



DENDROBIUM MINE WATER MANAGEMENT PLAN

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DOCUMENT REVISION LOG

Persons authorising this Plan

NAME	TITLE	DATE
Chris Schultz	Superintendent Environment	August 2023

Document Revisions

REVISION	DESCRIPTION OF CHANGES	DATE
3.0	Update to meet Environment Standard requirements	October 2011
4.0	Update to reflect change to EPL and following Triennial Environmental Independent Audit	March 2012
5.0	Update to reflect recent EPL variation and new South32 template	May 2014
6.0	The following changes have been made: <ul style="list-style-type: none"> Updated roles and responsibilities References to parent company changed Update in accordance with Development Consent	January 2018
6.1	Update following comments from Department of Planning & Environment	August 2018
7.0	Review of formatting and content for consistency. Update of plans. Inclusion of details for DCP. Inclusion of details regarding brine discharge. Update of surface water monitoring if water quality changes identified. Incorporation of comments from consultation.	December 2021
7.1	Response to review by DPE (11 and 22 April 2022).	27 April 2022
8.0	Update following approval of MOD 9. Included monitoring points and water management associated with Vent Shaft 2/3 and Cordeaux Colliery. Incorporates comments from consultation.	August 2023

Persons involved in the review of this Plan

NAME	TITLE	COMPANY	EXP (YRS)	DATE
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James Alchin	Specialist Environment	South32 IMC	5	February 2023
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Stuart Brown	Director	HGEO	26	April 2023

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1. INTRODUCTION

Dendrobium Mine is an underground mine which commenced construction in January 2002 following approval from the Minister of the then Department of Urban Affairs and Planning on 20 November 2001. Longwall mining commenced at Dendrobium in April 2005. The mine is owned and operated by Dendrobium Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), which is a wholly owned subsidiary of South32 Limited. The mine operates on a continuous basis, 24 hours a day and 7 days a week.

The mining operations are located immediately adjacent to Mt Kembla, approximately 8 km west of Wollongong, NSW, on the Illawarra escarpment (refer to Plan 1). Mt Kembla village, located within 500 m of the Pit Top site, has close historical links with coal mining.

Dendrobium produces predominately metallurgical coal from the Wongawilli Seam (Areas 1, 2 and 3) and is approved to produce up to 5.2 million tonnes of run of mine (RoM) coal per annum. The BlueScope Steel Port Kembla Steel Works (PKSW) and Liberty Primary Steel (Whyalla) are major customers. In addition to these Australian based customers, coal is exported via the Port Kembla Coal Terminal to international customers.

Approval for mining in Areas 1,2 and 3 was granted under DA 60-03-2001, as modified (the Consent).

The Consent allows mining operations to take place in the mining area until 31 December 2030. Resources are available for mining to extend beyond this period and would be subject to further approvals.

Cordeaux Colliery is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of ICHPL. Coal production ceased at the site in March 2001 and recovery of longwall mining equipment was completed on 12 April 2001. Following cessation of mining, the Colliery was placed on care and maintenance, on which it remains. The Cordeaux Colliery Pit Top functions as office space and a storage facility for various departments. The Pit Top is also used as a base for exploration activity across the Dendrobium and Appin mining leases and exploration tenements, and for access into the WaterNSW Catchment Special Area (Special Area).

Dendrobium Mine, Cordeaux Colliery and Appin Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

This Water Management Plan (WMP) has been prepared to detail the relevant water quality concentration limits, water management and erosion and sediment control measures, compliance procedures, and controls relating to the mining operations and associated activities. This WMP has been prepared to satisfy Conditions 13 - 17 of Schedule 4¹ of the Consent for the Water Management Plan and associated Water Balance, Erosion and Sediment Control Plan, Surface Water Monitoring Program and Surface and Groundwater Response Plan.

¹ Schedule 4 relates to surface facilities only.

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1.1 Objectives

The objectives of the WMP are to:

- provide the framework for the responsible management of water,
- describe the water management systems including measures to comply with discharge limits and minimise potable water usage;
- outline the framework for water monitoring, auditing and reporting;
- provide a water balance for the project including sources and usage;
- comply with the regulatory requirements set out in the Consent, Environment Protection Licence (EPL) 3241 and other legislation with regards to water management and monitoring; and
- meet the requirements of the South32 Environment and Climate Change Standard, and other relevant standards, policies and documents.

1.2 Scope

The scope of the WMP applies to all existing and future activities related to Dendrobium Mine² including operational and construction water quality impacts at:

- Dendrobium Pit Top - consists of administration buildings, workshop, machinery and equipment storage areas, personnel and materials access to the underground workings via the Dendrobium Tunnel, sediment pond and water treatment facility.
- Kemira Valley Coal Loading Facility (KVCLF) – receives coal from underground via the Kemira Valley Tunnel. RoM coal is transported from underground to KVCLF via an extensive coal clearance system. The coal is then fed into a rill tower and deposited onto a 140,000 tonne stockpile from which it is loaded into trains via an enclosed rail-loading chute. Sediment ponds are in place.
- Dendrobium Coal Preparation Plant (DCPP) – located within the PKSW, the DCPP receives and washes RoM coal from the underground operations.
- Kemira Valley Rail Line (KVRL) – used to transport the coal from KVCLF to the DCPP.
- Ventilation Shaft (VS) 1 - located within the Special Area administered by WaterNSW, operates as a downcast shaft (i.e. drawing fresh air into the underground workings). VS1 is located on land owned by IMC.
- VS2 and VS3 – located within the Special Area and within Mining Lease (ML) 1566. VS2 operates as an additional downcast shaft whilst VS3 operates as an upcast shaft (i.e. drawing air out of the underground workings). The site includes gas drainage infrastructure for Area 3C.
- Cordeaux Pit Top - located within the Special Area. Consists of administration buildings, workshop, machinery and equipment storage areas, personnel and

² For the purposes of this management plan, Dendrobium Mine refers to all sites included in the scope except where specifically listed in the document.

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materials access to the underground workings via a shaft (no longer utilised), ventilation fans (no longer utilised), coal storage bins (no longer utilised), exploration core shed, sediment pond and stabilisation lagoons. Corrimal #3 shaft is located approximately 3.5 km from the pit top. Cordeaux Pit Top and Corrimal #3 shaft are on care and maintenance.

- Dendrobium Underground Operations – coal is extracted from the Wongawilli Seam. The underground operations consist of a longwall shearer, development units, coal clearance conveyor network and associated infrastructure.

Refer to Plan 1 for locations of the above.

Groundwater and surface water impacts and monitoring associated with subsidence from the extraction of coal are addressed in the relevant Subsidence Management Plan (SMP) or other document as required under Schedule 3 of the Consent, specifically:

- Watercourse Impact Monitoring, Management and Contingency Plan (Condition 4);
- Swamp Impact Monitoring, Management and Contingency Plan (Condition 6); and
- Groundwater Monitoring Program (Condition 13).

These documents are reviewed and approved separately to the WMP required under Condition 13 of Schedule 4 of the Consent.

1.3 Environmental Management System

IMC has a comprehensive Environmental Management System (EMS) in place to minimise the impact of its operations on the local environment and community. The WMP is a component of the EMS which is certified to ISO 14001.

1.4 Consultation

Consultation has been undertaken as part of this review of the WMP with the Environment Protection Authority (EPA), WaterNSW and Department of Planning and Environment (DPE) Water Group. The comments from the consultation process have been incorporated into Version 8.0 of the WMP.

Appendix 2 outlines comments from the relevant government agencies following consultation and the IMC response.

Consultation with agencies as stated in Condition 13 of Schedule 4 of the Consent will only be undertaken where there is a material change to the WMP or if specifically requested by DPE. Administrative or descriptive changes do not constitute a material change.

Endorsement by the Secretary of suitably qualified and experienced persons to prepare the WMP will only be sought where there is a material change to the water management system or if specifically requested by DPE. Endorsement of personnel for Revision 8.0 is provided in Appendix 3.

2. ROLES AND RESPONSIBILITIES

Roles and responsibilities associated with environmental management at Dendrobium Mine are defined in the Environmental Management Strategy. Table 1 outlines the roles and responsibilities associated with the implementation and periodic review of the WMP.

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Table 1: Roles and Responsibilities

Role	Responsibilities
Superintendent Environment	<p>Implement and periodically review the WMP.</p> <p>Liaise with government regulators and IMC senior leadership team in relation to water related issues, including reporting.</p> <p>Ongoing review of environmental performance and associated management/preventative actions.</p>
Specialist Environment/Coordinator Environment	<p>Advise, coach and mentor IMC operations with respect to meeting the standards and requirements of the WMP.</p> <p>Monitor and review compliance against these requirements.</p> <p>Undertake monitoring as required.</p> <p>Report water balance internally and externally.</p> <p>Maintain water balance monitoring tool.</p> <p>Review water quality results and implement management/preventative actions as required.</p>
External Affairs Team	Meet the commitments contained within the WMP for stakeholder engagement.
Engineering and Maintenance Managers	Maintain plant, equipment and infrastructure required under the water management system.
Manager Approvals Superintendent Environment General Manager Dendrobium Mine Manager Exploration and Technical Support	Provide the necessary resources and systems to meet the requirements of the WMP.



3. LEGAL AND OTHER REQUIREMENTS

3.1 Consent Conditions

Potential water quality impacts associated with Dendrobium Mine were assessed during the preparation of the Dendrobium Project Environmental Impact Study (EIS) 2001 and the Surface Water Review (Appendix 1) for the Gas Management Infrastructure Modification (MOD 9). The EIS and MOD 9 were assessed and approved under the *Environmental Planning and Assessment Act 1979 (EP&A Act)* and associated Regulations.

IMC will carry out the development generally in accordance with all of the necessary approvals, licences and other information described in Condition 2 of Schedule 2.

All activities carried out at Dendrobium Mine will be undertaken in accordance with the conditions of Consent (Condition 2A of Schedule 2).

In accordance with Condition 4 of Schedule 2, IMC will comply with any reasonable and feasible requirements of the Secretary arising from the Department's assessment of:

- (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with the conditions of the Consent;
- (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with the conditions of the Consent; and
- (c) the implementation of any actions or measures contained in these documents.

Appendix 1 outlines the water management requirements of the Consent³ and cross references where the requirements have been addressed within the WMP.

The documents as listed in Condition 11 of Schedule 8 will be made publicly available.

3.2 Wollongong City Council Consent

Cordeaux Colliery currently operates under Development Consent D74/134, issued by Wollongong City Council.⁴

3.3 Environment Protection Licence Requirements

EPL 3241 applies to Dendrobium Mine and associated activities and EPL 611 applies to Cordeaux Colliery and associated activities. A copy of these licences can be accessed at the EPA website: <http://www.epa.nsw.gov.au/prpoeoapp/>.

3.4 Mining Leases

Dendrobium Mine operates in accordance with the following mining leases:

- Consolidated Coal Lease (CCL) 768.
- ML 1510 (covers the KVCLF).

³ The water management requirements in Schedule 2 and 3 of the Consent relate to subsidence and are not included in this WMP. These requirements are addressed in the relevant SMP.

⁴ Options to incorporate Cordeaux Colliery in the Dendrobium Consent are currently being investigated.

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- ML 1566 (covers VS2 and 3).

3.5 Water NSW Access Consent

Consent F2020/1545 has been issued at IMC pursuant to clause 10(4) of the *Water NSW Regulation 2020*. Consent F2020/1545 grants consent to IMC to traverse lands that are Special Areas for the purposes of undertaking the Permitted Activity within the Designated Area in accordance with the conditions of this Consent. It includes requirements for reporting incidents and the requirement for submission of an Annual Statement of Compliance.

3.6 Relevant Legislation

Key regulatory and WMP obligations applicable to Dendrobium Mine and Cordeaux Colliery are managed via an obligations management database. The obligations are allocated to responsible personnel. This process is detailed in the Environmental Compliance/Conformance Assessment and Reporting Procedure.

Legislation which may be applicable to water management includes but is not limited to:

- *Protection of the Environment Operations Act 1997 (POEO Act)*;
- *Protection and the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014*;
- *Environmental Planning and Assessment Act 1979 (EP&A Act)*;
- *Water Act 1912*;
- *Water Management Act 2000*;
- *Water Management (General) Regulation 2018*;
- *Mining Act 1992*;
- *Mining Regulation 2016*;
- *Water NSW Act 2014*;
- *Water NSW Regulation 2020*;
- *Soil Conservation Act 1938*;
- *Fisheries Management Act 1994*; and
- *National Environment Protection (National Pollutant Inventory) Measure 1998*.

3.7 Guidelines and Standards

This WMP has been developed to be consistent with the principles of the following:

- ISO 14001:2015 Environmental Management Systems;
- South32 Sustainability Policy; and
- South32 Environment and Climate Change Standard.

Other relevant guidelines for water management include:

- AS 1940-2017 - The storage and handling of flammable and combustible liquids;

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- AS 3780-2008 - The storage and handling of corrosive substances;
- Bunding and Spill Management Guidelines (EPA);
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000);
- Australian Drinking Water Guidelines (ADWG 2018);
- Water Accounting Framework for the Minerals Industry User Guide - Version 2.0 (Minerals Council of Australia, 2022) available [here](#).
- Controlled activities – Guidelines for laying pipes and cables in watercourses on waterfront land Fact Sheet (DPE, 2022);
- Guidelines for controlled activities on waterfront land - Riparian corridors INT19/15607 (NRAR, 2018);
- Managing Urban Stormwater – Soils and Construction, Volume 1 (Blue Book) (Landcom, 2004);
- Managing Urban Stormwater – Soils and Construction, Volume 2A Installation of services (DECC, 2008);
- Managing Urban Stormwater – Soils and Construction, Volume 2C Unsealed Roads (DECC, 2008); and
- Managing Urban Stormwater – Soils and Construction, Volume 2E Mines and Quarries (Landcom, DECC).

3.8 Water Management Act Licences

Water Supply Works Approval 10WA118772 applies to the Dendrobium Mine operations and contains specific conditions relating to water management.

The Water Access Licences listed in Table 2 have been issued for groundwater extraction associated with the Dendrobium operations.

Table 2: Groundwater Extraction Licences

Water Licence No.	Water Sharing Plan, Source and Management Zone	Entitlement (units)
10AL118771	Greater Metropolitan Region Groundwater Sources Sydney Basin South Groundwater Source Nepean Management Zone 3	75
10AL119249	Greater Metropolitan Region Groundwater Sources Sydney Basin Nepean Groundwater Source Nepean Management Zone 2	3962
10AL123125	Greater Metropolitan Region Groundwater Sources Sydney Basin Nepean Groundwater Source Nepean Management Zone 2	1840
10AL123124	Greater Metropolitan Region Groundwater Sources Sydney Basin Nepean Groundwater Source Nepean Management Zone 2	3653

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4. SITE WATER BALANCE

This element describes the water balance and associated management strategies utilised at the following sites:

- Dendrobium Pit Top;
- KVCLF;
- DCPD;
- VS 1, 2 and 3;
- Cordeaux Colliery Pit Top; and
- Dendrobium underground operations.

4.1 Water Supply and Use

Underground and surface operations at Dendrobium utilise a combination of town water and recycled mine water. The recycled water component is extracted from adjacent flooded underground workings and treated, whilst the town water component is supplied via the Sydney Water mains. The combination of town water and recycled mine water provides security of supply of water for both underground and surface operations.

Storm water is captured at the KVCLF in the onsite sediment ponds and buffer dam and is used as the primary supply for the KVCLF dust suppression system and to maintain acceptable water levels in the fire-fighting tank.

Water supply and use applicable to the Dendrobium and Cordeaux operations are summarised in Table 3.

Table 3: Water Supply and Use

Aspect	Town Water	Recycled Water (from underground workings)	Recycled Water (surface runoff)
Dendrobium Pit Top	<ul style="list-style-type: none"> • Bathhouse Facilities • Office Amenities 	<ul style="list-style-type: none"> • Portal Road dust suppression • Wash down bay • General hose down and cleaning • Fire fighting 	<ul style="list-style-type: none"> • Nil directly (transferred into underground workings from sediment pond)
Kemira Valley	<ul style="list-style-type: none"> • Nil 	<ul style="list-style-type: none"> • Back-up supply for the KVCLF site operations 	<ul style="list-style-type: none"> • Stockpile dust suppression • General hose down and cleaning • Firefighting • Amenities
DCPD	<ul style="list-style-type: none"> • Office amenities 	<ul style="list-style-type: none"> • Coal washing • Stockpile dust suppression • Wash down bay 	<ul style="list-style-type: none"> • Coal washing • Stockpile dust suppression

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		<ul style="list-style-type: none"> • General hose down and cleaning • Firefighting 	
VS 1	• Nil	• Nil	• Nil
VS 2/3 ⁵	• Nil	• Nil	• Nil
Cordeaux Pit Top	<ul style="list-style-type: none"> • Office amenities • Transported to site by road tanker 	• Nil	<ul style="list-style-type: none"> • Firefighting • Vehicle washdown • Exploration activities <p>(Excess surface water is transferred from the Mine Water Holding Lagoon to disused Cordeaux mine workings)</p>
Underground Operations	<ul style="list-style-type: none"> • Longwall hydraulic system • Back up supply if recycled water (mine) is unavailable • Firefighting 	<ul style="list-style-type: none"> • Secondary support • Development units • Dust suppression • Fire fighting • Conveyor wash down 	• Nil
Corrimal #3	• Nil	• Nil	• Nil

4.2 Water Balance

For the purpose of this management plan, the Dendrobium water balance is broken up into the following components:

- Surface Operations – Pit Top;
- Surface Operations – KVCLF;
- Surface Operations – DCPD;
- Surface Operations – Ventilation Shafts;
- Surface Operations – Cordeaux Colliery; and
- Dendrobium underground Operations.

The water balance for the Dendrobium and Cordeaux surface and underground facilities is tracked via the water balance spreadsheet. The spreadsheets are maintained by the Specialist Environment. Plan 2 provides an overview of the Dendrobium water balance and Figure 1 provides a summary of the water balance for FY23.

⁵ It is planned for recycled water to be used at the VS2/3 site during the construction of the Gas Management Infrastructure Project and during operations.

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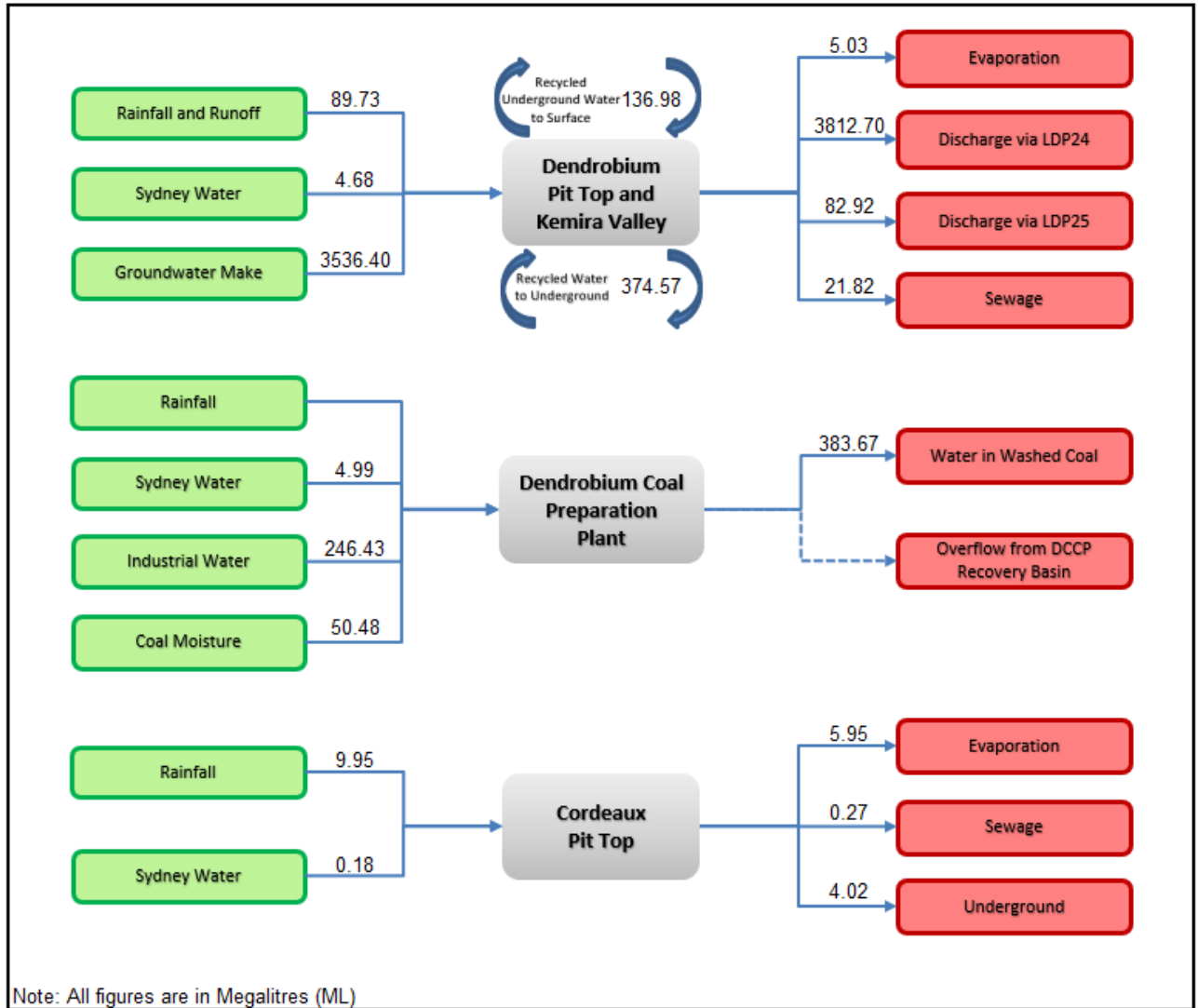


Figure 1: Water Balance Summary – FY23 (volumes in ML)

4.2.1 Surface Operations – Pit Top

Town water is used in the bathhouse and associated office facilities where potable water is required. Effluent from the bathhouse and office facilities is broken into a grey water stream and a black water stream. The grey water is directed to the Pit Top treatment plant and the black water is directed to the Sydney Water sewerage system.

The water cannons used for bushfire protection are connected to the Sydney Water supply.

The recycled water component, sourced from the Nebo Workings, is pumped to the surface and used in:

- the Portal Road dust suppression system;
- the wash down bay (located at the rear of the workshop); and
- for general hose down purposes.

Runoff from the general yard area and the Portal Road is directed to the Pit Top sediment pond from where it is pumped into the Pit Top treatment plant for transfer into the Nebo Workings. Runoff from the washdown bay is directed to the treatment plant, where it goes

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through an oily water separation unit and a holding tank prior to being transferred into the Nebo Workings. The site drainage system is described in more detail in Section 5.2 of the WMP.

4.2.2 Surface Operations – KVCLF

The KVCLF site is not connected to Sydney Water mains and therefore does not use any town water as part of the operations.⁶

Recycled water, sourced from the Nebo Workings, is used in:

- hose down reels;
- toilet flushing; and
- sink taps.

The fire tank can also be topped up with recycled water from the Nebo workings if required (e.g. during periods of low rainfall/low pond levels or pump failures).

Runoff from the site is directed to the sediment ponds from where, under normal circumstances, it is pumped into the fire tank where it is reused for:

- dust suppression;
- stockpile water sprays; and
- fire suppression.

Water from the sediment ponds is also periodically discharged via the mine dewatering pipeline to maintain adequate freeboard in the ponds in accordance with best practice for sediment pond management and EPL conditions.

The site drainage system is described in more detail in Section 5.2. Effluent from the toilets is collected and removed from site using a licenced waste contractor.

Water from O'Briens Drift is also able to be diverted to the buffer dam from where it can be directed to the fire tank.

Mine water from the underground workings is pumped directly to Licence Discharge Point (LDP) 5 via a 7 km pipeline. This water dilutes the brine discharged at LDP 5 that is produced from the Appin Mine (EPL 2504) water treatment plants and transported by tanker to this location.

4.2.3 Surface Operations – DCPD

Stormwater and surface water drain to onsite reclaim pits, sediment dams and a lagoon. Water is reused for dust suppression and coal processing. Runoff from stockpiles and hardstand areas during heavy rainfall discharges to Allans Creek and flows into Port Kembla Harbour.

Effluent from the toilets is connected to the Sydney Water sewerage system.

⁶ Investigations are underway to determine whether a Sydney Water connection via the underground workings is possible.

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Potable water is supplied to the DCPD by Sydney Water mains via the PKSW water network. Industrial water is supplied by Sydney Water mains via the PKSW water network.

The stockpile operations reuse water from the sediment dams (No. 4 Area). Industrial water is used to 'top up' the systems as required due to water loss on vehicles and to the environment.

4.2.4 **Surface Operations – Ventilation Shaft 1**

The VS1 site has been rehabilitated (to control runoff and erosion, but not to final proposed landform) and is considered a clean site. Runoff is not captured and flows freely to the surrounding landscape.

4.2.5 **Surface Operations – Ventilation Shaft 2/3**

The VS2/3 site has two sediment ponds that are utilised to capture the site water runoff allowing the sediment to drop out prior to the water being discharged via underflow drainage or discharge pumps (under normal conditions) or spillways (in high rainfall events). These sediment ponds have been expanded to manage sediment from the construction area associated with the Gas Management Infrastructure Project.

There are also two sediment ponds located along the access track to the VS2/3 site, however as these are not located on the actual site they have not been included in the water balance.

During construction, surplus water at the site (including but not limited to drilling operations) will be transferred to the underground workings for discharge via the Dendrobium dewatering pipeline.

Sydney Water will be supplied to the VS2/3 site via the underground workings and a borehole to the surface for cooling tower operation.

Surplus water at the site will be transferred underground to be discharged through the mine dewatering system.

4.2.6 **Surface Operations – Cordeaux Colliery**

Town water use at Cordeaux Colliery is generally for washing and toilet facilities. It is brought to site by road tanker as required and stored in the Clean Water Storage Tank.

Drinking water coolers are provided around site for consumption by Cordeaux personnel.

Site fire hoses and vehicle washdown bays use recycled water from the Mine Water Holding Lagoon.

Water from the Mine Water Holding Lagoon is also used in exploration activities. Volumes used are input to the site water balance.

The site has been designed to prevent dirty water run-off from entering the surrounding Special Area. The design provides effective treatment of run-off from potentially dirty areas such as the coal bins (disused), workshop, machinery hard-stand areas.. Drainage from these areas is collected in the Site Catchment Sedimentation Pond, before being pumped up to be gravity fed down a series of stabilisation lagoons. This process allows settling of contaminants and natural filtering as water passes down to each pond. Finally, the

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processed water is held in the Mine Water Holding Lagoon before it is gravity fed to disused Cordeaux underground workings.

Water used to clean vehicles at the wash-down bays is collected in a dedicated dirty water sump where it's removed by licensed contractors as required.

Clean area runoff is diverted to the Sand Filter Lagoon where it is filtered through sediment before leaving site to the Catchment Special Area.

All bathhouse and sewage effluent is contained on site. Both are collected in the site sewage tank before being transported off site by a licenced contractor for treatment and disposal.

4.2.7 Underground Operations

Dendrobium underground operations use a combination of town water and recycled water. The water balance spreadsheet is a tool used to help understand the long-term water make associated with the underground operations. The three main aspects of the underground water balance are discussed below.

4.2.7.1 Mine Water Flow (Pumping)

An extensive array of flow meters are utilised to determine the volume of water being pumped around the underground operations including areas such as secondary support, development and the longwall. The flow meters monitor real time flows at specified locations. A daily summary of the volumes is prepared and is used in conjunction with the other two aspects in 4.2.7.2 and 4.2.7.3 to determine the daily water balance for the underground operations.

Dendrobium underground water pumpout volume is recorded by a flow meter at Nebo Mains before the water is discharged to Marley Place. This flow meter records the total amount of water that leaves the mine from underground. A flow meter is located at the Break Tank and at LDP 5. The flow at both locations is monitored to identify any potential issues with the dewatering pipeline (e.g. leakage)⁷.

The general arrangement for the underground dewatering pumping system and water sampling are shown on Plan 8 and Plan 9 respectively.

4.2.7.2 Water in the Ventilation Air

Water is removed from the mine in exhaust air. Intrinsically safe hygrometers were installed in intake and return airways that indicated an average of 16.22 kL/day is removed from the mine in ventilation air. This data is used to estimate water loss within the daily water budget.

4.2.7.3 Water in the Coal

Water and moisture are removed from the mine with the RoM coal. A microwave moisture analyser was installed on the RoM belt in 2005 to monitor moisture in real time. The RoM coal moisture in conjunction with in-situ coal moisture obtained from block sampling allows the water removed from the mine with the RoM coal to be calculated.

⁷ Planned to be installed by end April 2023.

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4.3 Water Minimisation Strategy

4.3.1 System Design

The Dendrobium Mine water system has been designed to maximise the amount of recycled water used for the operations and hence minimise the volume of town water consumed. As discussed in Section 4.2.1, recycled water is extracted from the Nebo Workings and used for processes that do not require high quality ‘potable’ water such as:

- dust suppression;
- secondary support;
- development units;
- wash down areas; and
- firefighting purposes.

Town water is used for processes that require high quality potable water including:

- Pit Top bathhouse and office facilities; and
- longwall hydraulics.

4.3.2 Management Team Commitment

The Dendrobium Leadership Team is committed to maintaining water use efficiency to an acceptable level. Water efficiency targets have been developed for IMC.

The South32 water mitigation hierarchy is provided in Figure 2.

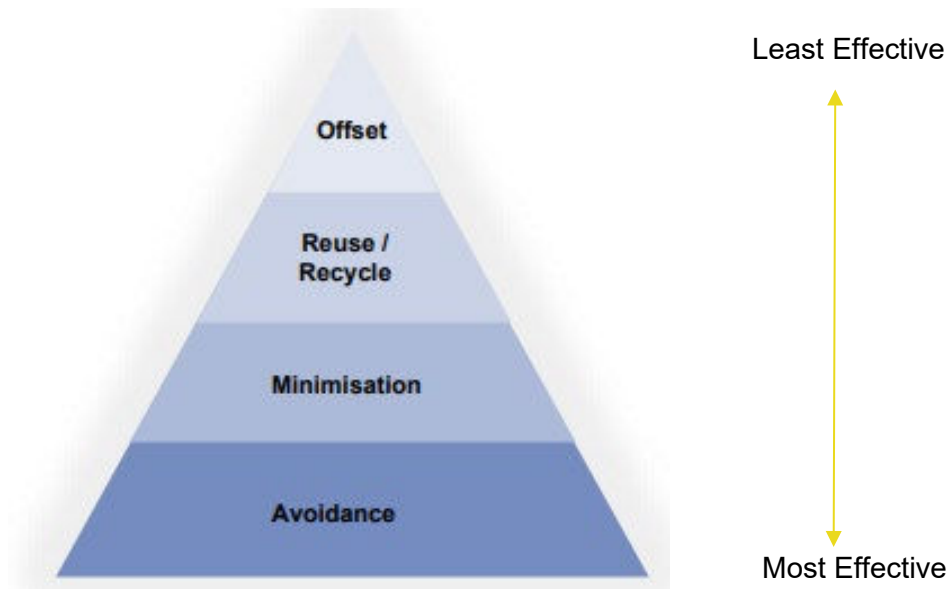


Figure 2: South32 Water Mitigation Hierarchy

4.3.3 Training and Awareness

Relevant water management aspects are included in the Environment Awareness e-learning training package. In addition to the training package, communications are presented to the workforce as required and awareness sessions are held as required that

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provide personnel with details of water usage and any projects that have been undertaken relating to minimising water use.

The sessions also provide a forum for the workforce to provide ideas and potential ways in which the water usage could be further minimised.

4.3.4 Identification of water reuse options

Potential water reuse/recycling improvement projects are investigated and reviewed via the following processes:

- Environmental Aspects and Impacts reviews;
- Environmental Improvement Plan reviews; and
- internal and external audits.

4.3.5 Performance Review

The water balance at Dendrobium mine is reviewed on a daily basis and is reported through to site management, Dams Safety NSW, WaterNSW and DPE on a monthly basis.⁸

The water balance is also reported on a monthly basis in the internal sustainability data collation app. Any significant variations in water consumption or discharge identified are investigated to determine the cause of the variation.

4.3.6 Cordeaux Colliery

There are limited opportunities to improve water efficiency at Cordeaux Colliery. Water is already recycled where potable water is not required.

4.4 Reporting

The reporting associated with water consumption and discharge is outlined in Table 4.

Table 4: Reporting Requirements

Water Type	Report/s	Stakeholders
Town water consumption (Type 1)	Monthly Sustainability Data Collation	South32 Stakeholders
	Annual Sustainability Reporting	South32 Group Management Committee and Shareholders

⁸ The monthly report to Dams Safety NSW is required when mining is occurring in the notification area.

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	Annual Review	DPE, EPA, WaterNSW, DS NSW, DCCC, WSC, WCC, CCC, BCS, DCCEEW, Resources Regulator ⁹
Recycled Water Usage	Annual Review	DPE, EPA, WaterNSW, DS NSW, DCCC, WSC, WCC, CCC, BCS, Resources Regulator, DCCEEW
Underground water balance	Monthly Report	DS NSW
Discharge to Allans Creek	Annual Review	DPE, EPA, WaterNSW, DS NSW, DCCC, WSC, WCC, CCC, BCS, DCCEEW, Resources Regulator
	Annual Returns	EPA
	14-day Report	All stakeholders ¹⁰

5. EROSION AND SEDIMENT CONTROL

The objectives of this element of the WMP are to:

- a) identify activities that could cause soil erosion and generate sediment;
- b) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;
- c) describe the location, function, and capacity of erosion and sediment control structures; and
- d) describe what measures would be implemented to monitor and maintain the structures over time.

This element describes in detail the erosion and sediment control management strategies utilised at the following sites:

- Dendrobium Pit Top ;
- KVCLF;
- VS 1 and 2/3;
- DCPD; and
- Cordeaux Colliery

⁹ DCCC – Dendrobium Community Consultative Committee, WSC – Wollondilly Shire Council; CCC – Campbelltown City Council, WCC – Wollongong City Council, BCS – Biodiversity, Conservation and Science Directorate, DCCEEW – Department of Climate Change, Energy, Environment and Water

¹⁰ Available on IMC website

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Erosion and sediment control management will be undertaken to be generally consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual.

5.1 Site Description

5.1.1 *Dendrobium Pit Top and Surrounding Streams*

The Dendrobium Pit Top is located in Mt Kembla near the top of Cordeaux Road, adjacent to Mt Kembla village at an elevation of approximately 300 m. The area around the mine site is extensively wooded with rainforest, often with a strong under storey of lantana in non-trafficked areas.

American Creek passes around the site on its south-western, southern and eastern sides and then flows down through Mt Kembla to join Brandy and Water Creek just west of Govett Crescent, Figtree. Above the confluence with Brandy and Water Creek, Upper American Creek has a catchment area of about 887 ha with a catchment above the Dendrobium Pit Top of approximately 243 ha. American Creek flows into Allans Creek at its approximate tidal limit in Unanderra. Allans Creek has a large catchment area, a high proportion of which is industrial in nature.

Potential works that can lead to erosion events include vegetation clearing, weed maintenance and construction activities.

5.1.2 *KVCLF and Surrounding Streams*

The KVCLF is located near the junction of the headwater tributaries of Brandy and Water Creek.

The site is located on a near-flat colluvial terrace on the western side of north-south flowing Brandy and Water Creek. The railway line passes southwards along the edge of this terrace and then east down a private South32 rail easement to the DCP, located within the PKSW.

The site has been partly filled with coal wash and other fill materials (eg basalt, rock slag), particularly beneath the railway embankment. Brandy and Water Creek passes along the eastern side of the terrace, parallel to the railway, with the centre of the creek bed being 15 to 20 m from the embankment of the terrace edge.

The uppermost one third of the catchment is in relatively pristine condition with steep forested slopes of >30% gradient leading up to the Illawarra Escarpment, with the Wollongong Motorcycle Club track also located in this catchment. The total catchment area is approximately 368 ha and has high rainfall due to the influence of the Illawarra Escarpment, which rises to 450 m at its headwaters.

Brandy and Water Creek passes through two distinct geomorphologic zones. The uppermost or first zone has a steep bed gradient, highly turbulent flow and well-defined, boulder-lined channels in a generally erosive but heavily wooded environment. Three small tributary streams drain three sub catchments on the escarpment and join where the second zone begins, just above a location adjacent to the old coal bins at the base of O'Brien's Drift.

The second geomorphologic zone is characterised by a much flatter bed gradient, lower stream velocities and increased deposition. One single channel dominates the catchment

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in this zone, and it passes through a relatively broad floodplain consisting of alluvial sediments beneath unimproved agricultural pasture.

Brandy and Water Creek then joins Upper American Creek in the west Wollongong suburb of Figtree immediately to the west of Cobblers Hill. The total catchment area of Brandy and Water Creek above this confluence is about 613 ha. A significant proportion of the catchment at this point is now residential, with a declining area used for rural purposes (cattle and horse grazing).

Potential works that can lead to erosion events include vegetation clearing, weed maintenance and construction activities.

5.1.3 **DCPP**

The DCPP and associated coal stockpiles is located within the boundary of the PKSW. Discharge from the PKSW site is to Allans Creek, which flows to the Port Kembla Harbour.

5.1.4 **Ventilation Shaft 1 and surrounding streams**

The VS1 site is located near O'Briens Gap. This location lies about 375 m west of the junction of Harry Graham Drive and Morans Road - the access road off Harry Graham Drive. The site lies about 120 m south of Morans Road, on a gentle north-dipping ridgeline. The site is located in medium density regrowth forest with relatively tall trees due to the good local soil quality and depth.

VS1 is located on IMC owned land. The site is located within a catchment that drains to Lake Cordeaux and therefore site activities are carried out in such a way so they do not impact adversely upon the water catchment. The VS1 site has been revegetated to reduce runoff and erosion potential.

5.1.5 **Ventilation Shaft 2/3 and surrounding streams**

The VS2/3 site is located within the Special Area between mining Areas 2 and 3a. Construction of the ventilation shafts was completed during 2008.

MOD 9 was approved in July 2022 for the construction of gas management infrastructure for Area 3C. At its closest point, the gas management infrastructure will be located approximately 277 m to the east of Sandy Creek and at an elevation approximately 47 m higher than that of the Sandy Creek bank. Sandy Creek forms the upper extent of Lake Cordeaux (i.e. the downstream reach of the creek would be inundated when Lake Cordeaux is at a sufficiently high level).

Potential works that can lead to erosion events include vegetation clearing, weed maintenance and construction activities.

5.1.6 **Cordeaux Colliery and surrounding streams**

The Cordeaux Colliery Pit Top is wholly contained within an area of approximately 11.9 ha located within the Special Area.

Cordeaux Creek is adjacent to the pit top to the west, which flows towards Cordeaux Dam. Clean water from the site is diverted to Cordeaux Creek.

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Corrimal #3 Shaft is located in the Special Area at the headwaters of an unnamed creek that is the outflow from a swamp. This creek flows to Cataract Dam.

5.2 Management Strategies

5.2.1 Dendrobium Pit Top

Surface water management at the Pit Top is divided into five separate streams as noted in Sections 5.2.1.1 to 5.2.1.5. The surface drainage system is shown in Plan 3.

5.2.1.1 Clean Water

Clean water runoff from off site is diverted around the entire site in open concrete drains and directed into American Creek.

5.2.1.2 Site Runoff

General site runoff (e.g. from car parking areas and yard areas), is directed to the sediment pond located on the Pit Top treatment plant flat. The water contained within the sediment pond is pumped in the Pit Top treatment plant and injected into the underground workings based on sediment pond water levels.

5.2.1.3 Oily Water

Water from the wash down bay and workshop is directed to the Pit Top treatment plant. The oily water separator is designed to remove oil and grease. The treated water is then pumped underground into the Nebo Workings.¹¹

5.2.1.4 Grey Water

Bathroom 'grey' shower water is directed to the Pit Top treatment plant.¹²

5.2.1.5 Black Water

Sewage from the site is discharged via the Sydney Water sewerage system.

5.2.1.6 Water Quality Management

In addition to the clean and site runoff water separation systems that have been implemented, the following strategies and controls are utilised to provide further hazardous material, sediment and erosion control at the Pit Top:

- Lubricants, hydraulic fluids and other machine-related chemicals are stored in bunded areas on the surface and in portable bunds underground where possible.

¹¹ A Pollution Reduction Program was undertaken during 2007 to determine whether these inputs have the potential to lead to short or long-term deterioration in the quality of the water in the old mining workings. The study concluded that there are not expected to be any such impacts from the discharges. The EPA agreed with the conclusion as stated in a letter received from the EPA on 30 January 2008.

¹² Investigations are underway to determine whether greywater can be directed to the Sydney Water sewerage system.

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Spill kits are located on the surface and in workshops so spills can be contained and cleaned up effectively. Absorbent material is available for cleaning up small spills from equipment, storage, or transfer of chemicals.

- Water from permanent and temporary bunds is regularly pumped out and removed from site by a licenced waste disposal company to prevent potentially contaminated water from reaching clean water systems on, or around, the site.
- Weekly inspections are carried out on the Pit Top sediment pond to monitor water levels. Under normal operating conditions, the water is pumped from the sediment pond (capacity of ~5 ML) into the primary silt trap in the Pit Top treatment system and after treatment transferred into the Nebo underground workings. During and following rainfall events, water may flow through or overtop the sediment pond spillway (LDP 22).
- Sediment traps and pits are installed in the site runoff water drainage system. These pits and traps are cleaned out as required.
- Revegetation is carried out as soon as practicable after completion of any construction works. This may include the application of spray grass or mulch, sowing of seeds or planting of tubestock.
- Sediment controls are installed on or downslope of disturbed or newly revegetated areas (until vegetation is established) to capture sediment and reduce erosion. These control measures may include the installation of sediment fencing, coir logs, matting, or other suitable sediment control. The type of control implemented will depend on the risk (consequence and likelihood) of erosion at the site.
- Slope stabilisation works may be required following extreme weather events to reinstate clean water diversion systems.

The impact of subsidence on groundwater and incidental water take due to subsidence related to mining is addressed in the SMP, a document prepared as part of the approval process for new mining areas.

Soil contamination that may lead to water pollution will be cleaned up as soon as practical. Where contamination is present that will require longer term management, controls will be installed to prevent the migration of the contamination to groundwater or surface water systems. The controls may include, but not be limited to, installation of booms or groundwater extraction wells.

5.2.2 KVCLF

At the KVCLF the surface drainage management system has been established so that clean water is diverted around the western side of the site and through a culvert beneath the rail line and site sediment pond and into Brandy and Water Creek¹³. Site runoff is captured via drainage structures and transferred to the on-site buffer dam and sediment ponds which have a combined capacity of approximately 15 ML (as shown in Plan 4). This water is re-

¹³ This culvert was replaced with a high density polyethylene pipeline in 2020 following an event that resulted in the uncontrolled release of water from the sediment pond to Brandy and Water Creek.

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used in the dust suppression system, stockpile sprays or used for the on-site firefighting system.

Water is discharged periodically from the sediment ponds via LDP 25 into the mine dewatering pipeline that discharges at LDP 5. If more than 60 mm of rainfall is received within a five-day period, water can be transferred through LDP 25 and the total suspended solids (TSS) water quality concentration limits at LDP 5 do not apply. During high rainfall events the sediment ponds may spill into Brandy and Water Creek through LDP 23 (Wet Weather Discharge). Sediment ponds are maintained to provide sufficient capacity to capture runoff from rainfall events.

The conveyor from the underground workings is fitted with regular hose connection points used to wash down the conveyor catch trays. Collection pits are emptied via an industrial vacuum truck at regular intervals.

The KVCLF drainage system is shown in Plan 4.

5.2.3 Ventilation Shafts

5.2.3.1 VS1

The VS1 site is unattended. Permanent drainage facilities have been constructed to operate with minimal maintenance. The site itself has been rehabilitated and is considered a clean site and surface runoff is not captured or treated.

5.2.3.2 VS2/3

Upslope runoff at the VS2/3 site is diverted around the site using low bund walls that directs clean water towards the tributaries to the south of the site. Some natural seepage through the bund does occur.

Sediment ponds are utilised to capture the site water runoff, allowing any sediment to drop out prior to the water being discharged via underflow drains or spillways in the event of heavy rainfall.

The non-operational footprint following the construction of VS2/3 was mulched and revegetated to minimise the generation of sediment laden runoff.

Construction activities associated with the Gas Management Infrastructure Project (approved under MOD 9) have commenced at the site. The sediment ponds were cleaned out and expanded to provide sufficient capacity for sediment control from the construction area.

Feasible and reasonable work practices will be implemented to minimise erosion and reduce sediment runoff at the site and along the access roads. Measures to be implemented may include but not be limited to:

- Directing the flow from exposed areas of the site (dirty water) to the on-site sediment ponds. The sediment ponds have been appropriately sized based on calculations conducted by HEC and will be constructed to meet the criteria in EPL 3241.
- Diverting clean water runoff away from the construction areas/areas of disturbance to minimise flows to on site sediment ponds.

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- Installing localised sediment control measures to slow flows and limit soil erosion at the source e.g. check dams (consisting of coir logs, sandbags or other suitable alternative), coir logs, straw bales, mulch bunds, sediment fences. Check dam spacing can be adjusted on site based on constructability and effectiveness.
- Temporarily stabilising areas where construction works are complete e.g. geofabric, coir matting, mulch bunds.
- Temporarily covering/stabilising exposed areas where heavy rainfall is predicted.
- Installing permanent rock energy dissipators at each sediment pond outlet, including the spillways, to reduce flow velocity, in general accordance with standard drawing “SD 5-8” in: Managing Urban Stormwater – Soils and Construction – Volume 1, 4th Edition (Landcom, 2004) (‘the Blue Book’);
- Installing de-silting markers in on-site sediment ponds to indicate the maximum height of the sediment storage zone calculated by HEC.
- De-silting sediment ponds if the settled sediment approaches the marker point.
- Dewatering sediment basins in accordance with EPL water quality discharge limits (50 mg/L for Total Suspended Solids and 100 NTU for turbidity) to maintain capacity for future rain events.
- Implementing sediment control structures (where not already in place) on site (close to source and around stockpiles of material), along access roads and downstream of sediment ponds e.g. sediment fences, sediment traps, table drains.
- Repairing of areas of erosion and maintaining sediment control structures (including sediment ponds) as required.
- Placing hardstand/gravel on or rehabilitating exposed areas as soon as practical.
- Limiting exposed areas to the minimum required to complete works.
- Capping and shaping of crown surface on access road to direct flows to mitre drains.
- Maintaining mitre drains and cross banks on access road.

Material that has been removed from the sediment ponds will be allowed to drain on site upstream of the existing sediment ponds. Sediment controls will be installed around the material to reduce sediment transfer into the sediment ponds.

Once dried, the sediment will be reused on site where practical, or removed off site to a suitable location.

In accordance with EPL 3241, discharge of TSS and turbidity from the sediment ponds via LDP 28 and 30 is permitted at unspecified concentrations when the discharge occurs solely as a result of rainfall at the premises exceeding a total of 95 mm over any consecutive five-day period.

Access to the VS2/3 site is via Firetrails 6, 6C, 6F and 6K in the Special Area. These tracks have numerous sediment management structures in place that are periodically maintained. The Soil Conservation Service – Scoping Report (dated 16 December 2022) provides additional detail on the erosion and sediment control structures on the fire trails.

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5.2.4 DCPP

Sediment ponds are in place at the coal stockpile area (Area 4) to capture stormwater and surface water. Water from these ponds is utilised on site for dust suppression.

Water may be discharged from these ponds into the Main Drain if required. Consultation with PKSW is required to set up the system and monitoring requirements prior to discharge.

5.2.5 Cordeaux

The Cordeaux Colliery Pit Top is sealed/hardstand and as a result erosion and sediment generation is well controlled.

The site has been designed to prevent dirty water run-off from entering the surrounding Special Area. The design effectively treats run-off from potentially dirty areas such as the coal bins (disused), workshop, machinery hard-stand areas and vehicle washdown bays. Drainage from these areas is collected in the Site Catchment Sedimentation Pond, before being pumped up to be gravity fed down a series of stabilisation lagoons.

Clean area runoff is diverted to the Sand Filter Lagoon where it is filtered through sediment before leaving site to the Special Area.

5.2.6 Construction Activities

Site specific Erosion and Sediment Control Management Plans will be developed for future construction activities where required. All construction sites will be rehabilitated as detailed in the Rehabilitation Management Plan.

5.3 Maintenance/Monitoring of Water Quality Control Structures

Erosion and sediment control structures and hazardous material bunds are nominally inspected monthly or after significant rain events, with maintenance works and repairs undertaken as required. Regular maintenance activities include:

- sediment removal from drains and sediment ponds;
- maintenance, repair or replacement of sediment control structures as required;
- repairs of areas, which become unstable following periods of high flow;
- maintenance of drainage structures that divert clean water from disturbed areas and that divert runoff from disturbed area to sediment basins;
- pump out of hazardous material bunds following significant rainfall; and
- checks on bund integrity and chemical storage to check compliance with the appropriate standards.

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6. SURFACE WATER MONITORING PROGRAM

The objectives of this element of the WMP are to:

- a) provide baseline data on surface water flows and quality in streams and other waterbodies that have been or could be affected by the surface facilities;
- b) include surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts;
- c) develop a program to monitor the impact of the surface facilities on surface water flows and quality, stream health and channel stability; and
- d) detail the procedures associated with reporting the results of the monitoring.

This element describes in detail the following monitoring programs:

- surface water monitoring program; and
- LDP 5 monitoring program.

The surface and groundwater monitoring programs for the mining areas are detailed in the relevant SMP and are therefore not included in this WMP.

6.1 Baseline Assessment

6.1.1 Surface Facilities

A baseline assessment of water-related impacts and flows for all aspects of the Dendrobium operation was included in the Dendrobium Project Environmental Impact Study (EIS) – refer to Volume 4 of the EIS. A Surface Water Review (Appendix 1) was undertaken for the Gas Management Infrastructure Modification (MOD 9).

Monitoring of water quality has been undertaken at upstream monitoring locations in American Creek (which flows past the Dendrobium Mine Pit Top) and Brandy and Water Creek (which flows past the KVCLF) since 2011. A summary of results that represent baseline (not affected by mining related activities) levels is provided in Table 5. These results represent a summary of 68 samples (Dend 7) and 67 samples (Dend 12), nominally collected every two months, covering all seasons.

Table 5: Baseline water quality data – Brandy and Water Creek and American Creek

Parameter	Measure	Water Quality Data
Dend 7 – Brandy and Water Creek		
pH	Average	8.11 pH units
	Range	6.34 - 8.8 pH units
EC	Average	484 μ S/cm
	Range	192 - 816 μ S/cm

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TSS	Average	26.7 mg/L
	Range	5 - 564 mg/L
Dend 12 – American Creek		
pH	Average	7.61 pH units
	Range	6.8 - 8.2 pH units
EC	Average	252 µS/cm
	Range	90 - 413 µS/cm
TSS	Average	10.5 mg/L
	Range	5 - 172 mg/L

No flow data is available for American Creek or Brandy and Water Creek. Flows fluctuate depending on rainfall in the catchment. During dry periods there are no significant flows into the creek.

A specific baseline assessment of the water quality and flow modelling of Allans Creek was completed as part of the brine discharge (via LDP 5) approval process prepared by UNSW Water Research Laboratory (November 2006) and SMEC (Snowy Mountain Engineering Corporation).

A summary of results that represent baseline levels in Allans Creek is provided in Table 6. These results represent a summary of 12 samples collected weekly from April to July 2006.

Table 6: Baseline water quality data Allans Creek

Parameter	Measure	Water Quality Data
pH	Average	7.4 pH units
	Range	7.3 – 7.6 pH units
EC	Average	533 µS/cm
	Range	178 - 818 µS/cm
Copper	Average	6 µg/L
	Range	2 - 14 µg/L
Zinc	Average	40 µg/L
	Range	11 - 81 µg/L



No flow data is available for the Allans Creek catchment. Flows fluctuate depending on rainfall in the attachment. During dry periods there are no significant freshwater inflows into the creek.

Further studies of the potential impact of brine on the Allans Creek aquatic environment, in particular the increase in volume of brine to be discharged from the Appin North water treatment plant, were undertaken (EGi, 2019; EGi, 2022). Under all scenarios modelled there is limited bioavailability of pollutants and a limited or low risk to aquatic fauna.

6.1.2 Mining Operations

Baseline water quality and quantity assessments for the current and proposed mining domains are included as part of the Environmental Assessment (EA) process to support SMP approvals. The baseline assessments involve assessing surface features (including natural watercourses) in the vicinity of mining domains prior to longwall extraction and using subsidence models to predict/identify potential impacts to these features as a result of longwall block extraction.

6.1.3 MOD 9

The Surface Water Review prepared by HEC (2022) comprised an assessment of the effects of MOD 9 on the water quality of surrounding watercourses and the recommendation of measures for the management of potential water quality effects.

MOD 9 would be located wholly within the previously approved and previously cleared area associated with VS2/3. MOD 9 constitutes an extension or expansion of the carrying out of the development and is therefore subject to Clause 11A of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* (Drinking Water SEPP)¹⁴.

Implementation of the erosion and sediment control measures would result in MOD 9 having the same impact on water quality as that of the existing development if it were extended or expanded under similar conditions as the existing Consent. Accordingly, MOD 9 would have a neutral effect to water quality in accordance with Clause 11A of the Drinking Water SEPP.

6.2 Monitoring

6.2.1 Surface Water Monitoring Program (Operations)

Surface water monitoring is carried out around the Dendrobium Pit Top and KVCLF sites in both American Creek and Brandy and Water Creek to identify any impacts associated with the surface facilities on surface water flows and quality, stream health and channel stability.

Water monitoring data is available in the 14-day Report, published on the IMC website at this [link](#).

When samples are collected, the following information is to be recorded:

- the date(s) on which the sample was taken;

¹⁴ This SEPP has been superseded by the *State Environmental Planning Policy (Biodiversity & Conservation) 2021*

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- the time(s) at which the sample was collected;
- the point at which the sample was taken; and
- the name of the person who collected the sample.

Water quality monitoring results are captured in EQUiS.

No water quality monitoring is undertaken at the DCPD by IMC¹⁵. Water quality monitoring in this area is undertaken by PKSW personnel in accordance with EPL 6092.

Water quality monitoring is not undertaken at the VS1 site as there is limited potential for impacts to surface water at this sites as it has been rehabilitated or covered with hardstand material, resulting in only clean water runoff.

Water quality monitoring is undertaken at the VS2/3 site is described in Section 6.2.2.2.

If significant variation in upstream and downstream water quality results are identified (see Table 11) or following an incident that has caused actual material environmental harm, an assessment of aquatic biota/stream health will be undertaken.¹⁶ This may include:

- a visual aquatic habitat assessment; and/or
- water quality monitoring; and/or
- macroinvertebrate stream health monitoring using Australian Rivers Assessment System (AUSRIVAS) rapid assessment sampling protocols and stream health indicators - Stream Invertebrate Grade Number Average Level (SIGNAL), Number of Taxa and Ephemeroptera, Plecoptera and Trichoptera (EPT) Index.

If required, the assessment will include upstream and downstream sites to compare background stream health with potentially affected areas of the watercourse.¹⁷

Channel stability is observed during water quality monitoring and site inspections. Any variations will be investigated and corrective measures implemented where required.

Water quality testing occurs every two months at the sites specified in Table 7. The sites are shown in Plan 5.

Table 7: Surface Water Monitoring Locations

Site ID	Site Description
Dend 7	Brandy and Water Creek - upstream of KVCLF
Dend 10	Brandy and Water Creek - downstream of KVCLF
Dend 12	American Creek - upstream of Pit Top
Dend 13	American Creek - downstream of Pit Top

¹⁵ Unless discharge is undertaken from the sediment ponds in Area 4.

¹⁶ The level of assessment required will consider the duration of the incident, weather conditions at the time of the incident, the contaminants involved, the location of the incident and any directions from relevant regulatory agencies.

¹⁷ An aquatic health assessment in Brandy and Water Creek and American Creek was undertaken following the uncontrolled release of water from the KVCLF sediment pond in August 2020 (Niche, 2020).

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Site ID	Site Description
LDP 22	Pit Top Sediment Pond

The parameters analysed as part of the two monthly water monitoring program are outlined in Table 8. Grab sample analysis is performed by a NATA accredited laboratory.

Table 8: Surface Water Monitoring Program

Parameter	Units of Measure	Sampling Method
pH	pH	In Situ and Grab Sample
Conductivity	µS/cm	In Situ and Grab Sample
Total Suspended Solids	mg/L	Grab Sample

6.2.2 LDPs

Locations of each of the LDPs associated with the Dendrobium operations are provided in Plan 5.

6.2.2.1 LDP 5 Water Quality

Monitoring at LDP 5 is undertaken in accordance with the relevant conditions in EPL 3241. The discharge point is connected to the underground dewatering system via a 7 km pipeline that enables Dendrobium to discharge into the tidal zone of Allans Creek. Water from the KVCLF sediment ponds is also discharged into this pipeline. The monitoring is carried out monthly during discharge.

Surface water discharges from the surface facilities are required to meet the relevant ANZECC/ANZG water objectives for the protection of aquatic ecosystems and water quality of existing receiving waters or comply with the discharge limits (both volume and quality) set for the development in EPL 3241.

The parameters analysed, water quality concentration limits and the sampling method for LDP 5 as stated in EPL 3241 are outlined in Table 9.

Table 9: LDP 5 Water Quality Monitoring Requirements

Parameter	Units of Measure	100 Percentile Concentration Limit	Sampling Method
Arsenic	mg/L	1.3	Grab Sample
Conductivity	µS/cm	N/A	Grab Sample
Copper	mg/L	0.080	Grab Sample
Nickel	mg/L	5	Grab Sample
Oil and Grease	mg/L	10	Grab Sample



Parameter	Units of Measure	100 Percentile Concentration Limit	Sampling Method
TSS	mg/L	30 ¹⁸	Grab Sample
Zinc	mg/L	0.4	Grab Sample
pH	pH	6.5-9.0	Grab Sample and In Situ

6.2.2.2 Vent Shaft 2/3 Water Quality

Water quality monitoring is undertaken at the VS2/3 site at the locations identified in Table 10 due to the commencement of construction activities associated with the Gas Management Infrastructure Project (MOD 9). This water quality monitoring will continue until the site has been stabilised/rehabilitated.

Table 10: VS2/3 Water Quality Monitoring Locations

Site ID	Location
LDP 29	VS2/3 North Sediment Pond
LDP 31	VS2/3 South Sediment Pond

The parameters analysed, water quality concentration limits and the sampling method for VS2/3 as stated in EPL 3241 are outlined in Table 11.

Table 11: VS2/3 Water Quality Monitoring Requirements

Parameter	Units of Measure	100 Percentile Concentration Limit	Sampling Method
TSS	mg/L	50	Grab Sample during Discharge (monthly)
Turbidity	Nephelometric turbidity units	100	Grab Sample during Discharge (monthly)

6.2.2.3 Volume Monitoring

The volume of water discharged through LDP 5 is monitored in accordance with EPL 3241 Condition M6.1. Details of the licenced flowmeters are provided in Table 12.

Table 12: EPL Volume Monitoring Sites

Site ID	Location
LDP 24	Pipeline dewatering underground water storage area.

¹⁸ Discharges from LDP 5 can exceed the concentration limit for TSS in the table above during release of stormwater from the KVCLF sediment ponds caused by rainfall totalling more than 60 mm in the preceding five days.



LDP 25 Pipeline discharge for KVCLF sediment ponds.

LDP 5 Located at Marley Place at the discharge point.

6.2.2.4 Wet Weather Discharge Points

The LDPs as listed in Table 13 are Wet Weather Discharge points and have no specified water quality concentration limits.

Table 13: Wet Weather Discharge Points

Site ID	Location
LDP 22	Spillway overflow from Pit Top Sediment Pond
LDP 23	Spillway overflow from KVCLF Sediment Pond
LDP 26	Nebo Portal groundwater drain
LDP 27	Kemira Portal groundwater drain
LDP 28	Spillway overflow from VS2/3 North Sediment Pond
LDP 30	Spillway overflow from VS2/3 South Sediment Pond

LDP 26 and LDP 27 are for groundwater that drains from the disused Nebo and Kemira mine portals respectively. These points have been in existence for many years and can produce flow during wet weather periods when the groundwater table rises in the old mine workings.

6.2.3 Cordeaux

6.2.3.1 Surface Water Monitoring

There are no LDPs at Cordeaux Colliery and it considered to be a zero-discharge site.

Monitoring of water quality from the Sand Filter Lagoon (where it is filtered through sediment prior to leaving site) is undertaken on a monthly basis.

Water in the Mine Water Holding Lagoon is tested for quality on a monthly basis with discharge volumes recorded on a quarterly basis.

6.2.3.2 Corrimal #3

In 2017, there was a spill event from a transformer on site following a vandalism event. The spill has since been remediated and associated monitoring at the site is no longer required. A reduced inspection is undertaken at the site on a monthly basis, as per care and maintenance requirements.

6.2.3.3 Groundwater Monitoring

A series of shallow groundwater monitoring wells are in place at site to monitor any potential leakage from the underground diesel tank. The monitoring wells are tested six-monthly.

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Details can be found in the Cordeaux Colliery Fuel System Operation Plan (ICAMP0145).

6.2.4 Groundwater Monitoring Program (Surface Facilities)

There is no groundwater monitoring program associated with the surface facilities.

6.2.5 Surface Water Monitoring Program (Mining Domain)

Monitoring of the surface water features above the mining domain is undertaken in accordance with the relevant SMP.

6.2.6 Groundwater Monitoring Program (Mining Domain)

Groundwater modelling and monitoring is undertaken to predict and monitor impacts associated with longwall extraction in the Dendrobium mining areas. The groundwater monitoring program for each mining area is covered in more detail in the relevant SMP.

6.2.7 Monitoring Equipment Calibration

Equipment used for water quality and flow monitoring will be calibrated as required. Records of calibrations will be maintained.

6.3 Reporting

6.3.1 Surface Water (Surface Facilities)

As most of the monitoring sites are located in natural watercourses that surround the Dendrobium Pit Top and KVCLF sites, including Brandy and Water Creek and American Creek, normal variations in response to local geology and rainfall occur.

The results from the downstream sites are compared to the upstream sites along with the long-term averages to identify possible trends. A summary of the results is reported to key stakeholders via the Annual Review and the 14-day Report (refer to Section 9.1).

6.3.2 Groundwater (Licences)

Annual compliance against Water Access Licences 10AL118771, 10AL119249, 10AL123125, and 10AL123124 and associated groundwater take will be reported in the Annual Review.

6.3.3 LDPs

All non-compliances with water quality concentration limits are reported in G360 (see Section 8.2). Results from the LDP 5 Monitoring Program are reported in the EPL Annual Return, the Annual Review and the 14-day Report (refer to Section 9.1).

6.3.4 Surface and Groundwater (Mining Domains)

Results from the surface and groundwater monitoring undertaken for the mining domains are analysed at the completion of each longwall block as per SMP requirements and are reported through to key stakeholders via the End of Panel Report (see Section 9.1.5).

A summary of the results are reported to key stakeholders via the Annual Review.

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7. SURFACE AND GROUNDWATER RESPONSE/CONTINGENCY PLAN

The objectives of this element of the WMP are to:

- detail the process for responding to any exceedances of the surface water, stream health and groundwater assessment;
- identify actions to mitigate and/or offset any adverse impacts on groundwater dependent ecosystems¹⁹, aquatic ecosystems or riparian vegetation; and
- manage any unpredicted impacts and their consequences to reduce ongoing impacts to levels below relevant impact assessment criteria as quickly as possible.

7.1 Surface Water Response/Contingency Plan

Monitoring as described in Section 6.2 will provide data that will be assessed to identify any unpredicted impacts on water quality. The response/contingency plan that will be implemented if unpredicted impacts associated with surface waters are identified is detailed in Table 11. Actions will be undertaken as outlined in Table 11 to reduce ongoing impacts to levels below relevant impact assessment criteria as soon as possible.

Table 14: Surface Water Response Plan

Event Type	Description	Response	Reporting	Responsibility
LDP Non-compliance	Exceedance of LDP water quality criteria	Exceedance investigated. Corrective actions identified and implemented (if applicable). ²⁰	<u>Internal</u> - Event Report <u>External</u> - Annual Return - EPA Notification - Annual Review - DCCC Meeting	Internal Reporting/ Investigation: Specialist Environment External Reporting: Superintendent Environment
Surface Water Variation	Significant variation (two standard deviations) identified between	Investigation conducted into possible cause of the variation, that may include additional water	<u>Internal</u> - Event Report	Internal Reporting/ Investigation: Specialist Environment

¹⁹ There are no groundwater dependent ecosystems associated with the surface facilities.

²⁰ Corrective actions will be dependent on the cause of the exceedance or variation in water quality and will be determined through the investigative process. Corrective actions may include but not be limited to retesting of samples by the laboratory, additional/more frequent monitoring, water treatment or a review of input/upstream water quality and potential sources of contamination. Weather conditions and feedback from external stakeholders may influence the actions undertaken.

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	upstream and downstream water monitoring sites during two monthly sampling	sampling. Corrective actions identified and implemented (if applicable). ²⁰	<u>External</u> - Annual Review	External Reporting: Superintendent Environment
Environmental Harm	Incident involving the Dendrobium operations which caused (or had the potential to cause) environmental harm	<u>As soon as practical</u> Notify regulatory agencies (as required by the Pollution Incident Response Management Plan (PIRMP)). Cease or restrict operations resulting in environmental harm. Conduct water quality sampling upstream and downstream of incident. <u>If required</u> Conduct clean-up activities. Undertake additional water quality sampling. Undertake stream health assessment. Rectify any damage to site infrastructure or natural features. ²¹	<u>Internal</u> - Event Report - Monthly Sustainability Report <u>External</u> - Initial notification - Written Incident Report to EPA, DPE and Resources Regulator - Annual Return - Annual Review - DCCC Meeting	Internal Reporting: Responsible operations personnel Investigation: Responsible operations personnel External Reporting: Superintendent Environment

²¹ Rectification may include repair to valves, pipelines, bunding or sediment ponds or repair works to creek banks, including but not limited to revegetation.

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7.2 Groundwater Response/Contingency Plan

Groundwater modelling and monitoring is undertaken to predict and monitor impacts associated with longwall extraction in the Dendrobium mining areas. The groundwater monitoring program for each mining area is covered in more detail in the relevant SMP. These plans also describe the measures and procedures to investigate, notify and mitigate any ground or surface water exceedances, outline ways to minimise, prevent or offset any adverse impacts to ground or surface water resources. These plans can be found on the IMC website at:

https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents_

Details of any significant changes in groundwater quality and/or levels associated with the mining domain are reported through to key stakeholders via End of Panel reports. A summary is also provided in Annual Review.

8. COMPLAINTS AND NON-COMPLIANCE MANAGEMENT

8.1 Complaints and Dispute Resolution

IMC has a 24-hour, free community call line (1800 102 210) and email address (illawarracommunity@south32.net) which is displayed at IMC Projects and Mine Sites, and included in newsletters, letters and other correspondence. The call line is for all complaints and general enquiries regarding environmental or community issues associated with IMC's operations.

Community complaints and enquiries may also be received in person by any employee of IMC, with details to be immediately shared with the External Affairs Team for investigation. All water related complaints received in relation to Dendrobium Mine will be managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint. An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.

Supplementary water monitoring may also be undertaken as necessary and until satisfactory resolution of the issue.

A summary of all complaints received during the reporting year will be provided as part of the Annual Review, that will include a comparison with complaints received the previous year. A log of complaints is also maintained on the IMC website at:

https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents_

8.2 Events, Non-Compliance, Corrective Action, and Preventative Action

Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental

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Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification. The key elements of the process include:

- identification of events, non-conformances and/or non-compliances:
- recording of the event, non-conformance and/or non-compliance in the event management system (G360);
- investigation/evaluation of the event, non-conformance and/or non-compliance to determine specific corrective and preventative actions;
- assigning corrective and preventative actions to responsible persons in G360; and
- review of corrective actions to verify the status and effectiveness of the actions.

Incidents and non-compliances with water quality criteria will be reported to all relevant stakeholders as detailed in Section 9.2.

8.2.1 Protocol for Assessing Compliance

The process for assessing compliance considers whether external extraordinary factors unrelated to Dendrobium Mine have adversely influenced a monitoring result. This is necessary to confirm water quality reporting is reliable and accurate and enables stakeholders to be properly informed.

The protocol for confirmation of monitoring results, including non-compliance with criteria in EPL 3241, includes the consideration of external factors such as upstream influences unrelated to Dendrobium Mine operations and not within Dendrobium Mine’s operational control.

8.2.1.1 Non-compliance due to invalid samples and external factors

Where a non-compliance with water quality criteria has been recorded due to an invalid sample (e.g. laboratory error) or external factors, and this has been validated, these results will not be recorded. A file note will be maintained providing justification for disregarding the sample. Notification to the relevant Government Agency will occur if the sample is required for compliance monitoring, providing justification for disregarding the sample.

8.2.1.2 Non-compliance due to operational activities

Where a non-compliance has been recorded and it has been validated that it is due to operational activities or the failure of controls, notifications to Government Agencies and other stakeholders will occur as detailed in Section 9.2.

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8.2.2 Adaptive Management

Where any exceedance of the criteria in EPL 3241²² has occurred, IMC will take all reasonable and feasible steps to ensure the non-compliance ceases and does not recur and consider all reasonable and feasible options for remediation (where relevant).

The Surface and Groundwater Response Plan is detailed in Section 7.

Monitoring results will be reviewed when received and as part of the Annual Review process to identify continual improvement opportunities. Improvement opportunities may also be identified during internal and external audits. These improvement opportunities will be discussed with relevant site personnel and raised through senior leadership team meetings as appropriate and will be documented in the Environment Improvement Plan or actions assigned in G360.

8.2.3 Cost of Management Measures

Notwithstanding that groundwater and surface water impacts associated with subsidence are addressed in the relevant SMP, IMC acknowledges it is responsible for the costs of all management measures (including measures to minimise, mitigate, offset or remediate impacts of the development which are not recoverable by a third party through the *Coal Mine Subsidence Compensation Act 2017* or the *Mining Act 1992* including but not limited to remediation of natural features, rehabilitation of ecological systems, the provision of supplementary waters and monitoring of the effectiveness of the works, as determined by the Planning Secretary.

8.2.4 Independent Review

If a landowner considers that impact assessment criteria in Schedule 4 are being exceeded, they may request an independent review in accordance with Condition 2 of Schedule 7. If the Planning Secretary is satisfied that an independent review is required, it will be undertaken in accordance with Conditions 3, 4 and 5 of Schedule 7.

9. REPORTING AND REVIEW

In accordance with Condition 8 of Schedule 8, Any condition of the Consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the *EP&A Act*.

This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.

²² There are currently no criteria in EPL 611.

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9.1 Reporting

9.1.1 Annual Review

IMC will report on the performance of the WMP in the Annual Review.

The Annual Review is prepared in accordance with the requirement of Condition 5 of Schedule 8 of the Consent and is submitted to relevant agencies (including DPE, NSW Resources Regulator, EPA, DCCC, DCCEEW, WCC, WSC, CCC, BCS, WaterNSW, DS NSW, DPE Water, NRAR) in September each year. Annual Reviews are made available to the regulatory agencies and general public via the IMC website.

The Annual Review will include:

- water quality and flow monitoring results including comparison to relevant statutory requirements, limits or performance measures/criteria, requirements of any plan or program required under the Consent, monitoring results of previous years and relevant predictions in the documents listed in Condition 2 of Schedule 2;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;
- identification of trends;
- groundwater take under water access licences;
- water quality related complaints and management/mitigation measures undertaken;
- management/mitigation measures undertaken in the event of any confirmed non-compliances, environmental impacts or failures of controls to rectify the non-compliance and avoid reoccurrence;
- review of the performance of management/mitigation measures and the monitoring program;
- describe the measures that will be implemented over the next financial year to improve the environmental performance of the development; and
- describe the development carried out in the previous financial year and proposed to be carried out in the current financial year.

9.1.2 Public Reporting of Results (via website)

A summary of the water quality and flow monitoring results, including details of exceedances and non-compliances (as determined in accordance with the protocol for assessing compliance as described in Section 8.2.1 of the WMP), will be provided on the IMC website in the 14-day Report at:

<https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

9.1.3 Annual Return

Results provided in the 14-day Report will be summarised and submitted to the EPA in the Annual Return for EPL 3241.

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Any water-related non-compliances at the Cordeaux Colliery Pit Top will be reported in the Annual Return for EPL 611.

9.1.4 DS NSW

The Dams Safety NSW Monthly Report is provided to comply with the DS NSW conditions of approval for Dendrobium Mine. The report summarises DS NSW related activities that have been undertaken in the month.

9.1.5 Internal Sustainability Reporting

Water inputs and outputs as detailed in the water balance and water accounting framework is collated monthly and reported to Head Office for aggregation.

South32 is a signatory to the International Council of Mining and Metals and is required to publicly report on water use and management. Aggregated water data is reported annually.

9.1.6 End of Panel Reports

End of Panel Reports are prepared following the completion of each longwall panel. The report outlines the measured and observed impacts during the extraction of the respective longwall and presents monitoring results and analyses compared to relevant impact assessment criteria and predictions in the SMP. End of Panel Reports are made available on the IMC website at: <https://www.south32.net/what-we-do/our-locations/australia/illawarra-metallurgical-coal/documents>.

9.1.7 Annual Statement of Compliance

In accordance with Condition 4.3.1 of Consent F2020/1545, IMC must provide Water NSW with a signed Annual Statement of Compliance indicating its compliance or otherwise with the conditions in Consent F2020/1545 for each 12-month period, with reports due annually by 30 September. The Consent Holder must sign and endorse the Annual Statement of Compliance and submit it to Water NSW via email to environmental.assessments@waternsw.com.au within 60 days of the end of each reporting period. The Annual Statement of Compliance is included as an Appendix in the Annual Review.

9.2 Incident and Non-compliance Notifications

9.2.1 Notification of Incidents

In accordance with Condition 3 and 4 of Schedule 8 of the Consent, the Department and any other relevant agencies will be notified immediately²³ by IMC after becoming aware of an incident²⁴. The notification will be in writing and submitted to

²³ Notification within 24 hours is required under the Consent. Notification is required immediately after the person becomes aware of the incident under EPL 3241.

²⁴ An incident is defined as an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.

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compliance@planning.nsw.gov.au and identify the development and set out the location and nature of the incident.

Where the incident has caused or has the potential to cause material environmental harm, the PIRMP will be activated, and notifications as listed in the PIRMP completed as required.

Within seven days of notifying the Department and other relevant agencies of such an incident, the Applicant must provide the Department and these agencies with a written report that:

- (a) describes the date, time, and nature of the incident;
- (b) identifies the cause (or likely cause) of the incident;
- (c) describes what action has been taken to date; and
- (d) describes the proposed measures to address the incident.

9.2.2 Notification of Non-Compliances – Government Agencies

In the event that a non-compliance with the relevant criteria is confirmed as per Section 8.2.1, a notification is to be made via the DPE Major Projects Planning Portal: <https://www.planningportal.nsw.gov.au/major-projects>.²⁵ This notification is to be made as soon as practicable and no longer than seven (7) days after obtaining monitoring results showing any exceedance of the water quality concentration criterion (see Section 8.2.1). The EPA is also to be notified of the non-compliance (via email).

9.2.3 Notification of Incidents and Non-compliances – Water NSW

Incidents in the Metropolitan Special Area must be reported to Water NSW in accordance with Conditions 4.1 and 4.2 of Consent F2020/1545 by contacting the Water NSW Incident Notification Number (1800 061 069). If a non-compliance with any of the conditions of Consent F2020/1545 are recorded, a comprehensive written report is required to be provided within 14 days of having become aware of the non-compliance. The incident report is to include the information required by Condition 4.2.1.

9.2.4 Notification of Exceedances and Non-compliances – Other Stakeholders

The DCCC will be advised of exceedances and non-compliances under the WMP at the next available meeting.

If landowners have been directly impacted by an exceedance or non-compliance with water quality criteria, notifications will be made in accordance with Condition 1 of Schedule 7.

9.3 Review of WMP

In accordance with Condition 2A of Schedule 8 of the Consent, the WMP will be reviewed, and if necessary revised, within three months, of:

- a) the submission of an annual review;

²⁵ Required under Condition 12 of Schedule 4.

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- b) the submission of an incident report;
- c) the submission of an Independent Environmental Audit (IEA) report; or
- d) any modification to the conditions of the Consent (unless the conditions require otherwise).

If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary and submitted to the Planning Secretary for approval within six weeks of the review.

Outcomes from each review will be documented in the Management Plan Review Log. The WMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the WMP. Administrative or descriptive changes do not constitute a material change.

Where a review triggers a revision of the WMP, the WMP will be revised and submitted to the Planning Secretary for approval.

The approved WMP will be implemented.

9.4 Audits

9.4.1 Independent Environmental Audit

In accordance with Condition 6 of Schedule 8 of the Consent, an IEA shall be commissioned every three years, that will include a review of the WMP.

- (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
- (b) include consultation with the relevant agencies and the DCCC;
- (c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this consent and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);
- (d) review the adequacy of strategies, plans or programs required under these approvals;
- (e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals; and
- (f) be conducted and reported to the satisfaction of the Planning Secretary.

The report is required to be submitted to the Planning Secretary and any other NSW agency that requests it, together with the response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations, within three (3) months of commencing²⁶ the IEA, in accordance with Condition 7 of Schedule 8 of the

²⁶ The date of commencing the IEA is defined as the first day of the site inspection.

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Consent. A copy of the IEA and response to recommendations will be provided on the IMC website.

The recommendations of the IEA must be implemented to the satisfaction of the Planning Secretary.

IEAs have been conducted every three years since 2008, with the last IEA being conducted in 2023 and the next IEA to be conducted in 2026. Recommendations from the IEA will be incorporated into the WMP where appropriate.

9.4.2 ISO 14001

As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard.

External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.

Internal Governance Reviews of the WMP are nominally undertaken on an annual basis.

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10. SUMMARY OF COMMITMENTS

Commitment	Section in WMP
IMC will provide personnel and resources to implement the WMP.	Section 2
IMC will comply with the conditions of the approval and relevant legislation.	Section 3
IMC will implement and maintain reasonable and feasible water quality mitigation measures across all sites to comply with water quality criteria and minimise the impact on the environment and community.	Section 5
IMC will identify and implement opportunities to minimise potable water use and maximise recycled water use.	Section 4
IMC will maintain the equipment required to calculate the Dendrobium water balance.	Section 4.2.5
IMC will maintain equipment and infrastructure required for the water management system to operate as designed.	Section 4 and Section 5
IMC will periodically provide awareness sessions to site personnel regarding site water use and management.	Section 4.3.3
IMC will undertake regularly inspections to verify that the water management systems is operating as designed.	Section 5.2.1.6
IMC will undertake water quality and flow monitoring as required by the Consent and EPL.	Section 6
Baseline water quality and quantity assessments for proposed mining domains will be assessed under the SMP.	Section 6.1.2
IMC will review monitoring data and review controls where data analysis indicates controls are not effective.	Section 7 and 8.2.2
IMC will conduct additional monitoring and spot checks to investigate incidents and complaints.	Section 6.2 and Section 8.1
IMC will maintain and calibrate monitoring equipment as required.	Section 6.2.6
IMC will take all reasonable and feasible measures to address non-compliances as soon as practicable and take appropriate remedial action as required.	Section 7 and 8.2.2
IMC will report and investigate complaints, incidents and exceedances of limits as required, and identify and implement corrective actions.	Section 8
IMC will undertake reporting as required.	Section 9
IMC will review the WMP as required.	Section 9.3
IMC will undertake audits as required.	Section 9.4

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11. ACRONYMS

Term	Definition
ANZECC	Australian and New Zealand Environment. Conservation Council (ANZECC)
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
AUSRIVAS	Australian Rivers Assessment System
BCS	Biodiversity Conservation and Science
CCC	Community Consultative Committee
DAWE	Department of Agriculture, Water and Environment
DCPP	Dendrobium Coal Preparation Plant
DPE	Department of Planning and Environment
DS NSW	Dams Safety NSW
EIS	Environmental Impact Study
EMS	Environmental Management System
EPA	Environment Protection Authority
<i>EP&A Act</i>	<i>Environmental Planning and Assessment Act</i>
EPL	Environment Protection Licence
EPT	Ephemeroptera, Plecoptera and Trichoptera
EQulS	Environmental monitoring database
G360	IMC event reporting system
ICHPL	Illawarra Coal Holdings Pty Ltd
IEA	Independent Environmental Audit
IMC	Illawarra Metallurgical Coal
km	kilometre
KVCLF	Kemira Valley Coal Loading Facility
LDP	Licence Discharge Point
ML	Mining Lease

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Mtpa	Million tonnes per annum
NRAR	Natural Resource Access Regulator
POEO	Protection of the Environment Operations
PKSW	Port Kembla Steel Works
RoM	Run of Mine
SEPP	State Environmental Planning Policy
SIGNAL	Stream Invertebrate Grade Number Average Level
SMP	Subsidence Management Plan
WCC	Wollongong City Council
WMP	Water Management Plan
WSC	Wollondilly Shire Council
VS	Ventilation Shaft

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12. REFERENCES

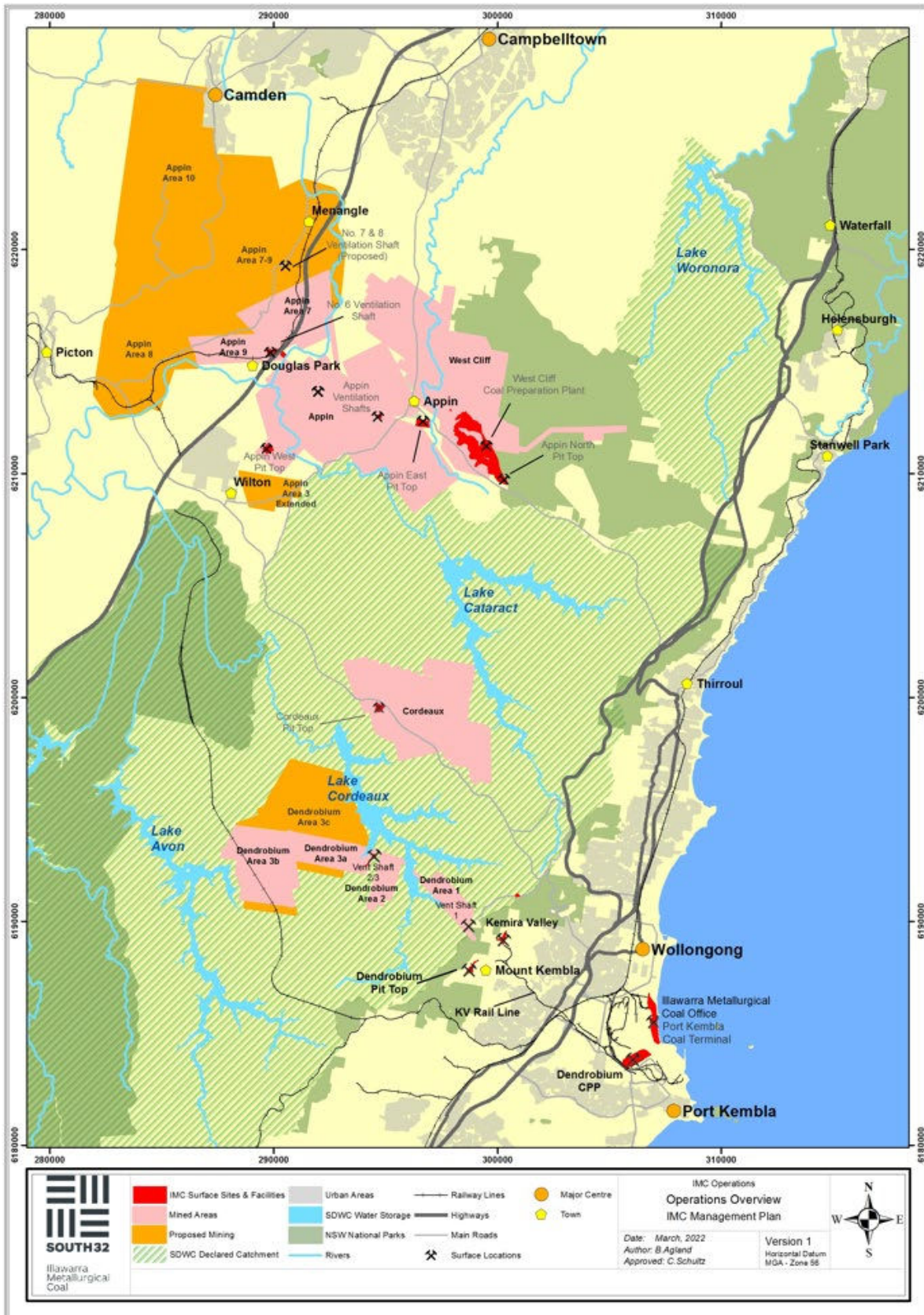
- Development Consent 60-03-2001, as modified
- Development Consent D74/134
- EPL 3241
- EPL 611
- Dendrobium Mine Environmental Management Strategy (DENMP0039)
- Handling Community Complaints, Enquiries and Disputes Procedure (IMCP0112)
- Reporting and Investigation Standard (IMCSTD0069)
- Environmental Compliance/Conformance Assessment and Reporting Procedure (IMCP0186)
- ISO 14001:2015 Environmental Management Systems Standard
- EGi (2019). Allans Creek licensed discharge water quality and hydrogeochemical modelling (Environmental Geochemistry International (EGi) and Hydro Engineering and Consulting Pty Ltd (HEC))
- EGi (2022). Technical Memorandum: Allans Creek hydrogeochemical model update and LDP 5 zinc investigation
- Managing Urban Stormwater: Soils and Construction Manual
- Rehabilitation Management Plan (DENMP0107)
- Dendrobium Mine Project: Assessment and Management of Water -Related Impacts (2000). Ecoengineers Pty Ltd
- Aquatic Ecology Monitoring Report: Brandy and Water Creek and American Creek (2020). Niche Environment and Heritage
- Dendrobium Mine Modification – Gas Management Infrastructure Modification Report (IMC, 2022)
- Dendrobium Gas Management Infrastructure – Modification Surface Water Review (2022). Hydro Engineering and Consulting (HEC)
- Cordeaux Colliery Fuel System Operation Plan (ICAMP0145)
- Avon and Cordeaux Reservoirs DS Notification Area Management, Closure and Contingency Plan (DENMP0078)
- Water Monitoring Procedure (IMCP0335)
- Gas Drainage Plant – Area 3C - Construction Erosion and Sediment Control Plan (Version 3 dated 15 December 2022)
- Soil Conservation Service – Scoping Report (dated 16 December 2022)
- State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

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13. PLANS

Plan 1: Dendrobium Mine Locality Plan



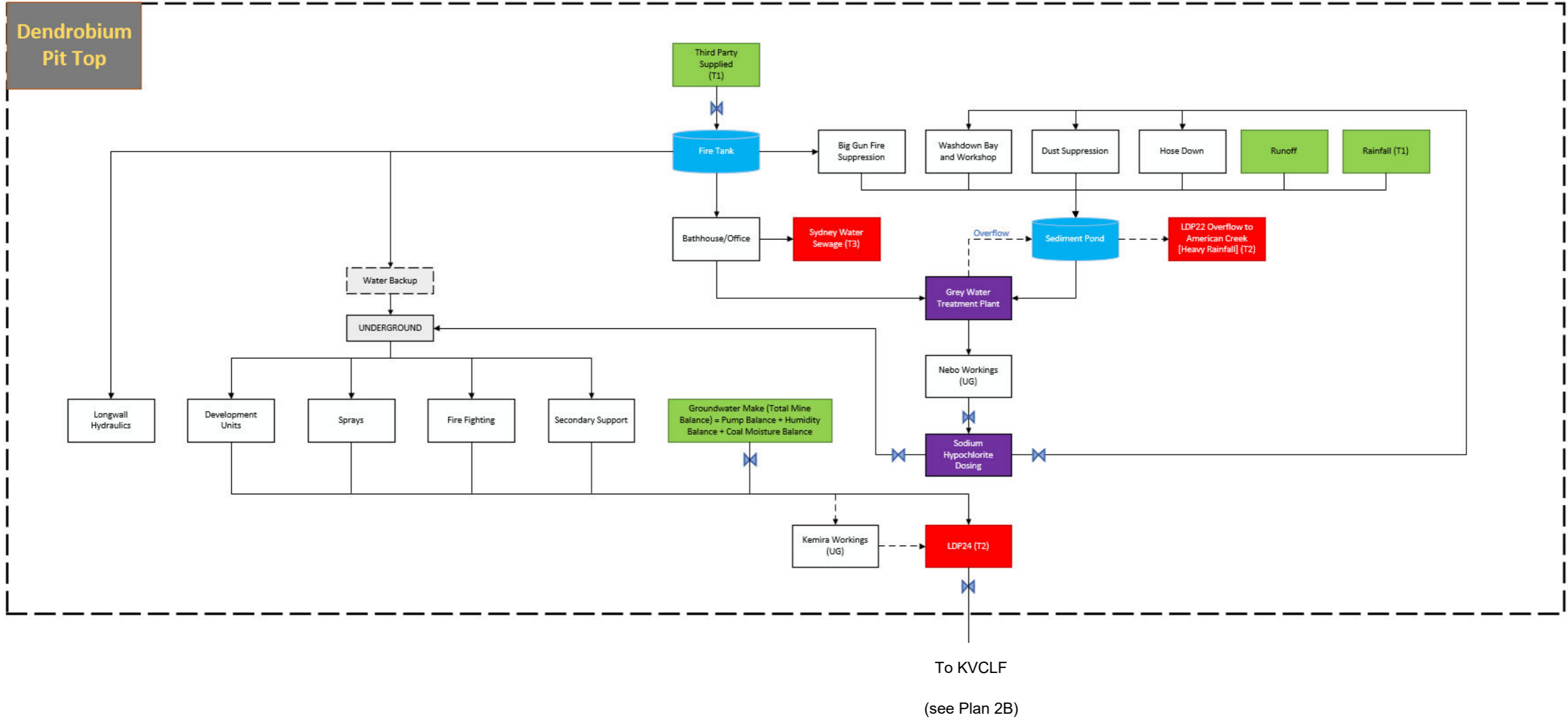
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Plan 2: Water Balance Flow Charts

Plan 2A: Dendrobium Pit Top

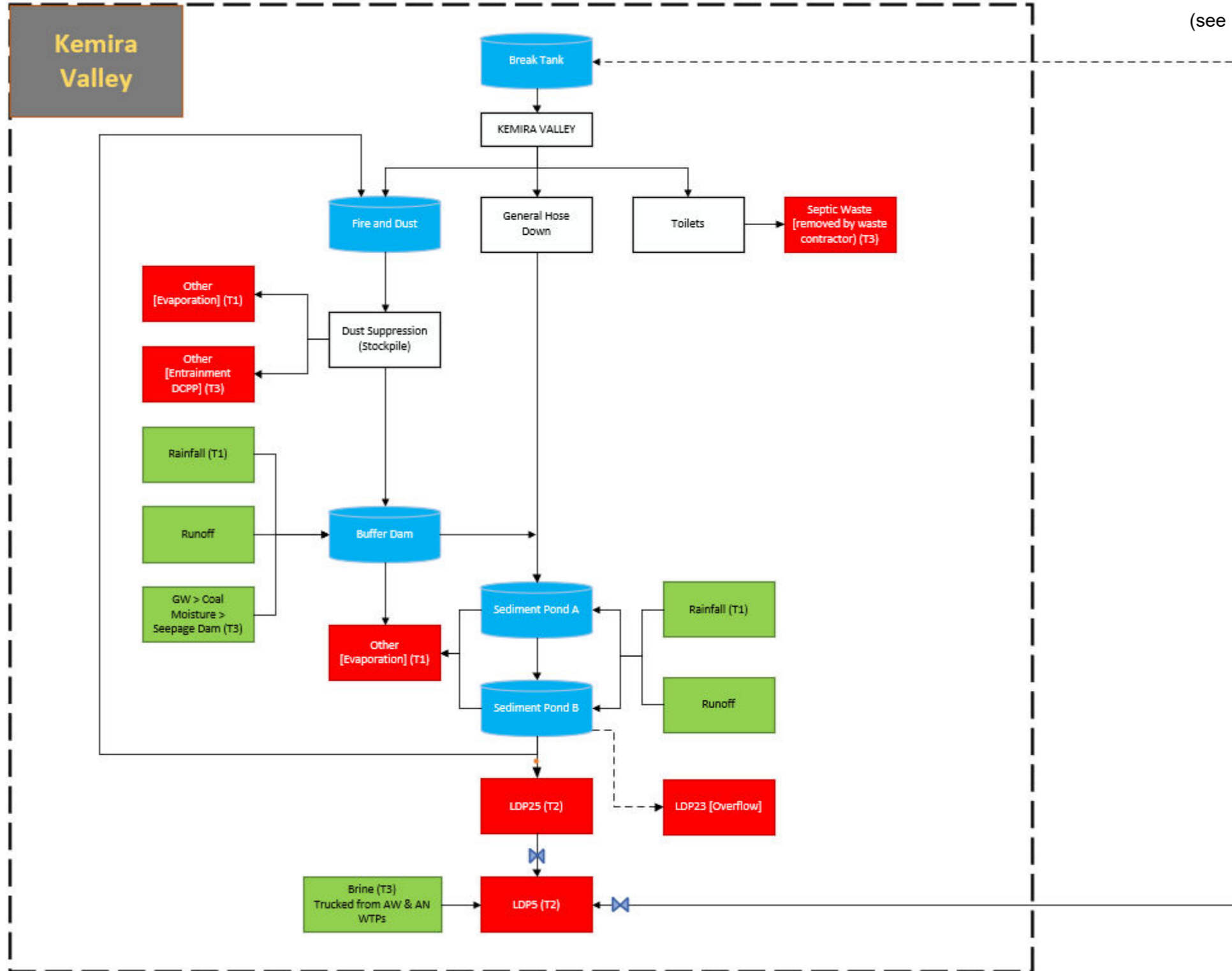


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Plan 2B: KVCLF

From Underground Workings
(see Plan 2A)

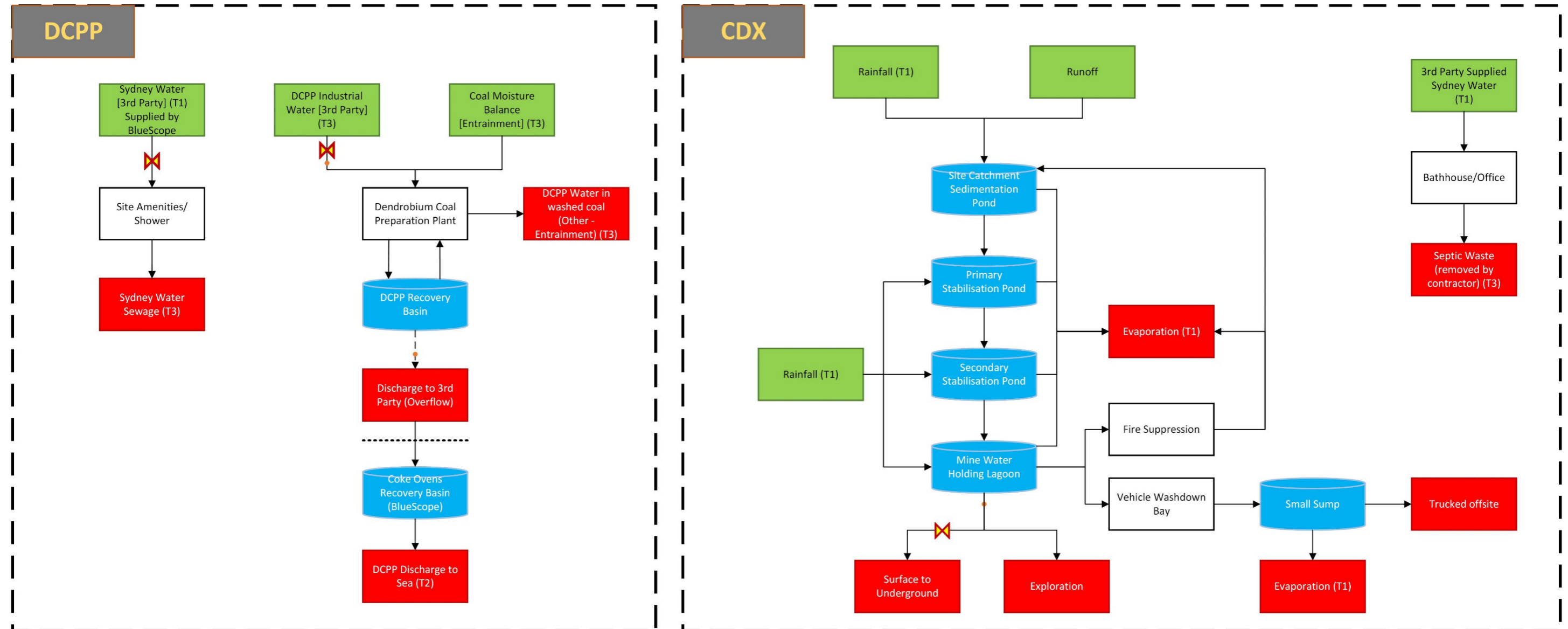


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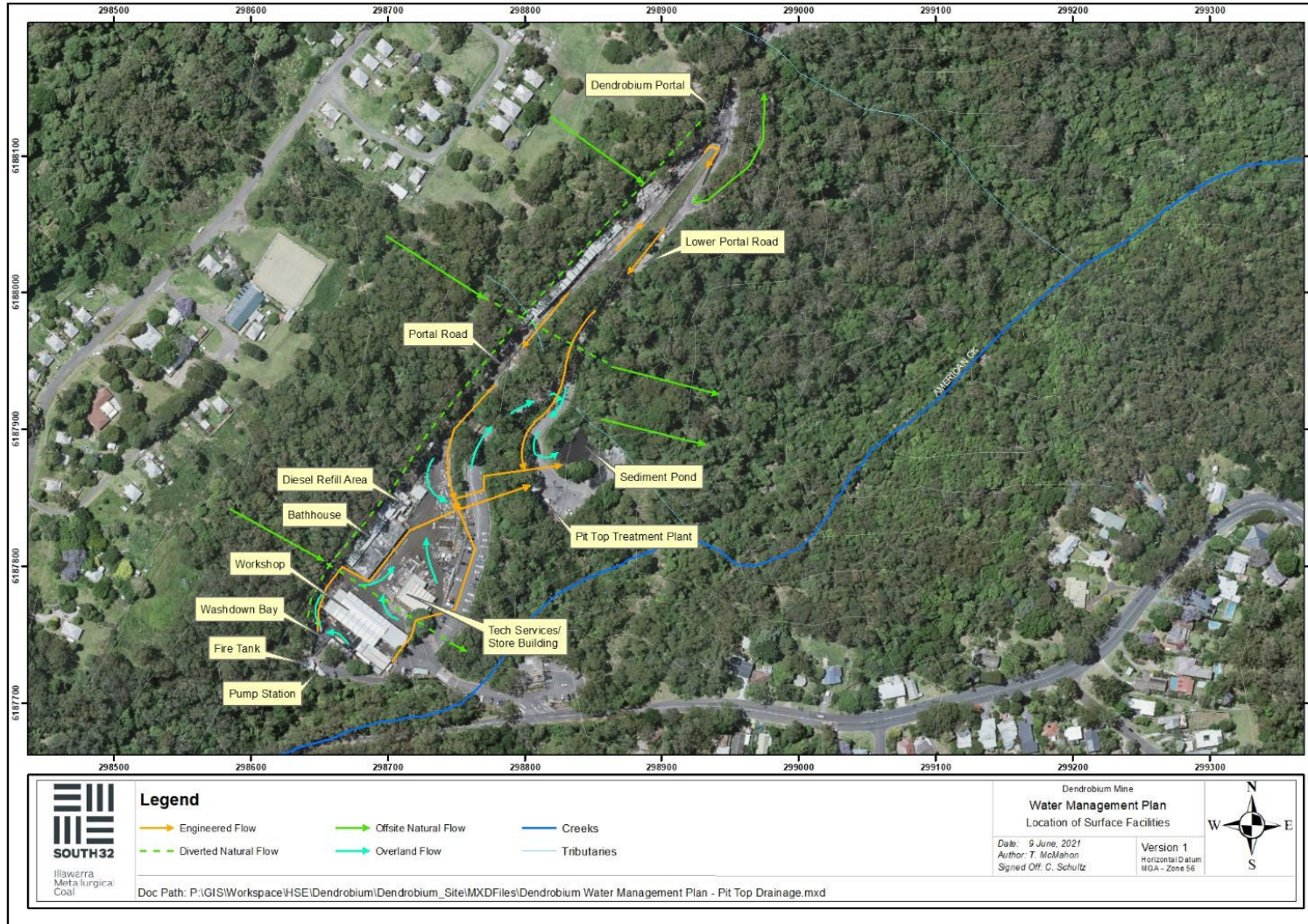
Plan 2C: DCPD and Cordeaux Colliery



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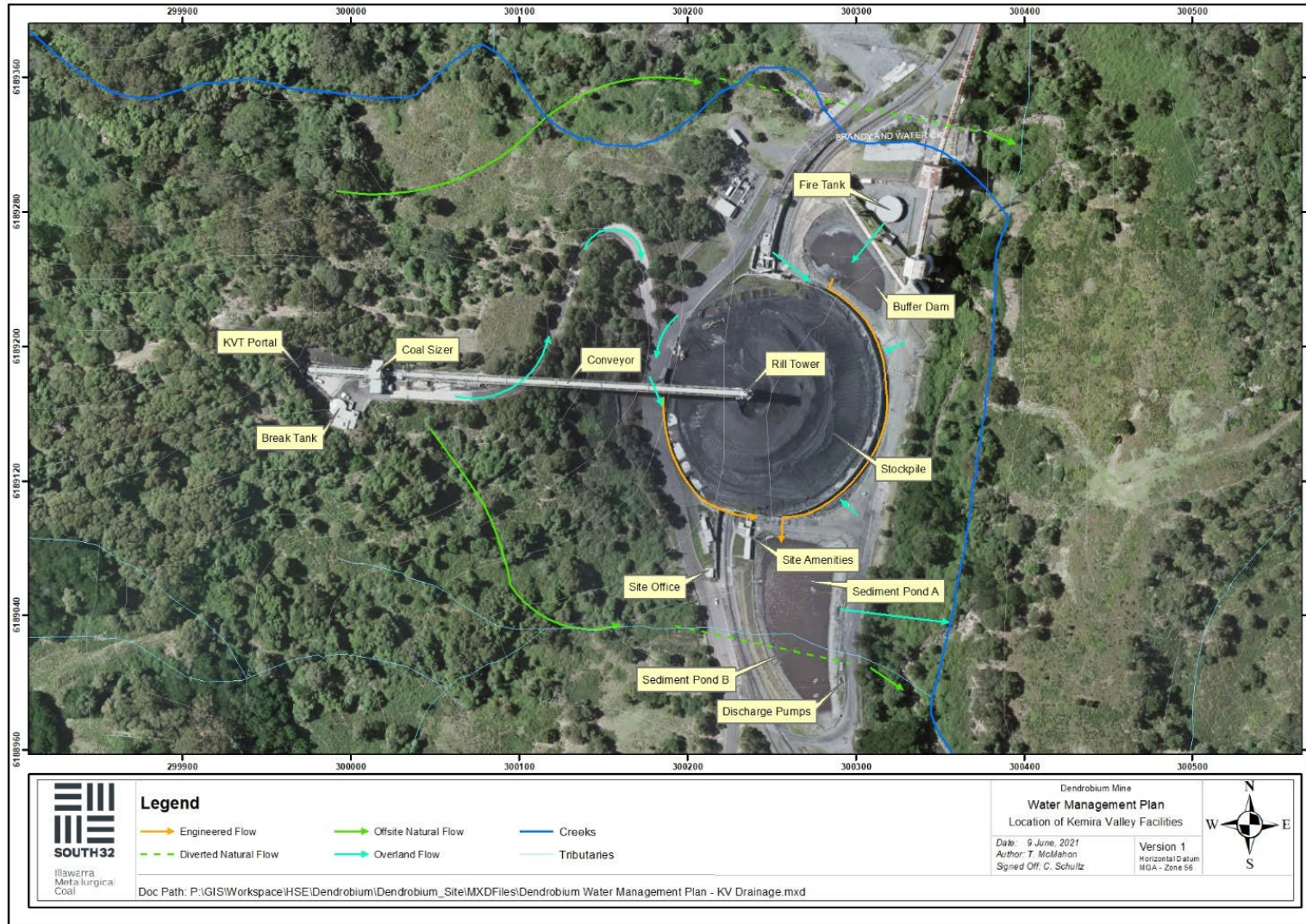
Plan 3: Dendrobium Pit Top Infrastructure and Drainage



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Plan 4: Kemira Valley Infrastructure and Drainage



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Plan 5: Water Monitoring and Discharge Points – Pit Top and KVCLF



<p>SOUTH32 Ilwaco Metallurgical Coal</p>	<p>Legend</p> <ul style="list-style-type: none"> Discharge Points Flow Monitoring Water Quality Monitoring Creeks 	<p>Dendrobium Mine Water Management Plan Water Monitoring and Discharge Points</p>		
		<p>Date: 05 July, 2021 Version 1 Author: T. McMahon Horizontal Datum Signed Off: C. Schutz MGA / zone 56</p>		
<p>Doc Path: P:\GIS\workspace\HSE\Dendrobium\Dendrobium_Site\WXDFiles\Dendrobium Water Management Plan - Surface Water.mxd</p>				

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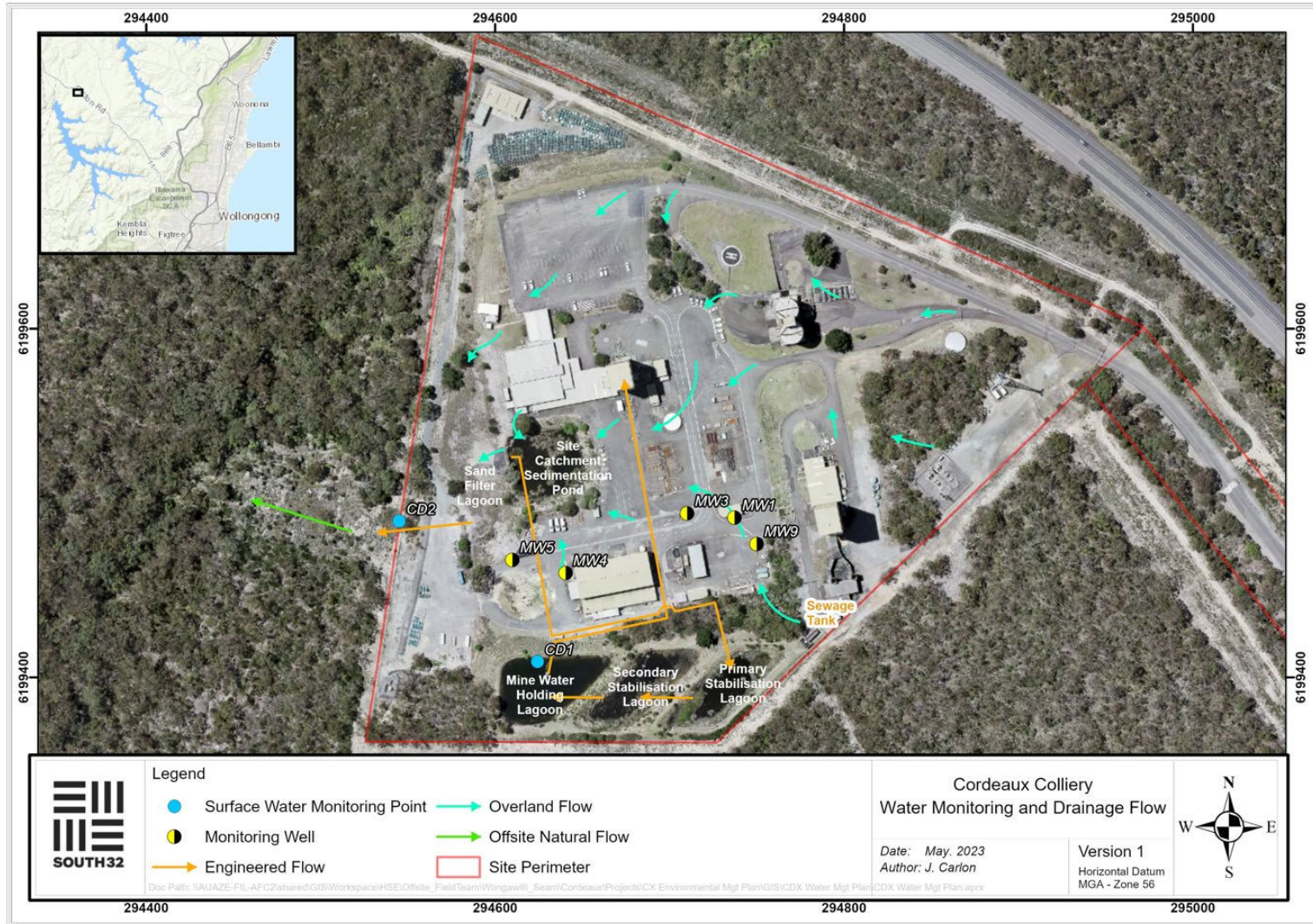
Plan 6: Water Monitoring and Discharge Points – VS2/3



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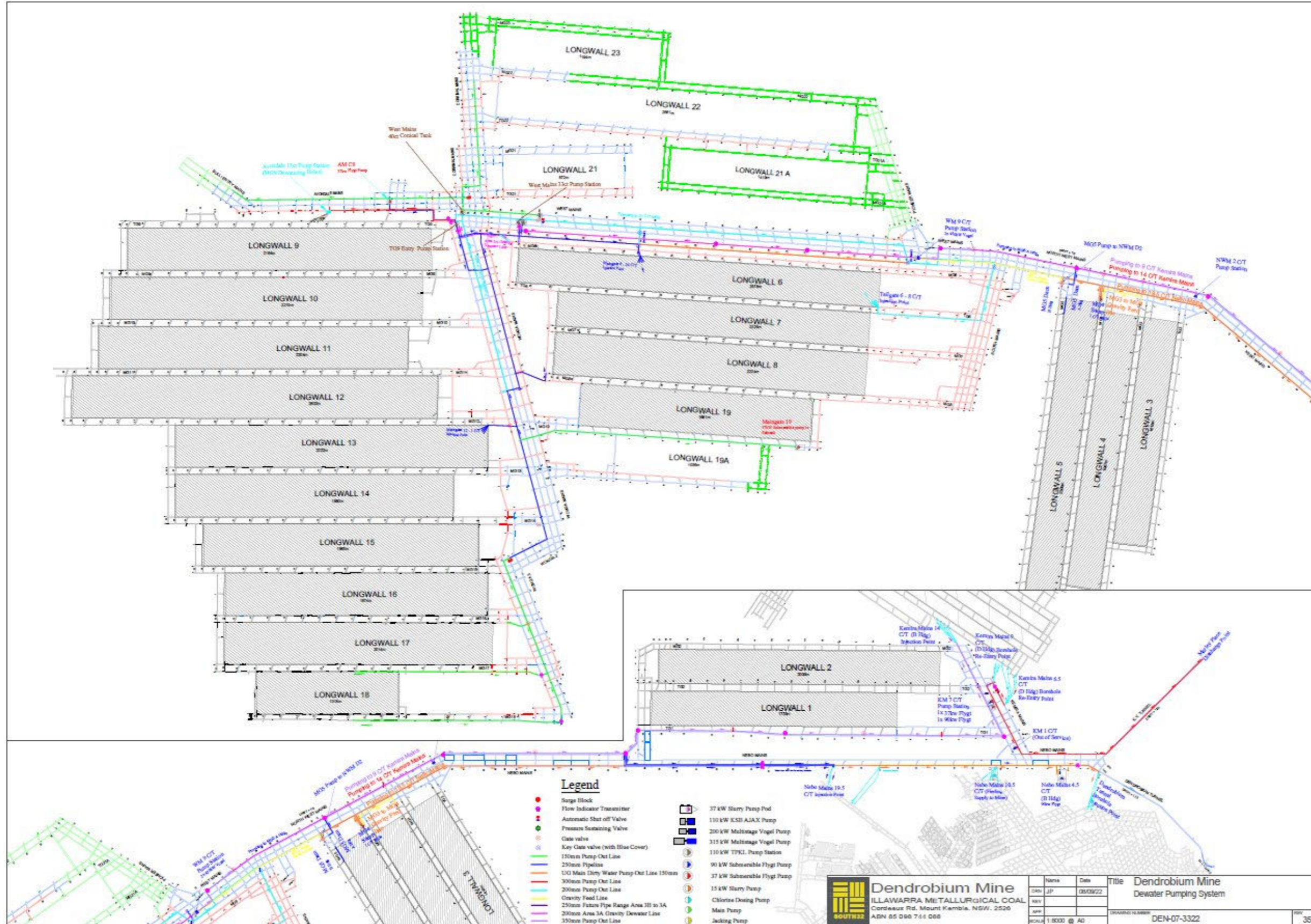
Plan 7: Water Monitoring and Discharge Points – Cordeaux Colliery



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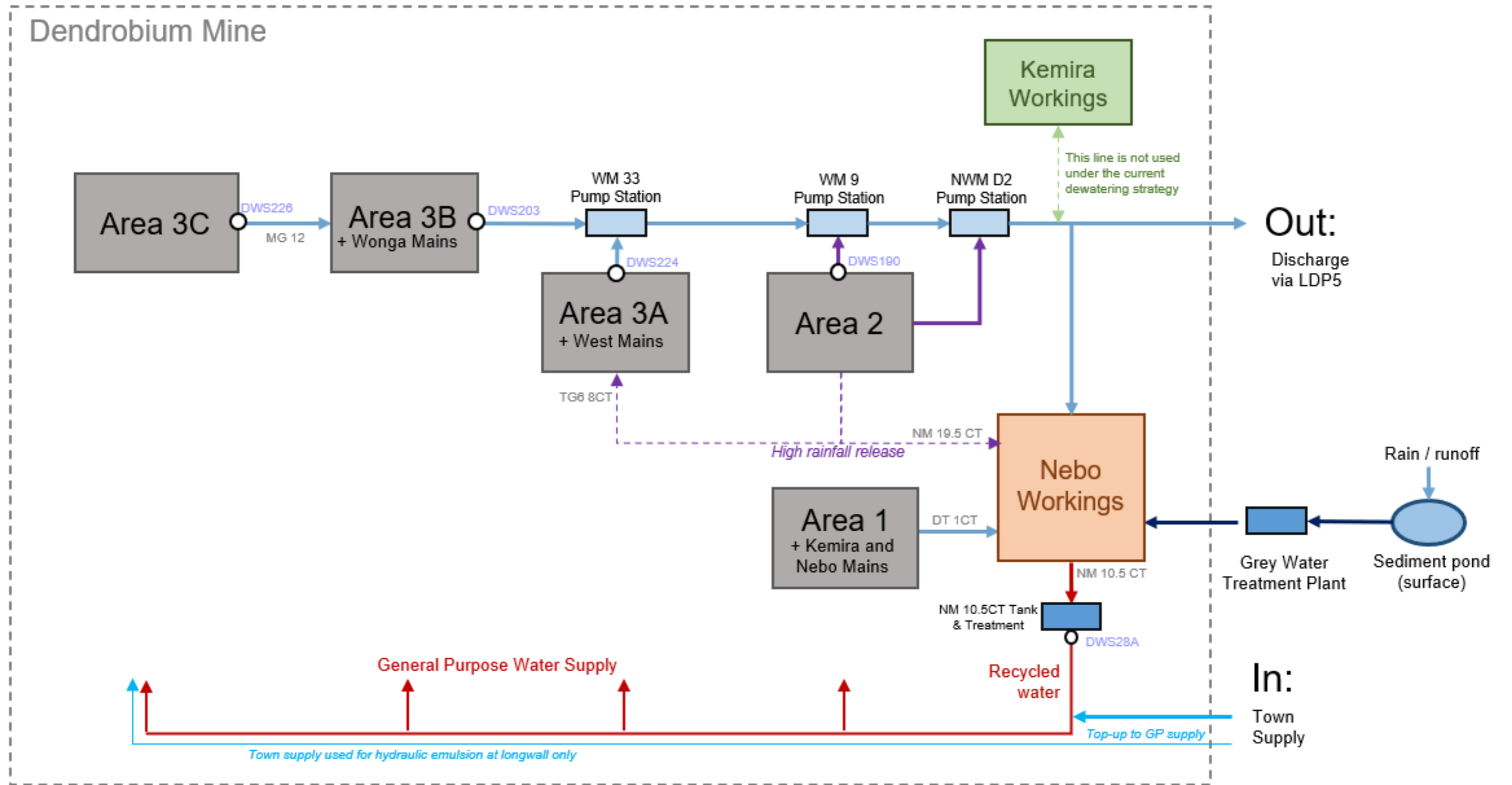
Plan 8: Underground Dewatering Pumping System



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Plan 9: Underground Water Sampling Diagram



MG = Main Gate; TG = Tail Gate; CT = Cut-through; NM = Nebo Mains; KM = Kemira Mains; DT = Dendrobium Tunnel; WM = West Mains; NWM = North West Mains; DWS = Key water sample location

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14. APPENDICES

Appendix 1: Consent Conditions: Water Management

Condition	Requirement	Section
Condition 2 of Schedule 2	<p>Terms of Consent</p> <p>The Applicant must carry out the development generally in accordance with the:</p> <p>(a) Development Application (DA 60-03-2001), EIS and associated submissions to the Dendrobium Underground Coal Mine Project Commission of Inquiry, and in particular its:</p> <ul style="list-style-type: none"> • Primary Submission (the Dendrobium Project, dated 30 July 2001); • Submission in Reply (the Dendrobium Project, undated); and • Environmental Effects of Subsidence Associated with the Dendrobium Project, prepared by National Environmental Consulting Services and dated August 2001; <p>(b) Modification Application dated 12 February 2002 and supporting information dated 27 January 2002;</p> <p>(c) Modification Application and supporting information dated 24 May 2002 and additional supporting information dated 14 June 2002;</p> <p>(d) Modification Application and Statement of Environmental Effects for the Dendrobium Coal Sizer, prepared by Olsen Environmental Consulting and dated March 2005;</p> <p>(e) Application for Further Approval of West Cliff Emplacement Area Stage 3, Vol 2 (including Appendices), prepared by Cardno Forbes Rigby and dated July 2007, associated Response to Submissions dated 1 November 2007 and associated Statement of Commitments dated 28 November 2007 (see Appendix 3);</p> <p>(f) Modification Application – Modification of Area 3 Footprint and Review of Conditions of Consent dated 27 November 2007, EA and associated Statement of Commitments (see Appendix 4); and</p> <p>(g) Modification 7, Modification 8 and Modification 9.</p>	Section 3.1
Condition 2A of Schedule 2	The Applicant must carry out the development in accordance with the conditions of this consent.	Section 3.1

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Condition 2A of Schedule 2	The Applicant must carry out the development generally in accordance with the development layout shown in Appendix 2.	
Condition 4 of Schedule 2	<p>The Applicant must comply with any reasonable and feasible requirement/s of the Secretary arising from the Department’s assessment of:</p> <p>(a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with the conditions of this consent;</p> <p>(b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with the conditions of this consent; and</p> <p>(c) the implementation of any actions or measures contained in these documents.</p>	Section 3.1
Condition 14 of Schedule 2	The Applicant must be responsible for the costs of all management measures (including measures to minimise, mitigate, offset or remediate impacts of the development which are not recoverable by a third party through the <i>Coal Mine Subsidence Compensation Act 2017</i> or the <i>Mining Act 1992</i> including but not limited to remediation of natural features, rehabilitation of ecological systems, the provision of supplementary waters and monitoring of the effectiveness of the works, as determined by the Secretary.	Section 8.2.3
Condition 1 of Schedule 3	<p>Watercourse Impact Management</p> <p>The Applicant must ensure that, as a result of the development:</p> <p>a) no rock fall occurs at Sandy Creek Waterfall or from its overhang;</p> <p>b) the structural integrity of the waterfall, its overhang and its pool are not impacted;</p> <p>c) cracking in Sandy Creek within 30 m of the waterfall is of negligible environmental and hydrological consequence; and</p> <p>d) negligible diversion of water occurs from the lip of the waterfall to the satisfaction of the Secretary.</p>	Section 1.2
Condition 2 of Schedule 3	The Applicant must ensure that underground mining operations do not cause subsidence impacts at Sandy Creek and Wongawilli Creek other than “minor impacts” (such as minor fracturing, gas release, iron staining and minor impacts on water flows, water levels and water quality) to the satisfaction of the Secretary.	Section 1.2



Condition 3 of Schedule 3	The Applicant must ensure the development does not result in reduction (other than negligible reduction) in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek, to the satisfaction of the Secretary.	Section 1.2
Condition 4 of Schedule 3	Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant must prepare a Watercourse Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary.	Section 1.2 Section 6.2.5
Condition 13 of Schedule 3	<p>Groundwater Monitoring Program</p> <p>The SMPs prepared under condition 7 must include a Groundwater Monitoring Program, which must include:</p> <ol style="list-style-type: none"> proposals to develop a detailed regional and local groundwater model, with special reference to flows to and from nearby water storages; detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality; groundwater impact assessment criteria; a program to monitor the impact of the development on: <ul style="list-style-type: none"> groundwater levels, yield and quality (particularly any potential loss of flow to, or flow from, SCA water storages); coal seam aquifers and overlying aquifers; and groundwater springs and seeps; and <p>consideration of the requirements of the latest version (or subsequent replacement) of Water NSW's <i>The Design of a Hydrological and Hydrogeological Monitoring Program to Access the Impacts of Longwall Mining in SCA Catchment</i>.</p>	Section 1.2 Section 6.2.6
Condition 12 of Schedule 4	<p>Discharges</p> <p>The Applicant must ensure all surface water discharges from the surface facilities:</p> <ol style="list-style-type: none"> meet the relevant ANZECC water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; and comply with the discharge limits (both volume and quality) set for the development in any EPL. 	Section 6 Section 6.2.2
Condition 13 of Schedule 4	Water Management Plan	This document

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	<p>The Applicant must prepare a Water Management Plan for the surface facilities to the satisfaction of the Secretary. This plan must:</p> <p>(a) be submitted to the Secretary for approval by 30 April 2009;</p> <p>(b) be prepared in consultation with EPA, WaterNSW and DoI by suitably qualified expert/s whose appointment/s have been approved by the Secretary; and</p> <p>(c) include a:</p> <ul style="list-style-type: none"> • Site Water Balance; • Erosion and Sediment Control Plan; • Surface Water Monitoring Program; and • Surface and Ground Water Response Plan. <p>The Applicant must implement the Water Management Plan as approved by the Secretary</p>	<p>Date is in the past</p> <p>Appendix 2</p> <p>Section 4</p> <p>Section 5</p> <p>Section 6</p> <p>Section 7</p>
<p>Condition 14 of Schedule 4</p>	<p>Site Water Balance</p> <p>The Site Water Balance must:</p> <p>(a) include details of:</p> <ul style="list-style-type: none"> • sources and security of water supply; • water use on site; • water intercepted by mining operations; • water management on site; • off-site water transfers and water stored or disposed of underground; • reporting procedures; and <p>(b) describe measures to minimise water use by the development.</p>	<p>Section 4</p> <p>Section 4.1</p> <p>Section 4.2</p> <p>Section 4.2.7</p> <p>Section 4.2</p> <p>Section 4.2</p> <p>Section 9.1</p> <p>Section 4.3</p>
<p>Condition 15 of Schedule 4</p>	<p>Erosion and Sediment Control</p> <p>The Erosion and Sediment Control Plan must:</p> <p>(a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);</p> <p>(b) identify activities that could cause soil erosion and generate sediment;</p> <p>(c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;</p>	<p>Section 5</p> <p>Section 5.1</p> <p>Section 5.2</p>

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	<p>(d) describe the location, function, and capacity of erosion and sediment control structures; and</p> <p>(e) describe what measures would be implemented to monitor and maintain the structures over time.</p>	<p>Section 5.2</p> <p>Section 5.3</p>
<p>Condition 16 of Schedule 4</p>	<p>Surface Water Monitoring Program</p> <p>The Surface Water Monitoring Plan must include:</p> <p>(a) baseline data on surface water flows and quality in streams and other waterbodies that have been or could be affected by the surface facilities;</p> <p>(b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts;</p> <p>(c) a program to monitor the impact of the surface facilities on surface water flows and quality, stream health and channel stability; and</p> <p>(d) procedures for reporting the results of this monitoring.</p>	<p>Section 6</p> <p>Section 6.1</p> <p>Section 6.2.1 and Section 7</p> <p>Section 6.2</p> <p>Section 9.1</p>
<p>Condition 17 of Schedule 4</p>	<p>Surface and Ground Water Response Plan</p> <p>The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:</p> <p>(a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; and</p> <p>(b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems, aquatic ecosystems or riparian vegetation.</p>	<p>Section 7</p> <p>Section 7</p> <p>Section 7.2</p>
<p>Condition 1 of Schedule 7</p>	<p>Notification of Landowners</p> <p>If the results of monitoring required in Schedule 4 identify that the impacts generated by the development are greater than the relevant impact assessment criteria in Schedule 4, except where this is predicted in the documents listed in condition 2 of schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Applicant must notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in Schedule 4.</p>	<p>Section 9.2.4</p>

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<p>Condition 2 of Schedule 7</p>	<p>Independent Review</p> <p>If a landowner considers the development to be exceeding the impact assessment criteria in schedule 4, except where this is predicted in the EA, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.</p> <p>If the Secretary is satisfied that an independent review is warranted, the Applicant must within 2 months of the Secretary's decision:</p> <p>a) consult with the landowner to determine his/her concerns; (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to:</p> <ul style="list-style-type: none"> • determine whether the development is complying with the relevant impact assessment • criteria in schedule 4; and • identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and <p>(c) give the Secretary and landowner a copy of the independent review.</p>	<p>Section 8.2.4</p>
<p>Condition 3 of Schedule 7</p>	<p>If the independent review determines that the development is complying with the relevant impact assessment criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Secretary. If the landowner disputes the results of the independent review then either the Applicant or the landowner may refer the matter to the Secretary for resolution.</p> <p>Where matters referred to the Secretary under this condition cannot be resolved by the Secretary within 28 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.</p>	<p>Section 8.2.4</p>
<p>Condition 4 of Schedule 7</p>	<p>If the independent review determines that the development is not complying with the relevant impact assessment criteria in Schedule 4, and that the development is primarily responsible for this noncompliance, then the Applicant must:</p> <p>(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or</p> <p>(b) secure a written agreement with the landowner to allow exceedances of the relevant criteria; or</p> <p>(c) offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below to the satisfaction of the Secretary.</p>	<p>Section 8.2.4</p>



<p>Condition 5 of Schedule 7</p>	<p>If further monitoring under condition 4(a) determines that the development is complying with the relevant impact assessment criteria, then the Applicant may discontinue the independent review with the approval of the Secretary.</p> <p>If further monitoring under condition 4(a) determines that measures implemented under that condition have not achieved compliance with the impact assessment criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner under condition 4(b) to allow these exceedances, then the Applicant must, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below.</p>	<p>Section 8.2.4</p>
<p>Condition 2 of Schedule 8</p>	<p>Management Plan Requirements</p> <p>Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:</p> <p>(a) a summary of relevant background or baseline data;</p> <p>(b) details of:</p> <p>(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);</p> <p>(ii) any relevant limits or performance measures and criteria; and</p> <p>(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</p> <p>(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;</p> <p>(d) a program to monitor and report on the:</p> <p>(i) impacts and environmental performance of the development; and</p> <p>(ii) effectiveness of the management measures set out pursuant to condition 2(c);</p> <p>(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p> <p>(f) a program to investigate and implement ways to improve the environmental performance of the development over time;</p> <p>(g) a protocol for managing and reporting any:</p> <p>(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);</p>	<p>Section 6.1</p> <p>Section 3</p> <p>Section 6.2.2</p> <p>Section 5.2</p> <p>Section 6 and Section 9</p> <p>Section 7</p> <p>Section 8</p> <p>Section 8.2</p>



	<p>(ii) complaint;</p> <p>(iii) failure to comply with statutory requirements; and</p> <p>(h) a protocol for periodic review of the plan.</p>	Section 9.3
Condition 3 of Schedule 8	<p>Within 24 hours of detecting the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant must notify the Department and other relevant agencies of the incident.</p>	Section 9.2
Condition 4 of Schedule 8	<p>Within 7 days of notifying the Department and other relevant agencies of such an incident, the Applicant must provide the Department and these agencies with a written report that:</p> <p>(a) describes the date, time, and nature of the incident;</p> <p>(b) identifies the cause (or likely cause) of the incident;</p> <p>(c) describes what action has been taken to date; and</p> <p>(d) describes the proposed measures to address the incident.</p>	Section 9.2
Condition 5 of Schedule 8	<p>Annual Review</p> <p>By the end of September each year (or other such timing as may be agreed by the Secretary), and for at least 3 years following the cessation of mining at the development, the Applicant must submit an Annual Review to the Secretary, CCC and all relevant agencies reviewing the environmental performance of the development to the satisfaction of the Secretary. This report must relate to the previous financial year and:</p> <p>(a) identify the standards and performance measures that apply to the development;</p> <p>(b) describe the development (including any rehabilitation) that was carried out in the previous financial year;</p> <p>(c) describe the development (including any rehabilitation) that is proposed to be carried out over the current financial year;</p> <p>(d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;</p> <p>(e) include a summary of the monitoring results for the development during the past year;</p> <p>(f) a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, including a comparison of these results against the: (i) relevant statutory requirements, limits or performance measures/criteria; (ii) requirements of any plan or program required under this consent; (iii) monitoring results of previous years; and (iv) relevant predictions in the documents listed in condition 2 of Schedule 2.</p>	Section 9.1.1

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	<p>(g) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;</p> <p>(h) evaluate and report on: (i) the effectiveness of the noise and air quality management systems; and (ii) compliance with the performance measures, criteria and operating conditions in this consent;</p> <p>(i) identify any trends in the monitoring data over the life of the development;</p> <p>(j) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and</p> <p>(k) describe what measures will be implemented over the next financial year to improve the environmental performance of the development. Copies of the Annual Review must be submitted to the affected Councils and made available to the CCC and any interested person upon request.</p>	
Condition 6 of Schedule 8	<p>Independent Environmental Audit</p> <p>By 31 December 2011, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <p>(a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;</p> <p>(b) include consultation with the relevant agencies and the CCC;</p> <p>(c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this consent and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);</p> <p>(d) review the adequacy of strategies, plans or programs required under these approvals;</p> <p>(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals; and</p> <p>(f) be conducted and reported to the satisfaction of the Secretary. Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.</p>	Section 9.4.1
Condition 7 of Schedule 8	<p>Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary, and any other NSW agency that requests it, together with its</p>	

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	response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Secretary. Note: The audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Secretary.	Section 9.4.1
Condition 8 of Schedule 8	Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.	Section 9
Condition 11 of Schedule 8	<p>Access to Information</p> <p>Before the commencement of Modification 8 until the completion of all rehabilitation required under this consent, the Applicant must:</p> <ol style="list-style-type: none"> a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website: <ol style="list-style-type: none"> i. the documents referred to in condition 2 of Schedule 2 of this consent; ii. all current statutory approvals for the development; iii. all approved strategies, plans and programs required under the conditions of this consent; iv. minutes of CCC meetings; v. regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; vi. a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; vii. a summary of the current stage and progress of the development; viii. contact details to enquire about the development or to make a complaint; ix. a complaints register, updated monthly; x. the Annual Reviews of the development; xi. audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations xii. any other matter required by the Secretary; and <p>keep such information up to date, to the satisfaction of the Secretary.</p>	<p>Section 3.1</p> <p>Section 6.3</p> <p>Section 8</p> <p>Section 9</p>

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Appendix 2: Agency Consultation

Agency Comments	IMC Response
Environment Protection Authority (EPA)	
<p><u>Response received 15 July 2021</u></p> <p>The EPA has reviewed the Plan and has no comments to provide. The EPA notes that changes made to Dendrobium Mine's licence 3241 by Notice 1609643 issued recently have been incorporated in the Plan.</p>	Noted
Water NSW	
<p><u>Response received 7 July 2021</u></p> <p>WaterNSW notes that only the three ventilation shaft sites and the underground operations are of interest to WaterNSW as other sites are outside the Sydney Drinking Water Catchment and Special Areas.</p> <p>It is noted that Ventilation shaft site 1 has been rehabilitated to control erosion and sediment runoff. The water runoff at the ventilation shaft sites 2 and 3 are managed by IMC with adequate erosion and sediment control structures and revegetation. It is reported that these sites have been revegetated in accordance with the WaterNSW approved Post Construction Rehabilitation Plan.</p> <p>The underground water balance, water quality and water management gets reported in the monthly DSC reports which WaterNSW receives and is also discussed at each Technical Working Group.</p> <p>There are no changes in water monitoring or management proposed in the updated version that is of interest or concern to WaterNSW.</p> <p>Consequently, WaterNSW has no further comments on the Water Management Plan.</p>	Noted
<p><u>Response received 3 May 2023</u></p> <p>WaterNSW reviewed the proposed changes to the Dendrobium WMP and particularly operations located within the Special Areas including surface operations at ventilations shafts (VS1, VS2 & VS3), Cordeaux Colliery pit top and Dendrobium underground operation.</p> <p>It was noted that in the updated WMP:</p> <ul style="list-style-type: none"> - there are no changes to surface operation of Ventilation Shaft 1, 	Noted

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<p>- a few minor edits are proposed to Dendrobium underground operation, and - the major update relates to addition of Cordeaux Colliery Pit top (including Corrimal #3 shaft) to the WMP, and modification of Ventilation Shaft 2/3 area for gas drainage infrastructure for Area 3C.</p> <p>WaterNSW has the following comments to the updated WMP:</p>	
<p>Dendrobium Underground Operation</p> <p>Plan 8 showing dewatering system could be supplemented with an additional plan as provided in DS NSW chemistry reports.</p> <p>Section 4.2.7.2 The statement that moisture contained in ventilation air accounts for approximately 10% of the overall water balance is replaced with an average of 16.2 kL/day. Is the average of 16.2 kL/day equal to 10% overall water balance?</p>	<p>This plan has been included as Plan 9.</p> <p>No – 16.2 kL/day does not equate to 10% water loss. It ranges from 0.2 – 2 %.</p>
<p>Modification at Ventilation Shaft 2/3</p> <p>The surface runoff management plan prepared by HEC (2022) refers to the conceptual erosion and sediment control that is subject of detailed design. The detailed design provided in the Construction Erosion and Sediment Control Plan (Version 3, dated 15-12-2022) is not referenced in the WMP.</p> <p>Section 5 states that this element of the WMP describes ‘in detail’ the erosion and sediment control management strategies:</p> <ul style="list-style-type: none"> - Section 5.2.3.2 should refer to the Construction Erosion and Sediment Control Plan (Version 3, dated 15-12-2022) for further detail including plans and specific erosion and sediment control management measures (including during operational phase). - Section 5.2.3 should clarify that discharge of TSS and turbidity from the sediment ponds “(LDP 28 and LDP 30)” is permitted at unspecified concentrations when the discharge occurs solely as a result of rainfall “at the premises” exceeding a total of 95 mm over any consecutive five-day period. EPL 3241 should be referenced here. - Section 5.2.3.2 access to VS2/3 is via Fire Trails 6, 6C, 6F and 6K <p>Should there be more information on the erosion and sediment control structures on the fire trails? Could reference the Soil Conservation Service - Scoping Report (dated 16 December 2022).</p> <p>Section 5.3 should include repair and maintenance of sediment control structures (not only replacement), and maintenance of drainage structures that divert clean water</p>	<p>Document has been referenced.</p> <p>Reference has been included in Section 5.2.3.2.</p> <p>Text has been updated to address comments.</p> <p>Text has been updated to address comment.</p> <p>Document has been referenced.</p> <p>Text has been updated to address comment.</p>

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<p>from disturbed areas and that divert runoff from disturbed area to sediment basins (for VS2/3).</p> <p>There is no reference on water quality discharge criteria for total suspended solids and turbidity.</p> <p>According to Construction Erosion and Sediment Control Plan, chemical treatment would be required to meet the water quality discharge criteria, which is mentioned in the WMP.</p> <p>Two reticulated boreholes will be drilled for process water. Water balance section does not comment on management of process water during gas drainage operation.</p>	<p>Water quality criteria are included in Table 11. Reference to EPL 3241 has been included.</p> <p>Noted.</p> <p>Additional text has been included in Section 4.2.5.</p>
<p>Cordeaux Pit Top</p> <p>Section 1.2 – should include that Cordeaux Colliery Pit Top is within a Special Area (as per VS1, 2, 3).</p> <p>It is stated in Section 6.2.3 that Cordeaux Colliery is considered to be a zero-discharge site. Section 4.2.6 comments that “clean area” runoff is diverted to the Sand Filter Lagoon being filtered through sediment before leaving site to the Special Area.</p> <p>There are no LDP discharge points but monitoring of water quality from the Sand Filter Lagoon (where it is filtered through sediment prior to leaving site) is undertaken monthly. Are there any potential contaminants of concern targeted by water quality monitoring?</p>	<p>Updated.</p> <p>Noted. Discharge refers to pumping water offsite.</p> <p>There are no particular contaminants of concern, however MBAS and Oil and Grease are analysed.</p>
<p>General</p> <p>References to WaterNSW Act 2014 and WaterNSW Regulation 2020 should be changed to Water NSW Act 2014 and Water NSW Regulation 2020 respectively.</p> <p>Water NSW Access Consent (F2020/1545) should be referred to in the WMP where relevant, (eg contains requirements for reporting incidents, requirement for Annual Statement of Compliance, etc).</p> <p>Section 4.2.7.1 (last sentence) refers to Plan 6 for the general arrangement for the underground dewatering pumping system. Plan 8 is the Underground Dewatering Pumping System.</p> <p>There are inconsistencies in description of the runoff system for Cordeaux Pit Top in Section 4.2.6 and in Plan 7 (Catchment Sedimentation Pond vs Primary separation lagoon).</p>	<p>Amended.</p> <p>Section 3.5, 9.1.7 and 9.2.3 have been included.</p> <p>Updated.</p> <p>Nomenclature made consistent. Plan 7 updated.</p>
<p>DPIE – Water Group</p>	
<p><u>Response received 6 July 2021</u></p>	<p>Noted</p>

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<p>Please refer the engagement request to the Natural Resource Access Regulator (NRAR) as they coordinate all Post Approval matters on behalf of DPIE Water. Their email address is nrar.servicedesk@dpi.e.nsw.gov.au</p>	
<p>NRAR/DPIE – Water Group</p>	
<p><u>Initial response received 10 September 2021, with additional context provided 21 September 2021</u></p> <p>There are contextual issues with the document and some technical ones. The WMP should clarify upfront and maybe even in its title that it applies to surface activities only. Unless we search online for Dendrobium consent approvals, there is no means to understand that Schedule 4 applies to surface facilities only.</p> <p>The WMP document describes the underground operations as part of the water balance section (section 4), then it only informs much later in the document that "there is no groundwater monitoring program associated with the surface facilities".</p> <p>Later on the document refers the reader for matters of GW monitoring and response plans to "SMPs" for each area (Section 7.2). This is confusing from our perspective as to what is covered and requires review. The dissecting of the GW management actions over a number of plans is not practical, noting items such as overall impact, water balance or licencing apply for the whole site and require consistency and transparency. The format of such dissected submissions also increase processing time significantly and is likely to result in a more constraining set of recommendations (such as here).</p> <p>1. Compile all Water Management sub-Plans from the mine site into one single Water Management Plan document.</p> <p>DPIE-Water recognise that different conditions in the CoA call for Water Management Plans, however, are of the opinion these are for a single overarching Water Management Plan for the whole of mine site and activities, not for individual sub-plans. Should an aspect of the mine site/activity present new or varied information this should be added to the whole of site WMP as an addendum until such time as the WMP is fully updated where upon the addendums are included in the body of the WMP.</p> <p>2. Include all aspects of groundwater interference, inflow, management, water balance tabulation, monitoring and licensing into the Water Management Plan for the whole of the mine site and activities.</p>	<p>Clarification provided in Section 1 and Section 1.2.</p> <p>This information is provided in the context of water required to be managed at the surface facilities.</p> <p>This is noted, however the documents are developed to meet the specific requirements of each condition in the Consent.</p> <p>A water balance diagram is provided in Plan 2 for context.</p> <p>This Water Management Plan has been developed to meet the requirements of Condition 13 of Schedule 4 of the Consent relating to the Surface Facilities.</p> <p>Other management plans required under Schedule 3 of the Consent are approved separately and therefore are not included in this WMP for reapproval.</p> <p>Groundwater licences are provided in Table 2 for context in relation to mine dewatering.</p>

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<p>The whole of site WMP must cover all aspects as indicated in the conditions of approval but must also include background and monitoring groundwater information, current licensing details, management and mitigation strategies for handling of groundwater, groundwater trigger details, Trigger Action Response Plan and groundwater monitoring plans for all elements of the mine site.</p> <p>3. Forward the completed final Water Management Plan for review by DPIE -Water via NRAR.</p> <p>From a technical perspective, the below paragraph taken from our detailed review summarises the limitation of the current document:</p> <p>Pit top site has limited interaction with groundwater, possibly only along the access tunnel. No discussion/outline of how this if any groundwater is taken by the goods and personnel access tunnel or how this is managed or accounted for is given.</p> <p>DPIE recognise that Ground water response, management and monitoring plans are components of the required Subsidence Management Plans (SMP) under the conditions of approval (CoA). However, it is not clear if these account for any groundwater intercepted by the access tunnel from the shallow aquifer system.</p> <p>Nor does this account for the recycled water as directed into the Nebo and Kemira Valley underground workings.</p> <p>Nor is the overflow from Nebo or Kemira portals during wet weather events accounted for or discussed. As these are stated as groundwater discharges from old portals associated with the mine site there must be management, monitoring and reporting of the groundwater from these sites.</p> <p>Before DPIE Water can support the current WMP, added context is required to the plan, resolution is also required around the pit top site and access tunnels as mentioned above.</p> <p>Lastly, the WMP (and any other for the Dendrobium site) need to clearly identify what is covered under which part of the management framework and must address how those common aspects (water balance, licencing, cumulative impacts) are addressed and documented.</p>	<p>Groundwater information, including monitoring, management and mitigation, triggers and TARPs are addressed in the groundwater impact assessments developed as part of SMP applications.</p> <p>Noted.</p> <p>This is correct. There is no significant groundwater interaction in the Dendrobium access tunnel.</p> <p>Not applicable. There is no significant groundwater interaction in the Dendrobium access tunnel.</p> <p>A water balance diagram is provided in Plan 2 for context.</p> <p>These flows are not measured as they are sporadic and insignificant in comparison to the mine dewatering.</p> <p>Additional context has been provided as noted.</p> <p>Additional context has been provided as noted.</p>
<p><u>Further response provided 16 November 2021</u></p> <p>1. Decide whether this document is to be a surface facility water management plan or a whole of site (surface facility and underground facilities) water management plan. The WMP is a long way from being suitable, considering the timeline of action and upcoming updates and changes IMC</p>	<p>This Water Management Plan has been developed to meet the requirements of Condition 13 of Schedule 4 of the Consent relating to</p>

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<p>requires for operational purposes. It is suggested a meeting be organised to discuss the requirement of the agencies and how best to resolve the situation towards approval of the WMP.</p> <p>2. Compile all Water Management sub-Plans from the mine site into a single Water Management Plan document.</p> <p>3. Include a summary of all water management, monitoring, balance, and licencing in the Water Management Plan for the whole of the mine site and activities, including surface water-groundwater interaction.</p> <p>4. Revise the WMP, so that DPIE Water have confidence that the WMP provides the tools to support the detection of impacts against thresholds, allows response in a timely manner, verifies water balance processes, and processes for reporting, and auditing in a single document. It should include:</p> <ul style="list-style-type: none"> – Useful summary of baseline data – Assessment of all relevant Consent Conditions, e.g. Conditions 4, 6, and 13 of Schedule 3 and Conditions 3-7 of Schedule 8 – Assessment of how the WMP meets ISO 14001 certification requirements – An assessment on how the WMP meets its stated objectives 	<p>the Surface Facilities. Some additional information has been included that benefits IMC to be included in the document and is over and above what is required by the condition.</p> <p>This is not the intent of Condition 13 of Schedule 4. Documents are developed to meet the requirements of the condition of the Consent.</p> <p>A summary of water management, monitoring, balance and licencing has been provided for the surface facilities as required by Condition 13 of Schedule 4.</p> <p>Section 6.1 references the baseline assessments. Water quality and flow monitoring data from 2012 to date is provided in the 14-day Report on the South32 website.</p> <p>Schedule 3 relates to underground operations which is not required to be addressed in the WMP. Conditions 3-7 of Schedule 8 have now been included in Appendix 1.</p> <p>ISO 14001 certification requires an Environmental Management System to be in place. The WMP is a component of the EMS.</p> <p>The WMP is written to meet these objectives. It is considered by IMC that it</p>
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<ul style="list-style-type: none"> - List/s of quantity and quality parameters and trigger levels for various elements of the Mine site and activities - Commitment to reporting on 10AL119249, 10AL123125, and 10AL123124 - Water balance summary (ranges and/or average values) - Clarification is needed to how water use minimisation will be quantitatively assessed and reported - Summary of trigger action response plans (TARP) for the Mine and associated activities - Summary of historic non-compliance events and corresponding action/s, including incident notifications <p>5. Forward the completed final Water Management Plan to NRAR for assessment and endorsement.</p> <p>Natural Resources Access Regulation recommends the following:</p> <p>1. Provide an updated summary of licences held as mentioned in Table to section 3.6 of the Water Management Plan has Water Sources and Licence Numbers incorrect. 10AL123124 and 10AL123125 appear to have the other entitlement listed and the water source for 10AL119249 is not Sydney Basin South Groundwater Source it is the Sydney Basin Nepean Groundwater Source.</p>	<p>the content of the WMP meets these objectives. Water quality limits are provided in Section 6.2.2.</p> <p>Section 6.3.2 amended to include this requirement. Figure 1 has been included to meet this requirement.</p> <p>A review of the water accounting framework is underway and a water efficiency target is under development. Included in Section 7.</p> <p>Footnote 4 references the most recent non-compliance. Non-compliances with water quality criteria are included in the 14-day Report.</p> <p>The Water Management Plan has been provided to NRAR/DPIE Water for consultation twice. IMC considers that the requirement for consultation in Condition 13 has been met.</p> <p>These errors have been corrected.</p>
<p><u>Response received 9 May 2023</u></p> <p>I refer to your request dated 4 April 2023 providing the Department of Planning and Environment (DPE) Water an opportunity to comment on the above matter.</p> <p>The Department of Planning and Environment- Water (DPE Water) has reviewed the Dendrobium Mine Water Management Plan (WMP) and has no comments on the updates to the plan.</p>	<p>Noted</p>



DPE Water notes there are a number of other management plans/programs referred to in the WMP that relate to water management issues. These include the Groundwater Monitoring Program, Subsidence Management Plan, Swamp Impact Monitoring, Management and Contingency Plan and the Watercourse Impact Monitoring, Management and Contingency Plan. DPE Water requests future updates of these plans be provided for comment.	Management Plans will be provided to external stakeholders for review as required by the Development Consent.
DPE	
Refer to Post Approval Review provided in April 2022 from Page 61.	
<u>Response received 3 August 2023</u>	
Section 5.1.5 identifies potential erosion opportunity at ventilation shaft 2/3 and surrounding streams, following approval of Mod-9, however controls are not identified. Please add opportunities and commitments to manage erosion and sediment impacts to Sandy Creek.	Section 5.1.5 provides a site description only. Additional information has been provided in Section 5.2.3.2.
Update reference to the <i>Australian Drinking Water Guidelines</i> (2011) to the current version	Updated.
In Figure 1, water balance values for outgoing water values are updated, but incoming water are presented the same as the old figure. Check and revise Figure 1 to present recent water <i>source</i> and <i>recycled</i> volume values in Figure 1 – Water Balance Summary.	FY23 data has been provided.
Section 5.2.3.2 states that the <i>Gas Drainage Plant – Area 3C - Construction Erosion and Sediment Control Plan (Version 3 dated 15 December 2022) provides further detail including plans and specific erosion and sediment control management measures (including during operational phase) at the site</i> , however a link to- or copy of- the December 2022 Construction Erosion and Sediment Control Plan is not provided in the WMP.	Management measures from the plan have now been incorporated in this section.
Section 6.1.1, Table 5 and Table 6 notes states “ <i>No flow data is available ...Flows fluctuate depending on rainfall in the attachment.</i> Possible typographical errors. Please revise.	Spelling error corrected.
Section 6.1.1 discusses baseline assessment, however a link to ongoing water monitoring data is provided. Please move the ongoing monitoring link and information to the appropriate section, and identify which monitoring locations are relevant to monitoring of American Creek and Brandy and Water Creek.	Link moved to Section 6.2.1. Table 7 updated with creek names to provide clarity on which monitoring points are located on the relevant creek.
Section 6.1.3 references a SEPP. Please specify which SEPP in section 6.1.3 text and include this in the References section.	Reference updated.

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Note: Blue text: further DPE comments on Version 7.1 of the WMP. Green text: Further comment from IMC				
WMP, Condition 1, Schedule 2	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Obligation to Minimise Harm to the Environment				
The Applicant must implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.	Yes	The summary of commitments contained in Section 10 describes: <i>"IMC will implement and maintain reasonable and feasible water quality mitigation measures across all sites to comply with water quality criteria and minimise the impact on the environment and community."</i>	-	
WMP, Condition 2, Schedule 2	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Terms of Approval				
The Applicant must carry out the development generally in accordance with the: a) Development Application (DA 60-03-2001), EIS and associated submissions to the Dendrobium Underground Coal Mine Project Commission of Inquiry, and in particular its: <ul style="list-style-type: none"> Primary Submission (the Dendrobium Project, dated 30 July 2001); Submission in Reply (the Dendrobium Project, updated); and Environmental Effects of Subsidence Associated with the Dendrobium Project, prepared by National Environmental Consulting Services and dated August 2001; 	Partial Partial	Section 3 outlines legal and other requirements, and outlines the consent conditions, environmental protection licence requirements, mining leases, legislation, guidelines and standards applicable to the project. It is noted that not all terms of approval detailed in Condition 2, Schedule 2 have been included within the WMP. Unresolved	Within Section 3, provide a commitment to carry out the development generally in accordance with all of the necessary approvals, licences and other information described in Condition 2 of Schedule 2. Unresolved Update Appendix 1 to detail all of the documents listed in Condition 2 of Schedule 2.	WMP has been updated to include this requirement. Documents have been listed as requested.
b) Modification Application dated 12 February 2002 and supporting information dated 27 January 2002;	Partial Partial	As above Unresolved	As above Unresolved As above.	

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c) Modification Application and supporting information dated 24 May 2002 and additional supporting information dated 14 June 2002;	Partial Partial			
d) Modification Application and Statement of Environmental Effects for the Dendrobium Coal Sizer, prepared by Olsen Environmental Consulting and dated March 2005;	Partial Partial			
e) Application for Further Approval of West Cliff Emplacement Area Stage 3, Vol 2 (including Appendices), prepared by Cardno Forbes Rigby and dated July 2007, associated Response to Submissions dated 1 November 2007 and associated Statement of Commitments dated 28 November 2007 (see Appendix 3);	Partial Partial			
f) Modification Application – Modification of Area 3 Footprint and Review of Conditions of Consent dated 27 November 2007, EA and associated Statement of Commitments (see Appendix 4);	Partial Partial			
g) EA (MOD 7); and	Partial Partial			
h) EA (MOD 8)	Partial Partial			
WMP, Condition 2A, Schedule 2	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Terms of Approval				

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The Applicant must carry out the development in accordance with the conditions of this consent.	Partial Yes	Some conditions of the approval have been referenced in Appendix 1 and addressed within text. Resolved	Update the WMP to address all conditions discussed herein. Resolved	Appendix 1 updated to include the additional conditions. Resolved
WMP, Condition 14, Schedule 2	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Costs of Management Measures				
The Applicant must be responsible for the costs of all management measures (including measures to minimise, mitigate, offset or remediate impacts of the development which are not recoverable by a third party through the <i>Coal Mine Subsidence Compensation Act 2017</i> or the <i>Mining Act 1992</i> including but not limited to remediation of natural features, rehabilitation of ecological systems, the provision of supplementary waters and monitoring of the effectiveness of the works, as determined by the Secretary.	No Yes	Not addressed within the WMP. Resolved	-	Section 8.2.3 of the WMP has been added to include this commitment. Resolved
WMP, Condition 1, Schedule 3	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Watercourse Impact Management				
The Applicant must ensure that, as a result of the development:	N/A	Section 1.2 refers to the Watercourse Impact Monitoring, Management and Contingency Plan.	-	

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a) no rock fall occurs at Sandy Creek Waterfall or from its overhang;				
b) the structural integrity of the waterfall, its overhang and its pool are not impacted;				
c) cracking in Sandy Creek within 30 m of the waterfall is of negligible environmental and hydrological consequence; and				
d) negligible diversion of water occurs from the lip of the waterfall to the satisfaction of the Secretary.				
WMP, Condition 2, Schedule 3	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Watercourse Impact Management				
The Applicant must ensure that underground mining operations do not cause subsidence impacts at Sandy Creek and Wongawilli Creek other than “minor impacts” (such as minor fracturing, gas release, iron staining and minor impacts on water flows, water levels and water quality) to the satisfaction of the Secretary.	N/A	Section 1.2 refers to the Watercourse Impact Monitoring, Management and Contingency Plan.	-	
WMP, Condition 3, Schedule 3	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Watercourse Impact Management				
The Applicant must ensure the development does not result in reduction (other than negligible reduction) in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek, to the satisfaction of the Secretary.	N/A	Section 1.2 refers to the Watercourse Impact Monitoring, Management and Contingency Plan.	-	
WMP, Condition 4, Schedule 3	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Watercourse Impact Management				

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Prior to carrying out any underground mining operations that could cause subsidence in either Area 3A, Area 3B or Area 3C, the Applicant must prepare a Watercourse Impact Monitoring, Management and Contingency Plan to the satisfaction of the Secretary. Each such Plan must:	N/A	Section 1.2 describes: "Groundwater and surface water impacts and monitoring associated with subsidence from the extraction of coal are addressed in the relevant Subsidence Management Plan (SMP) or other document as required under Schedule 3 of the Consent, specifically: • Watercourse Impact Monitoring, Management and Contingency Plan (Condition 4)"	-	
a) demonstrate how the subsidence impact limits in conditions 1 - 3 are to be met;	N/A	As above.	-	
b) include a monitoring program and reporting mechanisms to enable close and ongoing review by the Department and DRG of the subsidence effects and impacts (individual and cumulative) on Wongawilli Creek, Sandy Creek and Sandy Creek Waterfall;	N/A			
c) include a general monitoring and reporting program addressing surface water levels, water flows, water quality, surface slope and gradient, erodibility, aquatic flora and fauna (including Macquarie Perch, any other threatened aquatic species and their habitats) and ecosystem function;	N/A			
d) include a management plan for avoiding, minimising, mitigating and remediating impacts on watercourses, which includes a tabular contingency plan (based on the Trigger Action Response Plan structure) focusing on measures for remediating both predicted and unpredicted impacts;	N/A			
e) address third and higher order streams individually but address first and second order streams collectively;	N/A			

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f)	be prepared in consultation with OEH DECC, Water NSW and DRG.	N/A			
g)	incorporate means of updating the plan based on experience gained as mining progresses;	N/A			
h)	be approved prior to the carrying out of any underground mining operations that could cause subsidence impacts on watercourses in the relevant Area; and	N/A			
i)	be implemented to the satisfaction of the Secretary.	N/A			
WMP, Condition 13, Schedule 3		Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Groundwater Monitoring Program					
The SMPs prepared under condition 7 must include a Groundwater Monitoring Program, which must include:		N/A	Section 1.2 describes:	-	
a)	proposals to develop a detailed regional and local groundwater model, with special reference to flows to and from nearby water storages;		<p><i>“Groundwater and surface water impacts and monitoring associated with subsidence from the extraction of coal are addressed in the relevant Subsidence Management Plan (SMP) or other document as required under Schedule 3 of the Consent, specifically:</i></p> <ul style="list-style-type: none"> • <i>Groundwater Monitoring Program (Condition 13).</i> 		

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<p>b) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality;</p> <p>c) groundwater impact assessment criteria;</p> <p>d) a program to monitor the impact of the development on:</p> <ul style="list-style-type: none"> • groundwater levels, yield and quality (particularly any potential loss of flow to, or flow from, SCA water storages); • coal seam aquifers and overlying aquifers; and • groundwater springs and seeps; and <p>e) consideration of the requirements of the latest version (or subsequent replacement) of Water NSW's <i>The Design of a Hydrological and Hydrogeological Monitoring Program to Access the Impacts of Longwall Mining in SCA Catchment</i>.</p>				
<p>WMP, Condition 12, Schedule 4</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Discharges</p>				
<p>The Applicant must ensure all surface water discharges from the surface facilities:</p> <p>a) meet the relevant ANZECC water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; and</p>	<p>Partial Yes</p>	<p>Acknowledged within Appendix 1, which references Section 6.</p> <p>Section 6 does not specify that all surface water discharge from the surface facilities meet the relevant ANZECC/ ANZG water quality objectives for the protection of aquatic ecosystems and water quality of existing receiving waters; Resolved</p>	<p>Within Section 6, detail that all surface water discharges from the surface facilities meet the relevant ANZECC/ANZG water quality objectives for the protection of aquatic ecosystems and water quality of existing</p>	<p>Included text in 6.2.2 Resolved</p>
			<p>receiving waters. Resolved</p>	

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b) comply with the discharge limits (both volume and quality) set for the development in any EPL.	Partial Yes	Acknowledged within Appendix 1, which references Section 6. This condition is not directly addressed within text. Resolved	Within Section 6, provide a commitment to comply with discharge limits (both volume and quantity) set for the development in any EPL. Resolved	Included text in 6.2.2 Resolved
WMP, Condition 13, Schedule 4	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Water Management Plan				
The Applicant must prepare and implement a Water Management Plan for the surface facilities to the satisfaction of the Secretary. This plan must: a) be submitted to the Secretary for approval by 30 April 2009;	Yes	Condition acknowledged in Appendix 1.	-	
b) be prepared in consultation with EPA, Water NSW and DoI by suitably qualified expert/s whose appointment/s have been approved by the Secretary; and	Yes	Evidence of consultation contained within Appendix 2.	-	
c) include a: <ul style="list-style-type: none"> • Site Water Balance; • Erosion and Sediment Control Plan; • Surface Water Monitoring Program; and • Surface and Ground Water Response Plan. The Applicant must implement the Water Management Plan as approved by the Secretary.	Yes	<ul style="list-style-type: none"> • Site Water Balance – Section 4 • Erosion and Sediment Control Plan: Section 5 • Surface Water Monitoring Program – Section 6 • Surface and Ground Water Response Plan – Section 7. 	-	
WMP, Condition 14, Schedule 4	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Site Water Balance				

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The Site Water Balance must: a) include details of: <ul style="list-style-type: none"> sources and security of water supply; 	Partial Yes	The site water balance is outlined in Section 4. Section 4.1 describes water supply and use. Table 3 describes the use of town water for underground operations as a back up supply if recycled water is unavailable. However, the security of water in areas pertaining to the surface facilities is not discussed. Resolved	In Section 4.1, provide more detail regarding how water required for surface facility areas is secured. Resolved	Text in Section 4.1 amended.
<ul style="list-style-type: none"> water use on site; 	Yes	Described in Section 4.2.	-	
<ul style="list-style-type: none"> water intercepted by mining operations; 	Yes	Described in Section 4.2.5.	-	
<ul style="list-style-type: none"> water management on site; 	Yes	Described in Section 4.2.	-	
<ul style="list-style-type: none"> off-site water transfers and water stored or disposed of underground; 	Yes	Described in Section 4.2.	-	
<ul style="list-style-type: none"> reporting procedures; and 	Yes	Described in Section 9.1.	-	
b) describe measures to minimise water use by the development.	Yes	Described in Section 4.3.	-	
WMP, Condition 15, Schedule 4	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Erosion and Sediment Control				
The Erosion and Sediment Control Plan must:	Yes	The Erosion and Sediment Control Plan is contained in Section 5.	-	
a) be consistent with the requirements of the <i>Managing Urban Stormwater: Soils and Construction</i>		Section 5 describes that erosion and sediment control management will be undertaken to be generally consistent with the requirements of the <i>Managing Urban Stormwater: Soils and Construction Manual</i>		
b) identify activities that could cause soil erosion and generate sediment;	Yes	Section 5.1 describes activities that could potentially cause erosion for each area of the site.	-	
c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters	Partial Yes	Acknowledged in Appendix 1 and discussed in Section 5.2. Section 5.2 adequately describes measures to minimise sediment to be transported to downstream waterbodies. More detail is needed regarding measures that are in place to minimise soil erosion. Resolved	In Section 5.2, provide greater detail about measures in place to minimise soil erosion. Resolved	Text in Section 5.2.1.6 has been updated.

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d) describe the location, function, and capacity of erosion and sediment control structures; and	Yes	Acknowledged in Appendix 1 and addressed in Section 5.2.	-	
e) describe what measures would be implemented to monitor and maintain the structures over time.	Yes	Acknowledged in Appendix 1 and addressed in Section 5.3.	-	
WMP, Condition 16, Schedule 4	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Surface Water Monitoring Program				
The Surface Water Monitoring Plan must include: a) baseline data on surface water flows and quality in streams and other waterbodies that have been or could be affected by the surface facilities;	Partial Partial	Acknowledged within Section 6, which references Section 6 and Section 6.1. Section 6.1 references Volume 4 of the EIS, however baseline data on surface water quality in streams and other waterbodies is not provided. Section 6.1.1 has been updated to describe: <i>"Monitoring of water quality has been undertaken at upstream monitoring locations in American Creek (which flows past the Dendrobium Mine Pit Top) and Brandy and Water Creek (which flows past the KVCLF) since 2011."</i>	Provide a summary of baseline data on surface water flows and quality in the WMP. Within Section 6.1.1, provide information regarding how often monitoring was conducted, how many monitoring rounds were undertaken and describe seasonal context.	Table 5 and Table 6 have been included in the WMP. <i>Resolved.</i> Additional information provided regarding frequency of monitoring and seasonal context.
		However specific information regarding the number of sampling rounds/how often monitoring was conducted and the season samples were collected in.		

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<p>b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts;</p>	<p>Partial Yes</p>	<p>Acknowledged within Appendix 1, which references Section 7. It is noted that Section 7 does not detail the surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts. Resolved</p>	<p>Detail the surface water quality and stream health assessment criteria and trigger levels within the WMP. Resolved</p>	<p>Background water quality data for American Creek and Brandy and Water Creek are included in Table 5. Water quality criteria for Allans Creek are provided in Table 9. Stream health criteria are provided in Section 6.2.1 (Stream Invertebrate Grade Number Average Level (SIGNAL), Number of Taxa and Ephemeroptera, Plecoptera and Trichoptera (EPT) Index), noting that criteria will be developed using upstream data specific to the creek being investigated. Trigger levels are included in Table 11.</p>

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<p>c) a program to monitor the impact of the surface facilities on surface water flows and quality, stream health and channel stability; and</p>	<p>Partial Yes</p>	<p>Acknowledged within Appendix 1 which references Section 6.2.</p> <p>Section 6.2 describes:</p> <p><i>“Water quality monitoring is not undertaken at the VS1 and VS2/3 sites as there is limited potential for impacts to surface water at these sites.”</i></p> <p>It is not described why there is limited potential for impact to surface water at these sites. Resolved</p> <p>Section 6.2 also describes:</p> <p><i>“If changes in water quality are detected, or following an incident that has caused actual or potential material environmental harm, an assessment of aquatic biota/stream health may be undertaken.”</i></p> <p>This sentence is too general, and does not provide a commitment to assess water quality and aquatic biota/stream health in the instance where an incident has caused actual or potential material harm. Resolved</p>	<p>Within Section 6.2.1, provide detail as to why there is limited potential for impacts to surface water at these sites. Resolved</p> <p>In the statement:</p> <p>“following an incident that has caused actual or potential material environmental harm, an assessment of aquatic biota/stream health <u>may</u> be undertaken.” Resolved</p> <p>Replace the word “may” with “will”, to make a commitment to assessing surface water quality and stream health in the instance of an incident. Resolved</p>	<p>Additional text has been provided in Section 6.2.1.</p> <p>Wording has been amended.</p>
<p>d) procedures for reporting the results of this monitoring.</p>	<p>Yes</p>	<p>Acknowledge in Appendix 1 and addressed in Section 9.1.</p>	<p>-</p>	
<p>WMP, Condition 17, Schedule 4</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Surface and Ground Water Response Plan</p>				
<p>The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:</p>	<p>Partial Yes</p>	<p>Acknowledged in Appendix 1, which references Section 7. Resolved</p>	<p>In Section 7, detail the specific actions that will be implemented in the case of exceedances of</p>	<p>Additional text has been included in</p>

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a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; and		Table 9 describes that the response to exceedances include: “Corrective actions identified and implemented (if applicable).” No details are provided as to what the corrective actions consist of. Resolved	the surface water and stream health assessment criteria. Suggest creating a TARP to adequately address the condition requirements. Resolved	footnotes 13 and 17.
b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems, aquatic ecosystems or riparian vegetation.	N/A	Acknowledged in Appendix 1, which references Section 7.2. Section 7.2 references SMPs for groundwater monitoring programs specific to each project area.	-	
WMP, Condition 5, Schedule 5	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Water Quality Monitoring Program				
The Applicant must review its water quality monitoring program for the West Cliff Mine in consultation with DECC and Dol and to the satisfaction of the Secretary.	N/A	Section 1.2 describes: “Groundwater and surface water impacts and monitoring associated with subsidence from the extraction of coal are addressed in the relevant Subsidence Management Plan (SMP) or other document as required under Schedule 3 of the Consent”	-	As per Condition 8 of Schedule 5, Condition 5 of Schedule 5 no longer has force following determination of Project Approval 08_0150 and has therefore not been included in Appendix 1.
WMP, Condition 1, Schedule 7	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Notification of Landowners				

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<p>If the results of monitoring required in Schedule 4 identify that the impacts generated by the development are greater than the relevant impact assessment criteria in Schedule 4, except where this is predicted in the documents listed in condition 2 of schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Applicant must notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in Schedule 4.</p>	<p>No Yes</p>	<p>Not acknowledged in Appendix 1 or addressed within the WMP. Section 9.2.3 describes: <i>“The DCCC will be advised of exceedances and non-compliances under the WMP at the next available meeting...If landowners have been directly impacted by an exceedance or non-compliance with water quality criteria, notifications will be made in accordance with Condition 1 of Schedule 7.”</i></p>	<p>Acknowledge within Appendix 1 and address within text. Resolved</p>	<p>There are no impact assessment criteria for water in Schedule 4 and therefore this condition is not relevant. However, the text in Section 9.2.3 has been amended to include this requirement.</p>
<p>WMP, Condition 2, Schedule 7</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Independent Review</p>				
<p>If a landowner considers the development to be exceeding the impact assessment criteria in schedule 4, except where this is predicted in the EA, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, the</p>	<p>No Yes</p>	<p>Not acknowledged in Appendix 1 or addressed within the WMP. Resolved.</p>	<p>Acknowledge within Appendix 1 and address within text. Resolved.</p>	<p>There are no impact assessment criteria for water in Schedule 4 and therefore this condition is not relevant. Refer to Condition 12 of Schedule 4.</p>

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<p>Applicant must within 2 months of the Secretary's decision:</p> <p>(a) consult with the landowner to determine his/her concerns;</p> <p>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to:</p> <ul style="list-style-type: none"> • determine whether the development is complying with the relevant impact assessment criteria in schedule 4; and • identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and <p>(c) give the Secretary and landowner a copy of the independent review.</p>				<p>However, text has been included in Section 8.2.4 to address this requirement. Resolved.</p>
<p>WMP, Condition 3, Schedule 7</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Independent Review</p>				
<p>If the independent review determines that the development is complying with the relevant impact assessment criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Secretary. If the landowner disputes the results of the independent review then either the Applicant or the landowner may refer the matter to the Secretary for resolution.</p> <p>Where matters referred to the Secretary under this condition cannot be resolved by the Secretary within 28 days, the Secretary</p>	<p>No Yes</p>	<p>Not acknowledged in Appendix 1 or addressed within the WMP. Resolved.</p>	<p>Acknowledge within Appendix 1 and address within text. Resolved.</p>	<p>There are no impact assessment criteria for water in Schedule 4 and therefore this condition is not relevant. Refer to Condition 12 of Schedule 4.</p> <p>However, text has been included in</p>

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shall refer the matter to an Independent Dispute Resolution Process.				Section 8.2.4 to address this requirement. Resolved.
WMP, Condition 4, Schedule 7	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Independent Review				
If the independent review determines that the development is not complying with the relevant impact assessment criteria in Schedule 4, and that the development is primarily responsible for this noncompliance, then the Applicant must: (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria; or (c) offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below to the satisfaction of the Secretary.	No Yes	Not acknowledged in Appendix 1 or addressed within the WMP. Resolved.	Acknowledge within Appendix 1 and address within text. Resolved.	There are no impact assessment criteria for water in Schedule 4 and therefore this condition is not relevant. Refer to Condition 12 of Schedule 4. However, text has been included in Section 8.2.4 to address this requirement.
WMP, Condition 5, Schedule 7	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Independent Review				

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<p>If further monitoring under condition 4(a) determines that the development is complying with the relevant impact assessment criteria, then the Applicant may discontinue the independent review with the approval of the Secretary.</p> <p>If further monitoring under condition 4(a) determines that measures implemented under that condition have not achieved compliance with the impact assessment criteria in schedule 4, and the Applicant cannot secure a written agreement with the landowner under condition 4(b) to allow these exceedances, then the Applicant must, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 6-8 below.</p>	<p>No</p> <p>Yes</p>	<p>Not acknowledged in Appendix 1 or addressed within the WMP. Resolved.</p>	<p>Acknowledge within Appendix 1 and address within text. Resolved.</p>	<p>There are no impact assessment criteria for water in Schedule 4 and therefore this condition is not relevant. Refer to Condition 12 of Schedule 4.</p> <p>However, text has been included in Section 8.2.4 to address this requirement. Resolved.</p>
<p>WMP, Condition 2, Schedule 8</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Management Plan Requirements</p>				
<p>Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:</p> <p>a) a summary of relevant background or baseline data;</p>	<p>Partial</p> <p>Yes</p>	<p>Acknowledged in Appendix 1, which references Section 6.1.</p> <p>Section 6.1 does not detail background/baseline data. Resolved</p>	<p>In Section 6.1.2, provide a summary of relevant background/baseline data. Resolved</p>	<p>Table 5 and Table 6 have been included in the WMP.</p>
<p>b) details of:</p> <p>i) the relevant statutory requirements (including any</p>	<p>Yes</p>	<p>Acknowledged in Appendix 1, which references Section 3 and Section 6.2.2.</p>	<p>-</p>	

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<p>relevant approval, licence or lease conditions);</p> <p>ii) any relevant limits or performance measures and criteria; and</p> <p>iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</p>				
<p>c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;</p>	Yes	<p>Acknowledged in Appendix 1, which references Section 5.2.</p> <p>Section 5.2 describes surface water drainage and sediment management systems.</p>	-	
<p>d) a program to monitor and report on the:</p> <p>i) impacts and environmental performance of the development; and</p> <p>ii) effectiveness of the management measures set out pursuant to condition 2(c);</p>	<p>Partial</p> <p>Yes</p>	<p>Acknowledged in Appendix 1, which references Section 6 and Section 9.</p> <p>Section 6 describes the monitoring program. Refer to comments for Condition 16, Schedule 4. Resolved</p> <p>Section 9 outlines the reporting and review process. Refer to comments for Condition 5, Schedule 8. Resolved</p>	<p>Refer to comments for Condition 16, Schedule 4 and Condition 5, Schedule 8. Resolved</p>	<p>See comments for Condition 16, Schedule 4 and Condition 5, Schedule 8. Resolved</p>
<p>e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</p>	<p>Partial</p> <p>Yes</p>	<p>Acknowledged in Appendix 1, which references Section 7.</p> <p>Section 7 contains a surface water response plan. It is noted that this does not include a contingency plan, which must aim to manage any <u>unpredicted impacts</u> and their <u>consequences</u> and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible Resolved</p>	<p>Update Section 7 to include a contingency plan, which must outline the management of any unpredicted impacts and their consequences.</p> <p>Make a commitment within text to reduce ongoing impacts to levels below relevant impact</p>	<p>Text in Section 7 amended to address these requirements. Resolved</p>
			<p>assessment criteria as soon as possible, and outline how this will be achieved. Resolved</p>	

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f)	a program to investigate and implement ways to improve the environmental performance of the development over time;	Partial Yes	Acknowledged in Appendix 1, which references Section 8. Section 8 describes complaints and non-compliance management. It does not investigate and implement ways to improve the environmental performance of the development over time. Resolved	Within the WMP, describe how the environmental performance of the project will be improved over time. Resolved Outline who will be responsible for implementing ongoing reviews of environmental performance and associated management/preventative actions. Resolved	Additional text included in Section 8.2.2 Resolved Included in Section 2 Resolved
g)	a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and	Yes	Acknowledged in Appendix 1, which references Section 8.2 and Section 9.3.	-	
h)	a protocol for periodic review of the plan.	Yes	Acknowledged in Appendix 1 and addressed in Section 9.3.	-	
WMP, Condition 2A, Schedule 8		Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Revision of Strategies, Plans and Programs					
Within three months of the:		Partial	Generally addressed in Section 9.3.	Within Section 9.3, outline that if necessary, to either improve the	Text in Section 9.3 modified. Resolved
a)	submission of an incident report under condition 4 of Schedule 8;	Yes			

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<p>b) submission of an Annual Review under condition 5 of Schedule 8; c) submission of an Independent Environmental Audit under condition 6 of Schedule 8; or d) approval of any modification of the conditions of this consent, the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.</p> <p>If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary and submitted to the Secretary for approval within six weeks of the review.</p>		<p>However, Section 9.3 does not address the requirement that: "If necessary, to either improve the environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary and submitted to the Secretary for approval <u>within six weeks of the review.</u>" Resolved</p>	<p>environmental performance of the development or cater for a modification, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary and submitted to the Secretary for approval within six weeks of the review Resolved</p>	
<p>WMP, Condition 3, Schedule 8</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Incident reporting</p>				
<p>Within 24 hours of detecting the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant must notify the Department and other relevant agencies of the incident.</p>	<p>Yes</p>	<p>Addressed in Section 9.2.1</p>	<p>-</p>	
<p>WMP, Condition 4, Schedule 8</p>	<p>Sufficient (Yes/No/Partial)</p>	<p>Document reference and comment</p>	<p>Action Required</p>	<p>Company Response</p>
<p>Incident Reporting</p>				
<p>Within 7 days of notifying the Department and other relevant agencies of such an incident, the Applicant</p>	<p>Partial Yes</p>	<p>Incident reporting is briefly described in Section 9.2.1. It is noted that the specific requirements of Condition 4 are not discussed. Resolved</p>	<p>Outline in Section 9.2 that within 7 days of notifying the Department and other agencies of such an</p>	<p>The condition requires incident reporting within 7</p>

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<p>must provide the Department and these agencies with a written report that:</p> <p>(a) describes the date, time, and nature of the incident;</p> <p>(b) identifies the cause (or likely cause) of the incident;</p> <p>(c) describes what action has been taken to date; and</p> <p>(d) describes the proposed measures to address the incident.</p>			<p>incident, the following information will be provided to the Department and those agencies:</p> <p>(a) the date, time, and nature of the incident;</p> <p>(b) the cause (or likely cause) of the incident;</p> <p>(c) describes what action has been taken to date; and</p> <p>(d) the proposed measures to address the incident. Resolved</p>	<p>days, not 21 days. Resolved</p> <p>Text has been added to Section 9.2.1. Resolved</p>
WMP, Condition 5, Schedule 8	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Annual Review				
<p>By the end of September each year (or other such timing as may be agreed by the Secretary), and for at least 3 years following the cessation of mining at the development, the Applicant must submit an Annual Review to the Secretary, CCC and all relevant agencies reviewing the environmental performance of the development to the satisfaction of the Secretary. This report must relate to the previous financial year and:</p> <p>a) identify the standards and performance measures that apply to the development;</p>	<p>Partial</p> <p>Yes</p>	<p>Not acknowledged within Appendix 1.</p> <p>There is no reference to the requirement that the Annual Review will be submitted to the Secretary, CCC, and all relevant agencies reviewing the environmental performance of the development. Resolved</p>	<p>Acknowledge condition within Appendix 1. Resolved</p> <p>Address the specific condition requirements within Section 9.1.1. As this condition has been detailed in Appendix 1, no further action is required.</p>	<p>Condition 5 of Schedule 8 was included in Appendix 1 of V 7.0. Resolved</p> <p>Section 9.1.1 already states that the Annual Review will be prepared in accordance with Condition 5 of Schedule 8. Replicating the text from the Condition in the</p>

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				Management Plan does not add value. It is important to detail specific requirements so that the WMP can be relied upon as a standalone document. Reference to distribution list has been included in Section 9.1.1. Resolved
b) describe the development (including any rehabilitation) that was carried out in the previous financial year;	No Yes	Although the annual review process has been briefly explained in Section 9.1.1, there is no reference that the annual review will include a description of the development (including rehabilitation), that was carried out in the previous financial year. Resolved	Detail all information that will be provided in the Annual Review, in accordance with Condition 5, Schedule 8. Resolved	Text amended in Section 9.1.1
c) describe the development (including any rehabilitation) that is proposed to be carried out over the current financial year;	No Yes	Not addressed within Section 9.1.1. Resolved	Detail all information that will be provided in the Annual Review, in accordance with Condition 5, Schedule 8. Resolved	Text amended In Section 9.1.1 Resolved
d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;	Partial Yes	Section 9.1.1 describes “water quality related complaints and management/mitigation measures undertaken” as part of the Annual Review. There is no reference to the comparison of complaints received during the past year against those from previous years. Resolved	In Section 9.1.1, outline that complaints from the past year will be compared to those of previous years. Resolved	Text in Section 8.1 has been amended. Resolved
e) include a summary of the monitoring results for the development during the past year;	Yes	Section 9.1.1 describes that the Annual Review will include “water quality and flow monitoring results including comparison to criteria and identification of trends”.	-	

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<p>f) a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, including a comparison of these results against the:</p> <p>i) relevant statutory requirements, limits or performance measures/criteria;</p> <p>ii) requirements of any plan or program required under this consent;</p> <p>iii) monitoring results of previous years; and</p> <p>iv) relevant predictions in the documents listed in condition 2 of Schedule 2.</p>	<p>Partial Yes</p>	<p>Section 9.1.1 describes that the Annual Review will include “<i>water quality and flow monitoring results including comparison to criteria and identification of trends</i>”.</p> <p>It is noted that Section 9.1.1 is missing required information regarding the review of monitoring results and complaints, including the comparison of these results against:</p> <ul style="list-style-type: none"> requirements of any plan or program required under this consent; monitoring results of previous years; and relevant predictions in the documents listed in condition 2 of Schedule 2. Resolved 	<p>Update Section 9.1.1 to address all of the condition requirements. Resolved</p>	<p>Text amended in Section 9.1.1 Resolved</p>
<p>g) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;</p>	<p>Partial Yes</p>	<p>Section 9.1.1 describes that the Annual Review will include “<i>management/mitigation measures undertaken in the event of any confirmed non-compliances, environmental impacts or failures of controls...</i>”</p> <p>Note that management/mitigation measures need to be implemented to rectify the non-compliance and <u>avoid reoccurrence</u>. Resolved</p>	<p>Clarify that the management/mitigation measures to be implemented will aim to rectify the non-compliance and avoid reoccurrence. Resolved</p>	<p>Text amended in Section 9.1.1 Resolved</p>
<p>i) identify any trends in the monitoring data over the life of the development;</p>	<p>Yes</p>	<p>Outlined in Section 9.1.1.</p>	<p>-</p>	
<p>j) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and</p>	<p>No Yes</p>	<p>Not addressed in Section 9.1.1. Resolved</p>	<p>Update Section 9.1.1 to state that the Annual Review will identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies. Resolved</p>	<p>Text amended in Section 9.1.1 Resolved</p>

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k) describe what measures will be implemented over the next financial year to improve the environmental performance of the development.	No Yes	Not addressed in Section 9.1.1. Resolved	Within the Annual Review, provide a commitment to describe what measures will be implemented over the next financial year to improve the environmental performance of the development. Resolved	Text amended in Section 9.1.1 Resolved
Copies of the Annual Review must be submitted to the affected Councils and made available to the CCC and any interested person upon request.	No Yes	Not addressed in Section 9.1.1. Resolved	Within Section 9.1.1, outline that copies of the Annual Review will be submitted to the affected councils and made available to the CCC and any interested person upon request. Resolved	Text amended in Section 9.1.1 Resolved
WMP, Condition 6, Schedule 8	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Independent Environmental Audit				
By 31 December 2011, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:	Partial Yes	Not acknowledged within Appendix 1. Resolved . Section 9.4.1 briefly describes an independent environmental audit protocol. Resolved .	Acknowledge condition within Appendix 1. Resolved .	Condition 6 of Schedule 8 was included in Appendix 1 of V 7.0. Resolved

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a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Acknowledge condition within Appendix 1. Describe that the audit is conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary. Provide evidence of endorsement within the Appendix. Resolved.	Condition 6 of Schedule 8 was included in Appendix 1. Resolved. Section 9.4.1 already states that the IEA will be prepared in accordance with Condition 6 of Schedule 8. Note that this condition refers to an IEA.
b) include consultation with the relevant agencies and the CCC;	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, describe that the audit includes consultation with the relevant agencies and the CCC. Resolved	Text in Section 9.4.1 has been amended Resolved.
c) assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this consent and any relevant EPL or mining lease (including any strategy, plan or program required under these approvals);	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, outline whether the audit will assess the environmental performance of the development and assess whether it is complying with the relevant requirements in this consent and any relevant	Text in Section 9.4.1 has been amended Resolved.
			EPL or mining lease. Resolved.	
d) review the adequacy of strategies, plans or programs required under these approvals;	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, outline that the audit will review the adequacy of strategies, plans or programs required under these approvals. Resolved.	Text in Section 9.4.1 has been amended Resolved.

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e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals; and	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, outline that the audit will mend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals. Resolved.	Text in Section 9.4.1 has been amended Resolved.
f) be conducted and reported to the satisfaction of the Secretary. <i>Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of a) mine subsidence impacts and remediation and b) stream hydrology and water quality.</i>	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, describe that the audit will be conducted and reported to the satisfaction of the Secretary. Resolved.	Text in Section 9.4.1 has been amended Resolved.
WMP, Condition 7, Schedule 8	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Independent Environmental Audit				
Within three months of commencing an Independent Environmental Audit, or within another timeframe agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary, and any other NSW agency that requests	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.	Within Section 9.4, provide a commitment that within three months of commencing an Independent Environmental Audit, or	Condition 7 of Schedule 8 was included in Appendix 1 of V 7.0. Resolved.

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it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Secretary.			within another timeframe agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Secretary. Resolved.	This text was already included in Section 9.4.1 of V 7.0. Resolved.
WMP, Condition 8, Schedule 8	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Monitoring and Environmental Audits				
Any condition of this consent that requires the carrying out of monitoring or an environmental audit, whether directly or by way of a plan, strategy or program, is taken to be a condition requiring monitoring or an environmental audit under Division 9.4 of Part 9 of the EP&A Act. This includes conditions in respect of incident notification, reporting and response, non-compliance notification, compliance report and independent audit.	Partial Yes	Not acknowledged within Appendix 1. Condition requirement not addressed within text. Resolved.		Included in Section 9. Resolved.
WMP, Condition 11, Schedule 8	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
Access to Information				

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<p>Before the commencement of Modification 8 until the completion of all rehabilitation required under this consent, the Applicant must:</p> <p>a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website:</p> <ul style="list-style-type: none"> i. the documents referred to in condition 2 of Schedule 2 of this consent; ii. all current statutory approvals for the development; iii. all approved strategies, plans and programs required under the conditions of this consent; iv. minutes of CCC meetings; v. regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; vi. a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; 	<p>No</p> <p>Yes</p>	<p>Condition not acknowledged within Appendix 1 or addressed within text. Resolved.</p>	<p>Provide a commitment within the WMP to make the information and documents listed in Condition 11 of Schedule 8 publicly available.</p> <p>Outline where the information and documents will be made available. Resolved.</p>	<p>Condition included in Appendix 1. Resolved.</p> <p>References to where this requirement is included in the WMP provided. Resolved.</p>
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<p>vii. a summary of the current stage and progress of the development;</p> <p>viii. contact details to enquire about the development or to make a complaint;</p> <p>ix. a complaints register, updated monthly;</p> <p>x. the Annual Reviews of the development;</p> <p>xi. audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations</p> <p>xii. any other matter required by the Secretary; and</p> <p>b) keep such information up to date, to the satisfaction of the Secretary.</p>				
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Appendix 3: Appointment of Experts

Department of Planning and Environment



Our ref: DA60-03-2001-PA-184

Chris Schultz
Superintendent Environment
South32
Via: NSW Major Project Portal
10/02/2023

Subject: Appointment of experts to review Dendrobium Mine Water Management Plan

Dear Mr Schultz

I refer to your request dated 31 January 2023 for the Planning Secretary's endorsement of suitably qualified experts to review the Dendrobium Mine Water Management Plan under Condition 13 of Schedule 4 of the Dendrobium Mine Development Consent (DA 60-03-2001).

The Department has reviewed the nominations you have provided and is satisfied that two of the nominees are suitably qualified experts to review the Dendrobium Mine Water Management Plan, subject to the following limitations:

- Any updates of a material or technical nature must be completed or reviewed by Dr Stuart Brown, Principal Hydrogeologist (HGEO); and
- Any updates of an administrative or non-material nature may be completed or reviewed by Chris Schultz, Superintendent Environment (South32) or Dr Stuart Brown, Principal Hydrogeologist (HGEO).

Accordingly, subject to the limitations listed above, I can advise that the Planning Secretary approves the appointment of Dr Stuart Brown, Principal Hydrogeologist (HGEO) and Chris Schultz, Superintendent Environment (South32) to review the Dendrobium Mine Water Management Plan.

If you wish to discuss the matter further, please contact Gabrielle Allan on 02 9585 6078.

Yours sincerely

Jessie Evans
Director, Resource Assessments
Resource Assessments

As nominee of the Planning Secretary

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Appendix 4: Management Plan Approval

Department of Planning and Environment



Our ref: DA60-03-2001-PA-202

Chris Schultz
Superintendent Environment
Illawarra Coal Holdings Pty Ltd

Via: NSW Planning Portal

09/08/2023

Subject: Water Management Plan

Dear Mr Schultz

I refer to the Water Management Plan (rev 8, August 2023) submitted in accordance with Conditions 13 to 17, Schedule 4 of the consent for the Dendrobium Mine (DA60-03-2001). I also acknowledge your response to the Department's review comments and request for additional information.

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the relevant conditions in consent DA60-30-2001 as modified.

Accordingly, as nominee of the Planning Secretary, I approve the Water Management Plan (rev 8, August 2023).

For future versions of the Plan, the Department note that;

- reference to the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* should be contemporised, and
- you must ensure all changes to the Plan from the previously approved version are tracked.

You are reminded that if there are any inconsistencies between the Plan and the conditions of consent, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Emily Pemberton on 02 8275 1783.

Yours sincerely

Jessie Evans
Director, Resource Assessments
Resource Assessments

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