ATC WILLIAMS

REPORT

EVOLUTION MINING LIMITED
ABN: 74 084 669 036

Mount Rawdon Operation
Erosion and Landform Evolution
Modelling Report

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TAILINGS.WATER.WASTE.

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1 INTRODUCTION

1.1 Mount Rawdon Operation

Mount Rawdon Operation (MRO) is an open cut gold mine located approximately 80 kilometres (km) southwest of Bundaberg in South East Queensland. It is owned and operated by Evolution Mining Limited (Evolution) via its subsidiary Mt Rawdon Operations Pty Ltd.

Mining, processing of ore and tailings deposition commenced in January 2001. Gold ore is extracted from the open pit using conventional drill and blast / load and haul methods and processed at a centralised processing plant. The processing plant consists of primary and secondary crushing, Semi-Autogenous Grinding (SAG) and ball milling, followed by conventional cyanidation leaching. Mining operations were scheduled to cease in April 2025; however, it is understood that processing has ended.

MRO comprises the following key site features:

- A single open pit (Pit);
- A Tailings Storage Facility (TSF);
- Waste rock dumps;
- Several storage and sediment dams;
- Roads and associated supporting infrastructure.

MRO is authorised by the Department of Environment, Science, and Innovation (DESI) under Environmental Authority (EA) EPML00712113 on Mining Lease (ML) 1231, ML 1259, ML 50119, ML 100059, ML 1192, ML 1203, ML 1204, ML 1206, and ML 1210.

Evolution made an application for a proposed Progressive Rehabilitation and Closure Plan (PRCP) on 14 November 2022 **[1]**. Evolution was issued an Information Request Notice from DESI and will submit a revised PRCP.

The current layout of the existing site is provided in **DIAGRAM 1**.

DIAGRAM 1: MOUNT RAWDON OPERATIONS – EXISTING SITE LAYOUT

1.2 Scope

ATC Williams Pty Ltd (ATCW) has been engaged by Evolution to develop a final landform design that addresses the erosional stability and surface water management of the preferred final landform option identified in the TSF Final Landform Options Assessment **[2]**. The preferred option for the plateau following the MCA Workshop is the store and release cover (Cover D), as outlined in **[26]**. The rock fill batters were not modelled as the material is an engineered material comprising a well graded material and possessing a maximum particle size of 500mm with no greater than 5% fines (i.e. fraction passing the 75µm size) by weight. The rock fill material specified in the construction of the embankments was to not be susceptible to significant weathering, breakdown or degradation following placement. Rockfill used in dam construction is designed to provide stability and prevent erosion of the dam structure. This work will support the closure and rehabilitation objectives of the MRO TSF and PRCP.

To inform cover system erosion, ATCW has undertaken two-dimensional erosion modelling in Water Erosion Prediction Project (WEPP) and landform evolution modelling (LEM) in Siberia. Modelling has been used to determined erosional stability of the proposed landform. This Report has been prepared to detail the erosion modelling inputs, assumptions and discussion of results.

This Report provides the rationale, design considerations and technical requirements for the final landform. It should be read in conjunction with the TSF Final Landform Options Assessment **[2]**. A summary of this TSF Final Landform Options Assessment is presented in **Section 1.3**. This Report has been prepared to support the continued development of the final landform as MRO progresses towards closure.

This Report has been divided into the following sections:

SECTION 0:	Site conditions including climate, topography, drainage, regional groundwater and geology, and the pre-mining land use;
SECTION 0:	Objectives for the closure and rehabilitation of the TSF;
SECTION 0:	Final landform options assessment workshop outcomes including landform geometry;
SECTION 0:	Conceptual cover system design;
SECTION 6:	Hydrologic and Hydraulic Assessment
SECTION 7	Erosion and landform evolution modelling of the final landform; and
SECTION 8:	Conclusions and recommendations.

1.3 TSF Final Landform Options Assessment Background

1.3.1 Part One: PAF MATERIAL OPTIONS ASSESSMENT

ATCW was engaged by Evolution to undertake an Options Assessment to manage the Potentially Acid Forming (PAF) materials placed within the TSF at MRO.

Design aspects considered for the preliminary PAF Material Options Assessment were as follows:

- Landform footprint and height
- Direction of sloping final landform
- Rehandle PAF material to allow cutting of the drainage channels
- Position of final spillway location
- Which options provided sufficient drainage around the landform.

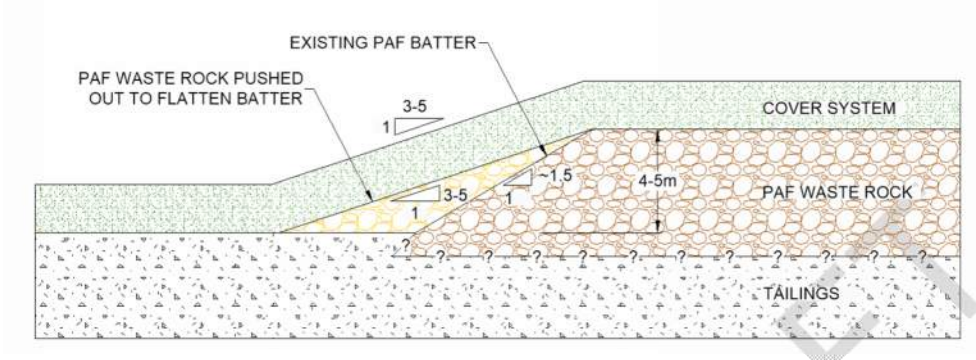
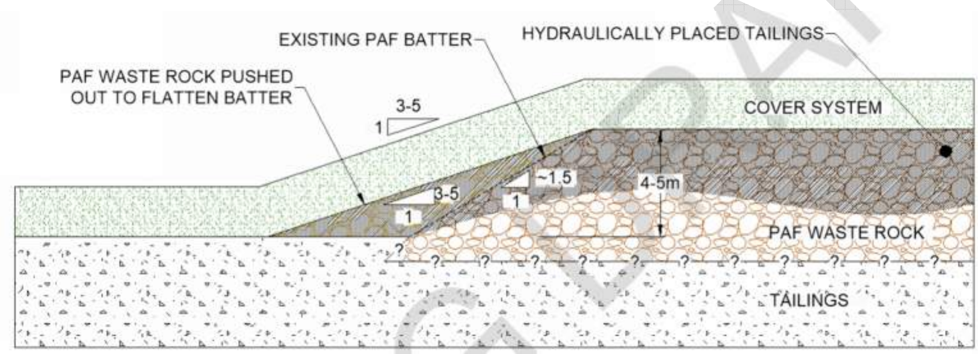
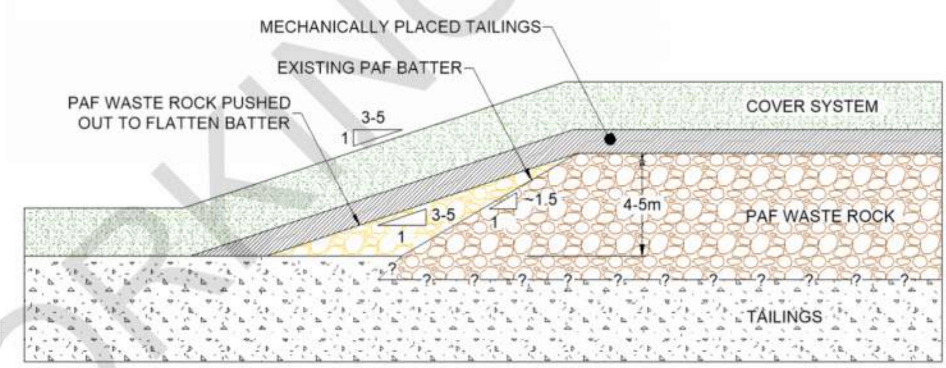
Based on the initial assessment, three (3) cover options were considered with a brief description of each option provided in **TABLE 1.**

TABLE 1: COVER OPTIONS – HIGH LEVEL PAF OPTIONS ASSESSMENT

Option Number	Brief Description
1	Cover system constructed over PAF material with no rehandling/ minimal rehandling of the PAF material.
2	Tailings hydraulically placed over PAF material (rehandled or minimal rehandling of PAF)
3	Tailings mechanically placed over PAF material (truck and shovel from existing dry tailings beach)

Conceptual cross-sections based on the proposed cover options are as shown in **TABLE 2**.

TABLE 2: COVER OPTIONS – HIGH LEVEL PAF OPTIONS ASSESSMENT FIGURE ILLUSTRATION

Option Number	Figure Illustration
1	
2	
3	

Based on the attained rating system, Option 2 indicated the highest combined score rating with Option 1/3 achieving the lowest score based on the assessment.

1.3.2 Part Two: FINAL LANDFORM OPTIONS ASSESSMENT

ATCW was engaged by Evolution to undertake an Options Assessment to design a final TSF landform at MRO.

Design aspects considered for the Final Landform Options Assessment were as follows:

- Regulatory Compliance
- Risk Reduction
- Post Mining Land Use
- Constructability

- Closure Capital Costs
- Battery limits
- Downstream Embankment
- Tailings Beach Slope
- Tailings Discharge
- Consolidation and Settlement
- Reshaping Batters & Rock Armouring

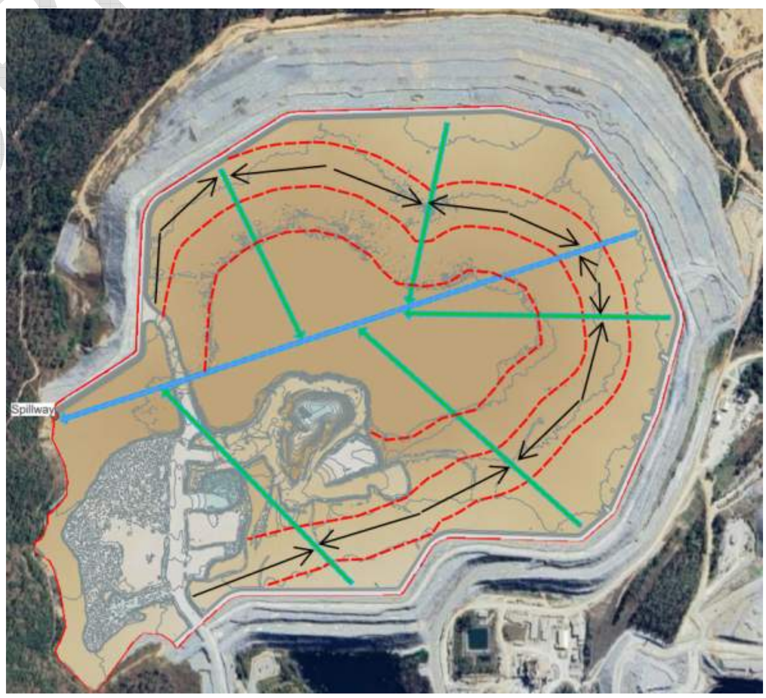
Based on the initial assessment, four (4) landform options were considered with a brief description of each option provided in **TABLE 3.**

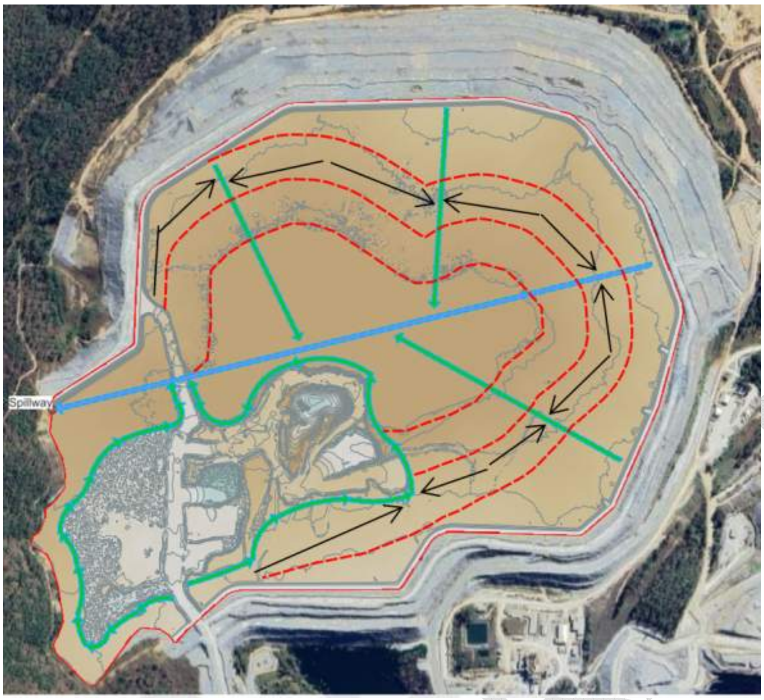
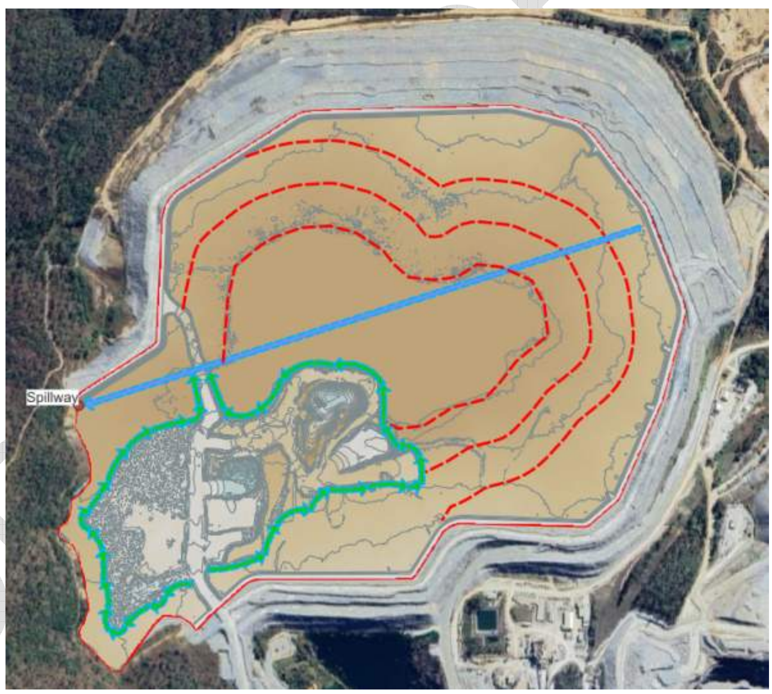
TABLE 3: LANDFORM OPTIONS ASSESSMENT

Option Number	Brief Description
1	Central drain and discharge from the spillway located on the north-western embankment interface with the natural topography Feeder drains to form around the PAF WRD and decant
2	Feeder drains directing flow towards the central drain and discharge from the spillway located on the north-western embankment interface with the natural topography Feeder drain to be created through the PAF stockpile / decant access ramps as required with bunding to direct flow towards feeder / central drain and reduce potential for ponding in concentrated areas and reduce potential for erosion
3	Central drain and discharge from the spillway located on the north-western embankment interface with the natural topography Feeder drains to form around the PAF WRD and decant with bunding to direct flow towards feeder/central drain and reduce potential for ponding in concentrated areas and reduce potential for erosion
4	Central drain and discharge from the spillway located on the north-western embankment interface with the natural topography Feeder drains to form around the PAF WRD and decant with bunding to direct flow towards feeder / central drain and reduce potential for ponding in concentrated areas and reduce potential for erosion

Conceptual illustrations based on the proposed landform options are as shown in **TABLE 4.**

TABLE 4: LANDFORM OPTIONS ASSESSMENT FIGURE ILLUSTRATION

Option Number	Figure Illustration
	Legend: Light Blue = Central Drain Light Green = Feeder Drain Red = Diversion Bunding Black Arrow = Direction of Flow
1	
2	

3	
4	

2 SITE CONDITIONS

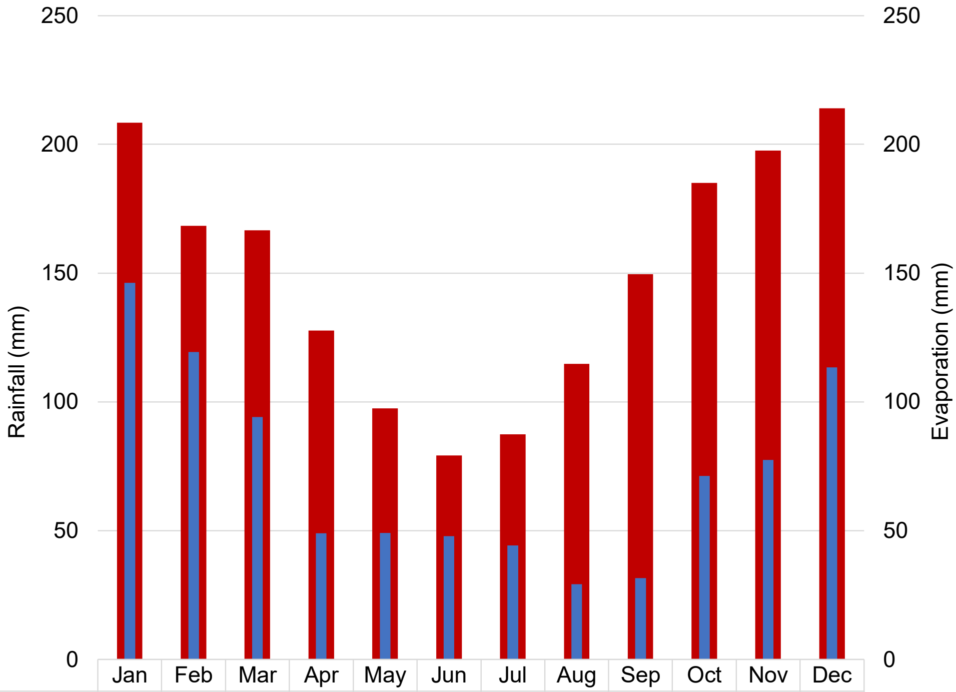
2.1 Climate

2.1.1 Rainfall and Evaporation

The closest operational weather station is the Mingo Creek Alert weather station (039340), located approximately 6 km southwest of MRO, which commenced operation in 1997. The Mt Perry The Pines (039070) weather station has been operational since 1886 and is located approximately 15 km northwest of MRO.

Local climate data has been sourced from the Scientific Information for Land Owners (SILO), which provides a patched point dataset **[3]**. There is a distinct wet and dry season with majority of rainfall occurring between October and March (refer **GRAPH 1**). The wettest month is January with an average rainfall of 146.2 millimetres (mm) and the driest month is August with an average rainfall of 29.2 mm. Mean annual rainfall is 759.2 mm and mean annual evaporation is approximately 149.9 mm. The maximum evaporation ratio occurs in September, with a mean evaporation of 149.6mm and a mean rainfall of 31.5mm, giving a ratio of 4.7. The minimum evaporation ratio occurs in February, with a mean evaporation of 168.3mm and a mean rainfall of 119.3mm, giving a ratio of 1.4. Evaporation exceeds rainfall in all months by at least a factor of 1.4.

GRAPH 1: MEAN CLIMATE DATA



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean evaporation (mm)	208.5	168.3	166.6	127.7	97.5	79.2	87.4	114.8	149.6	185.0	197.6	214.0
Mean rainfall (mm)	146.2	119.3	94.2	49.0	49.1	47.8	44.2	29.2	31.5	71.3	77.4	113.4

2.1.2 Long Term Projections

Climate projections data have been generated using 28 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) global climate models (GCMs) and four Representative Concentration Pathways (RCP 2.6, RCP 4.5, RCP 6.0, and RCP 8.5), which define a range of possible future climates. While more recent climate projects are available in the IPCC's Sixth Assessment Report (AR6), the AR5 data was available at the time of the Forage climate projections report development **[4]**. The median values for the historical data (1960-2010) and climate projections for 2030, 2050 and 2070 are presented in **TABLE 5.**

TABLE 5: PROJECTED ANNUAL CLIMATE SUMMARY

CLIMATE VARIABLE (MEDIAN ANNUAL)	HISTORICAL 1960-2010	PROJECTION 2030	PROJECTION 2050	PROJECTION 2070
Rainfall (mm)	828.5	798.0	778.6	762.1
Evaporation (mm)	1,778.2	1,858.0	1,905.7	1,947.9
Mean Temperature (°C)	20.8	21.6	22.2	22.6
Maximum Temperature (°C)	27.0	27.9	28.5	29.0
Minimum Temperature (°C)	15.7	16.7	17.3	17.8

Source: FORAGE Report: Regional Climate Projections Lot on Plan: BN37400,2SP138073,38BON559 **[4]**

Median annual rainfall is expected to decrease in 2030, 2050 and 2070, while median annual evaporation and temperature is expected to increase. Notwithstanding, the State of the Climate 2022 biennial report and IPCC's AR6 predicts greater variability and intensity in rainfall, more extreme weather events such as heat waves, droughts, and floods **[5]**, **[6]**.

While climate change projections indicate greater variability and increase in rainfall intensity and frequency, leading to higher runoff volumes, these factors primarily influence surface water management rather than cover system performance. While surface water management is a primary concern, extended dry periods can lead to reduced net infiltration rates due to changing precipitation patterns. This can impact vegetation coverage. To account for potential impacted vegetation coverage, one of the WEPP modelling scenarios had 0% vegetation cover as a worst case (see **Section 7.2.1.4**), and the Siberia modelling parameters were exaggerated to promote soil loss and rilling (see **Section 7.3.1.1**).

2.2 Topography

Local topography is characterised by steep hills and valleys to the north and west of the MRO and rolling hills to the east. The MRO is located within a gently sloping valley to the north towards Swindon Creek. The highest point in the area is Mount Rawdon, which has an elevation of approximately 400 metres Australian Height Datum (m AHD). The surrounding steep hills are generally lower between 120-150 m AHD. Mount Prazier is located to the north and has a small summit area and steep slopes.

The steep slopes suggest a high potential for soil erosion, leading to shallow soil profiles over weathered rock. Additionally, the narrow valleys with limited depositional zones may restrict the availability of suitable cover material. Directly around MRO and to the east, deeper soil may be present due to lower erosion rates and deposition in the broader valley.

The topography of the TSF is characterised by a relatively flat plateau with steep angle of repose slopes. There are many areas of gently sloping ground around MRO, where cattle are grazed.

The erosion modelling will only be looking at the TSF plateau cover.

2.3 Drainage

Site surface water drainage features are depicted in **FIGURE 001** and described as follows:

Northward: Surface water runoff flows via Swindon Creek, Rawdon Creek, and Twelve Mile Creek into the Perry River. The Perry River is dammed by the Perry River Dam. Flow over the Perry River Dam is conveyed via the Perry River to the Burnett River confluence point.

Southward: Surface water runoff flows into a reach of the Burnett River upstream of the Paradise Dam.

The TSF is located on Rawdon Creek, a minor tributary of the Perry River, which flows south to north. The Perry River is located approximately 2 km north of the TSF.

2.4 Regional Groundwater

Previous site investigations carried out prior to the TSF development **[7]**, **[8]**, **[9]**, **[10]**, and **[28]** suggested that no permanent continuous aquifer was present within the site to depths of up to 20 metres (m) below ground surface. Groundwater inflow was noted in a limited number of the predevelopment test pits and boreholes, predominantly reporting from the upper basement (depths less than 6 m). This inflow possibly occurs through fissures/fractures, which is likely recharged by direct surface infiltration of rainfall. This water is likely perched above the more intact basement sequences, with greater flow rates expected following prolonged rainfall events. Review of available geological mapping for the region suggests that a regional groundwater system may occur within the deeper basement sequences, the level of which would be controlled by the Perry River to the north and the Burnett River to the south. The groundwater surface would likely represent a subdued reflection of site topography and therefore would flow generally northward towards the Perry River.

The two main hydrogeological units are the Regolith Aquifer and the Weathered-Fractured Basement Rock Aquifer **0**.

2.4.1 Regolith – Weathered Rock Aquifer

The regolith aquifer consists of soil and small pockets of alluvium located along drainage lines (of limited extent and thickness). The composition generally consists of an organic-rich topsoil layer less than a meter thick, underlain by a layer of gravel, sand, or clay ranging from 1 to 4 meters in thickness, and highly decomposed/weathered igneous rocks up to 15 meters thick. Groundwater levels from monitoring bores indicate that the regolith is usually permanently saturated near mine water storages, such as the TSF and runoff containment dams. Elsewhere, the regolith primarily holds water as soil moisture and s generally unsaturated. Nearly all recharge occurs from rainfall infiltrating through the regolith within the catchment, with the weathering zone becoming saturated during these rainfall events **0**.

2.4.2 Fractured Rock Aquifer

The fractured rock aquifer (FRA) has structural features, including bedding planes and foliation, zones of argillization, dykes, faults, and fracture planes, that naturally influence groundwater flow. Saturated zones less than 50 m deep occur in mudstone, chert, minor mafic volcanics, or metasediments of the Curtis Island Group (CIG), as well as in the dacite or dacite-rich volcanics of the Arabanga Volcanic Group (AVG).

The upper beds of the AVG and CIG form the fractured rock aquifer. Most groundwater bores installed within rock fractures intercept groundwater in joints and isolated fractures, which are low-volume aquifer compartments with low storativity. Groundwater-bearing zones in fractured rock at MRO can consist of isolated or semi-isolated compartments of fractured rock surrounded by competent rock.

At depths greater than 30 m the basement rock comprises fresh granite, dacite, rhyolite, or granodiorite, that has, lower fracturing intensity than the FRA which results in generally minimal groundwater flow occurs.

2.5 Regional Geology

The geological setting is described as follows **[7]**:

> *The Maryborough geological map (1:250 000 scale:1968) indicates the geology of the area to comprise late Triassic Aranbanga Volcanic Group and/or Mount Rawdon Volcanics sequences,*

which consist typically of rhyolitic or andesitic volcanoclastics. Jurassic aged Hogback Tonalite and much older Permian aged Biggenden Beds also occur on a more regional scale. Jointing/lineations associated with this geology is reported to be subparallel with the Perry fault, which trends generally south to north through the Boolbunda Range. The drainage on which the tailings dam is to be formed therefore appears to be structurally controlled, in alignment with jointing.

The local geology, based on previous site investigation works within the project area, appears to vary considerably ranging from metasediments to tuff, with trachyte dykes throughout the site. These rocks have been interpreted to be principally volcanics, possibly rhyolite, forming part of the Aranbanga Volcanic Group. Notwithstanding the origin, these sequences are generally deeply weathered, with very weak to weak rock extending to depths greater than 6 m.

MRO is situated within the New England Fold Belt, which is the youngest of the Australia continental craton. The New England orogen is interpreted to be a complex tectonic collage of terrains that accreted onto the eastern margin of Australia in the Late Palaeozoic.

As part of the Wandilla Geological Province the area is characterised by three major stratigraphic blocks: (i) the Coastal block (ii) Goodnight block and (iii) Gympie block. MRO is located specifically within the Goodnight block to the north of the interpreted east-north-east trending Swindon fault and east of the regional north-northwest trending Mt Perry Fault.

Site host rocks comprise two dacite domes emplaced within a package of clastic rocks with a strong volcanic association currently traced to a depth of 800 m. Petrology studies suggest that host rocks are likely derived from an eruption and deposited proximal to the vent. Mt Rawdon gold deposit is characterised as a low-grade gold deposit, associated with zoned hydrothermal alteration and hosted within fine disseminated pyrite and base metal sulphides. The primary geological units in the area are summarised in **0**.

2.6 Pre-Mining Land Use

The site is located within Swindon Cattle Station; the grazing property is an approximately 3,000 hectares (ha). The Swindon Cattle Station is one of six large cattle grazing properties in the region operating since early settlement. The land surrounding the site is used primarily for low intensity cattle grazing. Prior to its current use for mining operations, the site was predominantly used for low intensity cattle grazing.

The Grosvenor Timber Reserve, which is protected under the *Forestry Act 1959*, is located approximately 1 km northwest of the TSF.

The primary PMLU will be open woodland, where occasional and low-intensity grazing may occur as a land management tool only.

3 REHABILITATION AND CLOSURE OBJECTIVES

3.1 Key Value Drivers

The key objective for the final landform design is ensuring that the landform is safe, stable, non-polluting and compliant with all relevant legal and regulatory requirements.

The key project drivers are described in **TABLE 6**.

TABLE 6: KEY VALUE DRIVERS

KEY VALUE DRIVER	DESCRIPTION
Regulatory Compliance	Meet thresholds for rehabilitation defined by standards, codes, regulations and best practice guidelines for mine closure.
Risk Reduction	Minimise environmental risks, particularly those associated with erosion, sedimentation and water quality.
Post Mining Land Use	Design a final landform that supports the PMLU of open woodland.
Closure Capital Costs	Landform and cover system design maximise its value and manage the overall capital cost (including closure provision) as well as future operating costs.

3.2 Closure Objectives

The Statutory guideline: Progressive rehabilitation and closure plan (PRC plans) (ESR2019/4964) (PRCP Guideline) outlines the process for achieving acceptable rehabilitation through rehabilitation planning and development of site-specific rehabilitation strategies **[11]**.

The design aspect and key closure objectives, as outlined in the PRCP Guideline, in addition to site specific closure objectives are presented in **TABLE 7**.

TABLE 7: CLOSURE OBJECTIVES FOR LANDFORM DESIGN

DESIGN ASPECT	OBJECTIVE
Health and Safety	All rehabilitated areas will meet agreed minimum safety standards. Public safety considerations will be incorporated into the final design.
Groundwater and Surface water	No acceptable environmental impact to surface water and groundwater and no acceptable change to the function of key water-dependent ecosystems.
Stability	Constructed landforms will be structurally / geotechnically stable.
Erosion	Erosion on constructed surfaces will be comparable to nearby areas, not disturbed my mining activities.
Material characterisation	Suitable materials (quantity and quality) will be selected for landform designs such that closure objectives are met. Constructed landforms will be geochemically non-polluting.
Growth media	A suitable growth medium will be used to facilitate plant establishment and growth as per design.
Revegetation	Vegetation will be resilient, self-sustaining, and suited to the agreed final land use.
Visual amenity	The visual amenity of constructed landforms will be compatible with that of local landforms.
Heritage and Social	PMLU will be determined in consultation with relevant stakeholders and landform design will not inhibit stakeholders' vision for future.

3.3 Rehabilitation

The Mined Land Rehabilitation Policy sets out the Queensland Government's expectation that mine operations will rehabilitate land disturbed by mining activities to a safe and stable landform that does not cause environmental harm and is able to sustain an approved PMLU.

A PMLU must be rehabilitated to a stable condition in accordance with the definition in Section 111A of the *Environmental Protection Act 1994* (EP Act). Land is in stable condition if the land is safe and structurally stable, and there is no environmental harm being caused by anything on or in the land, and the land can sustain a PMLU.

3.3.1 Rehabilitation Objectives

Condition G1 of the EA requires that the TSF is rehabilitated to achieve the following rehabilitation objectives:

- Safe for humans and wildlife;
- Non-polluting;
- Stable;
- Able to sustain an agreed PMLU;
- Revegetated with species endemic to the area with no declared pest species; and
- Compliance with all conditions of the EA.

In addition, the rehabilitation objectives should be consistent with key stakeholder agreed social and environmental values and aligned with creating optimal business value.

MRO proposes to rehabilitate the TSF to a PMLU of open woodland. Overall, the rehabilitation objectives that relate to this Report include the following:

Non-Polluting

- Surface water runoff quality will be within accepted criteria and will not result in deleterious impact to the receiving environment.
- The cover system will:
  - Limit net percolation into the underlying tailings thereby minimising seepage into the surrounding groundwater system to ensure no deleterious impact to the receiving environment.
  - Limit capillary rise of salts from the tailings into the root zone of the ISL.

Physically Stable

- Achieves a factor of safety in accordance with Australian National Committee on Large Dams (ANCOLD) Guidelines on Dam Safety Management.
- Mass stability under static and earthquake conditions.
- Minimises erosion risk within the approved disturbance footprint.
- Surface water drainage system to reduce erosion and runoff velocity and provide sustainable flow into the downstream natural drainage.

Sustains Agreed Post Mining Land Use

- Appropriate for the local climate and predicted climate change.
- Supports a PMLU of open woodland.

3.3.2 Rehabilitation Criteria

Performance criteria with respect to the cover system are as follows, as outlined in **[27]**:

- Water Balance:
  - Net infiltration into the TSF should be less than a nominal 10% of the total annual rainfall depth Error! Reference source not found.; however, this is subject to the revised cover system modelling.
- Flux (at interface between cover system and tailings):
  - The number of days with infiltration exceeding a nominal 10 mm/day at the interface between the cover system and tailings should be less than 10 days per year Error! Reference source not found.; however, this is subject to the revised cover system modelling.
- Capillary Rise:
  - No capillary rise of salts from underlying mine waste in the root zone that may affect plant growth.
- Vegetation Cover:
  - Percentage Cover: Establish 30% vegetation cover (nominal, subject to erosion modelling and final landform design).
  - Plant Species: Plant species selected are suitable for the agreed and include species endemic to area.
  - Invasive and Declared Species: Weed and pest species at no greater densities than that observed at reference sites. Reference sites are to be selected that reflect the proposed PMLU of open woodland.
  - Plant Available Water Capacity: The cover system should provide sufficient plant available water capacity to sustain the target vegetation. That is, plant available water

capacity should be sufficient to maintain plant growth during periods when suction pressures in the root zone exceed the wilting point. Plant available water capacity refers to the amount of water held in the soil that is readily available for plant uptake. Wilting point is the moisture content in the soil at which plants can longer extract water due to high suction pressures. The maximum period when suction is below the wilting point should be determined. This will be determined by vegetation type and drought resistance.

- Erosional Stability:
  - Soil Loss: The target average annual loss rate shall be consistent with natural ground topography (less than 10 t/ha/yr). Noting that erosion modelling that reflects the final landform and surface water management as well as the field flume measurements are required to refine and demonstrate that target average annual soil loss rate is achievable.
  - Visual Inspection: Maintain a stable cover system with minimal signs of rilling or gullying. Regular visual inspections for signs of erosion, such as rilling, gullying, or exposed soil surfaces.

3.4 Revegetation

Vegetation will be selected based on the final land use objectives, stakeholder expectations and landform drainage requirements. At this stage, it is expected that a range of native grasses will be established following closure, as well as shrubs and trees appropriate for an open woodland ecosystem. The milestone for vegetation cover would be a sustained 30% cover.

Once the vegetation type is selected, growth media, seeding and topsoil requirements will be defined, and a rehabilitation schedule will be developed.

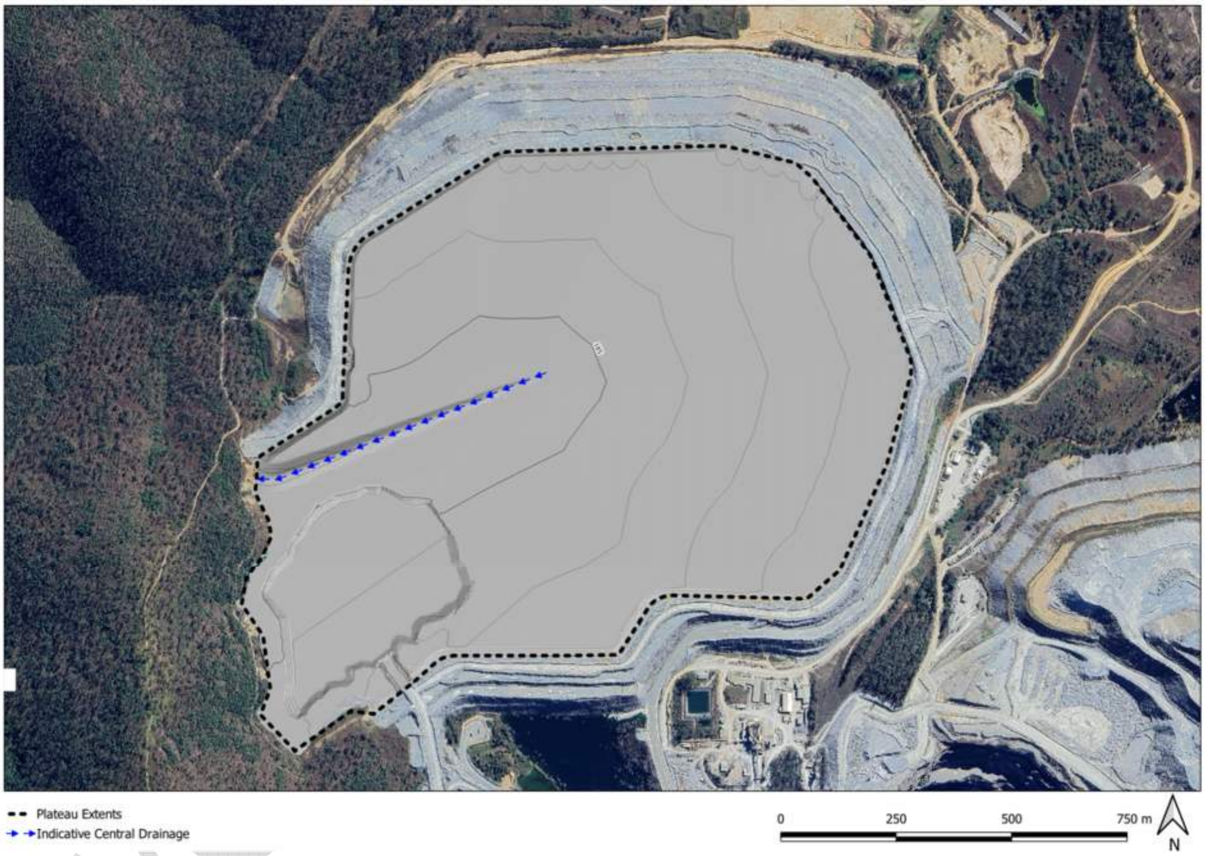
4 FINAL LANDFORM OPTIONS ASSESSMENT

A Final Landform Options Assessment workshop, which was attended by ATCW and Evolution, was held on 23 August 2024 to discuss options for the final landform and Potentially Acid Forming (PAF) waste rock stockpiles on the TSF. The outcome of the workshop and final landform option has been reported in **[2]**. The final landform is a raised near flat-lying plateau landform that will support an open woodland PMLU. This LEM report is confined to assessment of this plateau landform component.

Surface drainage of the final landform will be driven by cover system and batter design at cessation of tailings deposition.

The Final Landform Options Assessment made the following assumptions, as shown in **MAP 1**. The final plateau landform comprises shallow slopes of 0.6% and 1 % towards a drainage point. A discharge channel would be formed from the drainage point to the proposed final outlet location. No free water is to be retained within the TSF. All surface water reporting as runoff will be directed off the facility through a network of free draining open channels.

MAP 1: FINAL LANDFORM GEOMETRY



5 CONCEPTUAL COVER SYSTEM DESIGN

The preferred cover system option presented in the site's revised PRCP will be adopted. At the time of undertaking the erosion and landform evolution modelling, the preferred conceptual covers system design, as described in **[12]**, is store and release cover system that includes (surface to tailings):

- 0.2 m of topsoil;
- 1.3 m Infiltration Storage Layer (ISL) comprising loosely placed weathered rock material;
- 0.4 m Reduced Permeability Layer (RPL) comprising compacted residual material.

The store and release cover system is designed to shed excess water from the upper landform and allow sufficient rainfall to infiltrate into the cover system profile (i.e. ISL) to support vegetation. The RPL would minimise net percolation into the underlying tailings.

It is to be noted that there is still a need to optimise this cover design, and validate modelling predictions with the cover trial outcomes.

6 HYDROLOGIC AND HYDRAULIC ASSESSMENT

6.1 Hydrologic Assessment

6.1.1 General

As the MRO site is located at the upper extents of Swindon Creek, Rawdon Creek, Twelve Mile Creek and Mingham Creek, it will not receive flows from any external or upstream catchments. Direct rainfall was applied to the hydraulic model grid so a one dimensional hydrologic model was not required to estimate any other inflows to the hydraulic model domain..

6.1.2 Probable Maximum Precipitation

The Probable Maximum Precipitation (PMP) for the site has been assessed in accordance with Australian Rainfall and Runoff (2019) **[13]**. The site is located in the generalised tropical storm coastal zone and therefore the Generalised Short Duration Method (GSDM) **[14]** was adopted for event durations between 0.25 hrs and 6 hrs.

The GSDM requires catchment factors to be applied to the initial rainfall depth to estimate the PMP for the site. The site specific values of the catchment factors utilised in deriving the PMP estimates are summarised in **TABLE 8**.

TABLE 8: GSDM FACTORS FOR PMP ESTIMATE

Parameter	Value
Duration Limit	0.25 - 6 hours
Proportion Smooth	0.0
Proportion Rough*	1.0
Mean elevation at site (m AHD)	140
Elevation Adjustment Factor (EAF)	1.0
Moisture Adjustment Factor (MAF)	0.860

*Rough terrain is classified at that in which elevation changes of 50 m or more within horizontal distances of 400 m are common **[14]**.

These factors were applied to generate the PMP depths for 0.25 hr to 6 hr durations, as shown on **DIAGRAM 2** and in **TABLE 9**.

DIAGRAM 2: PMP DEPTH ESTIMATE

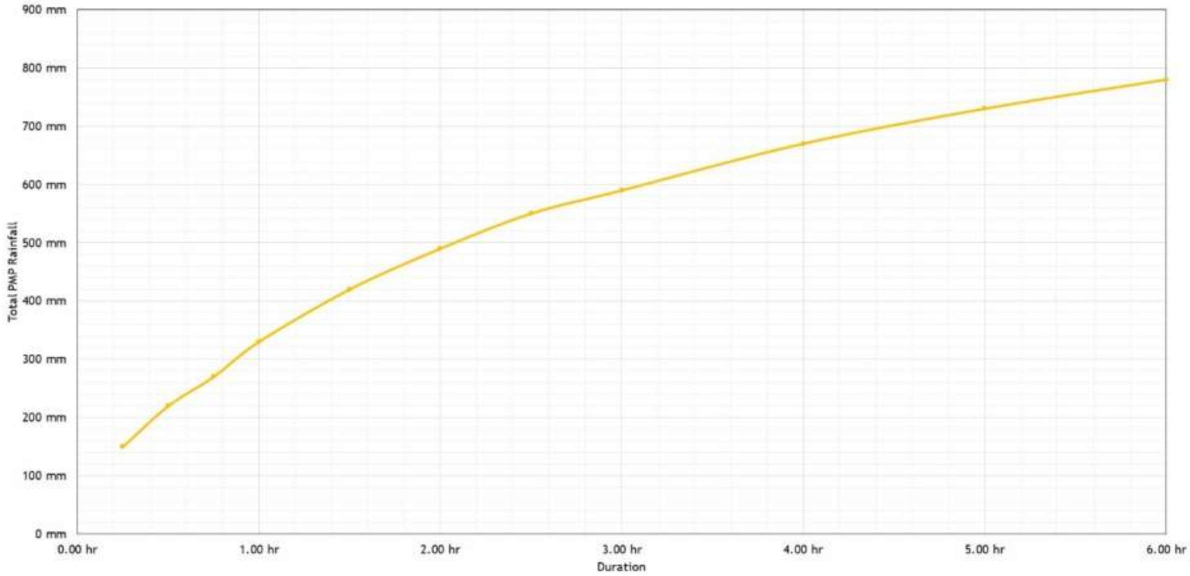


TABLE 9: PMP DEPTH ESTIMATE

Duration (hr)	Total Rainfall Depth (mm)
0.25	150
0.5	220
0.75	270
1.0	330
1.5	420
12.0	490
2.5	550
3.0	590
4.0	670
5.0	730
6.0	780

6.1.3 Rare Precipitation Estimation

Rare precipitation events are defined as events with an AEP equal to or greater than the 5% AEP event. Rainfall estimates for the 1% and 0.1% AEP storm events for the MRO site were obtained from the Bureau of Meteorology's 'Design Rainfall Data System' [15]. The rainfall depths for these events are summarised in **TABLE 10**.

TABLE 10: RARE RAINFALL DEPTH ESTIMATES 0

Duration	Rainfall Depth (mm)		
	5% AEP	1% AEP	0.1% AEP
1 min	5.1	6.59	9.44
2 min	8.76	11.4	16.5
3 min	12.3	16	23
4 min	15.5	20.1	28.9
5 min	18.5	23.9	34.3
10 min	30.2	39	55.7
15 min	38.6	49.8	71.2
20 min	45	58.1	83.2
25 min	50.2	64.9	93
30 min	54.4	70.6	101
45 min	64.1	83.7	120
1 hour	71	93.3	134
1.5 hour	80.8	107	154
2 hour	88	118	169
3 hour	98.7	134	191
4.5 hour	111	151	216
6 hour	120	165	236
9 hour	136	188	268
12 hour	149	207	295
18 hour	170	238	339
24 hour	187	262	376
30 hour	202	283	411
36 hour	215	300	440
48 hour	236	329	483
72 hour	264	367	535
96 hour	282	390	562
120 hour	291	402	576
144 hour	295	408	582
168 hour	295	409	582

Each duration event is further divided into an ensemble of ten temporal patterns (TP), as detailed in the Australian Rainfall and Runoff (ARR) Datahub **[13]**. The variations in the temporal patterns account for rainfall patterns not being uniform for their duration, with periods of more intense and less intense rainfall occurring within a single rainfall event. Rainfall hyetograph estimates from **TABLE 9** and **TABLE 10** were applied directly to the hydraulic model as rain on grid.

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6.2 Hydraulic Assessment

6.2.1 Model Overview

Hydraulic analysis of the study area has been undertaken using the two dimensional (2D) finite difference program TUFLOW, which is an industry accepted software package highly suited to the investigation of flood behaviour in complex flow scenarios. The model can simulate unsteady hydrodynamic flow in two dimensions on a rectilinear grid, as well as a one-dimensional unsteady hydrodynamic flow through waterway structures, such as culverts. The model is based on a robust finite difference solution scheme that is able to compute both sub-critical and supercritical flow regimes. The selected hydraulic solver for the 2D model was the HPC scheme.

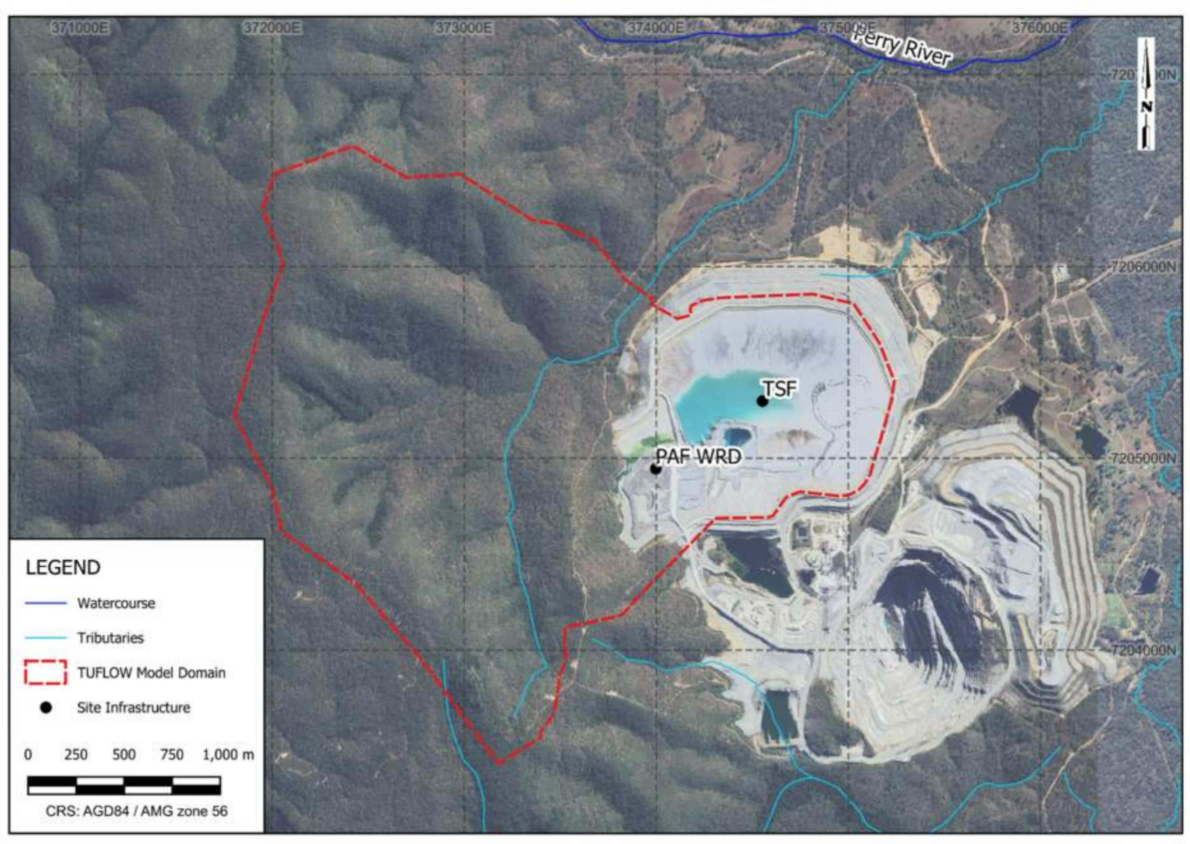
6.2.2 Model Domain

The TUFLOW model was set up to quantify the impacts of the 1% AEP, 0.1% AEP and PMP design storms. The model domain is depicted on **DIAGRAM 3** and includes the following structures and areas that will remain in the post-closure conditions.

- TSF (Post closure surface and spillway)

In conjunction with the site extents, the model domain includes a portion of Swindon Creek before it joins the Perry River.

DIAGRAM 3: TUFLOW MODEL DOMAIN



6.2.3 Digital Elevation Model

The topographical base for the TUFLOW model was developed from a series of regional survey and site specific LiDAR datasets. The site survey datasets were resampled into Digital Elevation Models (DEMs). The following datasets were input into the topographical model:

- Site Survey October 2020 **[16]**
- TSF Closure Surface and Spillway Configuration (see **Section 5**) **[17]**

6.2.4 Grid Size Selection and Time Step

The grid size was selected in accordance with the recommendations of the TUFLOW Manual **[18]** and ARR Revision Project 15 Report **[19]** that for flow in a channel, a minimum of five grid elements should be modelled across the channel width. The closure spillway has a base width of 10 m, and as such a maximum grid size would be 2 m. This 2 m grid size was adopted. Based upon the grid size of 2 m, an initial time step of 1 second was selected.

6.2.5 Surface Roughness

The Manning's 'n' surface roughness coefficient was used to describe the surface conditions within the model domain. Manning's 'n' roughness coefficients were assigned to the model domain based on land use type and characteristics, as depicted on **DIAGRAM 4**. A default surface roughness of n = 0.13 was adopted for non-mine impacted areas. A description of each adopted Manning's 'n' coefficients is provided in **TABLE 11**.

DIAGRAM 4: MANNINGS ROUGHNESS

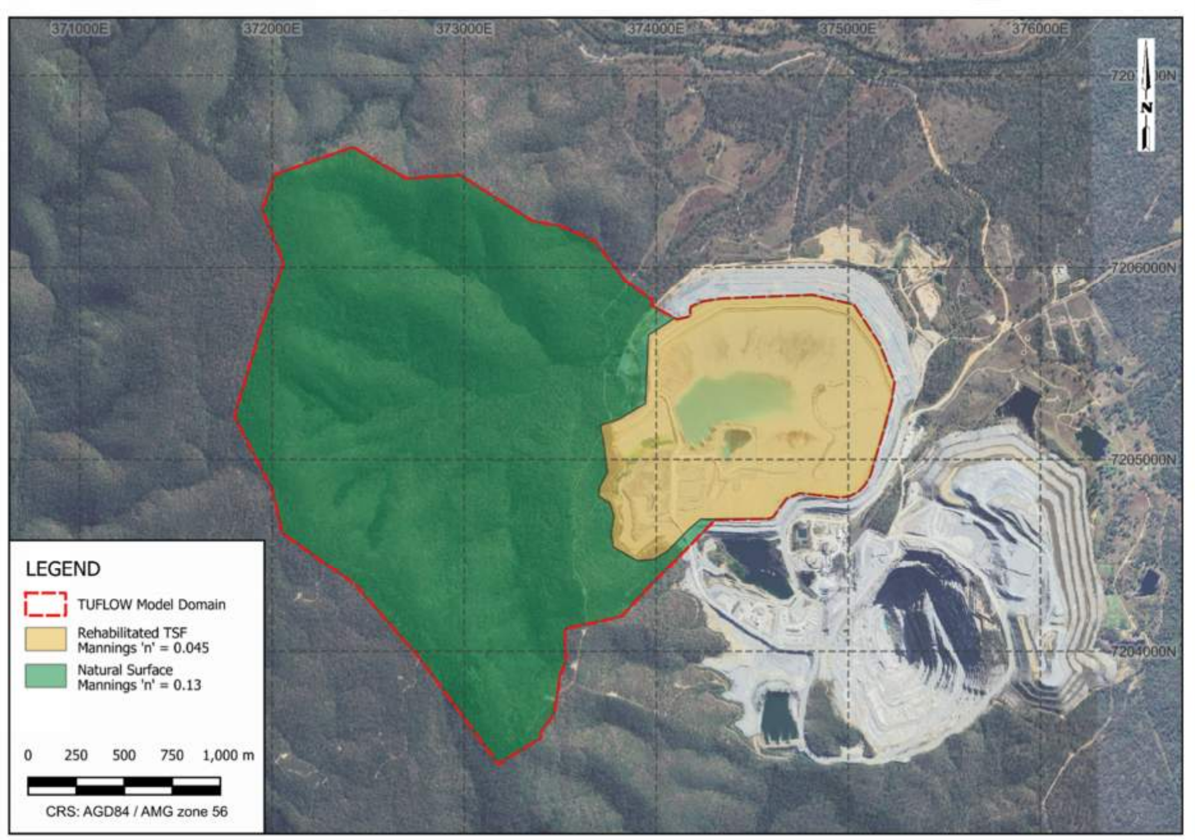


TABLE 11: MANNINGS 'n' ROUGNESS COEFFICIENT

Mannings 'n' coefficient	Description
0.045	Rehabilitated TSF surfaced, rock mulch an short vegetation
0.13	Light underbrush of grasses and vegetation. Tall canopy above.

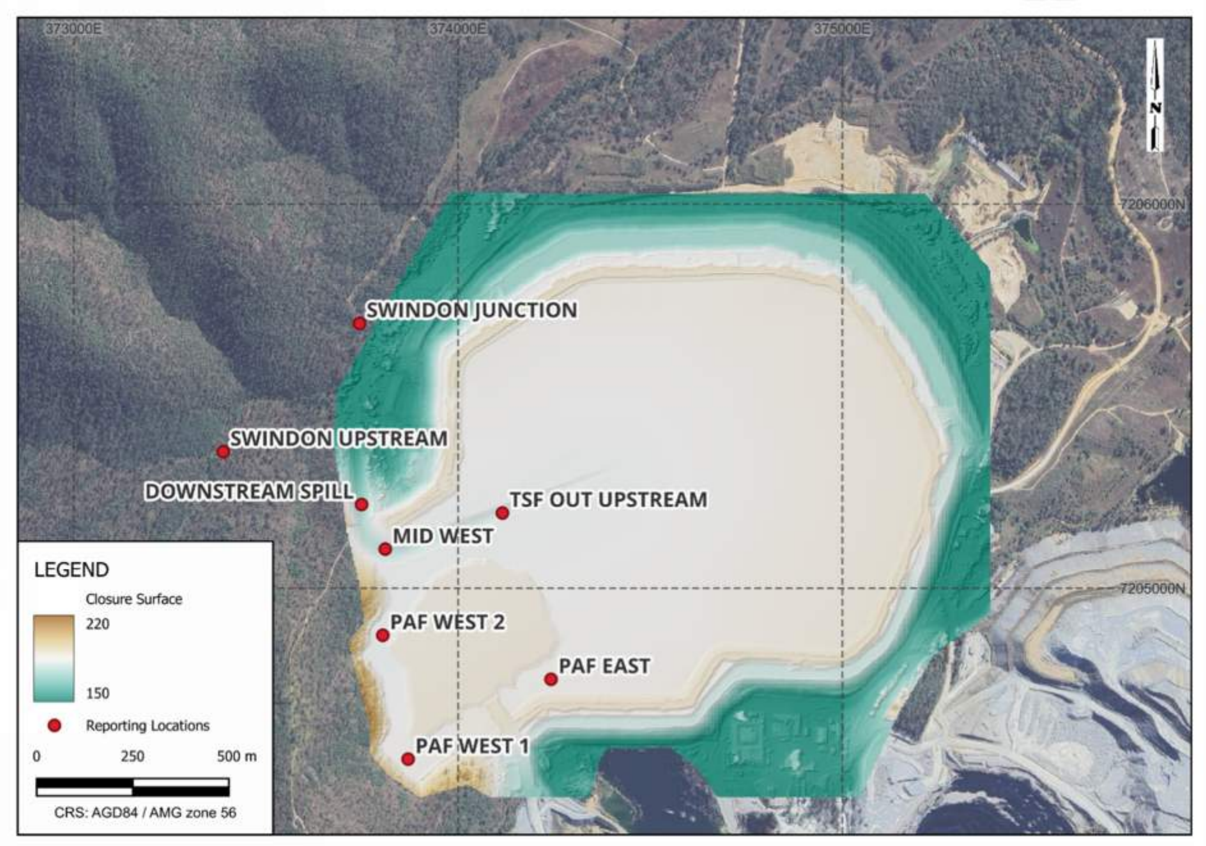
6.2.6 Results

6.3 Introduction

The results of the TUFLOW model showing maximum water depths and velocities are shown on **Figure 005** to **Figure 010**.

A summary of the results of flooding on the post closure conditions of the TSF, West Dam, South Dam Fill Area, Southern Diversion Drain, Pit Bund, Perry River Dam, retained dams on site and the downstream tributaries are summarised below. The locations at which results are reported are depicted on **DIAGRAM 5**.

DIAGRAM 5: RESULTS REPORTING LOCATIONS



The maximum recorded flow rates, depths and velocities in the TSF spillway and in the middle of the TSF closure surface are summarised in **TABLE 12**. Upon discharging from the TSF, flows enter Swindon Creek. The PMF rainfall event produces the highest water surface elevation, peak flow rate and peak velocity in the TSF. As rainfall depth decreases in conjunction with the decreasing extremity of the storm event (0.1% AEP and 1% AEP), the modelled depths, flow rates and velocities also decrease, as expected. Velocities over the capped surface are less than 1 m/s and depths less than 0.5 m up to the PMF event.

The results also indicate that there is a fall in water surface elevation across the TSF closure surface. The maximum velocities across the TSF closure surface are less than 0.6 m/s, so erosion of emerging vegetation is unlikely to occur in extreme rainfall events.

TABLE 12: TSF RESULTS

Location	Parameter	1% AEP	0.1% AEP	PMP
US TSF Spillway	Surface Elevation (m AHD)	181.05	181.05	181.05
	Maximum Water Surface Elevation (m AHD)	182.46	182.86	184.81
	Maximum Flood Depth (m)	1.41	1.81	3.76
	Flow Velocity (m/s)	1.9	2.1	2.4
	Critical Storm Duration and Temporal Pattern	45 min TP01	45 min TP01	60 min
Mid TSF Spillway	Surface Elevation (m AHD)	177.88	177.88	177.88
	Maximum Water Surface Elevation (m AHD)	181.61	182.28	184.38
	Maximum Flood Depth (m)	3.73	4.4	6.5
	Flow Velocity (m/s)	0.6	0.7	0.9
	Critical Storm Duration and Temporal Pattern	45 min TP01	45 min TP01	60 min
DS TSF Spillway	Surface Elevation (m AHD)	170.72	170.72	170.72
	Maximum Water Surface Elevation (m AHD)	173.33	173.91	175.83
	Maximum Flood Depth (m)	2.61	3.19	5.11
	Flow Velocity (m/s)	1.54	1.7	2.3
	Critical Storm Duration and Temporal Pattern	45 min TP01	45 min TP01	60 min
PAF West 1	Surface Elevation (m AHD)	185.70	185. 70	185. 70
	Maximum Water Surface Elevation (m AHD)	185.88	186.03	186.39
	Maximum Flood Depth (m)	0.18	0.33	0.69
	Flow Velocity (m/s)	0.3	0.4	0.6
	Critical Storm Duration and Temporal Pattern	45 min TP01	25 min TP01	15 min
PAF West 2	Surface Elevation (m AHD)	184.42	184.42	184.42
	Maximum Water Surface Elevation (m AHD)	185.03	185.15	185.64
	Maximum Flood Depth (m)	0.61	0.73	1.22
	Flow Velocity (m/s)	0.5	0.6	1.0
	Critical Storm Duration and Temporal Pattern	45 min TP01	25 min TP01	15 min
PAF East	Surface Elevation (m AHD)	185.88	185.88	185.88
	Maximum Water Surface Elevation (m AHD)	186.02	186.06	186.20
	Maximum Flood Depth (m)	0.14	0.18	0.32
	Flow Velocity (m/s)	0.1	0.2	0.3
	Critical Storm Duration and Temporal Pattern	45 min TP01	45 min TP01	15 min

In the PMF event, velocities in the spillway vary between 0.9 m/s (along sections with a 1% longitudinal slope) and increase to 2.4 m/s in the section with the 10% longitudinal slopes. This area of maximum velocity occurs where the spillway in constructed into bedrock material. In the PMF event, flow depths in the spillway vary between 6.5 m (along sections with a 1% longitudinal slope) and 3.76 m in the section with the 10% longitudinal slopes.

7 EROSION AND LANDFORM EVOLUTION MODELLING

Erosion modelling has been undertaken based on geotechnical investigations undertaken to date and based on the proposed geometry for the final landform. Results are considered conceptual and used to demonstrate the typical drainage controls required to prevent problematic erosion.

7.1 Objectives

The primary objectives with respect to erosion are to:

- Avoid erosion which would impact the performance of the cover system (i.e. though reducing the depth.
- Prevent exposure of the underlying waste.
- Ensure long-term erosional stability of the landform.

Quantitative objectives for erosion rates are difficult to establish given the variability of natural erosion rates across Australia. Factors such as rainfall, soil types, slope, vegetation cover and land use all contribute to soil loss rates.

The key driver for preventing erosion will be to establish and maintain vegetation over the rehabilitated landform. For the purpose of this assessment, a target loss rate of 10 t/ha/yr has been assigned as the maximum average soil loss rate for all years of modelling.

7.2 WEPP Modelling

7.2.1 Method

Average annual erosion rates for the final landform were estimated using the Water Erosion Prediction Project (WEPP) model. The WEPP model is a continuous simulation erosion prediction model developed by the United States Department of Agriculture (USDA). The WEPP model incorporates hydrology, vegetation science, hydraulics, and soil mechanics to simulate the erosion process (both detachment and transport) at a two-dimensional hillslope scale. The purpose of WEPP modelling is to estimate the net soil loss for rehabilitated areas.

7.2.1.1 Model Duration

A model duration of 50 years was adopted, considered to be an appropriate model duration to determine average erosion rates:

- Vegetation is assumed to be established at the beginning of the model start time, as erosion control structures would remain in place until sufficient ground cover was established, nominally to be established by a construction and rehabilitation works completion date. Vegetation coverage is discussed in **Section 7.2.1.4**.
- The 50-year period adopted includes years of high and low rainfall, allowing assessment of loss rates for varying climatic conditions.
- Results indicated erosion loss rates, range from 0.38 tonnes per hectare per year (t/ha/yr) to 4.2 t/ha/yr, which is less than half of the target loss rate.

Because the model predictions show a stable erosion rate over the 50-year period, longer model durations would be expected to be similar to the current model predictions. The WEPP model is sensitive to climate and therefore a representative climate record is necessary for accurate prediction. The model uses a synthetic data set (as per Section 7.2.1.2), which incorporates years of drought and years of high volume and high intensity rainfall events.

Geometry

A typical section of the landform plateau was modelled. The typical section include:

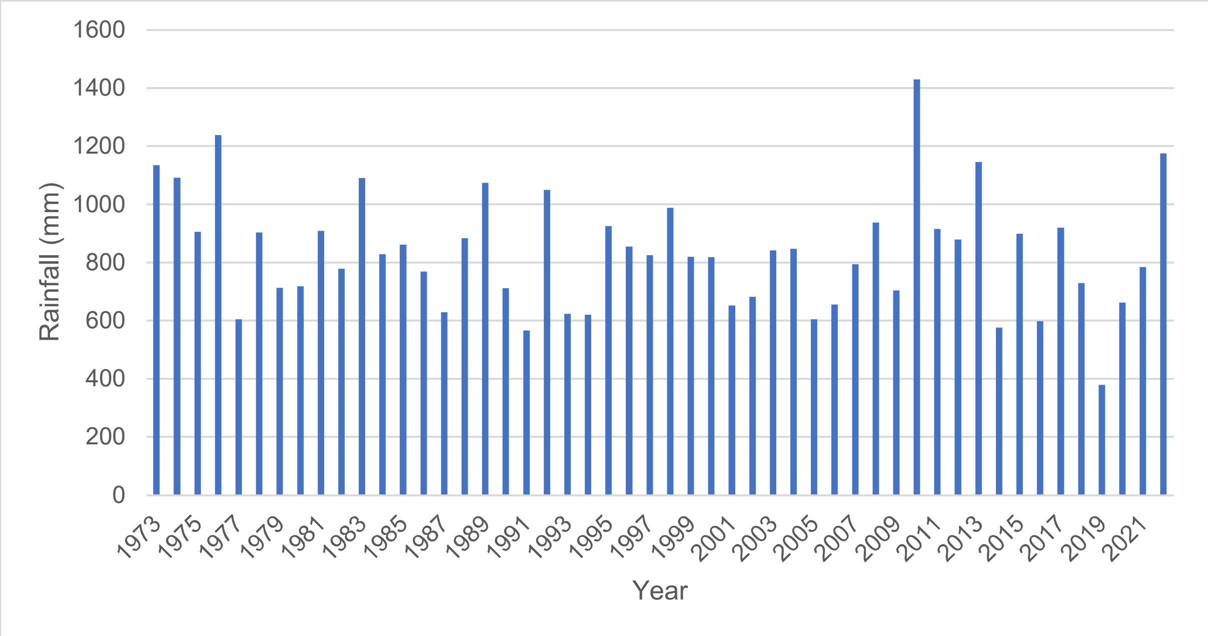
- 500 m long slope at 0.6% gradient.

7.2.1.2 Climate Data

A 50 year synthetic climate file was generated using the CLIGEN stochastic weather generator. Fifty years (1973 to 2022) of patched daily temperature (maximum and minimum) and rainfall data was imported into CLIGEN.

The annual rainfall for the years 1973 to 2022 are shown in **GRAPH 2**. The modelled period includes years of low rainfall (2019, 378.7 mm) and high rainfall (2010, 1,429.5 mm), compared to a mean annual rainfall of 834.7 mm.

GRAPH 2: ANNUAL RAINFALL



7.2.1.3 Soil Input Parameters

Soil input parameters for the WEPP model were informed by reported values and empirical formulas. Topsoil values were based on the erosion measure and modelling report prepared by RGS in 2023 **[21]**. For consistency in modelling, Sample 2 from the RGS report was adopted for the topsoil in the erosion modelling, as it was determined to be the most comparable to the topsoil adopted in the TSF Cover System Modelling **[25]**. The weathered rock material for the ISL was based on the material investigation completed by ATCW in 2024 **[13]**.

A sensitivity analysis was performed by increasing hydraulic conductivity. This conservative approach was adopted to reconcile the relatively low runoff results.

The soil input parameters adopted in the WEPP model are summarised in **TABLE 13**.

TABLE 13: WEPP MODEL SOIL INPUT PARAMETERS

PARAMETER	ISL WEATHERED ROCK (SAMPLE 8)	RGS 2023 TOPSOIL (SAMPLE 2)
Clay (%)	16	12
Sand (%)	68	80
Rock (%)	10	8
Organic Matter (%)	0.2	1.1
Cation Exchange Capacity (meq/100g)	14	4.1

7.2.1.4 Vegetation

The proposed PMLU is open woodland, which will support a range of native grasses, as well as shrubs and trees (refer **SECTION 3.3.2**).

Three vegetation scenarios were used in the WEPP model: no vegetation (0 %) (worst case), 30 % and 80 % static vegetation cover (i.e., vegetation does not grow or die off over the course of the simulation), aligning with the performance criteria. Noting that static vegetation cover may not represent site conditions (e.g., seasonal dieback and extended wet or dry seasons). Plant parameters are influenced by a wide range of factors including climate conditions, plant species and conditions; these conditions are complex to model.

7.2.2 Results

7.2.2.1 Predicted Average Annual Soil Loss Rates

The primary output from WEPP is the estimated soil loss rate (t/ha/yr). The objective is to achieve an average maximum soil loss rate of less than 10 t/ha/yr. The average annual soil loss rates predicted by the WEPP model are summarised in **TABLE 14**.

The WEPP model predicted average annual soil loss rates (<5 t/ha/yr) and very low average annual soil loss rates (<1 t/ha/yr) for 80 % vegetation. This is attributed to the low gradients of the final landform (0.6 %). In addition, vegetation established is important to manage erosion.

It is important to note that the presented values are annual averages that are considered over the long term; measured erosion rates in any one year will vary due to several factors including temporal climatic conditions.

TABLE 14: AVERAGE ANNUAL SOIL LOSS RATES

SCENARIO	AVERAGE ANNUAL SOIL LOSS (t/ha/yr)		
	0 % NO VEGETATION	30 % VEGETATION COVER	80 % VEGETATION COVER
500 m slope @ 0.6 % slope and vertical hydraulic conductivity = 7 mm/hr	4.2	2.14	0.75
500 m slope @ 0.6 % slope and calculated vertical hydraulic conductivity = 26.62 mm/hr	2.01	0.71	0.38

7.2.2.2 Limitations

The following limitations are noted:

- The WEPP model results are based on static (no change in vegetation cover over time), or no vegetation cover as stated in the modelling assumptions. No allowance has been made for seasonal dieback and increased soil loss rates as a result of rainfall after a dry period with reduced vegetation density.
- The WEPP model results are based on a simplified cross section geometry (500 m slope at 0.6 %). Localised erosion rates are likely to occur which exceed the average annual soil loss rates presented, which represent the annual average soil loss rates for the entire slope length.
- Variation to soil properties would impact the WEPP model outcomes (percentages of clay, sand and rock, organic matter and cation exchange capacity). The adopted soil input parameters assumed that that cover system comprised of moderately fresh and weakly altered NAF rock (ISL layer) overlain by soil/growth media. The ISL material is yet to be tested by the trial plots.
- There is a level of uncertainty when modelling future climate projections beyond a 50 year period using a relatively short-term climate record.

7.3 Landform Evolution Modelling

7.3.1 Method

Siberia is a soil erosion and landform evolution model that can predict type of erosion (that is, sheet wash and/or gullying) and to predict gully initiation and evolution **[22]**, **[23]**, **[24]**. Estimated soil loss rates generated using WEPP were input along with other parameters generated for the TSF (as detailed in the following section) to estimate the severity of erosion and estimate the final landform surface, at defined intervals. Inputs, assumptions and model outcomes are detailed in the following sections.

The grid geometry used for the Siberia model comprised 500 m long slope at 0.6% gradient. It is noted that due to limitations of the software, a 4 m grid size was required so that the entire slope could be input into the model.

7.3.1.1 Inputs

The initial calibrated input parameters resulted in negligible soil loss, primarily due to the low gradient of the final surface. As a result, the parameters were increased to promote soil loss and rilling to identify areas which may be prone to erosion. While the adopted parameters are deemed overly conservative, the erosion and rilling observed in the Siberia model still met the closure criteria discussed in **SECTION 0**.

Key model inputs used in the Siberia model are summarised in **TABLE 15**.

TABLE 15: VEGETATION PARAMETERS

Parameter	Assumption
Model run duration	The landform evolution model was undertaken for 200 years, with landform outputs generated at the following intervals: • 50 years • 100 years • 200 years
Beach Slope Geometry	500 m at 0.6 % grade
Grid size	A grid size of 1.5 m was adopted. This grid size was determined using trial and error to achieve the smallest grid size within the model limitations.
Sediment transport Parameters	Siberia adopts the Einstein-Brown sediment transport model defined as: $q_s = \beta_1 \times q^{m_1} \times S^{n_1}$ Where: B_1 = sediment transport coefficient q = discharge (m3/y) M_1 = discharge exponent S = slope N_1 = slope exponent Initial values for B1, M1 and N1 were calibrated against WEPP results with adopted as follows: B_1 = 0.000017 M_1 = 1.5 N_1 = 2.0 Adopted increased values for B1, M1 and N1 were calibrated against WEPP results with adopted as follows: B_1 = 0.1 M_1 = 2.2 N_1 = 2.0
Soil Parameters	Bulk density of soil = 1.7 t/m^3 Initial vegetation cover factor = 0.8 Adopted decreased cover factor = 0.3

7.3.2 Results and Discussion

The Siberia model results for the output periods of 50 years, 100 years, and 200 years:

- **FIGURE 002**: 50 year LEM results.
- **FIGURE 003**: 100 year LEM results.
- **FIGURE 004**: 200 year LEM results.

Based on the Siberia model results, erosion is minimal, with the cover system on the plateau performing well for 200 years. The maximum soil loss and soil accumulation on the TSF is presented in **TABLE 16**. Soil loss on the slopes accumulate at the bottom of the slope over the model period (200 years).

TABLE 16: ESTIMATED MAXIMUM SOIL LOSS

	Estimated Maximum Soil Loss		
	50 Years	100 Years	200 Years
Plateau	0.005 m	0.01 m	0.018 m
Central Drain batters	1.1 m	1.5 m	1.9 m
PAF batters	1.5 m	1.7 m	1.8 m
	Estimated Maximum Soil Accumulation		
Plateau	0.01 m	0.02 m	0.02 m
Central Drain channel	0.53 m	0.53 m	0.53 m
PAF batters	0.74 m	0.79 m	0.84 m

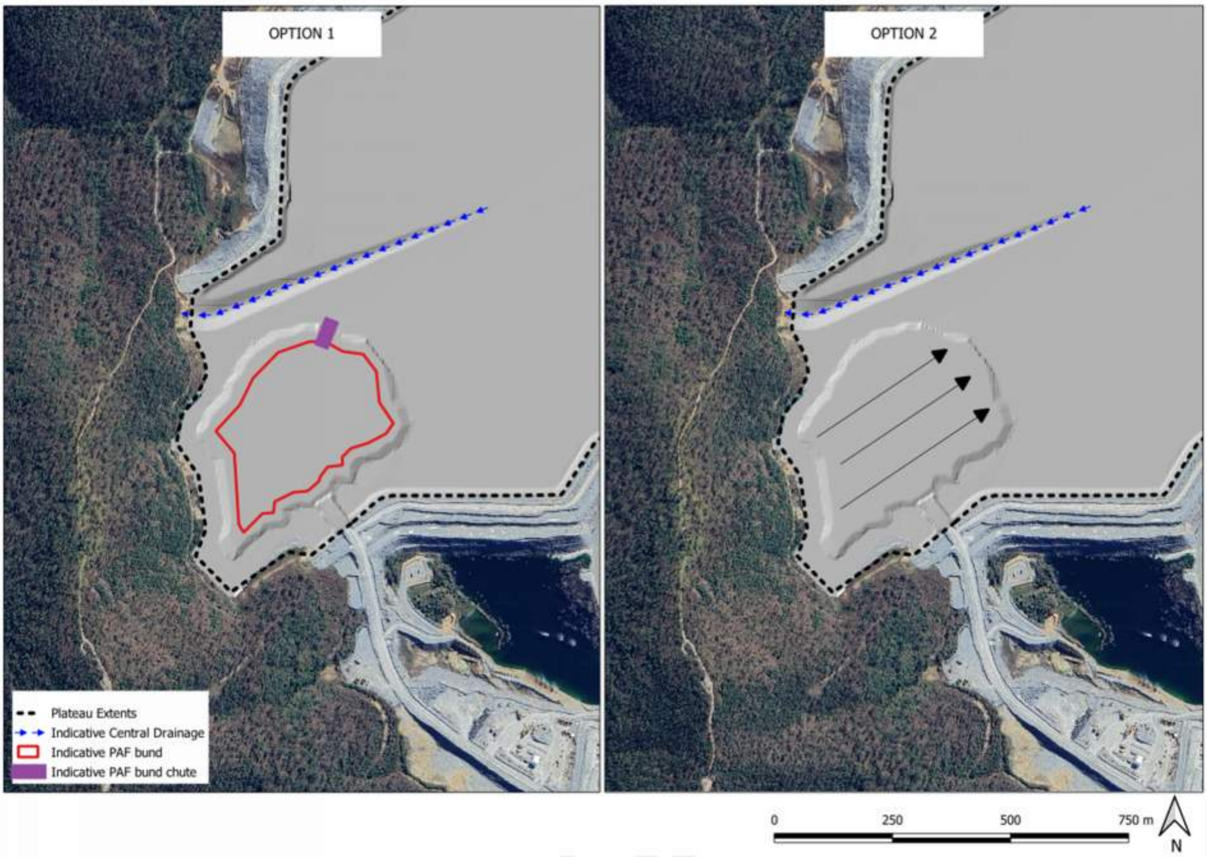
Erosion appears to be greatest near the embankment perimeter which may be a function of the perimeter bund. The cover design can potentially be managed through cover system maintenance during vegetation establishment.

No drainage controls are implemented. Based on expected erosion rates as modelled in WEPP, the addition of drainage controls, such as contour furrows, would further minimise soil loss.

The soil loss on the Central Drain and PAF batters is not at an acceptable level and so would need to be treated to reduce the soil lost. Potential treatment options for the Central Drain and PAF batters could include:

1. A bund around the PAF cell, draining to a central chute down the batters
2. Reshaping the PAF Plateau, grading to the east where batter height is low and avoid discharging to batters where the slope is high
3. Use rocky material to form a cover system on batter slopes

MAP 2: POTENTIAL TREATMENT OPTIONS FOR BATTERS



Limitations to the Siberia model include:

- The Siberia model can only implement one soil type
- Grid dimensions are limited to 500 x 500 grid points, thus only a 4m grid was able to be modelled
- The model is uncalibrated, and assumed to be conservative

8 CONCLUSIONS AND RECOMMENDATIONS

Erosion modelling and LEM of the final landform was undertaken by ATCW to provide an overall soil loss rate for the final landform under site conditions.

Erosion modelling was undertaken using the WEPP model, which indicated low average annual soil loss rates for the final landform under various scenarios including no vegetation, 30 % and 80 % vegetation cover. LEM was undertaken using Siberia. The Siberia model demonstrated minimal erosion and landform evolution over a 50, 100, and 200 year period, suggested that the proposed landform design meets rehabilitation and closure objectives.

As discussed in **Section 1.2**, the rock fill batters were not modelled as it is an engineered material designed to provide stability and prevent erosion.

These low rates for the 200 year LEM are primarily due to the low gradients adopted for the final landform design. Notwithstanding, the establishment and maintenance of vegetation cover will further minimise erosion and stability of the final landform. The final landform should be monitored to identify any potential issues.

The WEPP and Siberia model inputs should be revised as more site specific data is available to improve the accuracy of the erosion and landform evolution predictions.

Erosion modelling and LEM assessed the final landform tailings beach and did not consider the embankments. Reshaping the batters and rock armouring of batters should not be necessary based on the current profile and embankment materials (comprising rockfill).

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[28] G. Esslemont, Evolution Mining (2019). 'Mount Rawdon Environmental Evaluation: Stage 1 Characterisation of groundwater resources and identification of potential contaminant sources. Conceptual Hydrogeological Flow Model'.

[29] Allan Watson Associates, 'Tailings Storage Facility Stage 3 Lift Construction (RL 163.0m) design report.

[30] ATCW (2024). "Mount Rawdon Operation: Seepage Assessment and Remedial Options", Ref: 111359-104 R01 Rev0. ATC Williams Pty Ltd.

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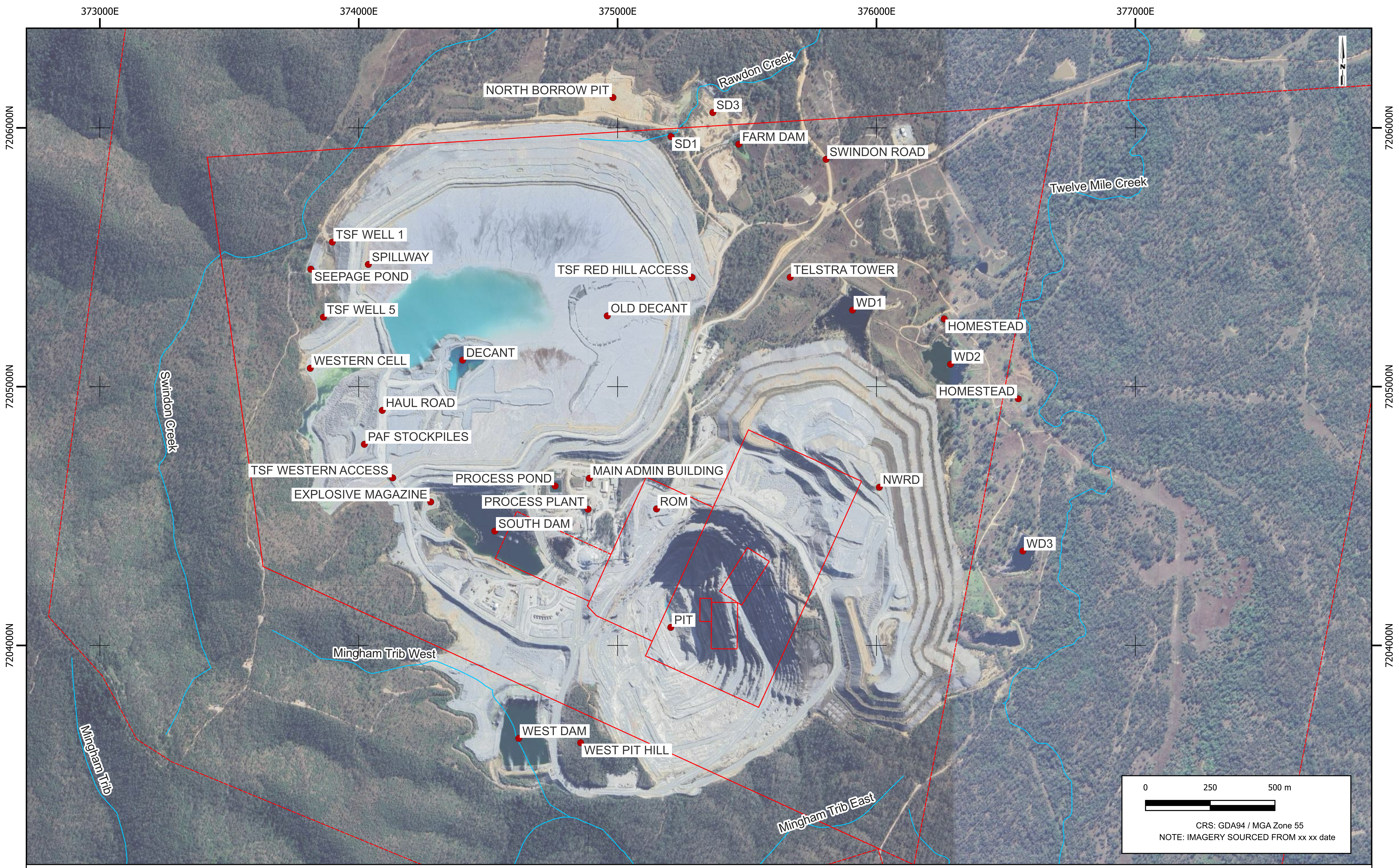
FIGURES



LEGEND

- Site Features
- Tributaries
- Mining Lease

MOUNT RAWDON OPERATION

FIGURE 001
KEY SITE FEATURES

FIGURE 001

ATC WILLIAMS

111359-100

DATE: 2024-09-13

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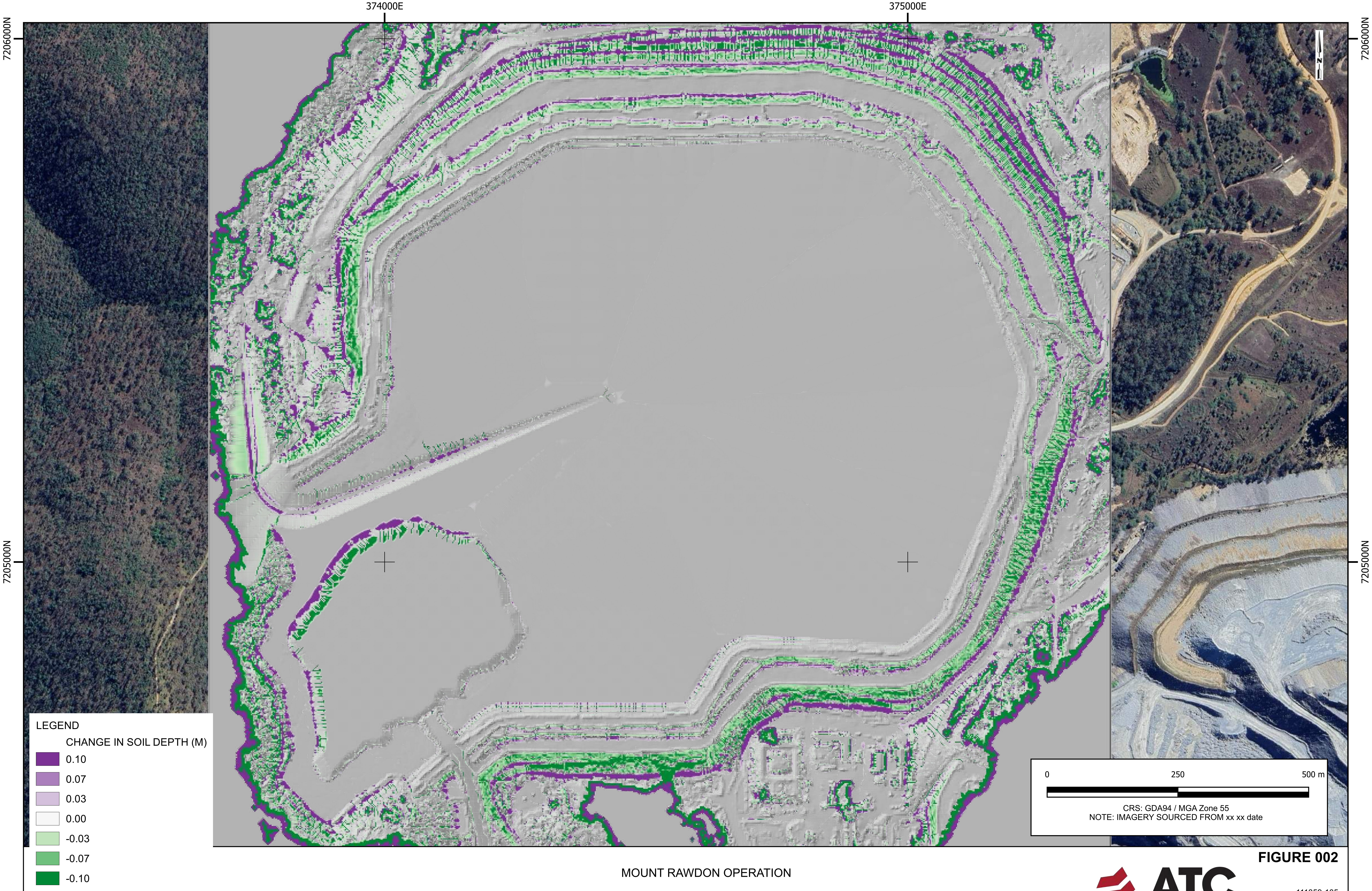

MOUNT RAWDON OPERATION

FIGURE 002
LEM RESULTS - 50 YEARS

FIGURE 002

ATC WILLIAMS

111359-105

DATE: 2024-12-02

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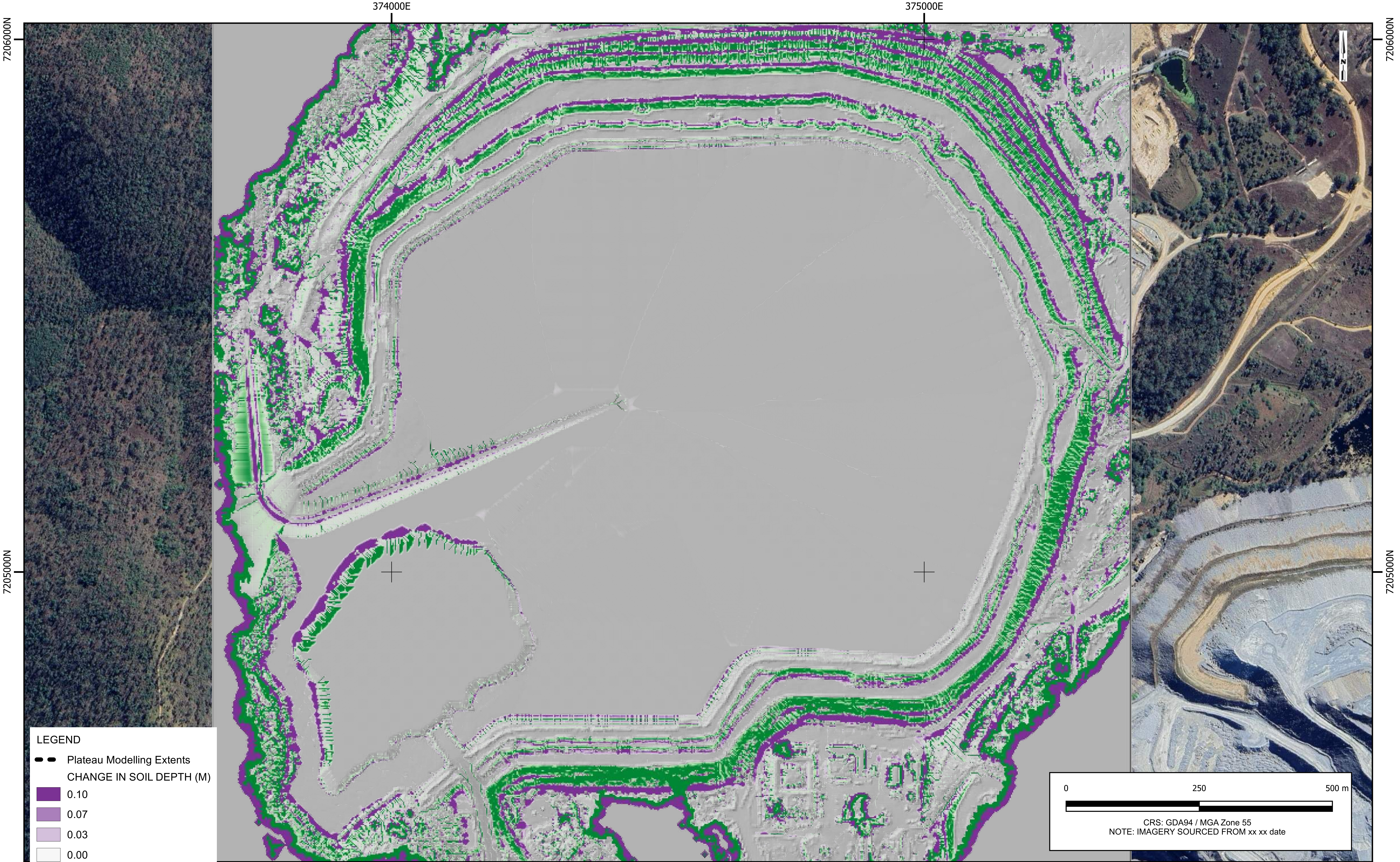

MOUNT RAWDON OPERATION

FIGURE 003
LEM RESULTS - 100 YEARS

FIGURE 003

ATC WILLIAMS

111359-105

DATE: 2024-12-02

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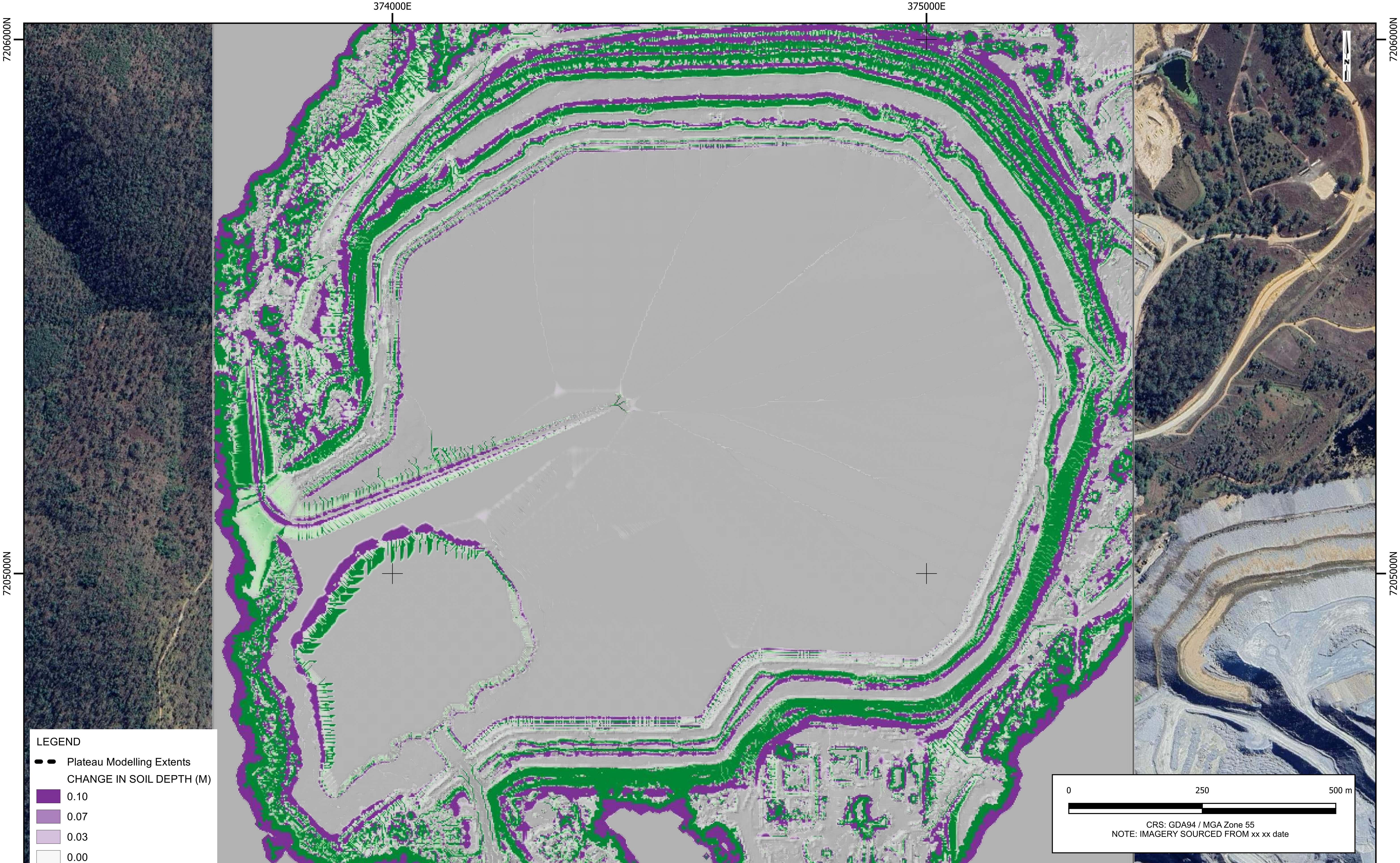

MOUNT RAWDON OPERATION

FIGURE 004
LEM RESULTS - 200 YEARS

FIGURE 004

ATC WILLIAMS

111359-105

DATE: 2024-12-02

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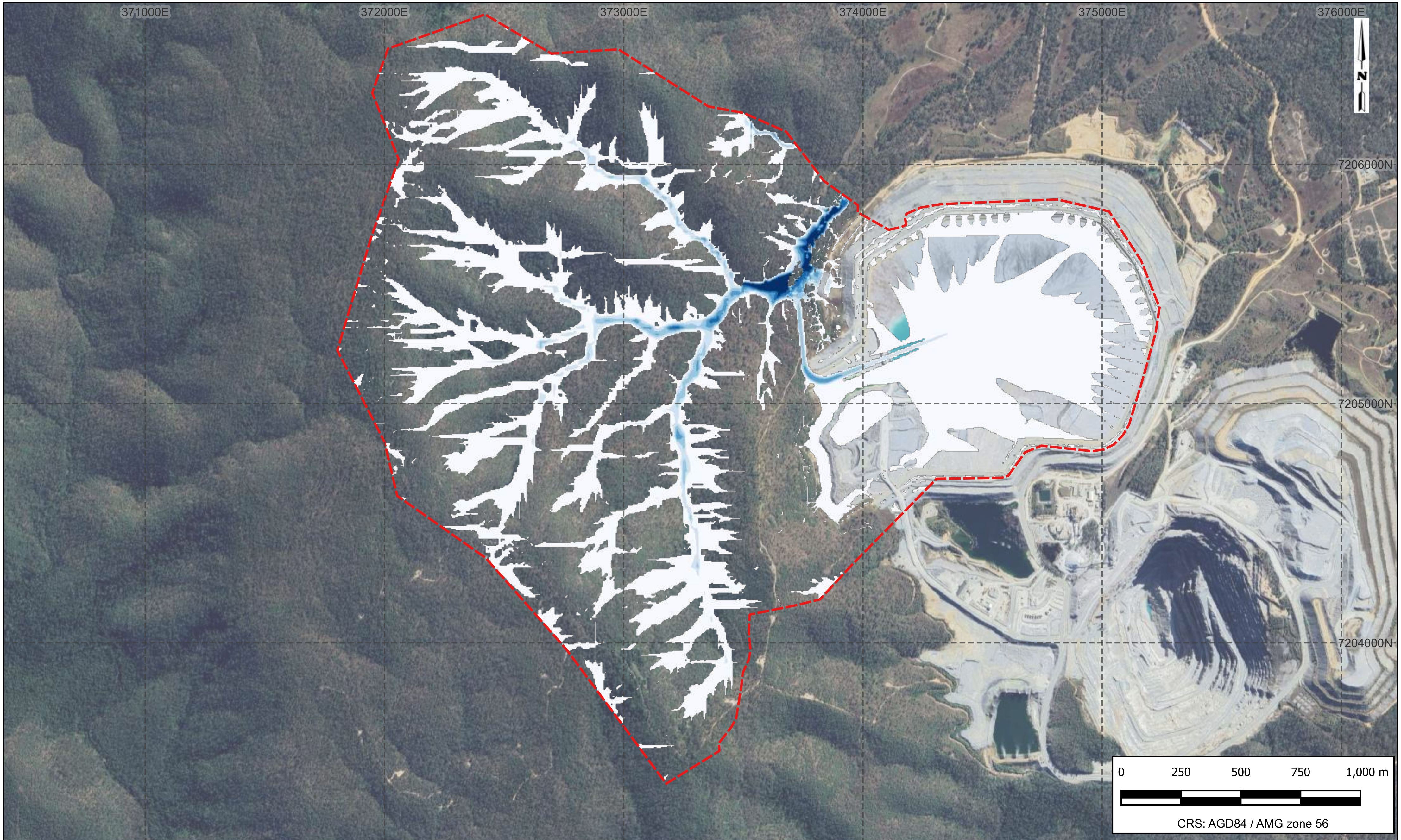


LEGEND

MODEL DOMAIN

MAXIMUM DEPTH (m)

<= 1.0m

1.0 - 2.0m

2.0 - 3.0m

3.0 - 4.0m

4.0 - 5.0m

> 5.0m

MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

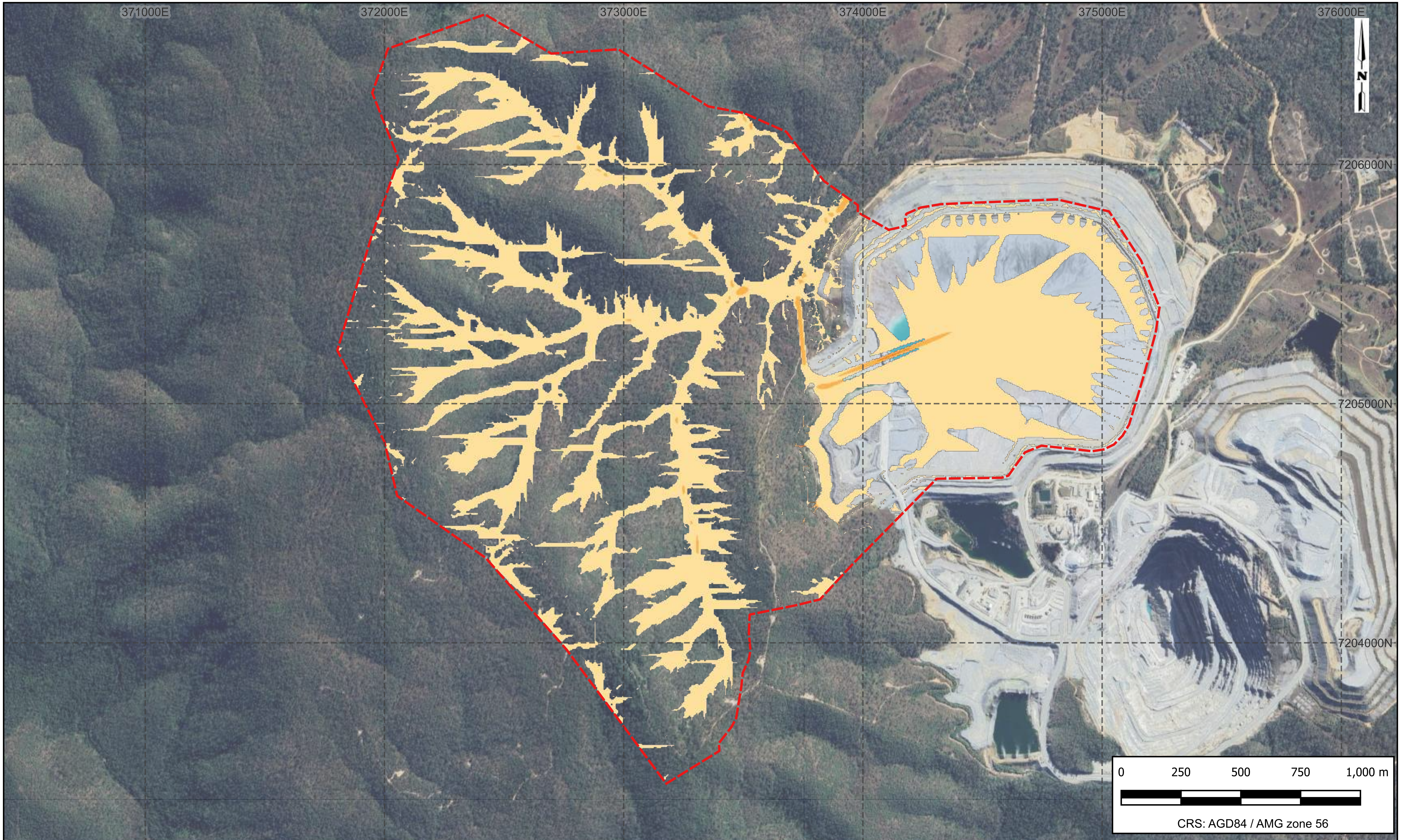
1% AEP
MAXIMUM FLOOD DEPTH

ATC WILLIAMS

FIGURE 001

111359-105

DATE: 2024-12-04



LEGEND

MODEL DOMAIN

MAXIMUM VELOCITY (m/s)

<= 1.0m/s

1.0 - 2.0m/s

2.0 - 3.0m/s

3.0 - 4.0m/s

4.0 - 5.0m/s

> 5.0m/s

MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

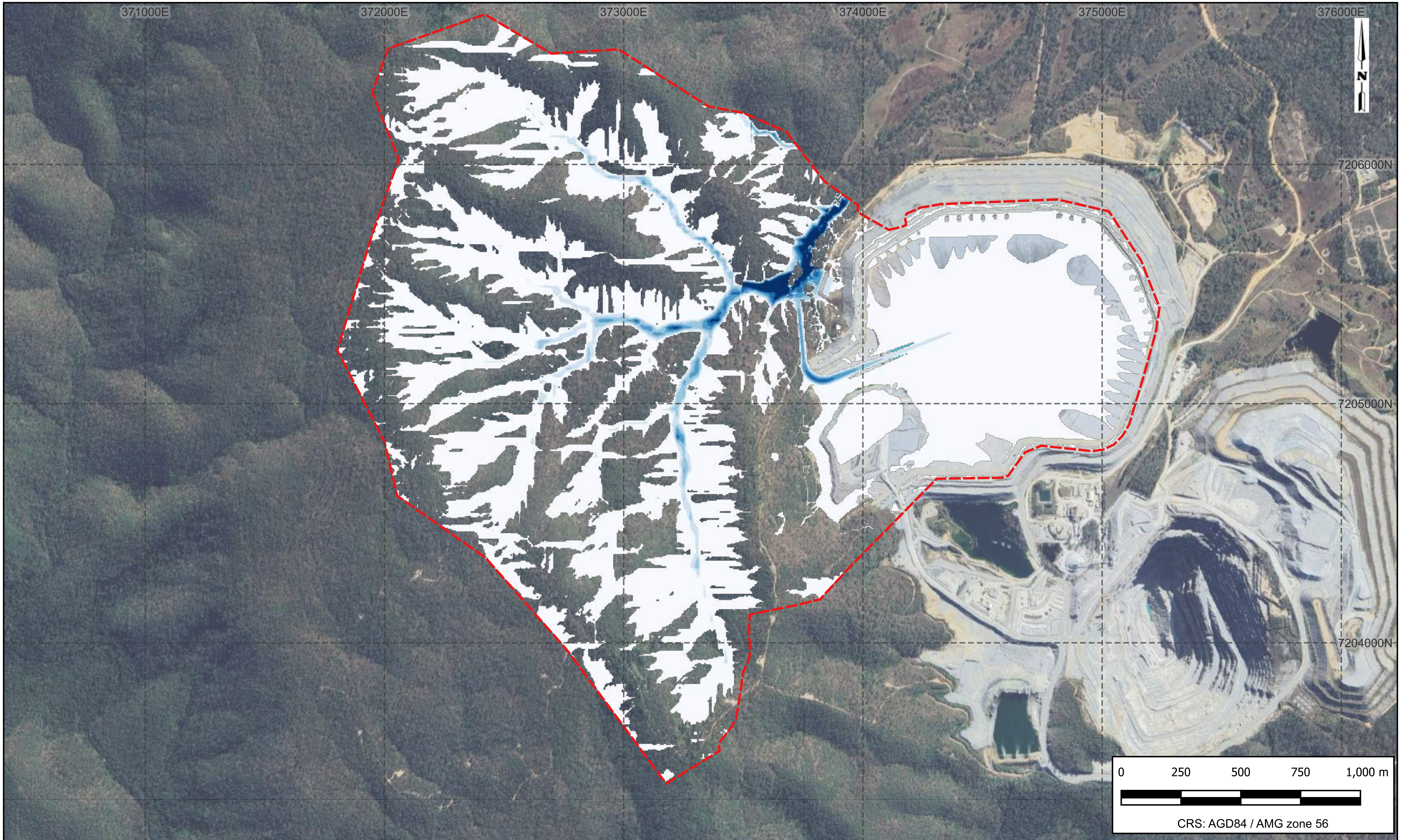
1% AEP
MAXIMUM FLOOD VELOCITY

ATC WILLIAMS

FIGURE 002

111359-105

DATE: 2024-12-04



LEGEND

MODEL DOMAIN

MAXIMUM DEPTH (m)

<= 1.0m

1.0 - 2.0m

2.0 - 3.0m

3.0 - 4.0m

4.0 - 5.0m

> 5.0m

MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

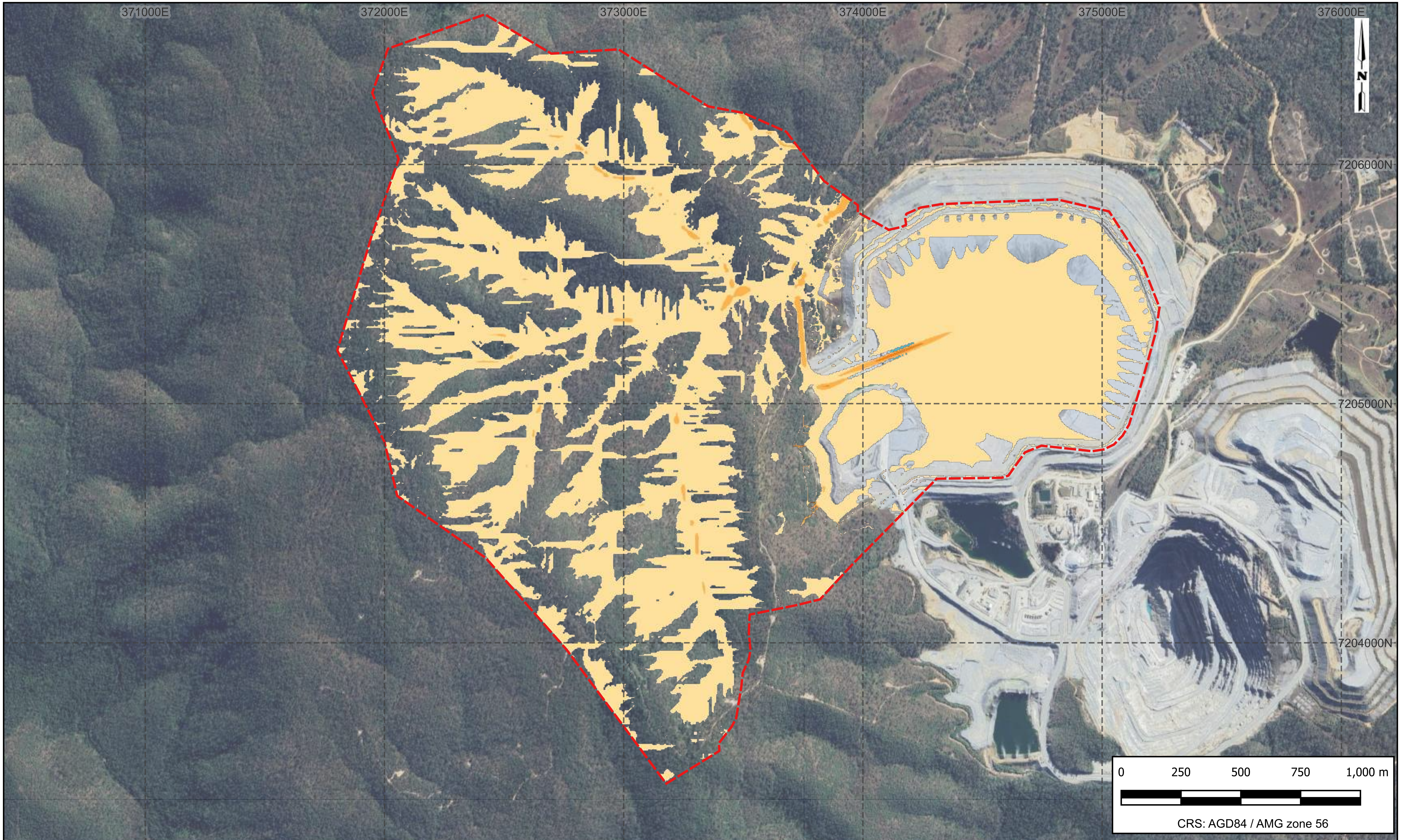
1% AEP
MAXIMUM FLOOD DEPTH

ATC WILLIAMS

FIGURE 001

111359-105

DATE: 2024-12-04



LEGEND

MODEL DOMAIN

MAXIMUM VELOCITY (m/s)

- <= 1.0m/s
- 1.0 - 2.0m/s
- 2.0 - 3.0m/s
- 3.0 - 4.0m/s
- 4.0 - 5.0m/s
- > 5.0m/s

MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

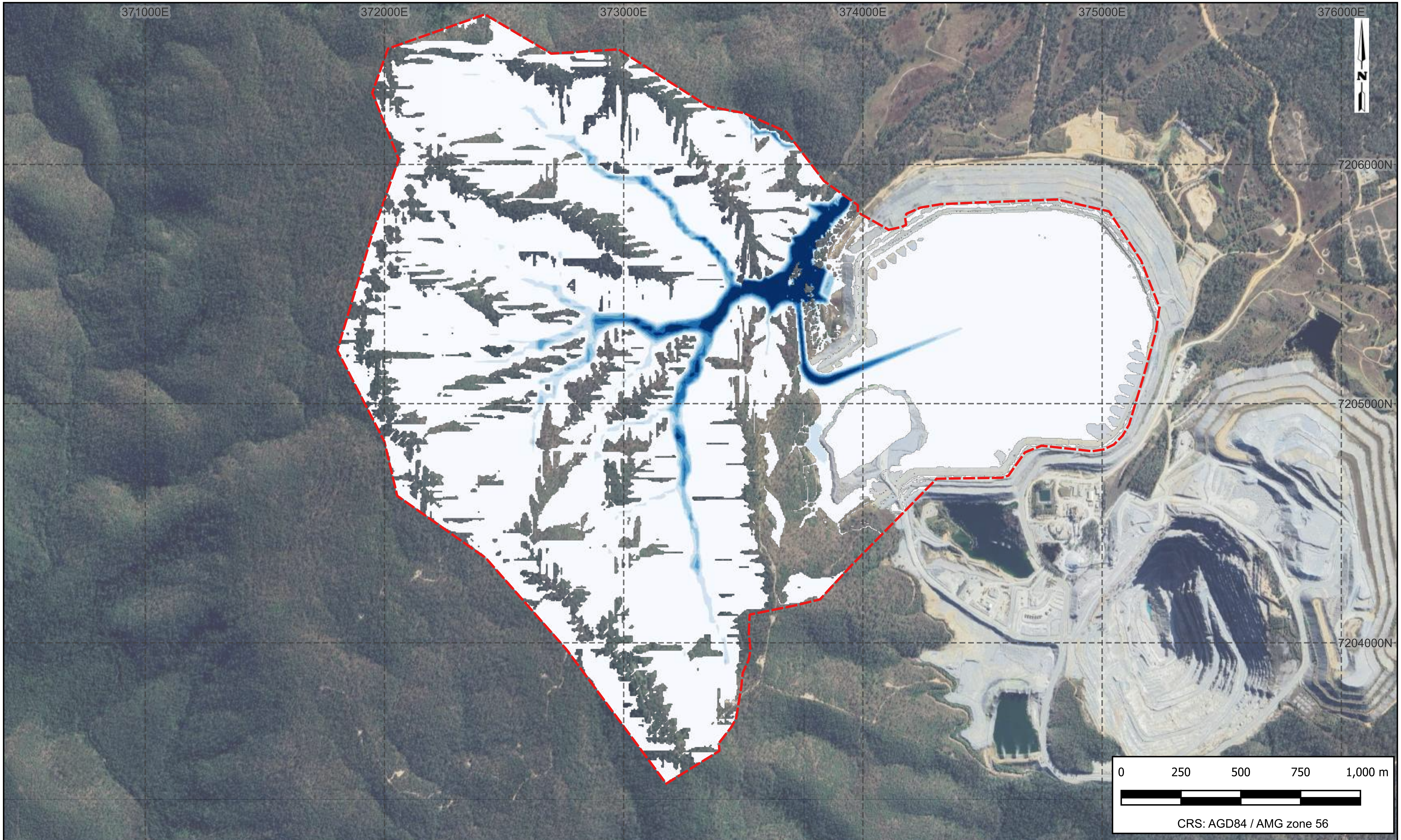
1% AEP
MAXIMUM FLOOD VELOCITY

ATC WILLIAMS

FIGURE 002

111359-105

DATE: 2024-12-04



LEGEND

MODEL DOMAIN

MAXIMUM DEPTH (m)

<= 1.0m

1.0 - 2.0m

2.0 - 3.0m

3.0 - 4.0m

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MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

1% AEP
MAXIMUM FLOOD DEPTH

ATC WILLIAMS

FIGURE 001

111359-105

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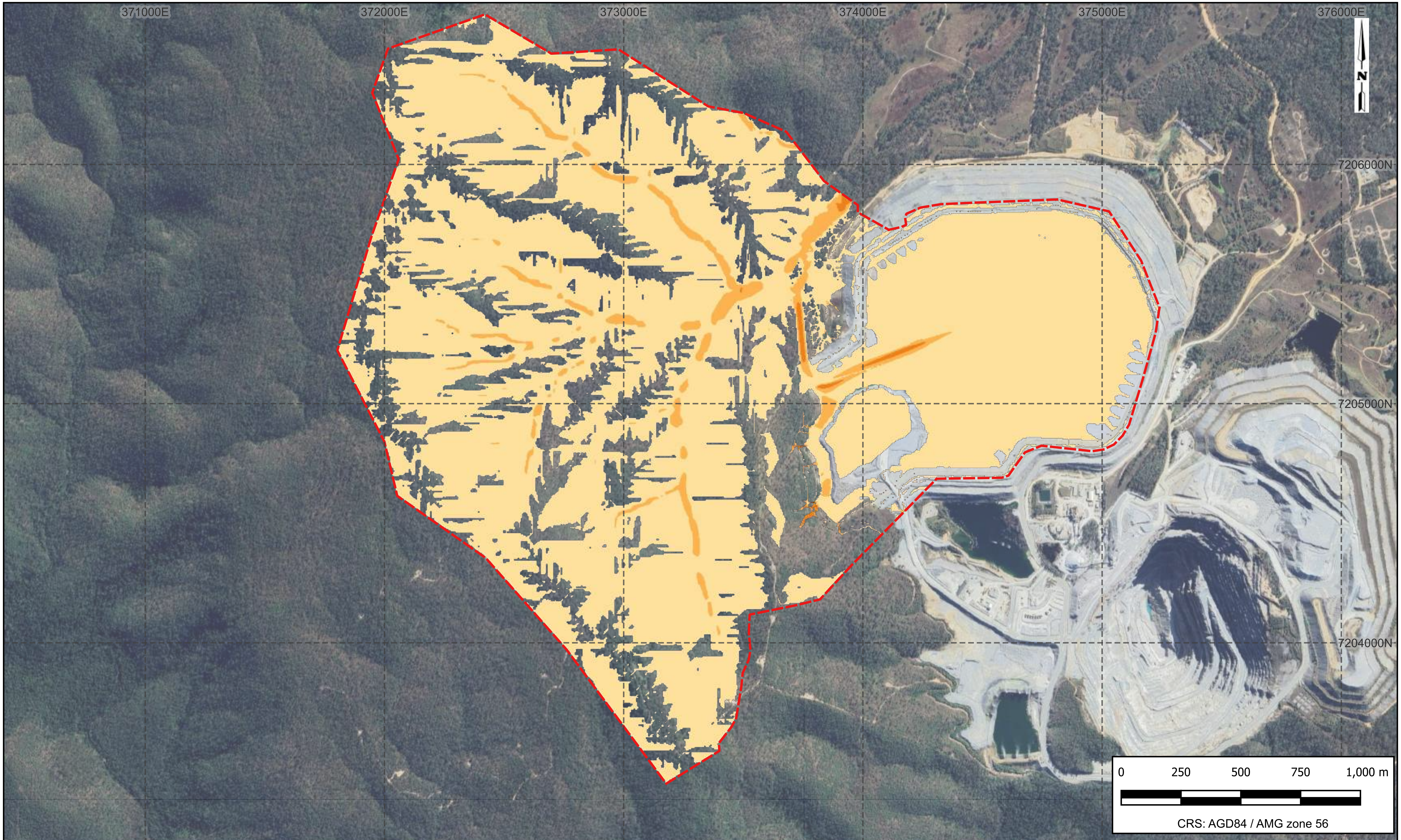

LEGEND

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- 1.0 - 2.0m/s
- 2.0 - 3.0m/s
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MT RAWDON GOLD MINE
FINAL LANDFORM ASSESS

1% AEP
MAXIMUM FLOOD VELOCITY

ATC WILLIAMS

FIGURE 002

111359-105

DATE: 2024-12-04