expo in Laverton.
- Involvement in the Laverton Sports Club.
- Active board member of the Laverton Leonora Cross Cultural Association since 2009.
- Providing over 150 flights to/from Perth each year for doctors and community volunteers.
- Assisting Shire of Laverton by transporting mattresses, bicycles and fencing materials from Perth to Laverton.
- Local procurement – Approximately 20% of inputs purchased from Laverton / Goldfields and majority of expenditure within WA.

To guide its social presence and economic activities in the Goldfields community, Lynas has developed a WA Community Statement of Commitment (Appendix E). In this statement Lynas documents its objectives to make a positive contribution to local employment, skills, education, health and the environment. More specifically, MWM will give a preference to locally based employees, incorporate a premium allowance for locals in procurement processes and actively encourage employees to engage with local communities.

MWM is committed to maintaining this respected and highly visible community presence which has been established over its time in the region. Management of social issues and consultation with the local community has and will be undertaken in accordance with MWM's Community Statement of Commitment (Lynas, 2021).

Additionally, Lynas has undertaken several broader local community engagement activities during 2019 and 2020. These include:

- Presented at the Kalgoorlie What's Down the Track Forum in November 2019 to over 300 attendees. The primary objective of the Kalgoorlie-Boulder Chamber of Commerce and Industry What's Down the Track Forum is to provide a 12-month forecast into the drivers that support the growth and opportunities that exist within the region's economy.
- Co-hosted a Business After Hours with the Kalgoorlie-Boulder Chamber of Commerce and Industry, engaging with 180 local community members.
- Established a Lynas Western Australia Facebook page (standalone from corporate) as a mechanism to further engage the community in Laverton and Kalgoorlie-Boulder.

3.3 Specific Consultation for the LOM Proposal

3.3.1 Pre-referral Consultation with EPA and EPA Services Unit

MWM has taken the opportunity to consult with both the EPA Chairman and senior representatives of DWER's EPA Services Unit as part of pre-referral scoping meetings for the LOM since 2018.

Table 3-1 summarises the key engagements as initiated by MWM.

Table 3-1: Summary of Pre-Referral Consultation

Date	Attendees	Key Outcomes
5-Nov-2018	• EPA Chairman • DWER Executive Director EPA/s • DWER Manager, Mining and Industrial South • MWM Vice President Production • MWM General Manager WA • MWM Environmental Advisor • Lead Consultant, KASA Consulting	Briefed the EPA Chairman and EPA/s on the proposed project changes and sought the EPA Chairman's views in relation to the likely Level of Assessment for the proposed changes.
21-Mar-2019	• DWER Manager, Mining and Industrial South • DWER Principal Officer, Mining and Industrial South, EPA/s • Lead Consultant, KASA Consulting	Provided overview of proposed EPA briefing and summary of current proposal relating to: • Life of Mine expansions at Mt Weld; • Presented MWM's assessment of the Proposal relative to key environmental factors and their significance; • Discussed LOM project footprint, disturbance and development envelopes, and scope of flora and fauna surveys completed to date; • EPA/s recommended that surveys needed to meet EPA guidance and survey gaps should be filled or a risk assessment undertaken by a qualified SME.
30-May-2019	• EPA Chairman • DWER Executive Director EPA/s • DWER Manager, Mining and Industrial South • DWER Principal Officer, Mining and Industrial South, EPA/s • MWM Vice President Production • MWM Environmental Advisor • Lead Consultant, KASA Consulting	Provided update since 5 November 2018: • Presented the current proposal relating to Life of Mine expansions at Mt Weld; • Presented our assessment of the Proposal relative to key environmental factors and their significance; • Sought EPA opinion on the likely assessment process and anticipated duration; • Discussed project timelines relative to the above; • Provided an overview of the planned establishment of a Cracking and Leaching facility in WA (feasibility studies ongoing) which will be referred separately at a later date.
6-Feb-2020	• DWER Manager, Mining and Industrial South • DWER Principal Officer, Mining and Industrial South, EPA/s • DWER Senior Officer, Mining and Industrial South, EPA/s • Lead Consultant, KASA Consulting	Discussed LOM project footprint, disturbance and development envelopes, and scope of flora and fauna surveys completed to date. MWM had commissioned a resurvey of entire footprint with independent peer review and impact assessment commissioned as well.

Date	Attendees	Key Outcomes
17-Dec-2021	• DWER A/Manager, Mining and Industrial South • DWER Principal Officer, Mining and Industrial South, EPA/s • MWM Environmental Advisor • Lead Consultant, KASA Consulting	Discussed content and scope of referral, key outcomes included: • EPA/s advised Proposal is likely to be considered a significant change to original Proposal and referred as a Revised Proposal. • MWM should aim to demonstrate where impacts can be regulated by other decision-making processes whilst meeting EPA objectives for key environmental factors. • All requisite studies for full development envelope extent are required at referral to allow for flexibility within the envelope and to manage level of assessment. • EPA/s recommend obtaining a letter of consent from Traditional Owners to show support for the Proposal.
30-Mar-2022	• DWER A/Manager, Mining and Industrial South • DWER Principal Officer, Mining and Industrial South, EPA/s • MWM Environmental Advisor • Lead Consultant, KASA Consulting	MWM provided update on progress of s38 referral and associated surveys and investigations. Key outcomes included: • EPA/s confirmed need for inclusion of proposed camp and power plant as part of LOM or via separate s45C. • EPA/s clarified definitions on Development and Disturbance Envelope presentation in s38 referral. • MWM advised timeframe for s38 submission of the Revised Proposal (early May 2022).
25-Jul-2022	• Minister for Mines and Petroleum; Energy; Corrective Services; Industrial Relations	Briefed the Minister on the proposed changes as part of this referral, the status of environmental approvals and expected project timeline, and sought WA government support for the Proposal. Confirmed Mt Weld Expansion is critically important to the State of Western Australia.
2-Aug-2022	• Minister for Environment; Climate Action	Briefed the Minister on the proposed changes as part of this referral, the status of environmental approvals and expected project timeline, and sought WA government support for the Proposal.
Pending Sep-2022	• Deputy Premier; Minister for State Development, Jobs and Trade; Tourism; Commerce; Science	Scheduled future engagement.

3.3.2 Consultation on Radiation Aspects

The RMP (v10, dated 5 November 2021) has been revised to transport of RE concentrate from Mt Weld to the REPF, and was approved by DMIRS on 21 March 2022. The RMP is revised on an iterative basis and will continue to be revised to incorporate LOM components as required.

While some radiation exposures will continue to be detectable as part of Mt Weld operations, MWM is able to demonstrate that neither employees, members of the public, nor the environment would be adversely impacted by radiation from Mt Weld operations under this Proposal. The operations will continue to be regulated by the Radiological Council and DMIRS and managed in accordance with the current RMP, as approved.

MWM will continue to engage DMIRS and the Radiological Council using the same approach it has adopted since commencement of mining. This involves detailed engagement with these key regulators, where drafts are reviewed and modified as needed.

3.3.3 Other Agencies

Other consultation has been undertaken as required with agencies including DWER (Part V), DMIRS and the Radiological Council as needed. These agencies have all been made aware of the LOM Proposal and have provided input into the required approvals pathways and the content of approvals documents.

4 ENVIRONMENTAL PRINCIPLES AND FACTORS

4.1 Environmental Principles

Table 4-1: Environmental Principles

Principle	Response
Precautionary principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by: a) Careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and b) An assessment of the risk-weighted consequences of various options.	From the technical work undertaken to assess the impacts of the Mt Weld mine expansion, MWM has concluded that serious or irreversible damage to the environment will not result and that environmental risks are ALARP. The Mt Weld mine is currently operating under a strong environmental compliance framework. This ensures that any expansion of operations will continue under this framework.
Inter-generational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	From the technical work undertaken to assess the impacts of the Mt Weld mine expansion, MWM has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations. Moreover, the use of RE has a significant global environmental benefit by reducing reliance on carbon-based products and energy sources.
Conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	From the ecological work undertaken to assess the impacts of the Mt Weld mine expansion, MWM has concluded that the Proposal would not compromise the biological diversity and ecological integrity of the affected areas.
Principles relating to the improved valuation, pricing and incentive mechanisms a) Environmental factors should be included in the valuation of assets and services. b) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement. c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes. d) Environmental goals, having been established, should be pursued in the most cost – effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.	REs are an essential component of contemporary societal operations. Many countries include REs on their critical mineral lists. REs are used in a variety of applications including wind turbines, ICE vehicles exhaust gas treatment and electric vehicles, oil refineries, defence technologies, and electronic devices. REs are included in the Australian Government's "Australia's Critical Mineral Strategy 2019" and are included in the United States "Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals". The extraction and processing of REs, including the management of any resulting environmental impacts, incorporates the full lifecycle costs in product pricing.
Waste minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	The LOM Proposal, by its very nature, produces industrial waste. Some of this waste will be stored and treated on-site. Any radiation from this waste will only be permitted at safe levels, managed and monitored through an approved RMP.

4.2 Identification of Significant Environmental Factors

Table 4-2 summarises all environmental factors relevant to the LOM Proposal. The table identifies those factors deemed to be of significance and worthy of EPA consideration. The determination of whether a factor is of significance takes into account the scale of the potential impacts as a result of the activity, the nature of the receiving environment and its sensitivity, proposed environmental mitigation measures and controls, and whether the potential impacts can be assessed and regulated by other decision-making processes administered by agencies or authorities other than the EPA through the Ministerial Statement.

Reference should be made to Sections 5 to 16 of this document for specific details that support the significance ratings below.

Table 4-2: Significant Environmental Factors

Factor	Objective	Relevance to Proposal	Significant Factor
Sea			
Benthic Communities and Habitat	To protect benthic communities and habitat so that biological diversity and ecological integrity are maintained.	No impacts to benthic habitats.	**No**
Coastal Processes	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.	No impacts to coastal processes.	**No**
Marine Environmental Quality	To maintain the quality of water, sediment and biota so that environmental values are protected.	No impacts to marine environmental quality.	**No**
Marine Fauna	To protect marine fauna so that biological diversity and ecological integrity are maintained.	No impacts to marine fauna.	**No**
Land			
Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	LOM activities will require a maximum 2,241.6 ha of disturbance in well represented flora and vegetation communities.	**Yes** – flora and vegetation studies have been completed and conclude that clearing will not produce a significant impact.
Landforms	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.	The impact on the landform of the Proposal site and its surrounds is not significant.	**No –** construction of waste rock landforms has the potential to alter the landscape and local amenity. Assessment and regulation of potential environmental impacts and rehabilitation measures can be achieved through the implementation of the approved MCP (v4, 2021), administered by DMIRS.

Factor	Objective	Relevance to Proposal	Significant Factor
Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	The Proposal will not impact subterranean fauna. All ponds and dams will be engineered to prevent seepage and will be monitored.	**No** – subterranean fauna survey demonstrated that Mt Weld does not provide prospective habitat for stygofauna or troglofauna.
Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.	The Proposal site is vegetated and largely rural in nature. The results of soil surveys indicate that most of the soil materials at the Proposal site are likely to be physically and chemically benign.	**No** – potential impacts, including soil contamination, erosion and disturbances to the natural offsite surface water regime can be managed with conventional techniques, through TSF, drainage and stormwater design, and through other regulatory means.
Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	Construction will impact natural habitat.	**Yes** – three significant species were confirmed as occurring in the survey area (Long-tailed Dunnart, Wood Sandpiper, and Common Sandpiper). The survey area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of either Sandpiper species.
Water			
Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.	Inland waters occur near the Proposal location, including groundwater resources and natural drainage into nearby surface water features.	**No** – continued abstraction of ground water and surface water will be managed through implementation of a Surface Water Management Plan (SWMP) and Groundwater Operating Strategy (GOS). Assessment and regulation of potential environmental risks can be achieved through other decision-making processes administered by DWER
Air			
Air Quality	To maintain air quality and minimise emissions so that environmental values are protected.	The Proposal will have the potential to increase the quantity of dust emissions.	**No** – emissions to air will be localised and are unlikely to result in any loss in amenity, regional air quality or impacts to biodiversity given the nature and location of sensitive receptors. The closest sensitive human receptors are located at the GGS accommodation camp located 10 km to the south-east. Emissions can continue to be regulated under Part V of the EP Act.

Factor	Objective	Relevance to Proposal	Significant Factor
Greenhouse Gas Emissions	To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change.	The Proposal will create new GHG emissions.	**No** – estimated annualised Scope 1 GHG emissions are 81,357 t CO_2-e/yr and below the EPA GHG guidance threshold of 100,000 t CO_2-e/yr.
People			
Social Surroundings	To protect social surroundings from significant harm.	The Proposal area is in a remote pastoral area. Potential noise and visual amenity issues will not be created. There are modest traffic impacts and indigenous heritage sites nearby.	**No** – indigenous heritage and transport impacts. Impacts to heritage will be managed through regular consultation with Traditional Owners and via objectives and controls identified within Social Surrounds Cultural Heritage Management Plan (SSCHMP).
Human Health	To protect human health from significant harm	No adverse human health impacts expected, however, radiation impacts need to be assessed.	**No** – The RMP (v10, dated 5 November 2021) has been revised to transport of RE concentrate from Mt Weld to the REPF, and was approved by DMIRS on 21 March 2022. The RMP is revised on an iterative basis and will continue to be revised to incorporate LOM components as required. Some radiation exposures will continue to be detectable as part of Mt Weld operations and will continue to be managed under the RMP as approved.

4.3 Relevant Environmental Factors

The EPA originally assessed the Mt Weld Rare Earths Project at the Public Environmental Review (PER) level of assessment and released its assessment report (Bulletin 646) in August 1992.

As referred, the Mt Weld Rare Earths Project included mining and beneficiation of a RE deposit at Mt Weld, as well as transport of concentrate 880 km by road to a secondary processing facility located at Meenaar (20 km east of Northam) to produce various RE oxides.

The EPA's conclusions and recommendations (Section 7 of Bulletin 646) identified a number of environmental factors relevant to its assessment.

At Mt Weld, the EPA determined that, in general, identified risks were considered minimal and manageable. Conversely, for Meenaar, the EPA determined that environmental risks were significant across the board, and recommended management conditions associated with:

- Solid and liquid waste management;
- Protection of residents and property at Meenaar from noise, dust and gaseous emissions from the secondary processing plant;
- Risks and hazards at Meenaar, including radiation and seismicity; and
- Transport of beneficiated concentrates, plant residues and dangerous goods.

Evidently, the major focus of the EPA's assessment as presented in Bulletin 646 was associated with the Meenaar component, not the Mt Weld component of the original proposal.

As a result of a business decision to locate secondary processing of Mt Weld's RE concentrate offshore, the Meenaar component was subsequently removed from the Project, as reflected in Attachment 1 of MS 476, approved on 14 May 2003 (refer Appendix A). It should be noted that Attachment 1 of MS 476 removed all references to the secondary processing plant at Meenaar from Schedule 1 (Key Proposal Characteristics Table) only, and did not extend to the removal of implementation conditions for the Meenaar processing plant.

In accordance with the EPA *Statement of Environmental Principles, Factors and Objectives* (October 2021), the environmental factors for the Mt Weld Rare Earths Project are now considered to be limited to:

- Flora and Vegetation;
- Terrestrial Fauna; and
- Greenhouse Gases.

As discussed in Section 1.6.9, in recognition of the EPA's *Interim Guidance – Taking decision-making processes into account*, a number of environmental factors are considered as being adequately assessed and regulated by other Decision-Making processes. These include:

- Inland Waters (Surface and Groundwater);
- Terrestrial Environmental Quality;
- Landforms;
- Air Quality (Dust and Power Station Stack Emissions);
- Social Surroundings (Noise, Heritage); and
- Human Health (Radiation).

5 ENVIRONMENTAL FACTOR – TERRESTRIAL ENVIRONMENTAL QUALITY AND LANDFORMS

5.1 EPA Objective

The EPA's environmental objective for the factor Terrestrial Environmental Quality is:

"To maintain the quality of land and soils so that environmental values are protected".

Terrestrial Environmental Quality includes the chemical, physical, biological, and aesthetic characteristics of soils.

The EPA's environmental objective for the factor Landforms is:

"To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected."

5.2 Policy and Guidance

- Environmental Factor Guideline Terrestrial Environmental Quality (EPA, 2016e)
- Environmental Factor Guideline Landforms (EPA, 2018)
- *Contaminated Sites Act, 2003* (CS Act) and Contaminated Sites Regulations 2006
- Environmental Protection (Controlled Waste) Regulations 2004
- *Soil and Land Conservation Act, 1945*
- Environmental Protection (Unauthorised Discharges) Regulations 2004
- Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes (DER, 2015a)
- Treatment and Management of Soil and Water in the Acid Sulphate Soil Landscapes (DER, 2015b)

5.3 Receiving Environment

5.3.1 Overview

The surface of the entire mine area is a level plain with an almost indiscernible but very consistent west-southwest slope of 1:300. The plain lies at the foot of a slightly steeper drainage gradient averaging 1:200 steadily rising to low escarpments 10 km to 13 km to the east of the Proposal site, where perennial rainfall and runoff is actively eroding weathered granitic and mafic basement rocks. Topographically, the mine site falls from 436 m AHD in the north-east to 415 m AHD in the south-west, with local catchments draining into Lake Carey, a large playa lake surrounded by low-relief topography comprising aeolian dunes.

The present-day plain is composed of highly oxidized, recently transported and deposited quartz and ironstone sand and gravel alluvium and has not developed a structured soil profile as usually occurs from in-situ weathering of underlying rocks and/or the effects of strong vegetation growth. Appreciable organic material is incorporated in surface sand directly beneath isolated mulga shrubs and thickets, and leaf litter and seed concentrate around generally dormant, ground-hugging *eremophila* and sparse wanderrie grass, but organic material is generally low or near absent.

5.3.2 Soil Surveys

In 2019, MWM commissioned Stantec to undertake a desktop topsoil resource assessment for the proposed TSF4 expansion (Stantec, 2019).

Stantec reported that the mine area is located entirely within the BE15 regional soil unit as mapped by the Australian Soil Resource Information System (ASRIS). The BE15 soil unit is described as gently undulating to low hilly pediments with stony and gravelly pavements and traversed by numerous seasonal streams; chief soils seem to be shallow earthy loams with shallow red earths, both underlain by red-brown hardpan.

The results of the original soil survey undertaken by Stantec (Outback Ecology, February 2014), indicate that most of the soil materials at Mt Weld are likely to be physically and chemically benign. A preliminary soil resource inventory was developed by Stantec, based on key physical and chemical characteristics of the undisturbed and stockpiled topsoils, which identified that both topsoil materials are considered most suitable for use as an outer surface rehabilitation medium on the flat surfaces, mid and lower slopes of constructed waste landforms, due to a potential for erodibility and a low proportion of coarse fragments in these predominantly sandy loam to clay loam soils. The relatively low coarse fragment content of both the undisturbed and stockpiled topsoils is unlikely to provide a high degree of surface armouring and erosion resistance.

5.3.3 Waste Materials Characterisation

5.3.3.1 Overview

Stantec was commissioned by MWM to conduct a materials characterisation assessment for the Mining Campaign 4 Open Pit cutback (Stantec, 2020b). For this assessment, there was a focus on materials that may potentially be used for armouring purposes or require encapsulation. The materials identified for characterisation in this study were Calcrete limestone (CC), Lake clay (LC), and Alluvium (AL). Analysis included the characterisation of physical, chemical and geochemical properties, with the key findings described below.

5.3.3.2 Calcrete Limestone

The CC material has a variable coarse material fraction and therefore is recommended for different uses based on these variations. The material is structurally stable but has a low hydraulic conductivity and has a tendency for hard setting. With the low coarse content material, it is recommended that this is encapsulated within a landform and not placed on a landform surface. For the CC material with a higher coarse content, it is recommended that this be used for rock armouring. Given the different uses, it is recommended that the calcrete material is mined and stockpiled separately as "Calcrete – soft" and "Calcrete – coarse".

5.3.3.3 Lake Clay

The LC materials are not recommended for use on landform surfaces, due to their low coarse content, extremely slow drainage, and tendency for hard setting. Additionally, the LC material is characterised as having properties that increase erosivity. The LC material could potentially be used in scenarios where low hydraulic conductivity is required and erosion is not an issue. It is, therefore, suitable for its current use as a TSF impermeable liner. The LC material was re-characterised as non-NORM material.

5.3.3.4 Alluvium

The AL material has a large coarse material fraction and therefore has potential use as rock armouring. The soil fraction of the material, however, is also partially dispersive and sodic, and could be subject to erosion. The course fraction has also been noted to break-up under compaction (pers comm. Adam Cargill, 2020), consequently an understanding of the material durability before use is recommended in addition to minimal traffic compaction on application. The use of the material is also recommended for the lower, flatter slopes of landforms with appropriate construction for the capture of sediments.

5.4 Potential Impacts

At Mt Weld, achieving the objectives of this environmental factor is predominantly defined by:

- Maintenance of the integrity of waste structures and ponds, including the evaporation ponds, TSFs, by-product storage and waste rock landforms.
- Understanding and managing the nature of the materials stored in the waste structures and ponds.
- Design, monitoring, and management of waste structures and ponds to avoid environmental impacts.
- Mine closure planning (refer Section 5.6.4).

In approving the initial mining project, the EPA considered that solid residues and liquid wastes generated by proponents could be managed to protect the receiving environment. The EPA considered that the proposed disposal of beneficiation residues and wastewater was unlikely to significantly impact on the quality of groundwater in the confined and unconfined aquifers at Mt Weld.

MWM primary objectives of rehabilitation are to stabilise the surface of all exposed surfaces and to re-establish self-sustaining vegetation. Prior to mining, the majority of the land that the Project is located on, was classified as 'Pastoral Land'. MWM anticipates that the post-mining land use for the majority of the Project area will be pastoral. This is consistent with the current dominant land use in the Murchison subregion and MWM are committed to the rehabilitation of all disturbed areas to the agreed final land use(s).

The EPA considered MWM's proposal for rehabilitation and decommissioning of the mine pit, plant facilities, associated infrastructure, residue and overburden storage areas, and other disturbed areas at Mt Weld to be acceptable in principle.

The most recent MCP approved in July 2021 (REG ID: 96627) to allow for Stage 4 open pit and waste rock landform expansions. Further details of this updated MCP are provided in Section 5.6.4 below.

Additionally, the Kalgoorlie REPF, which has been approved by the EPA under MS 1181, will process RE concentrate from the Mt Weld mine to produce a RE carbonate product. By-products generated by the REPF include IP, to which the NORM from the Mt Weld concentrate reports, and non-radioactive gypsum.

It is proposed that these IP and gypsum by-products (117,000 dry tonnes per year and 285,000 dry tonnes per year respectively) may be transported back to Mt Weld, or to an alternative approved facility, for long-term storage. This approach was proposed to the EPA via a Section 43(a) Change to the Proposal During Assessment for the REPF (dated 9 September 2021) and subsequently approved.

5.4.1 Seepage

Notwithstanding the above, impacts associated with seepage from proposed TSF4 and future TSFs, as well as the cumulative effect of seepage from the existing TSFs (TSF1, TSF2 and TSF3), evaporation ponds, and other water-holding structures have the potential to occur.

TSF4 and subsequent TSFs will receive tailings from the flotation process (approximately 11.6% w/w solids) combined with a proportion of RO raffinate. The RO raffinate contains salts which will act as a coagulant for solids agglomeration. Before the tailings are deposited in TSFs they will be mixed with a flocculant polymer, promoting further solids agglomeration and settling rates, accelerating solids consolidation.

Based on TSF3 design investigations and assessment of seepage (seepage potential and water quality of seepage), TSF4 and subsequent TSFs will have no engineered liner, other than to compact the silty sand subgrade after topsoil has been removed. This subgrade material meets the requirements outlined in Water Quality Protection Note No 27 (Liners for containing pollutants, using engineered soils) (DoW, 2013).

Seepage analysis undertaken for TSF3, predicted that total flux across the interface will initially increase gradually to approximately 70 m^3/day. Following the Stage 2 embankment raise for TSF3, the flux is predicted to decrease to between 30 m^3/day and 50 m^3/day. If the Stage 2 decant pond were to be maintained after tailings deposition ceases, flux would decrease to around 20 m^3/day.

The results of previous modelling are detailed below:

- Lateral seepage through the embankment construction is not anticipated due to the low permeability of materials and its extension via a cut-off trench into the hardpan.
- The saturated areas are limited to the tailings deposit and less than 2 m thickness of the foundation soil and hardpan directly beneath the decant pond.
- Predicted seepage rates from the overall TSF3 footprint are low (equivalent to less than 2% of the daily water discharged to the TSF).

Significant potential environmental impacts due to seepage from future TSFs are not anticipated, given:

- Seepage rates are likely to be very low based on knowledge gained from over 10 years of ambient groundwater monitoring.
- Steady state saturated connectivity between the decant pond and groundwater is not anticipated.
- Decant water quality is expected to be like that of groundwater.
- Surface expression of seepage due to groundwater mounding is not anticipated (and there is no Groundwater Dependent Vegetation in the vicinity of TSFs on General Purpose Leases).
- Lateral seepage beyond the facility is not anticipated.

Notwithstanding the above, MWM will (as part of applications for a Works Approval and Mining Proposal for any future critical containment infrastructure), consult with DWER and DMIRS to determine the nature and scope of any further assessment of seepage that may be necessary including, but not limited to, the completion of an updated seepage assessment for the site.

5.4.2 Post-closure Landforms

MWM anticipates that the post-mining land use for the majority of the Proposal areas will be Pastoral Land, consistent with the current dominant land use in the Murchison subregion, 85% of which is grazing (Cowan et al, 2001). MWM is committed to the rehabilitation of all disturbed areas to the agreed final land use(s), however, it is possible that some elements of the Proposal area post-closure will not be suitable for the return to pastoral rangeland.

As discussed in the approved MCP (v4, 2021), the existing waste rock landforms and TSFs will be permanent features of the post-mining landscape. It is MWM objective to site all permanent landforms outside of the carbonatite boundary.

5.5 Assessment of Impacts

Table 5-1: Impacts on Terrestrial Environmental Quality

Possible Impact	Assessment of Impact at Mt Weld
Remaining low grade ore stockpiles on completion of mining could result in exposure of the public and surrounding environment to above background levels of radiation.	On completion of mining, low grade ore that cannot be economically processed will be returned to the pit or encapsulated within the waste rock landform. As the pit fills with groundwater, this material will become covered with water or adequately covered by waste overburden, blanketing radiation and removing the potential risk of exposure to the public. The radioactive components of the carbonatite-derived material have been in equilibrium with the groundwater for a long period of geological time with no significant dissolution. There is therefore no risk of contamination of the natural final void water body or surrounding groundwater with elevated levels of radiation.
Re-establishment of a self-sustaining ecosystem may be difficult to achieve on post-mining landforms.	Areas will be progressively rehabilitated throughout the life of the mine as they become available. MWM will undertake rehabilitation trials to determine appropriate rehabilitation methods for the site.
Seepage from TSFs, evaporation ponds, and other water-holding structures may occur during the life of the mine and could result in contamination of soils and groundwater.	Due to the presence of relatively low permeability hardpan and clay at existing TSF foundations, together with the very low permeability of deposited tailings, saturated connectivity between the decant pond and groundwater is not anticipated (ATC Williams, 2017). It is anticipated that foundation characteristics for future TSFs located on General Purpose Leases will be similar. Further geotechnical investigations are required to support these assumptions. During future TSF detailed design, amendments to design may be required to meet all relevant requirements.
Spills of hydrocarbons and other chemicals may occur during the life of the mine and could result in contamination of soils, groundwater and surface water.	Throughout operations, MWM will ensure that storage and use of hydrocarbons and chemicals is in accordance with the Dangerous Goods Safety Act, 2002 and appropriate Australian Standards (e.g., AS1940). Spill clean-up equipment will be readily available, and personnel will be trained in the prevention and clean-up of spills. Surface drainage has been designed so that no surface water drainage within the Project area that is potentially contaminated will be released to the environment without treatment. On closure, MWM will identify and remediate any contaminated sites that may be present because of the Project.
On completion of mining the final void will be left to fill with water. If evaporation significantly exceeds in-flows, then the water in the void will become hypersaline and could affect the water quality in the adjacent aquifer.	Groundwater flow through the pit is expected to be enough to prevent any significant increase in salinity levels. The monitoring programme instigated by Mt Weld will be maintained for the life of the Project and will provide ongoing data for prediction of final salinity in the main carbonatite aquifer. The final void may be partially backfilled with low grade ore reducing the pit volume. The inherent risk will be Medium to Low depending on the extent of backfilling and surface water and groundwater inflows.
The final landforms and roads may result in changes to the surface hydrology in the local area causing ponding or flooding in some areas and water starvation in other areas. Other areas may be prone to erosion	The Project has been designed to divert surface water runoff around the Project and re-join the natural drainage system immediately downslope to re-establish sheet flow characteristics rather than forming a channel. Some channels will be modified to promote passive infiltration into the carbonatite aquifer. Areas of vegetation will be retained between Project components wherever practicable, to reduce scouring. Areas will be progressively rehabilitated throughout the life of the Project, and high erosion risk areas will have additional stabilisation.

Possible Impact	Assessment of Impact at Mt Weld
It is possible that some elements of the Proposal area post closure will not be suitable for the return to pastoral rangeland. Primarily this includes the approved open pit void (MS 476), however, may extend to waste rock landforms and TSF areas.	Landforms have been designed within the constraints of the waste material properties, to ensure they are physically (geotechnically) stable, (geochemically) non-polluting / non-contaminating, and capable of sustaining an agreed post-mining land use, refer to Section 5.6.4 for further discussion of mine closure planning.

5.6 Mitigation

5.6.1 Design of TSFs and Stockpiles

The LOM Proposal involves construction of new TSFs, including a new TSF4 to the west of the current TSFs and evaporation ponds – refer to Figure 1-2 and Figure 2-1. TSF4 will be designed by subject matter geotechnical experts. The design and operational management of the TSF will be approved by DMIRS and DWER, and the TSF design will meet appropriate standards and requirements (DMIRS (2013), ANCOLD (2019)). The conceptual design and impact management for the TSF will be in accordance with the existing TSFs, the details of which are set out below.

TSF4 will form an impoundment adjacent to existing tailings storage cells (TSF1 and TSF2) which are 5 m high. TSF4 embankment is likely to be 5 m high at the first construction stage and approximately 1,680 m in length. A second construction stage, using downstream methods, may be explored to raise the cell perimeter by 5 m to a maximum height of 10 m. Alternatively, additional TSFs may be utilised, keeping height of embankments to 5 m high.

Site topography is of low relief with a maximum fall of approximately 0.2% from east to west.

Foundation conditions are expected to comprise a thin superficial deposit of silty sand over ferricrete hardpan approximately 15 m thick and underlain by hard residual clay. Groundwater is present at the base of the hardpan which forms a superficial aquifer, and in a deeper Carbonatite aquifer, between which the clay layer acts as an aquiclude.

The foundation soil profile is like that in the mine open pit, from which excavated materials (ferricrete and clayey soil) will be used for embankment construction.

Stantec (2020b) concluded that the tailings are considered geochemically benign, have low levels of NORM radionuclides and the tailings decant water is comparable with that in the superficial aquifer.

The in-situ materials beneath the impoundment are of low permeability. Seepage analyses indicates that hydraulic connection between the tailings pond and groundwater is not anticipated and the ferricrete will remain largely unsaturated during operation of the facility. Further geotechnical investigations are required to support the assumptions of underlying foundations. Design of the facilities may be altered during detailed design phase in consultation with DMIRS and DWER approval process.

5.6.2 Protection of Constructed Landforms

For both the construction and operational phases, a key environmental objective is to ensure that constructed landforms (TSFs, evaporation ponds and waste rock landforms including by-product stockpiles) are designed and constructed to be safe, stable and non-polluting throughout the Project life, and capable of sustaining an agreed post-mining land use.

Drainage and stormwater infrastructure for the overall Mt Weld Project Area has been designed to segregate clean stormwater runoff from potentially contaminated areas and to prevent increased rates of sedimentation and erosion. Specifically, surface water management will continue to divert flow around the Project Area and directed to natural downstream drainage. Where applicable some water will be diverted to sumps and infiltration bores to passively recharge carbonatite aquifer as part of sustaining this valuable resource.

The current approved EMP includes a Surface Water Management Plan (SWMP), which is being actively implemented during mining operations, will continue through the LOM operations.

Specific to waste rock landforms including stockpiles of by-products received from the Kalgoorlie REPF, surface water flood protection will direct water around these structures to minimise the risk of erosion.

Additionally, the current MCP (Appendix G) will be revised periodically in consultation with DMIRS across the life of the Project to reflect relevant progressive changes to surface water management as landforms are developed.

5.6.3 Management of Hydrocarbons

The following measures will be implemented onsite to reduce the risk of soil (and groundwater) contamination:

- During construction, MWM will maintain a high standard of housekeeping and ensure spills are contained and cleaned up promptly, and disposed of correctly (e.g., to the approved bioremediation facility, or via a licensed contractor, if hazardous). Equipment for containing and cleaning up spills will be provided in readily accessible areas where the risk of spills is high.
- New pipelines will be located within bunded corridors and/or with installed telemetry systems and pressure sensors to allow detection of leaks and failures.
- New infrastructure (flotation cells; reagent storage) will be located within bunded hardstand areas.
- Chemical reagents will continue to be stored in the designated reagent storage area in accordance with Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992 or other standards prescribed by the DWER and/or DMIRS to ensure the safety of personnel and protection of the environment.
- Hydrocarbons will continue to be stored consistent with the requirements of Dangerous Goods Licence DGS021014.

- All staff are to be trained and informed of the requirements of the GOS and SWMP, particularly:
  - Measures to prevent and manage groundwater impacts and incidents; and
  - To identify and manage or report spills (*MTW-SH-PRO-0021 – Incident Reporting and Investigation Procedure*).
- If triggered, implement an internal event investigation (*MTW-EN-PRO-0013 – Environmental Spill Sampling Investigation*) and, when necessary, a Groundwater Recovery Plan as required under L8141/2007/2.

5.6.4 Mine Closure Plan

As part of the regulatory requirements of the Mining Act, MWM has prepared a MCP to document how the mine will be closed and decommissioned following the cessation of the LOM operations. The most recent revision of the MCP (Stantec, 2021) was approved by DMIRS in July 2021 (REG ID: 96627) and will be revised periodically across the life of the Proposal to reflect advancements in knowledge and learnings from rehabilitation trials, and to include closure of additional LOM components, including the storage of REPF by-products.

The MCP presents the management actions and remedial strategies which demonstrate the ways in which terrestrial environmental quality and post-closure landforms will be maintained for the post-mining phase.

Mt Weld's key proposed closure objective is to design all landforms within the constraints of the waste material properties, to ensure they are physically (geo-technically) stable, (geo-chemically) non-polluting / non-contaminating, and capable of sustaining an agreed post-mining land use.

The key commitments made in the MCP, in relation to terrestrial environmental quality and landforms, are shown below:

- Re-instate natural hydrology upon closure as far as practicable, ensuring any surface water diversion structures which will be retained post closure are suitable, without impacting the integrity of permanent landform features.
- Commence the research, investigations and trials presented in the MCP within the period outlined in Closure Implementation Schedule.
- Undertake the decommissioning tasks identified in the Closure Schedule.
- Updating the Legal Compliance Register with any new approvals or licences that may be granted following submission of the 2021 MCP.
- Design landforms within the constraints of the waste material properties, to ensure physical stability and to minimise erosion.
- The physical and chemical characteristics of waste materials and the placement within landforms will be utilised as the basis for selecting appropriate target analogues.
- Ensure surface water management is incorporated into the detailed design of landforms to ensure that water runoff is managed effectively to reduce erosion.
- Rehabilitation of all disturbed areas to the agreed final land use(s).

- Continue monitoring rehabilitation analogues on agreed landform rehabilitation sites, which are representative of post-closure landforms, or in representative areas undisturbed by mining.
- The development of remedial and intervention strategies, (if monitoring demonstrates movement outside of the agreed parameters), and continuing post closure monitoring until agreed completion criteria has been demonstrated to be met.
- Consultation with key stakeholders will continue and will be documented throughout the life of the Proposal.
- Abandonment bunds will be in place at closure in accordance with DMIRS guidance.
- Local seed will be sourced for use in rehabilitation. The seed will be appropriately cleaned and stored.
- All infrastructure will be removed at closure unless a signed legal transfer of asset agreement is in place.
- A Preliminary Site Investigation (PSI) will be undertaken to progress mine closure planning and to ensure potentially contaminated sites identified at the Mt Weld Project are managed in accordance with the CS Act.

For the waste rock and by-products landforms, it is currently proposed that IP (which may be reprocessed in long-term future) will be encapsulated by gypsum which will then be encapsulated by alluvium and topsoiled. Crest bunds will be installed to prevent overtopping.

Specific closure initiatives applicable to the REPF by-products will be incorporated in future revisions of the MCP and will be informed by the following:

- Progressive and final landform designs for encapsulated by-products;
- Completion of Landform Evolution Modelling (LEM) in order to assess the significance and rates of erosion of proposed capping material;
- Determination of the nature, quantity and source(s) of capping material to ensure that final landforms containing residual by-product materials (if any, subject to feasibility assessment of potential reuse options for this material) are safe, stable and non-polluting; and
- Completion of a seepage risk assessment of stored by-products. Current considerations for the proposed storage location within the landforms include the significant separation distance between the base of the by-products stockpile and depth to groundwater being approximately 15 mbgl, thereby presenting a negligible risk of groundwater contamination from seepage.

5.6.5 Monitoring

A key mitigation strategy will be the continuation of the monitoring regime currently in place over the mine. The monitoring and inspection summary are detailed in Appendix C, and relates to all existing monitoring and extends the programme to monitor potential impacts associated with the LOM Proposal.

5.7 Predicted Outcomes

No detrimental effects are anticipated to terrestrial environmental quality as a result of the LOM Proposal. Final landforms will be designed and constructed to be safe, stable and non-polluting, and capable of sustaining an agreed post-mining land use.

It is considered that the existing obligations and commitments prescribed under DMIRS tenement conditions, and the EPA-approved SWMP, the MCP (Appendix G), *Mt Weld Mining's IMS Management and Monitoring Procedures* are appropriate to manage potential impacts on terrestrial environmental quality (refer Section 1.6.9, Table 1-2). MWM therefore considers that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on this environmental factor.

On this basis, MWM concludes that the EPA's objectives for Terrestrial Environmental Quality and for Landforms will be met and is not considered a significant environmental factor.

6 ENVIRONMENTAL FACTOR – FLORA AND VEGETATION

6.1 EPA Objective

The EPA's environmental objective for the factor Flora and Vegetation is:

"To protect flora and vegetation so that biological diversity and ecological integrity are maintained."

In the context of this objective: Ecological integrity is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements.

6.2 Policy and Guidance

- *Environmental Protection Act, 1986*
- Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations)
- *Biodiversity Conservation Act, 2016* (BC Act)
- Environmental Factor Guideline Flora and Vegetation (EPA, 2016b)
- *Environment Protection and Biodiversity Conservation Act, 1999*
- Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016a)
- Protection of Naturally Vegetated Areas Through Planning and Development, Environmental Protection Bulletin No. 20 (EPA, 2013)

6.3 Receiving Environment

6.3.1 Overview

The flora and vegetation of Mt Weld are typical of the region and are dominated by a mulga woodland with some localised mallee and spinifex communities. No rare or geographically restricted plant species are known to occur. The area suffers from overgrazing, primarily by cattle, rabbits, camels, horses, and disturbance by some exploration activities.

6.3.2 Conservation Reserves and Environmentally Sensitive Areas

Conservation Reserves (including National Parks, Conservation Parks and Nature Reserves) are lands managed by the Department of Biodiversity, Conservation and Attractions (DBCA) for the preservation of wildlife and ecological values. National Parks often also represent Environmentally Sensitive Areas (ESA). Under Section 51B of the EP Act, ESAs are declared by the Minister for Environment (Government of Western Australia 2017). The aim is to protect environmental values in these areas, such as declared rare flora, threatened ecological communities (TECs), or significant wetlands from degradation. Criteria for the declaration of ESAs do not include State-listed Priority Ecological Communities (PECs) which are protected under the BC Act.

No conservation reserves or ESAs intersect the survey area – refer to Figure 6-1. There are two National Parks within 150 km of the survey area. These are the De La Poer Nature Reserve, approximately 147 km to the north, and Goongarrie National Park, 135 km to the south-west. The De La Poer Range Nature Reserve (74,935 ha) was gazetted in 1974 (Barton and Cowan, 2001) and Goongarrie National Park (60,397 ha) in 1995; both are characterised by a range of woodlands and mulga shrubland.

In addition to Lake Marmion, Lake Ballard is 140 km south-east of the survey area and is listed as a Proposed Ramsar addition. Several other nature reserves, timber reserves and important wetlands occur within 250 km of the survey area.

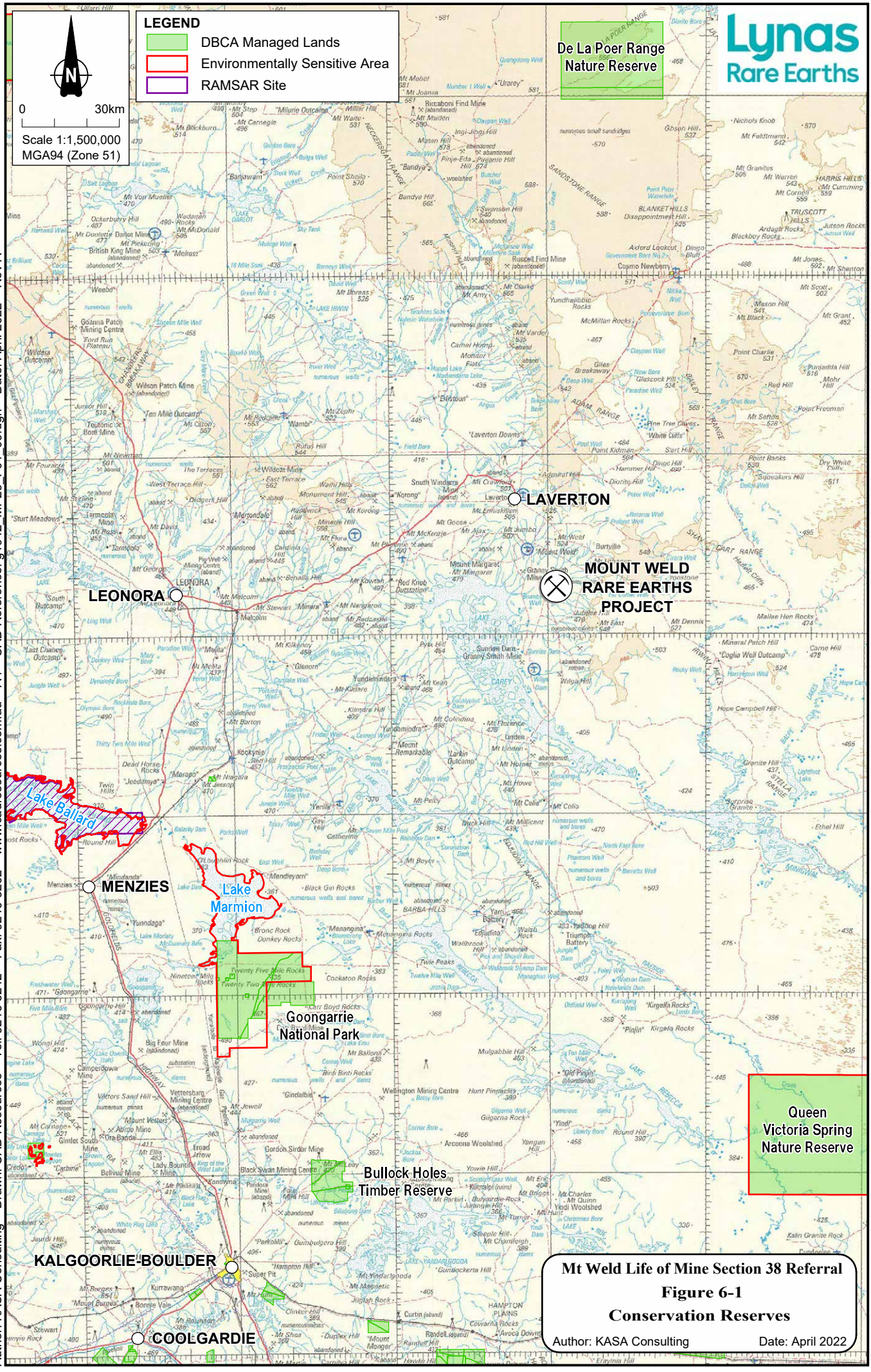


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Figure 6-1

Conservation Reserves

Author: KASA Consulting Date: April 2022

6.3.3 Recent Flora Surveys

In 2020, MWM commissioned Stantec Australia Pty Ltd (Stantec), to undertake a two-phase detailed flora and vegetation survey within tenements associated with, and adjacent to, the Mt Weld mine site (Appendix J). The consolidated extent of the survey effort is shown in Figure 6-2.

The objective of the survey was to provide a comprehensive understanding of the flora and vegetation values within the survey area. The survey comprised a desktop assessment to consolidate all applicable previous flora and vegetation surveys for the Project and a two-phase detailed flora and vegetation field survey to develop a consolidated list of flora species recorded as occurring in the survey area.

Phase 1 of the survey (Stantec, June 2020a) was conducted between 30 March and 6 April 2020, across a 3,254 ha survey area. A preliminary technical review (Western Botanical, June 2020) following completion of the Phase 1 survey identified dry seasonal conditions as being a limitation of the Phase 1 survey noting, however, that the field survey adequately addressed the first phase of a Detailed Survey as required by the EPA, with adequate coverage and representation of vegetation units.

Phase 2 of the survey was conducted between 24 and 31 August 2020 incorporating findings from the preliminary technical review, and was followed by a second technical review (Appendix M) conducted by Onshore Environmental (February 2021). The review was made against the latest technical guidance for flora and vegetation for environmental impact assessment (EPA, 2016a), and included a number of recommendations which were addressed in version 5 of the detailed flora and vegetation survey report (Stantec, February 2021).

The technical review of the final report (Onshore Environmental, February 2021) did not result in any further recommendations, however, to further assess the more specific impacts of the Proposal, MWM commissioned Onshore Environmental (April 2022) to prepare a LOM Disturbance Envelope Impact Memorandum (Appendix L) for the full Development Envelope extent.

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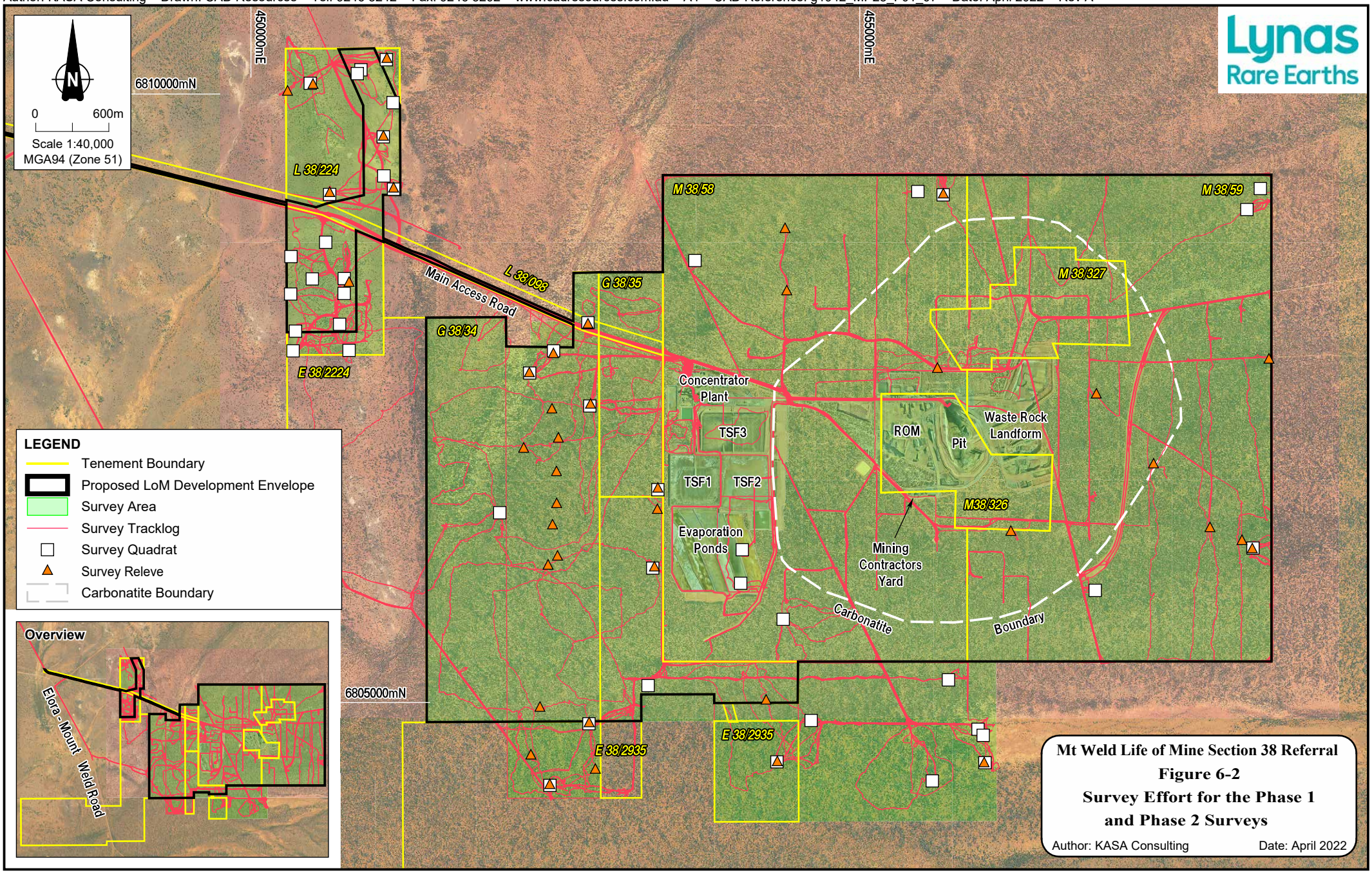

Mt Weld Life of Mine Section 38 Referral

Figure 6-2

Survey Effort for the Phase 1 and Phase 2 Surveys

Author: KASA Consulting Date: April 2022

A total of 38 sample sites (35 quadrats and three relevés) were assessed during the survey. Sixteen of these quadrats represent previously sampled relevés from surveys occurring in 2014 or 2018. The remaining 19 quadrats were installed during Phase 1 and re-sampled in Phase 2 to ensure adequate replication of quadrats within vegetation types, spatial distribution, and areas of particular interest were sufficiently surveyed. An additional two relevés were recorded during Phase 2 to assist in vegetation mapping refinement.

Eight vegetation types were described and mapped within the survey area (Table 6-1), with seven of these vegetation types represented within the proposed Development Envelope (Figure 6-3). None of the eight vegetation types recorded in the survey area represent a TEC or PEC, noting there are no known TECs within the Murchison bioregion. Vegetation within the survey area was determined to be well represented at all levels (state-wide, bioregional and local), with >99% of the pre-European extent, as mapped by Beard (1975), remaining intact. Vegetation was mapped using a combination of data collected from quadrats along with reconciling the previously described vegetation types, with refinements made as necessary.

The most dominant vegetation type was AiAcaArrAtEma mapped across 1,762 hectares (54% of the survey area).

The vegetation condition across the 3,254.8 ha survey area was mapped as either 'Very Good' (90.15% of the survey area), or in areas where the has been previous vegetation clearance and land disturbance for mining activities, the condition was mapped as 'Completely Degraded' (Figure 6-4). Previously cleared / disturbed land accounted for approximately 9.85% of the survey area. For the proposed Development Envelope that intersects the survey area, 100% was rated as being in very good condition, 0.01 ha (<0.01%) was rated as completely degraded.

Table 6-1: Vegetation Types within Survey Area and Proposed Development Envelope

Vegetation Type	Survey Area		Proposed Development Envelope[7]	
	Extent (ha)	Proportion (%) within Survey Area	Extent (ha)	Proportion (%) within Dev. Envelope
HpMpEyy Hakea preissii scattered tall shrubs to tall open shrubland over Maireana pyramidata and Eremophila youngii subsp. Youngii open shrubland to low open shrubland	32.14	0.99	26.93	**1.11**
AcAptAaptAtRcSspp. Acacia craspedocarpa and/or Acacia pteraneura/Acacia aptaneura low open woodland over Acacia tetragonophylla scattered shrubs over Rhodanthe charsleyae and Sclerolaena spp. Open herbland	6.74	0.21	0.00	**0.00**
AcAaptAanAtSsPo Acacia caesaneura, Acacia aptaneura and Acacia aneura low open forest over Acacia tetragonophylla and Santalum spicatum tall open shrubland over Ptilotus obovatus scattered low shrubs	55.75	1.71	48.12	**1.98**
HpAapMtPo Hakea preissii and Acacia ?aptaneura low open woodland over Maireana triptera and Ptilotus obovatus low shrubland	22.72	0.70	20.63	**0.85**
AaptHpMtMsp.Po Acacia ?aptaneura and Hakea preissii low open woodland over Maireana triptera, Maireana sp. And Ptilotus obovatus low shrubland to low open shrubland	138.08	4.24	46.82	**1.93**
AptAaptPsMsp.Esp. Acacia pteraneura and Acacia aptaneura low woodland over Ptilotus schwartzii, Maireana sp. And Eremophila sp. Low open shrubland	13.89	0.43	3.62	**0.15**
AiAcaArrAtEma Acacia incurvanerua and Acacia caesaneura low woodland over Acacia ramulosa subsp. Ramulosa and Acacia tetragonophylla tall open shrubland over Eremophila margarethae open shrubland to low open shrubland	1,761.98	54.13	1,579.25	**64.98**
AiAcAaptAtArrEgr Acacia incurvaneura, Acacia caesaneura and Acacia aptaneura over Acacia tetragonophylla and Acacia ramulosa subsp. Ramulosa tall open shrubland over Eremophila granitica low open shrubland	902.83	27.74	704.88	**29.00**
Completely Degraded (cleared)	320.68	9.85	0.01	**<0.01**
Totals	**3,254.81**	**100**	**2,430.24**	**100**

[7] Previously approved / cleared areas are not included in the total extent.

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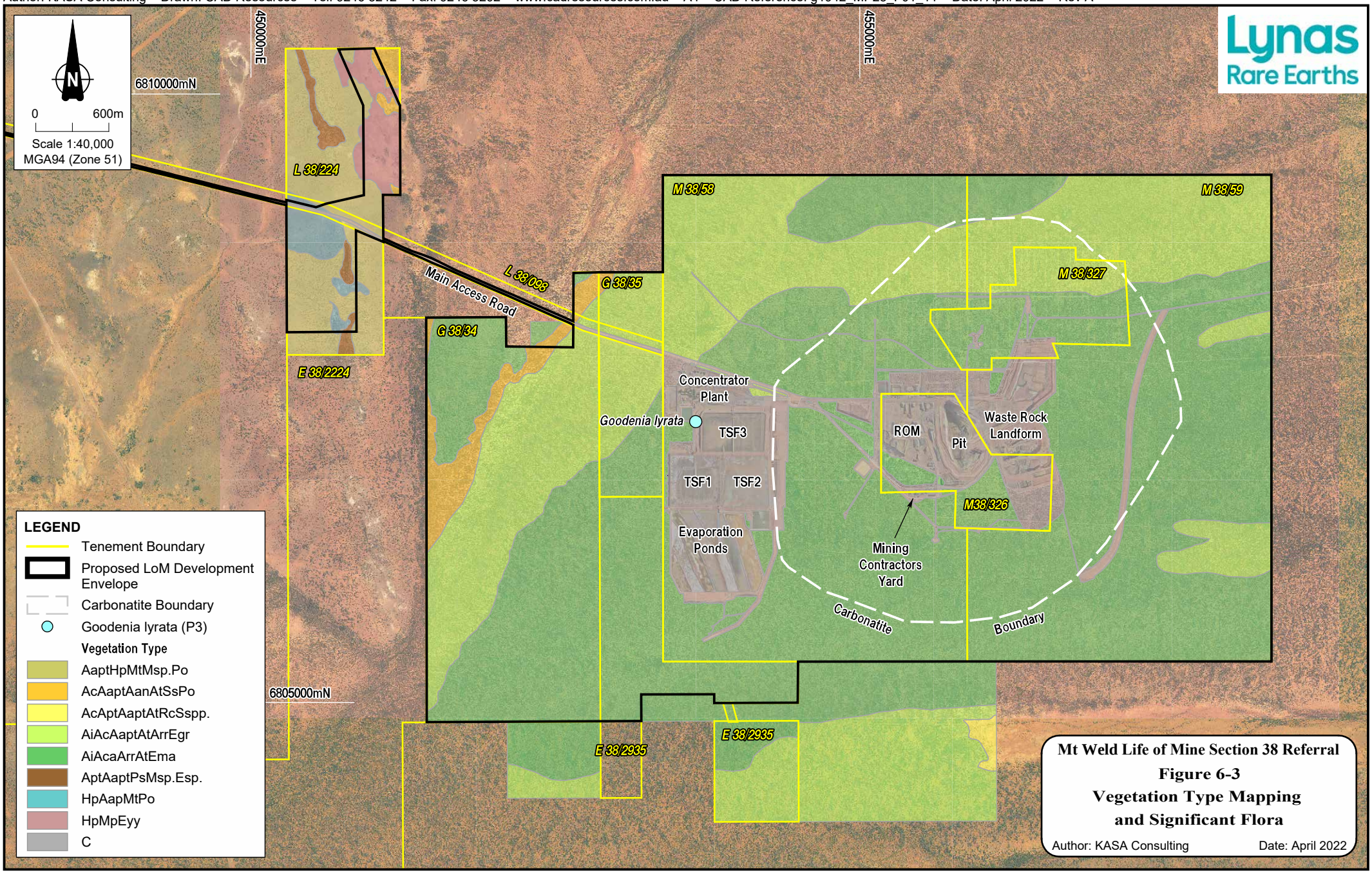

Lynas Rare Earths

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Figure 6-3

Vegetation Type Mapping and Significant Flora

Author: KASA Consulting Date: April 2022

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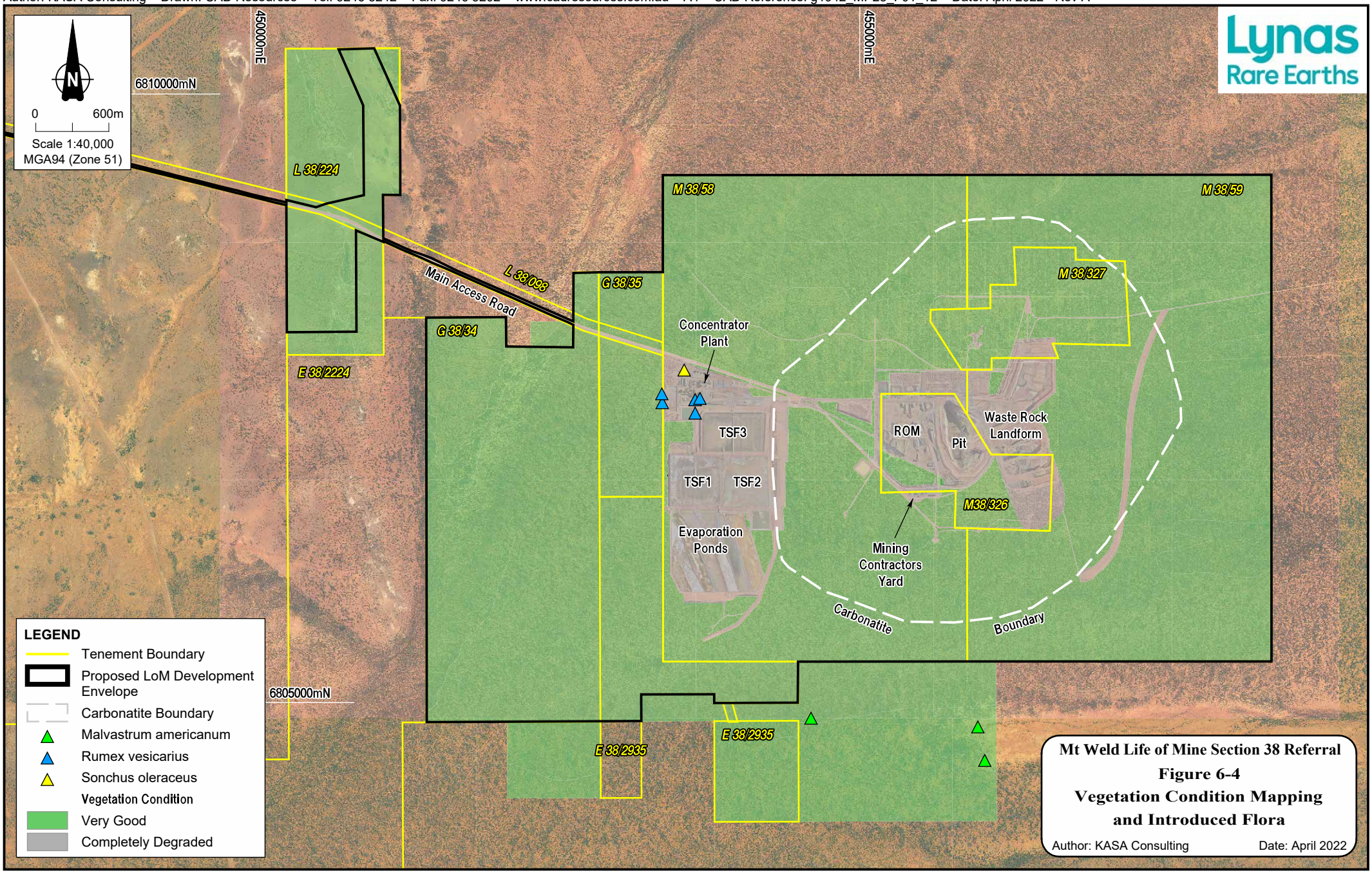


Lynas Rare Earths

Mt Weld Life of Mine Section 38 Referral

Figure 6-4

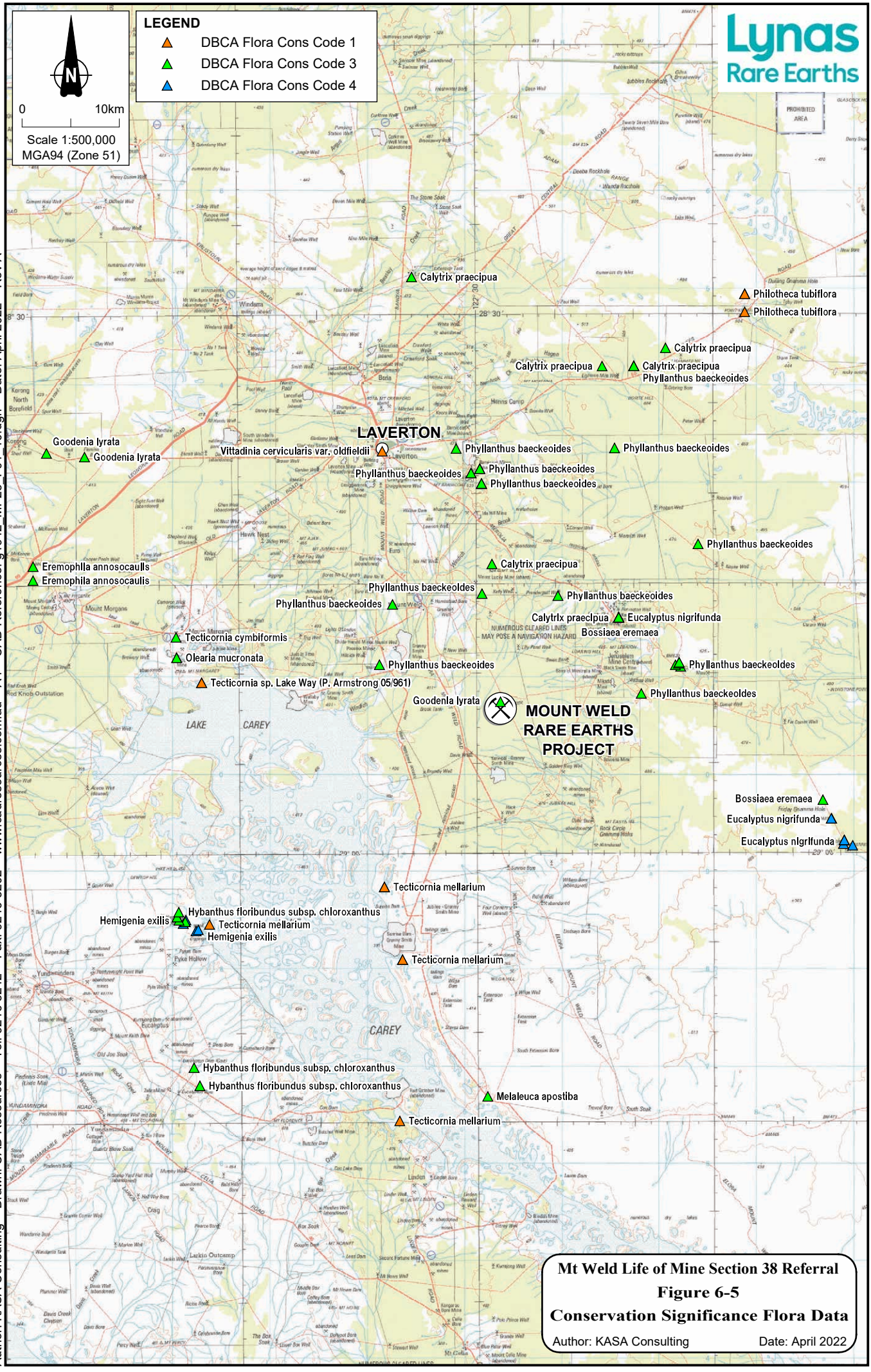
Vegetation Condition Mapping and Introduced Flora

Author: KASA Consulting Date: April 2022

There were 87 vascular flora taxa recorded during the Survey. *Fabaceae, Chenopodiaceae* and *Scrophulariaceae*, and *Eremophila* and *Acacia* and were the most represented families and genera respectively. The timing of Phase 1 survey was within the recommended season for botanical assessments within the region, however, below average rainfall preceding both Phase 1 and Phase 2 resulted in sub-optimal on-ground conditions with lower species diversity than would typically be expected. As such, 69 records could not be confidently identified, some of which are likely to represent additional species. Some families (such as Poaceae) and genera within the dataset are under-represented compared to what would be expected to occur in optimal conditions. Despite this, 32 species (37% of the 2020 species list) recorded during the Survey were species not recorded in any of the previous surveys since 2011. Where appropriate, and despite taxonomic changes since 2011, the results of previous flora and vegetation surveys are considered to still be relevant for incorporation into this report. The incorporation of the applicable results from those reports provides a comprehensive understanding of the flora and vegetation values within the survey area. A total of 208 vascular flora taxa have been recorded within the survey area since 2011, with representation from 41 families and 99 genera.

No significant flora was recorded during the Survey. One Priority 3 species, *Goodenia lyrata* has previously been recorded within the survey area in 2011, in a location that has since been cleared, refer to Figure 6-5. There is potential for *Goodenia lyrata* to occur following good seasonal rainfall given that this taxon is an opportunistic annual life form. However, given the extensive representation of the associated vegetation type and known occurrence of *Goodenia lyrata* within multiple bioregions across Western Australia, the potential for any impact on this taxon within the proposed development footprint is considered to be low. No other threatened or priority listed flora species are considered likely to occur within the survey area.

Three introduced flora species were recorded within the survey area, **Rumex vesicarius* (Ruby Dock), **Sonchus oleraceus* (Common Sowthistle), and **Malvastrum americanum* (Spiked Malvastrum). Ruby Dock was represented at two spot locations within the proposed Development Envelope.



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Mt Weld Life of Mine Section 38 Referral

Figure 6-5

Conservation Significance Flora Data

Author: KASA Consulting Date: April 2022

6.4 Potential Impacts

A direct impact to flora and vegetation will occur from ground disturbance of up to 2,241.6 ha within the Development Envelope. Vegetation within the Survey Area was determined to be well represented at all levels, and none of the vegetation types recorded within the Survey Area are aligned with known TECs or PECs.

In broad terms, flora and vegetation at the mine site is confined to shallow-rooted species due to cemented hardpan underlying shallow soil. Operational monitoring results have shown that vegetation has not been significantly impacted by variation in groundwater levels from groundwater abstraction since 1989.

However, the Project area is susceptible to water starvation and consequent loss of vigour in vegetation if natural sheet flow drainage is impeded. Bunding of additional drains around the mine could cause localised drainage shadow effects to the west-southwest of the Project area.

6.5 Assessment of Impacts

The LOM Proposal will increase the Area of Disturbance from 429 ha to 2,241.6 ha.

To assess the more specific impacts of the clearing, MWM commissioned Onshore Environmental to prepare a Stage 2 Disturbance Footprint Impact Memorandum (Appendix L). This memorandum comprises a summary of the potential likelihood of impacts to significant flora, vegetation and fauna by proposed clearing. Overall, the memorandum concludes that the disturbance within the survey area is unlikely to have a significant impact on significant flora or fauna confirmed or likely to occur within the survey area. Likewise, the Development Envelope is unlikely to impact on significant vegetation types and fauna habitats within the survey area. The vegetation types and habitats within the Development Envelope and survey area are not considered locally significant, unique or restricted within the region.

Although an assessment of impacts has been completed for the entirety of the Disturbance Envelope, it is not MWM's intensions to disturb all areas. A wholistic impact assessment of the Disturbance Envelope provides the flexibility to locate future tailings storage, waste rock landforms and future borefields in optimal locations, acknowledging the requirement for subsequent amendments to environmental approvals. MWM will adopt DWER's Clearing Principles and clear only what is required, in order to limit the disturbance areas.

6.6 Mitigation

The potential impacts of the Proposal on flora and vegetation will be mitigated by the implementation of sound management practices. MWM has been carrying out environmental management on the mine site since 2011 and has a robust EMP in place.

Further, MWM will extend feasibility assessments, including infrastructure layouts and designs (for TSFs, evaporation ponds, borefields, etc.), in order to refine the disturbance footprints for key infrastructure, with a view to minimising these as far as practicable.

The key commitments of the EMP are as follows:

- Clearing to be restricted to the areas defined in the regulatory documents. Areas to be cleared are clearly marked and 'no-go' areas are flagged. Post-clearing inspections are undertaken.
- Collect viable native seed for future potential rehabilitation. Where practicable, seed should be collected within the Project footprint prior to clearing, if viable seed is present.
- Topsoil, rootstock, log debris and leaf litter should be removed for future use in rehabilitation programmes. If possible, stockpiled topsoil should be directly replaced on disturbed areas as this increases the success of seedling establishment and propagule regeneration.
- Stored topsoil stockpiles should not exceed 3 m in height, if practicable. Handling and stockpiling of moist (or wet) topsoil should be avoided where practicable.
- Minimise the introduction and spread of invasive weeds using approved herbicides and by maintaining vehicle hygiene via the use of appropriate blow-down or wash-down facilities for vehicles that are entering the Project area. Light vehicles restricted to main roads (e.g., those used for daily transport of personnel to and from site) will not be required to implement hygiene measures unless they have been off-road or are intended to be used off-road within the Project area.
- Undertake rehabilitation trials to research appropriate soil preparation, drainage works, seed mixes and any other methods used to promote revegetation.
- Progressively rehabilitate the Project area throughout the life of the mine.
- Waste landforms will be shaped so that the slope does not exceed 20° unless justified by rehabilitation trials. The waste rock landform will be capped with a 100 mm layer of topsoil or friable material and deep ripped (on the contour) to break any compaction, enhance infiltration and graft the growth media with the underlying waste material.
- Inspect disturbed and rehabilitated areas for weeds and treat infested areas. Implement feral animal control measures prior to commencement of rehabilitation to promote vegetation establishment.
- Use existing tracks where possible and minimise off-road driving unless necessary (e.g., for exploration work).
- Park vehicles and machinery only in designated locations.
- Control dust during construction and mining operations and along roads with water sprays. Ensure that dust suppression activities do not result in any additional adverse impacts on vegetation (e.g., through prevention of overspray and runoff of saline water onto vegetated areas).
- Implement the Surface Water Management Plan to minimise potential surface water impacts on vegetation.
- Ensure spills are promptly contained, cleaned up and spill waste appropriately disposed of.
- Implement an Environmental Induction programme to educate employees of the impacts of their activities on the native flora and vegetation and their obligations to manage these impacts.
- Restrict the recreational use of off-road motor vehicles.
- Dispose of solid or liquid wastes in one of the designated waste disposal areas (e.g., overburden waste landforms, general landfill). Hazardous wastes such as waste oils and spent liquid chemicals taken offsite by a licensed contractor.

6.7 Predicted Outcomes

Flora and vegetation were originally discussed in EPA Report 646 (Section 6.1.2 – Native Vegetation Impacts) but was not considered a key environmental factor (Section 7 – Conclusions and Recommendations). The EPA considered that the proponent's proposed construction and operating activities would have minimal and manageable impacts on the extent of native vegetation and floral species diversity at Mt Weld. Impacts on native flora, vegetation and fauna were not considered to be key environmental factors for the Project.

Recent surveys show that activities within the Development Envelope will not impact on any TEC or PEC, noting there are no known TECs within the Murchison bioregion, and vegetation within the survey area was determined to be well represented at all levels (state-wide, bioregional and local). Ongoing environmental management outcomes confirm that the Mt Weld LOM operations will continue to have minimal impact on the flora and vegetation of the area.

It is considered that the existing obligations and commitments prescribed under DMIRS tenement conditions, the MCP (Appendix G), *Mt Weld Mining's IMS Management and Monitoring Procedures* are appropriate to manage potential impacts on terrestrial flora and vegetation (refer Section 1.6.9, Table 1-2). MWM therefore considers that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on this environmental factor.

Accordingly, MWM concludes that the EPA's objective for Terrestrial Flora and Vegetation will be met given the nature and scale of the Proposal, the lack of TEC or PEC within the survey area, the fact that all vegetation within the survey area is well represented at all levels, and the proposed management and mitigation measures proposed. This includes limiting disturbance to less than 2,241 ha (or 80% of the proposed Development Envelope of 2,802 ha).

7 ENVIRONMENTAL FACTOR – TERRESTRIAL FAUNA

7.1 EPA Objective

The EPA's environmental objective for the factor Terrestrial Fauna is:

"To protect terrestrial fauna so that biological diversity and ecological integrity are maintained".

7.2 Policy and Guidance

- *Biodiversity Conservation Act, 2016*
- *Environment Protection and Biodiversity Conservation Act, 1999*
- Environmental Factor Guideline Terrestrial Fauna (EPA, 2016c)
- Technical Guidance Sampling Methods for Terrestrial Vertebrate Fauna (EPA, 2016d)
- Technical Guidance Terrestrial Fauna Surveys (EPA, 2016i)

7.3 Receiving Environment

7.3.1 Recent Fauna Surveys

Concurrent with the flora and vegetation survey described in Section 6, MWM has committed significant resources over recent years to fully characterising the terrestrial fauna habitat and species present within and surrounding the Project area by commissioning multiple surveys in accordance with applicable guidelines including the EPA's *Technical Guidance Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA, 2020) (November 2020).

More recently, MWM commissioned Stantec to undertake a two-phase terrestrial fauna survey within tenements associated with, and adjacent to, the Mt Weld mine site (Appendix K).

The objective of the survey was to understand the vertebrate and short-range endemic (SRE) invertebrate values of the survey area to support environmental approval for the LOM Proposal. The survey comprised a desktop assessment and a two-phase survey (Level 2 and Targeted Terrestrial Fauna Survey) across the survey area (3,254.81 ha), conducted in autumn (between 27 March and 6 April) and spring (between 14 September and 23 September) of 2020. This followed four Level 1 surveys which had been previously conducted within sections of the survey area since 2011.

The desktop assessment component comprised seven database searches and the review of 11 previous surveys that were undertaken within or in the vicinity of the survey area. Only one of these surveys was a Level 2 survey, which was comparable in scope and size to the most recent survey.

The report for these surveys was prepared by Stantec (Appendix K) and was peer reviewed by environmental consultants Onshore Environmental (Appendix M). The Onshore Environmental (December 2020) peer review concluded that the Stantec report and background work was carried out in accordance with the EPA's *Technical Guidance Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA, 2020), using an experienced study team and implementing robust sampling techniques as outlined in the EPA's technical guidance (EPA, 2020). The fauna assemblages within the survey area were sampled at systematic trapping sites. Species accumulation curves indicated that between 70% and 100% of the fauna assemblages were captured during the Survey. Onshore Environmental (December 2020) note that further survey effort is likely to result in more bird species being recorded, however, additional species were also recorded from the survey area via targeted and opportunistic survey methods that were not captured in the species accumulation curves. The species assemblages recorded during the survey recorded a higher number of species than previous surveys undertaken in the vicinity of the survey area and Onshore Environmental (December 2020) concluded that it is unlikely that additional systematic sampling of bird species would increase the general knowledge for the area.

In order to assess the specific impacts of the Proposal on terrestrial fauna within the Development Envelope, MWM further commissioned Onshore Environmental (April 2022) to prepare a LOM Disturbance Envelope Impact Memorandum (Appendix L) for the full Development Envelope extent.

7.3.2 Fauna Habitats

Seven broad fauna habitat types were mapped within the survey area (Table 7-1), of which six were represented within the proposed Development Envelope. The land systems in which these habitats occur were considered typical of the East Murchison subregion.

Three of the fauna habitats represented within the proposed Development Envelope (mulga on stony plain, shrub plain, and low mulga on clay loam) were determined to be unlikely to support significant fauna species, and therefore were rated as being of low conservation significance.

Within the survey area, the 'mulga on clay loam' habitat was well represented occurring over 2,644.11 ha (or 81.24%) of the survey area, with 2,264.13 ha (93.16%) of the mapped extent occurring within the Development Envelope. It is considered marginal habitat for the Malleefowl (*Leipoa ocellata;* vulnerable (EPBC Act)), however no Malleefowl or nesting mounds have been recorded within the survey area despite extensive targeted searches. It is therefore considered unlikely that Malleefowl may occur, and the impacts to this species associated with clearing of native vegetation within the proposed Development Envelope are considered low. No other fauna of conservation significance are likely to rely on the 'mulga on clay loam' habitat within the proposed Development Envelope or within the wider survey area.

Within the survey area, the 'stony rise' and 'rocky ridge and outcropping' habitats are considered the most important habitats on a local scale and are important to the listed Long-tailed Dunnart. These habitats are of limited extent within the survey area, occurring over 108.13 ha (3.32%) and 6.61 ha (0.20%) respectively within the survey area, and 37.93 ha (1.56%) and 1.85 ha (0.08%) respectively within the Development Envelope. These habitats also supported microhabitats including rocky crevices and cracks, important for SRE taxa.

Table 7-1: Fauna Habitats within Survey Area and Proposed Development Envelope

Habitat	Vegetation Description	SRE Potential	Survey Area		Proposed Development Envelope[8]	
			Extent (ha)	Proportion (%) within Survey Area	Extent (ha)	Proportion (%) within Dev. Envelope
Mulga on clay loam	*Acacia aneura* low open forest over *Acacia ramulosa var. ramulosa* tall shrubland over *Eremophila latrobei subsp. Filiformis* and *Eremophila margarethae* low open shrubland.	Low	2,644.11	81.24	2,264.13	93.16
Mulga on stony plain	*Acacia aneura* low woodland over *Acacia tetragonophylla* open shrubland over *Acacia caesaneura, Maireana sp.* And *Ptilotus obovatus* low scattered shrubs.	Low	137.97	4.24	104.66	4.31
Stony rise	*Hakea preissii* and *Acacia sp*. Low open woodland over *Senna sp.* And *Sida sp.* Shrubland over *Maireana sp.* And *Ptilotus obovatus* low open shrubland.	Medium	108.13	3.32	37.93	1.56
Shrub plain	*Acacia aneura* low open woodland *over Acacia tetragonophylla* and *Santalum spicatum* tall open shrubland over *Eremophila youngii subsp. Youngii* scattered shrubs over *Ptilotus obovatus* scattered low shrubs.	Medium	16.98	0.52	16.54	0.68
Low mulga on clay loam	*Acacia aneura, Acacia caesaneura* and *Acacia aptaneura* low open forest over *Acacia tetragonophylla* and *Santalum spicatum* tall open shrubland over *Ptilotus obovatus* scattered low shrubs.	Low	9.76	0.30	5.14	0.21
Rocky ridge and outcropping	*Acacia aneura*, *Acacia pteraneura*, *Acacia ayersiana* low woodland over *Acacia minyura* tall, scattered shrubs over *Eremophila sp., Maireana sp*. And *Ptilotus obovatus* low open shrubland.	High	6.61	0.20	1.85	0.08
Sparse shrubland on heavy clay	*Acacia aneura*, *Acacia pteraneura* and *Acacia aptaneura* low open woodland over *Acacia tetragonophylla* tall open shrubland over *Rhodanthe charsleyae* and *Sclerolaena spp.* Open herbland.	Low	5.24	0.16	-	-
Cleared	N/A	Low	326.01	10.02	-	-
Totals			**3,254.81**	**100**	**2,430.24**	**100**

[8] Previously approved / cleared areas are not included in the total extent.

7.3.3 Terrestrial Vertebrates

The inventory of 95 species of vertebrate fauna recorded during the Survey represents 35.9% of the total number of species identified from the database searches and fauna surveys undertaken in the vicinity of the Proposal. Species recorded during the Survey comprised 18 native mammals, five non-native mammals, 52 birds and 20 reptiles (nil amphibians).

The species assemblages recorded during the survey recorded a higher number of species than most other surveys undertaken in the vicinity of the survey area. Eleven species recorded during the survey were not identified during the desktop assessment; the Ooldea Dunnart, Western Grey Kangaroo, White-striped Freetailed Bat, South-western Free-tailed Bat, Inland Free-tailed Bat, Western Whistler, Whiskered Tern, Mulga Dragon, Dark-spined Blind Snake, Banded Knob-tailed Gecko and the Perentie, none of which were fauna of significance.

The desktop assessment identified 25 significant fauna species with the potential to occur within the survey area comprising six mammals, 18 birds and one reptile. Of these, three species were confirmed as occurring during the survey:

- Long-tailed Dunnart (P4);
- Wood Sandpiper (Mi; IA); and
- Common Sandpiper (Mi; IA).

Based on the desktop assessment and habitats identified within the survey area, an additional 11 species were assessed as possible and eight were assessed as unlikely to occur.

The Long-tailed Dunnart was recorded from nine locations within the survey area. Three of these locations were within the proposed Development Envelope, within the 'stony rise' habitat in the L38/244 tenement area. Additionally, the species has been recorded at a total of 33 location within a 5 km radius of the survey area. These records occur along the continuation of the preferred 'stony rise' and 'rocky ridge and outcropping' habitats which extend outside the survey area to the north-west and south.

The Long-tailed Dunnart was also recorded at the 'rocky ridge and outcropping' habitat within the survey area. This habitat was represented over 1.85 ha within the Development Envelope representing a proposed impact to 27.99% of the total habitat extent mapped within the survey area. There were no Long-tailed Dunnart records from the area of 'rocky ridge and outcropping' habitat represented within the Development Envelope.

The survey area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of either the Wood Sandpiper or Common Sandpiper, due to limited aquatic habitat. A single Wood Sandpiper was recorded at the evaporation ponds within a previously approved and cleared portion of the survey area and a single Common Sandpiper was recorded at the return water pond within a previously approved and cleared portion of the survey area. Neither species has previously been recorded from the proposed Development Envelope.

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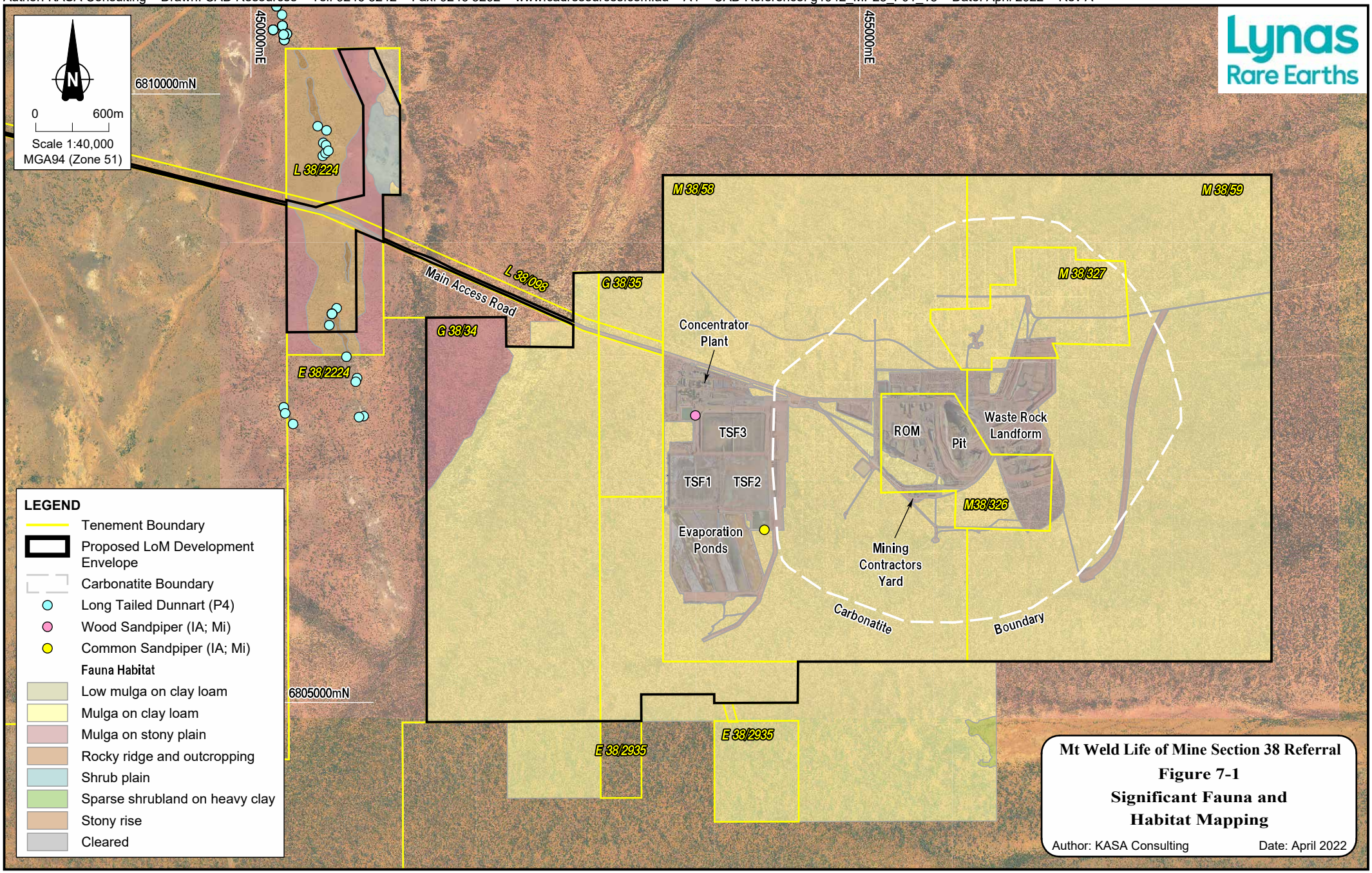

7.3.4 SRE Invertebrates

Habitats in the survey area were assessed for the potential to support SRE species based on the presence of microhabitats, habitat extent and isolation. Based on these criteria, one habitat; 'rocky ridge and outcropping' was assessed as having a high potential to support SRE species. In addition, the 'shrub plain' and 'stony rise' habitats were assessed as having a medium potential to support SRE species.

A total of 20 specimens from groups prone to short-range endemism were collected during the survey (Figure 7-2). Of these, six were identified to morphospecies and four taxa were only able to be identified to genus. Although none were known SRE species, the following were considered to represent potential SRE species and were classified as data deficient:

- the mygalomorph spider specimen from the genus *Proshermacha* 'MYG715'.
- the slater specimen from the morphospecies *Buddelundia* '103'.
- the slater specimen from the morphospecies *Buddelundia* '106'.
- the pseudoscorpion specimen from the morphospecies *Synsphyronus* 'weld'.

The *Proshermacha* 'MYG715', *Buddelundia* '106', and *Synsphyronus* 'weld' specimens were collected from within the Development Envelope associated with the 'mulga on clay loam' habitat. The 'mulga on clay loam' habitat is extensive and well connected within and surrounding the survey area, therefore impacts to these taxa are expected to be low.

The *Buddelundia* '103' specimen was recorded from within the Development Envelope associated with the 'shrub plain' habitat. There is 16.54 ha of the 'shrub plain' habitat represented within the Development Envelope, which represents 82.76% of the habitat mapped within the survey area. The 'shrub plain' habitat was classified as having medium SRE potential due to being restricted and isolated within the landscape, however, it does not contain significant SRE microhabitats. Given that a high proportion of the mapped extent of this habitat type is within the Development Envelope, the potential impact on the taxon is determined to be moderate.

Additionally, a total of five taxa could not be identified to species level and were considered to potentially represent SRE species; all occur within the Development Envelope. They include the mygalomorph spiders *Aname sp. Indet., Aganippe sp. Indet., Idiopidae sp*. And *Idiosoma sp.* And the scorpion *Urodacus sp. Indet*. All five taxa were collected from the widespread 'mulga on clay loam' habitat type, noting that the *Idiosoma sp.* Was also collected from the 'stony rise' and 'shrub plain' habitat types. It is therefore determined that any impact to these five taxa is expected to be low.

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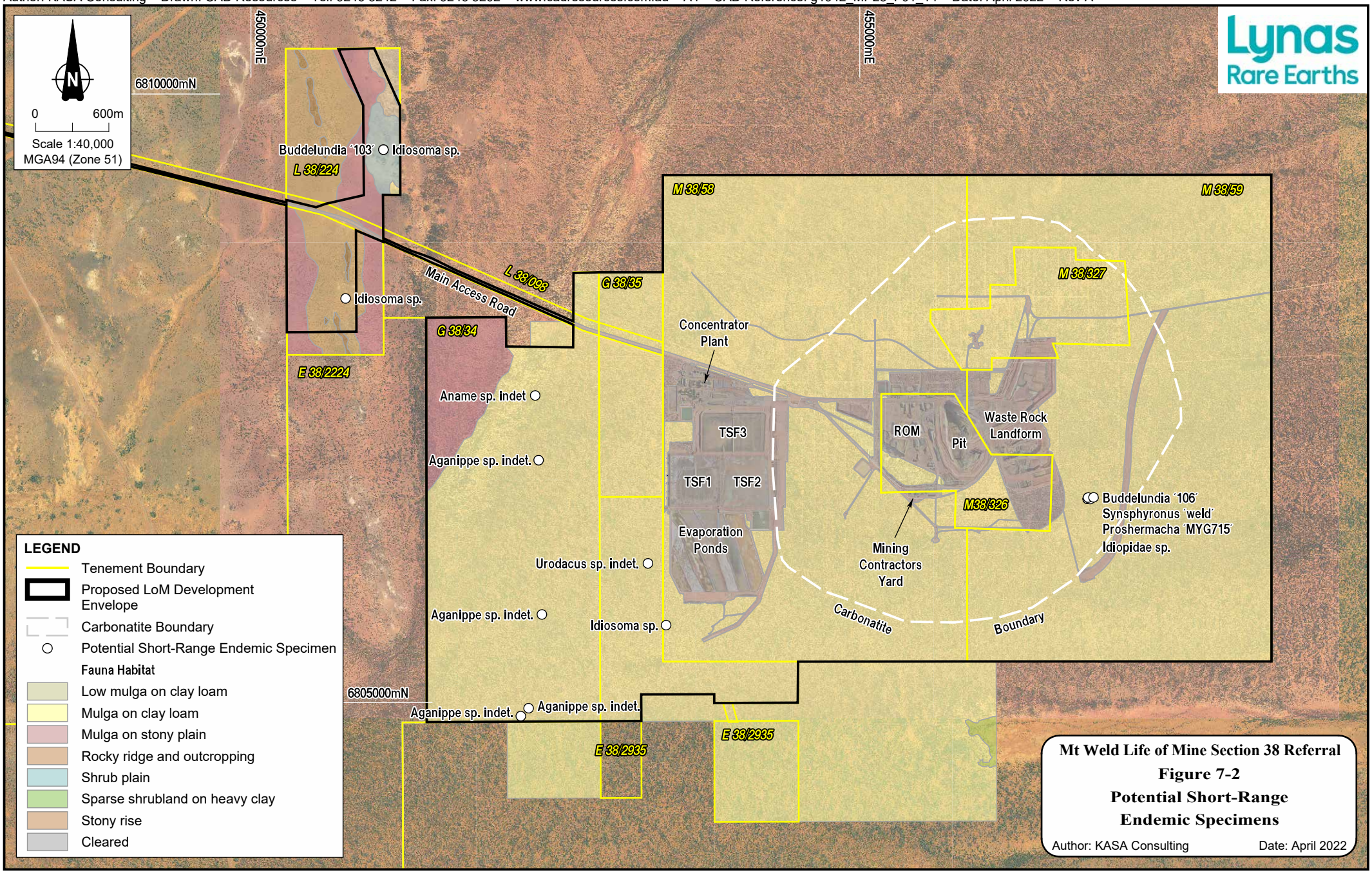

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Figure 7-2

Potential Short-Range Endemic Specimens

Author: KASA Consulting Date: April 2022

7.3.5 Arid Bronze Azure butterfly (*Ogyris subterrestris petrina*)

MWM is aware of a species of interest in the Goldfields region, namely the Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*), which is a Threatened species that is listed as Critically Endangered under the EPBC Act and the BC Act. The Arid Bronze Azure Butterfly has an obligate association with a sugar ant *Camponotus sp. Nr. Terebrans*.

The larvae are cryptic and extremely difficult to detect. The most critical factor for habitat occupancy by the butterfly is the presence of large colonies of the host ant; only large colonies can support the Arid Bronze Azure Butterfly because, being a parasitic species, it requires large numbers of hosts.

The target vegetation for the host ant is mature mixed Gimlet (*Eucalyptus salubris*) / Salmon Gum (*Eucalyptus salmonophloia*) woodlands on red-brown loam soils, with an open understorey. In addition to Gimlet and Salmon Gum, other smooth-barked eucalypts which have basal ant colonies include Wandoo (*Eucalyptus capillosa subsp. Wandoo*), Smooth-barked York Gum (*Eucalyptus loxophleba subsp. Lissophloia*) and Ribbon-barked Mallee (*Eucalyptus sheathiana*) (Onshore Environmental, March 2021). Specialist advice received from qualified field ecological consultants indicates that as the vegetation types required to support the host ant are not represented within the Mt Weld Project Area, the butterfly will not occur at the site.

It is therefore concluded that the likelihood of direct or indirect impact on the Arid Bronze Azure Butterfly is negligible and no further assessment has been deemed necessary.

7.4 Potential Impacts

The potential direct impact of the Proposal on fauna is attributes to the clearing of vegetation within the proposed Development Envelope. In addition to habitat disturbance, impacts to fauna may include:

- Unearthing of burrowing species during earthworks.
- Entrapment of small reptiles and mammals in open trenches or pits.
- Accidental death and injury from vehicles and machinery.
- Noise impacts.
- The presence of feral animals such as rabbits, resulting in destruction of the habitats used by native fauna and competition for scarce natural food resources.
- Reliance on the Proposal for food (e.g., domestic waste is not disposed of appropriately) and water (e.g., ponds and water resources).

Migratory birds are highly mobile and may only be present irregularly, either as nomads or migrants occurring during particular climatic conditions, e.g., after significant rainfall events (Outback Ecology, 2011).These species are not likely to be impacted by the Proposal.

Many of the small native mammals expected to occur within the Development Envelope have limited mobility and tend to be residential species. These are likely to be affected by the Proposal but are species that are considered widespread throughout the Goldfields, and consequently the impact will be strictly local. Larger mammals such as kangaroos and bats are highly mobile and are unlikely to be impacted by mining activities.

Reptiles and amphibians are likely to be affected by clearing activities and increased traffic movement. Monitor lizards and larger snakes are highly mobile and unlikely to be seriously affected by the Proposal. All reptile and amphibian species expected to occur within the Development Envelope have widespread geographic ranges throughout much of the arid zone and therefore only minimal local impact is expected to occur.

SRE specimens were predominantly collected from within the 'mulga on clay loam' habitat. The 'mulga on clay loam' habitat is extensive and well connected within and surrounding the survey area, therefore impacts to these taxa are expected to be low. The *Buddelundia* '103' specimen was recorded from inside the proposed Development Envelope within the 'shrub plain' habitat which is classified as having medium SRE potential due to being restricted and isolated within the landscape, however, it does not contain significant SRE microhabitats. Given that a high proportion of the mapped extent of this habitat type is within the proposed Development Envelope, the potential impact on the taxon is determined to be moderate.

7.5 Assessment of Impacts

Three of the seven fauna habitats represented within the proposed Development Envelope (mulga on stony plain, shrub plain, and low mulga on clay loam) were determined to be unlikely to support significant fauna species, and therefore were rated as being of low conservation significance.

The 'mulga on clay loam' habitat was well represented, occurring over 81.24% of the survey area, with 93.16% of the mapped extent occurring within the Development Envelope. It is considered marginal habitat for the Malleefowl, however, given no Malleefowl or nesting mounds have been recorded within the survey area the impacts to this species associated with the Proposal is considered to be low.

No other fauna of conservation significance are likely to rely on the 'mulga on clay loam' habitat within the proposed Development Envelope or within the wider survey area, therefore the potential impact is determined to be low.

The 'stony rise' and 'rocky ridge and outcropping' habitats were both classified as being significant for the Long-tailed Dunnart (*Sminthopsis longicaudata*; Priority 4). Relatively small areas for both habitats occur within the proposed Development Envelope (37.93 ha and 1.85 ha respectively), representing 35.07% and 27.99% of their respective extent within the wider survey area. Given that the known extent of each habitat type within the proposed Development Envelope is <35% of the known extent within the survey area, and that both habitats have been confirmed to extend at least 5 km to the north-west, any impact from clearing within the proposed Development Envelope is considered to be low to moderate.

The Development Envelope does not contain any important habitat nor support an ecologically significant proportion of the population of the Wood Sandpiper and Common Sandpiper, due to limited aquatic habitat (Stantec, November 2020), therefor migratory birds are unlikely to be impacted by the Proposal.

None of the SRE collections from the survey area were known SRE species. There were six taxa identified to morphospecies and three other taxa that could only be identified to genus level; four of these taxa were considered to represent 'Potential SRE: Data Deficient'. All but one of these SRE taxa were collected from the 'mulga on clay loam' habitat which is extensive and well connected within and surrounding the survey area; impacts to these taxa are therefore expected to be low. The *Buddelundia* '103' specimen was recorded from the 'shrub plain' habitat which was classified as having medium SRE potential. A high proportion of the 'shrub plain' habitat represented within the survey area occurs within the Disturbance Envelope (82.76%), hence any potential impact is determined to be moderate.

7.6 Mitigation

The potential impacts of the Proposal on terrestrial fauna and SRE invertebrates will be mitigated by the implementation of sound management practices. MWM has been carrying out environmental management at the Mt Weld Rare Earths Project site since 2011 and has a robust EMP in place.

The key commitments of the EMP in relation to fauna management are as follows:

- Implement the vegetation management measures above to minimise disturbance to fauna habitat and undertake progressive rehabilitation as areas become available.
- Use cleared vegetation in rehabilitation to provide habitat refuges.
- Regularly inspect diversion drains, evaporation pond, holes and trenches for any distressed or dead fauna. If adverse impacts on native animals are observed, then means to exclude fauna, such as fencing, netting or other deterrent mechanisms will be used.
- Check the integrity of capping on exploration or other boreholes.
- When a dead or injured animal is found, try to identify the animal. If this is not possible, contact DWER for assistance in identification. Injured fauna should be assessed for repatriation and sent to a wildlife rehabilitation centre if practicable (unless a feral animal). If the injured animal is severely injured, is a feral animal, or it is not practicable to send the animal to a wildlife rehabilitation centre, then the animal is to be dispatched humanely on advice from DWER or a veterinarian.
- Dispose of mine rubbish appropriately and ensure any food scraps disposed on site are buried. All waste receptacles on site should always be kept covered or contained and in a tidy condition. Any storage areas where food waste is stored awaiting removal, should be enclosed to prevent fauna access.
- Participate in local and regional feral animal control in consultation with Department of Agriculture and Food and pastoral owners.
- Prohibit the use of firearms (except for firearms for feral animal control by authorised individuals) and keeping of pets.
- Off-road driving will be restricted, and speed limits adhered to on access tracks particularly at dawn, dusk and after dark at night when nocturnal species are active. The speed limit on the access road and around the site will be risk based to prevent likelihood of roadkill events.

- Potential noise impacts on fauna will be minimised in accordance with measures currently prescribed in the EPA approved Mt Weld Noise Management Plan (Section 6.7 of the EMP). Measures include the use of silencers and noise attenuation on construction equipment where necessary, limiting road traffic movements to avoid noise sensitive periods particularly at night when nocturnal species are active, and implementing a maintenance and inspection schedule for equipment on a regular basis.
- Educate employees of the impacts of their activities on the native fauna and discourage direct contact with fauna, through an Environmental Induction programme. Training on reporting of incidents relating to fauna, should be included in the induction programme.

7.7 Predicted Outcomes

Terrestrial fauna was not considered a factor in EPA Reports 646 or 884. While three significant species were confirmed as occurring in the survey area (Long-tailed Dunnart, Wood Sandpiper, and Common Sandpiper), the survey area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of either Sandpiper species. Relatively small areas of habitats significant to the Long-tailed Dunnart occur within the proposed Development Envelope, and both habitats have been confirmed to extend at least 5 km to the north-west. Clearing within the proposed Development Envelope is therefore considered to be low to moderate. Whilst direct impacts will be minimised through avoidance of known habitats as far as practicable, implementation of measures defined in the existing Mt Weld Fauna Management Plan during land clearing and operations are anticipated to mitigate potential risks to significant fauna species.

It is considered that the existing obligations and commitments prescribed under DMIRS tenement conditions, the MCP (Appendix G), *Mt Weld Mining's IMS Management and Monitoring Procedures* are appropriate to manage potential impacts on terrestrial fauna (refer Section 1.6.9, Table 1-2). MWM therefore considers that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on this environmental factor.

Accordingly, MWM concludes that the EPA's objective for Terrestrial Fauna will be met given the nature and scale of the Proposal, the low potential for the Proposal area to support significant fauna species, the fact that the fauna habitats within the survey area are well represented, and the proposed management and mitigation measures proposed. This includes limiting disturbance to less than 2,241 ha (or 80% of the proposed Development Envelope of 2,802 ha).

8 ENVIRONMENTAL FACTOR – SUBTERRANEAN FAUNA

8.1 EPA Objective

The EPA's environmental objective for the factor Subterranean Fauna is:

"The objective of the factor Subterranean Fauna is: To protect subterranean fauna so that biological diversity and ecological integrity are maintained".

8.2 Policy and Guidance

Subterranean fauna is protected under State and Federal legislation, governed by three Acts:

- *Biodiversity Conservation Act 2016*
- *Environmental Protection Act, 1986*
- *Environment Protection and Biodiversity Conservation Act, 1999*

With this legislation in mind, the EPA developed the Technical Guidance Subterranean Fauna Survey (Environmental Protection Authority 2016b), equivalent to EAG 12 Environmental Assessment Guideline for Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia (EPA, 2013) and the Technical Guidance Sampling Methods for Subterranean Fauna Survey (Environmental Protection Authority 2016a).

8.3 Receiving Environment

Subterranean fauna was not considered in EPA Reports 646 or 884 as they were relatively unknown at that time. A groundwater abstraction limit of 2.8 GL/yr currently authorised in GWL17130(3) and the GOS. MWM proposes to extend the existing borefield in order to optimise raw water availability for expanded operations. New / amended approvals to develop and abstract water from proven resources will be scoped and applied for in consultation with DWER. MWM has therefore commissioned a survey which confirmed the absence of subterranean fauna (Stantec, November 2019). The results of these surveys are provided as Appendix N.

The survey and assessment demonstrated that the mining area of the Mt Weld Rare Earths Project area does not provide prospective habitat for stygofauna (stygobites) or troglofauna (troglobites), with key findings summarised in Table 6-1 of the report in Appendix N. Database searches and a literature review did not identify any subterranean taxa within the immediate vicinity of the Project, with most taxa in the broader area associated with shallow calcrete systems. Similarly, the desktop review of hydrogeological information indicated that the mining area would be unlikely to support subterranean fauna.

8.4 Potential Impacts

Impacts on subterranean fauna may be direct or indirect. Direct impacts include the removal of habitat, drawdown of groundwater, inundation, and water quality changes. The main threats include excavation of geologies known to support subterranean fauna; groundwater extraction for process or domestic purposes; dewatering for below water table excavation, and groundwater reinjection of waste or excess water.

Indirect impacts include changes to hydrology, siltation, void collapse, alteration to nutrient balance and contamination. The main threats include changed surface topography due to compaction or creation of hard surfaces resulting in altered groundwater flow paths, increased runoff, and reduced infiltration and aquifer recharge; clearing of surface vegetation leading to sedimentation and changed nutrient inputs; potential leaks or leaching including tailings and waste water resulting in alterations to ground water chemistry and quality, and introduction of toxins or radiation; and salinisation due to intrusion of saline water into freshwater aquifers and leaching from pit voids.

8.5 Assessment of Impacts

The habitat characterisation reported in the subterranean fauna assessment (Stantec, November 2019), indicated that the cemented and/or clay dominated alluvial strata, which account for most of the unsaturated zone (under natural conditions) are likely to lack the extensive, interconnected vugs and voids required for troglofauna (troglobites). For stygofauna, while the groundwater quality is suitable, the cementation and/or clay matrices of the alluvium and underlying clay strata would likely limit the pore spaces available for stygofauna, namely stygobites. Vugs, voids, solution cavities and fractures, where present in the regolith or underlying fresh bedrock tend to be infilled or occur at depth, also decreasing the prospectivity for stygofauna habitat. The discontinuous, semi-confining clay layer is also expected to at least partially restrict the input of resources; nutrients and organic matter, to the regolith aquifer and, where present, the underlying fractured rock aquifer.

The low prospectivity of the hydrogeology within the Mt Weld site was confirmed by the pilot survey, with no stygofauna (stygobites) or troglofauna (troglobites) recorded. The only potential obligate subterranean fauna taxon collected was the isopod *Paraplatyarthrus nr pallidus* OES26, associated with the outcropping low ridgeline, more than 5 km from the mine pit, in the western reference area. This area, which may host limited troglofauna values, has a linear extent of at least 5 km and occurs in a different geological domain to the Mt Weld mine site.

8.6 Mitigation

The findings of the subterranean fauna research show the prospectivity at the Mt Weld mine site for subterranean fauna is negligible. Specific mitigation actions are not required other than the sound environmental management practices currently adopted at the site through the implementation of the EMP.

8.7 Predicted Outcomes

The assessment indicates that the Mt Weld mine site is not prospective for stygofauna (stygobites) or troglofauna (troglobites). Accordingly, subterranean fauna will not represent an environmental factor for future regulatory approvals for the Mt Weld Rare Earths Project. The results of the pilot survey, supported by habitat characterisation, suggest that the LOM Proposal will not impinge on the representation, diversity, viability and ecological function of subterranean fauna at the species, population or assemblage level, in line with EPA objectives.

It is therefore considered that no further stygofauna or troglofauna assessment of subterranean fauna is necessary, for environmental approvals to proceed.

9 ENVIRONMENTAL FACTOR – INLAND WATERS

9.1 EPA Objective

The EPA's environmental objective for the factor Inland Waters is:

"To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected".

9.2 Policy and Guidance

- Environmental Key Factor Guideline Inland Waters (EPA, 2016f)
- Australian and New Zealand Environment and Conservation Council Water Quality Guideline (ANZECC, 2000)
- DWER Water Quality Protection Notice (WQPN) 26, (liners for containing pollutants, using synthetic membranes)
- Groundwater Operating Strategy – Mt Weld GWL 171310(3) (AECOM, 2019)
- Mt Weld Mine Operations – Surface Water Management Plan (Lynas, 2020)

9.3 Receiving Environment

9.3.1 Hydrology

Catchments near the Mt Weld mine site are generally flat with rocky outcrops along the margins that act as drainage divides. Surface drainages are typically poorly defined with shallow branching watercourses in the upper portions of the catchments that generally flow for only a few days after rainfall. The local catchments all drain into Lake Carey, a large playa lake surrounded by low-relief topography comprising aeolian dunes. Lake Carey is generally dry for most of the year, although small pools persist at the lower elevations on the lake surface following rainfall runoff.

The Proposal area is subject to surface sheet wash drainage following exceptionally heavy or prolonged rainfall events and is within a land system that is susceptible to water starvation if sheet-flow is impeded. There is a large catchment to the east of the Project area in excess of 100 km^2 with the eastern most portion of the catchment having undulating topography and runoff leaving the area via a system of natural channels. The lower portion of the catchment is much flatter and natural channels are poorly defined, indicating that surface runoff during extreme floods will occur as sheet flow, with a fairly even covering of water over the ground flowing to the west.

The existing mine pit, waste rock landforms, stockpiles and plant site are protected from flooding and sheet-flow by bunding and drains that divert surface water drainage away from the Project infrastructure – refer to Figure 9-1. Topographically, the mine site falls from 436 m AHD in the north-east to 415 m AHD in the south-west as shown on Figure 9-2. This provides a fall of about 1:300 across the mine site.

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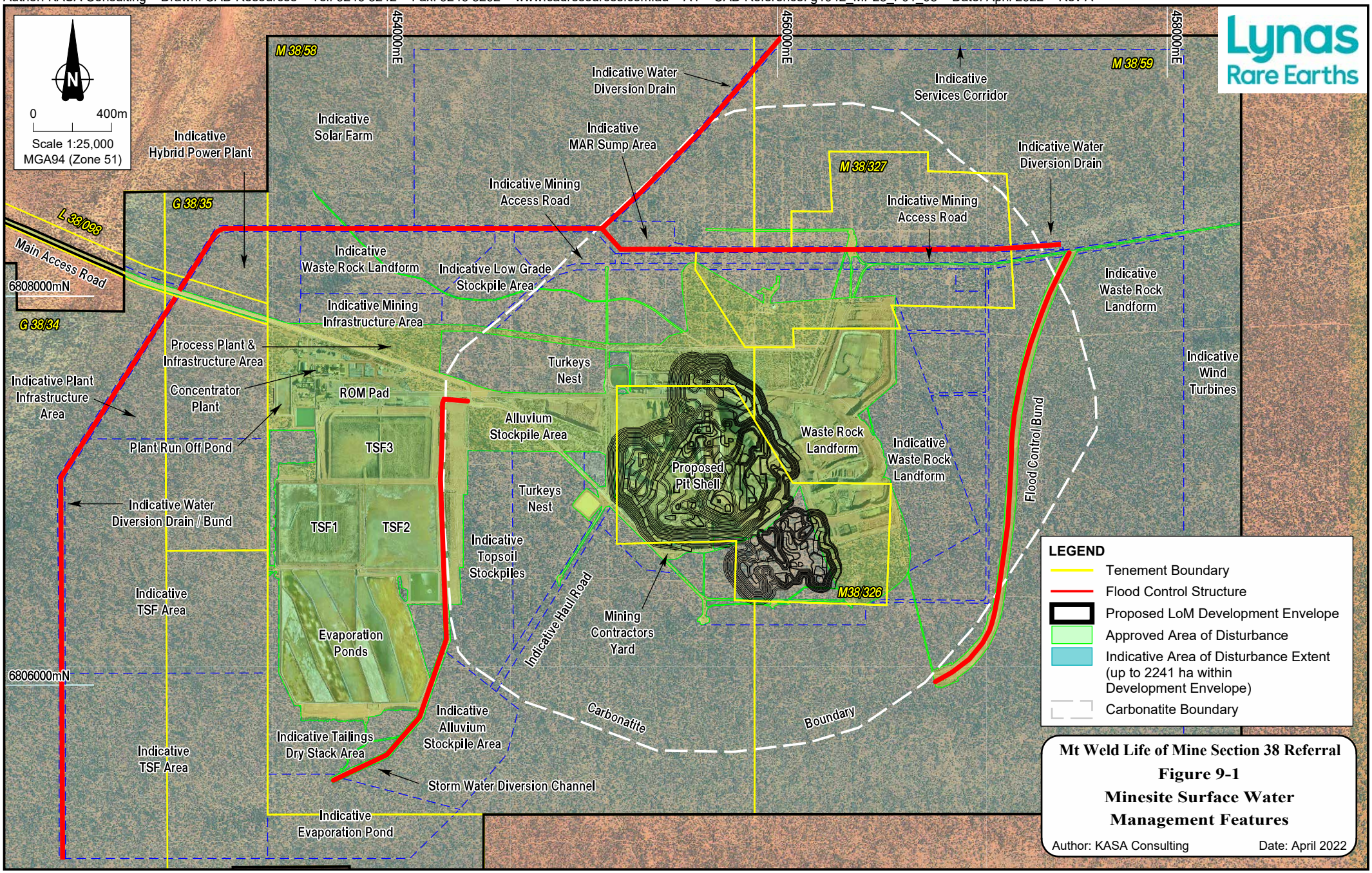

Lynas Rare Earths

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Figure 9-1

Minesite Surface Water Management Features

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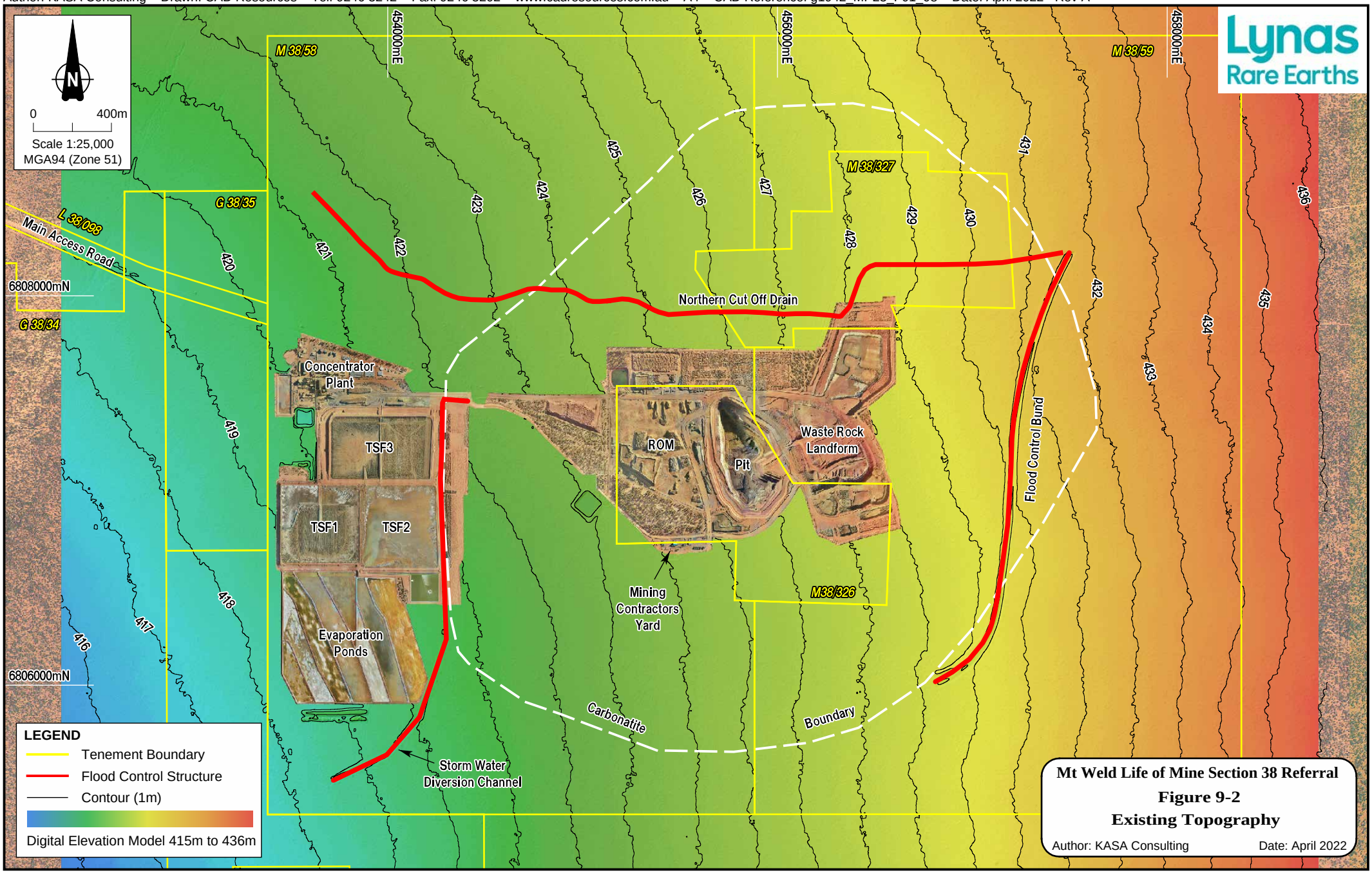


9.3.2 Hydrogeology

9.3.2.1 Overview

There are three main regional groundwater flow systems in the vicinity of the Proposal area:

- An unconfined superficial aquifer, of regional extent, formed within surface alluvium.
- A confined / semi-confined weathered carbonatite aquifer, formed by the carbonatite regolith, located to the east of the existing TSFs.
- A confined / semi-confined regional weathered bedrock / fresh bedrock aquifer.

Limited connectivity is thought to occur between the superficial and bedrock aquifers due to the presence of confining lacustrine clays. Consequently, the bedrock aquifer appears to be confined, with groundwater levels elevated above the lacustrine clay layer. This regional bedrock aquifer is interpreted to hold little ground water; however, it is expected some connectivity between this aquifer and the carbonatite stock occurs through permeable features across the glimmeritic clay zone (Ultramafix, 2011).

The regional groundwater flow direction is south-west away from the carbonatite and towards Lake Carey and the Carey Palaeodrainage System. However, groundwater abstractions since 1989/90 from the carbonatite complex (URS, 2012) have created a sink whose hydraulic influence extends into the surroundings including the existing TSF and evaporation pond locations (Ultramafix, 2011).

A hydrogeological assessment (Ultramafix, 2011) commissioned by MWM indicates that groundwater flows towards the weathered carbonatite to the east of the TSFs and evaporation pond locations. Further assessment by AECOM (June 2018) identified that a groundwater sink has developed as a result of nearby open pit dewatering and water supply abstraction. This groundwater sink has reversed the regional groundwater flow direction back towards the open pit, rather than towards the west and Lake Carey. With the capture zone divide identified about 2.5 km south-west of TSF3 and evaporation pond area, all seepage from the TSFs and evaporation ponds report back toward the open pit hydraulic sink.

9.3.2.2 Groundwater Quality and Depth

Groundwater quality and depth is monitored in accordance with the DWER Licence L8141/2007/2 at several bores located around the existing TSFs and evaporation ponds.

When assessing water quality, MWM has corporately adopted the ANZECC Livestock Drinking Water Guideline (LDWG), assuming beef cattle as the primary beneficial user of the water (ANZECC and ARMCANZ, 2000).

The Mt Weld Rare Earths Project's EMP targets for groundwater quality are defined as:

- Groundwater monitoring data does not indicate a significant increase in salinity of abstracted water; and
- Groundwater monitoring data indicates no contamination of the groundwater resource.

A quantitative indication of groundwater quality is presented in the Groundwater Monitoring Summary prepared by AECOM (2021) for reporting years 2020/21. During the reporting period, no exceedances of the LDWG were recorded.

Groundwater quality samples were obtained from the operational production bores (where water can be obtained) on a quarterly basis and all samples are forwarded to a NATA accredited laboratory for a chemical component analysis.

For the 2020/21 reporting period:

- pH readings reported fluctuation in operating dewatering bores, however remained within recent long-term ranges of between 7.7 and 8.3.
- Bicarbonate concentrations have generally remained steady, albeit a slight fluctuated in 2021, with concentrations up to 320 mg/L.
- The concentrations of chloride, calcium, sulphate, magnesium, potassium, and sodium in operating dewatering bores have remained stable during the reporting period.

All analytes are generally within recent long-term trends with little change over the reporting period.

MWM dewatering bores are all located in the western zone of the carbonatite aquifer. Over time, all bores have reported increasing salinity from approximately 3,000 mg/L in 2014 up to approximately 6,000 mg/L in 2018 prior to changes in the dewatering infrastructure. Bore B11, located within the open pit, has however reported salinities up to approximately 20,000 mg/L. It is apparent this bore is located within a deep zone of highly weathered carbonatite and there appear to be salinity stratification in the deeper aquifer zones.

Typically, groundwater salinity from the western side of the aquifer is brackish to saline.

Increased groundwater abstraction from the western part of the carbonatite stock to support an increase in MWM dewatering requirements, resulted in localised groundwater levels declining at slightly increased rates over the past few years as expected.

Based on the monitoring data presented and the significant distance to other groundwater users, it is concluded that no local groundwater users have been adversely affected by the abstraction from the Mt Weld Borefield. The cattle station bores, located on the pastoral lease of the Mt Weld Station, draw groundwater from an alternate superficial aquifer and are not influenced by abstraction from the Mt Weld Aquifer. There are no known Groundwater Dependent Ecosystems (GDEs) near the borefield.

Groundwater quality has remained relatively stable since mining commenced.

9.4 Potential Impacts

9.4.1 Surface Water

Construction of new bunding on the west side of the TSF4 area may result in temporary ponding at the bund wall and a drainage 'shadow' downstream from the mine expansion area. Similar effects could also be experienced in the vicinity of the Project area along roads that have been constructed across the main surface drainage flow. Roads constructed parallel with the main drainage direction are potentially susceptible to localised scouring, but at the same time, low surface gradients restrict water flow velocity and erosive energy.

Construction activities may increase the sediment load of surface water runoff. This disturbance is not expected to have a significant impact on the surface hydrology of the area. During operations, surface water runoff from around the plant and vehicle servicing areas could contain substances such as hydrocarbons that may be harmful to the environment. Runoff from around the stockpiles may also contain levels of radiation slightly above background levels.

9.4.2 Groundwater

Access to the groundwater resources of the Mt Weld carbonatite aquifer is provided by an agreement between MWM and Goldfields Granny Smith (GGS), and GGS GWL 59529 issued by the Department of Water (DoW) (now DWER) for abstraction of 4 GL per year. The agreement between MWM and GGS is due to expire in October 2023 where MWM will be the sole abstractor and user of water sourced from the carbonatite aquifer.

Dewatering of the carbonatite regolith has been undertaken since December 1989 with the water used by the GGS and Mt Weld operations. Detailed monitoring of the quantity and quality of groundwater abstracted has been carried out throughout this period and will be continued through MWM's operations. Total abstraction to June 2021 was 55 GL over the 37-year period which has resulted in appreciable dewatering of the aquifers. An assessment of remaining groundwater resources by AECOM in September 2021 suggests that the remaining available groundwater resource may be up to 18 GL.

Water for the Mt Weld expanded operations will be required mainly for beneficiation of ore at higher production rates, ancillary uses in dust suppression on haul roads and around the process plant and load-out facility as well as for construction activities.

Water will be sourced from the existing wellfield and potentially eastern and western borefields if proven. At Mt Weld, MWM is actively considering further water conservation strategies to improve the water balance into the long term. MWM has commissioned an engineering feasibility study to examine water recycling options for the site. The most important of these is the possible construction of a high recovery Reverse Osmosis plant which will provide high recovery and availability of plant feed water. Abstraction rates from the carbonatite will remain within existing GWL limit of 2.8 GL/year. Where supplementary water supplies are required to meet production demands, these will be sourced from alternate aquifers or water sources within MWM's Leases with approvals sought under the *Rights in Water and Irrigation Act, 1974* (RIWI Act), as necessary.

Given reductions in demand and analytical indications that recharge water is less saline than originally abstracted water, it is considered that the planned groundwater abstraction for the Mt Weld Project will have negligible effects on the quantity and quality of existing groundwater resources. Over the 12 years of operation, no impacts on overlying vegetation or downstream hydrology have been noted because of groundwater abstraction.

On future cessation of abstraction by both Mt Weld and GSM, direct recharge from rainfall will ultimately return the groundwater table to pre-abstraction levels and reduce salinity in the main carbonatite aquifer. The relatively intensive monitoring programme implemented by Mt Weld will be maintained for the life of the Mt Weld Rare Earths Project and will provide ongoing data for prediction of final salinity in the main carbonatite aquifer.

During the LOM operational phase, the pit void will be subject to water influx during direct rainfall events. The highly porous ore in the base of the pit, above the present-day water table, will likely absorb most of this water and evaporation of the remainder will not affect salinity levels of groundwater.

In terms of potential impacts and mitigation measures associated with contamination of groundwater, reference should be made to Section 5 which discusses the potential for seepage of contaminants from containment facilities (TSFs, evaporation ponds and proposed by-product stockpiles).

9.5 Assessment of Impacts

9.5.1 Surface Water Management

Bunds and diversion channels around the Project area will be constructed so that clean surface runoff from the north is diverted in a westerly direction to re-join the natural drainage system immediately downslope of the protected facilities. Water originating in the east will continue to be diverted by the eastern flood channel and divert water to the south (Figure 9-1). Water will be diverted such that sheet flow characteristics will be re-established, rather than forming a channel. Areas of vegetation will be retained between Project components wherever practicable, to reduce scouring.

The current surface water management for the site consists of three separate diversion channels. There is one major diversion channel to the east of the site which is designed to prevent the runoff from the large catchment area to the east, entering the site. The other diversion channels are designed to control runoff from rainfall that occurs on the site itself and a proposed northern diversion infrastructure to protect flooding from the north. It is proposed that some surface water flows from the north will be directed to a sump fitted with water infiltration bores to passively recharge the carbonatite aquifer.

The diversion channels will be trapezoidal open channels cut into the existing ground surface predominantly perpendicular to the slope of the ground. This reduces the potential for erosion in the base of the channel and allows the channels to release water at a low velocity over a broad area like the natural diffuse surface water flows.

Additional diversion channels and bunds will be required over the LOM to divert water away from infrastructure. Water will be conveyed around the project to re-join the natural surface water paths. In some areas of the project the diversion channels will have sumps established with infiltration bores to passively recharge the carbonatite aquifer as is currently installed at the southern end of the eastern diversion channel.

9.5.2 Groundwater

Abstraction of groundwater for processing activities within the proposed pit area means that no significant dewatering of the pit is required during the pre-strip and operations phase. No dewatering water will be discharged to the environment. Any water pumped from the pit (rainwater, remnant ground water) will be directed to the existing MWM borefield reticulation system for use as process water and dust suppression.

The existing groundwater monitoring programme implemented by Mt Weld would be continued to meet the Project's Ministerial Conditions for pre-operational monitoring programmes. This programme shows no impact on water quality is currently being experienced as a result of mining operations.

9.6 Mitigation

9.6.1 Surface Water

MWM has developed a SWMP to minimise potential surface water impacts associated with activities at the Mt Weld Rare Earths Project by:

- Identifying areas susceptible to erosion and defining proposed management strategies that can be implemented to mitigate associated impacts; and
- Identifying potential sources of contaminants that require appropriate controls and containment to prevent the risk of an uncontrolled release to the environment.

The SWMP also draws from the following information to achieve the abovementioned objectives:

- A detailed assessment of capacity of existing stormwater infrastructure to contain runoff from the processing plant, blended ore stockpiles, concentrate storage, and laydown areas so that there is zero discharge of contaminated stormwater from the processing area for a 1 in 100 annual exceedance probability (AEP) storm event over 72 hours;
- A surface water drainage map of the processing site showing contours and flow paths;
- Where it is determined that existing infrastructure such as the plant runoff pond is insufficient, identification of additional infrastructure/operational controls required to ensure no discharges of contaminated stormwater during a 1 in 100 AEP storm event over 72 hours; and
- Provision of schedule for constructing additional infrastructure and/or implementing operational controls, if required.

Reference should be made to Section 5.6 for proposed management and mitigation measures in relation to surface water and erosion impact mitigation for constructed landforms including engineered containment facilities (TSFs and evaporation ponds), waste rock landforms and proposed by-product stockpiles.

9.6.2 Groundwater

A GOS, imposed as a condition of the GWL, is being implemented across the Mt Weld mine site. This GOS describes the MWM water use and abstraction regime, and address issues associated with the abstraction of water for pit dewatering under GWL 171310(3). It also defines the MWM responsibility in terms of monitoring and managing the impacts of taking water and reporting to the DWER.

This GOS has been prepared to meet the requirements of Operational Policy 5.08 'Use of operating strategies in the water licensing process' (DoW, 2011) and describes the following:

- A summary of the site hydrogeological setting.
- A water source description.
- Monitoring programme.
- Environmental impact management.
- Contingency plans.
- Water use efficiency initiatives.

9.7 Predicted Outcomes

Attachment 2 of MS 476 (May 2003) defined the water supply source as dewatering with a maximum annual requirement of 225 ML/yr from the Mt Weld aquifer. This figure was later annualised to a maximum annual requirement of 2.8 GL/yr (Mt Weld aquifer). In January 2018 this requirement was removed from the Key Characteristics table of MS 476 as groundwater abstraction is regulated under GWL17130(3) and the GOS.

A total of 2,217,056 kL (sourced from Mt Weld aquifer) was abstracted by MWM and GGS during FY2021. Mt Weld used 1,541.794 kL of total abstraction which is well within GWL17130(2) licence abstraction limit of 2.8 GL/yr.

Groundwater abstraction is currently not expected to exceed the approved limit in the GWL. It is not expected that there would be any additional detrimental effects on the Inland Waters environmental factor due to the changes in the Proposal as there are no permanent natural surface water sources present within the project boundary envelope.

Groundwater is monitored in accordance with amended DWER Licence L8141/2007/2. During the 2021 reporting period there were no exceedances of the ANZECC Livestock Drinking Water Guidelines.

Overall, ambient groundwater monitoring for 2021 indicates that operational activities at Mt Weld continue to have no significant impact on groundwater quality surrounding the Project when compared to baseline data.

There are unlikely to be any detrimental impacts on surface water caused by the proposed LOM development. Surface water monitoring and inspections will continue across the LOM in accordance with the requirements of the SWMP to monitor for areas susceptible to erosion.

Accordingly, it is considered that the existing obligations and commitments prescribed under existing (or by revisions to) DWER licence conditions, DWER water licence GWL171310(3) and the GOS (AECOM, 2019), DMIRS tenement conditions, the Surface and Groundwater Management Plans and *Mt Weld Mining's IMS Management and Monitoring Procedures* are appropriate to manage potential impacts on surface and groundwater resources within the Project area (refer Section 1.6.9, Table 1-2). MWM therefore considers that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on this environmental factor.

The legal instruments described above prescribe limits on abstraction volumes from the Carbonatite aquifer, as well as conditions to ensure that surface and groundwater quality of inland waters is not adversely impacted.

Accordingly, MWM concludes that the EPA's objective for inland waters will be met given the nature and scale of the Proposal, prescribed operating conditions in the DWER environmental licence L8141/2007/2, DWER water licence GWL171310(3) and GOS (AECOM, 2019), and the monitoring and mitigation measures proposed.

10 ENVIRONMENTAL FACTOR – AIR QUALITY

10.1 EPA Objective

The EPA's environmental objective for the factor Air Quality is:

"To maintain air quality and minimise emissions so that environmental values are protected".

10.2 Policy and Guidance

Key policy and guidance documents for the air quality factor are:

- Environmental Factor Guideline Air Quality (EPA, 2016g)
- National Environment Protection Measure (Ambient Air Quality) (NEPC, 2016)

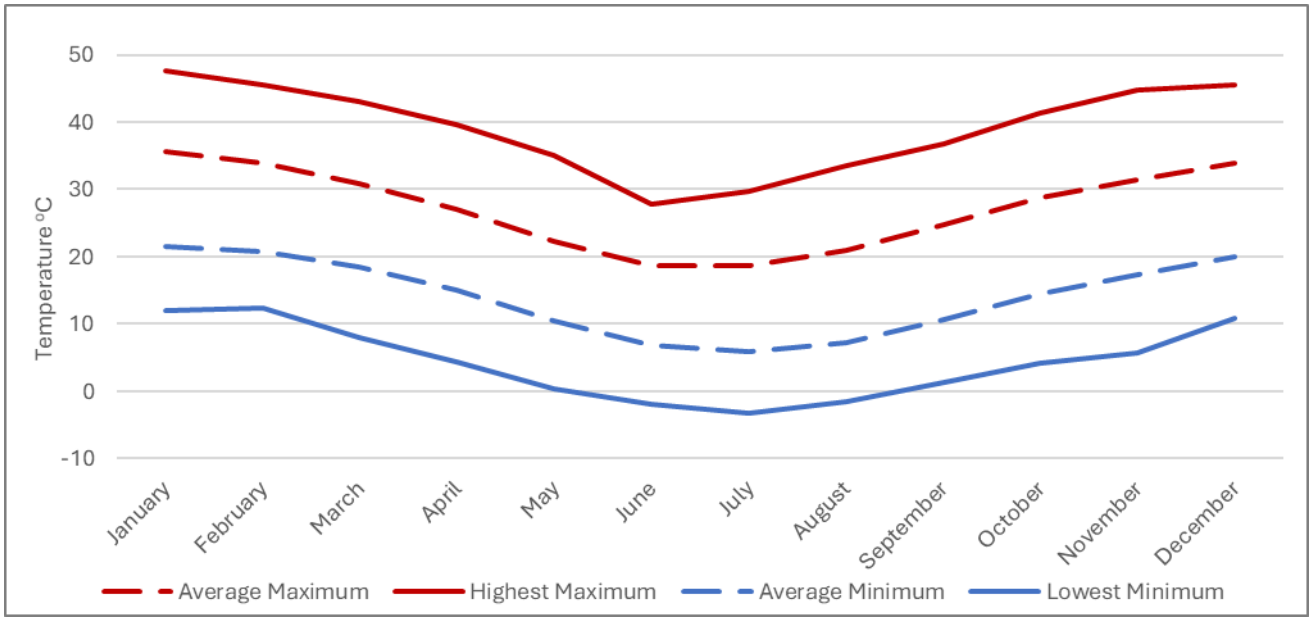
10.3 Receiving Environment

The climate and meteorological characteristics of a region control the dispersion, transformation, and removal (or deposition) of pollutants from the atmosphere, and therefore ambient air quality. To present the climatic characteristics of the existing site and locality, data was sourced from the nearest Bureau of Meteorology (BoM) automatic weather station (AWS) to the Mt Weld mine site, Laverton Airport, located approximately 29 km to the to the north-west.

Laverton has a semi-arid climate characterised by hot summers and mild to cool winters. The long-term temperature statistics from the BoM Laverton AWS are presented in Insert 10-1. January is the hottest month with an average maximum temperature of 35.6°C. Temperatures above 40.0°C occur on approximately 16 days per year with hot, dry easterly winds.

By contrast, winters are cool, with July average minimum and maximum temperatures being 5.9°C and 18.6°C, respectively. Overnight temperatures fall below freezing less than two times in a typical winter and fall below 2°C approximately 8 times in a typical winter.

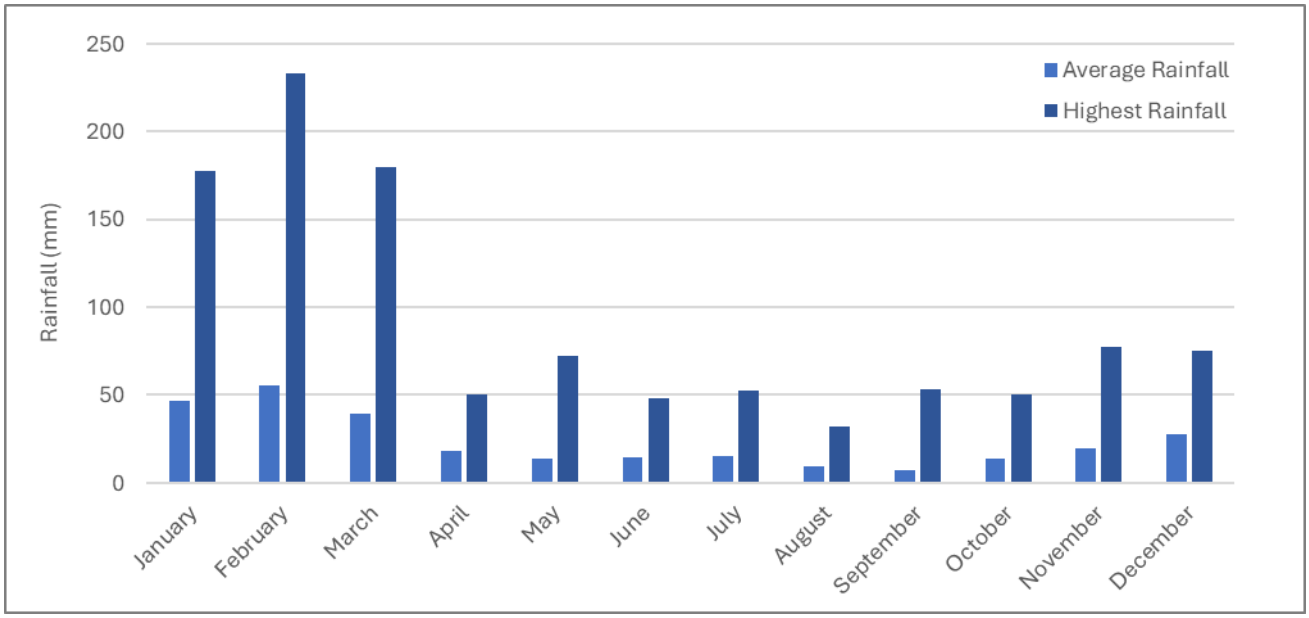
Insert 10-1: Long Term Temperature Statistics, Laverton Airport (1991-2022)



Source: BoM, 2022

The mean annual rainfall is 281 mm on an average of 53 days and, while the average rainfall is evenly distributed throughout the year, there is a slight summer maximum. Rainfall also displays considerable variation from year to year, with average annual rainfall shown in Insert 10-2.

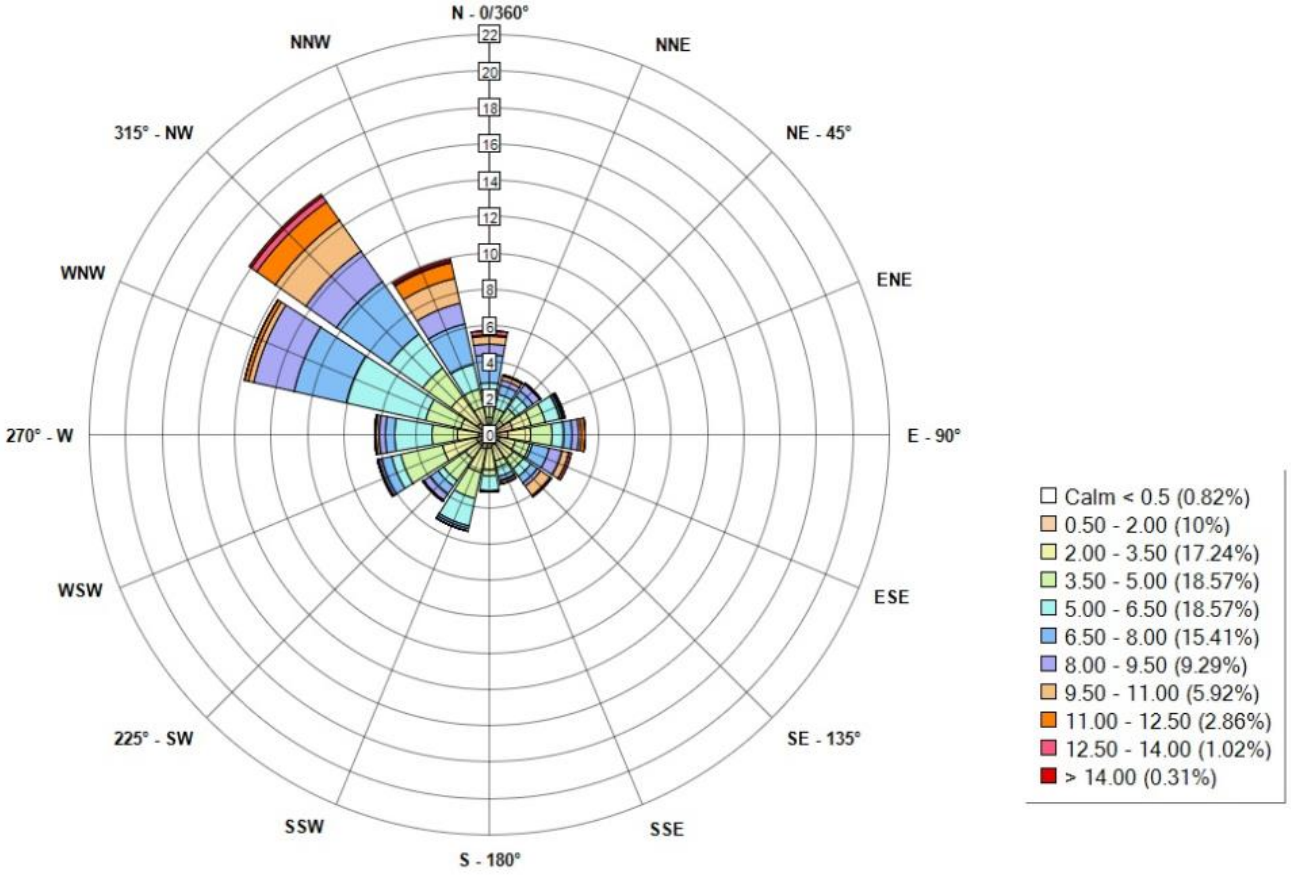
Insert 10-2: Long Term Rainfall Statistics, Laverton Airport (1994-2022)



Source: BoM, 2022

The annual wind rose for the Project is sourced from the Lynas Mt Weld Mine Weather Station (Weathermation, 2022) and is presented in Insert 10-3, showing prevailing winds from the north-west.

Insert 10-3: Annual Wind Rose, Mt Weld Mine



Source: Weathermation, 2022

The closest sensitive human receptors to the Mt Weld mine site are located at the GGS accommodation camp located 10 km to the west. MWM considers that this is a sufficient separation distance to conclude that localised dust generation will not impact this population. It is therefore not unexpected that since commencement of operations at Mt Weld in 2007, no dust complaints have been received from GGS or any other complainant.

The proposed Mt Weld accommodation village, located approximately 2 km to the west of closest operational areas of Mt Weld, is not considered to be a sensitive receptor, as the health, safety and comfort of the MWM workforce is regulated under the *Mines Safety and Inspections Act, 1994* (MSIA), administered by DMIRS.

High-volume dust monitoring at the site is carried out in accordance with the guideline *'NORM-3.4. Airborne Radioactivity Sampling'* (2010) and Australian Standard AS 3580.9.3:2015 *Methods for sampling and analysis of ambient air Method 9.3: Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method.*

A total of eight samples were collected during the 2019/20 monitoring period at an average flowrate of ≈78 m^3/hr. Five sub-samples (37-mm in diameter) from each filter were analysed using Canberra aspectrometers (model 7401), calibrated in accordance with the guideline 'NORM-3.4. Airborne Radioactivity Sampling' (2010).

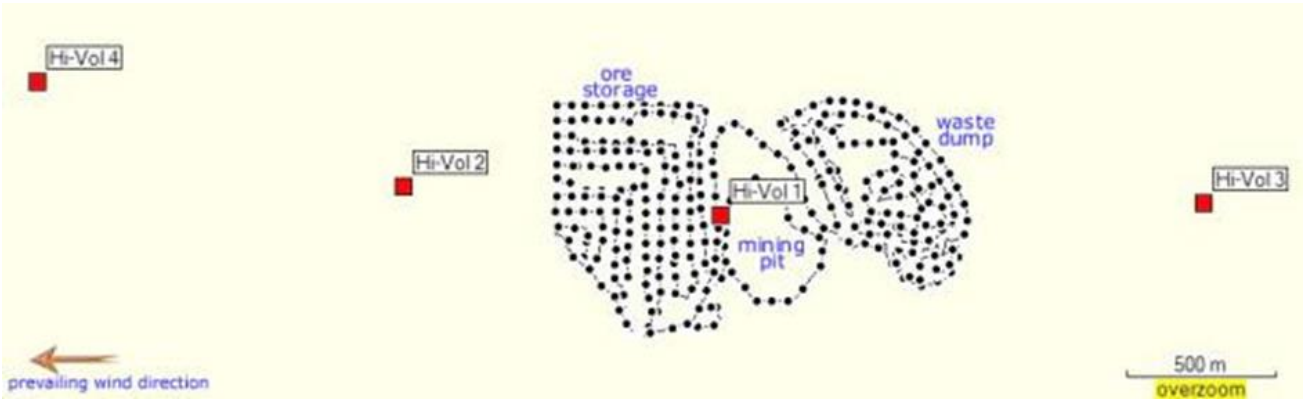
The geology at the site has very low silica content and contains no fibrous minerals (i.e., asbestos). Environmental dust monitoring results are summarised in Table 10-1 with the corresponding sampling locations shown in Insert 10-4. Location "Hi-Vol 3" serves as a background monitoring point, "Hi-Vol 1" to monitor the level of dust from the mining pit, "Hi-Vol 2" to monitor the dust from the ore stockpile, and the levels measured at the location "Hi-Vol 4" would indicate if any dust from site travels relatively far in the area.

Table 10-1: Environmental Dust Monitoring Results

Period	Dust Concentration (mg/m^3)	Dust Activity (mBq/m^3)
2015	0.055±0.038	0.345±0.270
2016-17	0.055±0.038	0.345±0.270
2017-18	0.037±0.038	2.381±1.919*
2018-19	0.029±0.025	0.643±1.088*
2019-20	0.101±0.069	0.807±0.478

* Monitoring period contained erroneous low-vol sampling.

Insert 10-4: Approximate Locations of Dust Monitoring Points



These results demonstrate that dust concentrations across the site are low.

10.4 Potential Impacts

Typically, during early stages of construction, localised dust is generated from vegetation clearing activities, and activities on unsealed surfaces. Further, operations activities such as blasting, crushing, general material handling and vehicle movements are expected to create localised dust emissions.

The operation of diesel-powered vehicles, heavy equipment and power generation during construction and operations will result in generation of combustion emissions, which are expected to rapidly disperse upon release given their limited nature.

Uncontrolled, dust can cause reduced air quality, impact on public health, and settling on vegetation limiting photosynthesis and causing potential smothering. The potential impact of dust is determined by particle size, chemicals composition and concentration – the total suspended particulate (TSP) fraction of dust is typically responsible for nuisance or loss of amenity whereas the smaller PM_{10} and $PM_{2.5}$ fractions are more commonly associated with the potential for health impacts. Human health is discussed further in Section 13.

10.5 Assessment of Impacts

As dust impacts are assumed to be localised, impacts on the closest sensitive human receptors located at the GGS accommodation village (greater than 10 km from the site), are considered to be negligible and ambient National Environment Protection Measure (NEPM) standards are expected to be met. The proposed Mt Weld accommodation village, located approximately 2 km to the north-west of the beneficiation area of Mt Weld, is not considered to be a sensitive receptor, as the health, safety and comfort of the MWM workforce is regulated under the MSIA, administered by DMIRS.

It is not considered that dust emissions represent a significant or long-lasting impact to air quality or health during either construction or operations phases.

10.6 Mitigation

The Mt Weld Rare Earths Project currently operated under a comprehensive EMP and RMP which outlines a systematic and prescriptive approach to environmental management, and high-volume dust monitors are installed at four key locations across the site to monitor construction and operations phase dust levels.

MWM will continue to undertake dust suppression activities during construction and operations activities, on an as-needed basis, to minimise potential impacts to the workforce, using dust suppression techniques already employed at the site. Conventional techniques already employed at the site include:

- Regular visual inspections.
- Dust suppression via use of combined wastewater.
- Appropriate training and inductions for personnel.
- Traffic control to maximise use of non-dust generating roads and parking locations.

For operations activities, a comprehensive housekeeping programme is in place for crushing and/or screening, flotation plant, and for the ore / concentrate storage / handling area.

Roads on site and within controlled and supervised areas are regularly sprayed with a water truck to keep dust generation at low levels.

10.7 Predicted Outcomes

Relative to the Mt Weld Rare Earths Project, emissions to air will be localised and are unlikely to result in any loss in amenity, regional air quality or impacts to biodiversity given the absence of sensitive environmental and human receptors in the vicinity of the Proposal area. The closest sensitive human receptors are located at the GGS accommodation camp located 10 km to the west. It is therefore proposed that emissions can continue to be regulated under Part V of the EP Act.

On this basis, Air Quality is not considered a significant environmental factor and that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

For discussion on potential dust emissions associated with concentrate handling and transport, reference should be made to Section 13.4.

11 ENVIRONMENTAL FACTOR – GREENHOUSE GAS EMISSIONS

11.1 EPA Objective

The EPA's environmental objective for the factor Greenhouse Gas Emissions is:

"To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change".

11.2 Policy and Guidance

Key policy and guidance documents for the air quality factor are:

- Environmental Factor Guideline Greenhouse Gas Emissions (EPA, 2020)
- National Environment Protection Measure (Ambient Air Quality) (NEPC, 2016)
- Environmental Protection Bulletin No. 24 – Greenhouse Gas Emissions and Consideration of Projected Climate Change Impacts in the Environmental Impact Assessment Process

11.3 Receiving Environment

Data published by the Department of Industry, Science, Energy and Resources in its most recent Quarterly Update of Australia's National Greenhouse Gas Inventory: September 2021 (DISER, 2021) estimates that total GHG emissions for the nation amounted to 101.1 Mt CO_2-e from all stationary sources.

Stationary sources include emissions from direct combustion of fuels, predominantly from the manufacturing, mining, residential and commercial sectors, excluding registered transport, electricity generators, agriculture, waste, and land use / forestry emissions.

In the year to December 2021, stationary energy accounted for 20.2 per cent of Australia's national inventory. Emissions from industrial processes and product use occur as the result of by-products of materials and reactions used in production processes. This sector includes emissions from processes used to produce chemical, metal, and mineral products.

The total national emissions for the year to December 2021 were estimated to be 501.5 Mt CO_2-e.

Greenhouse gas emissions associated with the Proposal are predominantly associated with power generation, combustion flame burners and transport during mining activities and production of RE concentrate.

Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity. Scope 1 emissions are sometimes referred to as direct emissions. Scope 1 emission sources relevant to the Proposal include:

- Consumption of natural gas for power generation;
- Consumption of diesel and natural gas in burners for steam generation and concentrate dying;
- Consumption of diesel fuel in mobile and fixed plant;
- Sewerage and domestic wastes; and
- Organic material decomposition following progressive vegetation clearing.

Scope 2 greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of electricity (i.e., from the grid). Mt Weld does not source any electricity from the Laverton power grid.

As part of the energy supply mix for the LOM Proposal, MWM propose to construct a hybrid power station, including a solar array, battery storage, and wind turbines. While Lynas refines its energy targets (refer Section 2.4.5) and resolves the expansion to renewable energy generation, a thermal baseload power supply is required for continuing operations. For the purposes of this assessment, Scope 2 emissions are excluded as Mt Weld consumes electricity generated on-site and does not source electricity from the grid. Generation of electricity is considered under Scope 1 emissions.

Scope 3 emissions are indirect greenhouse gas emissions other than Scope 2 emissions that are generated in the wider economy. Some examples for Mt Weld are extraction and production of purchased materials, transportation of purchased fuels, use of sold products and services, and flying on a commercial airline by a person from another business. Emissions from solid and liquid waste generation have also been allocated under Scope 3. For the purposes of this assessment, other Scope 3 emissions are excluded.

11.4 Potential Impacts

GHG emission estimates for the LOM Proposal are based on methodologies and emission factors for determining Scope 1 emissions as defined in the National Greenhouse and Energy Reporting (NGER) (Measurement) Determination 2008 as amended (CER, 2021).

Table 11-1 summarise projected worst case annualised energy consumption data and resultant greenhouse emissions for the Proposal, once fully operational.

The estimates are provided with the following assumptions:

- Estimates based on approximately 1.3 Mt ore processed per annum as prescribed under a DWER Part V licence.
- No electrification of mining or light vehicle fleet over life of the Proposal.
- No improvements to efficiencies in materials handling or advancements in RE processing technology and techniques over life of the Proposal.
- No conversion from diesel fired burners to natural gas fired burners.
- No waste heat recovery option to reduce diesel use within the boiler.
- Natural gas consumption for power generation based on a load demand that is often higher than actual demand once in operation.

Table 11-1: Estimated Annual Greenhouse Gas Emissions

Activity	Energy Type	Estimated Annual Quantity	Scope 1 (tCO_2-e/yr)	Scope 2 (tCO_2-e/yr)
Power Generation	Natural Gas + Renewable Energy Sources (e.g., Solar, BESS[1], Wind)	12,100,000 m^3	23,500	-
Total Energy Generation			**23,500**	**-**
Burner – Boiler	Diesel	8,521 kL	23,090	
Burner – Concentrate Dryer	Diesel	5,599 kL	15,174	
Total Plant			**38,264**	
Transport – Mine to Mill Fleet	Diesel	640 kL	1,743	-
Transport – Light Vehicle and Support Fleet	Diesel	5,962 kL	16,217	-
Total Mobile Fleet			**17,960**	**-**
Domestic Waste	Putrescible waste and sewerage	200 persons	24.5	-
Clearing	Vegetation decay (over 40 years)	2,241.6 ha (cleared over first 10 years)	1,608	-
Subtotal tCO_2-e/yr			**81,357**	**0**
TOTAL tCO_2-e/yr			**81,357**	

Table Notes:

1. BESS: Battery Energy Storage Systems

11.5 Assessment of Impacts

The data illustrates that the bulk of greenhouse emissions associated with the LOM Proposal arise from the consumption of natural gas for thermal electricity generation, diesel fired burner and transportation.

It is proposed that, over the life of the Proposal, renewable energy production will increase.

This scenario, which assumes a portion of the Proposal's energy generation will be produced by renewable sources, shows that the annual greenhouse gas emissions associated with electricity generation is predicted to be 23,500 t CO_2-e/annum, 38,264 t CO_2-e/annum from diesel fired burners with a further 17,960 t CO_2-e/annum of emissions coming from transport. The conservative total Scope 1 greenhouse gas emissions predicted to be emitted by the Proposal are approximately 81,357 t CO_2-e/annum.

The WA EPA's Environmental Factor Guideline – Greenhouse Gas Emissions (EPA, 2020) communicates how the factor – Greenhouse Gas Emissions – is considered by the EPA in its environmental impact assessment process. The guideline references an amount of 100,000 tonnes per annum of CO_2-e direct (Scope 1) emissions above which projects are assessed, and greenhouse gas emission requirements recommended, in an effective, consistent, and equitable manner.

11.6 Mitigation

MWM through its parent company, Lynas, has confirmed their commitment to the SBTi in the Lynas 2021 Environmental, Social Governance Report and released a GHG Policy to coincide with the announcement. Lynas is now working to develop science-based GHG reduction targets in line with SBTi criteria and the Lynas GHG Policy, with the objective of limiting the global temperature increase to well below 2°C. Lynas will announce the new targets once they have been officially validated by the SBTi.

As part of the energy supply mix for the LOM Proposal, MWM propose to construct a hybrid power station, including a solar array, wind turbines and battery storage. Power transmission will utilise an 11 kV HV distribution network along several service corridor within the Development Envelope.

MWM will continue to identify opportunities for process optimisation within the Proposal design, and establish a framework that will include the following:

- Identify opportunities to improve energy efficiency across key processes as part of the Proposal implementation.
- Application of the MWM custom built emissions inventory and reporting tool for monitoring and tracking energy consumption and calculation of Scope 1 GHG emissions consistent NGER methodologies.
- Track energy efficiency and GHG intensity to determine performance against baseline targets.
- Maintain a watching brief on similar operations globally to establish appropriate benchmarks to compare performance against.

- Extend the current Greenhouse Gas Management Plan to include detail on proposed the management and mitigation measures that will be used to reduce greenhouse gas emissions and improve operational efficiency using the mitigation hierarchy, including the management and mitigation measures that can be implemented over time to achieve a long-term reduction in greenhouse gas emissions.

11.7 Predicted Outcomes

Given the proposed initiatives to be implemented by MWM to reduce its GHG footprint through the introduction of renewable electricity sources to its Mt Weld energy portfolio thereby limiting annual greenhouse emissions from the Proposal to below the EPA GHG guidance threshold of 100,000 t CO_2- e per annum, greenhouse gas emissions are not considered to be a key environmental factor.

12 ENVIRONMENTAL FACTOR – SOCIAL SURROUNDINGS

12.1 EPA Objective

The EPA's environmental objective for the factor Social Surroundings is:

"To protect social surroundings from significant harm".

The objective recognises the importance of ensuring that social surroundings are not significantly affected because of implementation of a proposal or scheme.

12.2 Indigenous Heritage

12.2.1 Policy and Guidance

Key policy and guidance documents for the indigenous heritage factor are:

- *Aboriginal Heritage Act, 1972*
- *Aboriginal Cultural Heritage Act, 2021*
- Social Surrounds under the *Environmental Protection Act, 1986*

In relation to indigenous heritage matters, EPA Environmental Factor Guideline: Social Surroundings states:

"Most of Western Australia is remote and Aboriginal people have lived throughout the entire state. As such, the EPA recognises that not all significant Aboriginal heritage is registered. It is important that the necessary surveys and consultations are undertaken to ascertain the presence of objects or sites customarily used by or traditional to Aboriginal people that are important and significant."

12.2.2 Receiving Environment

The Proposal area, with exception of the proposed accommodation village on the western ridge, is located wholly within a floodplain 17 km north-east of Lake Carey, entirely within the Nyalpa Pirniku Native Title claim (WC2019/002). The Mt Weld area has been subject to several ethnographic and archaeological surveys in the past.

12.2.2.1 2019 Heritage Survey

12.2.2.1.1 Ethnographic Findings

An ethnographic heritage clearance and site identification was commissioned by MWM in 2019 over the Development Envelope (Taylor, 2019). The survey was conducted over three days from 4 to 6 October 2019, with nominated Aboriginal Consultants (Nyalpa Pirniku Consultants) from the Nyalpa Pirniku Native Title Claim (WC2019/002, WAD91/2019). The survey was attended by representatives of the Nyalpa Pirniku Native Title Claim and was intended to fulfill the Proponent's statutory obligations under the *Aboriginal Heritage Act, 1972* (AHA).

A consultation process among traditional stakeholders were held at three stages:

a.) At the beginning of the survey;
b.) After each mapped target in the work area surveyed; and
c.) At the end of the survey for concluding recommendations and conditions, where appropriate, to the Proponent.

MWM recognises the importance of an iterative method of discussing findings, as is the appropriate context whereby the Nyalpa Pirniku Consultants can discuss their recommendations or conditions and reach consensus among themselves freely, thoughtfully and without coercion. The process offered the opportunity for all participants to express their views and then arrive at a collective determination and discuss alternatives where appropriate.

The ethnographic research consisted of a desktop study comprising an assessment of any relevant previous reports and archival research, including an online check of the Department of Planning, Lands and Heritage (DPLH) Listed Registered Sites, and consultation with members of the Nyalpa Pirniku Native Title group, including a field survey / site inspection of the Proposal area with six Nyalpa Pirniku Consultants.

In terms of pre-European contact there is little ethnographic information on social and cultural organisation of Aboriginal groups in and around the proposed Development Envelope, however, Taylor (2019) cites that a great deal of mythology is linked to regional waterways and waterholes.

The Nyalpa Pirniku Native Title Claim has four sizeable playas: Lake Marmion, Lake Carey, Lake Raeside and Lake Rebecca. These are known widely as important to the Carpet or Water Snake (Warnampi) Dreaming, located throughout the Goldfields Palaeodrainage. Although the extensive playas are outside of the Proposal area, the Nyalpa Pirniku Consultants were aware of the symbolic significance of the extensive lake system in their claim and its continued mythic meaning and connection to wider cognate Western Desert groups.

The survey report concluded that, after completing the ethnographic heritage survey, the Nyalpa Pirniku Consultants had no objection to the proposed development activities. The Nyalpa Pirniku Consultants determined, contingent on the separate archaeological findings (refer 12.2.2.1.2 and 12.2.2.2 below), that MWM could proceed with its Proposal as indicated in the report.

12.2.2.1.2 Archaeological Findings

An Aboriginal archaeological field survey was undertaken at the Mt Weld mine expansion area by heritage consultants Archae-aus between 30 September 2019 and 4 October 2019 in conjunction with traditional owner representatives from the Nyalpa Pirniku Native Title Claimant group, who participated in all aspects of the archaeological survey and site recording (Archae-aus, October 2019).

The 2019 survey sets out the archaeological context of the area in detail, describing the various artefact scatters and open surface scatters that were evident in the surrounding area.

Five new Aboriginal archaeological sites: MW19-01, MW19-02, MW19-03, MW19-04 and MW19-05 were identified during the 2019 survey and were recorded at a sufficient level for the Aboriginal Cultural Materials Committee to make assessments under the AHA. These sites are shown in Figure 12-1 and are detailed in Table 12-1 below. Three of these sites were re-visited in 2022 (Section 12.2.2.2).

Archae-aus reported that they do not consider the that 172 isolated stone artefacts recorded during the survey constitute Aboriginal archaeological sites according to Sections 5 and 39 (2) the AHA (Archae-aus, October 2019).

Table 12-1: Aboriginal Archaeological Sites

Site Name	Site Type	Recording Level	Central coordinates (E/ N)	Dimensions (Maximum)	Area (m^2)
MW19-01	Artefact Scatter Reduction Area	Site Identification	454139/6805683	32 m x 24 m	482
MW19-02	Artefact Scatter Reduction Area	Site Identification	453080/6807792	13 m x 24 m	268
MW19-03	Artefact Scatter	Site Identification	452361/6806651	31 m x 86 m	1656
MW19-04	Artefact Scatter	Site Identification	452311 / 6806469	28 m x 62 m	912
MW19-05	Artefact Scatter	Site Identification	452558 / 6807420	120 m x 367 m	20,261

12.2.2.2 2022 Heritage Survey

A further comprehensive Aboriginal Heritage survey was undertaken by heritage consultants Integritat, across the LOM Development Envelope between 14 February 2022 and 18 February 2022 (Integritat, March 2022). The survey subject consolidated the previous surveys and was conducted in collaboration with members of the Nyalpa Pirniku Native Title Claimant group. The survey participants were selected by the Native Title group due to their intimate knowledge of the heritage values in the Laverton area and their involvement in previous surveys. The extent of the 2022 survey is shown in Figure 12-1.

The survey included a desktop assessment to review existing heritage survey reports, in addition to a comprehensive heritage survey for the Proposal area, which was conducted as a site avoidance / work area clearance survey. The report is attached as Appendix F.

The desktop assessment was conducted using the DPLH Aboriginal Heritage Inquiry System (AHIS). No new heritage sites were identified during the 2022 survey. Of the five previously recorded sites (Archae-aus, October 2019), three were revisited during the survey and reassessed.

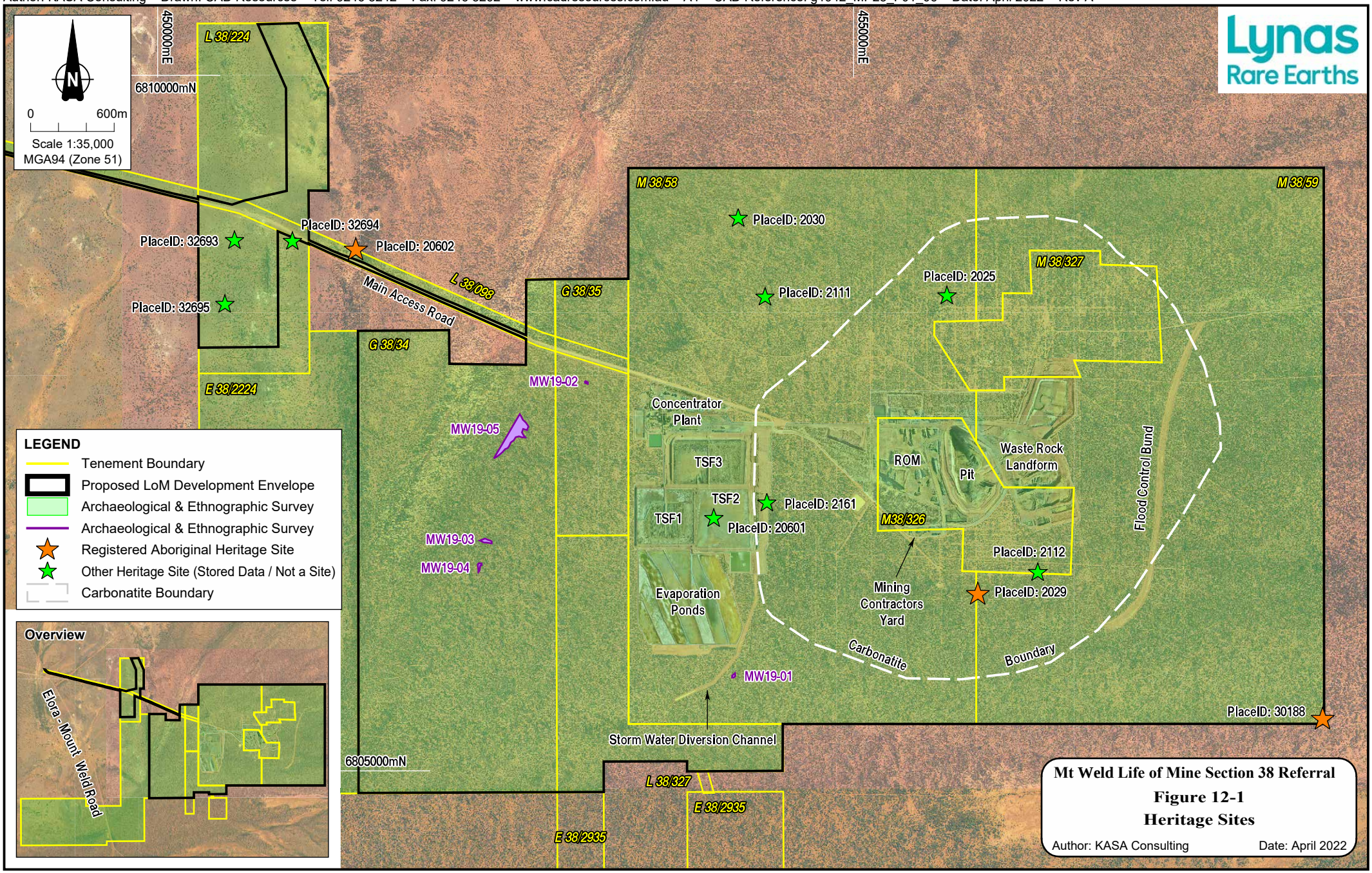
Three registered archaeological sites were identified during the desktop review, and it was determined that none of these places will be impacted by Proposal activities.

Nine stored data sites were also identified in the broader Development Envelope. These sites are shown in Figure 12-1 and are detailed in Table 12-2 below.

Table 12-2: DPLH Registered Sites

DPLH ID	Site Name	Site Type	DPLH Status
20602	Mount Weld 8	Artefact Scatter	Registered
2029	Mount Weld	Artefact Scatter	Registered
30188	Mount Weld relocation site	Artefact Scatter	Registered
32693	Chert Site	Artefact Scatter	Stored data
32695	Silicified Silt Stone	Artefact Scatter	Stored data
2111	Mount Weld	Artefact Scatter	Stored data
20601	Mount Weld 7	Artefact Scatter	Stored data
2030	Mount Weld	Artefact Scatter	Stored data
2161	Mount Weld	Artefact Scatter	Stored data
32694	Pipeline Site	Artefact Scatter	Stored data
2025	Mount Weld	Artefact Scatter	Stored data
2112	Mount Weld	Artefact Scatter	Stored data

Author: KASA Consulting ~ Drawn: CAD Resources ~ Tel: 9246 3242 ~ Fax: 9246 3202 ~ www.cadresources.com.au ~ A4 ~ CAD Reference: g1942_MP23_F01_06 ~ Date: April 2022 ~ Rev A



12.2.3 Potential Impacts

MWM recognises that Aboriginal heritage sites provide an important link for Aboriginal people to their past and their culture. In their report, Archae-aus (October 2019) captured comments from Nyalpa Pirniku representatives that any planned disturbance to the identified heritage sites requires further consultation with the Nyalpa Pirniku Native Title Claimant group before applying for consent to disturb site(s) under Section 18 of the AHA.

Site MW19-01 was inspected during the most recent survey (Integritat, March 2022) and survey participants identified three isolated artefacts. Participants discussed the potential impacts of future Proposal development in this area and the Traditional Owners expressed that they had no issue with this prospect and again reinforced that they were very supportive of the LOM Proposal and appreciated the transparency and honesty that the company displayed during the survey and associated presentations.

As previously stated, Proposal activities would not impact on the three registered archaeological sites identified during the desktop review.

No additional artefact material or ethnographic values were identified during the 2022 survey.

12.2.4 Assessment of Impacts

The Mt Weld LOM area is characterised as a level plain containing gently undulating to low hilly pediments with stony and gravelly pavements, traversed by seasonal streams. The area is largely absent of landscape features such as rock outcrops, caves, permanent and semi-permanent waterholes, etc., that would be considered likely to contain aboriginal sites (DPLH, 2013). The 2022 survey observed that the geomorphology and vegetation of the area does not lend itself to traditional occupation, and the Nyalpa Pirniku traditional owners present at the survey confirmed that this area was likely travelled through and was unlikely to be occupied for longer periods.

The 2022 survey covered the full Development Envelope extent and three artefact scatter sites identified in 2019 were revisited during the survey.

No artefact material could be identified in the vicinity of MW19-02 and the Traditional Owners were satisfied that this was not a site of cultural significance. The larger artefact scatter to the south-west, MW19-05, produced a small number of flakes distributed over a large area, best described as low-density scatter with low archaeological significance and not likely to meet Section 5 of the AHA. MWM confirmed that this area would not be disturbed as part of future development, but MWM committed to further consultation with Nyalpa Pirniku representatives in relation to the potential salvage of the artefacts, should future development be proposed.

As previously discussed, the survey participants identified three isolated artefacts at MW19-01.

Following a detailed presentation provided by MWM that covered current operations and the intended expansion associated with the LOM Proposal, participants discussed the potential impacts of the Proposal in this area. The key outcome was that the Traditional Owners expressed no objections and reinforced their broad support of the Proposal.

No other artefact material or ethnographic values were identified during the conduct of the survey.

Figure 12-1 shows the extent of the 2022 survey. Areas shown in green have been cleared by the Traditional Owners.

12.2.5 Mitigation

MWM is committed to establishing a Social Surrounds and Cultural Heritage Management Plan (SSCHMP) for the Proposal, in accordance with the *Aboriginal Cultural Heritage Management Plan, 2021*, and in direct consultation with members of the Nyalpa Pirniku Native Title Claimant group.

A workshop was held with representatives and senior elders, from the Nyalpa Pirniku Native Title Claimant group in May 2022 to discuss the key objectives, management measures and reporting actions for inclusion in the SSCHMP. A draft revision of the document has been prepared for stakeholder review and comment, and a signing event in Kalgoorlie, with Lynas and Nyalpa Pirniku Native Title Claimant group representatives in attendance, is planned for September 2022.

The SSCHMP will be implemented to ensure future best-practice management of Aboriginal heritage sites across the Proposal area, and will be implemented to meet the following objectives:

1. Establish a framework and process to identify and record significant heritage sites and cultural values in collaboration with the relevant Traditional Owners.
2. Avoid, where possible, and minimise impacts to significant heritage sites and cultural values.
3. Proactively manage and minimise potential indirect impacts, including visual, noise, dust and vibration impacts to social and cultural places and activities.
4. Where possible, maintain access to areas for the relevant Traditional Owners to undertake traditional activities.
5. Avoid, where possible, and minimise impacts to culturally significant flora and fauna.
6. Avoid, where possible, and minimise changes to water regimes of water resources known to have Aboriginal cultural values.
7. Establish a framework for ongoing consultation with the relevant Traditional Owners through the life cycle of the project.
8. Work collaboratively with the relevant Traditional Owners to identify training, employment and contracting opportunities, in association with, but not limited to the objectives above.

12.2.6 Predicted Outcomes

The LOM Proposal has minimal impact on sites of indigenous heritage significance. MWM is committed to proactive management of heritage impacts in consultation with Traditional Owners to ensure future best-practice management of Aboriginal heritage sites withing the Proposal area. A SSCHMP will be developed in consultation with Traditional Owners for the LOM Proposal and will be implemented such that risks to heritage sites and values are minimised.

With mitigation and management measures in place, the Proposal will have minimal impact on sites of indigenous heritage significance. Consent to disturb identified sites will require further consultation with the Nyalpa Pirniku Native Title Claimants under Section 18 of the AHA.

On this basis, Heritage is not considered a significant environmental factor under Sections 38G(4) and 44(2AA) of the EP Act; other decision-making processes are adequate to ensure the EPA's objectives will be met.

12.3 Transport and Traffic

12.3.1 EPA Objective

The EPA objective for the social surroundings factor is to:

"Protect social surroundings from significant harm."

12.3.2 Policy and Guidance

In accordance with Commitment 18 of MS 476 (Review of Transport Options), a comprehensive TMP is currently in place for the Mt Weld Rare Earths Project and was submitted to EPA/s for information following consultation with relevant stakeholders and DMAs.

The existing TMP was prepared in accordance with the following legislation:

- Western Australian *Road Traffic Act, 1974* and Road Traffic Code, 2000
- *Mines Safety and Inspection Act, 1994* and Regulations, 1995
- *Environmental Protection Act, 1986*
- *Occupational Safety and Health Act, 1984*
- *Radiation Safety Act, 1975* and Radiation Safety (General) Regulations, 1983
- Radiation Safety (Transport of Radioactive Substances) Regulations, 2002
- Code of Practice for Fatigue Management for Commercial Vehicle Drivers, 2004

12.3.3 Receiving Environment

A robust TMP, supported by an Emergency Response Plan, is currently implemented at the Mt Weld Rare Earths Project to manage unplanned events such as traffic accidents associated with vehicle movements.

Currently, RE concentrate is transported in closed containers from the Mt Weld mine to the Perth metropolitan area for export using either rail (i.e., road transport to Leonora where containers are loaded onto rail for transport to Fremantle port) or by road for the full route when the rail system is not available.

Transportation of concentrate from the Mt Weld Concentration Plant to Leonora is undertaken via road. As part of this Proposal, the number of containers transported will increase to 280 containers per week via triple road trains to the Malcolm Siding in Leonora. This equates to approximately 16 truck dispatches per day over a 6-day week, or approximately 31 complete truck movements over a 12-hour day, which include the return journey to Mt Weld.

The proposed rail option will utilise the existing operational rail line between Leonora and Kalgoorlie, using the existing rail configuration and timetable.

12.3.4 Potential Impacts

Mt Weld RE concentrate will be transported in sealed Rotainers to the REPF in Kalgoorlie (once commissioned) for processing, and then transported to Fremantle for export utilising existing transport routes. The frequency of rail movements will not change as a result of delivering RE concentrate to the REPF in Kalgoorlie or as a result of delivering REPF carbonate product to Fremantle, however the number of train wagons will increase.

It is anticipated that there will be an increase from the current truck movements to up to 31 trucks from Mt Weld to the rail siding at Leonora and back per day as a result of the LOM Proposal.

Additionally, a portion of the by-products from the REPF may be back-freighted to Mt Weld for long-term storage in accordance with MS 1181. By-products generated by the REPF include IP, to which the NORM from the Mt Weld concentrate reports, and non-radioactive gypsum. The radiation level of the IP by-product will be similar to that of the Mt Weld concentrate, ore and tailings. Where possible, REPF by-products will be transported back to Mt Weld in containers that would otherwise be returned empty, subject to identifying alternative re-reuse, long-term storage or disposal options for the by-products.

MWM considers that the return of REPF by-products is approved under MS 1181 Conditions 3-2 and 3-4, which states “the proponent shall ensure that processing facility derived [by-product] waste is removed to a waste facility at the Mt Weld mine or an alternative waste facility”. The return of REPF by-products to Mt Weld is only discussed in this section for information.

Discussion regarding potential public risk from radiation during transport of concentrate is presented in Section 13.

12.3.5 Assessment of Impacts

The increase in production proposed as part of the LOM Proposal will result in up to 280 containers of RE concentrate being transported from Mt Weld to Leonora each week. This equates to approximately 16 truck dispatches per day over a 6-day week, or approximately 31 complete truck movements per day, including the return journey of trucks from Leonora to Mt Weld. This equates to an increase in truck traffic for Laverton of approximately 29% and 14% for Leonora.

The total distance travelled by truck from Leonora to Mt Weld is approximately 130 km. The only significant population centre is the township of Laverton, 95 km east of Leonora, with a population of 340 (2016 census). Trucks containing concentrate do not pass through the Laverton townsite, and instead use the Laverton Bypass to Mt Weld Road.

In real terms, the perceived traffic impact of this increase in traffic movements can be normalised to the equivalent of three triple road trains traversing a local / district road every hour, which can readily be accommodated by the district road network without notable effects on public amenity in terms of traffic volumes. This is not considered to present a significant adverse impact on local amenity to members of the public residing along the transport route, nor to other road users.

This increase in transport movements will not result in a change to the number of trains from Leonora to Fremantle, though the number of train wagons will increase.

MWM considers that the increase in traffic as a consequence of the LOM Proposal will be negligible.

12.3.6 Mitigation

Overall, MWM considers that expansion phase and operational transport movements because of the Proposal are unlikely to present a significant increase to existing baseline traffic movements in and around Laverton. MWM therefore proposes to manage transport movements for this Proposal under the existing TMP and Emergency Response Plan. Minor updates to these Plans may be implemented to reflect operational detail, more so than the need for additional mitigation measures and controls, and the Mt Weld TMP will be updated to accommodate transport of REPF by-products to Mt Weld, upon commissioning of the REPF.

The management of radiation impacts due to transport of concentrate is discussed in Section 13.

12.3.7 Predicted Outcomes

The Mt Weld LOM Proposal will have a negligible impact on the social surroundings environmental factor given that the Proposal will result in minimal impact on existing road networks, noise and amenity.

12.4 Other Social Matters

The EPA previously considered (Report 646) that noise, dust, atmospheric emissions, and visual impacts resulting from construction and operating activities would have minimal and manageable impacts on the environment at Mt Weld. These issues are presently regulated and managed under the DWER Works Approval and Licence (L8141/2007/2) currently in place.

The effects of noise originating from the Proposal will be localised and unlikely to result in any loss in amenity, given the absence of sensitive human receptors in the vicinity of the Proposal area. The proposed Mt Weld accommodation village, located approximately 2 km to the west of the operational areas of the Mt Weld mine site, is not considered to be a sensitive receptor in the context of this referral as the health, safety and comfort of the MWM workforce will be administered by DMIRS under the MSIA, and the Project will continue to comply with the *Environmental Protection (Noise) Regulations 1997.*

Additionally, public access to the Project area is restricted as is a requirement under the MSIA, and therefore the potential for noise impacts on any community members (indigenous or otherwise) that may be traversing the area is negligible.

No further assessment of other social matters is therefore considered necessary.

13 ENVIRONMENTAL FACTOR – HUMAN HEALTH

13.1 EPA Objective

The EPA's objective for the factor Human Health is:

"To protect human health from significant harm."

The objective recognises the importance of ensuring that human health is not significantly affected because of implementation of a proposal or scheme.

13.2 Policy and Guidance

- Environmental Factor Guideline Human Health (EPA, 2016h)
- Mines Safety and Inspection Regulations, 1995

13.3 Receiving Environment

The existing operations at Mt Weld are carried out under an approved Radiation Management Plan (Appendix H) which has a comprehensive monitoring programme. Radiation monitoring at Mt Weld is carried out in the form of:

- Personal dust monitoring for internal exposure to long-lived alpha emitters.
- Thoron (Rn-220) and radon (Rn-222) air concentrations monitoring.
- Personal monitoring of the exposure to external gamma-radiation (OSL badges).
- Site area gamma-radiation surveys.
- Environmental dust monitoring.
- Ground water monitoring for Ra-226 and Ra-228.

The key points from 2020-2021 occupational and environmental radiation monitoring programme are as follows:

- The average radiation dose for workers at Mt Weld was 0.9 mSv/year, which is less than 5% of the radiation worker limit (20 mSv/year) as set by the Regulations under the RSA.
- There has been no increase in gamma-radiation observed from site boundary gamma surveys.
- All high-volume dust samples were well below the investigation trigger point of 2 mBq/m^3.
- All groundwater samples reported concentrations of Ra-226 and Ra-228 consistent with historical levels and well below the ANZECC trigger point of 5 Bq/L.

In summary, the environmental radiation monitoring programme detected no contamination by radioactive material in the environment within or surrounding the Mt Weld site.

In September 2010 the Radiological Council endorsed the removal of commitments 22 and 29 relating to *Radiation protection design targets* (commitment 22), and the *Legislative compliance* section in commitment 29 as they are both adequately addressed by the requirements of the RSA and MSIA and their respective regulations.

There are unlikely to be any detrimental effects from the LOM Proposal on the Human Health environmental factor.

13.4 Potential Impacts

The three main types of radiation associated with mining and mineral processing in general are alpha (α), beta (β) and gamma (γ) radiation.

Alpha radiation is considered a hazard if its source is located inside the body, highlighting an internal radiation risk. In mining and mineral processing, the main way in which the source can get into the body is when it is breathed in as dust (inhalation and respiration). Small amounts may be taken in through the mouth (ingestion), but this material is typically disposed from the body by excretion.

Dust that is inhaled could stay in lungs for long periods. If the dust contains alpha-emitters, the lungs will be subject to a certain dose of alpha-radiation. Other sources of alpha radiation within the body are decay products of radon (^{222}Rn) and thoron (^{220}Rn), radioactive gases in the decay chains of uranium and thorium.

Beta-radiation mainly affects skin and the tissue that lies immediately underneath the skin. Sources of gamma-radiation could cause radiation damage without residing within the body. A person located near any radioactive material, which emits gamma-radiation, will be subject to a certain radiation dose. Gamma radiation affects skin, deep tissue and organs depending on the dose received. Beta and gamma radiation both present an external radiation risk.

With respect to radiation, development activities associated with the LOM Proposal that have the potential to impact on human health include, but are not limited to:

- Mining, processing or storage of naturally occurring radioactive materials or ores.
- Transport and storage of naturally occurring radioactive materials.
- Industrial processes that result in the build-up and release of naturally occurring radioactive materials.

13.4.1 Concentrate Transport

RE concentrate produced at Mt Weld is currently transported in closed containers to Fremantle Port via road and rail for export to the LAMP in Malaysia. All temporary storage locations at which the concentrate is stored for more than 24 hours are registered with the Radiological Council.

The thorium and uranium concentrations in the RE concentrate are approximately 1,630 ppm thorium and 43 ppm uranium, which yields a specific activity in the order of 6.3 Bq/g.

The Australian (ARPANSA, 2014) and International Transport Safety Regulations (International Atomic Energy Agency, 2012) do not apply to the lanthanide ore or concentrate produced at Mt Weld, as Table 2 in Section IV "Basic Radionuclide Values" of the regulations gives the values for Th (nat) and U (nat) at 1.0 Bq/g each. Paragraph 107 provides an exclusion applicable for the Mt Weld ore and RE concentrate:

> *107. The Regulations do not apply to any of the following:*
>
> *"(f) Natural material and ores containing naturally occurring radionuclides, which may have been processed, provided the activity concentration of the material does not exceed 10 times the values specified in Table 2, or calculated in accordance with paras 403(a) and 404–407. For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium the calculation of the activity concentration shall be performed in accordance with para. 405."*

The transport of RE concentrate will therefore remain exempt from transport regulations so long as the combined concentrations of uranium and thorium do not exceed 10 Bq/g (Lynas, 2021).

Whilst the specific activity of RE concentrate and REPF IP by-product is well below applicable transport limits, the gamma radiation emitted is above natural background levels, typically in the order of 0.3 – 1.3 µSv/hr.

Upon commissioning of the Kalgoorlie REPF, concentrate will be transported in sealed Rotainers to the REPF in Kalgoorlie for processing, and then transported to Fremantle for export utilising existing transport routes. As a part of the Kalgoorlie REPF operations, the gypsum and IP by-products will be removed from the REPF to Mt Weld or an alternative approved facility for long-term storage, in accordance with MS 1181[9].

13.4.1.1 General Radiation Exposure Scenario

An assessment of the potential radiation exposure to employees involved with transport of RE concentrate from Mt Weld has been conducted and is documented in the approved RMP (Appendix H).

Thermoluminescent Dosemeter (TLD) badges worn by RE concentrate truck drivers have established that the gamma exposure inside the truck cabin is equivalent to natural background – the average result being 0.10 µSv/hr. The disparity between gamma surveys and TLD results is attributed to the shielding provided by the truck cab and the increased distance of truck drivers to the concentrate (minimum 5 metres when in cab).

Gamma radiation surveys have been conducted at registered premises to monitor potential exposure to storage yard and port workers. Gamma radiation levels vary between 0.1 and 2.3 µSv/hr and average 0.58±0.13 µSv/hr. Some elevated gamma radiation readings at the Fremantle Port can be attributed to natural radiation occurring within limestone used in the construction of North Quay.

[9] MWM considers that the return of REPF by products is approved under MS 1181 Conditions 3 2 and 3 4, which states "the proponent shall ensure that processing facility derived [by-product] waste is removed to a waste facility at the Mt Weld mine or an alternative waste facility". The return of REPF by products to Mt Weld is only discussed in this document for information.

Gamma radiation surveys along the RE concentrate transport route from Mt Weld were carried out between 2012 to 2015 to establish the baseline levels in the unlikely case of a traffic accident resulting in concentrate spillage and requiring clean-up to return the area to background levels.

The typical gamma radiation levels varied between 0.1 and 0.7 µSv/hr and averaged 0.21±0.11 µSv/hr.

13.4.1.2 Potential Radiation Exposures to Members of the Public

It is expected that no member of the public will receive a radiation dose exceeding 1 mSv/year, which is the limit as set by the Regulations under the RSA.

There are several potential scenarios in which members of the public may be exposed to radiation, all of them through exposure to external gamma-radiation from RE concentrate located in containers.

Scenario A. Members of the public driving alongside truck / train:

A member of the public may drive alongside a truck or train transporting RE concentrate along certain sections of the route. The annual exposure time is conservatively estimated at 30 hours per annum at a distance of greater than 20 metres.

Scenario B. Member of the public at a rail crossing waiting for train to pass:

There are several level crossings along the railway line between the freight depot and the port. It is assumed that a member of the public meets the train at one of the level crossings once a week. The vehicle stops at a distance of 6 m away from the side of the rail tracks and waits for this ~250 m long line source to pass at a speed of 30 km/hr (0.5 minutes). Total exposure time is approximately 0.5 hours per year.

Scenario C. Public in suburban and rural areas:

The Brookfield railway runs through rural areas where members of the public may be exposed in varying degrees. It is unlikely that any dwellings are closer than 10 m from railway. A member of the public residing at this location would be exposed to approximately six containers a day for about 30 seconds. The total exposure time is estimated at 18 hours/year.

The results of the assessments are summarised in Table 13-1 below:

Table 13-1: Summary of Possible Public Exposures

Scenario	A	B	C
Distance (m)	20	6	10
Exposure (hr/year)	30	0.5	18
Dose Rate (µSv/hr)	0.02	0.21	0.08
Dose (mSv/year)	0.0007	0.0001	0.0015
Percentage of Public Limit	**0.07%**	**0.01%**	**0.15%**

The above assessments show that the public radiation exposure from transport of RE concentrate is extremely low and would be indistinguishable to natural background radiation. No member of the public is expected to receive a radiation dose exceeding the public limit of 1 mSv/year during the transport of RE concentrate from Mt Weld.

13.4.1.3 Potential Incident causing Spillage

An exposure assessment has been conducted to estimate the potential dose to a member of the public should an incident occur in which concentrate is spilled along the transport route between Mt Weld and the Kalgoorlie REPF.

RE concentrate typically has a surface (5 cm) gamma dose-rate between 1.0-1.5 Bq/g, for this assessment a conservative figure of 2 µSv/hr will be employed.

Should an incident occur in which RE concentrate of IP spills outside a container, a member of the public would need to be within 5cm of the RE concentrate or IP for a constant period of 500 hours (≈3 weeks) before they exceed the radiation dose limit of 1.0 mSv/yr (1000 µSv) as set by the RSA. This assessment highlights the low risk posed by any potential spillage of concentrate along the transport route to members of the public.

13.5 Assessment of Impacts

Activities that are associated with a potential radiation exposure risk are governed by current legislation enforced by the Radiological Council and the DMIRS Radiation Safety Division.

Statutory requirements around prescribed radiation exposure levels have been superseded by the *Western Australian Radiation Safety (General) Regulations* and the *Radiation Safety (Transport of Radioactive Substances) Regulations 2002*.

These Regulations as well as the Australian Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (ARPANSA, 2005) currently recommends:

- A maximum permissible exposure limit of 20 milli sieverts per annum for workers; and
- A dose limit of 1 milli sieverts per annum for the public.

Monitoring of mining operations at Mt Weld indicates that the exposure dose for plant operators is a fraction of and well below statutory limits. Specifically, doses to occupational workers are conservatively estimated to be less than 1 mSv/year, which is well below the 20 mSv/year limit for radiation workers.

MWM considers that the Proposal's anticipated increase in transport movements presents minimal risk of radiation exposure for the public. There are very few circumstances conceivable in which members of the public would be sufficiently close to concentrate or IP by-product being transported for long enough that they would absorb doses discernible from background levels. Public doses are only likely as a result of concentrate transport from Mt Weld to the Kalgoorlie REPF, with doses estimated between 0.0001 to 0.0015 mSv/year which is well under 1% of the 1 mSv/year limit.

There is no expected radiological impact to non-human species outside the Proposal area.

13.6 Mitigation

The operations will continue to be strictly regulated and, while some exposures will continue to be detectable, it is considered that neither employees, members of the public, nor the environment would be harmed by radiation from Mt Weld operations under the LOM Proposal.

MWM will continue to measure external gamma radiation around the site and personal exposure will be continued to be assessed by personal monitors as described in the approved version 10 of the RMP (Lynas, 2021) and its subsequent iterations on approval from the Radiological Council and the Resources Safety Division of DMIRS.

Ongoing monitoring on the Mt Weld site for internal exposure to alpha-radiation will continue to be carried out using personal and positional dust monitoring, and thoron monitoring as described in the approved RMP (Lynas, 2021) and subsequent iterations.

In summary, the proposed changes do not present a significant detrimental environmental or human health risk. It is therefore considered that measures in the existing *Radiation Management Plan* (*MTW-MT-PLA-0001*) are appropriate to manage potential radiation impacts.

Site specific operational radiation controls are outlined within the RMP (which includes a radioactive waste management plan). The framework for these controls is set out below.

13.6.1 Classification of Workplaces and Employees

Guidance is provided for radiological classification of workplaces in ARPANSA (2005) as follows:

- Supervised Area: “an area in which working conditions are kept under review but in which special procedures to control exposure to radiation are not normally necessary.”
- Controlled Area: “an area to which access is subject to control and in which employees are required to follow specific procedures aimed at controlling exposure to radiation.”

Guidance is provided for radiological classification of employees in ARPANSA (2005) which recommends the intensity of employee monitoring to be commensurate with the exposures potentially received.

13.6.2 Site Access Control

Vehicle access to the remote site is well controlled. The main site access road is well signed to indicate active mining area and no unauthorised access. All site visitors are required to report to the site office to check in.

13.6.3 Radiation Safety Expertise

The Mt Weld site has access to suitably qualified and experienced radiation safety professionals to assist during the design and pre-operational phases of the LOM Proposal.

During operation, a suitably qualified RSO will be appointed and be responsible for implementation of the RMP and RWMP. A fully qualified Surface Ventilation Officer (SVO) will be appointed to ensure all air monitoring is undertaken in accordance with the appropriate Australian Standards and Western Australian guidelines.

13.6.4 Induction and Training

All employees and contractors will be required to undertake a radiation induction outlining sources of radiation exposures, personal exposures in different areas of the Proposal area, radiation health risks, management of radiation exposures, principles of radiation protection monitoring, etc. Additional information and training will be provided to employees working in controlled radiation areas commensurate with the hazards presented by elevated radionuclide concentrations.

13.6.5 Record Keeping

A comprehensive computer-based record keeping system will be established and maintained. The system will include:

- Records of radiation protection training of employees and contractors.
- Records of occupational radiation monitoring and survey results.
- Records of any special and/or accidental exposures.
- Records of environmental radiation monitoring.
- Any other relevant information that may be required to be recorded as instructed by the Radiological Council or DMIRS.

13.6.6 Reporting

Annual reporting of occupational and environmental radiation monitoring results will be provided to the Radiological Council and State Mining Engineer.

13.6.7 Radiation Monitoring

The Radiation Management Plan prepared and implemented for the Mt Weld site incorporates a robust monitoring programme.

The key points from the 2020-2021 occupational and environmental radiation monitoring programme are as follows:

- The average radiation dose for workers at Mt Weld was 0.9 mSv/year, which is less than 5% of the radiation worker limit (20 mSv/year) as set by the Regulations under the RSA.
- There has been no increase in gamma-radiation observed from site boundary gamma surveys.
- All high-volume dust samples were well below the investigation trigger point of 2 mBq/m^3.
- All groundwater samples reported concentrations of Ra-226 and Ra-228 consistent with historical levels and well below the ANZECC trigger point of 5 Bq/L.

In summary, the environmental radiation monitoring programme detected no contamination by radioactive material in the environment within or surrounding the Mt Weld site.

13.6.8 Transport and Spill Management

A TMP and Emergency Response Plan have been developed and are currently implemented to govern the response to a spill of concentrate during the transport process.

In the case of a concentrate spill during transport, the transport provider is responsible for providing the resources required to manage and clean-up the spill. The Mt Weld RSO will be notified and mobilised to the spillage site to monitor radiation levels and ensure the spill site is returned to background following spill clean-up.

A number of emergency exercises have been enacted (and will continue to be enacted) by the Mt Weld Incident Management Team (IMT) in conjunction with external crisis practitioners to prepare for scenarios based around concentrate spillage along the transport route.

13.7 Predicted Outcomes

MWM has extensive experience in managing the radioactive materials likely to be present in the processes and operations of the LOM Proposal. As a result of this experience, a robust radiation management plan has been implemented to manage any residual impacts.

The predicted outcomes are a low level of residual radioactive material, that is continually monitored. Through the implementation of a thorough, sound and long-standing management programme, residual impacts will be negligible. Despite increased processing volumes associated with the proposed expansion, the exposure of the workforce to radiation is not expected to materially change from historically reported low levels since commencement of operations. This is because the lower grade ores mined and processed in future also contain lower concentrations of radionuclides.

The public radiation exposure from transport of RE concentrate is extremely low and would be indistinguishable to natural background radiation. No member of the public is expected to receive a radiation dose exceeding the public limit of 1 mSv/year during the transport of RE concentrate from Mt Weld.

The operations will continue to be regulated by the Radiological Council and DMIRS and managed in accordance with the current RMP, as approved.

Access to the Project area is restricted as is a requirement under the MSIA, and therefore the potential for human health impacts particularly associated with radiation or contact with radioactive materials by community members traversing the area is unlikely.

On this basis, Human Health is not considered a significant environmental factor and that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment to ensure the EPA's objectives will be met.

The above assessment and analysis is also considered adequate justification that the LOM Proposal does not trigger the requirement for the Proposal to be referred under the EPBC Act as discussed further in Section 14.

14 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

14.1 Policy and Guidance for the MNES

Section 22 of the EPBC Act defines a nuclear action. As set out in Section 1.6.4 of this document, DAWE advised that for this Proposal, a nuclear action may be triggered under Section 22.

14.2 Precedence on Applicability of EPBC Act to Lynas' Operations

Lynas has recently been granted environmental approval under MS 1181 for the construction and operation of the REPF in Kalgoorlie, which will process RE carbonate produced by the LOM Proposal. The REPF Proposal was referred to DAWE under the EPBC Act as radioactive materials in the RE carbonate feed and resultant by-products stored on site may be considered within the definition of nuclear actions.

The Delegate determined, on the basis of information provided in support of the referral, specifically those which demonstrate the low level of impacts associated with radiation, that the Proposal did not constitute a Controlled Action and therefore approvals under the EPBC Act are not required.

As a result of the decision above, as well as a detailed assessment of the potential risks to human health and the public as a result of this Proposal, MWM has not referred this Proposal to DAWE. This decision is considered to be justified on the basis that the potential radiation impacts associated with this Proposal can be demonstrated to present a lower risk to environmental values and to public health compared to that for the REPF. Further, it should be noted that the levels of radionuclides in the ore will decrease across the LOM, in line with the anticipated mining and processing of lower grade ores with lower inherent radioactivity.

Accordingly, MWM considers that there are no other Matters of National Environmental Significance relevant to the LOM Proposal.

14.3 Existing Environmental Value(s) of the MNES

In describing the receiving environment, the following have been considered:

- Baseline radiation studies describing background radiation levels in the surrounding environment;
- Ongoing by-product characterisation studies;
- Tailings Storage Facilities basis of design;
- The isolated nature of the project's location relative to sensitive receptors; and
- Personnel and public exposure as a result of materials and product (concentrate) handling and transport.

14.4 Potential Impacts on the MNES

As documented in Section 13.4, there are three main types of radiation associated with mining and mineral processing – alpha (α), beta (β) and gamma (γ) radiation. The impacts of exposure to these types of radiation at above threshold levels, can present human health risks where exposure rates exceed threshold value; this is not the case for proposed activities under this LOM Proposal.

14.5 Assessment of the MNES

In addition to the assessment of radiological impacts detailed in Section 13.4.1 above, the RMP (Appendix H) has shown radiological impacts of the Proposal will be low. doses to occupational workers are conservatively estimated to be less than 1 mSv/year, which is well below the 20 mSv/year limit for radiation workers. Public doses are only likely as a result of concentrate transport from Mt Weld to the Kalgoorlie REPF, with maximum doses estimated between 0.0001 to 0.0015 mSv/year which is well under 1% of the 1 mSv/year limit.

There is no expected radiological impact to non-human species outside the Proposal area.

14.6 Proposed Mitigation

The mitigation measures for the radioactive impacts are described in Section 13.6. These are summarised again below.

Site specific operational radiation controls will be outlined within the RMP, which includes a radioactive waste management strategy (Appendix H). The framework for these controls is set out below:

- Classification of Workplaces and Employees – so that radiation impact management is based around risk.
- Dust Suppression and Extraction – to ensure that dust generation is minimised in the work area.
- Housekeeping and Personal Hygiene – housekeeping and personal hygiene requirements within controlled radiation areas will be maintained at higher standards than other areas on site.
- Surface Contamination Control – to ensure no radioactive material in excess of the statutory limit of 0.4 Bq/cm^2 in a 300 cm^2 area is released from site through transport on equipment, plant or worker clothing.
- Site Access Control – access to the REPF will be strictly controlled to ensure inadvertent impacts are not created.
- Work Permit System and Special Exposures – a Work Permit System for the minimisation and monitoring of personal radiation exposures during special works will be implemented.
- Radiation Safety Expertise – suitably qualified and experienced radiation safety professionals from both Mt Weld and LAMP operations to assist during the design and pre-operational phases.
- Induction and Training – all employees and contractors will be required to undertake rigorous radiation inductions.
- Records Management – a comprehensive computer-based record keeping system will be established and maintained.

- Reporting – annual reporting of occupational and environmental radiation monitoring results will be provided to the Radiological Council and State Mining Engineer.
- Radiation Monitoring – will draw on experience and expertise from Mt Weld and LAMP as required.
- Appropriate By-Products Storage and Disposal.

14.7 Controlled Action Determination

Lynas referred the REPF Proposal to DAWE under the EPBC Act because the NORM in the IP by-product may be within the current definition of nuclear actions. In reviewing the Proposal, DAWE sought clarification on a number of issues relating to IP storage design at Lot 500, and air emissions which Lynas addressed conclusively. On advice from DAWE, the Delegate determined that the Proposal was not a Controlled Action and approval under the EPBC Act is not required.

15 HOLISTIC IMPACT ASSESSMENT

The EPA guidance statement for Section 38 referrals requests that proponents provide a holistic assessment of the impacts of the Proposal on the whole environment. This should describe the connections and interactions between the parts of the environment (environmental factors) and discuss predicted outcomes in relation to the environmental principles and the EPA's environmental objectives.

The Mt Weld Rare Earths Project has been operating in a remote area of the Northern Goldfields in Western Australia since 2007. The Project operates within a robust environmental management framework that has successfully managed environmental impacts associated with Project operations across the Project life. With the global demand for REs forecast to grow significantly, this LOM Proposal provides for expansion of the Mt Weld operations to effectively a "life of mine" extent, in order to meet growing global demand.

Through the studies and assessment undertaken by the various subject matter experts, a thorough understanding of the surrounding environment has been achieved with baseline studies. These were discussed above in Sections 5 to 16 of this document.

The assessment demonstrates that the nature and scale of identified environmental impacts are not significant, can be adequately managed to meet the EPA's objectives and in many circumstances Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on the environment.

Accordingly, whilst there may be inherent connections and interactions between environmental factors, these are not considered to warrant further assessment given that each can be managed in their own right, and therefore do not pose a significant risk through their interconnectivity.

Examples include inter-relationships between:

- Terrestrial Environmental Quality (soil contaminations) and surface and groundwater contamination; or
- Flora and fauna habitats and surface and groundwater contamination.

Prevention of soil, surface or groundwater contamination through sound operational practices and compliance with operating conditions prescribed in the DWER licence will inevitably prevent indirect impacts to flora and fauna habitats.

15.1 Environmental Management Plans

Notwithstanding, MWM will revise the current consolidated EMP that includes site specific management plans to address the significant operational environmental factors, as relevant to the LOM, including:

- Flora and Vegetation Management;
- Terrestrial Environment Quality Management;
- Fauna Management;
- Surface and Groundwater Management;
- Radiation Management, including Radioactive Waste Management (Appendix H); and
- Cultural Heritage Management.

Management plans will be revised and contemporised to reflect current EPA guidance and templates on EMPs and include, where applicable:

- Key environmental factors;
- Applicable condition requirements;
- Rationale and approach to management;
- Consultation outcomes;
- Defined outcomes and objectives;
- Monitoring and evaluation of appropriate indicators;
- Trigger and threshold criteria;
- Management actions and responses; and
- Reporting commitments.

15.2 Environmental Management System

MWM holds triple ISO certification of its Integrated Management System (Health and Safety, Environment, Quality) in Western Australia. This management programme forms a key part of Mt Weld's EMS, with supporting documents developed to implement the objectives outlined within the EMP. The monitoring and management outcomes of the MWM EMP are subject to annual third-party audit and are reported annually in the Annual Environmental Report (AER).

In January 2022, MWM commissioned an independent compliance audit against all environmental legal obligations and commitments relevant to the current Mt Weld Rare Earths Project. No non-compliances were identified in relation to implementation of conditions prescribed in Ministerial Statement 476, DWER licence L8141/2007/2, Tenement Conditions or active Mining Proposals. In addition, the audit concluded that environmental management systems and processes are generally adequate to support substantial compliance and ensure that key environmental risks are appropriately managed.

16 CUMULATIVE ENVIRONMENTAL IMPACT ASSESSMENT

In accordance with the EPA's Instructions for referral of a proposal under Section 38 of the EP Act (October 2021), MWM has considered the potential cumulative impacts of the LOM Proposal relative to relevant environmental factors, specifically the successive, incremental and interactive impacts on the environment of the Proposal with past, present and reasonably foreseeable future activities associated with the LOM Proposal.

Given the scale and isolated location of the Proposal, relative to other operations in the region, the significant geographical separation is not conducive to any discernible or measurable cumulative impact for any environmental factor. Accordingly, MWM has focussed on any potential cumulative impacts associated with its progressive development of the Mt Weld Project, and whether this adversely impacts on meeting the EPA's objectives for key environmental factors.

The proposed changes to the Project will increase the Development Envelope from 505 ha to 2,802 ha. Inherently, this has direct and indirect implications on terrestrial flora within the disturbed areas. Whilst this appears to present a significant step change in the project footprint, it is important to note that MWM does not intend to disturb all areas.

Further, a holistic impact assessment of the Disturbance Envelope provides the flexibility to locate future tailings storage, waste rock landforms, future borefields and renewable electricity generation in optimal locations, acknowledging the requirement for subsequent amendments to environmental approvals. MWM will adopt DWER's Clearing Principles and clear only what is required, in order to limit the disturbance areas.

16.1 Flora and Vegetation

As discussed in Section 6.3, the flora and vegetation of Mt Weld are typical of the region and are dominated by a mulga woodland with some localised mallee and spinifex communities. No rare or geographically restricted plant species are known to occur. The area suffers from overgrazing, primarily by cattle, rabbits, camels, horses, and disturbance by some exploration activities.

No conservation reserves or ESAs intersect the survey area and surveys show that activities within the Development Envelope will not impact on any TEC or PEC, noting there are no known TECs within the Murchison bioregion.

No significant flora was recorded during the most recent survey of the Proposal area.

One Priority 3 species, *Goodenia lyrata* has previously been recorded within the survey area in 2011, in a location that has since been cleared. Whilst there is potential for *Goodenia l*yrata to occur following good seasonal rainfall given that this taxon is an opportunistic annual life form, given the extensive representation of the associated vegetation type and known occurrence of *Goodenia lyrata* within multiple bioregions across Western Australia, the potential for any impact on this taxon within the proposed development footprint is considered to be low.

No other threatened or priority listed flora species are considered likely to occur within the survey area, and vegetation within the survey area was determined to be well represented at all levels (state-wide, bioregional and local).

Reference should be made to the impact assessment discussion in Section 6.5 and the proposed mitigation measures described in Section 6.6.

16.2 Fauna

As discussed in Section 7.3, while three significant species were confirmed as occurring in the survey area (Long-tailed Dunnart, Wood Sandpiper, and Common Sandpiper), the survey area was determined not to contain any important habitat nor support an ecologically significant proportion of the population of either Sandpiper species. Relatively small areas of habitats significant to the Long-tailed Dunnart occur within the proposed Development Envelope, and both habitats have been confirmed to extend at least 5 km to the north-west. Clearing within the proposed Development Envelope is therefore considered to be low. The existing environmental management plan for operations is well placed to manage any impacts from the LOM. Terrestrial fauna was not considered a factor in EPA Reports 646 or 884.

16.3 Inland Waters

As discussed in Section 9.4.2, access to the Mt Weld carbonatite aquifer groundwater resources is provided by an agreement between MWM and Goldfields Granny Smith (GGS), and GGS GWL 59529 issued by DWER for abstraction of 4 GL per year. The agreement between MWM and GGS is due to expire in October 2023 where MWM will be the sole abstractor and user of water sourced from the carbonatite aquifer.

A GOS imposed as a condition of the GWL, is being implemented across the Mt Weld mine site. This GOS describes the MWM water use and abstraction regime, and address issues associated with the abstraction of water for pit dewatering under GWL 171310(3). It also defines the MWM responsibility in terms of monitoring and managing the impacts of taking water.

Mining activities across the LOM could reduce groundwater levels and/or have an effect on groundwater quality. However, monitoring that has been undertaken to date indicates the environmental impacts are negligible and well managed.

Water for the Mt Weld expanded operations will be required mainly for beneficiation of ore at higher production rates, ancillary uses in dust suppression on haul roads and around the Plant and load-out facility and construction activities. Water will be sourced from the existing wellfield, with exploration currently underway to prove potential eastern and western borefields.

MWM considers that effects to the groundwater resource can be effectively managed through (or by revisions to) the DWER Part V Licence 8141/2007/2; GWL171310(3) and the GOS; DMIRS Mining Act approvals and the Surface and Groundwater Management Plan.

Water will be sourced from the existing wellfield and potentially eastern and western borefields if proven. As discussed in Section 9.4.2, MWM is actively considering further water conservation strategies to improve the water balance into the long term. MWM has commissioned an engineering feasibility study to examine water recycling options for the site. The most important of these is the possible construction of a high recovery Reverse Osmosis plant which will provide high recovery and availability of plant feed water. Abstraction rates from the carbonatite will remain within existing GWL limit of 2.8 GL/year. Where supplementary water supplies are required to meet production demands, these will be sourced from alternate aquifers or water sources within MWM's Leases with approvals sought under the RIWI Act as necessary.

Reference should be made to the impact assessment discussion in Section 9.5.2 and the proposed mitigation measures described in Section 9.6.2.

On the basis of the above, MWM considers that potential cumulative impacts have been fully quantified and assessed in this document, and therefore further analysis is not deemed necessary at this stage.

16.4 Predicted Cumulative Outcomes

On the basis of the above assessment, MWM does not consider that the Proposal presents a significant risk relative to current, proposed or cumulative impacts for each key environmental factor.

Further, as discussed throughout this document, it is considered that the existing obligations and commitments prescribed under a range of regulatory instruments and decision-making processes, including DMIRS tenement conditions, DWER licence conditions, DWER water licence GWL171310(3) and the GOS (AECOM, 2019), Environmental Management Plans, *Mt Weld Mining's IMS Management and Monitoring Procedures* are appropriate to manage potential cumulative impacts associated with the Project (refer Section 1.6.9, Table 1-2).

MWM therefore considers that Sections 38G(4) and 44(2AA) of the EP Act are directly relevant in terms of other decision-making processes being able to mitigate the potential impacts of the Proposal on key environmental factors thereby mitigating the risks associated with cumulative environmental impacts.

17 BACKGROUND ON REQUESTS FOR CHANGES TO MS 476 CONDITIONS AND COMMITMENTS

As noted in Section 1.6.1, MWM submitted a Request for Changes to Ministerial Statement 476 on 1 December 2016 (Appendix B). The EPA advised its decision on 22 February 2017 that the changes would be assessed under Section 46 of the EP Act (EPA Assessment Number 2114).

MWM's application included a summary of proposed modifications to MS 476 following a detailed review of each auditable element of MS 476. The review identified applicable conditions and proponent commitments nominated for modification or removal, and presented a brief justification for each request.

The review concluded that many of the conditions and commitments were:

- Out-dated.
- Did not reflect the current processes or operational activities at Mt Weld.
- Were regulated through other government agencies and regulatory instruments, therefore presenting a duplication in regulation of some environmental factors.
- Related to project components such as the Secondary Processing Plant that are undertaken in Malaysia as opposed to within the Meenaar Industrial Estate.
- Have low environmental risks relative to those currently assessed and regulated by the EPA subject to significance tests under the current Environmental Impact Assessment Administrative Procedures and EPA Guidance Statements.

MWM were advised 12 months after submission that EPA/s was still not able to progress the Section 46 due to internal resourcing limitations, and by November 2017, due to the urgent need for separate approvals required under Section 45C of the EP Act at Mt Weld, the EPA/s advised MWM to withdraw the Section 46 request to avoid a conflict in assessment and further impact resourcing within the Department. MWM acceded to the request and withdrew the Section 46 application in November 2017.

Given the above, MWM continues to allocate significant resources in order to meet the many outdated and irrelevant obligations under MS 476 particularly relating to operational controls, monitoring and regulatory reporting.

MWM's Section 46 request to the EPA is presented here (Appendix B) both as relevant background but also presents MWM's position with regard to nature, range and content of proposed conditions within the new Ministerial Statement for the LOM Revised Proposal.

MWM requests that any forthcoming conditions of the new Ministerial Statement focus on residual significant key environmental factors with significant potential to impact on the environment, that are not already or cannot be regulated through other decision-making processes or legal instruments (refer Section 1.6.9).

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