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Strategic Project Solutions

Mavis South Underground Extension

*Surface Water Assessment –
Supporting Information*

Final - Rev 0

EXECUTIVE SUMMARY

This report documents the high-level surface water assessment to investigate the potential impact to the water management at Millennium Coal Mine (MCM) because of the extension of Mavis underground extension. This proposed extension builds upon the existing approved Mavis underground in a southerly direction by an additional four panels (106 to 109) and associated extension of the 100 mains.

The impact assessment has focused on the potential impacts to surface water with key outcomes are summarised as follows:

- There are no anticipated changes to the configuration and operation of the existing surface water management infrastructure at MCM because of the Mavis South underground extension.
- Minor subsidence is anticipated above the surface of the proposed Mavis South underground extension (< 50 mm), which is not anticipated the impact the existing surface water flow paths. Key locations for continued subsidence monitoring have been recommended.
- The proposed Mavis South underground extension is a continuation of existing mining operations that extend the life of mine but does not inherently change the water balance for the operation, with modelling showing no increased risk of overflow (i.e., capacity within the existing mine-affected water storages to contain the forecasted inventories under all climatic conditions).

This executive summary is an overview of the contents of this report and omits information necessary for its proper application. Any party who relies on this report must read the full report.

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CLARIFICATIONS REGARDING THIS REPORT

This report is an instrument of service of KCB Australia Pty Ltd (KCB). The report has been prepared for the exclusive use of MetRes Pty Ltd (Client) for the specific application to the Mavis South underground extension at Millennium Coal Mine. It may not be relied upon by any other party without KCB's written consent.

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2. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
3. The report is based on information provided to KCB by the Client or by other parties on behalf of the Client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
4. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.
5. This report is electronically signed and sealed, and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.

1 INTRODUCTION

Millennium Coal Mine (MCM) is an open cut and underground coal mine in Queensland's Bowen Basin, approximately 140 km south-west of Mackay and 22 km west of Moranbah. The mine includes two main mining areas, across six mining leases (MLs) and one mining development leased (MDL):

- Mavis Downs mining area:
 - ◆ ML70401 North Poitrel;
 - ◆ ML70457 Mavis Downs;
 - ◆ ML70483 Mavis Downs Southern Triangle Extension;
 - ◆ ML70485 New Chum Creek; and
 - ◆ MDL3046 Carborough Downs Extension.
- Millennium mining area:
 - ◆ ML70313 Millennium West; and
 - ◆ ML70344 Mountain Pit.

A locality plan of MCM is presented in Figure 1.1.

MCM has been operational since 2005 and produces low ash coking coal and pulverised coal injection (PCI) for export. Run-of-mine (ROM) coal is extracted from three MLs: ML70313 Millennium West, ML70401 North Poitrel and ML70457 Mavis Downs and is washed in a coal handling and preparation plant (CHPP) on an adjoining infrastructure lease, ML70312 Millennium East.

MCM is owned by MetRes Pty Ltd, a joint venture between Stanmore Resources and M Resources. This joint venture and the operation of MCM is managed by M Mining Pty Ltd (M Mining) in accordance with environmental authority (EA) EPML00819213 – Millennium Coal Mine. The latest updated of this EA was issued by the Department of Environment and Science (DES) on 12 June 2023 (Queensland Government 2023).

In 2022, MetRes and MCM received approval to commence underground mining within the existing Mavis E Pit in a north-easterly direction mining the Leichhardt coal seam (i.e., Mavis underground). Underground bord and pillar mining commenced in June 2022 and is expected to continue through to June 2024.

As part of ongoing developments in the Mavis mining area, MetRes and MCM are proposing to further extend the Mavis underground mining operations in a south-easterly direction (i.e., Mavis South underground extension).

To do this, MetRes require an amendment to MCM's EA. To support this EA amendment process, KCB Australia Pty Ltd (KCB) has been engaged by MetRes to undertake a high-level surface water assessment for the Mavis South underground extension.

This high-level surface water assessment comprises three main parts:

1. Review project data relevant to the Mavis South underground extension including legislative and regulatory requirements.
2. Describe the existing water management system at MCM and the surface water drainage within the vicinity of the Mavis South underground extension.
3. Assess the potential impacts to the water management at MCM because of the Mavis South underground extension.

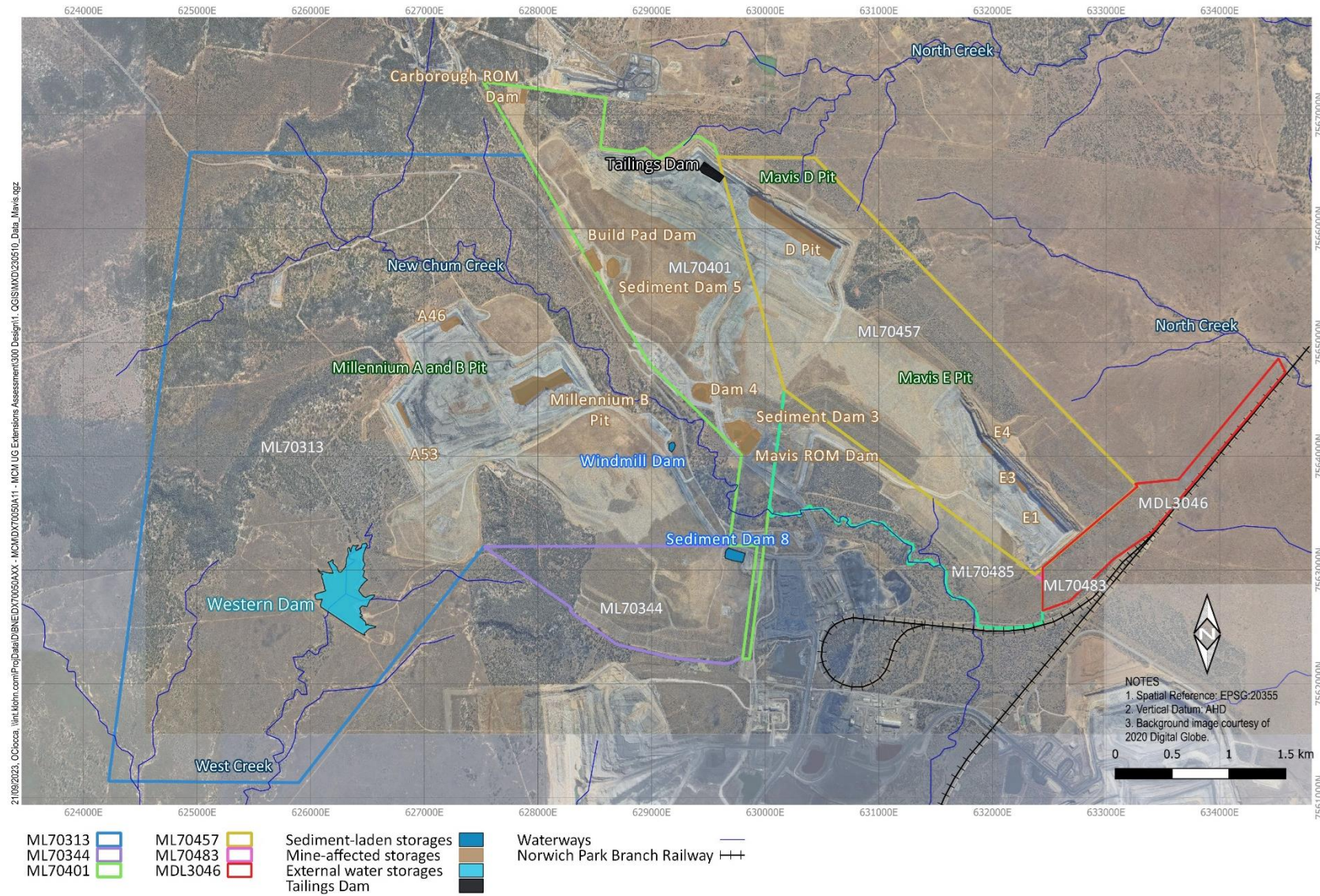


Figure 1.1 MCM locality plan

2 MAVIS SOUTH UNDERGROUND EXTENSION

2.1 Overview

In 2022, MetRes and MCM received approval to commence underground mining within the existing Mavis E Pit in a north-easterly direction mining the Leichhardt coal seam (i.e., Mavis underground). Underground bord and pillar mining commenced in June 2022 and is expected to continue through to June 2024.

MetRes and MCM propose to further extend the Mavis underground mining operations in a south-easterly direction (i.e., Mavis South underground extension). This proposed extension is expected to be a continuation of the Mavis underground with mining continuing in the 100 mains with four additional panels (i.e., panels 106 to 109) and covers 38.1 ha in MDL3046. The mining method will be bord and pillar operation, as used for the Mavis underground. Mining in the Mavis South underground extension is planned to commence in July 2024 and continue for 11-months until the end of May 2025.

Figure 2.1 shows details of the proposed Mavis South underground extension over the 11-month mining period and includes:

- proposed Mavis South underground panels (extension of the 100 mains and four new panels 106 to 109) (provided by MetRes (MetRes 2023); and
- access to Mavis South underground extension via the existing haul road into Mavis E Pit.



Figure 2.1 Proposed Mavis South underground extension area (106, 107, 108 and 109)

3 LEGISLATIVE AND REGULATORY REQUIREMENTS

Legislative and regulatory requirements relating to the proposed Mavis South underground extension area are summarised in Table 3.1.

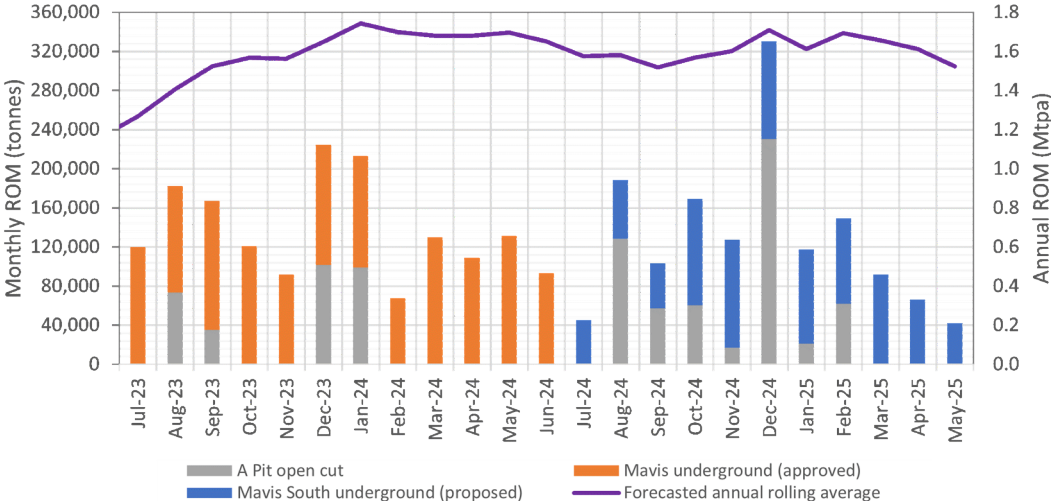
Table 3.1 Legislative and regulatory requirements

Legislation / Regulation	Administering Authority	Description
Commonwealth		
Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Department of Climate Change, Energy, the Environment and Water (DCCEEW)	<ul style="list-style-type: none"> ▪ EPBC Act is designed to protect national environmental assets, known as Matters of National Environmental Significance (MNES). ▪ EPBC Act protected matters report for the proposed Mavis South underground extension identified (Department of Climate Change, Energy, the Environment and Water 2023): <ul style="list-style-type: none"> ♦ no world heritage properties or national heritage places; ♦ no wetlands of international importance (Ramsar) or Great Barrier Reef marine parks; ♦ three threatened ecological communities; ♦ 24 threatened species; ♦ 13 listed marine species; and ♦ eight migratory species. ▪ MCM operates under conditions relating to the EPBC 2009/4981. The proposed Mavis South underground extension is outside of the approved area of disturbance (refer to Figure 3) and existing EPBC Act approval. ▪ The EPBC Act requires the potential impacts from the proposed Mavis South underground extension to be assessed. The first stage of this assessment is a self-assessment to determine if the proposed extension is likely to have significant impact on MNES. ▪ An EPBC Act self-assessment has been conducted with reference to the significant impact criteria provided in <i>Significant Impact Guidelines 1.1 – Matters of National Environmental Significance 2013</i> and <i>Significant Impact Guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments – Impacts on Water Resources 2022</i>. Refer to EPBC Act Self-Assessment for Water MNES report (KCB 2023) for further details with summary of potential impact tables presented in Appendix I. ▪ The EPBC Act self-assessment report concluded that, <ul style="list-style-type: none"> ♦ no additional MNES are expected to be triggered by the proposed underground extension and the current EPBC approval conditions and methods of assessment are expected to remain applicable (significant impact criteria 1.1); and ♦ no changes to the hydrological and water quality characteristics of the surface waters are expected (significant impact criteria 1.3).

Legislation / Regulation	Administering Authority	Description
State		
Environmental Protection Act 1994 (EP Act)	DES	<ul style="list-style-type: none"> ▪ EP Act is the primary legislation regulating environmental protection in Queensland. ▪ <i>Environmental Protection (Water and Wetland Biodiversity) Policy 2019</i> (EPP) is designed to achieve objectives set out by the EP Act and applies to Queensland waters. It provides a framework to protect and/or enhance the suitability of Queensland waters for various beneficial uses by: <ul style="list-style-type: none"> ♦ identifying environmental values (EVs) for the receiving waters; and ♦ determining water quality guidelines (WQGs) and water quality objectives (WQOs) to enhance and protect the EVs; ▪ As detailed in Figure 3.1, the surface area above the proposed Mavis South underground extension lies in the headwaters of New Chum and North Creeks. The eastern half of the surface area above the proposed Mavis South underground extension drains to the south-east and is in the North Creek catchment, with the western half draining to the south-west and is in New Chum Creek catchment. Both New Chum and North Creeks are ephemeral with flows occurring between December and March (summer months) and long dry spells interspersed with flow events. ▪ New Chum and North Creeks are scheduled under the EPP as surface waters of the Isaac River Sub-basin of the Fitzroy Basin water plan (WQ1301), with both creeks and associated tributaries part of the Isaac northern tributaries. There are no high ecological value (HEV) aquatic ecosystems in the area. ▪ Legislated EVs, identified under Schedule 1 of EPP, for these surface waters are: aquatic ecosystems; irrigation; farm supply/use; stock water; primary recreation; drinking water; industrial use; and cultural and spiritual values. Additional EVs for human consumer, secondary recreation, and visual recreation apply to the waterways only. ▪ The indicators and WQGs relevant to the EVs are listed in the Department of Environment and Heritage Protection (DEHP) Queensland Water Quality (QWQ) Guidelines (2009) and ANZECC Guidelines (2000). The conditions of waterways in the vicinity of A Pit are classified as Level 2: moderately disturbed ecosystems under the QWQ Guidelines. ▪ The downstream receiving waters do not include potable or irrigation water supply systems or National or State Parks within 100 km of the site. ▪ The downstream users of the waterways that flow through the MCM are predominantly graziers and other mining operations. ▪ Default trigger values for aquatic ecosystem protection at MCM and surrounds are shown in site's water management plan (WMP). An assessment of the background water quality in the MCM receiving waters against the trigger values is provided within the receiving environment monitoring plan (REMP).

Legislation / Regulation	Administering Authority	Description
Queensland Water Act 2000 (Water Act)	Queensland Government	<ul style="list-style-type: none"> ▪ Water Act is the primary legislation regulating surface water protection in Queensland and it aims to advance sustainable management and efficient use of water resources by established system for planning and allocation, and use of water. ▪ Water Act is enacted under the framework of catchment specific Water Resource Plans (WRPs) with the MCM MLs and MDL included in the Water Plan (Fitzroy Basin) 2011. ▪ Water Act includes criteria for determining water courses that require authorisation to interfere with the flow of water and drainage features that may require authorisation to interfere with overland flow. As defined by the Water Act: <ul style="list-style-type: none"> ♦ there are no declared water courses or drainage features in the MCM MLs or MDLs; ♦ Isaac River and downstream extents of New Chum Creek (both to the south of MCM) are declared water courses; and ♦ North Creek (to the east of MCM) is a declared drainage feature.
Mineral Resources Act 1999	Department of Resources	<ul style="list-style-type: none"> ▪ Activities associated with the proposed Mavis South underground extension are within approved MDLs, specifically MDL3046 Carborough Downs Extension.
Aboriginal Cultural Heritage Act 2003	Department of Aboriginal and Torres Strait Islander Partnerships	<ul style="list-style-type: none"> ▪ The traditional owners of MCM are the Barada Barna People and MCM operates under an approved Cultural Heritage Management Plan (CHMP) (i.e., CLH011011 for Millennium Mine and expansion project) approved by the Barada Barna People. ▪ Culturally significant surface areas close to the proposed Mavis South Pit underground extension include Red Hill which has not yet been approved for disturbance activities. ▪ Cultural heritage approved areas (i.e., areas where disturbance has been reviewed and approved by the Barada Barna people) include the Mavis E Pit open cut and highwall areas which extend to the north-east and south-east boundaries of ML70457. ▪ The proposed Mavis South underground extension, is not expected to impact the surface above the underground operation and as such, it is expected that the current CHMP conditions and methods of assessment are expected to remain applicable to MDL3046.
EP Act 1994 Nature Conservation Act 1992 Vegetation Management Act 1999	DES DES Department of Resources	<ul style="list-style-type: none"> ▪ Matters of State Environmental Significance (MSES) are features of biodiversity interest to the Queensland Government as defined under the State Planning Policy (SPP) and Environmental Offsets Regulation 2014 (Offset Regulation). ▪ MSES includes certain EVs that are protected under Queensland legislation including: Nature Conservation Act 1992; Marine Parks Act 2004; Fisheries Act 2004; EP Act 1994; Regional Interests Planning Act 2014; Vegetation Management Act 1999; and Environmental Offsets Act 2014. ▪ MSES mapping of the surface area of MDL3046 (encompassing the surface area above the proposed Mavis South underground extension) is presented in Figure 5.1 and includes: <ul style="list-style-type: none"> ♦ no conservation areas (marine parks, fish habitat, protected areas); ♦ no HEV, high ecological significance (HES) or general ecological significance (GES) wetlands or watercourse; ♦ no wildlife habitat (endangered or vulnerable species, special least concern animals or koalas); and

Legislation / Regulation	Administering Authority	Description																										
		<ul style="list-style-type: none"> ◆ no regulated vegetation (defined watercourse, category B or C endangered or of concern, category R GBR riverine and essential habitat); and ◆ no legally secured offsets. 																										
Environmental Authority	DES	<ul style="list-style-type: none"> ■ As detailed in Section 1, the EA for Millennium Coal Mine (i.e., EPML00819213 – Millennium Coal Mine) was issued by DES on 12 June 2023 (Queensland Government 2023). ■ Condition A2 states that ROM coal extracted and received from third parties must not be more than 5.5 Mtpa. Estimates of monthly ROM coal to be extracted from the proposed Mavis South underground extension are detailed below with the forecasted ROM coal from the proposed underground extension totalling just over 853,000 tonnes over the 11-month period from July 2024 to end of May 2025. <table border="1" data-bbox="680 612 1227 1066"> <thead> <tr> <th>Month</th> <th>ROM (tonnes/month)</th> </tr> </thead> <tbody> <tr><td>July 2024</td><td>45,000</td></tr> <tr><td>August 2024</td><td>60,000</td></tr> <tr><td>September 2024</td><td>46,289</td></tr> <tr><td>October 2024</td><td>109,302</td></tr> <tr><td>November 2024</td><td>110,187</td></tr> <tr><td>December 2024</td><td>100,000</td></tr> <tr><td>January 2025</td><td>96,617</td></tr> <tr><td>February 2025</td><td>87,000</td></tr> <tr><td>March 2025</td><td>91,499</td></tr> <tr><td>April 2025</td><td>65,772</td></tr> <tr><td>May 2025</td><td>41,899</td></tr> <tr><td>TOTAL (tonnes)</td><td>853,565</td></tr> </tbody> </table> ■ In addition to the ROM coal extracted from the proposed Mavis South underground extension, concurrent open cut mining is expected to be undertaken in Millennium A Pit North and South (i.e., between August 2024 to February 2025). ■ Forecasted monthly ROM coal for MCM from August 2023 to May 2025 are presented below and in Appendix II. This includes the approved Mavis underground tonnages from August 2023 up to July 2024 (onset of the proposed Mavis South underground extension) and any concurrent A Pit open cut mining (based on the A Pit south priority). 	Month	ROM (tonnes/month)	July 2024	45,000	August 2024	60,000	September 2024	46,289	October 2024	109,302	November 2024	110,187	December 2024	100,000	January 2025	96,617	February 2025	87,000	March 2025	91,499	April 2025	65,772	May 2025	41,899	TOTAL (tonnes)	853,565
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Legislation / Regulation	Administering Authority	Description
Environmental Authority (continued)	DES	 <ul style="list-style-type: none"> ■ Forecasted annual rolling average of the total ROM coal tonnes does not exceed 5.5 Mtpa (EA condition A2), even with the Mavis South underground extension (based on current predictions for the A Pit open cut mining). This extraction rate does not include ROM coal received from external third parties (i.e., Vitrinite and Isaac Downs mines as part of EA condition A14). This is expected to cease on 31 July 2024, with only one month overlap with the proposed Mavis South underground extension. ■ Surface water related conditions are listed in Schedule C of the EA and include: <ul style="list-style-type: none"> ◆ C1 - C15: mine-affected water release criteria and contaminant trigger levels; ◆ C16 - C17: mine -affected water storage monitoring and contaminant limits; ◆ C18 - C19: receiving environment monitoring and contaminant trigger levels; ◆ C20 - C23: development and annual review of the site’s REMP; ◆ C24: mine-affected water reuse; ◆ C25 - C26: water general (relating to water quality); ◆ C27: annual water monitoring reporting; ◆ C28: interference with waterways; ◆ C29 - C34: development and annual review of the site’s WMP; ◆ C35 – C36: saline and acid rock drainage; and ◆ C37 - C38: stormwater and water sediment controls.

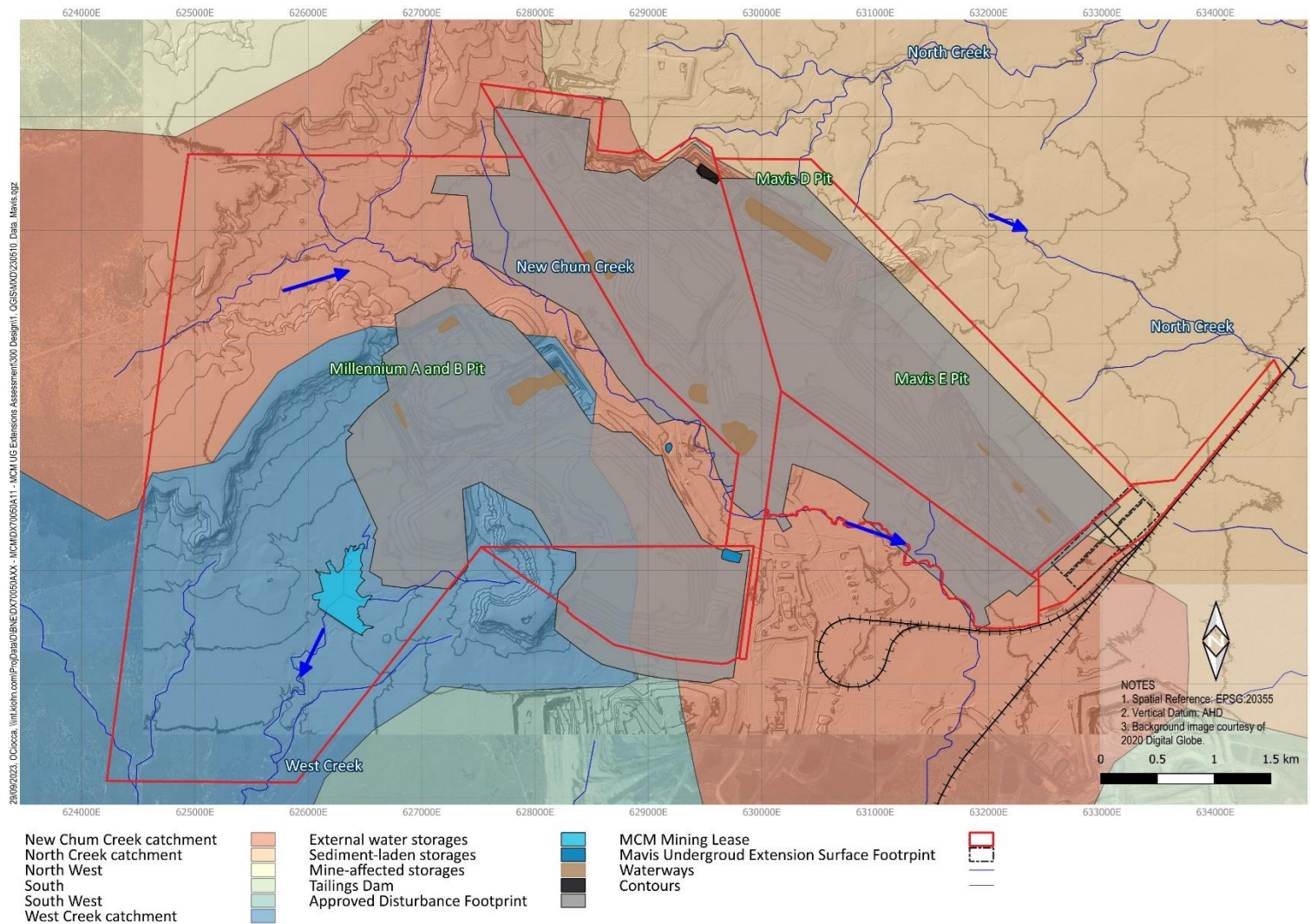


Figure 3.1 Regional and local waterway catchments

4 WATER MANAGEMENT

4.1 Objectives and principles

MCM has an established water management system operated in accordance with the site’s WMP and manages the five types of water at MCM, including external water, mine-affected water, groundwater, sediment-laden water, and unimpacted. Definitions of each water type along with the main objectives of the water management system specific to each water type are presented in Table 4.1.

Table 4.1 MCM water types and management objectives

Water type	Definition	Management objectives
External	<ul style="list-style-type: none"> ▪ Raw and potable water sourced from outside the mining operation. 	<ul style="list-style-type: none"> ▪ Allocation and associated infrastructure meet the site demands under low rainfall conditions.
Groundwater	<ul style="list-style-type: none"> ▪ Water that collects or flows beneath the earth’s surface, filling the porous spaces in soil, sediment, and rocks. ▪ Groundwater enters the mine workings through open cut mining pits and underground operations 	<ul style="list-style-type: none"> ▪ Understand, manage, and reduce the impact of the water management system on the regional groundwater system
Mine-affected	<ul style="list-style-type: none"> ▪ Water of a lesser quality than other water types and is available for reuse on site. Mine-affected water is retained and stored on site and managed in accordance with the site’s EA. Mine-affected water includes: <ul style="list-style-type: none"> ◆ pit water, tailings dam water, processing plant water; ◆ rainfall/runoff from industrial and coal stockpile areas; ◆ rainfall/runoff that reports to in-pit areas; ◆ rainfall/runoff that has had contact with mining activities and is not suitable to manage only through erosion and sediment control (ESC) measures; ◆ groundwater seepage that reports to in-pit and underground operations; and ◆ a mix of mine-affected water and other water. 	<ul style="list-style-type: none"> ▪ Reduce uncontrolled discharges in wet periods and have water supplies for site during dry periods.
Sediment-laden	<ul style="list-style-type: none"> ▪ Rainfall/runoff from disturbed catchments that, if managed in accordance with the site’s erosion and sediment control plan (ESCP), can discharge from site. ▪ This water typically does not contain contaminants (other than suspended sediment) at levels higher than the receiving environment surface water. ▪ Sediment-laden water would typically include runoff from recently rehabilitated spoil (less than five years) and pre-strip areas. 	<ul style="list-style-type: none"> ▪ Maintain water quality leaving the ESC structures to a quality as close to background levels as reasonably possible.
Unimpacted	<ul style="list-style-type: none"> ▪ Rainfall/runoff from catchment areas undisturbed by mining activities and stable rehabilitated spoil areas (greater than five years) which is diverted around the mining activities to reduce the impact on downstream water quality caused by mining operations. 	<ul style="list-style-type: none"> ▪ Separate clean upstream waters from the mine-affected and sediment-laden water systems to allow them to pass uninterrupted down the catchment.

In accordance with the MCM WMP, the general principles to manage water at MCM (including the proposed Mavis South underground extension) are:

1. The separation of mine-affected water, sediment-laden water and unimpacted water.
2. Collect and contain on site mine-affected water in dedicated mine-affected water storages with mine-affected water storages used as the primary water source for coal processing at Red Mountain Infrastructure (RMI) CHPP and for dust suppression.
3. Collect and treat surface water runoff in a manner in accordance with the site ESCP.
4. Use onsite water to reduce the need for importing external water.

4.2 Water management system

A schematic of the existing water management system (which manages external, mine-affected and sediment-laden water flow around MCM) is presented in Figure 4.1. Locations of the existing external, mine-affected and sediment-laden water storages in relation to the proposed Mavis South underground extension are presented in Figure 3.1.

The water balance model (WBM) is a fundamental management tool for the MCM water management system. MCM maintains a WBM which was designed and configured to simulate the operation of the MCM water management system (including external, sediment-laden and mine-affected water storages as shown in Figure 4.1) and is referred to herein as the MCM WBM. A detailed summary of the water management system and associated WBM operational guidelines is presented in Appendix III.

The MCM WBM provides the mine with a flexible, predictive tool to analyse current and future water requirements, develop water management procedures and manage water storages.

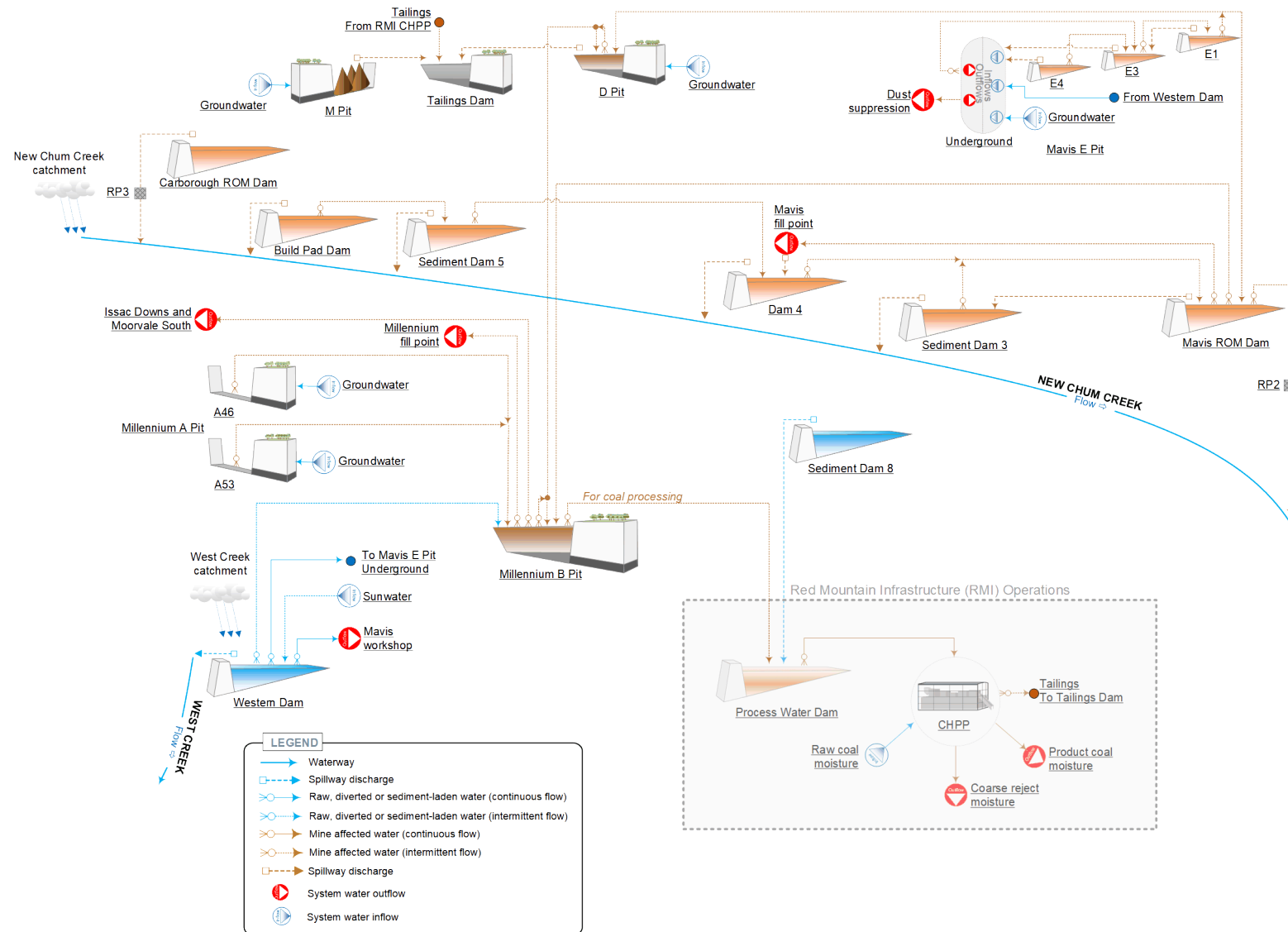


Figure 4.1 MCM WBM schematic

5 IMPACT ASSESSMENT

5.1 Overview

As detailed in Section 2.1, the proposed Mavis South underground extension builds upon the existing underground mining operations within the Mavis E Pit. Water requirements and potential impacts are summarised in Table 5.1.

Table 5.1 Proposed Mavis South underground extension potential water impacts

Water type	Requirements	Information or Impacts
External	<ul style="list-style-type: none"> ▪ Raw water supply to the underground operation for cleaning, dust management, potable water conversion and production equipment, will need to be extended to the end of May 2025. ▪ MetRes advised that the same equipment will be used for the Mavis South underground extension as used in the Mavis underground operations. As such, the raw water demands for the underground remain the same as the approved Mavis underground operations with the usage extended up to the end of May 2025. ▪ Refer to Appendix III for underground raw water usage. 	<ul style="list-style-type: none"> ▪ WBM has been updated to reflect the proposed Mavis South underground extension raw water demand and used to assess raw water reliability until the end of May 2025. ▪ Refer to Section 5.3.2 for impact assessment.
Groundwater	<ul style="list-style-type: none"> ▪ Groundwater inflow will report to the proposed Mavis South underground extension. ▪ SLR (SLR 2023) provided the expected inflow rates of: <ul style="list-style-type: none"> ◆ 59 ML/year for 2024; and ◆ 72 ML/year for 2025. 	<ul style="list-style-type: none"> ▪ The groundwater impact assessment has been completed by SLR Consulting in 2023. ▪ KCB updated the WBM to reflect the proposed Mavis South underground extension groundwater inflows (which return into the water management system as mine-affected water).
Mine-affected	<ul style="list-style-type: none"> ▪ As detailed in Figure 4.1, mine-affected water from the existing Mavis E Pit underground operations is pumped to E1, E3 and E4 sumps located in the Mavis E Pit. These sumps also pick up rainfall/runoff from within the in-pit area. From here, mine-affected water is pumped directly to Mavis ROM Dam and onto Millennium B Pit (or to D Pit if Millennium B Pit inventory is high). In accordance with water management system principles, from Millennium B Pit this mine-affected water is used for: <ul style="list-style-type: none"> ◆ dust suppression; ◆ coal processing water; and ◆ supply of third-party water transfer. 	<ul style="list-style-type: none"> ▪ The existing mine-affected water management system will be used to capture and manage mine-affected water from the proposed Mavis South underground extension with no augmentation required. ▪ WBM has been updated to reflect: <ul style="list-style-type: none"> ◆ ROM tonnes from July 2023 to end of May 2025 (as detailed in Table 3.1 and Appendix II) which impacts the volume of mine-affected water used for coal processing; and ◆ water pumped from the underground (i.e., groundwater inflows and raw water returns which impact the volume of mine-affected water and containment). ▪ Refer to Section 5.3.2.2 for impact assessment.

Water type	Requirements	Information or Impacts
	<ul style="list-style-type: none"> ▪ Groundwater inflows from the proposed Mavis South underground extension will be pumped into the mine-affected water system (via E3 sump). ▪ A percentage of raw water demands for the proposed Mavis South underground extension will also be pumped into the existing mine-affected water system (via E3 sump). Consistent with the current Mavis E Pit underground operations, the following returns are expected: <ul style="list-style-type: none"> ◆ 100% return of cleaning and production equipment water; and ◆ no return of potable water conversion or dust management (KCB 2022a). 	
Sediment-laden	<ul style="list-style-type: none"> ▪ No impact expected as no changes to the existing management of sediment-laden waters based on the footprint of the proposed Mavis South underground extension. ▪ Rainfall/runoff from the haul road leading into the Mavis E Pit is directed into the sumps within Mavis E Pit (i.e., E1, E3 and E4) or to the Mavis ROM Dam via drains. ▪ Rehabilitated out-of-pit (OOP) dump to the south-west of the Mavis E Pit are stable with rehabilitation undertaken over five years ago. As such, rainfall/runoff from these OOP areas is deemed to be unimpacted water. 	<ul style="list-style-type: none"> ▪ No impact expected to sediment-laden flow paths or existing infrastructure. ▪ Sediment-laden water inventory up to the end of May 2025 has been included in the total site water inventory (i.e., containment assessment – refer to Section 5.3.2.2).
Unimpacted	<ul style="list-style-type: none"> ▪ Rainfall/runoff from the undisturbed highwall catchments located to the north-east and south-east within MDL3046 is currently either captured in existing surface water drains and diverted or flows overland to North Creek. ▪ Rainfall/runoff from the from stable rehabilitated spoil dump to the south-west of Mavis E Pit is currently captured in existing surface water drains and diverted to either North Creek or New Chum Creek (some drains are still under construction at the time of this report). 	<ul style="list-style-type: none"> ▪ The existing unimpacted water drainage features will be used to continue to divert unimpacted water from the surface area above the proposed Mavis South underground extension around the Mavis E Pit with no augmentation required. ▪ However, subsidence of the surface above the proposed Mavis South underground extension may cause subsidence which has the potential to change the existing drainage catchments and features. ▪ Refer to Section 5.2 for impact assessment.

5.2 Unimpacted water

A site surface for Mavis E Pit and the surrounding area (including MDL3046 and the surface above the proposed Mavis South underground extension) was developed using the March 2023 LiDAR topographical data and includes existing and proposed key unimpacted water drainage features relevant to Mavis E Pit and the proposed Mavis South underground extension. Using this site surface and HEC-RAS rain-on-grid modelling, existing surface water drainage pathways and flow direction for the area above the proposed Mavis South underground extension were identified and are presented in Figure 5.1. For reference, this figure also shows:

- local waterways and associated tributaries (i.e., New Chum and North Creeks);
- MCM MLs and MDL; and
- MSES areas.

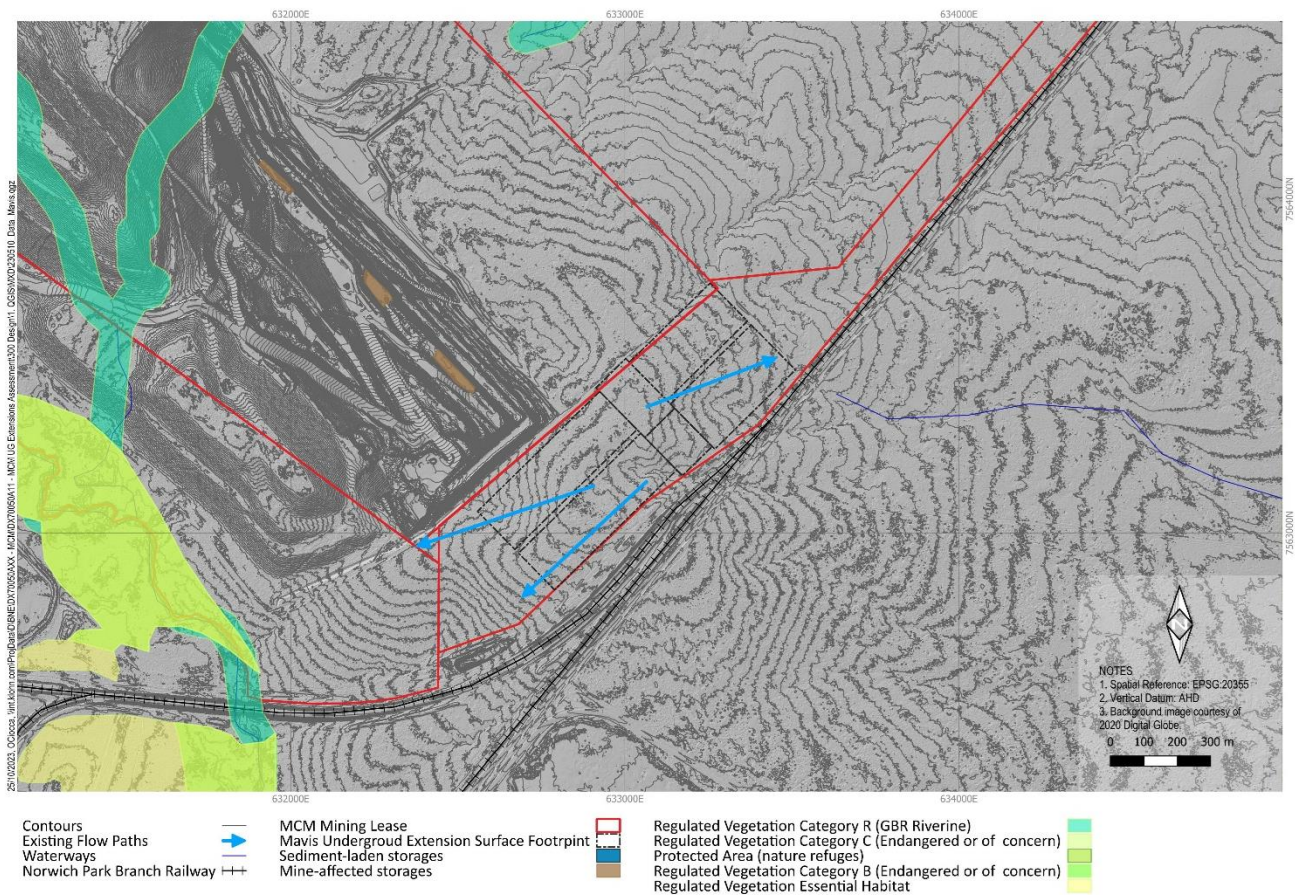


Figure 5.1 Surface water drainage flow paths and areas of significance

Review of Figure 5.1 shows that, based on existing and proposed key drainage features, surface water above the proposed Mavis South underground extension is expected to:

- flow overland to North Creek (bounded by the Norwich Park Branch Railway) for the surface above the 100 mains, 106 and 107 panels and the north-eastern end of the 108 and 109 panels; and

- be captured by the proposed drain along the eastern highwall (yet to be constructed) and discharged to New Chum Creek for the surface above panel 108; and
- flow overland to New Chum Creek (bounded by the Norwich Park Branch Railway) for the surface above panel 109.

As detailed in Table 5.1, there is potential for changes to the existing drainage catchments and features because of subsidence from the proposed Mavis South underground extension. Subsidence could change the surface and cause ponding of water within drainage features and catchments.

MCM have implemented specific construction techniques to reduce the likelihood of subsidence. Drilling investigations and subsidence monitoring is current underway on site above the existing Mavis underground operations. Gordon Geotechniques (Gordon Geotechniques Pty Ltd 2023) have prepared a report which outlines the potential of subsidence of the existing Mavis underground. They have used drilling boreholes with and without sonic velocity to measure geological sequence of overburden and coal seams, and sediments below the seams for mining. Sonic velocity logs allow the estimation of rock strength. Based on preliminary reporting completed by Gordon Geotechniques subsidence of less than 50 mm is expected above the approved Mavis underground.

As the underground mining technique for the proposed Mavis South underground extension is expected to be a continuation of the current Mavis underground operation, at a similar depth, subsidence of similar levels is expected. Given this, the estimated subsidence of less than 50 mm, is not expected to influence free draining surfaces around the surface above the proposed Mavis South underground extension area.

Subsidence monitoring will continue during the existing Mavis E Pit underground operations with further subsidence information available over time. This monitoring is proposed to continue for the duration of the proposed Mavis South underground extension (up to the end of May 2025). If monitoring indicates a potential for additional subsidence and ponding is evident, surface water drains may need to be re-graded to ensure they are free draining.

There is an existing railway that borders MDL3046 and the proposed Mavis south underground extension. Whilst minimal subsidence is being recorded above the approved Mavis underground, and this is not expected to change, it is recommended that monitoring be continued along the railway corridor.

5.3 External, sediment-laden and mine-affected water

5.3.1 Overview

To assess the potential impact of the proposed Mavis South underground extension on the external, sediment-laden and mine-affected waters at MCM, the MCM WBM has been updated to reflect the current and future water management system up to the end of May 2025. As detailed in Table 5.1, the update includes:

- approved Mavis E Pit underground operation;
- proposed A Pit north and south open cut extension; and

- proposed Mavis South underground extension.

The connectivity and operational configuration of the water management system (as detailed in Section 4.2 and Appendix III) along with water storage catchments is expected to remain unchanged by the proposed Mavis South underground extension (i.e., no change to external and mine-affected water infrastructure).

Using the updated MCM WBM, the expected performance of the site’s water management system over the next 22-months (up to the end of May 2025), has been assessed by review of the modelled:

- external raw water use and comparison with the current raw water allocation (Section 5.3.2); and
- site water inventory (including external, sediment-laden and mine-affected water) and containment of this inventory within the existing water management system infrastructure (Section 5.3.2.2).

The performance of the water management system (i.e., forecast modelling) has been completed using stochastically generated rainfall (which allows for a wider range of climatic scenarios to be assessed). The MCM WBM contains 500 daily rainfall sequences (or realisations) that are 20 years in length (Jacobs Australia Pty Limited 2019). The stochastic rainfall input was derived by Jacobs from historical SILO Data Drill daily rainfall depths for MCM in the stochastic climate library (SCL) (Jacobs Australia Pty Limited 2019).

Each climatic sequence (or realisation) produces a unique system response for the upcoming two-and-a-half-year simulation. This results in 500 distinct solutions for each time step within the two-and-a-half-year simulation period, with statistics used to present the results in terms of non-exceedance percentiles for each day in the simulation period. For example, P10 represents the 10th percentile of exceedance where there is a 10% chance of water volumes being greater because of wet climate conditions (or a 90% chance of volumes being less), P50 represents the 50th or median percentile exceedance because of average climate conditions and P90 represents the 90th percentile of exceedance where there is 90% chance of water volumes being greater because of dry climate conditions (or a 10% chance of volumes being less).

Sequences start on the common date of 7 August 2023 (based on available water and electrical conductivity (EC) levels) with initial starting volumes and EC levels for the water storages presented in Table 5.2.

Table 5.2 MCM WBM starting conditions

Storage		Volume (ML) taken 6/08/2023	EC (µS/cm) taken 22 and 24/11/2022
Water type	Name		
External water	Western Dam	258	1,700
Mine-affected water	A46	6.3	5,000
	A53	2.0	5,000
	Build Pad Dam	0.5	327
	Carborough ROM Dam	1.3	430
	Dam 4	30.2	2,360
	D Pit	602	5,000
	E1 sump	15	4,770
E3 sump	0.6	4,770	

Storage	Volume (ML)	EC (µS/cm)
E4 sump	1.2	4,200
Mavis ROM Dam	42.0	5,110
Millennium B Pit	905	5,900*
Sediment Dam 3	44.1	3,210
Sediment Dam 5	2.5	1,040
Sediment-laden water Sediment Dam 8	1.2	793**
TOTAL	2,043	

Note: * reading taken on 24/11/2022
** reading taken 24/05/2022 (no later water quality available)

5.3.2 Impact Assessment

5.3.2.1 External water

As detailed in Figure 4.1 and Appendix I, external raw water is sourced from the Sunwater pipeline (with a maximum allocation of 349 ML/year) and used to top-up the Western Dam to a maximum operating level of 231 mRL (or maximum operating volume (MOV) of 272 ML).

Water from the Western Dam is currently used to supply:

- Mavis workshops at 6.2 ML/year;
- Mavis E Pit underground operations at a maximum of 202 ML/year and a minimum of 123 ML/year; and
- Millennium B Pit when the mine-affected water inventory is low.

As detailed in Section 5.1, the proposed Mavis South underground extension is to be a continuation of the existing Mavis underground bord and pillar operation using the same equipment. As such, the water demand from the Western Dam has been modelled as the same demand extended for an 11-month period from July 2024 to the end of May 2025.

Modelled Sunwater usage and Western Dam inventory up to the end of May 2025, including the proposed Mavis South underground extension, are presented in Figure 5.2 and Figure 5.3, respectively.

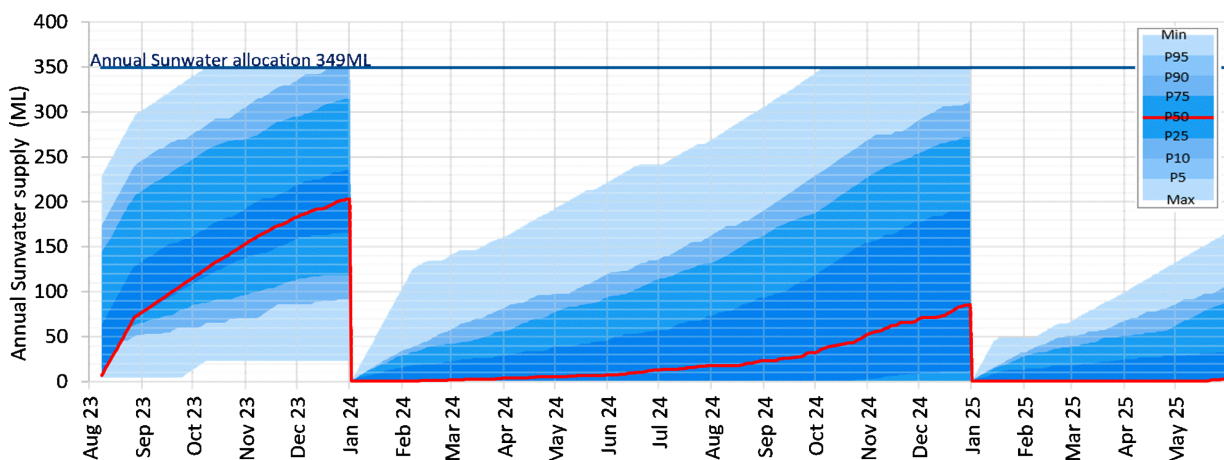


Figure 5.2 Modelled Sunwater usage

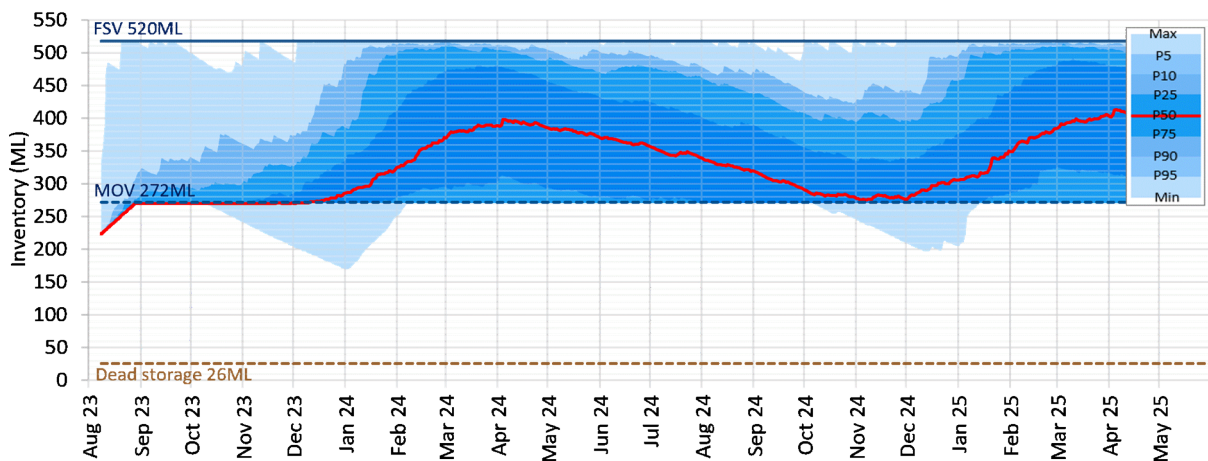


Figure 5.3 Modelled Western Dam inventory

Review of Figure 5.2 and Figure 5.3 shows that, based on a daily time step assessment:

- Under very dry climate conditions (min and P95):
 - ◆ full Sunwater annual allocation is expected to be used to top-up the Western Dam due to the minimal catchment runoff reporting to the dam;
 - ◆ Western Dam water level is expected to fluctuate seasonally ranging from a low of around 170 ML (just prior to the wet season) up to the MOV; and
 - ◆ Western Dam is expected to remain above the dead storage volume suggesting that the raw water demands for the Mavis workshop, approved Mavis E Pit underground and proposed Mavis South underground are expected to be met over the modelled duration.
- Under median climate conditions (average P50):
 - ◆ full Sunwater allocation is not expected to be required to fill up the Western Dam to the MOV; and
 - ◆ Western Dam is expected to fluctuate seasonally ranging from the MOV up to around 400 ML.
- Under very wet climate conditions (max and P5):
 - ◆ Sunwater allocation is expected to be minimal as the catchment runoff reporting to the Western Dam is expected to maintain the dam at the MOV.
- For all modelled climate conditions:
 - ◆ gradient of the Sunwater usage curve is flatter during the wet season where the surface runoff from the Western Dam catchment tops up the Western Dam and steeper during the dry season where the catchment runoff is reduced and more Sunwater allocation is required to maintain the Western Dam at MOV; and
 - ◆ maximum Sunwater allocation of 349 ML/year assists in keeping the Western Dam inventory above the dead storage volume, with the dam expected to effectively supply the site’s raw water demands, including the proposed Mavis South underground extension.

5.3.2.2 Total site water

In the WBM, the total site water inventory is defined as the volume of water in the following storages and mining pits:

- mine-affected water storages: Millennium B Pit, D Pit, Mavis ROM Dam, Carborough ROM Dam, Build Pad Dam, Sediment Dams 3 and 5, Dam 4, and Mavis E Pit sumps (E1, E3 and E4);
- sediment-laden water storages: Sediment Dam 8;
- external water storages: Western Dam; and
- mining pits: Millennium A Pit (A46 and A53).

As detailed in Section 5.1, the proposed Mavis South underground extension is not expected to require augmentation of the water management system because of the proposed Mavis South underground extension (i.e., total site inventory expected to be capture and managed within the existing water management system infrastructure).

Modelled total site water inventory up to the end of May 2025, including the proposed Mavis South underground extension, is presented in Figure 5.4. Also presented on this figure are the following key volumes:

- Dead storage volume of 471 ML:
 - ◆ below this volume, mine-affected water reserves may be depleted and external water may be needed to supplement mine-affected water demands; and
 - ◆ methods for the conservation of mine-affected water should be in place.
- Mine-affected water storage capacity of 6,780 ML:
 - ◆ below this volume (but above the dead storage volume), the total site water inventory is tracking in the normal and target operating zone and contained within existing mine-affected water storages.
- Total site water storage capacity of 9,423 ML:
 - ◆ below this volume (but above the mine-affected water storage volume), mine-affected water storage capacity has been exceeded and methods for the reduction of mine-affected water should be in place, such as controlled release of mine-affected water from licensed release points (RPs); and
 - ◆ above this volume, the mine-affected, external and sediment-laden water storage capacity has been exceeded with excess mine-affected water stored in active pits (i.e., Millennium A Pits – A46 and A53), and methods for the reduction of mine-affected water should be in place.

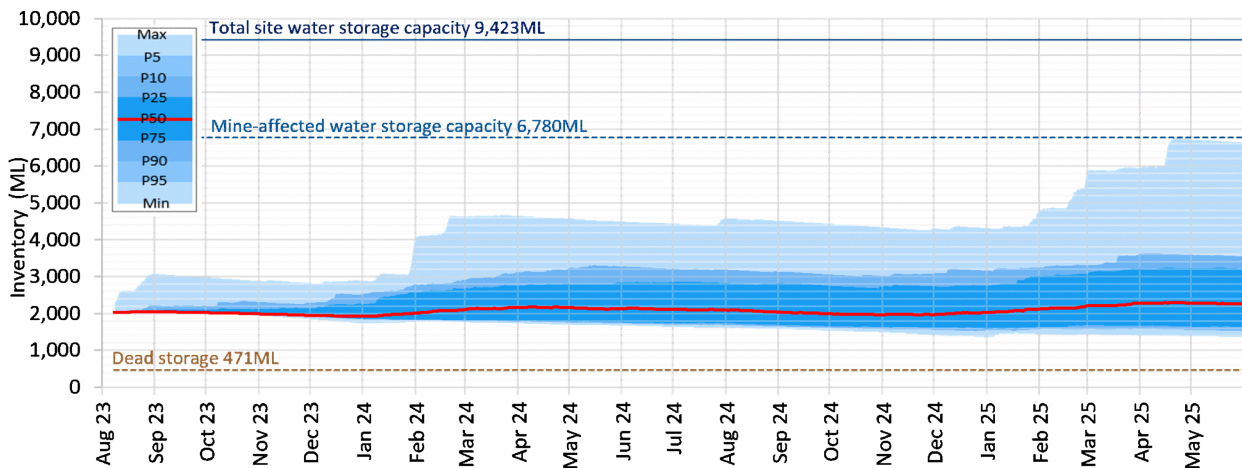


Figure 5.4 Forecasted total site water inventory

Review of Figure 5.4 shows that, based on a daily time step assessment:

- Under very dry climate conditions (min and P95):
 - ◆ inventory is expected to decrease over time as the ROM tonnages have increased slightly and more water is needed for CHPP processing; and
 - ◆ inventory is expected to remain within the target operating zone (i.e., be contained within mine-affected water storage capacity and above the dead storage where mine-affected water reserves may be depleted and methods for the conservation of mine-affected water should be in place).
- Under median climate conditions (average P50):
 - ◆ inventory is expected to remain relatively stable with seasonal fluctuations (i.e., increase in wet season and drawdown in dry); and
 - ◆ inventory is expected to remain within the target operating zone.
- Under very wet climate conditions (max and P5):
 - ◆ inventory is expected to increase over time; and
 - ◆ inventory is expected to remain within the target operating zone, with maximum wet-climate-condition inventory expected to reach close to the mine-affected water storage capacity at the end of the 2024/2025 wet season.
- For all modelled climate conditions:
 - ◆ inventory is expected to remain within the target operating zone and be contained within the existing mine-affected water storages with no excess mine-affected water required to be stored in external, sediment-laden water and tailings storages or active mining pits.

The expected performance of the current water management system up to the end of May 2025 (i.e., no proposed Mavis South underground extension) has also been assessed by review of the modelled site water inventory and containment of this inventory within the existing water management system infrastructure. Modelled site water inventory is presented in Appendix IV

with the performance of the total site inventory expected to remain within the targeted and normal operating zone and be contained within existing mine-affected water storages under all climate conditions modelled.

In comparison with the total site water inventory profiles developed including the proposed Mavis South underground extension, there is minimal difference in the expected wet, average, and dry climatic inventories. This is consistent with the minimal change expected to the water management system because of the proposed Mavis South underground extension (i.e., continuation of the existing underground operation and associated raw water demands and mine-affected water returns).

The ability to model trends and responses of the MCM water management system is a function of the WBM configuration, input parameters and background assumptions. Definition and documentation of the WBM is important to allow interpretation and use of the model in line with the purpose for which it has been developed. Given the dynamic nature of mining at MCM, it is recommended that the MCM WBM be reviewed and updated to take into consideration the changes to the water management system proposed for the future expansions (i.e., A Pit south and north and the proposed Mavis South underground extension) as needed.

6 CONCLUSIONS

The existing water management system at MCM is designed to manage surface water and is operated in accordance with the site's EA. Based on KCB's review of the proposed Mavis South underground extension layout and water balance modelling for the extension, the proposed extension is not expected to impact the existing water management system or downstream environment. Key outcomes of the high-level surface water impact assessment are:

Mavis South underground extension:

- Proposed Mavis South underground extension area is outside of the EA approved disturbance area (i.e., Condition A2).
- Additional ROM coal extracted from the A Pit south and north extension areas, combined with the proposed Mavis underground operation, will be within the EA approved 5.5 Mtpa extraction (i.e., Condition A2).

Surface water management (above Mavis South underground extension):

- Based on current subsidence monitoring of the surface above the approved Mavis underground extension (< 50 mm), minor subsidence may be expected in the surface above the proposed Mavis South underground extension. This minor subsidence is not anticipated to impact the existing surface water flow paths on the surface above the proposed Mavis South underground extension. Continued subsidence monitoring during the underground operations is recommended (with key areas of interest along the eastern highwall drain and MDL3046 boundary in the railway corridor).
- There are no other changes planned for the surface footprint for the Mavis South underground, so no other impacts to surface runoff from this area is expected.

Mine-affected water management:

- The proposed Mavis South underground extension is a continuation of existing mining operations that extend the life of mine but does not inherently change the water balance for the operation, with modelling showing no increased risk of overflow (i.e., capacity within the existing mine-affected water storages to contain the forecasted inventories under all climatic conditions).

7 CLOSING

We would like to thank MetRes for the opportunity to provide this supporting surface water impact assessment report for the proposed Mavis South underground extension. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

KCB AUSTRALIA PTY LTD.



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OC and KB:RR

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APPENDIX I

EPBC significant impact guidelines 1.1 and 1.3

Significant Impact Guidelines 1.1 – Matters of National Environmental Significance 2013 and Significant Impact Guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments – Impacts on Water Resources

Summary of potential impacts against the Significant Impact Criteria 1.3, Changes to Hydrological Characteristics 2022

Parameter	Comments
Flow regime (volume, timing, duration, and frequency of surface water flows)	<ul style="list-style-type: none"> ▪ Flow regime of New Chum Creek and its tributaries (volume, timing and frequency) is not expected to change due to the extension of the underground works within the Mavis Pit. ▪ Mine-affected water from the underground extension will be captured, pumped into existing mine-affected water storages at MCM, and re-used or released to New Chum Creek in accordance with current EA controlled release criteria. ▪ Controlled releases will be monitored in accordance with relevant EA conditions which prescribe the minimum flow in the receiving waters for release to occur along with water quality release limits. In accordance with the EA, a cumulative maximum release of 20% of flow in receiving waters is allowed. ▪ Minimal surface subsidence is expected. As such, catchments and overland flow paths are not expected to change. ▪ No change to erosion or sediment control measures is expected because of the proposed extension.
Recharge rates to groundwater	<ul style="list-style-type: none"> ▪ Refer to groundwater EPBC Act self-assessment report undertaken by others.
<p>Aquifer pressure or pressure relationship between aquifers</p> <p>Groundwater table and potentiometric surface levels</p> <p>Inter-aquifer connectivity</p>	<ul style="list-style-type: none"> ▪ Refer to groundwater EPBC Act self-assessment report undertaken by others.
<p>Groundwater / surface water interactions</p> <p>River / floodplain connectivity</p>	<ul style="list-style-type: none"> ▪ Water required for the Mavis South underground extension will be sourced from existing raw water storage at MCM (i.e., Western Dam). The overall raw water requirements for the extension of the underground are not expected to be greater than currently approved. ▪ Mine-affected water from the underground extension will be captured, pumped into existing mine-affected water storages at MCM, and re-used or released to New Chum Creek in accordance with EA controlled release criteria. Mine-affected water storages and any controlled releases will be monitored in accordance with relevant EA conditions. ▪ New Chum Creek and its tributaries are not considered to be baseflow-fed creeks. ▪ Therefore, potential impacts to surface water interactions because of the underground extension are not anticipated; and will not result in any changes to river and/or floodplain connectivity.
Coastal processes	<ul style="list-style-type: none"> ▪ Mavis South underground extension is in central Queensland. Given the distance to the coast and no potential impacts to surface water from the underground extension, changes to coastal processes are not expected to occur.

Summary of potential impacts against the Significant Impact Criteria 1.3, Changes to Water Quality 2022

Parameter	Comments
<p>Create risks to human or animal health or to the condition of the natural environment because of the change in water quality</p>	<ul style="list-style-type: none"> ▪ Mine-affected water from the underground extension will be managed within the existing mine-affected water management system and associated storages at MCM to prevent pollution of downstream waterways. ▪ Water quality of the main mine-affected water storages is tested regularly and in accordance with EA conditions for onsite water storages contaminant limits. ▪ Mine-affected water is re-used for coal washing in the RMI CHPP and haul road dust suppression and released at licensed controlled RPs dependent on water quality characteristics of the mine-affected water and the flow regime of the receiving waterways. These water quality EA release conditions have been put in place to reduce any potential risk to downstream humans and animal users. ▪ Mavis South underground extension will not impact the water quality of the overland flow of the unimpacted surface water above the underground extension. ▪ A receiving environment monitoring program (REMP) assessment considers the cumulative impacts of releases, change in salinity and adverse effects to the receiving environment (of New Chum Creek) through water and sediment sampling. In accordance with the EA, an annual REMP report must be prepared by 1 August and submitted to the administering authorities on request. This REMP reporting will continue for the full duration of the Mavis South underground extension and provides an annual water quality health check of the receiving environment. ▪ Changes to surface water quality because of the Mavis South underground extension are not anticipated and it is not likely that the underground expansion would result in a risk to human or animal health, or to the condition of the environment because of a change in water quality. ▪ No change to erosion or sediment control measures is expected because of the proposed extension.
<p>Substantially reduces the amount of water available for human consumptive uses or for other uses, including environmental uses which are dependent on water of the appropriate quality</p>	<ul style="list-style-type: none"> ▪ The main groundwater aquifer system of the MCM MLs is the coal seam, with typically low yields and poor water quality. As such, no groundwater is typically extracted for agricultural, domestic or industrial usage (i.e., not impacted by the Mavis South underground extension). ▪ Mavis South underground extension will require raw water, however, the amount required is expected to be within MCM’s annual allocation with no additional raw water required from Sunwater (i.e., no changes to existing). ▪ Identification of downstream surface water users is predominantly cattle grazing. However, the ephemeral nature of New Chum Creek and its tributaries results in a short period of use while water is present. It is not anticipated that the Mavis South underground extension would reduce the amount of surface water available for opportunistic stock use.

Parameter	Comments
Causes persistent organic chemicals, heavy metals, salt, or other potentially harmful substances to accumulate in the environment	<ul style="list-style-type: none"> ▪ MCM EA defines the water quality of the mine-affected water that can be released from MCM. Contaminant release and investigation trigger levels are in place for water quality characteristics (i.e., is only able to be released from MCM at licensed RPs when the water quality is below EA defined trigger limits). In addition, the water quality at the downstream monitoring point on New Chum Creek assesses the water quality of the receiving water during release events. ▪ The annual REMP report assesses the long-term condition of surface water, sediment, and the aquatic ecosystem health. ▪ EA conditions regarding the water quality of controlled released water and the health of the receiving environment will continue throughout the duration of the Mavis South underground extension and as such, the Mavis South underground extension is unlikely to introduce organic chemicals, heavy metals, salt, or other potentially harmful substances to the environment.
Seriously affects the habitat or lifecycle of a native species dependent on a water resource	<ul style="list-style-type: none"> ▪ Habitats dependent on water resources in the vicinity of MCM and the Mavis South underground extension include aquatic ecosystems within the creek system. New Chum Creek and North Creek and tributaries are ephemeral. It is not expected that the project will change the water resource within the creek system as no water will be extracted from local waterways. Mine-affected water released because of the underground extension will be in accordance with EA conditions regarding flow and water quality. ▪ Therefore, surface water baseflow volumes and species dependent on water resources are not predicted to be impacted. ▪ No changes to surface water quality have been identified because of the Mavis South underground extension. ▪ No changes to habitat or lifecycle of a native species dependent on a water resource are expected.
Causes the establishment of an invasive species (or the spread of an existing invasive species) that is harmful to the ecosystem function of the water resource	<ul style="list-style-type: none"> ▪ No changes to surface water quality have been identified because of the Mavis South underground expansion. Therefore, no changes to the water resource that may cause the establishment of an invasive species (or the spread of an existing invasive species) are expected. ▪ If required, MCM will prevent the spread of weeds or invasive species through by developing an Environmental Management Plan.
There is a significant worsening of local water quality (where current local water quality is superior to local or regional water quality objectives)	<ul style="list-style-type: none"> ▪ Identification of downstream surface water users is predominantly cattle grazing. However, the ephemeral nature of New Chum Creek and its tributaries results in a short period of use while water is present. ▪ EA conditions regarding the water quality of controlled released water and the health of the receiving environment will continue throughout the duration of the Mavis South underground extension and as such, it is not anticipated that the underground extension would worsen the local water quality.
High quality water is released into an ecosystem which is adapted to a lower quality of water	<ul style="list-style-type: none"> ▪ Mine-affected water is the only water expected to be released to the receiving waters as part of the Mavis South underground extension via controlled release conditions). This water is not expected to be of a higher quality water, and as such, no changes to ecosystem water qualities are anticipated.

APPENDIX II

ROM monthly tonnages

From August 2023 to May 2025 total ROM coal estimates

Month	ROM (tonnes/month)				
	A Pit open cut	Mavis underground (approved)	Mavis South underground (proposed)	TOTAL (with Mavis South underground)	TOTAL (without Mavis South underground)
July 2023	-	120,069	-	120,069	120,069
August 2023	73,435	108,773	-	182,208	182,208
September 2023	34,963	131,892	-	166,855	166,855
October 2023	-	120,815	-	120,815	120,815
November 2023	-	91,555	-	91,555	91,555
December 2023	101,518	123,189	-	224,707	224,707
January 2024	98,862	114,005	-	212,867	212,867
February 2024	-	67,448	-	67,448	67,448
March 2024	-	129,908	-	129,908	129,908
April 2024	-	109,074	-	109,074	109,074
May 2024	-	131,253	-	131,253	131,253
June 2024	-	93,269	-	93,269	93,269
July 2024	-	-	45,000	45,000	-
August 2024	128,318	-	60,000	188,318	128,318
September 2024	57,066	-	46,289	103,355	57,066
October 2024	60,024	-	109,302	169,326	60,024
November 2024	17,119	-	110,187	127,306	17,119
December 2024	230,071	-	100,000	330,071	230,071
January 2025	20,908	-	96,617	117,525	20,908
February 2025	62,059	-	87,000	149,059	62,059
March 2025	-	-	91,499	91,499	-
April 2025	-	-	65,772	65,772	-
May 2025	-	-	41,899	41,899	-
TOTAL (tonnes)	884,343	1,341,249	853,565	3,079,158	2,225,593

APPENDIX III

WBM operational guidelines

Function	Item	Guideline or control																																									
External water inputs	Sunwater	<ul style="list-style-type: none"> Raw water supplied to MCM via an offtake from Sunwater pipeline. Annual allocation of 349 ML. 																																									
	Groundwater inflow	<ul style="list-style-type: none"> Inflow into mining pits and underground operations provided by SLR (SLR 2023). <table border="1"> <thead> <tr> <th rowspan="3">Year</th> <th colspan="7">Groundwater inflow (ML/year)</th> </tr> <tr> <th rowspan="2">A46</th> <th rowspan="2">A53</th> <th rowspan="2">D Pit</th> <th rowspan="2">Tailings Dam</th> <th rowspan="2">M Pit</th> <th colspan="2">Mavis E Pit</th> </tr> <tr> <th>Open cut</th> <th>Underground (approved)</th> </tr> </thead> <tbody> <tr> <td>2023</td> <td>-</td> <td>37</td> <td>47</td> <td>91</td> <td>4.6</td> <td>24</td> <td>33</td> </tr> <tr> <td>2024</td> <td>-</td> <td>37</td> <td>-</td> <td>-</td> <td>7.2</td> <td>48</td> <td>74</td> </tr> <tr> <td>2025</td> <td>-</td> <td>45</td> <td>-</td> <td>-</td> <td>60</td> <td>2.3</td> <td>60</td> </tr> </tbody> </table>	Year	Groundwater inflow (ML/year)							A46	A53	D Pit	Tailings Dam	M Pit	Mavis E Pit		Open cut	Underground (approved)	2023	-	37	47	91	4.6	24	33	2024	-	37	-	-	7.2	48	74	2025	-	45	-	-	60	2.3	60
		Year		Groundwater inflow (ML/year)																																							
				A46	A53	D Pit	Tailings Dam	M Pit	Mavis E Pit																																		
			Open cut						Underground (approved)																																		
2023	-	37	47	91	4.6	24	33																																				
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2025	-	45	-	-	60	2.3	60																																				
Site demands and returns	Dust suppression	<ul style="list-style-type: none"> Mine-affected water sourced from Mavis ROM Dam (Mavis fill point) and Millennium B Pit (Millennium fill point) at rates of 0.36 ML/day and 0.54 ML/day, respectively. No dust suppression water is returned to the mine-affected water system. When no mine-affected water reserves are available at MCM, raw water is expected to be used to supplement dust suppression shortfalls. 																																									
	Mavis E Pit underground operations	<ul style="list-style-type: none"> Raw water sourced from Western Dam (via Mavis E Pit tanks) and used for cleaning, dust management, potable water conversion and production equipment. Forecasted maximum rate of 0.55 ML/day provided by MCM (KCB 2022b): <ul style="list-style-type: none"> cleaning = 72,000 L/day; dust management = 138,240 L/day; potable water conversion = 30,000 L/day; and production equipment = 312,320 L/day. No dust management and potable conversion water is returned to the mine-affected water system. 100% of cleaning and production equipment water is returned to the mine-affected water system via E3 sump. 																																									
	Mavis workshop	<ul style="list-style-type: none"> Raw water sourced from Western Dam via Mavis workshop tanks at a rate of 0.017 ML/day. No Mavis workshop water is returned to the mine-affected water system. 																																									
Internal transfers	Build Pad Dam to Sediment Dam 5	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 248 L/s. 																																									
	Sediment Dam 5 to Dam 4	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 248 L/s. 																																									
	Dam 4 to Mavis ROM Dam	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 167 L/s. 																																									
Internal transfers (continued)	Sediment Dam 3 to Mavis ROM Dam	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 167 L/s. 																																									
	E1 sump to Mavis ROM Dam or D Pit	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 600 L/s. 																																									

Function	Item	Guideline or control
	E4 sump to E3 sump	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 200 L/s.
	E3 sump to E1 sump	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 200 L/s.
	Mavis ROM Dam to Millennium B Pit	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 248 L/s.
	D Pit to Millennium B Pit	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 200 L/s. Used when Millennium B Pit inventory is low.
	Millennium B Pit to D Pit	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 200 L/s. Used when Millennium B Pit inventory is high.
	Western Dam to Millennium B Pit	<ul style="list-style-type: none"> Pumping (as required) at a maximum rate of 100 L/s. Used when Millennium B Pit inventory is low and raw water is used to supplement the mine-affected water demands (i.e., coal processing and dust suppression etc).
	Pit dewatering	<ul style="list-style-type: none"> Pumping (as required) from active mining pits of Millennium A Pit (A46 and A53) to Millennium B Pit at a maximum rate of 345 L/s.
External transfers	Third party transfer agreements	<ul style="list-style-type: none"> Third party water transfer agreements exist between MCM and: <ul style="list-style-type: none"> RMI for coal processing; Moorvale South; and Isaac Downs. Transfer agreements pump mine-affected water from Millennium B Pit off site with no return to the mine-affected water system. <p>RMI transfer agreement:</p> <ul style="list-style-type: none"> Water required for coal processing at RMI CHPP. Demand of 125 L/t of ROM coal. <p>Moorvale South transfer agreement</p> <ul style="list-style-type: none"> Demand of 0.22 ML/day (or 20 ML/quarter) when agreement is operational – currently not operational. <p>Isaac Downs transfer agreement:</p> <ul style="list-style-type: none"> Demand of 0.82 ML/day. Expected to end upon commencement of Mavis E Pit underground operations (as using the same pipeline).
Raw water storages	Western Dam	<ul style="list-style-type: none"> Spillway level at 232.3 mRL (approx. 503 ML) with overflow to West Creek. Storage maintained at 231 mRL (approx. 272 ML) with makeup sourced from Sunwater pipeline. Current source for Mavis workshop, Millennium B Pit (only when mine-affected water inventory is low), and raw water tanks in Mavis E Pit for underground operations.
Mine-affected water storages	Build Pad Dam	<ul style="list-style-type: none"> Spillway level at 253.5 mRL (approx. 2.3 ML) with overflow to New Chum Creek. Mine-affected water pumped to Sediment Dam 5.
	Carborough ROM Dam	<ul style="list-style-type: none"> Spillway level at 286.8 mRL (approx. 15 ML) with overflow to New Chum Creek. Licensed RP3 for release of mine-affected water to New Chum Creek.

Function	Item	Guideline or control
	Dam 4	<ul style="list-style-type: none"> Spillway level at 245.2 mRL (approx. 78 ML) with overflow to New Chum Creek. Mine-affected water pumped to Mavis ROM Dam, as required.
	D Pit	<ul style="list-style-type: none"> Storage located in the south-eastern end of the inactive Mavis D Pit. Two-way pumping/pipeline connectivity between Millennium B Pit with excess water pumped from Millennium B Pit to D Pit when inventory high is Millennium B Pit and vice versa when inventory is low in Millennium B Pit. Overflow level at 190 mRL (approx. 3,935 ML) (Cartledge Mining and Geotechnics 2023) with overflow to Tailings Dam.
	E1	<ul style="list-style-type: none"> Sump located in the south-eastern end of Mavis E Pit as part of the Mavis E Pit underground operations. Mine-affected water pumped to Mavis ROM Dam or D Pit (using existing highwall pumping infrastructure) to maintain the sump as empty as possible. Spillway level at 148.8 mRL (approx. 67 ML) with overflow into E3 sump.
	E3	<ul style="list-style-type: none"> Sump located in the middle of Mavis E Pit as part of the Mavis E Pit underground operations. Mine-affected water pumped to E1 sump to maintain the sump as empty as possible. Spillway at 148.8 mRL (approx. 88 ML) with overflow directed into underground portal.
	E4	<ul style="list-style-type: none"> Sump located in the north-western end of Mavis E Pit as part of the Mavis E Pit underground operations. Mine-affected water pumped to E3 sump to maintain the sump as empty as possible. Spillway at 148.8 mRL (approx. 2.4 ML) with overflow directed into Dam 1 (M Mining 2023).
	Mavis ROM Dam	<ul style="list-style-type: none"> Spillway level at 242.5 mRL (approx. 105 ML) with overflow to Sediment Dam 3. Source for Mavis fill point. Licensed RP2 for release of mine-affected water to New Chum Creek.
	Millennium B Pit	<ul style="list-style-type: none"> Largest mine-affected water storage at MCM. Overflow level at 161 mRL (approx. 1,164 ML) with overflow to Millennium A Pit (Cartledge Mining and Geotechnics 2023). Source for Millennium fill point and water transfer agreements.
	Sediment Dam 3	<ul style="list-style-type: none"> Spillway level at 243.0 mRL (approx. 129 ML) with overflow to New Chum Creek. Mine-affected water pumped to Mavis ROM Dam.
	Sediment Dam 5	<ul style="list-style-type: none"> Spillway level at 252.4 mRL (approx. 20 ML) with overflow to New Chum Creek. Mine-affected water pumped to Dam 4.
Sediment-laden water storages	Sediment Dam 8	<ul style="list-style-type: none"> Spillway level at 243.8 mRL (approx. 21 ML) with overflow to RMI's Process Water Dam.
Tailings storage	Tailings Dam	<ul style="list-style-type: none"> Storage for dried tailings from the RMI CHPP located in the north-western end of Mavis D Pit.
Mining pits	Mavis D Pit	<ul style="list-style-type: none"> Inactive open cut pit in the Millennium and Mavis mining areas. Northern end currently used for the storage of dried tailings (Tailings Dam). Southern end currently used to storage excess mine-affected water (D Pit).
	Mavis E Pit	<ul style="list-style-type: none"> Inactive open cut pit in Mavis mining area. Open cut mining ceased and underground operations underway.
	M Pit	<ul style="list-style-type: none"> Inactive open cut pit in the Millennium mining area. Backfilling and rehabilitation of pit underway.

Function	Item	Guideline or control
	Millennium A Pit	<ul style="list-style-type: none"> Existing open cut pit in Millennium mining area (i.e., includes A46 and A53). Mining proposed to recommence in A Pit north and south (2 strips).
Mining underground	Mavis E Pit	<ul style="list-style-type: none"> Underground operation in Mavis E Pit approved up to July 2024. Extension of underground operations (i.e., Mavis South underground extension) proposed from July 2024 to the end of May 2025.
Site releases	Controlled releases	<ul style="list-style-type: none"> Water released in accordance with EA release conditions from Mavis ROM Dam (RP2) and Carborough ROM Dam (RP3). Releases dependent on mine-affected water inventory and associated trigger action response plans (TARPs).

APPENDIX IV

Total site water inventory (without Mavis South underground extension)

