SOUTH32 Illawarra Metallurgical Coal

APPIN MINE
WATER MANAGEMENT PLAN

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DOCUMENT REVISION LOG

Persons authorising this Plan

NAME	TITLE	DATE
Chris Schultz	Superintendent Environment	December 2022

Document Revisions

REVISION	DESCRIPTION OF CHANGES	DATE
IMC Document – IMCMP0235		
1.0	Original Document	September 2012
2.0	Addressed comments from government agencies	December 2012
3.0	Update following Triennial Independent Audit	October 2014
4.0	Change to South32 and Review of Inventory Tables	December 2016
5.0	Update following BSO consent amendment	January 2017
5.1	Minor changes following feedback from the Department of Planning and Environment	June 2018
6.0	Review of content/format, inclusion of comments from consultation and inclusion of Appin North Water Treatment Plant	July 2020
Conversion to APN Document - APNMP0121		
1.0	Updated water balance. Inclusion of new licence discharge points. Update information on water treatment plant. Removal of groundwater monitoring requirement. Update following approval of MOD 9. Including feedback on comments from DPE.	December 2022

Persons involved in the review of this Plan

NAME	TITLE	COMPANY	EXP (YRS)	DATE
Chris Schultz	Superintendent Environment	South32 IMC	26	Dec 2022
David Gregory	Specialist Environment	South32 IMC	12	July 2021
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Vicky Longley	Superintendent Surface Services	South32 IMC	17	July 2022
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Tim Fan	Specialist Environment	South32 IMC	5	July 2022

1. INTRODUCTION

Appin Mine incorporates the underground mining operations, which extract coal from the Bulli Seam, and associated surface activities, including the West Cliff Coal Preparation Plant (WCCPP) and Coal Wash Emplacement Area (CWEA). Appin Mine is located approximately 25 kilometres (km) north-west of Wollongong in New South Wales (See Plan 1). Appin Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

ICHPL received Project Approval 08_0150[1] (the Project Approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011 for current and proposed mining of the Bulli Seam Operations (BSO) for the next 30 years, and production of up to 10.5 million tonnes per annum of run of mine (ROM) coal. This approval incorporates underground mining, transport and coal wash emplacement activities undertaken 24 hours a day, seven days per week.

This Water Management Plan (WMP) has been prepared to detail the control measures, compliance procedures, monitoring programs, evaluation protocols, notification and communication processes for water management for Appin Mine. This plan has been prepared to satisfy Condition 16 of Schedule 4 of the Project Approval for the Surface Water Management Plan[2].

1.1 Plan Objectives

This WMP has been prepared to comply with the intent and requirements of Condition 16 of Schedule 4 of the Project Approval. The objectives of this WMP are to:

- establish responsibilities for water management across Appin Mine, including but not limited to the ventilation shafts;
- comply with all relevant regulatory requirements, Environment Protection Licence (EPL) 2504 and South32 policies and standards for water management;
- 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, usage and discharge quality;
- outline the process to reduce the impacts on biota from the Brennans Creek Dam (BCD) discharge; and

[1] Project Approval modifications approved in April 2015 (MOD 1), October 2016 (MOD 2) and April 2022 (MOD 3).
[2] Surface facilities are defined in the Definitions section in the Project Approval and does not include the underground workings.

- specify investigation and communication processes in response to water related issues and complaints.

1.2 Scope

The WMP applies to all existing and future activities related to Appin Mine including water management for operational and construction needs at:

- Appin East, Appin West and Appin North Pit Top areas;
- Existing Ventilation Shafts 1 (downcast), 2 (upcast), 3 (downcast) and 6 (upcast);
- Appin Mine Ventilation and Access (AMVA) Project site (including Ventilation Shafts 7 (downcast) and 8 (upcast));[3]
- WCCPP;
- CWEA; and
- North Cliff Mine site.[4]

Refer to Plan 1 for locations of these sites.

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 was undertaken as part of the Revision 6.0 review of the WMP (IMCMP0235) with the Department of Planning, Industry and Environment – Water (DPIE – Water)/Natural Resource Access Regulator, and the Environment Protection Authority (EPA). The comments from the consultation process have been incorporated into the current version of the WMP. A summary of consultation has been provided in Appendix 3.

Consultation with agencies as stated in Condition 16 of Schedule 4 will only be undertaken where there is a material change to the WMP or if specifically requested by Department of Planning and Environment (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 6.0 is provided in Appendix 5. The same personnel were utilised for Revision 1.0 (APNMP0121).

[3] Construction at the Ventilation Shaft 7/8 site commenced in FY23 and is expected to be completed in FY25.
[4] North Cliff Mine site is no longer an operational site. Rehabilitation/closure of the site is planned.

2. ROLES AND RESPONSIBILITIES

Roles and responsibilities associated with environmental management at Appin 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.

Table 1: Roles and Responsibilities

Role	Responsibilities
Site Specialist Environment	Advise, coach and mentor IMC operations with respect to meeting the standards and requirements of the WMP. Monitor and review compliance against these requirements. Undertake monitoring and reporting as required. Update and review water monitoring data in EQuIS.
Superintendent Environment	Implementation and periodic review of the WMP. Liaise with government regulators and IMC senior leadership team in relation to arising water issues.
Maintenance and Operations Supervisors Site Maintenance Managers	Operation and maintenance of surface infrastructure in accordance with the requirements of the WMP.
External Affairs Team	Meeting the commitments contained within the WMP in relation to stakeholder engagement.
Manager Approvals Superintendent Environment General Manager Appin Mine	Provide the necessary resources and systems to meet the requirements of the WMP.

3. LEGISLATION AND PLANNING

3.1 Project Approval Conditions and Statement of Commitments

Potential surface water usage and impacts associated with Appin Mine were addressed in the BSO Project Environmental Assessment (EA) 2009 and the Modification Report for the AMVA Project. The EA and Modification Report were assessed and approved under the *Environmental Planning and Assessment Act 1979 (EP&A Act)* and associated Regulations.

All activities carried out at Appin Mine will be in accordance with the conditions of the Project Approval, in accordance with any written directions of the Planning Secretary and generally

in accordance with the Environmental Assessment (EA), Statement of Commitments and Preferred Project Report.

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

Appendix 2 summarises the requirements of the commitments included within the EA and cross references where the requirements have been addressed within the WMP.

Documents as listed in Condition 2 of Schedule 2 will be made available on the IMC website: https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

3.2 Environment Protection Licence Requirements

Environment Protection Licence No. 2504 (EPL 2504) applies to Appin Mine and associated activities. A copy of the licence can be accessed at the EPA website: http://www.epa.nsw.gov.au/prpoeoapp/.

3.3 Relevant Legislation and Licences

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

Legislation applicable to water, erosion and sediment control management may include 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*;
- *Water NSW Act 2014*;
- *Sydney Water Regulation 2017*;
- *Soil Conservation Act 1938*; and
- *National Environment Protection (National Pollutant Inventory) Measure 1998*.

A list of water licences issued by WaterNSW is provided in Appendix 4.

3.4 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 Standard.

Other relevant guidelines for water management may include but not be limited to:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2018);
- Australian Drinking Water Guidelines (ADWG 2011);
- Bunding and Spill Management Guidelines (EPA);
- National Water Quality Management Strategy: Guidelines for Sewerage Systems – Effluent Management (ANZECC/ARMCANZ, 1997);
- National Water Quality Management Strategy: Guidelines for Sewerage Systems – Use of Reclaimed Water (ANZECC/ARMCANZ, 2000c);
- Recycled Water Management Systems (Department of Primary Industries Office of Water 2015);
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1), Environment Protection and Heritage Council, the Natural Resource Management Ministerial Council and the Australian Health Ministers' Conference (2006);
- Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004);
- 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);
- Managing Urban Stormwater – Soils and Construction, Volume 2D Main Road Construction (DECC, 2008);
- Managing Urban Stormwater – Soils and Construction, Volume 2E Mines and Quarries (Landcom, DECC); and
- Water Accounting Framework for the Minerals Industry User Guide - Version 2.0 (Minerals Council of Australia, 2022) available here.

4. BASELINE AND WATER BALANCE

4.1 Baseline

4.1.1 Environment Assessment

A comprehensive EA was completed in 2009 (BSO Project Environmental Assessment: Resource Strategies 2009) as part of the Part 3A application. The assessment included comprehensive baseline datasets for rainfall and evaporation, and water flow and quality data for the Nepean River, Georges River, Cataract River, O'Hares Creek, Woronora River and Punchbowl Creek catchments and surface water resources. This baseline data can be viewed in Appendix C – Surface Water Assessment Baseline Hydrology on pp. 24-120 in the EA. Appendix C is available here.[5]

Recommendations from the baseline water assessment included in the EA have been considered in the development of this WMP.

4.1.2 Modification Report – AMVA Project

4.1.2.1 Surface Water

Foot Onslow Creek is the primary water body near the AMVA Project site and meanders in and out of the eastern boundary, flowing in a northerly direction. Foot Onslow Creek is a 3rd order (Strahler) stream. This creek contained stagnant pools of water when ecologists were on the Site in August 2020 and January 2021 and was not flowing.

There are two unnamed ephemeral drainage lines on the site which flow into Foot Onslow Creek. One follows the contour of the Site from the south-western corner through a series of dams before meeting Foot Onslow Creek, while the other flows under Menangle Road in the west and flows into Foot Onslow Creek in the north of the Site. Both of these drainage lines are 1st order (Strahler) streams. Neither contained any water when ecologists were on site.

4.1.2.2 Groundwater

The general groundwater regime for Appin Mine comprises:

- Perched groundwater system – perched water tables are hydraulically disconnected from the regional aquifer and are associated with swamps, elevated sandstone and shales.
- Shallow groundwater system – associated with the Hawkesbury Sandstone.
- Deep groundwater system – associated with the sandstones of the Narrabeen Group and coal seam aquifers.

Recharge to the groundwater system in the BSO area is from rainfall and from lateral groundwater flow. Although groundwater levels are sustained by rainfall infiltration, they are controlled by ground surface topography, geology and surface water levels. A local groundwater mound develops beneath hills with ultimate discharge to incised creeks and

[5] The baseline data has not been replicated in the WMP due to the extensive dataset provided in the EA.

water bodies, and loss by evapotranspiration through vegetation where the watertable is within a few metres of ground surface within upland swamps and outcropping sandstone/shales.

No upland swamps are located above the longwall mining area or within 600m of the edge of any secondary extraction (BSO Project Preferred Project Report, 2010).

The only recognised economic aquifer in the area is the Hawkesbury Sandstone. The Project lies within the Hawkesbury Sandstone – South-East, Hawkesbury Sandstone - Confined and the Wianamatta Shale – Sydney groundwater flow systems.

The water quality in the Hawkesbury Sandstone is generally good beneath the Woronora Plateau and the Illawarra Plateau, but it deteriorates rapidly towards the northern limits of the Southern Coalfield. In the vicinity of the Mine, the salinity is generally in the range 1,000 to 3,000 milligrams per litre (mg/L).

4.2 Water Balance

A Water Balance model has been developed for Appin Mine in line with the Water Accounting Framework for the Minerals Industry User Guide. The Water Balance model for Appin Mine is shown in Figure 1. [6]

The categories of water shown in the water balance reflect the categories in the User Guide:

- Type 1: Water is of a high quality and may require minimal and inexpensive treatment (for example disinfection and pond settlement of solids) to raise the quality to appropriate drinking water standards.
- Type 2: Water is of a medium quality with individual constituents encompassing a wide range of values. It would require moderate level of treatment such as disinfection, neutralisation, removal of solids and chemicals to meet appropriate drinking water standards.
- Type 3: Water is of a low quality with individual constituents encompassing high values of total dissolved solids, elevated levels of dissolved metals or extreme levels of pH. It would require significant treatment to remove dissolved solids and metals, neutralise and disinfect to meet appropriate drinking water standards

Water recycling is a key component of the water management system at Appin. Captured water will be recycled where possible.

Internal and external measuring points have been installed to monitor the inputs, outputs and recycling to inform the water balance.

[6] Figures shown are total volume used or discharged in megalitres (ML) for FY22.

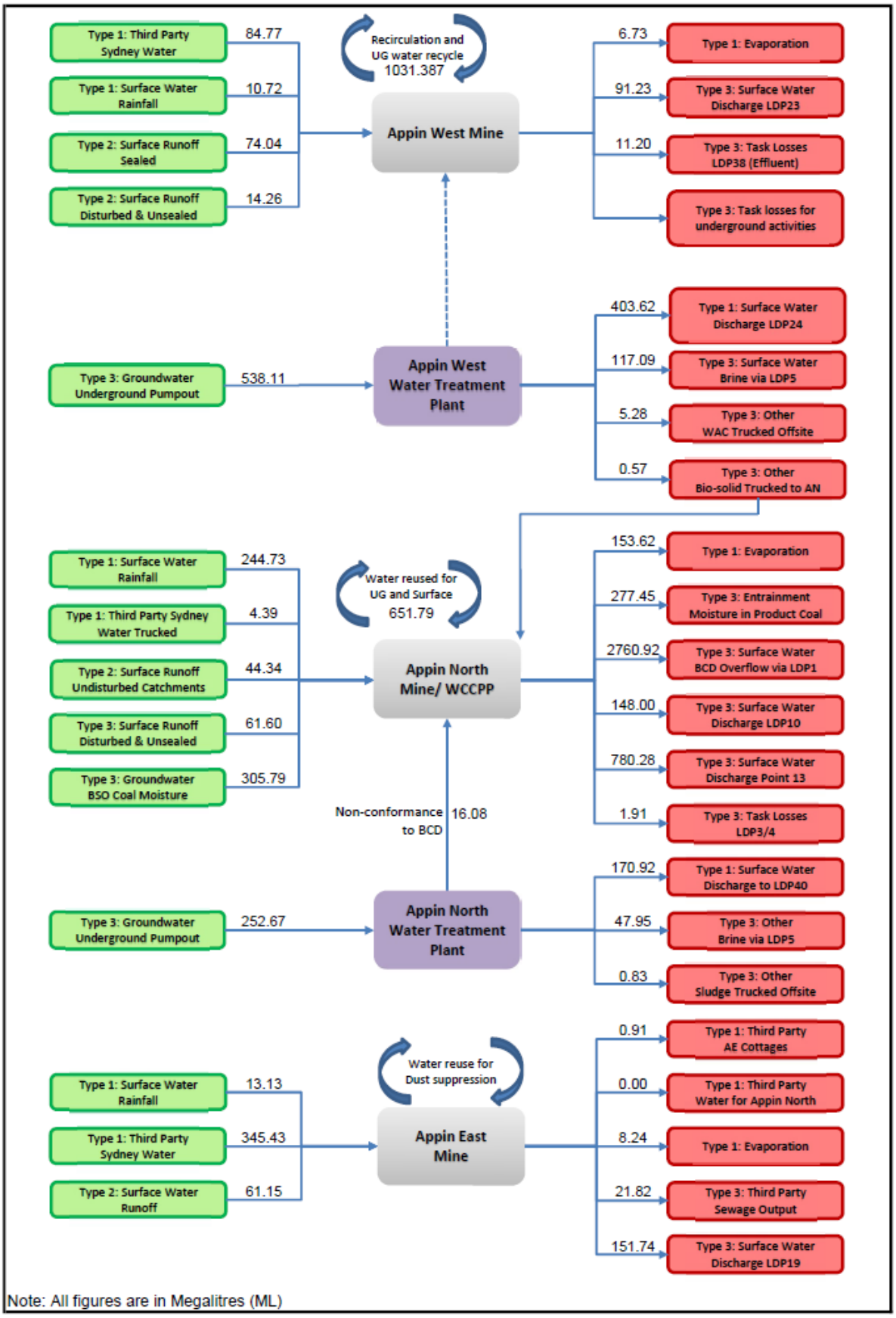


Figure 1: Appin Mine Water Accounting Framework (Water Balance – FY22)

4.3 Water Treatment Plant – Appin North

The implementation of a water treatment plant (WTP) at Appin North was identified as an opportunity to improve the water quality in Brennans Creek/Georges River, maintain a minimum flow of 1.5 ML/day[7] and remove excess water from the underground workings. The requirement to implement a WTP has been included in EPL 2504 in Special Condition E1. This requirement was to be implemented by 31 March 2021, however licence variations have been sought to revise the date for completion. It is expected that the plant will be completed in FY23.[8]

In December 2020, South32 implemented a temporary WTP. The temporary WTP was commissioned in May 2021. Water outputs from the WTP in FY22 are reflected in the water balance. Anticipated[9] outputs from the long-term WTP are reflected in Table 2. The temporary WTP is required to be operated and maintained to achieve a 90% availability when input water is available until the long-term WTP is operational.

Table 2: Anticipated performance – Appin North Long-term WTP

Feed		Permeate[10]	Brine
Underground	Emplacement Underdrainage		
1.6 ML/day	0.9 ML/day	2.2 ML/day	0.32 ML/day

4.4 Underground Water Extraction

No change in peak inflows is predicted due to the extraction of the proposed Longwalls 709 to 711 and 905. Extraction of Longwalls 709 to 711 and 905 will result in up to 0.63 ML/day (230.88 ML/year) of groundwater inflows.

5. OPERATIONAL WATER MANAGEMENT

This section of the WMP provides a detailed summary of the operational water management processes that are utilised across Appin Mine to manage water resources.

5.1 Water Management - Summary

Table 3 provides a summary of the water management processes and activities that are implemented to comply with surface water discharge/EPL limits.

[7] Averaged over the month.
[8] Impacts to the schedule were experienced due to COVID affecting manufacture and supply of equipment and availability of personnel, higher than average rainfall and other delays.
[9] Operational constraints identified during the commissioning process may affect plant performance.
[10] Permeate that does not comply with the water quality limits in EPL 2504 is directed to BCD.

Table 3: Water Management Processes and Activities

Type	Description	Storage and Treatment
Mine water	Blend of process water from underground operations and groundwater inflows that is initially stored in old underground workings (goaf areas).	**Appin Mine**: Underground storage - Areas 1, 4 and 5. Treatment via the WTPs located at the Appin West and Appin North Pit Tops[11]. Dosing at Appin East in the Green Tank.
		WCCPP:[12] Black water events from underground and backwash water from the WTP are treated through the concrete settling tanks and recirculated to the washery and WTP feed.
Treated mine water	Mine water that has been treated to a suitable quality for reuse (surface and underground operations) and/or discharge via Licence Discharge Points (LDPs).	**Appin West**: Water from the WTP is stored in the product water tanks prior to delivery underground or discharged to Sandy Gully/Allens Creek via LDP 24.
		Appin East: Mine water is pumped to the surface at Appin East into Green Tank, where it is dosed with sodium hypochlorite and pumped back underground for operational use.
		Appin North/WCCPP: Mine water pumped from Area 5 is treated at the Appin North WTP and discharged to BCD or to Brennans Creek via LDP 40.
Surface and stormwater management	Clean and potentially contaminated stormwater is separated at each of the sites. Potentially contaminated stormwater is treated, reused and/or discharged via a LDP.	**Appin East**: Stormwater is chemically treated, settled in the Main Dam and filtered via a Dynasand filter prior to discharge via LDP 19. Overflow from the Main Dam during high rainfall events is via the spillway (LDP 21).
		Appin West: Stormwater is settled in the surface water basins and filtered via a Stormfilter® prior to discharge via

[11] A temporary water treatment plant is currently in operation (as at July 2022). The long-term plant remains under construction and is expected to be commissioned in FY23.
[12] Groundwater pump out to BCD ceased in February 2019.

Type	Description	Storage and Treatment
		LDP 23. Overflow from the basins during high rainfall events is via the spillway (LDP 25).
		Vent Shaft 1/2: Clean water is diverted around the site. The site is sealed.
		Vent Shaft 3: Surface water drains to the onsite sediment basin. The basin overflows when full and water gradually evaporates. There is no active management.
		Vent Shaft 6: Stormwater is settled in the surface water basins and discharged to Harris Creek. This water can be dosed if required. Overflow from the basin during high rainfall events is via the spillway.
		AMVA Project/Ventilation Shaft 7/8:[13] Runoff from the site is captured in the on-site sediment pond where it is settled prior to discharge (LDP 41). Overflow from the sediment pond during high rainfall events is via the spillway (LDP 42).
		Appin North: Stormwater is chemically treated (where required), settled in settling dams and stored in BCD for use or discharge via LDP 10 (if water quality criteria are met) or during and immediately following BCD rainfall events resulting in BCD overflow via the spillway (LDP 1).[14]
		North Cliff: Surface water drains to the onsite sediment pond. The pond overflows when full and water gradually evaporates. There is no active management.
Effluent	Effluent is a waste product from site toilets, bathhouse and kitchen facilities.	**Appin East**: Effluent from the toilets, kitchen and bathhouse is connected into the Sydney Water sewerage system.

[13] Construction at the AMVA site commenced in FY23.
[14] Discharge from BCD will be restricted with stable and consistent operation of the Appin North WTP. Discharge will still occur during and immediately following rainfall events resulting in BCD overflow, if discharge at LDP 10 meets water quality criteria or if flows in the Georges River are sufficient to dilute discharge from BCD to meet water quality criteria at a designated downstream monitoring location.

Type	Description	Storage and Treatment
		Appin West: Effluent from the toilets, kitchen and bathhouse is treated via a sewage treatment package plant and treated effluent is irrigated on site via LDP 38[15]. Discharge via LDP 39 may occur during or following high rainfall events.
		Appin North: Effluent from the toilets, kitchen and bathhouse is treated via a sewage treatment package plant and treated effluent is irrigated on site via LDP 3/4.
Potable water	Potable water supplied by Sydney Water is used for drinking, bathhouse facilities, surface cooling systems and longwall support hydraulics (when Sydney Water not available). A Sydney Water supply is available to dilute discharge from BCD to reduce salinity levels in-line with the EPL.[16]	**Appin West/East:** Potable water is either stored in tanks or transferred from the main line to the fresh water supply lines underground.
		Appin North/WCCPP: Potable water is trucked to Appin North/WCCPP and stored in tanks.
Oils and oily water	Waste oil and oily waters are stored in tanks and removed by truck for off-site treatment.	**Appin Mine and WCCPP:** Oil is removed from oily waters via mechanical and chemical separators. Waste oil and oily waters are treated off-site at a licenced waste facility.

Flexibility in and ongoing maintenance of the water management system at Appin provides the capacity to manage water under all weather conditions.

[15] Previously LDP 22.
[16] Use of Sydney Water for dilution ceased in 2020. It is available for use under extraordinary circumstances in consultation with the EPA..

5.2 Mine Water Management

5.2.1 Appin West

5.2.1.1 Mine Water Make

The mining process results in the liberation of groundwater from the coal seam and strata immediately overlying and underlying the working areas of the mine. Groundwater from the Bulli Seam is unsuitable for direct re-use in the mining operations and is transferred into old mine workings in Area 1 (White Panel), Area 4, Area 5[17] and Longwall 515 goaf for storage. The estimated storage capacity of each underground storage area is as follows:

- Area 1 – 941 ML;
- Area 4 – 560 ML;
- Area 5 – 96 ML; and
- 515 – 58 ML.

The levels of water in the underground water storages are monitored to manage available storage capacity.

5.2.1.2 Underground Supply

Process water is used underground for machine cooling, controlling dust emissions in active underground mining areas, hydraulic oil emulsions, conveyors and fire-fighting purposes. Water supplied to underground operations needs to meet specific minimum water quality requirements for human health and operational needs. The water is sourced from treated mine water (primary supply) or Sydney Water (backup supply).

5.2.1.3 Treatment System

Mine water is pumped from Areas 1 and 4 to the WTP at Appin West Pit Top which has two trains – Integrated Membrane System (IMS) 1 and IMS2. The plant provides treated mine water (permeate) for the underground operations at Appin Mine. The WTP includes mine dams for solids settlement and nutrient removal, filter units (multimedia, granular activated carbon, and microfiltration units), water softeners and a reverse osmosis unit.

The WTP reduces the concentration of suspended solids, metals and salinity to acceptable levels for reuse/recycling underground as process water for operational activities, and to meet water quality concentration limits at LDP 24 for water discharged to the environment that is surplus to operational requirements.

Back wash and cleaning waste water from the WTP is returned to Mine Dam 2 where it undergoes treatment through the Backwash Treatment Plant (mine dam aerators, Dynasand filter and sludge separator). This water is primarily blended with the permeate that is pumped underground and partially with permeate discharged to the environment to achieve the desired water quality.

[17] Water from Area 5 can be transferred to the Appin West WTP via the Area 1 and Area 4 water storages if required.

Brine from the WTP is transported off site to LDP 5 (under EPL 3241 for Dendrobium Mine), located at Marley Place, Unanderra. At LDP 5 the brine mixes with mine water that is pumped out of Dendrobium Mine, into Allans Creek, which flows into Port Kembla Harbour. Alternative licenced locations for brine disposal may be utilised as required.

Weak acid cation exchange solution is transported to an appropriate licenced waste facility for reuse. Biosolids are transported to the CWEA for disposal.

Mine water pumped out from the underground storage areas can also be directly recirculated into the underground workings for use in areas not requiring higher quality water.

5.2.2 Appin North

5.2.2.1 Mine Water Make

As noted in 5.2.1.1, groundwater from the Bulli Coal Seam is transferred into old mine workings in Area 1 (White Panel), Area 4, Area 5 and Longwall 515 goaf for solids settling and storage. The WTP at Appin North[18] treats mine water from Area 5.

5.2.2.2 Underground Supply

Water from BCD is disinfected with chlorine dioxide and pumped underground and to the WCCPP for operational use. Treated water from the Appin North WTP will not be directly returned to the underground workings for use. Some water from the WTP will be transferred to BCD.[19]

5.2.2.3 Treatment System

The Appin North WTP receives water from the Area 5 underground water storage, which can be mixed with a portion of the underdrainage from the CWEA[20] prior to treatment. The treated water is either discharged to Brennans Creek for environmental flows or BCD (if non-compliant with EC and pH water quality limits in EPL 2504).

The WTP will reduce the concentration of suspended solids, metals and salinity to acceptable levels to meet water quality concentration limits at LDP 40 for water discharged to the environment.

Back wash and cleaning waste water from the WTP is recycled through the WTP.[21]

Brine from the WTP is transported off site to LDP 5 (under EPL 3241 for Dendrobium Mine), located at Marley Place, Unanderra. At LDP 5 the brine mixes with mine water that is

[18] A temporary WTP was commissioned in May 2021. The temporary WTP will operate until the long-term WTP is commissioned, and may run in parallel until consistent operation of the long-term WTP is achieved.
[19] Where water quality criteria for discharge to Brennans Creek are not met.
[20] Not applicable for temporary water treatment plant, which only treats mine water from Area 5. The source of this water is the coffer dam or Emplacement Pond 2.
[21] A trial is being undertaken where the backwash water is transported to the concrete settling tanks at the WCCPP to settle out solids prior to being returned to the plant.

pumped out of Dendrobium Mine, into Allans Creek, which flows into Port Kembla Harbour. Alternative licenced locations for brine disposal may be utilised as required.

Chemical waste will be transported to an appropriate licenced waste facility for reuse, recycling or disposal as appropriate.

5.2.3 WCCPP

5.2.3.1 Mine Water

Water for the WCCPP is preferentially sourced from BCD, that is either pumped directly into the WCCPP or to the Concrete Settling Tanks, which is then pumped into the WCCPP for use in the coal washing process. Mine water can be used as a top-up supply under exceptional circumstances e.g. drought conditions or black water events.

5.2.3.2 Process Water

WCCPP process water no longer required by the plant is directed to P3 for initial settlement. This water is pumped back into the Concrete Settling Tanks and recirculated through the WCCPP.

Overflow from P3 flows into Pond 4A (P4A). The pipeline from P4A to the eastern clean water diversion drain (that flows into BCD) can be opened if required to transfer water. Overflow from P4A also filters through the CWEA and into the underdrainage system.

5.2.3.3 Treatment System

The Concrete Settling Tank treatment system is used to chemically assist coagulation, flocculation and settling of water used in the WCCPP. The treatment system is located adjacent to the WCCPP.

The Concrete Settling Tanks are operated separately and independently of the Pond P1/P2 /P4A surface runoff system, as that system has been designed to treat surface stormwater runoff.

The tanks are cleaned out (i.e. sediment removed) periodically for efficient operation of the treatment system. Periodic inspections are completed by the site Specialist Environment to check the system is operating effectively and associated chemical storage is adequately bunded.

5.3 Surface and Stormwater Runoff Management

5.3.1 Appin East

The surface water drainage and LDPs at Appin East are shown in Plan 2.

5.3.1.1 Clean Stormwater Catchment

Clean stormwater from undisturbed areas around the site is diverted around the Appin East Pit Top to avoid potential contamination.

5.3.1.2 *Mine Entrance and Sherriff Road Catchment*

Stormwater runoff from the mine entrance and Sheriff Road is diverted into a retention system that is designed to capture the 'first flush' after rain events. The stormwater is then pumped into the Main Dam for use in the stockpile suppression system. During heavy rainfall events (above the capacity of the first flush system), clean stormwater overflows into the Georges River.

5.3.1.3 *Disturbed and Potentially Contaminated Surface and Stormwater Catchment*

Surface and stormwater from the internal roads, workshop, stockpile and other disturbed areas is directed to the silt trap (for settlement of coal fines and other particulates) via the chemical treatment system, which overflows into the Main Dam.

A slurry pit is in place at the base of the surface elevator belt to capture coal fines.

Coal fines are removed from the slurry pit, Main Dam silt trap, Main Dam and settling pond on an as required basis and placed onto the drying areas (adjacent to the Main Dam, coal bins or on the coal stockpile).

Water from the Main Dam is used as the primary water supply for dust suppression sprays on the stockpiles.

Water from the Main Dam is pumped into the Sediment Dam, from which it is pumped through the Dynasands filter into the Georges River via LDP 19.

Overflow from the Main Dam is via LDP 21.

5.3.2 *Appin West*

The surface water drainage and LDPs at Appin West are shown in Plan 3.

5.3.2.1 *Clean Stormwater Catchment*

Clean stormwater from undisturbed areas around the site is diverted around the Appin West Pit Top to avoid potential contamination.

5.3.2.2 *Disturbed and Potentially Contaminated Surface and Stormwater Catchment*

Storm and surface water from disturbed and potentially contaminated areas is diverted to the Surface Water Dams. The catchment includes the pit top, stormwater drainage system, internal roads, hardstand areas, car park and the workshop. Surface water from the sealed areas around the workshop and store which has the potential to be contaminated with oily water is transferred to the oil water separator sump. Treated water from sump is transferred to Dam 2. All other surface water can be transferred to either Dam 1 or Dam 2.

The surface water management system (Surface Water Dams and Storm Filter System) is designed to capture and treat a 1 in 10-year, 72-hour duration rainfall event. Surface water is filtered to reduce suspended solids prior to discharge into Sandy Gully (Clements Creek) via LDP 23.

Overflow from Dam 1 is via LDP 25.

5.3.3 Appin North/WCCPP

The Appin North/WCCPP water management system has been designed to:

- collect all groundwater inflows in underground workings and pump them to the surface for treatment with the Appin North WTP;
- discharge treated water (permeate) from the WTP to BCD and Brennans Creek to improve water quality and aquatic macroinvertebrate health in Brennans Creek/Georges River;
- collect, store, and treat all dirty water surface runoff from rainfall events up to a 1 in 10-year ARI 3-day duration storm; and
- transfer all treated surface water flows to BCD for storage and reuse onsite/underground, or discharge to Brennans Creek/Georges River (pending ability to meet water quality concentration limits).

The water management system includes several onsite drains, treatment systems, and surface water storage/treatment ponds, including Ponds 1 to 7 and Emplacement Ponds (EPs) 2 and 3, with a combined storage capacity of over 200 ML. This infrastructure is used to store and treat all site dirty surface runoff from coal stockpile areas, haul roads, active coal wash emplacement areas, and process flows from the WCCPP and underground mine water[22].

The reclaim pond at the base of BCD collects seepage from the dam. This water is either discharged to Brennans Creek (if water quality concentration limits are achieved) or pumped back into BCD.

The surface water drainage and EPL 2504 LDPs at Appin North, CWEA and WCCPP are shown in Plan 4.

5.3.3.1 Clean Stormwater Catchment

The segregation of clean and dirty water is an important feature of the site water management system as it minimises the clean catchment area draining to the active emplacement catchment and ensures that the emplacement water management system is not overloaded. The Brennans Creek clean water diversion channels are located to the:

- south-west of the CWEA; and
- adjacent to Brennans Creek on both sides of the valley.

These clean water diversion channels have been established to divert clean water runoff around the active CWEA and ponds EP2 and EP3. The clean water diversion system must be maintained throughout the operational lifetime of the CWEA to minimise the amount of clean water catchment draining to the CWEA water treatment system.

Stormwater runoff from the Appin North Pit Top office/administration area is considered clean and directed to Brennans Creek via the Brennans Creek diversion channel around the CWEA.

[22] Regular discharges of underground mine water to BCD via P3 and P4A ceased in February 2019.

Stormwater runoff from the CWEA with established landform (with vegetation spread) is considered to be clean runoff and is directed to the clean water diversion system to minimise the load entering the CWEA water management system.

5.3.3.2 Disturbed and Potentially Contaminated Catchment

Storage ponds located within the Appin North/WCCPP site also form part of the site water management system. Their function is summarised as follows:

- P1 (23 ML) captures runoff from coal stockpile areas, with controlled release and spill to P2.
- P2 (24 ML) captures runoff from adjacent coal stockpile areas. Water from P2 is gravity fed to either P3 or P4A.
- P3 (23 ML) is located adjacent to the Concrete Settling Tanks at the WCCPP. Water from P3 is pumped back to the settling tanks (if required) or spray irrigated on to the CWEA. Overflow from P3 reports to P4A.
- P4A (45 ML) captures overflow from P3 and the active emplacement area. Inflow water is able to be dosed with flocculant to facilitate solids removal. The pipeline from P4A to BCD can be opened if required to transfer water. Overflow from P4A also filters through the CWEA and into the underdrainage system. Water from P4A can also be irrigated on the active CWEA.
- P5 (8 ML) is located in the Stockpile 4 area north of the WCCPP. Water is released from P5 to P6 and P7. Clean water is diverted around Stockpile 4 and the pond system.
- P6/P7 (21 ML) are located immediately downslope of P5. Inflow water is dosed with flocculant to facilitate solids removal. Water from the ponds is discharged to BCD.
- EP2/EP3 (68ML) are located downstream of the active emplacement area. EP2 is used for primary settlement prior to the water being dosed with flocculant and released into EP3 for settlement prior to discharge to BCD.[23]

The management of water levels in each of the ponds is reliant on manual processes such as visual observations of pond volumes, and cumulative pumping rates. The levels are heavily influenced by rainfall events and therefore the ponds are generally kept empty during dry periods as this allows for sufficient storage capacity to capture and treat rainfall events as per their design specifications.

In summary, the majority of water used at the WCCPP is recycled from stormwater or underground mine water (if required). Prior to storage in BCD, the water passes through water treatment systems which use chemically-assisted coagulation, flocculation and settling.

Prior to reuse or storage in tanks, BCD water is pumped through a chlorine dioxide plant to reduce microbiological growth, into the:

- North Tank;

[23] Additional EPs will be constructed as required.

- South Tank; or
- underground workings water management system via the water supply borehole.

Water from the North Tank is used for the truck wash, firefighting tanks and make-up requirements for the WCCPP, and to supply the South Tank, located at the Appin North Pit Top. The South Tank is used to provide water for fire-fighting capacity and for vehicle wash down requirements.

5.3.4 CWEA

5.3.4.1 Active CWEA Runoff

Runoff from the active CWEA (or areas where the vegetation has not yet been spread) is directed to the CWEA water management system (i.e. P4A, EP2, and EP3) for treatment, if required, prior to being gravity fed to BCD.

The CWEA water treatment system is designed for a:

- 1 in 10-year 72-hour duration storm event; and
- maximum active emplacement area of 21 hectares.

The active CWEA draining to P4A, EP2 and EP3 is maintained at or below 18 ha.

If additional treatment is required prior to transfer into BCD (i.e. during/following a rainfall event), the water can be re-circulated through the EP2/EP3 dosing flume to improve the water quality.

Clean catchment areas (including rehabilitated CWEA) are diverted around the CWEA water treatment system, either via the Brennans Creek diversion channel or the clean water cutoff drains.

5.3.4.2 CWEA Under-Drainage

CWEA under-drainage flows are generally clean. The CWEA under-drainage is pumped to the clean water diversion channel for release into BCD. If required (i.e. if the water is turbid), the under-drainage can be directed into the CWEA dirty water system.

Overflow from the CWEA under-drainage system feeds directly to the CWEA water treatment system.

Water from the CWEA under-drainage/Coffer Dam/EP2 can also be pumped to the Appin North WTP for blending with mine water prior to treatment. [24]

5.3.5 Ventilation Shaft 1/2

Clean water is diverted around the site. The site is sealed and there is very limited hydrocarbon storage at the site. Surface water drainage at this site is shown on Plan 5.

[24] Long term WTP only.

5.3.6 Ventilation Shaft 3

Surface water from rainfall drains to the onsite sediment pond. The majority of the site is sealed. The basin overflows when full and water gradually evaporates. There is no active management of the sediment pond. Surface water drainage at this site is shown on Plan 5.

5.3.7 Ventilation Shaft 6

Surface runoff that was captured on site during the construction phase was treated with flocculant in surface dams prior to discharge into Harris Creek[25]. Ventilation Shaft 6 site is now in the operational phase and the majority of the site is either vegetated or sealed. Surface runoff no longer requires treatment under normal operating conditions, however discharge is still carried out as required.

Overflow from the surface dam is via the spillway. Surface water drainage at this site is shown on Plan 6.

5.3.8 AMVA Project/Ventilation Shafts 7 and 8

Surface runoff on site during the construction phase will be captured in the sediment pond prior to discharge into Foot Onslow Creek via LDP 41. Flocculant may be used to achieve water quality concentration limits.

Overflow from the sediment pond is via the spillway (LDP 42). Surface water drainage at this site is shown on Plan 7.

The sediment pond will be retained for the operational phase of the site.

5.3.9 North Cliff

Surface rainfall run off is directed to the on-site sediment pond. The pond overflows when full or passively seeps through a semi-permeable dam wall to natural swamp bushland and water gradually evaporates. There is no active management of this sediment pond. The sediment pond has an approximate capacity of 6.5 ML.

5.4 Surface Water Discharges

Water releases from Appin Mine are undertaken in accordance with the requirements of EPL 2504. Additional monitoring points are also sampled. A summary of monitoring and discharge points is shown in Table 4.

[25] LDP 36 (discharge) and LDP 37 (spillway) were removed from EPL 2504 in May 2022.

Table 4: Licence Monitoring and Discharge Points – Surface Waters

Point	Description	Receiving Environment	Monitoring Frequency	Sample Method
Appin North/WCCPP				
Point 1 (LDP 1)	Overflow (spillway) from BCD	Brennans Creek / Georges River	N/A	N/A
Point 10 (LDP 10)	Discharge from BCD	Brennans Creek / Georges River	Monthly during discharge Continuous during discharge	Grab sample In line Instrumentation
Point 11	Ambient Water Quality (located in the Georges River upstream of Brennans Creek confluence)	N/A	Monthly	Grab sample
Point 12	Ambient Water Quality (located in the Georges River downstream of Brennans Creek confluence)	N/A	Monthly	Grab sample
Point 13 (LDP 13)	Volume monitoring for Point 10 discharge.	Brennans Creek / Georges River	Continuous during discharge	In line Instrumentation
Point 16[26]	CWEA underdrainage	BCD	Monthly	Grab sample
Point 40 (LDP 40)	Water quality monitoring of discharge from Appin North WTP	BCD/Brennans Creek / Georges River	Monthly during discharge Continuous during discharge[27]	Grab sample In line Instrumentation
	Volume monitoring of discharge from Appin North WTP		Continuous during discharge	In line Instrumentation
Appin East				
Point 18 (LDP 18)	Underflow from the filter lagoon	Georges River	Monthly during discharge	Grab sample
Point 19 (LDP 19)	Dynasand Filter outlet	Georges River	Monthly during discharge	Grab sample
Point 21 (LDP 21)	Overflow (spillway) from the site Main Dam	Georges River	N/A	N/A

[26] Point 16 is not included in EPL 2504. It is used to inform water quality inputs to BCD.
[27] For discharge water quality checking.

Point	Description	Receiving Environment	Monitoring Frequency	Sample Method
Appin West				
Point 23 (LDP 23)	Stormwater discharge	Sandy Gully/Nepean River	Monthly during discharge	Grab sample
Point 24 (LDP 24)	Treated mine water discharge	Sandy Gully/Nepean River	Monthly during Discharge Continuous during discharge	Grab sample In-line instrumentation
Point 25 (LDP 25)	Overflow (spillway) from the sand filtration dam	Sandy Gully/Nepean River	N/A	N/A
AMVA Project/Ventilation Shaft 7/8				
Point 41 (LDP 41)	Discharge from the sediment pond	Foot Onslow Creek/Nepean River	Monthly during discharge	Grab sample
Point 42 (LDP 42)	Overflow spillway on sediment pond	Foot Onslow Creek/Nepean River	N/A	N/A

The monitoring requirements and licence limits for Appin Mine as defined in EPL 2504 are provided in Table 5.

Table 5: Water Quality Concentration Limits

Pollutant	Units of Measure	50th%ile concentration limit	80th%ile concentration limit	90th%ile concentration limit	100th%ile concentration limit
Point 3					
BOD	mg/L	30	-	-	50
pH	pH	6.5 - 8.5	-	-	6.0 - 9.0
Point 10					
Aluminium (dissolved)	µg/L	-	-	800	-
Arsenic (dissolved)	µg/L	-	-	19	-
Cadmium (dissolved)	µg/L	-	-	0.5	-
Cobalt (dissolved)	µg/L	-	-	20	-
Copper (dissolved)	µg/L	-	-	18	-
Lead (dissolved)	µg/L	-	-	6	-
(Manganese (dissolved)	µg/L	-	-	40	-
Nickel (dissolved)	µg/L	-	-	200	-
pH	pH	-	-	-	6.5 – 9.3
TSS	mg/L	-	-	-	50

Zinc (dissolved)	µg/L	-	-	84	-
Point 18					
pH	pH	-	-	-	6.5 – 8.5
TSS	mg/L	-	-	-	50
Point 19					
pH	pH	-	-	-	6.5 – 8.5
TSS	mg/L	-	-	-	50
Point 23					
pH	pH	-	-	-	6.5 – 8.5
TSS	mg/L	-	-	-	50
Point 24					
Aluminium (dissolved)	µg/L	-	55	-	-
Bicarbonate alkalinity (as $CaCO_3$)	mg/L	-	185	-	-
Cobalt (dissolved)	µg/L	-	1.4	-	-
Copper (dissolved)	µg/L	-	1.4	-	-
EC	µS/cm	-	-	-	600
Nickel (dissolved)	µg/L	-	11	-	-
Nitrogen (total)	µg/L	250	-	-	-
pH	pH	-	-	-	6.5 – 8.5
Zinc (dissolved)	µg/L	-	8	-	-
Point 38					
BOD	mg/L	30	-	-	50
pH	pH	-	-	-	6.0 - 9.0
Point 40[28]					
Aluminium (dissolved)	µg/L	-	-	-	55
Bicarbonate alkalinity (as $CaCO_3$)	mg/L	-	-	-	185
Cobalt (dissolved)	µg/L	-	-	-	1.4
Copper (dissolved)	µg/L	-	-	-	1.4
EC	µS/cm	-	-	-	495
Nickel (dissolved)	µg/L	-	-	-	11
Nitrogen (total)	µg/L	-	-	-	250
pH	pH	-	-	-	6.5 – 8.5
Zinc (dissolved)	µg/L	-	-	-	8

[28] As noted in EPL 2504, limits at Point 40 only apply to discharge from the long-term WTP. New limits for flow and concentration of substances discharged from Point 40 will be attached to the licence after commissioning of the long-term WTP. The limits will be based on the actual measured performance of the installed equipment when operated in a proper and efficient manner.

Point 41					
pH	pH	-	-	-	6.5 – 8.5
TSS	mg/L	-	-	-	50

The EPL can be accessed via this link: http://www.epa.nsw.gov.au/prpoeoapp/.

Environmental monitoring (sampling) is undertaken by the site Specialist Environment with the lab analysis performed at a NATA accredited laboratory.

5.4.1 Appin East

Stormwater runoff from the mine entrance and Sheriff Road is diverted into a treatment system that is designed to capture the 'first flush' after rain events. The stormwater is then pumped into the Main Dam for use in the stockpile dust suppression system. During heavy rainfall events (above the capacity of the first flush system), clean stormwater overflows from the first flush system into the Georges River via LDP 18.

Pit top surface and stormwater is directed to the Main Dam where it is treated and allowed to settle. After settling occurs, treated surface and stormwater is filtered via a Dynasand filter and discharged into the Georges River via LDP 19. During high rainfall events, the Main Dam may spill to the Georges River via LDP 21.

5.4.2 Appin West

Surface water settles in the surface water dams and is then filtered via the Stormfilter® which reduces suspended solids prior to release via LDP 23. During high rainfall events, the surface water dams may spill to Sandy Gully via the main spillway at LDP 25 to protect the integrity of the dam walls.

Mine water is treated at the WTP, resulting in a reduction in suspended solids, electrical conductivity, nutrient load and metals. Treated mine water is discharged into Sandy Gully via LDP 24.

5.4.3 Appin North/WCCPP

Releases from BCD are authorised via LDP 1 (spillway) and LDP 10. Pollution Reduction Programs and an Environment Improvement Program (EIP) have been implemented to progressively improve water quality and aquatic macroinvertebrate health in the Georges River.

Water is currently discharged from BCD under controlled conditions to minimise uncontrolled releases over the BCD spillway to the Georges River past LDP 1 to:

- minimise the impact to the aquatic environment in the Georges River;
- control discharges to Georges River to manage water quality;
- provide dry weather environmental flow (where required); and
- provide sufficient capacity and settlement time for treatment after rainfall events.

The volume of BCD to its spillway is approximately 320 ML, with a maximum depth behind the dam wall of 12.5 m. A Trigger Action Response Plan (TARP) is in place for the operation of discharges from BCD. A target depth in the dam is maintained to provide security of supply and to accommodate rainfall events. The discharge of water from BCD may cease when the water level falls below nine metres.

A pipeline has been installed that transfers potable water from Appin East to BCD. This water is able to be used for dilution of discharge from BCD to meet electrical conductivity water quality limits. In accordance with Condition L 2.6 of EPL 2504, dilution is not required when drinking water restrictions are in place as gazetted under the Sydney Water Regulation 2017.

When the Appin North WTP reaches stable and consistent production at 1.5 ML per day capacity, discharge from BCD is likely to be restricted. It is proposed that discharge will still occur during and immediately following rainfall events resulting in BCD overflow, if discharge at LDP 10 meets water quality criteria or if flows in the Georges River are sufficient to dilute discharge from BCD to meet water quality criteria at a designated downstream monitoring location.[29]

Overflow from BCD via the spillway will still occur during rainfall events.

The WTP treats a mix of water from Area 5 (underground) and water from the CWEA underdrainage system/Coffer Dam/EP2[30]. The treated water (permeate) is preferentially discharged to Brennans Creek to meet the 1.5 ML/day minimum discharge requirement (averaged over one month) in Condition E1.1 Table 3 in EPL 2504[31]. Any surplus water, or water that does not meet the water quality concentration limits, is discharged to BCD.

5.4.4 Ventilation Shaft 6

Surface runoff is captured on site in surface dams prior to discharge into Harris Creek. Ventilation Shaft 6 is now in the operational phase and the majority of the site is either vegetated or sealed.

Overflow from the surface dam is via the spillway.

5.4.5 AMVA Project/Ventilation Shafts 7 and 8

Surface runoff on site during the construction phase will be captured in the sediment pond prior to discharge into Foot Onslow Creek via LDP 41. Flocculant may be used to achieve water quality concentration limits.

Overflow from the sediment pond is via the spillway (LDP 42). Surface water drainage at this site is shown on Plan 7.

The sediment pond will be retained for the operational phase of the site.

5.5 Sewage Effluent Treatment and Management

Sewage effluent irrigation at Appin West and Appin North is undertaken in accordance with the requirements of EPL 2504. A summary of EPL 2504 monitoring points relevant to effluent irrigation is shown in Table 6.

[29] The operational parameters for discharge will be confirmed with the EPA following consistent operation of the long-term WTP and review of monitoring results.
[30] Long-term WTP only. The temporary WTP only treats mine water from Area 5.
[31] Discharge volume requirement applies to long-term WTP.

Table 6: Licence Discharge Points – Effluent Irrigation/Overflow

LDP[32]	Description	Receiving Environment
Appin North		
Point 3/4	Spray Irrigation onto grassed utilisation area	On-site
Appin West		
Point 38[33]	Spray irrigation onto grassed utilisation area	On-site
Point 39	Overflow weir on stabilisation lagoon of STP	On-site

5.5.1 Appin East

The primary method for disposal of bathhouse waters (grey waters) and sewage effluent (black waters) is through the Sydney Water wastewater system (low pressure sewer connection).

5.5.2 Appin West

Bathhouse water and sewage is treated at the Appin West site through a primary aeration pond and a Smith and Lovelace STP that discharges into a holding pond. The treated effluent is spray-irrigated via LDP 38 onto the utilisation area.

In order to meet the land capability and irrigation management requirements of the utilisation area, the predicted overflow of the storage dams is up to 2.5 times per year, provided only the minimum of 3.8 ha of irrigation is available; and wet-weather storage is triggered following >5mm of rain.

As a result, discharge of treated effluent from the storage dam is permitted via LDP 39 during and following rainfall events.

Treated effluent may also be removed from site by truck/tanker if required.

5.5.3 Appin North/WCCPP

Sewage from bathhouse and toilet facilities is treated on site using a Smith and Lovelace STP that discharges into a holding pond. Treated effluent is spray-irrigated via LDP 4 to a dedicated utilisation area (located on-site).

[32] An LDP is planned to be added to EPL 2504 prior to operation of STP at Ventilation Shaft 7/8.
[33] Previously LDP 22. Varied in EPL 2504 in March 2021.

5.5.4 Ventilation Shafts 1, 2, 3 and 6

Sewage generated at the ventilation shaft sites is collected in septic tanks and pumped out and disposed of offsite by a licenced contactor.

5.5.5 AMVA Project Site/Ventilation Shafts 7/8

Sewage generated at the AMVA Project site is collected in tanks and pumped out and disposed of offsite by a licenced contactor.

A Sewage Treatment Plant (STP) will be constructed to treat all wastewater generated on-site during the operational phase to an appropriate standard for the receiving environment, in accordance with relevant guidelines. The treatment plant is planned to be sized with a capacity for up to 25 m^3/day, discharging via an irrigation spray field. [34]

5.6 Water Supply

Potable water (including Sydney Water and treated water) storage capacities are provided in Table 7, Table 8 and Table 9. Water used on site is preferentially sourced from on-site supplies i.e. WTP or site storage dams e.g. BCD, to minimise the use of Sydney Water.

5.6.1 Appin East

Potable water is supplied to Appin East by mains connections to the Sydney Water network. Sydney Water is used in the administration buildings, workshops and bathhouse. It is also supplied to the underground workings when required, and for dilution at BCD (if required).

The Sydney Water supply provides water to properties owned by IMC adjacent to the Pit Top, Ventilation Shafts 1/2 and 3 and the EDL Power Plant (at Ventilation Shaft 1/2).

5.6.2 Appin West

Potable water is supplied to Appin West by mains connections to the Sydney Water network. Sydney Water is used in the administration buildings, workshops and bathhouse and is also supplied to the EDL Power Plant.

The majority of water used at Appin West (and in the Appin Mine underground workings) is supplied by the WTP located at Appin West. Treated water is used in areas that require high quality water, including:

- the longwall roof support hydraulics emulsion; and
- underground supply at Appin Mine.

Sydney Water is used to replace water from the WTP when required.

5.6.3 Appin North/WCCPP

Potable water is supplied to Appin North/WCCPP via:

[34] Further detail on this system will be provided in future updates of the WMP when available. A LDP will be sought prior to commencement of this system.

- a pipeline used to dilute discharge from BCD (where required) to reduce salinity levels in-line with EPL 2504. This pipeline may be used as a water supply to the WCCPP during drought conditions or be diverted to Appin North in the future; and
- water tanker to the remainder of the site.

Potable water is used in the administration buildings, workshops and the bathhouse.

5.6.4 Ventilation Shaft 6

Water is extracted from the Nepean River and used on site for operational purposes. The water is extracted under the Surface Water Licence No. 10WA117285, issued by NSW Office of Water on 15 November 2011. The licence allows up to 53 ML to be diverted, comprising 40 ML for mining use and 13 ML for industrial use in any one year commencing 1 July.

5.6.5 Ventilation Shaft 6 and AMVA Project/Ventilation Shaft 7/8

Water will be trucked to the AMVA Project site from Ventilation Shaft 6 for use during the construction phase[35]. Potable water will also be trucked to site until Sydney Water is connected to the site.[36]

Water for use on site may also be sourced from the Appin West WTP if surplus water is available.

5.7 Water Storage Facilities (Surface)

Appin Mine stores and treats water for operational needs via a number of storage bodies as listed in Table 7, Table 8 and Table 9.

Table 7: Key Water Storages at Appin East

Facility	Capacity (kL)	Comments
Bathhouse water and effluent		
Bathhouse wastewater tank	24	Concrete tanks which collect the bathhouse/sewage water prior to discharge into the municipal sewerage system.
Sewage treatment tanks	34	
Mine Water		
Green Tank	1,400	Provides water for underground mining operations. Water is supplied to the tank from the underground storages and dosed prior to being pumped back underground for general use. It can be topped up with Sydney Water.
Fresh Water		

[35] A pipeline from the pumping station may also be installed.
[36] Connection is planned but not yet installed.

Facility	Capacity (kL)	Comments
White Tank	600	Provides potable water supplied by Sydney Water: • onsite for offices, bathhouse, toilets and workshop; and • off site for the EDL Power Plant, mine cottages, BCD and Ventilation Shafts 1, 2 and 3. The tank is set up with an emergency valve to ensure 200 kL of fire water is always available.
Potentially contaminated storm and surface waters		
Main Dam	20,000	This earthen dam is used to capture, treat and recycle surface and stormwater from the Pit Top. Water is used from the Main Dam for dust suppression.
Sediment Dam	2,000	This dam is used as a settling dam after surface and stormwater from the Main Dam has been treated. The treated water can be drawn from the dam to the Dynasand filter for discharge to the Georges River.
Sand filter lagoon	500	Sand filter for the filtration of clean storm water prior to discharge via LDP 18 (no longer utilised).
First flush system	136	Collects and treats potentially contaminated storm water from the mine entrance and Sheriff Road.
Surface elevator sump	10	Collects coal fines washed from elevator belt structure.
Workshop sump and oil / water separator	9	Collects, stores and treats wastewater from the wash down facility in the workshop.

Table 8: Key Water Storages at Appin West

Facility	Capacity (kL)	Comments
Potentially contaminated storm and surface waters		
Surface Water Dam 1	4,000	The surface water dams are kept low to capture and treat storm event. The volume stored is dependent upon rainfall and volume diverted prior to dams for reuse
Surface Water Dam 2	3,500	
Storage Tank under Coal Bins	1,000	Not currently in use. Available for additional surface water storage.
Drying Dam	1,700	Dam is used for the drying of solids as required.
Workshop Sump	40	Contains wastewater from the workshop. Wastewater is pumped into an oily water separator. Waste oil is transferred to the waste oil tank and clean water is transferred into Surface Water Dam 1.

Facility	Capacity (kL)	Comments
Water Treatment Plant		
Mine Dam 1	1,900	Approximately 5000 kL/day is pumped from the underground workings into Mine Dam 1.
Mine Dam 2	3,400	Mine Dam 2 is set up as a biological lagoon to treat the backwash and cleaning wastes from several of the stages of the WTP.
Raw Water Buffer Tank	250	Pre-treated mine water storage tank. Acts as an operational buffer to keep WTP operational when underground pumps are being maintained.
Product Water Tank	2 x 1600	Tank stores treated mine water from the WTP for use in underground operations.
Bulk storage tanks	2 x 1000	Tank stores a blend of treated water from WTP and Sydney Water for underground use.
Brine Tank	420	Tank stores waste brine from the WTP. Brine is transported from site and discharged via LDP 5 (under EPL 2341).
Biosolids Tank	2 x 15	Biosolids from the backwash treatment plant is stored ready for transportation off site.
MF filtrate tank	2000	Filtered mine water storage for sustaining of production of the reverse osmosis system and source of supply for blending waters.
Potable water		
Sydney Water Tank	300	Tank stores potable water supplied by Sydney Water to provide backup supply for underground operations. The tank is set up to maintain 200 kL of fire water for firefighting. Potable water for offices, bathhouse, cooling towers, toilets, workshop is supplied direct from the Sydney Water mains line.
Treated sewage effluent		
Effluent Pond 1	1,200	Raw effluent is fed from the mutrator into Pond 1 where it undergoes aeration. The effluent is then fed into the STP for further polishing. Pond 2 receives treated effluent from the STP. Treated effluent is transferred from Pond 2 to the Irrigation Tank.
Effluent Pond 2	1,200	
Irrigation Tank	3	Treated effluent is irrigated onto the licenced utilisation area from the Irrigation Tank.
Underground storage		
Areas 1 and 4	1,500,000	Area 1 and Area 4 have a storage capacity of 1500 ML (combined)

Table 9: Key Water Storages at Appin North/WCCPP/CWEA

Facility	Capacity (kL)	Comments
Appin North/WCCPP/CWEA		
BCD	320,000	BCD is the key water body at Appin North. It is located in the lower reaches of Brennans Creek, downstream of pit top disturbance and the CWEA.
Reclaim Pond	750	Collects seepage from BCD.
P1	23,000	Captures runoff from coal stockpile areas, with controlled release and spill to P2.
P2	24,000	Captures runoff from adjacent coal stockpile areas. Water from P2 is gravity fed to either P3 or P4A.
P3	23,000	Located adjacent to the Concrete Settling Tanks at the WCCPP. Water from P3 is pumped back to the settling tanks (if required) or spray irrigated on to the CWEA. Overflow from P3 reports to P4A.
P4A	45,000	Pond P4A captures overflow from P3 and the active emplacement area. Inflow water is able to be dosed with flocculant to facilitate solids removal. The pipeline from P4A to BCD can be opened if required to transfer water. Overflow from P4A also filters through the CWEA and into the underdrainage system. Water from P4A can also be irrigated on the active emplacement area.
P5	8,000	P5 is located in the Stockpile 4 area north of the WCCPP. Water is released from P5 to P6 and P7. Clean water is diverted around the pond system.
P6/P7	21,000	Downslope of P5. Inflow water is dosed with flocculant to facilitate solids removal. Water from the ponds is discharged to BCD.
EP 2/3	68,000	Combined capacity of the emplacement pond system. Collects dirty water runoff from the active emplacement area.
Underdrainage Pond	2,000	Collects water from emplacement underdrainage and supplies water to Appin North WTP.
North Tank	400	Supplies the WCCPP with BCD water.
Firefighting supply tanks	1,200	Two tanks which store 660 kL each. The tanks store recycled water for firefighting.
Drill mud and water ponds	10,000	Ponds used for the disposal of drill muds and water from exploration and other drilling operations.
Water Treatment Plant – Long term		
Blended water storage tank	1800	Stores a blend of water from the Underdrainage Pond and Area 5 prior to treatment.

Facility	Capacity (kL)	Comments
Permeate storage tank	1800	Stores permeate prior to discharge to Brennans Creek or BCD.
Back Wash Tank	230	Used to store back wash volumes (reject) from the Ultra Filtration systems.
Feed Water Tank	1850	Used to storage underground mine water and underdrain waters before for processing.
Brine Storage Tank	500	Used to store waste waters from the RO process to be trucked to LDP5 (under EPL 2341).
Water Treatment Plant - Temporary		
Aeration Tank	70	Feed tank for the AN TWTP, performs pH correction of acidic feed if needed.
Clarifier	46	Settling/coagulation vessel for removal of suspended solid particles prior to exposure to sensitive membrane systems.
UF Feed Tank	46	Storage tank for UF system influent.
Filtrate Tank	46	Storage tank for RO system influent, water also used to backwash UF membranes.
Permeate Tank	46	Storage tank for RO permeate prior to discharge as product water. Water from this tank also used for permeate flushing and both UF & RO CIP purposes. Expected to receive 50m3/hr during normal operations.
Brine Tank 1	46	Storage tank for brine produced by RO systems, expected to receive 10m3/hr during normal operations. Brine is removed from site via tanker truck.
Brine Tank 2	46	Storage tank for brine produced by RO systems, expected to receive 10m3/hr during normal operations. Brine is removed from site via tanker truck.
Sludge Tank	46	Storage tank for solids waste removed from feed water by clarifier awaiting removal from site via tanker truck.
Waste Sump	10	Onsite drain collection point, instrument drains, equipment drains and surface runoff are collected here.
Recirculation Tank	46	Water from waste sump is returned here for storage before being slowly re-introduced with fresh feed water to minimize waste production on site.
Appin North Pit Top		
Bathhouse water tank	60	Supplies potable water for bathhouse and amenities.
South Tank	22	Supplies recycled water from BCD for surface hose down and fire water.
Underground storage		

Facility	Capacity (kL)	Comments
Area 5	96,000	Area 5 has a storage capacity of approximately 96 ML.

5.8 Other Operational Areas/Activities

5.8.1 Surface Cooling Towers

All operational cooling towers are required to have certified microbial treatment. The treatment systems for the Gas Extraction Plant cooling towers have been certified by a chemical treatment company. The maintenance and microbiological management of cooling and seal water systems is in accordance with the relevant Australian Standards.

5.8.2 Chemicals and Hydrocarbon Management

5.8.2.1 Storage and Handling

The chemical and hydrocarbon products in use at Appin Mine are stored in appropriately designed and maintained facilities, or on temporary storage prior to transport underground. SDSs are required for all substances brought onto site by IMC employees and contractors. The site SDSs are stored in the ChemAlert System and available through the controlled document system to all personnel.

Diesel fuel is brought to Appin East, Appin West and Appin North/WCCPP sites by road tanker and stored in above ground bunded tanks from where it is transferred to diesel pods for underground use or direct to machinery. Spills and leakages are directed to oily water separators to remove the mineral-based hydrocarbons from the surface water streams. Oily water separators are used to reduce the potential of hydrocarbon contamination of the surface water management systems.

These facilities are managed as detailed in the IMC Bund, Sump and Oily Water Separator Management Procedure.

5.8.2.2 Pollution Incident Response Management Plan

A Pollution Incident Response Management Plan (PIRMP) has been developed for EPL 2504 in accordance with Part 5.7A Section 153A of the *Protection of the Environment Operations Act 1999* (*POEO Act*) and Part 3A Section 98C of the *Protection of the Environment Operations (General) Regulation 2009* (*POEO Regulation*).

The objectives of the PIRMP (as per the EPA's Guideline: Pollution Incident Response Management Plans, dated March 2020) are to:

- minimise the risk of a pollution incident occurring as a result of licenced activities, by identifying risks and the actions proposed to be taken to minimise and manage those risks;
- have established clear and effective notification, action and communication procedures to ensure the right people are notified, warned and quickly provided with updates and information they may need to act appropriately; including

- people who may need to be involved in incident responses, including staff at the premises, the EPA and other relevant authorities (such as Fire and Rescue NSW, NSW Health and local councils); and
- industrial, commercial and residential neighbours and other members of the community; and

- have properly trained staff and up-to-date incident management information available to ensure the potential impact of a pollution incident is minimised.

The PIRMP is available in the controlled document system and on the South32 website at the following link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

5.8.3 Waste Management

Waste management (including liquid waste) is conducted in accordance with the Appin Mine Waste Management Plan which is available in the controlled document system or on the South32 website at the following link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

5.8.4 Construction Activities

Construction activities will be undertaken periodically and as required at Appin Mine. When site specific disturbance occurs due to construction activities or remediation works, temporary sediment controls (e.g. sand bags, filter fabric) will be installed where appropriate to intercept sediment movement that may occur during the works and for a period after completion.

Erosion and sediment control works will be designed, installed and managed generally in accordance with applicable erosion and sediment control principles and guidelines (e.g. the requirements of the NSW Blue Book Managing Urban Stormwater: Soils and Construction – Volume 1 2004[37], Guidelines for controlled activities on waterfront land 2018[38], Controlled activities – Guidelines for laying pipes and cables in watercourses on waterfront land 2022[39]). Water controls will be employed as per the applicable project assessment or management plan documentation.

Sediment fencing and/or sandbags and coir logs would generally be used for sediment control. At the pit tops, runoff water will be directed to site dirty water management system for treatment and discharge.

These controls would be maintained as required by removing any excessive build-up of sediment and repairing any failure of the structures e.g. due to storm activity.

[37] https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-editon
[38] https://www.nrar.nsw.gov.au/__data/assets/pdf_file/0003/367392/NRAR-Guidelines-for-controlled-activities-on-waterfront-land-Riparian-corridors.pdf
[39] https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0006/386205/licensing_approvals_controlled_activities_laying_pipes_cables.pdf

Erosion and sediment control measures at the AMVA Project site are detailed in the Early Works Construction Environmental Management Plan (CEMP)[40] and Primary Works CEMP[41].

5.8.5 Service Supply Boreholes

Service supply boreholes will be cased and grouted to address any known regionally significant aquifers.

5.8.6 Drilling Process Water

Drilling process waste water will be managed as per the relevant project assessment.

Drill mud ponds are available at Appin North (see Table 9) for the disposal of drilling muds and waste waters.

5.8.7 Mining Induced Subsidence

Subsidence Management Plans (SMPs) and Extraction Plans (EPs) address the management of potential impacts and/or environmental consequences of underground mining on water courses and aquifers, including the collection of baseline data where required.

WMPs for each of the mining areas are detailed in the approved SMP or EP and can be accessed on the South32 website at the following link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

5.9 Risk Identification and Control Summary

A summary of the identified risk and associated controls with respect to water management and minimisation is provided in Table 10, Table 11 and Table 12.

Table 10: Appin East Water Management and Usage Minimisation Measures

Area	Potential Water Management Issue	Operational Controls
Surface and stormwater management	Contaminated water may exit the site if not contained and treated prior to discharge, resulting in pollution of water and land.	• Clean stormwater (from undisturbed areas) is diverted around the site. In extreme rain events some runoff is discharged via LDP 18. • All pit top surface and stormwater is directed to the Main Dam, where it is chemically treated and allowed to separate via gravity. The water quality in the Main Dam is assessed regularly, and when within acceptable limits, is transferred to the Sediment Dam, before being filtered through the Dynasands unit, prior to discharge via LDP 19.

[40] Approved 17 June 2022.
[41] To be submitted and approved prior to commencement of Primary Works.

Area	Potential Water Management Issue	Operational Controls
		• Water pumped from the Main Dam into the Sediment Dam will overflow back into the Main Dam if discharge is not occurring. • Continuous monitoring of waters discharged to the Georges River via LDP 19 occurs. Exceedance of pH criteria results in the Dynasands pump being turned off and discharge ceasing. • During high rainfall events, the Main Dam may spill to the Georges River via the main spillway (LDP 21) to protect the integrity of the dam walls. • Inspection of the surface water drainage system is conducted by the Specialist Environment as part of the routine inspection program to ensure drains and silt traps on site are maintained. • Detailed surface water management measures are outlined throughout the WMP.
Storage and handling of chemicals, oils and fuels	Inadequate handling and storage of chemicals, oils and fuels could result in water contamination	• Chemicals, oils and fuels are segregated and stored within bunded areas to reduce the risk of spills entering the stormwater system. • Inspections of storages are undertaken by site personnel. • Oily water separators are installed to treat collected spills and leakages and prevent oil entering the stormwater system.
Oily water separator	Failure of the oily water separator(s) could result in oil entering the stormwater system and potentially contaminating the water discharged into waterways	• Systems are regularly maintained using the maintenance system. • Removal of waste oil from the separator is undertaken by a licenced contractor. • Personnel conduct inspections which include the condition and levels within the oily water separator. • Contaminated water/oily water can be isolated in the Main Dam.
Waste management	Poor waste management and housekeeping could result in water contamination	• Waste is stored, transported and disposed of in accordance with regulatory requirements and the Waste Management Plan.
Potable water usage	Excessive usage of Sydney Water	• Use of Sydney Water for BCD discharge dilution will be minimised as per Condition L2.6 in EPL 2504. • Water usage is monitored.
Water availability	Water not available for site processes	• Water usage and water storage volumes are monitored.

Table 11: Appin West Water Management and Usage Minimisation Measures

Area	Potential Water Management Issue	Operational Controls
Surface and stormwater management	Contaminated water may exit the site if not contained and treated prior to discharge, resulting in pollution of water and land. Build-up around drains and blockage caused by debris and waste.	• Clean stormwater is diverted around the site and into Sandy Gully via natural drainage lines. • Surface water (from disturbed and sealed areas) is diverted to surface water dams and filtered through a stormwater filter system before being discharged into Sandy Gully via LDP 23. During high rainfall events, the dams may spill to Sandy Gully via the main spillway (LDP 25) to protect the integrity of the dam walls. • Water is managed by transfers between Dams 1 and 2 as required. • Inspection of the surface water drainage system is conducted by the Specialist Environment as part of the routine inspection program to ensure drains and silt traps on site are maintained. • Detailed surface water management measures are outlined throughout the WMP.
Management of mine water (from underground)	Mine water quality may result in exceedances of EPL limits if not treated prior to discharge.	• Mine water from underground is stored in dams prior to treatment at the WTP prior to reuse or discharge via LDP 24.
Storage and handling of chemicals, oils and fuels	Inadequate handling and storage of chemicals, oils and fuels could result in water contamination	• Chemicals, oils and fuels are segregated and stored within bunded areas to reduce the risk of spills entering the stormwater system. • Inspections of storages are undertaken by site personnel. • Oily water separators are installed to treat collected spills and leakages and prevent oil entering the stormwater system.
Oily water separator	Failure of the oily water separator(s) could result in oil entering the stormwater system and potentially contaminating the water discharged into waterways	• Systems are regularly maintained using the maintenance system. • Removal of waste oil from the separator is undertaken by a licenced contractor. • Personnel conduct inspections which include the condition and levels within the oily water separator. • Contaminated water/oily water can be isolated in the Surface Water Dams.
Waste management	Poor waste management and housekeeping could result in water contamination	• Waste is stored, transported and disposed of in accordance with regulatory requirements and the Waste Management Plan.
Sewage and bathhouse waste water management	Inadequate treatment or overloading of the STP could result in EPL non-	• Site personnel conduct regular inspections. • Sewage and bathhouse wastes are treated on site, with the treated effluent spray irrigated via LDP 38. During and following high rainfall events,

Area	Potential Water Management Issue	Operational Controls
	compliance and pollution of land and water.	discharge can occur via LDP 39 to protect the integrity of the dam walls.
Potable water usage	Excessive usage of Sydney Water.	• Sydney Water usage is largely limited to office and amenity usage. • The WTP produces water for use underground, and Sydney Water only supplements supply when WTP water is not sufficient/available.
Water availability	Water not available for site processes.	• Water usage and water storage volumes are monitored. • The WTP produces the majority of water for use underground, and Sydney Water only supplements supply when WTP water is not sufficient/available.

Table 12: Appin North/WCCPP Water Management and Usage Minimisation Measures

Area	Potential Water Management Issue	Operational Controls
Surface and stormwater management	Contaminated water may exit the site if not contained and treated prior to discharge, resulting in pollution of water and land.	• Clean stormwater (from undisturbed areas) is diverted around the site. • Surface water (from disturbed and sealed areas) is diverted to the site dirty water management system for treatment and directed into BCD. • BCD TARP and automated response system can detect water quality issues and react accordingly (i.e. raising alarms). The system controls discharge flows based on water storage levels to maintain freeboard for heavy rainfall events. • The surface water drainage system is inspected by site personnel.
Storage and handling of chemicals, oils and fuels	Inadequate handling and storage of chemicals, oils and fuels could result in water contamination	• Chemicals, oils and fuels are segregated and stored within bunded areas to reduce the risk of spills entering the stormwater system. • Inspections of storages are undertaken by site personnel. • Oily water separators are installed to treat collected spills and leakages and prevent oil entering the stormwater system.
Sewage and bathhouse waste water management	Inadequate treatment or overloading of the STP could result in EPL non-compliance and pollution of land and water.	• Site personnel conduct regular inspections. • Sewage and bathhouse wastes are treated on site, with the treated effluent spray irrigated via LDP 3/4.
Waste management	Poor waste management and housekeeping could result in water contamination	• Waste is stored, transported and disposed of in accordance with regulatory requirements and the Waste Management Plan. • Coal wash is managed in accordance with the CWEA Management Plan.

Area	Potential Water Management Issue	Operational Controls
Management of mine water (from underground)	Mine waters are saline and have potential to impact surface water environments if discharged untreated.	• Mine water from Area 5 is treated in the Appin North WTP. Treated water is discharged to the environment via LDP 40. • Mine water may be used in the WCCPP to supplement BCD supply.
Oily water separator	Failure of the oily water separator(s) could result in oil entering the stormwater system and potentially contaminating the water discharged into waterways	• Systems are regularly maintained using the maintenance system. • Removal of waste oil from the separator is undertaken by a licenced contractor. • Personnel conduct inspections which include the condition and levels within the oily water separator. • Contaminated water/oily water can be isolated in the dirty water system.
Potable water usage	Excessive usage of Sydney Water	• Potable water is not utilised in the WCCPP. • Use of Sydney Water for BCD discharge dilution will be minimised as per Condition L2.6 in EPL 2504. • Potable water usage is monitored.
Water availability	Water not available for site processes.	• Water usage and water storage volumes are monitored. • The level of water in BCD is monitored and releases controlled to maintain adequate water availability for continued site operations.

6. IMPROVEMENT ACTIVITIES (5, 7 AND 10 YEARS)

As part of the Project Approval, IMC is required to identify and deliver improvement projects that will reduce the impacts on biota in the Georges River as a result of the discharge from Appin North, and Allens Creek (and subsequent flows into the Nepean River) as a result of discharge from Appin West. Table 13 provides a summary of the planned identified projects over the period 2022 to 2027, which are aligned with the requirements in Condition E1 of EPL 2504, and Table 14 provides a summary of planned identified projects for the seven and 10 year periods.

Progress against the listed projects will be provided via the Annual Review. It is noted that operational changes, external influences or community expectations may influence the proposed timeframes.

6.1 Five Year Horizon

Table 13: Improvement Activities Proposed for 2022 to 2027

Activity/Project	Assumptions	Expected benefits
Complete Aquatic Health Monitoring Program (AHMP).	Planned to be undertaken for an additional four-year period.	Continue the AHMP to identify long term trends in river health and assess changes post

Activity/Project	Assumptions	Expected benefits
		implementation of the Appin North WTP.
Undertake quarterly ecotoxicity monitoring at LDP 40 and LDP 24.	Required for a period of two years post implementation of new/upgraded WTPs.	Increase understanding of potential ecotoxicity of discharge waters from WTPs on aquatic health.
Construct long term Appin North WTP.	Plant commissioned by 30 December 2022.	Improved quality of discharge water to Brennans Creek and the Georges River.
Continue meetings with Georges River Stakeholder Group.	Meetings will continue until at least the end of FY23.	Continue to keep the community and other stakeholders advised of progress of Appin Water projects.
Implementation of the Georges River Rehabilitation Plan.	Approvals received from relevant regulatory agencies and access agreements established with landholders.	Repair of subsidence impacts from underground longwall extraction in Area 5.

6.2 Seven to 10 Year Horizon

Table 14: Improvement Activities Proposed for 2028 to 2031

Activity/Project	Assumptions	Expected benefits
Investigate options for desilting BCD.	Disposal location for sediment able to be sourced.	Continue long term improvement of water quality in BCD.
Construct EP4.	Scheduling to be reviewed and detailed design to be undertaken.	Provide additional capacity for water management downstream of the CWEA.

7. MONITORING PROGRAM

7.1 EPL 2504 Monitoring and Discharge Points

Sampling of licence monitoring and discharge points is undertaken in accordance with the requirements of EPL 2504. A summary of the monitoring and discharge points is provided in Table 4.

The monitoring program is designed to:

- inform management decisions relevant to operations;
- ensure compliance with all regulatory requirements set out in EPL 2504 and the Project Approval with regards to water management; and

- measure the influence of discharges from Appin Mine on Brennans Creek/Georges River and Sandy Gully/Allens Creek/Nepean River.

Note that the monitoring sites and frequencies are subject to change through consultation with the relevant agencies and approving authorities. EPL 2504 provides the most up to date monitoring regime relevant to the monitoring and discharge points and should be used as the main reference point. A copy of the licence is available online via this link:

http://www.epa.nsw.gov.au/prpoeoapp/.

A summary of the results from the monitoring program is made available to the public (via the South32 website) in accordance with the requirements of the *POEO Act.* A more detailed summary of the monitoring results is provided in the Annual Review.

The summary and Annual Review can be accessed via this link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

7.2 Georges River Aquatic Health Monitoring Program

The Georges River EIP has been in place since 2016, which was a monitoring and improvement program for the Upper Georges River. The program included:

- quantitative sampling of macroinvertebrates conducted in line with previous studies;
- ecological assessment of the sediments using a DNA-based approach, referred to as metabarcoding;
- in-stream water quality testing; and
- laboratory ecotoxicological testing of the discharge water from BCD.

A variation to EPL 2504 issued in March 2020 revoked the EIP and included Special Condition E3, that requires the development and implementation of the Georges River Aquatic Health Monitoring Program (AHMP) that meets the same objectives as the Georges River EIP.

Special Condition E3 states:

The licensee must prepare an aquatic health monitoring program to verify improvements to the aquatic health of the Georges River following commissioning of the reverse osmosis water treatment plant required by condition E1.1. The monitoring must include:

- *quantitative sampling of macroinvertebrates;*
- *ecological assessment processed using DNA extracted from sediment (as appropriate);*
- *in-stream water quality; and*
- *laboratory water testing.*

A copy of the monitoring program was submitted to the EPA by 30 June 2020.[42]

[42] Due to delays associated with the construction of the long-term Appin North WTP, the period of monitoring under the AHMP is likely to be extended.

A further variation to EPL 2504 was issued in March 2021. Special Condition E2 requires quarterly ecotoxicity monitoring of discharge at LDP 40 and LDP 24.

7.3 Surface and Groundwater Monitoring – Subsidence Zones

Water monitoring programs for each of the active mining areas are detailed in the approved SMP or EP which can be accessed using this link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

A summary of the results from the surface and groundwater monitoring associated with active mining zones is provided in the End of Panel reports which are available using this link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

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 and email address are 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 Community Team for investigation. All water related complaints received in relation to Appin 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 surveys will also be undertaken as required 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. A log of complaints is also maintained on the IMC website at:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

8.2 Compensatory Water Supply

A compensatory water supply will be provided to a land owner in accordance with Condition 14 of Schedule 4 of the Project Approval if a privately-owned water supply is adversely affected by mining activities (other than an impact that is negligible). A supply equivalent to the loss attributed to the project will be provided (at least on an interim basis) within 24 hours of the loss being identified. Long term supply will be provided following identification of the most feasible alternative.

If an agreement cannot be reached with the landowner, or there is a dispute regarding the implementation of the measures, the matter will be referred to the Planning Secretary for resolution. Alternative compensation may be offered if an alternative long-term supply is unable to be provided.

The Landholder Compensation and Land Access Agreements Guideline defines the process for offering compensation.

8.3 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 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 ensure the status and effectiveness of the actions.

Incidents, exceedances or non-compliances with water related criteria will be reported to all relevant stakeholders as detailed in Section 9.2.

Specifically, in the event that there is a ground or surface water exceedance of criteria or water pollution has occurred, the following process would be followed:

- responsible personnel would be notified of the exceedance/event;
- measures would be taken as soon as possible to control (e.g. turning off valves, blocking off drains) the source of the exceedance/contamination (if applicable) or contain any contamination (potentially with the use of booms, dosing or earthworks) to minimise the extent of impact;
- if the event is deemed to be material, the notification process as outlined in Section 8.4 would be implemented;
- if required, any contamination would be cleaned up (including removal of contaminated soil, pumping of contaminated water);
- additional monitoring may be undertaken (to determine water quality or verify laboratory results);
- an investigation would be undertaken to identify the cause of the event/exceedance;
- corrective actions would be identified, preferably including engineering controls to reduce or eliminate the risk of the exceedance or event occurring again; and
- reporting to regulatory agencies would be undertaken as outlined in Section 9.2.

8.3.1 Protocol for Assessing Compliance

The process for assessing compliance considers whether external extraordinary factors unrelated to Appin 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 2504, includes the consideration of external factors such as upstream influences unrelated to Appin Mine operations and not within Appin Mine's operational control.

8.3.1.1 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.

8.3.1.2 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 in the document management system 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.

8.3.2 Adaptive Management

Where any exceedance of the criteria in EPL 2504 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 8.4.

8.4 Surface and Groundwater Response Plan

8.4.1 Surface Water Response Plan

The response plan associated with surface waters is detailed in Table 15.

Table 15: Surface Water Response Plan

Event Type	Trigger	Response	Reporting	Responsibility
LDP Non-compliance	Exceedance of the water quality criteria at an LDP.	Exceedance investigated. Corrective actions identified and implemented (if applicable).	Internal - Event Report External - Annual Return - EPA Notification - Annual Review - ACCC	Internal Reporting/ Investigation: Specialist Environment External Reporting: Superintendent Environment
Surface Water Variation	Significant variation identified between upstream and downstream water monitoring sites.	Investigation conducted into possible cause of the variation, that may include additional water sampling. Corrective actions identified and implemented (if applicable).	Internal - Event Report External - Annual Review	Internal Reporting/ Investigation: Specialist Environment External Reporting: Superintendent Environment
Environmental Harm	Incident involving the Appin operations which caused (or had the potential to cause) environmental harm	Notify regulatory agencies (as required by the PIRMP). If required, conduct water quality sampling and/or undertake stream health assessment. Conduct sampling upstream and downstream of incident. Conduct clean-up activities (if required).	Internal - Event Report - Monthly Sustainability Report External - Initial notification - Written Incident Report to EPA, DPE and Resources Regulator - Annual Return - Annual Review - DCCC	Internal Reporting: Responsible operations personnel Investigation: Responsible operations personnel External Reporting: Superintendent Environment

8.4.2 Groundwater Response Plan

Groundwater modelling and monitoring is undertaken to predict and monitor impacts associated with longwall extraction in the Appin mining areas. The groundwater monitoring program for each mining area is covered in more detail in the relevant EP. 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 South32 website at:

https://www.south32.net/our-business/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.

8.5 Independent Review

If the owner of privately-owned lands considers that Appin Mine is exceeding the air quality criteria in Condition 10 of Schedule 4 (refer to Section 7.3), they are entitled to request, in writing, an Independent Review.

In accordance with Condition 2 and 3 of Schedule 5 of the Project Approval, IMC will comply with the requirements of the Secretary and commission an Independent Review where the Secretary is satisfied that an Independent Review is warranted.

9. REPORTING AND REVIEW

9.1 Reporting

The results of water monitoring are compiled and reported to internal and external stakeholders (as required). The reports include:

- 14-day report (compliance with EPL water quality and volume monitoring conditions which is updated on the South32 website);
- Annual Review (for mining leases and Project Approval);
- Annual Return (for EPL);
- National Pollutant Inventory;
- internal sustainability report;
- End of Panel reporting for mining areas; and
- periodic environmental and operational updates to the Community Consultative Committee.

9.1.1 Annual Review

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

The Annual Review will include:

- water monitoring results and comparison to relevant statutory requirements, limits or performance measures/criteria, requirements of the WMP, monitoring results of previous years and relevant predictions in the EA;
- identification of trends in monitoring data over the life of the project;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;
- identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to achieve compliance;
- management/mitigation measures undertaken in the event of any confirmed exceedance of water quality and volume criteria; and
- review of the performance of management/mitigation measures and the monitoring program; and
- describe what measures will be implemented over the next financial year to improve the environmental performance of the project.

The Annual Review is prepared in accordance with the requirement of Condition 4 of Schedule 6 of the Project Approval and is submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the IMC website.

9.1.2 Public Reporting of Results (via website)

A summary of the water monitoring results, including details of exceedances and non-compliances (as determined in accordance with Section 8.3 of the WMP), will be provided on the IMC website in the 14-day Report at:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

Results provided in the 14-day Report will be summarised and submitted to the EPA in the Annual Return for EPL 2504.

9.1.3 Internal Sustainability Reporting

Water consumption, reuse/recycle and discharge data is collated monthly and reported to Head Office for aggregation.

9.1.4 Groundwater (Licences)

Annual compliance against Water Access Licences (as noted in Appendix 4) and associated monitoring will be reported in the Annual Review.

9.2 Incident, Non-compliance and Exceedance Notifications

9.2.1 Notification of Incidents – Government Agencies

In accordance with Condition 7 of Schedule 6 of the Project Approval, the Planning Secretary is to be notified in writing via the Major Projects website immediately after

becoming aware of a water related incident[43]. Reports are to be provided in accordance with the requirements set out in Appendix 7. Notification to the EPA will also be undertaken in accordance with the reporting requirements of the Pollution Incident Response Management Plan (if applicable) or via email/phone.

9.2.2 Notification of Non-compliances – Government Agencies

In accordance with Condition 7A of Schedule 6 of the Project Approval, the Planning Secretary must be notified in writing via the Major Projects website within seven (7) days after becoming aware of a non-compliance[44].

The EPA is also to be notified of the non-compliance (via email).

9.2.3 Notification of Exceedances – Other Stakeholders

In accordance with Condition 1 of Schedule 5 of the Project Approval, where an exceedance of criteria due to operational activities has been confirmed, the affected landowners will be notified in writing of the exceedance as soon as practicable and no longer than seven (7) days following confirmation of the exceedance. Notifications of exceedances is to be undertaken prior to inclusion in the 14-day report.

Regular monitoring results will be provided to each affected landowner until compliance with criteria is achieved.

The CCC and MAP (where relevant) will also be advised of exceedances of criteria at the next available meeting.

9.3 Review of WMP

In accordance with Condition 5 of Schedule 6 of the Project Approval, the WMP will be reviewed, and if necessary revised, within three months, of:

- the submission of an Annual Review;
- the submission of an incident report;
- the submission of an Independent Environmental Audit report; and
- any modification to the conditions of the Project Approval (unless the conditions require otherwise) or
- a direction of the Planning Secretary under Condition 4 of Schedule 2.

The WMP will also be reviewed, and if necessary revised, following a variation to EPL 2504.

Outcomes from each review will be documented in the Management Plan Review Log (unless the WMP is being updated as part of the review). The WMP will only be revised where a material change to site operations or environmental management has occurred, or

[43] The definition of an incident in the Project Approval is "A set of circumstances that causes or threatens to cause material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in this approval"

[44] A non-compliance that has been notified as an incident does not need to also be notified as a non-compliance.

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. Once approved, the WMP will be uploaded to the IMC website.

The approved WMP will be implemented.

9.4 Audits

9.4.1 Independent Environmental Audit

In accordance with Condition 9 of Schedule 6 of the Project Approval, an IEA shall be commissioned every three years, that will include a review of the WMP. The report, together with the response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations, is required to be submitted to the Secretary within six weeks of completion of the IEA, in accordance with Condition 10 of Schedule 6.

The IEA is also undertaken to comply with Condition 18 of EPBC Approval 2010/5350. A copy of the report is also submitted to the Department of Agriculture, Water and the Environment to satisfy Condition 18 (g).

IEAs have been conducted in 2013, 2016/17, 2019 and 2022, with the next IEA scheduled to be conducted in 2025. 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.

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 approvals and relevant legislation.	Section 3
IMC will maintain a water balance.	Section 4.2
IMC will maintain infrastructure for water diversion, storage, pumping, treatment, discharge and monitoring.	Section 2
IMC will conduct regular inspections of the site and water infrastructure to ensure the water management system is functioning effectively.	Section 5.9
IMC will implement and maintain erosion and sediment controls to reduce the risk of water contamination.	Section 5.8.4 Section 5.9
IMC will construct a new WTP at Appin North and modify the existing WTP at Appin West to achieve water quality concentration limits.	Section 5.4.3 Section 6.1
IMC will implement the Georges River Rehabilitation Plan.	Section 6.1
IMC will continue to implement an Aquatic Health Monitoring Program in the Georges River, and undertake quarterly ecotoxicity monitoring for discharge from LDP 10 and LDP 24.	Section 6.1 Section 7.2
IMC will maintain the active emplacement area at 18 hectares.	Section 5.3.4.1
IMC will comply with water quality concentration and discharge volume limits and monitoring requirements, including the collection of baseline data where required.	Section 5.4, 5.5, 5.8.5 and 4.1
IMC will reduce reliance on Sydney Water by substituting treated or recycled water where possible.	Section 5.6 Section 5.9
IMC will store chemical and hydrocarbon products in appropriately designed and maintained facilities.	Section 5.8.2
IMC will report and investigate complaints, incidents, exceedances of limits and non-compliances as required, and identify and implement corrective actions.	Section 5.8.2.2 Section 8 Section 9
IMC will manage wastes to minimise the risk of water contamination.	Section 5.8.3 Section 5.9
Compensatory water supply will be provided if a privately-owned water supply is adversely affected by mining activities.	Section 8.2
IMC will undertake reporting as required.	Section 9
IMC will review the WMP and undertake consultation with relevant stakeholders as required.	Section 9.3 Section 1.4
IMC will ensure the WMP is suitably integrated with the Water Management Plans that form part of extraction plans.	Section 5.8.5
IMC will undertake audits as required.	Section 9.4

11. ACRONYMS

Term	Definition
AHMP	Aquatic Health Monitoring Program
BCD	Brennans Creek Dam
BSO	Bulli Seam Operations
CWEA	Coal Wash Emplacement Area
DoPI	Department of Planning and Infrastructure (now DPE)
DPE	Department of Planning and Environment
EDL	Energy Developments Limited
EIP	Environment Improvement Program
EMS	Environmental Management System
EPA	Environment Protection Authority
EPL	Environment Protection Licence
EP	Extraction Plan
EP&A Act	*Environmental Planning and Assessment Act*
EQuIS	Environmental Quality Information Systems
FY	Financial Year
G360	IMC event reporting system
ICHPL	Illawarra Coal Holdings Pty Ltd
IEA	Independent Environmental Audit
IMC	Illawarra Metallurgical Coal
LDP	Licence Discharge Point
MAP	Menangle Advisory Panel
NPI	National Pollutant Inventory
NSW	New South Wales
PIRMP	Pollution Incident Response Management Plan

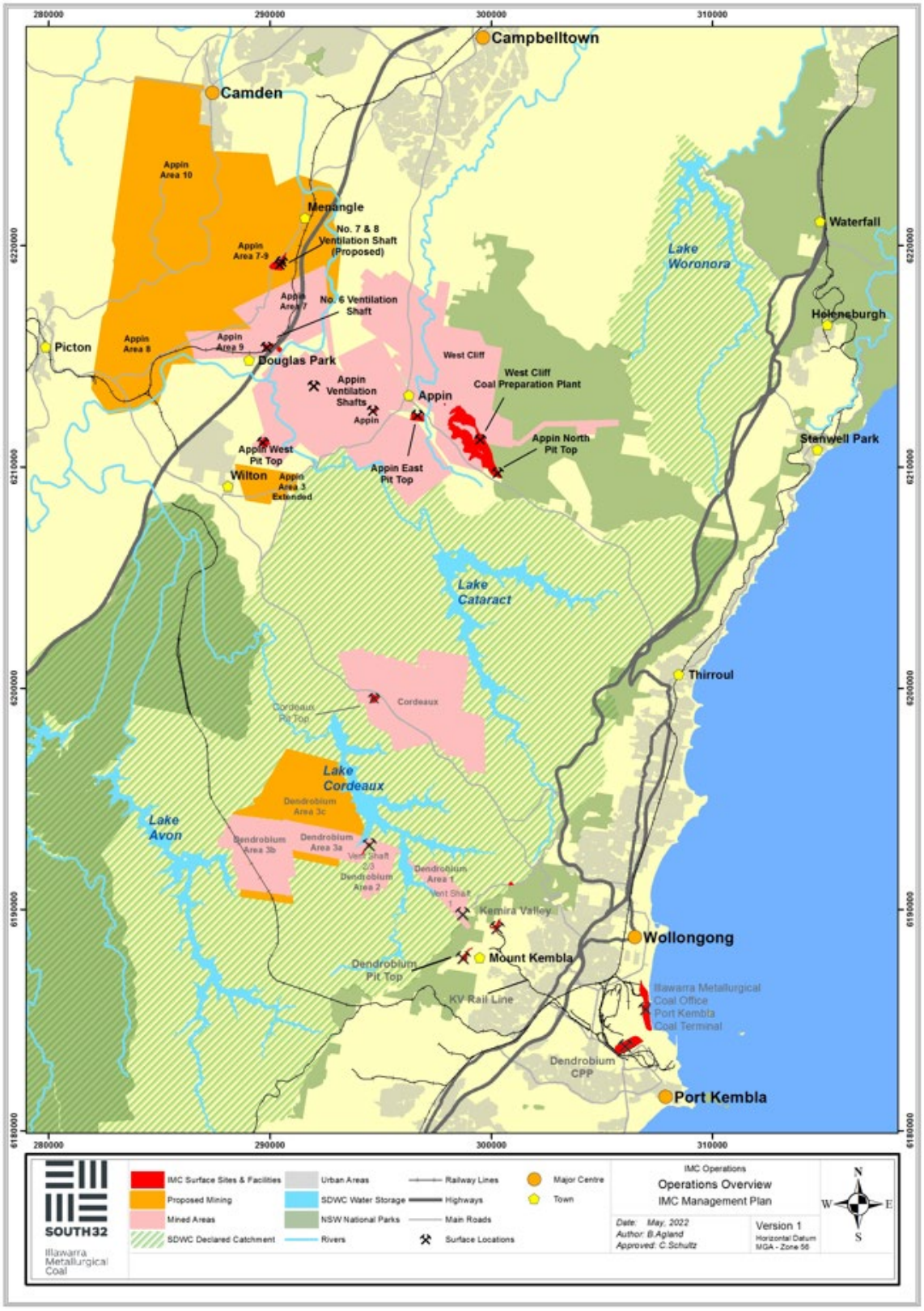
POEO Act	*Protection of the Environment Operations Act*
RoM	Run of mine
SMP	Subsidence Management Plan
STP	Sewage Treatment Plant
TARP	Trigger Action Response Plan
WCCPP	West Cliff Coal Preparation Plant
WMP	Water Management Plan
WTP	Water Treatment Plant

12. REFERENCES

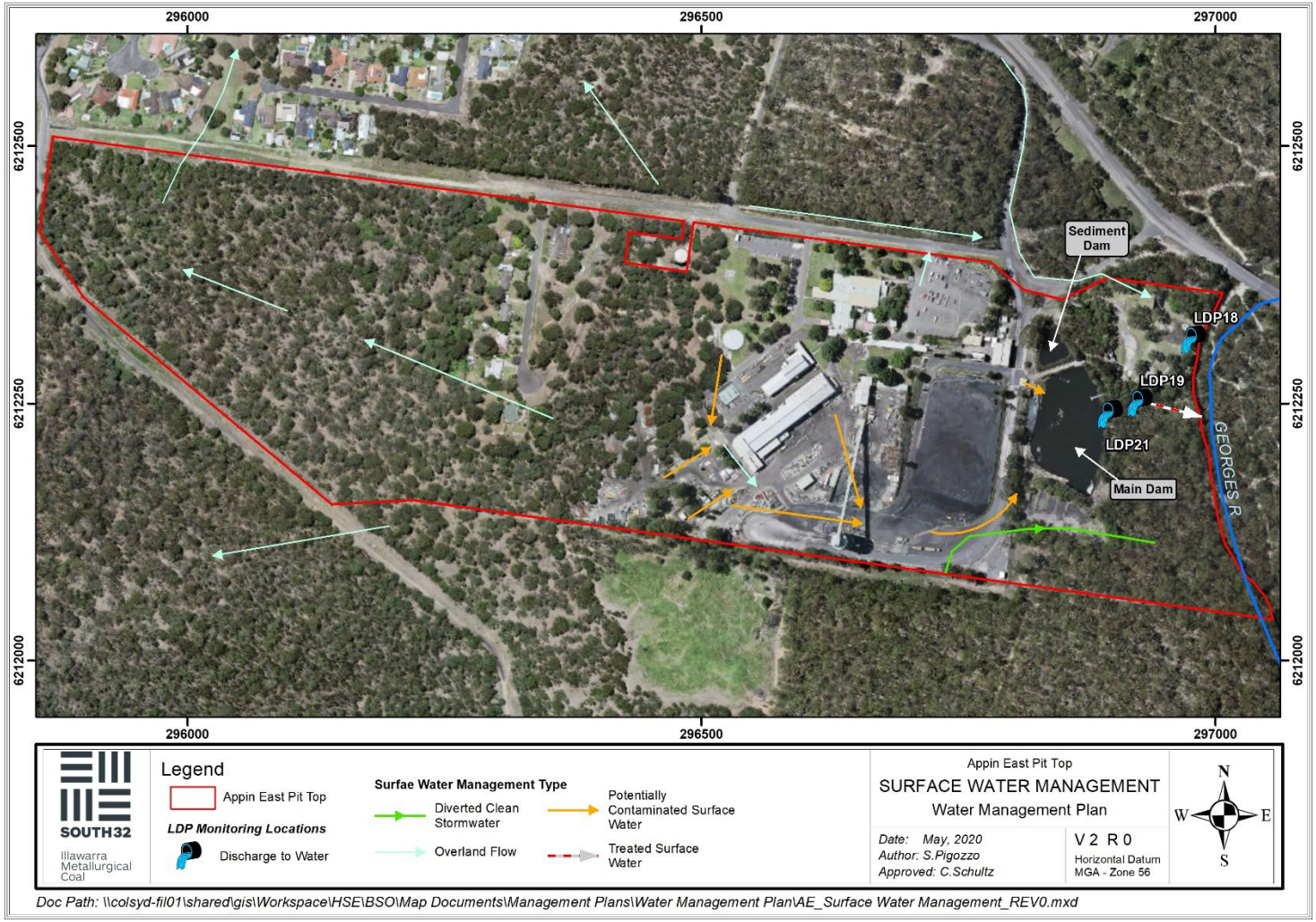
- Project Approval 08_0150, as modified
- IMC Environmental Aspects and Impacts Register
- Resource Strategies, 2009, Bulli Seam Environmental Assessment
- AMVA Modification Report (link)
- AMVA Project Construction Environmental Management Plan (CEMP) – Early Works (APNMP0130)
- AMVA Project CEMP – Primary Works
- ISO 14001:2015 Environmental Management Systems Standard
- Appin Mine Rehabilitation Management Plan (APNMP0127)
- Appin West Surface Stormwater Dam Operations (APNP0015)
- Water Monitoring Procedure (IMCP0335)
- Coal Wash Emplacement Area Management Plan (WCPMP0019)
- Appin Mine Waste Management Plan (APNMP0110)
- Bund, Sump and Oily Water Separator Management Procedure (IMCP0184)
- Environment Data Internal Reporting (IMCP0201)
- Spill Management Procedure (IMCP0183)
- Spill TARP (IMCTARP0006)
- Brennans Creek Dam TARP (WCPTARP0007)
- Environmental Compliance/Conformance Assessment and Reporting Procedure (IMCP0186)
- Handling Community Complaints, Enquiries and Disputes Procedure (IMCP0112)
- Event Investigation Procedure (IMCP0098)
- Landholder Compensation and Land Access Agreements Guideline (IMCGD0097)
- Pollution Incident Response Management Plan (APNMP0124)
- Guideline: Pollution Incident Response Management Plans (EPA) dated March 2020
- Reporting and Investigation Standard (IMCSTD0069)
- Water Accounting Framework for the Minerals Industry User Guide - Version 2.0 (link)

13. PLANS

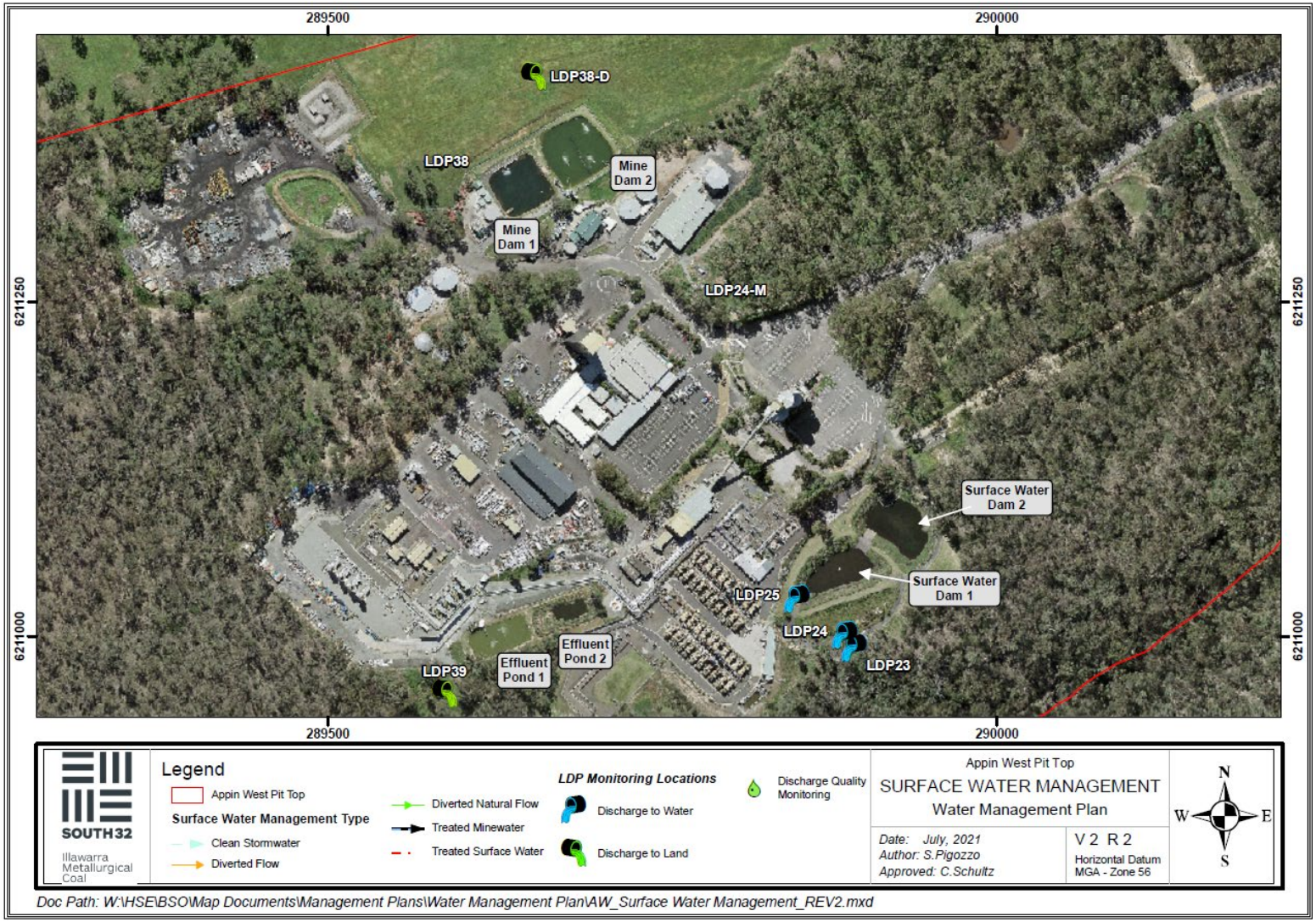
Plan 1: Appin Mine Locality Plan



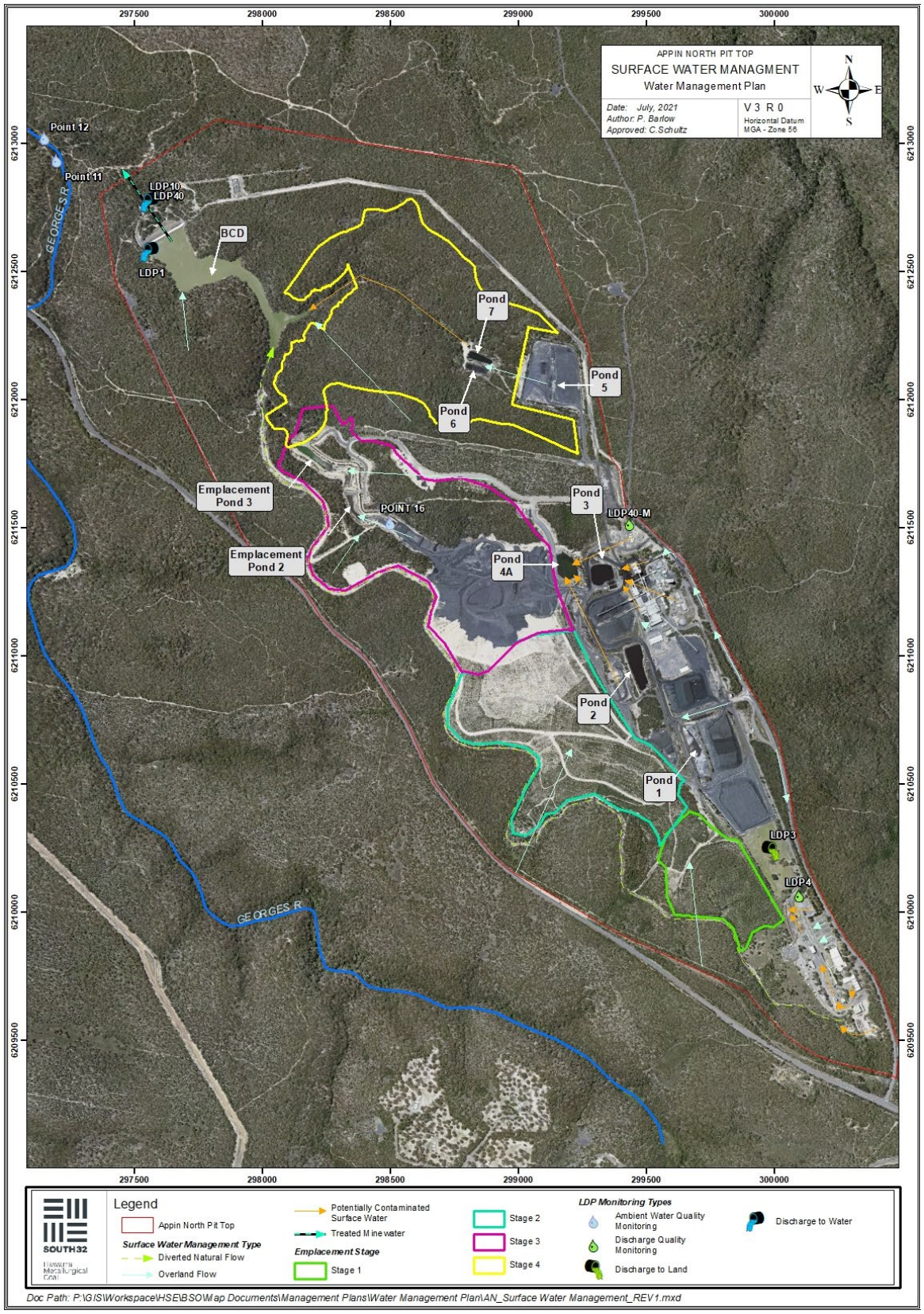
Plan 2: Surface Water Drainage and EPL 2504 Points – Appin East



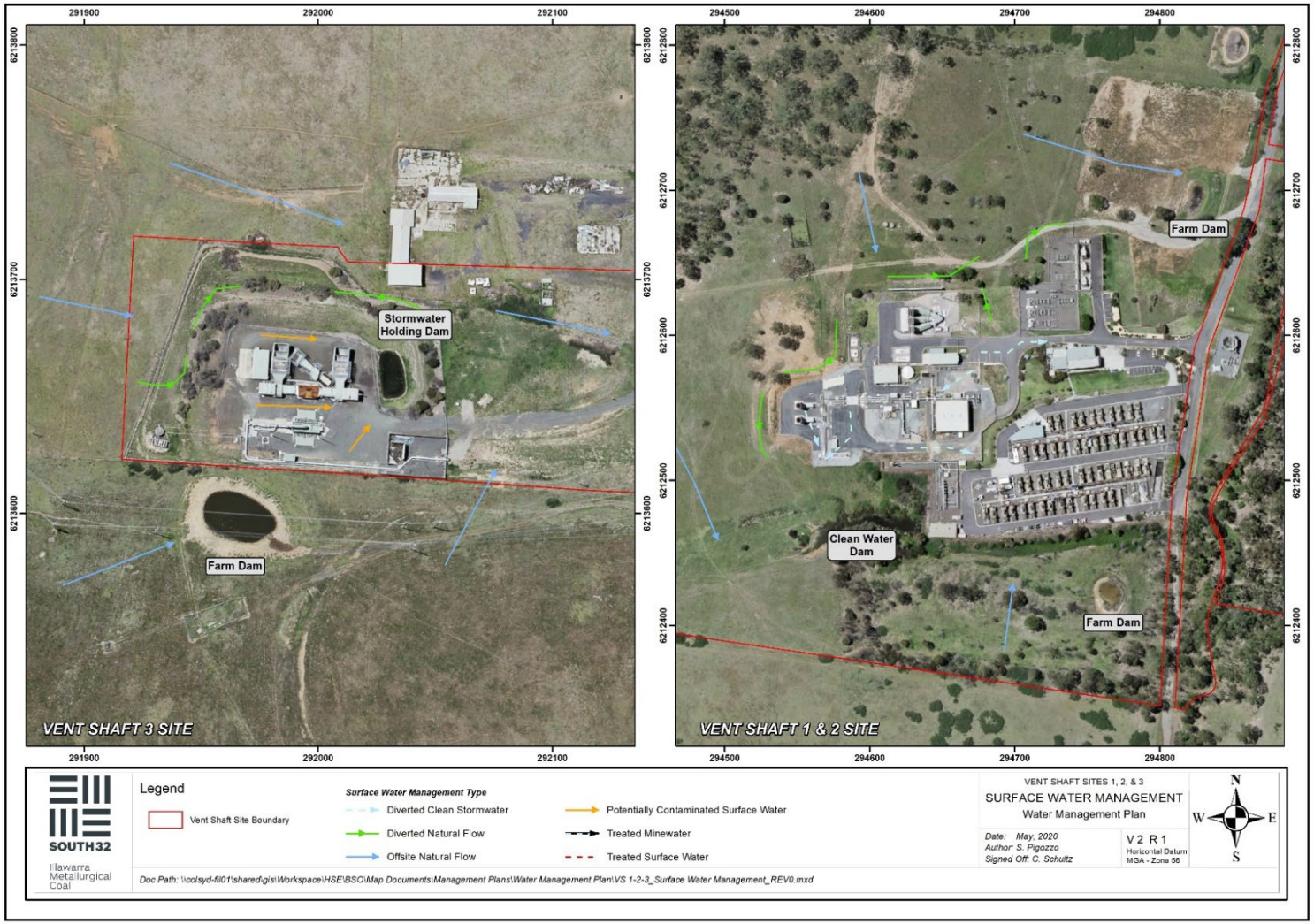
Plan 3: Surface Water Drainage and EPL 2504 Points – Appin West



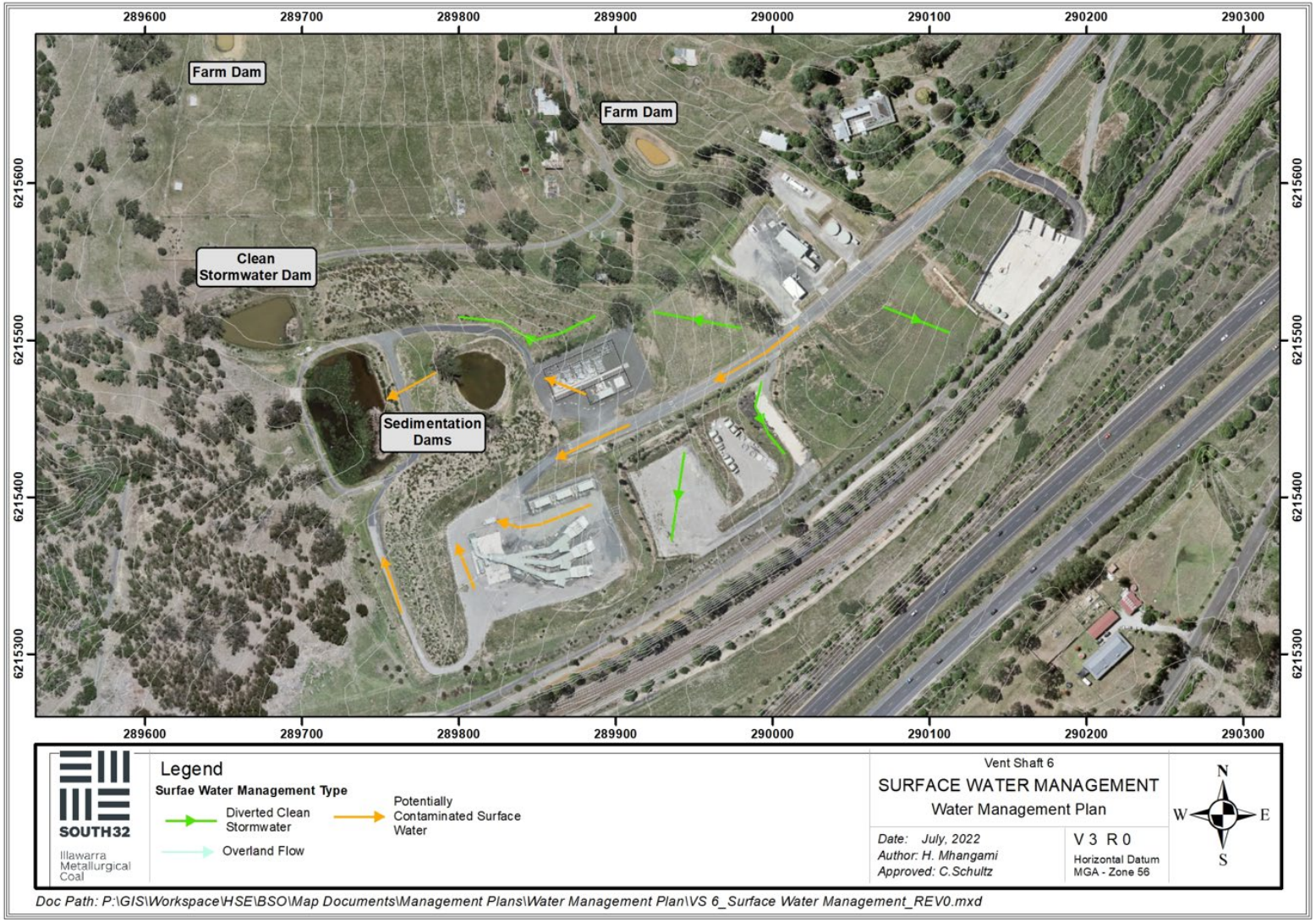
Plan 4: Surface Water Drainage and EPL 2504 Points – Appin North, WCCPP and CWEA



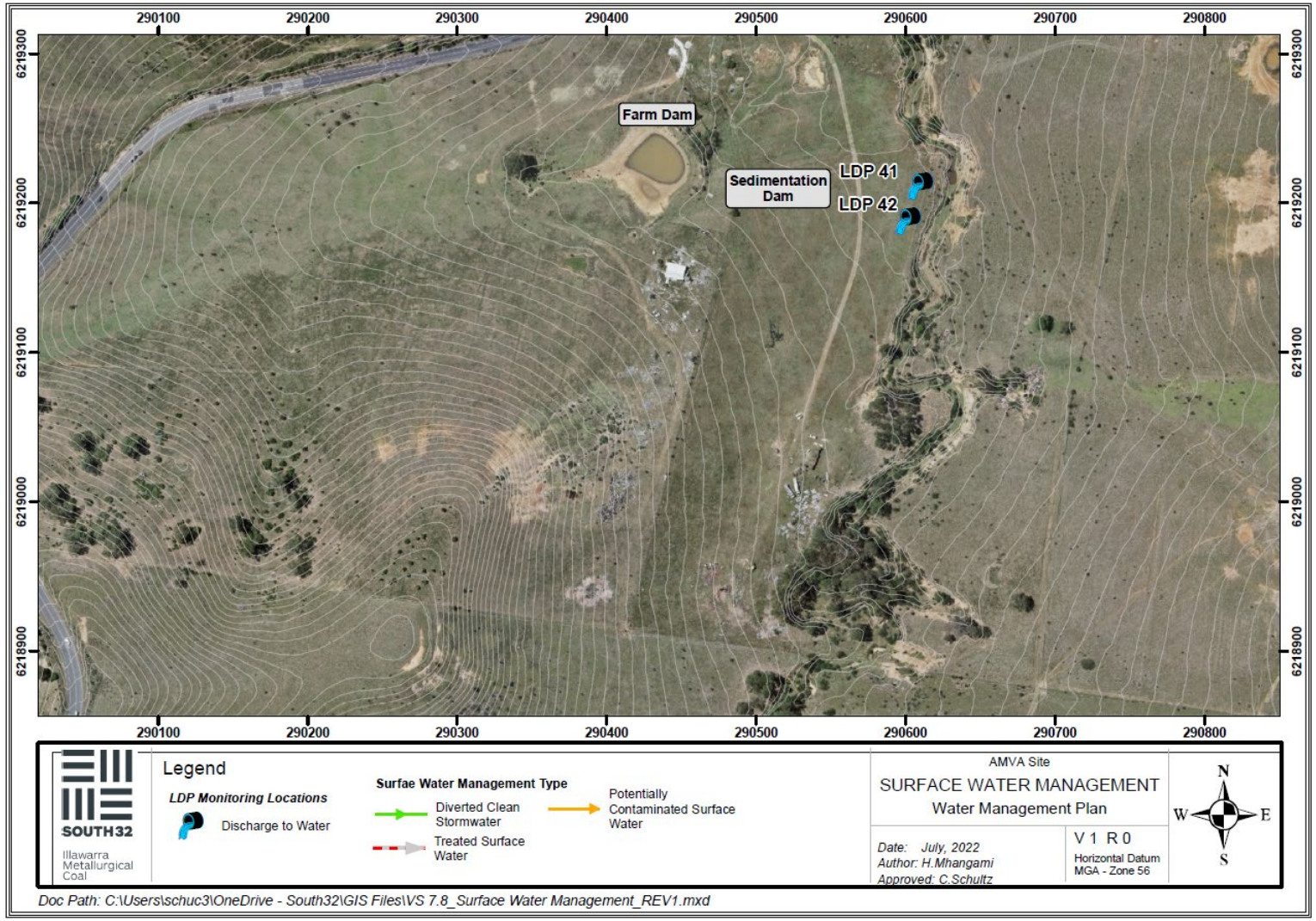
Plan 5: Surface Water Drainage – Ventilation Shafts 1, 2 and 3



Plan 6: Surface Water Drainage and EPL 2504 Points – Ventilation Shaft 6



Plan 7: Surface Water Drainage and EPL 2504 Points – AMVA Site



14. APPENDICES

Appendix 1: Project Approval Conditions: Water Management

Condition	Requirement	Document / Section
Condition 1 of Schedule 2	**Obligation to minimise harm to the environment** In addition to meeting the specific performance criteria established under this approval, the Proponent shall 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 project.	Section 5
Condition 2 of Schedule 2	**Terms of Approval** The Proponent must carry out the project: (a) generally in accordance with the EA, Statement of Commitments and PPR; (b) in accordance with the conditions of this approval; and (c) in accordance with any written directions of the Planning Secretary.	Section 3.1
Condition 4 of Schedule 2	Consistent with the requirements of this approval, the Planning Secretary may make written directions to the Proponent in relation to: (a) the content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this approval, including those that are required to be, and have been, approved by the Planning Secretary; and (b) the implementation of any actions or measures contained in any such document referred to in condition 4(a).	Section 3.1
Condition 12 of Schedule 2	**Operation of Plant and Equipment** The Proponent shall ensure that all plant and equipment used at the site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Section 2
	Soil and Water Note: Under the Water Act 1912 and / or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.	Appendix 4
Condition 14 of Schedule 4	**Compensatory Water Supply** The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project, in accordance with the approved Surface Water Management Plan.	Section 8.2

Condition	Requirement	Document / Section
	The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer to the Secretary for resolution. If the Proponent if unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.	
Condition 15 of Schedule 4	The Proponent shall ensure that all surface water discharges from the site (including from Brennans Creek Dam) comply with the discharge limits (both volume and quality) set for the project in any EPL.	Section 5.4 Section 7 Table 4, Table 5, Table 10, Table 11, Table 12
Condition 16 of Schedule 4	**Surface Water Management Plan** The Proponent shall update the Surface Water Management Plan for the project to the satisfaction of the Planning Secretary.	This Plan
	This plan must be prepared in consultation with DPE Water and EPA by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary, and submitted to the Planning Secretary for approval by 31 January 2017.	Section 1.4 Appendix 3 Appendix 5 Note: These actions were completed by 31 January 2017. This date is not relevant for this review.
	This plan must include: a) a comprehensive water balance for the project, that includes details of: • sources and security of water supply and water make; • water use; and • water discharges; and	Section 4.2
	b) management plans for the surface facilities sites, that include: • a detailed description of water management systems for each site, including:	Section 5 Table 10, Table 11

Condition	Requirement	Document / Section
		and Table 12
	- clean water diversion systems;	Section 5
	- erosion and sediment controls;	Section 5
	- on-site sewage management systems; and	Section 5
	- any water storages	Table 7, Table 8 and Table 9
	• measures to minimise potable water use and to reuse and recycle water;	Section 5 Table 10, Table 11 and Table 12
	• trigger levels for investigating any potentially adverse impacts on water resources or water quality;	Section 8.4 Table 5
	• a Water Response Plan, which describes the measures and/or procedures that would be implemented to: - investigate, notify and mitigate any ground or surface water exceedances; - minimise, prevent or offset any adverse impacts to ground or surface water resources; - provide compensatory water supply to any owner of privately-owned land whose water supply is adversely impacted (other than an impact that is negligible) as a result of the project; and	Section 8.4 Section 5 Section 8.2
	• measures to comply with surface water discharge limits;	Section 5.4 Table 10, Table 11 and Table 12
	• implementation of any pollution reduction program relating to mine water discharges from Brennans Creek Dam and identification of 5,7 and 10-year commitments to substantially reduce the impacts on biota of salinity and other pollutants in such discharges; and	Section 6 Section 7.2
	• monitoring and reporting procedures including:	Section 7
	- collection of baseline data on surface water quality in creeks and other waterbodies that could potentially be affected by the project; and - surface water and stream health impact assessment criteria.	Section 4 and Section 7
Condition 16A of Schedule 4	The Proponent must implement the Surface Water Management Plan approved by the Planning Secretary.	Section 9.3 Section 5.8.5

Condition	Requirement	Document / Section
	Note: This plan must be suitably integrated with the Water Management Plans that form part of Extraction Plans.	
Condition 17 of Schedule 4	e) a comprehensive water monitoring program for the emplacement;	Section 5.3.4
Condition 11 of Schedule 4A	**Construction Environmental Management Plan** Prior to the commencement of Appin Mine Ventilation and Access Site early works, the Proponent must prepare a Construction Environmental Management Plan for the construction phase of the Appin Mine Ventilation and Access Site to the satisfaction of the Planning Secretary. This plan must: (a) be prepared in consultation with the EPA; (b) provide specific environmental management and monitoring measures for construction works, including for: i. minimising construction-related noise, dust, visual impacts, and surface disturbance; ii. stormwater management including erosion and sediment controls and clean water diversion; iii. monitoring and managing groundwater inflows and impacts to groundwater resources as a result of shaft construction activities at the Appin Mine Ventilation and Access Site:	Section 1.2 The requirements of this condition are covered in the relevant CEMP (separate to this WMP)
Condition 1 of Schedule 5	**Notification of Landowners** As soon as practicable and no longer than 7 days after obtaining monitoring results showing: a) an exceedance of any relevant criteria in schedule 4, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with relevant criteria; and	Section 9.2.3
Condition 2 of Schedule 5	**Independent Review** If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 4, then he/she may ask the Planning Secretary in writing for an independent review of the impacts of the project on his/her land. If the Planning Secretary is satisfied that an independent review is warranted, then within 2 months of the Planning Secretary's decision the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to: • consult with the landowner to determine his/her concerns; • conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 4; and	Section 8.5

Condition	Requirement	Document / Section
	• if the project is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) give the Planning Secretary and landowner a copy of the independent review.	
Condition 3 of Schedule 5	If the independent review determines that the project is complying with the relevant criteria in Schedule 4, then the Proponent may discontinue the independent review with the approval of the Planning Secretary. If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Planning Secretary. If the independent review determines that any relevant acquisition criteria in schedule 4 are being exceeded and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 4-5 below	Section 8.5
Condition 4 of Schedule 5	**Land Acquisition** Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on: (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the project, having regard to the: • existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and • presence of improvements on the land and/or any approved building or structure which has been physically commenced on the land at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of any additional noise mitigation measures under Condition 6 of Schedule 4; (b) the reasonable costs associated with: • relocating within the Wollondilly local government area, or to any other local government area determined by the Planning Secretary; and	Section 8.5

Condition	Requirement	Document / Section
	• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and (c) reasonable compensation for any disturbance caused by the land acquisition process. If the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired within 28 days after the Proponent makes its written offer, then either party may refer the matter to the Planning Secretary for resolution. Upon receiving such a request, the Planning Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to: • consider submissions from both parties; • determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above; • prepare a detailed report setting out the reasons for any determination; and • provide a copy of the report to both parties. Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination. However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Planning Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Planning Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report disputing the independent valuer's determination, and any other relevant submissions. Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Planning Secretary's determination. If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Planning Secretary determines otherwise.	
Condition 5 of Schedule 5	The Proponent shall pay all reasonable costs associated with the land acquisition process described in Condition 4 above, including the costs associated with obtaining Council approval for any plan of	Section 8.5

Condition	Requirement	Document / Section
	subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.	
Condition 2 of Schedule 6	**Management Plan Requirements** The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
	a) detailed baseline data;	Section 4.1
	b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions; • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any measurements measures;	Section 3 Table 5 Section 5 Section 7
	c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits of performances measures / criteria;	Section 5 Table 9, Table 10, Table 11
	d) a program to monitor and report on the: • impacts and environmental performance of the project; • effectiveness of any management measures (see c above)	Section 7
	e) a contingency plan to manage unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 5 Section 8.4
	f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 6
	g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and / or performance criteria; and	Section 8 Section 9
	h) a protocol for periodic review of the plan. *Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.*	Section 9.3
	Adaptive Management The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of	Section 8.3.2

Condition	Requirement	Document / Section
Condition 3 of Schedule 6	this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of the criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity: a) take all reasonable and feasible steps to ensure the exceedance ceases and does not recur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing these options and any preferred remediation measures or other course of action; and c) implement remediation measures as directed by the Planning Secretary to the satisfaction of the Planning Secretary.	
Condition 4 of Schedule 6	**Annual Review** By 30 September 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Planning Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past financial year, and the development that is proposed to be carried out over the next year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the past financial year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • requirements of any plan or program required under this approval; • monitoring results of previous years; and • relevant predictions in the EA; (c) identify any non-compliance over the past financial year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	Section 9.1.1

Condition	Requirement	Document / Section
	(f) describe what measures will be implemented over the current financial year to improve the environmental performance of the project.	
Condition 5 of Schedule 6	**Revision of Strategies, Plans and Programs** Within 3 months of: (a) the submission of an annual review under Condition 4 above; (b) the submission of an incident report under Condition 7 below; (c) the submission of an audit report under Condition 9 below; and (d) any modification to the conditions of this approval, (unless the conditions require otherwise); or (e) a direction of the Planning Secretary under Condition 4 of Schedule 2; the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Planning Secretary.	Section 9.3
Condition 7 of Schedule 6	**Incident Notification, Reporting and Response** The Planning Secretary must be notified in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. The notification must identify the project (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 7.	Section 9.2.1
Condition 7A of Schedule 6	**Non-compliance Notification** The Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance. A non-compliance notification must identify the project and the application number for it, set out the condition of approval that the project is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. *Note: A non-compliance which has been notified as an incident does not need to also be notified as a noncompliance.*	Section 9.2.2
Condition 8 of Schedule 6	**Regular Reporting** The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the	Section 9

Condition	Requirement	Document / Section
	reporting arrangements in any plans or programs approved under the conditions of this approval.	
Condition 9 of Schedule 6	**Independent Environmental Audit** By the end of December 2013, and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Planning Secretary; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals); (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals. *Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Planning Secretary*	Section 9.4.1
Condition 10 of Schedule 6	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Planning Secretary, the Proponent shall submit a copy of the audit report to the Planning Secretary, together with its response to any recommendations contained in the audit report.	Section 9.4.1
Condition 11 of Schedule 6	**Access to Information** From 30 June 2012, the Proponent shall: (a) make copies of the following publicly available on its website: • the documents referred to in Condition 2 of Schedule 2; • all current statutory approvals for the project; • all approved strategies, plans and programs required under the conditions of this approval;	Section 3.1 Section 8.1 Section 9.1 Section 9.4.1

Condition	Requirement	Document / Section
	• a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs; • a complaints register, updated on a monthly basis; • minutes of CCC meetings; • the annual reviews of the project; • any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; • any other matter required by the Planning Secretary; and (b) keep this information up-to-date, to the satisfaction of the Planning Secretary	
Table SOC-3	• Stormwater runoff, soil and erosion control measures will be managed in accordance with guidelines detailed in the publication Soils and Construction, Volume 1, 4th Edition and Controlled Activities on Waterfront Land. Guidelines for Laying Pipes and Cables in Watercourses on Waterfront Land, 2012, where relevant. Water controls will be employed as per the applicable project assessment or management plan documentation. • Service supply boreholes will be cased and grouted to address any known regionally significant aquifers. • Drilling process waste water will be managed as per the relevant project assessment. • Water required for projects will be sourced from appropriate sources, such as: ○ Recycling captured water where possible, ○ Water Licence in accordance with the requirements of the Water Sharing Plan 2010 (DECCW 2009) and the Water Management Act 2000; ○ An authorised Sydney Water supply; or ○ Appin Mine Filtration Plant.	Section 5.8.4 Section 5.8.5 Section 5.8.6 Section 4.2 Appendix 4 Section 5.1 Section 4.3 and 5

Appendix 2: Appin Mine EA Commitments: Water Management

EA Section	EA Commitment	Document / Section
5.6.2	ICHPL is currently conducting assessments and trials in accordance with an existing PRP under EPL 2504, in relation to the continued licensed release of water from Brennans Creek Dam to the Georges River. *PRP11 completed and submitted.*	Section 7.2
5.6.2	The current PRPs at Appin West and Appin East pit tops would continue to be addressed and relevant improvements implemented to enable future pit top water management to be conducted in compliance with EPL conditions.	Section 5 Section 6
5.6.3	*Surface Disturbance* Where surface disturbance activities are undertaken outside of existing contained catchments with erosion and sediment controls in place (e.g. pit tops, shaft sites), temporary erosion and sediment controls (e.g. silt fences and sediment control structures) would be installed prior to the commencement of construction activities. Erosion and sediment control measures would be designed in accordance with applicable water management principles and guidelines (e.g. *Managing Urban Stormwater: Soils and Construction* [Landcom, 2004]).	Section 5.8.4
5.6.3	*Site Water Balance* The existing monitoring regime for tracking the water balance of each pit top together with water supply and use in the underground operations and at the surface facilities would be continued for the life of the Project. The performance of the water management system would be reviewed regularly using the monitored data, in combination with the site water balance model, to identify changes in water management performance against targets. These reviews would be used to implement corrective actions and improvements in line with EPL PRP targets.	Section 4.2
5.6.3	*Licenced Water Releases to Georges River* ICHPL is conducting ecologically based studies and trials to determine an appropriate water quality release limit for salinity from Brennans Creek Dam under dry weather flow conditions, with the intention to include this limit in EPL 2504 for the West Cliff pit top. ICHPL is scheduled to complete these assessments and trials by the end of 2009 in accordance with the current PRP under EPL 2504. *PRP11 completed*	Section 6 Section 7.2

Appendix 3: Consultation with Agencies

Agency Comments	IMC Response/Where addressed in WMP
Environment Protection Authority (EPA)	
Response received 11 June 2020 The EPA has reviewed the plan and provided minor comments for consideration at relevant locations in the attached document. Overall the EPA notes that the plan contains the elements required by the Project Approval including a description of: the water balance, stormwater management, water storage & re-use, monitoring & reporting, and proposed programs to "substantially reduce the impacts on biota of salinity and other pollutants in such discharges". The latter point incudes the new requirements for toxicity and aquatic health monitoring in the licence (conditions E2 & E3). The EPA recommends that the plan be updated following completion of work on the water treatment plants required under the licence in 2021. This could include review of the TARP for management of Brennans Creek Dam further clarifying its joint roles for water storage and environment protection.	WMP to be updated and resubmitted following the implementation of works required under EPL 2504 at Appin North and Appin West.
Section 4.2 - Suggest that a note be added to the effect that Figure 1 doesn't reflect cessation of groundwater discharges to BCD since February 2019.	Footnote has been included in Section 5.1.
Section 5.2.2.3 - Could clarify that the underdrainage will also be treated in the WTP.	Clarification has been provided in the WMP.
Section 5.3.3.2 - Is chlorine dioxide still used or was it replaced with sodium hypochlorite?	Yes. The chemicals that are mixed to treat water pumped from BCD are sodium chlorite and hydrochloric acid. These chemicals form chlorine dioxide.
Section 5.4.2 – Are the surface water dams and spillway designed for a 1:1000 or 1:100-year rainfall event.	The 1:1000-year statement incorrectly referred to rainfall events. It related to a 1:1000-year flood level and the relationship with the spillway. This statement has been removed from the WMP.
Department of Planning, Industry and Environment - Water	

Response provided 27 May 2020 We do not review post approval requests. Please submit to nrar.servicedesk@industry.nsw.gov.au.	Noted. Request for comment sent to NRAR
Natural Resources Access Regulator	
Response received 21 July 2020 1. The project is to identify if the Water Management Plan (WMP) submitted is intended to address both Schedule 4, Clause 16 and Schedule 3, Clause 5 of the Conditions of Approval (08_0150), or if a separate WMP has been prepared for the purpose of Schedule 3, Clause 5. The current draft WMP does not address the requirements for a WMP as specified in Schedule 3, Clause 5.	The WMP has been prepared to meet the requirements of Condition 16 of Schedule 4. This is clearly stated in Section 1.1. The WMP required under Condition 5 h) of Schedule 3 has been included in the Extraction Plan for Longwalls 901 – 904 and will be included in further Extraction Plans as developed.
2. Provide a clear, tabulated form of the water balance detailing water input to Appin Mine versus water output from the mine for easier comprehension of the water balances.	The water balance has been updated in Version 1 with FY21 data. The water balance has been made clearer to reflect inputs and outputs.
The Water Management Plan (WMP) does not comply with Conditions of Approval 08_0150. Whilst impacts relating to groundwater under Conditions of Approval 08_0150 Schedule 4, Clause 16 Surface Water Management Plan are required in: (b) management plans for the surface facilities sites, that include: • a Water Response Plan, which describes the measures and/or procedures that would be implemented to: ○ investigate, notify and mitigate any ground or surface water exceedances; ○ minimise, prevent or offset any adverse impacts to ground or surface water resources; The document has been presented as a Water Management Plan, not a Water Response Plan as a component of a Surface Water Plan, and therefore must also satisfy Schedule 3, Clause 5 Extraction Plan: (h) include a Water Management Plan, which has been prepared in consultation with OEH, WaterNSW and DPI Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including: • surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;	The assessment by NRAR is noted. The determination of whether the WMP complies with Condition 16 of Schedule 4 is the remit of the Department. Included in Section 8.4 A WMP was included in the Longwall 901 – 904 Extraction Plan, submitted for approval in 2014. The WMP submitted in the Extraction Plan meets the requirements of Condition 5 of Schedule 3, and the content has not been replicated in the WMP being submitted under Condition 16 of Schedule 4.

• a program to monitor and report stream flows and assess any changes resulting from subsidence impacts; • a program to monitor and report groundwater inflows to underground workings; and • a program to predict, manage and monitor impacts on groundwater bores on privately-owned land; Although the current document has not been presented in connection with an Extraction Plan, it is clear the WMP as presented does not contain any references to groundwater impact monitoring other than that for hydrocarbon contamination. Contamination matters are administered by the EPA. As the WMP could potentially be referenced by any pending or existing extraction plan, DPIE-Water cannot endorse the WMP.	This is correct, as groundwater monitoring associated with longwall mining operations has been included in the Extraction Plan. Groundwater monitoring included in the WMP in Section 7.3 relates to hydrocarbon contamination monitoring. This has been clarified in the document. Noted. Noted. Endorsement of the WMP by NRAR is not required under Condition 16 of Schedule 4, rather that the WMP to prepared in consultation with NRAR.
In review of the presented document, DPIE-Water makes the following comments in relation to groundwater: **Water Balance** The water balance is hard to decipher, a clear tabulated water in, water used and water out with balances would greatly improve understanding. In terms of groundwater it is interpreted from the flowchart documented that 242 ML/year is contained in product moisture; 803 ML/year is extracted from Appin West underground workings; and 579 ML/year is extracted from West Cliff underground workings. A total of 1624 ML per year of groundwater take. DPIE-Water interpret that a water volume of 2148 ML/year is discharged from varies approved discharge points. Whilst 27 ML/year is diverted to underground storage. How much of this discharged water is groundwater or whether all the groundwater is held in the adequate underground storage is not clear.	The water balance has been updated in Version 1 with FY22 data. The water balance has been made clearer to reflect inputs and outputs. Clarification on predicted water extraction (i.e. groundwater) is provided in Section 4.4. The calculation provided by NRAR does not take into account the recycling of water underground.
Groundwater Take The incidental groundwater ingress to each coal mine is not outlined. However, the overall volume is assumed to be as outlined in the water balance, a total of 1382 ML/year of	The water balance has been updated in Version 1 with FY22 data. The water balance has

pumped groundwater; this excludes 242 ML/year of groundwater as contained product moisture. This volume is stated to be directed to underground storage. The mine complex has underground storage capacity of 1710 ML/year in three storage Areas, 1, 4 and 5. Further, and notably, there is no outline of groundwater take versus groundwater licence volume on an annual basis in regard to trigger level or Trigger Action Response Plan (TARP). Unless these are in a specific groundwater management plan, as yet to be supplied and reviewed.	been made clearer to reflect inputs and outputs. This information is provided where applicable in the annual return for each water licence.
Proposed Changes to Monitoring Programme Improvement activities proposed for 2020 to 2025 period include to "Cease groundwater monitoring at Appin East and Appin North". Justification for this is given that "Review of groundwater monitoring results indicates a trend of no hydrocarbon contamination" and that "No remediation of groundwater [is] required." DPIE-Water fail to see how discontinuing groundwater monitoring for contamination fits with the principal of "identify and deliver improvement projects that will reduce the impacts on biota in the Georges River as a result of the discharge from Appin North, and Allens Creek (and subsequent flows into the Nepean River) as a result of discharge from Appin West." It would be in the interest of all concerned parties that six-monthly monitoring be continued for a minimum of 10 years beyond closure of mines to assess continued compliance, unless this closure time frame is already met.	This has been clarified to state this relates to monitoring for hydrocarbons. NRAR is correct. There is no linkage between the cessation of the hydrocarbon contamination monitoring and the water treatment plant projects at Appin North and Appin West. The monitoring was implemented for decommissioned underground fuel storage tanks, and there is no further source of contamination at those sites.
Groundwater (Contamination) Monitoring Contamination monitoring in groundwater is monitored at two locations only, Appin East (three bores) and Appin North (one bore), under an EPA endorsed monitoring programme. DPIE-Water notes that this appears minimal in comparison to other mines operating in the state. The type of contamination is not directly clear in the text of this section in the WMP. In addition, it is not clear, as it is not outlined, what elements and chemical compounds are being analysed for, nor what groundwater quality trigger level criteria are used to compare the analyses against.	There is no other identified source of contamination at the Appin Mine surface facilities that has the potential to impact groundwater. The groundwater monitoring that has been implemented is in response to identified past sources of contamination.
General Overall the WMP, as presented, is not a stand-alone document. There are numerous references to external	Noted.

located documents which the reader must source to understand this water management document.	
Department of Planning, Industry and Environment – Planning Services	
Approval received 11 September 2020. The Department notes that the management plan does not include details about the volume of water that would be treated at the Appin North Water Treatment Plant or the upgraded Appin West Water Treatment Plant, and the water balance does not reflect the changes associated with these plants. The Department also notes the water balance included in the management plan uses data that is three years old, and the plan does not clearly demonstrate the mine's capacity to manage water under all meteorological conditions, including unusually wet or unusually dry years. Consequently, the Department requests that you submit an updated water management plan by 31 July 2021 (being the date by which the Appin West Water Treatment Plant must be installed under special condition E1.1 of Environmental Protection Licence 2504). The revised management plan should include a water balance based on up-to-date water inputs/outputs, should reflect the changes resulting from the installation/upgrades of the water treatment plants, and should clearly demonstrate the capacity of the mine to manage water under all weather conditions. The Department also draws your attention to the comments provided by the Natural Resources Regulator (NRAR) on the water balance. The Department concurs with NRAR that the water balance is not particularly easy to interpret, and you should include in the next revision of the management plan a table comparing water inputs, usage and outputs.	The water balance has been updated in Version 1 with FY22 data. The water balance has been made clearer to reflect inputs and outputs. Section 4.3 has been included to provide some clarity on WTP inputs and outputs. Two extensions for the submission of the WMP was sought and approved due to delays with the implementation of the long-term WTP. This extension was until 31 July 2022. The water balance has been updated in Version 1 with FY22 data. The water balance has been made clearer to reflect inputs and outputs. The management of water under all weather conditions is addressed in Section 5 and specifically Section 5.9. The water balance has been updated in Version 1 with FY22 data. The water balance has been made clearer to reflect inputs and outputs.
Response received 13 December 2022	
Surface Water Discharges Condition 15 Schedule 4: The Proponent shall ensure that all surface water discharges from the site (including from the Brennans Creek Dam) comply with the discharge limits (both volume and quality) set for the project in any EPL. A summary of the surface water discharge points in the EPL are provided in section 5.4 Table 4. Includes Point 16 which is not in the EPL (not clear if this is an additional monitoring point). States that water releases from Appin Mine are undertaken in accordance with the requirements of EPL 2504,	

however the concentration limits from the EPL (L2), as relevant for various points, are not provided *Provide an explanation for the inclusion of Point 16 in Table 4.* *Include the concentration limits from the EPL.*	 Footnote 26 has been included. Table 5 has been included.
Condition 16 Schedule 4: The Proponent must update the Surface Water Management Plan for the project to the satisfaction of the Planning Secretary. This plan must be prepared in consultation with DPE Water and EPA by suitably qualified and experienced persons whose appointment has been endorsed by the Planning Secretary, and submitted to the Planning Secretary for approval by 31 January 2017. This plan must include: A project modification was approved on the 12 April 2022. There were updates to condition 16 which required updated consultation. *Expediate consultation consistent with condition 16.*	There have been numerous changes to water management at Appin Mine since the last WMP was approved that need to be formalised in an approved WMP. IMC commits to undertaking consultation with agencies as identified in Condition 16 of Schedule 4 as part of the next review, that will be scheduled to commence by 30 September 2023 to include a revised water balance and criteria following commissioning of the long-term WTP at Appin North.
Condition 16 Schedule 4 (b): management plans for the surface facilities sites, that includes: • trigger levels for investigating any potentially adverse impacts on water resources or water quality; As stated in Condition 15 Schedule 4 the concentration limits from the EPL (L2), as relevant for various points, are not provided. *Include the concentration limits from the EPL*.	 Table 5 has been included.
Condition 16A Schedule 4: The Proponent must implement the Surface Water Management Plan approved by the Planning Secretary. Note: This plan must be suitably integrated with the Water Management Plans that form part of Extraction Plans. There is no commitment to implement the approved Water Management Plan. *Include a commitment to implement the approved WMP.*	 This commitment has already been included in Section 9.3.
Management Plan Requirements Condition 2 Schedule 6: The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (b) a description of: • any relevant limits or performance measures/criteria;	

The discharge limits are set in the EPL and are not included in the Water MP. *Include the concentration limits from the EPL.*	Table 5 has been included.
Condition 2 Schedule 6: The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (h) a protocol for periodic review of the plan. Section 9.3 Review of Water MP. This section does not include changes to the EPL as a trigger for review of the WMP, however much of the content of the WMP relies on the details of the EPL. An update to the EPL may result in the Plan not being consistent with the EPL, as required under Condition 15, Schedule 4. *Include changes to the EPL as a trigger for reviewing and updating the WMP.*	This commitment has been included in Section 9.3.
Table SOC-3 • Stormwater runoff, soil and erosion control measures will be managed in accordance with guidelines detailed in the publication Soils and Construction, Volume 1, 4th Edition and Controlled Activities on Waterfront Land. Guidelines for Laying Pipes and Cables in Watercourses on Waterfront Land, 2012, where relevant. Water controls will be employed as per the applicable project assessment or management plan documentation. • Service supply boreholes will be cased and grouted to address any known regionally significant aquifers. • Drilling process waste water will be managed as per the relevant project assessment. • Water required for projects will be sourced from appropriate sources, such as: ○ Recycling captured water where possible, ○ Water Licence in accordance with the requirements of the Water Sharing Plan 2010 (DECCW 2009) and the Water Management Act 2000; ○ An authorised Sydney Water supply; or ○ Appin Mine Filtration Plant. ○ WMP does not include the commitments or how it is addressed. *Include the commitments as per the CoC Appendix 6*	This commitment has been included in Appendix 1.
General Comments Several hyperlink errors were identified in the WMP. *Update the hyperlink in the document.*	A check of hyperlinks was undertaken and errors corrected where identified.
There is no recent consultation undertaken.	IMC commits to undertaking consultation with agencies as

Expediate consultation	identified in Condition 16 of Schedule 4 as part of the next review, that will be scheduled to occur in September 2023 to include a revised water balance following commissioning of the long-term WTP at Appin North.

Appendix 4: Water Licences

Licence	Number	Issue Date	Expiry Date
Licence to divert Brennans Creek around Stage 3 of refuse area	10WA103794	01/07/2011	30/06/2024
Nepean River Extraction Across from VS 6. Douglas North pump (Nepean River).	10WA117285	15/11/2011	14/11/2026
WCCPP Water Usage BCD. BCD UG Supply and BCD Recycled.	10WA117999	15/11/2012	14/11/2028
Appin Mine Underground Groundwater Extraction	10WA118778	01/07/2013	18/02/2028
West Cliff Mine Groundwater Extraction	10WA118766	01/07/2013	26/03/2028
Groundwater Access Licence – West Cliff	36481	NA	NA
Groundwater Access Licence – Appin	36477	NA	NA
Groundwater Access Licence – Appin	37464	NA	NA
Surface Water Access Licence – Brennans Creek Dam	35519	NA	NA
Surface Water Access Licence – Mountbatten	30145	NA	NA

Appendix 5: Secretary Endorsement of Personnel

Planning, Industry & Environment

Mr Chris Schultz
Lead Environment
Illawarra Metallurgical Coal

By Email: chris.schultz1@south32.net

23/04/2020

Dear Mr Schultz

Bulli Seam Operations (MP08_0150)
Appointment of Persons to Review Surface Water Management Plan

I refer to your request for the Planning Secretary's approval of suitably qualified persons employed by South32 to review and update the Water Management Plan for the Bulli Seam Operations Project.

The Department has reviewed the nominations and information you have provided and is satisfied that Christopher Schultz, David Gregory, Simon Pigozzo and Nicola Curtis are suitably qualified and experienced.

Consequently, I can advise that the Planning Secretary approves the appointment of these persons to review the plan.

If you wish to discuss the matter further, please contact Rose-Anne Hawkeswood on 927 6324.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments

As nominee of the Planning Secretary

4 Parramatta Square, 12 Darcy Street, Parramatta 2150 | dpie.nsw .gov.au | 1

Appendix 6: Management Plan Approval

Department of Planning and Environment

Our ref: MP08_0150-PA-67

Chris Schultz
Superintendent Environment
Illawarra Coal Holdings Pty Ltd
PO Box 514
Unanderra, NSW, 2526

23/12/2022

Subject: Bulli Seam Operations – Water Management Plan

Dear Mr. Schultz,

Thank you for submitting the Water Management Plan in accordance with Condition 16, Schedule 4 of the consent for the Bulli Seam Operations (MP08_0150). I also acknowledge your response to the Department's review comments and request for additional information.

I note the Water Management Plan contains the information required by the conditions of approval, though no feedback from consultation with DPE Water was obtained.

Accordingly, as nominee of the Planning Secretary, I conditionally approve the revised Water Management Plan (Rev 1.0 dated December 2022). Within six weeks of receiving feedback from DPE Water, the Department requires you to review and (if necessary) revise the Water Management Plan to reflect feedback, and resubmit to the Department for review and approval via the Major Projects portal.

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 Charissa Pillay on 0299955944.

Yours sincerely

Jessie Evans
Director, Resource Assessments
Resource Assessments

As nominee of the Planning Secretary

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