



Surface Water Management Plan

Table of Commitments

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
3.5.1_1	<p>The Surface Water Management Plan that includes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> detailed baseline data on surface water flows and quality of watercourses and/or water bodies potentially impacted by the development, including: <ul style="list-style-type: none"> <input type="checkbox"/> stream and riparian vegetation health; <input type="checkbox"/> channel stability (geomorphology); and <input type="checkbox"/> water supply for other surface water users; <input type="checkbox"/> a detailed description of the surface water management system; <input type="checkbox"/> detailed plans, design objectives and performance criteria for water infrastructure, including: <ul style="list-style-type: none"> <input type="checkbox"/> any approved creek diversions or restoration works associated with the development; <input type="checkbox"/> water run-off diversions and catch drains; <input type="checkbox"/> water storages and sediment dams; <input type="checkbox"/> emplacement areas; and <input type="checkbox"/> backfilled pits and any final voids for the development (see also Table 6); and <input type="checkbox"/> reinstated drainage networks on rehabilitated areas of the site; <input type="checkbox"/> detailed performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts associated with the development, for: <ul style="list-style-type: none"> <input type="checkbox"/> downstream surface water flows and quality; <input type="checkbox"/> channel stability; <input type="checkbox"/> downstream flooding impacts; <input type="checkbox"/> stream and riparian vegetation health; 	<p>SSD 7142 Condition B49(e)(iv)</p> <p>SOC_8.0_Management Measures_040</p> <p>SOC_6.8_Water_022</p>	Ongoing commitment	Various sections of this plan

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
	<ul style="list-style-type: none"> <input type="checkbox"/> water supply for other water users; and <input type="checkbox"/> post-mining water pollution from rehabilitated areas of the site; <input type="checkbox"/> a program to regularly monitor: <ul style="list-style-type: none"> <input type="checkbox"/> compliance with the relevant performance measures listed in Table 4 and the performance criteria established above; <input type="checkbox"/> controlled and uncontrolled discharges and seepage/leachate from the site; <input checked="" type="checkbox"/> impacts on water supply for other water users; <input type="checkbox"/> surface water inflows, outflows and storage volumes to inform the Site Water Balance; and <input type="checkbox"/> the effectiveness of the surface water management systems and the measures within the Erosion and Sediment Control Plan; <input type="checkbox"/> reporting procedures for the results of the monitoring program; and <input type="checkbox"/> a plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development; 			
3.5.1.1_1	This plan must be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary.	SSD 7142 Condition B52(a)	Complete	3.5.1.1
3.5.1.2_1	The SWMP will be prepared in accordance with relevant statutory requirements in consultation with the NSW DPIE Water and the EPA.	SSD 7142 Condition B52(b)	Complete	3.5.1.2
4.2.2.1_1	<p>The WMP and subplans will include Trigger Action Response Plans (TARPs) for impacts on water resources affecting private landholders.</p> <p>The Water Management Plan for United Wambo will include a Trigger Action Response Plan (TARP) for surface water and impacts on water</p>	SOC_RFAI_007 SOC_RTS_A_047 SOC_RTS_A_070 SOC_6.8_Water_022 SOC_RTS_B_006	Ongoing	4.2.2.1

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
	resources affecting private landholders.			
4.3_1	<p>United Wambo will prevent unnecessary water ingress to reduce energy usage and associated emissions. The surface water management system is designed to maximise separation of clean and dirty water systems.</p> <p>Clean water will be diverted away from mining areas, consistent with the mine water management system design. They will not be used to permanently store water for mining use.</p>	<p>SOC_RTS_A_072</p> <p>SSD 7142 Condition B49</p> <p>SSD 7142 Condition B450</p> <p>SOC_6.05_GHG_012</p>		4.3
4.3_2	<p>Overburden emplacement areas will:</p> <ul style="list-style-type: none"> Encapsulate and prevent migration of tailings, acid forming and potentially acid forming materials, saline and sodic material. Be designed, installed and maintained to prevent and/or manage long-term saline seepage (out-of-pit emplacements only) 	<p>SSD 7142 Condition B49</p> <p>Table items 18-19</p>	Ongoing	4.3
4.3_3	<p>Aquatic, riparian and groundwater dependent ecosystems (including GDE1 and GDE2):</p> <ul style="list-style-type: none"> Negligible environmental consequences beyond those predicted in the document/s listed in SSD 7142condition A2(c) Maintain or improve baseline channel stability Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006) 	<p>SSD 7142 Condition B49</p> <p>Table items 25-27</p>	Ongoing	4.3
4.3_4	<p>Design objectives for mine water storage infrastructure include:</p> <ul style="list-style-type: none"> Install and maintain to avoid unlicensed or uncontrolled discharge of mine water 	<p>SSD 7142 Condition B49</p> <p>Table items 15-16</p> <p>SOC_6.08_Water_001</p> <p>SOC_6.08_Water_002</p>	Ongoing commitment	4.3

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
	<ul style="list-style-type: none"> Maintain the 100-year ARI 24-hour storm event and minimise permeability 			
4.3_5	Clean drains will be sized to safely convey the 1% AEP storm event flows and proposed pump flows from upstream clean water dams to each of the respective clean water catch dams or downstream receiving catchment area.	SOC_6.08_Water_016	Ongoing commitment	4.3
4.3_6	<p>Design objectives for clean water diversions include:</p> <ul style="list-style-type: none"> Design, install and maintain the clean water system to capture and convey the 100 year ARI flood event Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site Intercept, convey and/or release, where practicable, to downstream environment 	SSD 7142 Condition B49 Table items 11-12	Ongoing commitment	4.3
4.3_7	<p>Design objectives for creek diversions and restoration works include:</p> <ul style="list-style-type: none"> Hydraulically and geomorphologically stable Incorporation of erosion control measures based on vegetation and engineered revetments Incorporation of pool and riffle sequences with persistent/permanent pools for aquatic habitat that are consistent with the geomorphology of the creek to be diverted Revegetation with suitable native species. 	SSD 7142 Condition B49 Table items 21-24	Ongoing commitment	4.3
4.3_8	<p>Design criteria for clean water dams include:</p> <ul style="list-style-type: none"> Surge capacity for a design storm event of 100-year ARI, 24-hour event in addition to operating capacity; and 	SSD 7142 Condition B49 Table items 11-12 SOC_RTS_A_072	Ongoing commitment	4.3

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
	<ul style="list-style-type: none"> Spillways designed for conveyance of the 100-year ARI peak flow with 300-millimetre freeboard. Will not be used to permanently store water for use within the Project. 			
4.3_9	Design and maintain tailings storages to encapsulate and prevent the release of tailings seepage/leachate.	SSD 7142 Condition B49 Table items 17	Ongoing commitment	4.3
4.3_10	<p>Drainage structures and catch drains are designed and installed to:</p> <ul style="list-style-type: none"> Divert water towards appropriate storage area Be safe, stable and non-polluting (i.e. for drainage lines established in the final landform) Capture and convey the 1% AEP flood event 	<p>SOC_8.0_Management Measures_012</p> <p>SOC_6.8_Water_016</p> <p>SSD 7142 Condition B49 Table items 11-12</p>	Ongoing commitment	4.3
4.3_11	<p>Flood levees are designed, installed and maintained to:</p> <ul style="list-style-type: none"> protect mining areas from a 1,000-year ARI flood event (including from Wollombi Brook) ensure no adverse effect on roads or privately-owned land designed using the latest available flood data (including Golden Highway road realignment structures) 	<p>SOC_6.08_Water_001</p> <p>SOC_6.08_Water_007</p> <p>SOC_RTS_B_004</p>	Complete	4.3
4.3_12	Chemicals and hydrocarbons will be stored in bunded areas in accordance with the relevant Australian Standards	SSD 7142 Condition B49 Table items 20	Ongoing commitment	4.3
4.3_13	United Wambo will integrate appropriate drainage in the design of rehabilitation areas to effectively manage drainage of the final landform without resulting in adverse impacts.	SOC_6.9_Ecology_008	Ongoing commitment	4.3

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
4.3_14	<p>Final voids will minimise to the greatest extent practicable:</p> <ul style="list-style-type: none"> the size and depth of final voids the drainage catchment of final voids any high wall instability risk the risk of flood interaction <p>The designs for the final voids will be refined over the life of the Project and will be incorporated in the United Wambo Rehabilitation Management Plan.</p>			
4.3_15	<p>Water management systems minimise potential indirect impacts to flora, fauna and their habitats from erosion and unnatural flooding events.</p>	SOC_6.09_Ecology_002-8	Ongoing commitment	4.3
4.3_16	<p>Should monitoring indicate the changes in groundwater levels and quality, and surface waters are more extensive or significant than predicted, mitigation measures will be considered. Mitigation measures that will be considered following discussion with relevant government authorities include:</p> <ul style="list-style-type: none"> injection of water into the depressurised aquifers sourcing of additional water from other sources obtaining additional water licence allocations treatment of mine water for reuse within the water management system. 	SOC_RTS_A_045-1	Ongoing commitment	4.3
5.1_1	<p>The SWMP will incorporate an updated surface water monitoring program that includes the development of specific triggers around pH and associated monitoring of metals/metalloids. The program will be developed in accordance with requirements of approvals and EIS commitments.</p>	<p>SOC_6.08_Water_006 SOC_6.08_Water_021-1 Schedule 2 Condition P1 Schedule 5 Condition M2.1 Schedule 5 Condition M2.2 SOC_RTS_B_001 SOC_RTS_B_002 SOC_RTS_B_002</p>	Complete	5.1

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
5.1_2	The SWMP monitoring program will monitor and document the existing water quality upstream and downstream of the Project Area using the water quality parameters, frequency of sampling and water quality triggers as for the existing approved operations.	SOC_6.08_Water_021 SOC_RTS_B_001	Ongoing commitment	5.1
5.1_3	The SWMP monitoring program will monitor and document water quality within the WMS as required for pH, electrical conductivity, total suspended solids, total dissolved solids, oil and grease and for a suite of metals, metalloids and ions within, downstream and, where possible, upstream of the Project Area.	SOC_6.08_Water_021	Ongoing commitment	5.1
5.1_4	Potential changes to scour/erosion/deposition within creek channels will be monitored.	SOC_RTS_A_071	Ongoing commitment	5.1.6
5.1_5	United Wambo will monitor mine water seepage to identify seepage rates and quality. Samples will be collected of pumped seepage with the objective of providing an early indication of any mixing of shallow alluvial groundwaters with the Permian strata. Water quality analysis should be similar as for the groundwater monitoring bores. The seepage monitoring program will include: <ul style="list-style-type: none"> • measurement of water pumped from the mining areas using flow meters or other suitable gauging apparatus; • monitoring quality of water pumped from the mining areas (full water quality suite); • correlation of rainfall records (and catchments) with mining area seepage records so groundwater and surface water can be separated; and monitoring of coal moisture content.	SOC_6.08_Water_034	Ongoing commitment	5.1
5.1_6	Prior to disposal of sediment waste, a risk assessment will be undertaken and dams with an increased risk of containing hydrocarbons or other	SOC_6.19_Waste_001 SOC_6.08_Water_034	Ongoing commitment	5.1.7

Commitment Reference	Commitment Description	Approval/EIS Reference	Status	Section
	<p>potential environmental pollutants will be tested for these contaminants. Sediment that is not contaminated will be co-disposed with overburden in overburden emplacement areas. Any identified contaminated sediment material will either be treated on site and disposed of with overburden, or will be disposed off-site at an appropriately licensed facility.</p> <p>Sediments at increased risk of containing hydrocarbons or other potential environmental pollutants will be tested prior to disposal.</p>			
5.4_1	<p>In the event of an unforeseen spillage associated with incidents such as accidental damage, operational failures or extreme catastrophic occurrences, the hazard notification protocols in the Project's Water Management Plan will be followed. Should the incident involve the potential for material harm, the Pollution Incident Response Management Plan to be prepared for the Project will be followed.</p>	SOC_6.08_Water_023	Ongoing commitment	5.4
5.4_2	<p>The SWMP will include the hazards to be managed, incident management processes, notification procedures, and other key information to address incidents.</p>	SOC_6.8_Water_022	Ongoing commitment	5.4
5.5_1	<p>United Wambo will report surface water monitoring results in the Annual Review, in accordance with relevant statutory requirements (including approvals and EIS commitments). The annual review will also identify if any additional monitoring sites are required.</p>	SOC_6.08_Water_021 SOC_6.08_Water_026 SOC_6.08_Water_029 SOC_RTS_A_044	Ongoing commitment	EM Strategy

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1. Purpose

The purpose of this Surface Water Management Plan (SWMP) is to describe the management and mitigation strategies, procedures, controls and monitoring programs that will be implemented to manage surface water related requirements at the United Wambo Open Cut Coal Mine (United Wambo).

2. Scope and Objectives

2.1 Scope

United Wambo is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales. United Wambo is a 50:50 joint venture between United Collieries Pty Limited (United) and Wambo Coal Pty Limited (Wambo). United is owned 95 per cent by Abelshore Pty Limited, a wholly owned subsidiary of Glencore Coal Pty Limited (Glencore) and five per cent by the Mining and Energy Union (MEU). Wambo is a subsidiary of Peabody Energy Australia Pty Limited.

United Wambo is managed by Glencore and has approval to extract up to 10 million tonnes per annum (mtpa) of Run of Mine (ROM) coal up until 31 August 2042. ROM coal is processed through the Wambo Coal Handling and Preparation Plant (CHPP) and transported by rail from Wambo to the Port of Newcastle for export.

This SWMP applies to all operational activities at United Wambo Joint Venture (i.e. excludes Wambo underground, CHPP and train load facility), and addresses the relevant conditions of **SSD 7142** and **EPL 3141**. It forms part of United Wambo's Environmental Management System (EMS) and should be read in conjunction with the **United Wambo Environmental Management Strategy (EM Strategy)**. The SWMP applies to all United Wambo employees, and contractors working for, or on behalf of, United Wambo within the project approval boundary.

The Wambo Mine, approved under DA 305-7-2003 and DA 177-8-2004, includes an underground mine, coal handling and preparation plant (CHPP) and train loading facility. These items are managed by Peabody under standalone management plans related to that consent (see **section 3.4.1.1**).

Water is managed across both United Wambo and Wambo project boundaries. This includes shared water storages, shared water infrastructure and shared impacts. This plan does cover management of these shared management scenarios across the two operations, referred to as *the Complex*.

2.2 Objectives

The objectives of this SWMP are to:

- to provide context on the baseline for surface water flows and quality in creeks and other waterbodies associated with the operation;
- outline water impacts and their relevant assessment criteria;
- outline the obligations and commitment measures to be implemented to minimise surface water impacts both upstream and downstream of the operation;
- provide measurement and evaluation methods to be implemented to assess compliance and performance against **SSD 7142**, **EPL 3141** and other relevant legislation relating to surface waters;
- establish a protocol for the assessment, response and reporting of surface water monitoring data

3. Planning

3.1 Baseline Data

3.1.1 Background Surface Water Environment

3.1.1.1 Surface Water Quality Monitoring Programs pre-SSD 7142

Surface water quality monitoring was historically undertaken by Wambo and United operations since approximately 2003, in accordance with approved surface water monitoring programs. The monitoring programs at both operations covered all three relevant water categories: clean, dirty and mine water systems. The clean water system consisted of runoff from undisturbed or rehabilitated areas. The dirty water system consisted of runoff from disturbed areas (excluding mine water). The mine water system consists of runoff from areas exposed to coal or water used in coal processing or from coal stockpile areas.

Surface water quality monitoring was undertaken for the following parameters:

- pH
- electrical conductivity (EC);
- total suspended solids (TSS); and
- total dissolved solids (TDS).

Comprehensive monitoring has also been undertaken annually on the site dams for a broad range of analytes, including metals and nutrients.

United Wambo undertook a review of the surface water quality monitoring sites historically monitored at Wambo and United prior to the approval of the United Wambo Joint Venture project, and refined the sites to be monitored as described in **Table 3-1** Relevance of Historic Surface Water Monitoring Location to United Wambo Project. Currently monitored sites are shown in **Figure 5-1** and geospatial data for previously monitored sites is available in site records.

Table 3-1 Relevance of Historic Surface Water Monitoring Location to United Wambo Project

Site ID	Description	Revised Site ID	Comment
WAMBO			
SW01	Wollombi Brook - Upstream	N/A	Located at Bulga Village – upstream location for United Wambo is SW40/WB01.
SW02	Wollombi Brook - Downstream	WB03	Wollombi Brook - Warkworth
SW03	Wollombi Brook - Pump-Out	WB02	Wollombi Brook - Pumps
SW04	North Wambo Creek - Upstream	NWC01	North Wambo Creek - Upstream
SW05	North Wambo Creek – Downstream	NWC03	North Wambo Creek - Downstream
SW06	South Wambo Creek - Upstream	N/A	Out of impact zone for United Wambo. Will remain in Wambo UG program
SW07	South Wambo Creek – Junction with Stony Creek	N/A	Out of impact zone for United Wambo. Will remain in Wambo UG program

SW08	Stony Creek	N/A	Out of impact zone for United Wambo. Will remain in Wambo UG program
SW12	West Cut Dam	W13	West Cut Dam
SW14	Box Cut Dam (Admin)	W11	Wambo MIA Box Cut Dam
SW15	Eagles Nest Dam – Licenced Discharge Dam (EPA ID No. 4)	W10	Process Water Dam
SW20	West Cut Holding Dam	N/A	Not required for United Wambo
SW27a	North Wambo Creek – Middle-Lower	N/A	Midstream for North Wambo Creek is monitored at SW32a/NWC02.
SW29	SW29	N/A	Not required for United Wambo
SW30	Chitter Dam	N/A	Dam removed for South Wambo UG
SW31	Gordon Below Franklin Dam	W09	CHPP Dams
SW32a	North Wambo Creek – Pump	NWC02	North Wambo Creek - Midstream
SW38	Homestead Open Cut	W12	Homestead Pit
SW39	Waterfall Creek	WFC01	Waterfall Creek
SW40	Wollombi Brook – Upstream of Wambo Creek	WB01	Wollombi Brook - Upstream
SW52	C11 Void	W08	C11 Void
SW54	Montrose Pit Inflows	W14	Montrose Pit Inflows
UNITED			
SW02	North Wambo Creek Downstream	NWC03	North Wambo Creek - Downstream
SW03	Wollombi Brook Upstream	WB02	Wollombi Brook - Pumps
SW04	Wollombi Brook Downstream	WB03	Wollombi Brook - Warkworth
SW06	Redbank Creek Downstream	RC01	Redbank Creek - Downstream
Dam 2	Dam 2	W02	Dam 2
Dam 3	Dam 3	W04	Dam 3
Dam 7	Dam 7	W15	Dam 7
Dam 8	Tailings Dam 2	W17	Tailings Dam
Dam 12	Dam 12	N/A	Dam removed by Project
Dam 13	Dam 13	N/A	No longer required
Dam 14	Dam 14	W07	Dam 14
Dam 15	Dam 15	W16	Dam 15

3.1.1.2 Historic Water Quality Data

The full set of historical monitoring data was reviewed in 2016 during the preparation of the EIS and as part of the development of an integrated and comprehensive surface water quality monitoring program for United Wambo and Wambo operations. An additional review was undertaken for the Response to Submissions – Part B Report, which can be found on the NSW Major Projects website at majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-7142%2120190911T023209.938 GMT.

Results of surface water quality monitoring undertaken from 2004 to 2015 for Wollombi Brook, North Wambo Creek, Redbank Creek, and from 2012 to 2015 for Stony Creek and Waterfall Creek, as well as for the WMS, were examined as part of the surface water assessment for the EIS.

The monitoring data shows that the water quality parameters are highly variable across the monitoring network, as would be expected within ephemeral drainage systems. Wollombi Brook, being perennial, exhibits notably less variation in its water quality. The water quality in Wollombi Brook shows little variation at monitoring locations upstream and downstream of the existing operations, indicating that Wollombi Brook is not exhibiting any measurable impacts due to the existing operations.

The ephemeral creek systems within and adjacent to the Project Area also generally exhibit similar water quality results upstream and downstream of the existing operations. Again, this suggests little to no measurable impact on the surrounding ephemeral watercourses as a result of the mining operations. Notably, the measured total suspended solids (TSS) load decreases downstream of the existing operations in Redbank Creek and Stony Creek, and is similar in North Wambo Creek, indicating that the existing WMS is effective at managing TSS within the site.

Analysis of the concentrations of various metals and metalloids reveals a generally wider spread in the concentrations detected in the samples from the existing operations compared with the samples from the surrounding surface water systems. There are several parameters monitored within the existing WMS for which the mean and median values exceed the default 95% species protection ANZECC trigger value for slightly to moderately disturbed freshwater ecosystems, including cadmium, chromium, copper, lead, nickel and zinc. However, these exceedances are not reflected in downstream receiving waters, supporting the view that the existing WMSs are effective in containing and managing poorer quality water.

A summary of the baseline data is provided in *Table 3-2* and *Table 3-3*.

The results of water quality monitoring are reported annually in the Annual Review for United and Wambo and have been utilised in the development of the site-specific trigger levels detailed in *Section 3.3.1*.

Table 3-2 Baseline Water Quality Data – pH, ED TDS and TSS

Site ID	Site Description	Sampling Period	Former Wambo Site ID	Former United Site ID	pH			EC (µS/cm)			TDS (mg/L)			TSS (mg/L)		
					Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
WB01	Wollombi Brook - Upstream	July 2008 – December 2018	SW40	-	6.4	7.6	8.8	36	718	2940	18	354	1090	1	17	179
WB02	Wollombi Brook - Pumps	July 2008 – December 2018	SW03	SW03	6.3	7.6	7.8	106	1319	6280	<1	681	2924	<1	43	1630
WB03	Wollombi Brook - Warkworth	July 2008 – December 2018	SW02	SW04	6.3	7.6	9.0	148	1179	5290	<5	684	3238	1	15	308
NWC01	North Wambo Creek - Upstream	July 2008 – December 2018	SW04	-	6.8	7.7	8.7	256	351	563	<5	855	2712	1	41	154
NWC02	North Wambo Creek - Midstream	July 2008 – December 2018	SW32a	-	7.2	8.0	9.2	199	794	6970	<6	779	4400	1	472	5440
NWC03	North Wambo Creek - Downstream	July 2008 – December 2018	SW05	SW02	6.6	7.7	9.5	111	1828	4770	<5	996	2162	1	41	1110
RC01	Redbank Creek - Downstream	July 2008 – December 2018	-	SW06	7.6	8.3	8.8	576	1394	4400	-	-	-	-	-	-
WFC01	Waterfall Creek	July 2008 – December 2018	SW39	-	6.6	7.6	9.3	92	337	1268	82	514	2220	8	391	2600

Table 3-3 Baseline Water Quality Data – Metals – Wollombi Brook – SW02 (now WB03)

Analyte	Sampling Period	Sample Count	Min	Mean	Max	80th percentile	ANZECC 80th percentile
Aluminium (ug/L)	January 2015 - April 2016	21	20.00	871.91	9560.00	682.00	150.00
Cadmium (ug/L)	January 2015 - April 2016	21	0.02	0.13	0.20	0.20	0.80
Copper (ug/L)	January 2015 - April 2016	21	0.20	1.23	4.00	1.30	2.50
Iron (ug/L)	January 2015 - April 2016	21	490.00	2100.48	4760.00	3170.00	N/A
Lead (ug/L)	January 2015 - April 2016	21	0.20	0.87	2.00	1.00	9.40
Nickel (ug/L)	January 2015 - April 2016	21	0.20	1.51	4.00	2.00	17.00
Zinc (ug/L)	January 2015 - April 2016	21	1.80	4.81	9.00	6.00	31.00
Aluminium (ug/L)	January 2015 - April 2016	21	20.00	871.91	9560.00	682.00	150.00
Cadmium (ug/L)	January 2015 - April 2016	21	0.02	0.13	0.20	0.20	0.80
Copper (ug/L)	January 2015 - April 2016	21	0.20	1.23	4.00	1.30	2.50

Notes to table:

- Not historically sampled

3.1.1.3 Historic Stream Flow Data

Flow monitoring data shows that Wollombi Brook is perennial and has a persistent baseflow between rainfall events. In comparison, site drainages are ephemeral and typically only flow in response to intense rainfall events. Flow monitoring data has been used to characterise the flow regime of the monitored watercourses.

Figure 3-1 shows the flow duration curves for Wollombi Brook at the DPE Water gauging stations at Warkworth and Bulga (GS 210004 and GS 210028) which have been derived from flow recorded between 1908 and 2018. It is apparent that the distribution of flows in Wollombi Brook upstream and downstream of Wambo has generally been similar but with an increased frequency of low flows at the downstream station.

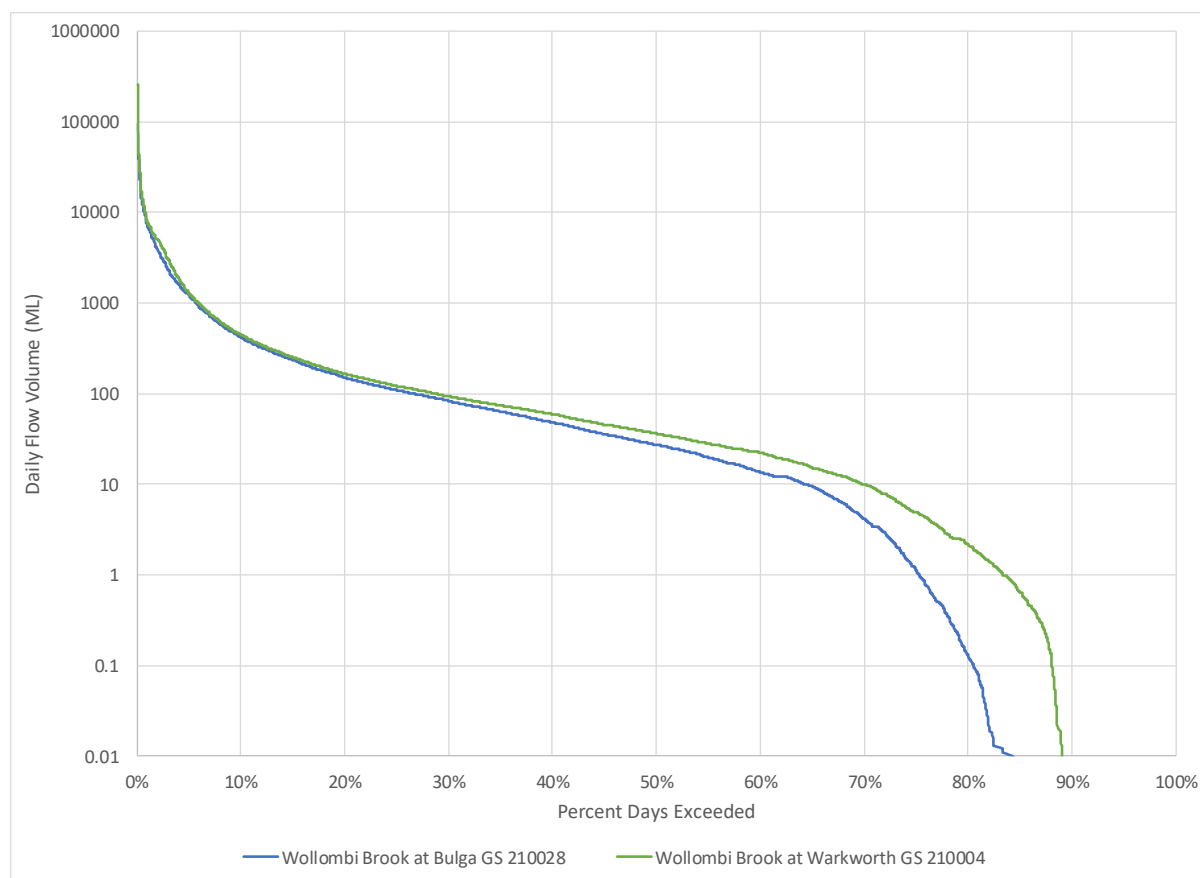


Figure 3-1 Flow Duration Curves Wollombi Brook Upstream and Downstream of the Mine

Flow monitoring undertaken on North Wambo Creek shows that the creek is ephemeral, typically only flowing in response to intense rainfall with multi-year, no-flow periods. The flow gauges were installed following the June 2007 flood event. Due to the limited period that the flow gauges have been installed (i.e. under nine years) and that this creek system is ephemeral, there is insufficient data to accurately characterise flows in North Wambo Creek.

There are no long-term flow gauges on Wambo Creek or Redbank Creek, which are also tributaries of Wollombi Brook; nor on Waterfall Creek, which is a tributary of the Hunter River.

Surface water flows will continue to be monitored by Wambo with the results shared with United Wambo.

3.1.2 Historic Channel Stability and Stream and Riparian Vegetation Health

3.1.2.1 Redbank Creek

Dam U2 is a water storage located in the middle reaches of Redbank Creek. Dam U2 replaced the former Dam 1 that was mined through in the early development of United Pit. Upstream of the dam, Redbank Creek typically has an ill-defined channel, a wide floodplain and sparse riparian vegetation. This area will be mined through during the progression of the United Pit. The mid and downstream portions of Redbank Creek typically have a well-defined channel and wide floodplain, east of the site boundary. Redbank Creek is ephemeral and frequently dry. In the downstream portion of Redbank Creek, the riparian zone of the creek banks is lightly to moderately vegetated and existing erosion is minimal.

3.1.2.2 Waterfall Creek

Waterfall Creek is ephemeral and frequently dry. Its channel is generally shallow and poorly defined along its length as its catchment is predominantly drained by overland sheet flow. As such, Waterfall Creek's riparian zone is also poorly defined.

3.1.2.3 Wambo Creek and North Wambo Creek

Wambo Creek has undergone little modification from existing operations. Wambo Creek has a generally well-defined channel, and its upper reaches have a more heavily vegetated riparian zone than its lower reaches. The Project will not impact on the catchment area or watercourse of Wambo Creek.

North Wambo Creek has been significantly modified due to the existing approved diversion around the mining operations. This diversion has a well-defined channel, and the rehabilitated riparian zone is moderately vegetated. Downstream of the diversion, the channel is likewise well-defined, with a lightly to moderately vegetated riparian zone.

Wambo monitors the channel stability of Wambo Creek and North Wambo Creek. The baseline Riparian Vegetation and Bed Bank Stability Monitoring Program commenced in October 2006 to monitor potential subsidence impacts. The program aims to separate natural erosion from mine subsidence associated instability, through pre-mining and post-mining survey of North Wambo Creek and South Wambo Creek. Monitoring of channel stability will continue to be undertaken by Wambo in accordance with the **Wambo Surface Water Management Plan**.

3.1.2.4 Pre-Mining Monitoring

Due to a lack of baseline channel stability and riparian vegetation data, United Wambo completed photographic monitoring at suitable locations along Wollombi Brook, Redbank Creek and Waterfall Creek prior to commencement of mining. Photographic records were taken at locations selected based on observations of stream and riparian vegetation cover, bed condition, active erosion points and potential areas of instability determined by the creek line inspections.

3.1.3 Water Supply for Other Surface Water Users

Surface and alluvial water take within the unregulated watercourses surrounding United Wambo (i.e. Wollombi Brook catchment and Waterfall Creek catchment) is regulated under the Water Management Act 2000 (WM Act) and Water Management (General) Regulation 2018. Water take from the Hunter River is also regulated under the WM Act and Water Management (General) Regulation 2018.

Water may be extracted from both Wollombi Brook and the Hunter River by United Wambo and Wambo. Extraction of water from the Wollombi Brook is managed under the WSP Hunter Unregulated and Alluvial Water Sources 2009 and Hunter River extraction is managed under the Water Sharing Plan (WSP) for the Hunter Regulated River Water Source 2016.

There are no known licensed non-mining water users on waterways directly downstream of United Wambo along Wollombi Brook, its tributaries (Wambo Creek, North Wambo Creek and Redbank Creek) or Waterfall Creek. There are licensed water users downstream of United Wambo on the Hunter River, which is a regulated river with extraction managed by WaterNSW. Water is also extracted downstream of site from the Hunter River for stock and domestic purposes.

3.1.4 Site Water Management Systems

Section 4.4 of the **WMP** describes the proposed strategy for the management of clean and dirty water at United Wambo for Phase 2. The strategy is based on the containment and re-use of mine water and the control of sediment that may be potentially carried with runoff from disturbed areas.

The UWJV Water Management System (WMS) handles water generated within the operational areas, while diverting runoff from upstream undisturbed catchments around such areas. It includes both permanent structures that will continue to operate post closure and temporary structures that will only be required until the completion of rehabilitation works. The UWJV **WMP** includes a schematic of pipeline networks and water transfers.

The United Wambo site water management system is integrated with the Wambo Underground water management system, managed under DA 305-7-2003. For context on how the UWJV water infrastructure system integrates via the Complex (United Wambo Open Cut and Wambo Underground), see the **United Wambo & Wambo Site Water Balance**. Note that the tailings storage facilities and the current Licenced Discharge Point are managed by Wambo.

The UWJV surface water management system includes:

- up-slope catchment diversion structures
- water storage dams
- tailings storage facilities
- sediment dams
- water transfer infrastructure (i.e. pumps and pipelines)

The UWJV water management system operates predominately as a closed self-contained system, except for transfers to and from Wambo. The water balance of the system fluctuates with climatic conditions and as the extent of the mining operations evolves over time.

A network of storages and drains has been established to capture runoff from mine water catchment areas. Runoff from areas disturbed by mining is collected in open cuts and mine water storages. These storages are used as priority sources of water for the Wambo CHPP and open cut dust suppression. Runoff from haul roads is captured in sediment traps or is diverted to mine water storages.

Runoff from rehabilitated and establishing revegetated mine areas is directed to sediment retention storages. This water is then directed to mine water storages.

The water storages shown in **Table 3-4** United Wambo key water storages and maximum capacities and Figure 3-2 are the major water storages in the United Wambo water management system. For more information on the Wambo underground storages managed under DA-7-2003, refer to the **United Wambo & Wambo Site Water Balance** and **Wambo Surface Water Management Plan**.

Table 3-4 United Wambo key water storages and maximum capacities

Storage	Max Capacity (ML)
U2 Dam	333
U3 Dam	227
United Box Cut	250
United Underground	5,000
Wombat Dam	16
Roses Pit (void)	N/A
Montrose West (void)	N/A
Various sediment dams (see UWJV ESCP)	N/A

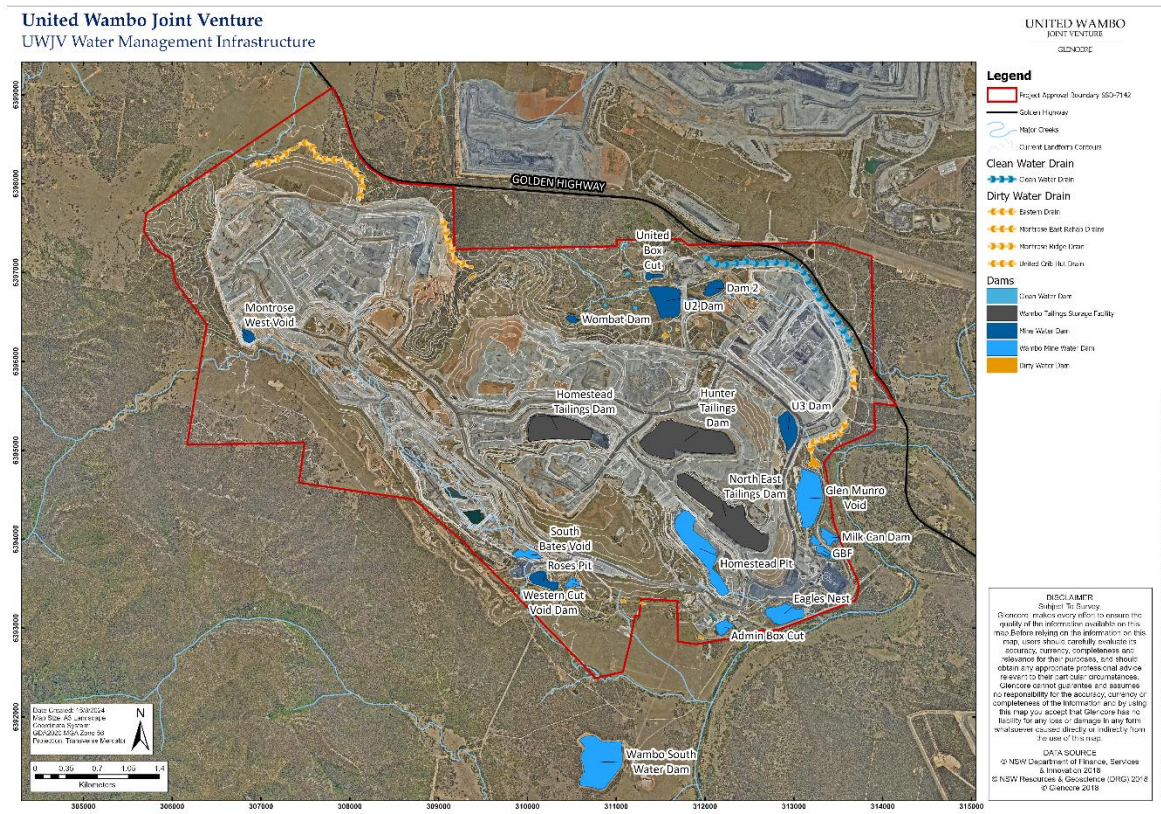


Figure 3-2 Phase 2 Water Management System (2020-2025)

3.2 Surface Water Impacts

Impacts from United Wambo on surface water are shown in **Table 3-5** below.

Table 3-5 Surface water impacts

Potential Impact	Cause
Surface flow regimes	<ul style="list-style-type: none"> • Diversion of run-off from areas upslope of the operation • Run-off from disturbed areas during the operational and rehabilitation phases • Flow volumes into ephemeral watercourse systems and other downstream environments • Changing catchment areas based on mining and rehabilitation progression <p>As identified in the EIS, modelled changes to the pre-SSD 7142 environment and former approved final landform (under DA 305-7-2003) included:</p> <ul style="list-style-type: none"> • Changes to the catchment areas for Wollombi, North Wambo Creek, Redbank Creek and Waterfall Creek • Reductions in catchment areas for North Wambo Creek and Redbank creek are small within the context of ephemeral streams. The predicted change in flow volumes is less than seasonal and annual variations when comparing wet and dry years. • The reduction expected in the Wollombi Brook is also expected to have negligible cumulative impacts on the downstream watercourses. • No impact on flows within the Hunter River as a result of the large catchment area. • Expected to have minor to negligible impacts on flows and water quality immediately downstream of the operation.
Water quality (physical and chemical properties)	<ul style="list-style-type: none"> • Discharge of mine water to downstream environments • Unlicensed discharge/spill/seepage of mine affected water, sediment laden water or sediments
Water availability to downstream users	<ul style="list-style-type: none"> • Changed catchment areas • Licenced extraction from surface water sources (Wollombi Brook, Hunter River)
Geomorphological and hydrological values of watercourses	<ul style="list-style-type: none"> • Changes to catchments • Changes to environmental flows <p>Note: As identified in the EIS, UWJV not expected to result in a significant impact on the geomorphological and hydrological values of local surface water systems.</p>
Riparian and ecological values of watercourses	<ul style="list-style-type: none"> • Changes to catchments • Changes to environmental flows
Flooding	<p>As identified in the EIS:</p> <ul style="list-style-type: none"> • Flood modelling indicated that the inundation extent of a one per cent Annual Exceedance Probability (AEP) flood event included an area of the footprint of the United Open Cut.

Potential Impact	Cause
	<ul style="list-style-type: none"> The flood inundation within the footprint is due to backwater from Wollombi Brook entering the lower reaches of Redbank Creek during flood events.

3.3 Criteria and Performance Metrics

United Wambo develop internal targets as part of annual planning (*EM Strategy Section 3.6*), which inform operational management, and ensure that obligated criteria and performance metrics outlined in this section are complied with.

3.3.1 Surface Water Impact Assessment Criteria

3.3.1.1 Discharge Criteria

Although approved in SSD 7142, there is no Licenced Discharge Point (LDP) nominated in EPL 3141 managed by United Wambo.

In accordance with EPL 529, Wambo is permitted to discharge mine water through LDP No. 4, located at Eagles Nest Dam. Refer to the *Wambo Surface Water Management Plan* for water volume and quality discharge limits managed under EPL 529.

3.3.1.2 Surface Water Quality Criteria

The impact assessment criteria for surface water quality are summarised in *Table 3-6* below. The criteria have been set based on the 20th and 80th percentile for the available dataset for pH, and the 80th percentile for EC, TSS and TDS.

WB04 was a monitoring site established in 2020. United Wambo will develop site specific criteria when sufficient data is available. In the interim, default ANZECC physical and chemical stressor trigger values for slightly disturbed lowland river systems in south-east Australia have been adopted as the impact assessment criteria for WB04.

No site-specific surface water quality criteria have been generated for metals/metalloids, due to limited data set for the monitoring locations. United Wambo propose to develop site specific criteria when sufficient data is available. In the interim, default 95% species protection ANZECC trigger values for slightly to moderately disturbed freshwater ecosystems Australia have been adopted as the impact assessment criteria (refer to *Table 3-7*).

Table 3-6 Surface Water Quality Criteria

Site ID	Site Description	Sample Count	pH		EC (µs/cm) ¹	TSS (mg/L)		TDS (mg/L)
			Lower	Upper		Low flow	High flow	
WB03	Wollombi Brook – Warkworth	-	7.4	8.1	1974	17	308	~3
WB04	Wollombi Brook – Downstream	-	6.5	8.5	2200	50 ²		~3
NWC03	North Wambo Creek - Downstream	57	7.3	8.0	2350	53	1110	1270-

Site ID	Site Description	Sample Count	pH		EC (µs/cm) ¹	TSS (mg/L)		TDS (mg/L)
			Lower	Upper		Low flow	High flow	
RC01	Redbank Creek - Downstream	70	7.9	8.3	8456	26		- ³
WFC01	Waterfall Creek	39	7.3	7.9	435	582	1922	646

Notes to Table:

- 1 Upper trigger
- 2 A default of 50 mg/L TSS has been utilised for WB04 until the site-specific criteria is developed.
- 3 No historical data available for this site. There is no ANZECC criteria set for TDS therefore no limits have been identified for this site until suitable amount of results available.

Table 3-7 ANZECC Criteria for Metals and Metalloids

Parameter	ANZECC Criteria (µg/L)	Parameter	ANZECC Criteria (µg/L)	Parameter	ANZECC Criteria (µg/L)	Parameter	ANZECC Criteria (µg/L)
Aluminium (Al)	55	Manganese (Mn)	1900	Lead (Pb)	3.4	Calcium (Ca)	N/A
Arsenic (As)	24	Nickel (Ni)	11	Potassium (K)	N/A	Barium (Ba)	N/A
Cobalt (Co)	N/A	Selenium (Se)	11	Silver (Ag)	0.05	Magnesium (Mg)	N/A
Copper (Cu)	1.4	Zinc (Zn)	8	Flouride (Fl)	N/A	Cadmium (Cd)	0.2
Iron (Fe)	N/A	Mercury (Hg)	0.6	Boron (B)	370	Sodium (Na)	N/A

N/A – No ANZECC criteria available

3.3.1.3 Surface Water Flow Impact Assessment Criteria

Wollombi Brook is perennial and the impact assessment criterion for Wollombi Brook has been set to zero flow at the Warkworth gauging station.

Flow impact assessment criteria for the local mine site ephemeral creeks (Stony Creek, South Wambo Creek and North Wambo Creek) are included in the **Wambo Water Management Program**.

3.3.2 Surface Water Performance Criteria

Surface water performance criteria are outlined in **Table 3-8** below.

Table 3-8 Surface Water Performance Criteria

Aspect	Performance Measures	Performance Indicator
Downstream surface water quality	Negligible change in surface water quality (compared to predicted impacts)	Surface water quality monitored is outside of the adopted trigger values (refer below) for at least one parameter for more than two consecutive monitoring rounds

Aspect	Performance Measures	Performance Indicator
Channel stability	No increase in areas of instability within watercourses	Channel stability monitoring indicates one or more areas of decreasing stability in watercourses
Downstream flooding impacts	Negligible change in downstream flood access (compared to predicted impacts)	No change to flood inundation of downstream properties in major flood events
Stream and riparian health	Riparian health	No evidence of significant weed growth or death of vegetation
	Condition of channel	No evidence of significant scour, undercutting or slumping
	Deposition of sediment and debris	No evidence of significant accumulation or deposition, large blockages in channel
	General conditions	No evidence of significant hazards presented to the public, poor aesthetics or feral animals, or geomorphic instability
Surface Water User Supplies	Negligible impact to downstream surface water users (compared to predicted impacts)	<p>Mining extents/disturbance areas lie within approved boundaries.</p> <p>Surface water take is licensed and undertaken in accordance with available water determinations issued by WaterNSW</p> <p>No complaints from downstream water users regarding loss of surface water (quality and/or quantity)</p>
Post-mining water pollution from Rehabilitated areas of the site	Water discharged from the site is suitable for receiving waters and fit for aquatic ecology and riparian vegetation	<p>Runoff water quality from rehabilitation areas is within the range of water quality data recorded from analogue sites and/or baseline data and does not pose a threat to downstream water quality</p> <p>Drainage structures (including drainage lines established in the final landform) are stable and there is no evidence of overtopping or significant scouring as a result of runoff</p>

3.3.3 Criteria Exceedance and Unforeseen Impacts Protocols

If the monitoring results trigger a response as per *Table 3-6* and/or *Table 3-7*, further investigations are required as per the TARPS in *Appendix E - Surface Water Management TARPS*. The process for the investigations triggered by the TARPS is detailed in the *UWJV Incident Investigation Procedure*.

Due to the low likelihood of surface water incidents occurring, any associated impacts have been characterised as unforeseen impacts. The process for the investigations triggered by unforeseen impacts is also detailed in the *UWJV Incident Investigation Procedure*.

Surface water incidents, which may be addressed by the unforeseen impacts protocol, include mine water discharge, non-compliances with erosion and sediment control practices, and generally any non-compliance to surface water conditions within the Project Approval conditions not covered by an associated protocol or TARP.

3.4 Requirements of this Plan

United Wambo operations and support teams undertake consistent approaches to ensure that all approvals and licences are obtained and managed in accordance with conditions. **Section 3.4** outlines those approvals, licences and other regulatory requirements on applicable to United Wambo, obligations are added to the compliance management system to ensure compliance is managed.

3.4.1 Statutory Requirements

3.4.1.1 Project Approval

United Wambo received **SSD 7142** in accordance with Part 4 of the **Environmental Planning & Assessment Act 1979 (EP&A Act)** from the NSW Independent Planning Commission (IPC), on 29 August 2019. Conditions within **SSD 7142** relating to surface water management, and where these are addressed within this document, are provided in **Appendix A - Table A-1**.

Further commitments relating to water management were made during the environmental assessment phase of the project. These commitments are summarised in **Appendix A -**.

It is noted that adjacent to United Wambo is the Wambo Mine, approved under DA 305-7-2003 and DA 177-8-2004. Requirements under the Wambo Mine development consent are managed by Peabody.

3.4.1.2 Environment Protection Licence

United Wambo operates under **EPL 3141**, issued by the **NSW Environment Protection Agency (EPA)** under the authority of the **Protection of the Environment Operations Act 1997 (POEO Act)**.

Conditions within **EPL 3141** that regulate surface water quality at United Wambo are provided in **Appendix A - Table A-2**.

3.4.1.3 Water Licences

The Complex, i.e. both United Wambo and Wambo operations, hold WALs under the **Water Management Act 2000** which permit water take from surface water and groundwater sources. Water take against each WAL is managed and reported by the licence holder. **Table 3-9** lists the WALs relevant to the Complex surface water management.

Table 3-9 Surface water licences relevant to United Wambo under the Water Management Act

Water Sharing Plan	Water Source	Category	Licence Number ¹	WAL Reference Number	Description	Nominated Water Supply Work Approval	Works Approval Expiry Date	Purpose	License Holder	Entitlement (Units)	Predicted Take (ML/year)	Comment
Hunter Regulated River Water Source 2016	Hunter Regulated River Water Source	Regulated River (High Security)	WAL 718	20AL200631	Hunter River Pump	20WA200632	30/06/2027	E Industrial	Wambo Coal Pty Ltd	1000	Various pumping	Water take is based on operational need. Pumping is undertaken by Wambo Underground to a Wambo Underground water storage (South MIA Box Cut).
		Regulated River (High Security)	WAL 8599	20AL201457	Hunter River Pump	20CA201459	25/09/2028	I Irrigation K Farming	Wambo Coal Pty Ltd	6		
		Regulated River (General Security)	WAL 8600	20AL201458	Hunter River Pump	20CA201459	25/09/2028		Wambo Coal Pty Ltd	868		
		Supplementary Water	WAL 8604	20AL203044	TBC (extraction via Hunter River Pump)	-	-		Wambo Coal Pty Ltd	240		
		Regulated River (High Security)	WAL 10541	20AL200927	Hunter River Pump	20WA200928	30/06/2027	Industrial	Maher Anthony John & Kelly Grahame Patrick (UWJV)	300	Various pumping	Water take is based on operational need. Pumping is undertaken by UWJV to a UWJV storage (U3).
Hunter Unregulated and Alluvial Water Sources 2009	Lower Wollombi Brook Water Source	Aquifer ²	WAL 23897	20AL211371	Well No. 2	20WA211372	31/07/2032	Industrial	Wambo Coal Pty Ltd	70	-	Refer to the UWJV Groundwater Management Plan .
		Unregulated River	WAL 18437	20AL208641	Wollombi Brook Pump	20WA208642	31/07/2032	E Industrial	Wambo Coal Pty Ltd	366.9	Various pumping	Water take is based on operational need. Pumping is undertaken by Wambo Underground to a Wambo Underground water storage (Eagles Nest).
		Unregulated River	WAL 18445	20AL208713	Bywash Dam	20WA208714	13/03/2023	Industrial	Maher Anthony John & Kelly Grahame Patrick (UWJV)	200		
		Unregulated River	WAL 18549	20AL208705	Other Pump	20WA208706	18/11/2032	Industrial	Maher Anthony John & Kelly Grahame Patrick (UWJV)	100		

Notes to table:

- All water licences (WALs) are in perpetuity, i.e. no expiry date.
- Predicted water take against this licence is also shown in the UWJV Groundwater Management Plan.

3.4.2 Other Approvals / Legislation Requirements

There are numerous statutory requirements under both State and Federal legislation which apply to the operations of the Project. United Wambo will apply to the relevant regulators for all required approvals and licences.

The planning and environmental legislative framework which United Wambo must operate within, is detailed in Section 4 of the EIS (located on the United Wambo website): (<https://www.glencore.com.au/.rest/api/v1/documents/3bde49b0581024055f46289487f747d4/United-Wambo-Project-EIS-Main-Text.pdf>).

3.5 Preparation and Implementation of this Plan

3.5.1 Preparation of SWMP

The SWMP has been prepared for United Wambo was developed in consideration of requirements listed in the EIS Statement of Commitments and SSD 7142 Condition B52(e)(iv).

3.5.1.1 Suitably Qualified Person

United Wambo engaged a suitably qualified and experienced person to prepare the initial SWMP for the site, in accordance with Condition B52 of **SSD 7142**. The Plan was prepared in accordance with relevant statutory requirements (including approvals and EIS commitments) and was approved by the then NSW Department of Planning, Industry and Environment (DPIE, now NSW Department of Planning, Housing and Infrastructure (DPIE)) on 12 December 2019. A copy of the approval is attached in **Appendix B -**.

Further updates to the plan are made by UWJV, using support from qualified consultants where required.

3.5.1.2 Stakeholder Consultation

Condition B52 (b) of **SSD 7142**, requires this SWMP to be prepared in consultation with DPIE Water and EPA; and submitted to the Planning Secretary for approval.

Records of consultation undertaken with DPHI, DPIE Water and EPA during reviews of this WMP version are included in **Appendix B - Stakeholder Consultation**.

3.5.1.3 SWMP Hold Points

There are no hold points relating to water management at United Wambo.

3.5.2 Implementation of SWMP

United Wambo will implement the approved SWMP, in accordance with relevant statutory requirements (including approvals and EIS commitments).

A copy of the currently approved SWMP is publicly available on the United Wambo website. The approval letter from DPE is included in **Appendix D - DPHI approval of SWMP**.

4. Implementation

4.1 Training and Awareness

Effective implementation and maintenance of this plan depends on the competency of the United Wambo Workforce and its Contractors.

Training is provided to relevant personnel in accordance with the site Training Needs Analysis and the **United Wambo EM Strategy**. For further details, refer to the **United Wambo EM Strategy**.

4.2 Response Mechanisms and Strategies

4.2.1 Proactive Mechanisms

Proactive surface water management involves the planning of activities in advance of potentially adverse conditions.

4.2.2 Reactive Mechanisms

Reactive Surface Water management includes the modification or suspension of activities in response to triggers.

4.2.2.1 Trigger Action Response Plans

Trigger Action Response Plans (TARPs) are used to guide UWJV to minimise surface water quality impacts, including effects on private landholders. The aim of the trigger action response plan is to provide mine management with an early warning mechanism that identifies water trends departing from historical values allowing a response to be initiated.

TARPs are implemented following visual inspection of conditions or receipt of monitoring results from the surface water monitoring network. Surface water TARPs (**Appendix E - SWM TARPs**) at United Wambo include:

- Surface Water Quality – Watercourses Trigger Action Response Plan
- Surface Water Quality – On-site water storages Trigger Action Response Plan
- Erosion and Sediment Control – Trigger Action response plan
- Channel Stability – Watercourses Trigger Action Response Plan
- Downstream Water Users – Trigger Action Response Plan
- Flooding - Trigger Action Response Plan
- Riparian Vegetation – Trigger Action Response Plan

4.3 Mitigation and Management Measures

Surface water management measures applicable at United Wambo are shown in **Table 4-1**. These measures do not apply to water management structures constructed under previous consents.

Instances where a water impact and associated management measure are applicable to another environmental or community aspect, the management measures and procedures may be detailed in that applicable management plan. The following management plans cross-over with the SWMP:

- ***UWJV Rehabilitation Management Plan*** and ***UWJV Rehabilitation Strategy***: closure planning requirements. Including data from the monitoring detailed in ***Section 5.1*** can assist to predict final void water quality prior to mine closure;
- ***Social Performance Management Plan*** (SPMP): consultation with stakeholders regarding water impacts

Table 4-1 Surface water management mitigation and management measures

Control Type	Impact Type	Management Measure	Trigger / Evidence / Status
Mine Planning	Water Quality	<p>United Wambo will prevent unnecessary water ingress to reduce energy usage and associated emissions. The surface water management system is designed to maximise separation of clean and dirty water systems.</p> <p>Clean water will be diverted away from mining areas, consistent with the mine water management system design. They will not be used to permanently store water for mining use.</p>	Design and construction reports
	Water Quality	<p>Overburden emplacement areas will:</p> <ul style="list-style-type: none"> Encapsulate and prevent migration of tailings, acid forming and potentially acid forming materials, saline and sodic material. Be designed, installed and maintained to prevent and/or manage long-term saline seepage (out-of-pit emplacements only) 	<p>A geochemical assessment of the overburden and tailings to be emplaced for SSD 7142 operations was undertaken. The results determined that the waste rock leachate within the Project Area at United Wambo will have relatively low salinity and is not likely to generate acidic leachate.</p> <p>Details on the management of rehabilitation areas, including soil characteristics sampling and materials management, is provided in the United Wambo Rehabilitation Management Plan.</p>
	Floristic	<p>Aquatic, riparian and groundwater dependent ecosystems (including GDE1 and GDE2):</p> <ul style="list-style-type: none"> Negligible environmental consequences beyond those predicted in the document/s listed in SSD 7142condition A2(c) Maintain or improve baseline channel stability Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006) 	<p>Water quality analysis and floristic condition monitoring</p> <p>Watercourse Stability Monitoring and Management</p>

Control Type	Impact Type	Management Measure	Trigger / Evidence / Status
Surface Water Infrastructure Planning	Water quality	Design objectives for mine water storage infrastructure include: <ul style="list-style-type: none"> • Install and maintain to avoid unlicensed or uncontrolled discharge of mine water • Maintain the 100-year ARI 24-hour storm event and minimise permeability 	Dam & drain designs / construction reports Visual inspection / completed inspections
	Water quality	Clean water drains will be sized to safely convey the 1% AEP storm event flows and proposed pump flows from upstream clean water dams to each of the respective clean water catch dams or downstream receiving catchment area.	Dam & drain designs / construction reports
	Water quality	Design objectives for clean water diversions include: <ul style="list-style-type: none"> • Design, install and maintain the clean water system to capture and convey the 100 year ARI flood event • Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site • Intercept, convey and/or release, where practicable, to downstream environment 	Visual inspection / Completed inspections Water storages are installed to assist in the separation of water types and their beneficial reuse. Maintenance of infrastructure is completed as required.
	Water quality and habitat value	Design objectives for creek diversions and restoration works include: <ul style="list-style-type: none"> • Hydraulically and geomorphologically stable • Incorporation of erosion control measures based on vegetation and engineered revetments 	There are no creek diversions planned under SSD7142. Refer to Section 4.3.1. Visual inspection / completed inspections Clean water diversion designs Construction reports

Control Type	Impact Type	Management Measure	Trigger / Evidence / Status
		<ul style="list-style-type: none"> Incorporation of pool and riffle sequences with persistent/permanent pools for aquatic habitat that are consistent with the geomorphology of the creek to be diverted Revegetation with suitable native species. 	
	Water quality	Design criteria for clean water dams include: <ul style="list-style-type: none"> Surge capacity for a design storm event of 100-year ARI, 24-hour event in addition to operating capacity; and Spillways designed for conveyance of the 100-year ARI peak flow with 300-millimetre freeboard. Will not be used to permanently store water for use within the Project. 	There are no clean water dams at United Wambo.
	Water quality	Design and maintain tailings storages to encapsulate and prevent the release of tailings seepage/leachate	Dam & drain designs / construction reports
	Water quality	Drainage structures and catch drains are designed and installed to: <ul style="list-style-type: none"> Divert water towards appropriate storage area Be safe, stable and non-polluting (i.e. for drainage lines established in the final landform) capture and convey the 1% AEP flood event 	Dam & drain designs / construction reports Water catch drains are installed at various locations around UWJV to direct water towards the required dams. Maintenance of infrastructure is completed as required. The final landform will utilise a natural landform design process incorporating micro-relief principles. This process will be undertaken as part of the rehabilitation planning process and completed through the United Wambo Rehabilitation Management Plan.
	Flooding	Flood levees are designed, installed and maintained to:	Dam & drain designs / construction reports One flood protection levee is installed between United Pit and the Golden Highway to protect mining areas from Wollombi Brook flooding. This will

Control Type	Impact Type	Management Measure	Trigger / Evidence / Status
		<ul style="list-style-type: none"> protect mining areas from a 1,000-year ARI flood event ensure no adverse effect on roads or privately-owned land designed using the latest available flood data (including Golden Highway road realignment structures) 	ensure no adverse effect on roads or privately-owned land. Refer to Section 4.3.2.
	Hydrocarbon and chemical contamination	Chemicals and hydrocarbons will be stored in bunded areas in accordance with the relevant Australian Standards	Visual inspection / completed inspections Construction reportsplw
Rehabilitation and Disturbance Planning	Rehabilitation Instability	United Wambo will integrate appropriate drainage in the design of rehabilitation areas to effectively manage drainage of the final landform without resulting in adverse impacts.	Drainage designs based on the approved final landform Construction reports
	Water Quality and Quantity	<p>Final voids will minimise to the greatest extent practicable:</p> <ul style="list-style-type: none"> the size and depth of final voids the drainage catchment of final voids any high wall instability risk the risk of flood interaction <p>The designs for the final voids will be refined over the life of the Project and will be incorporated in the United Wambo Rehabilitation Management Plan.</p>	Final landform design
	Flora and Fauna	Water management systems minimise potential indirect impacts to flora, fauna and their habitats from erosion and unnatural flooding events.	Ground Disturbance Permit Visual inspection / completed inspections Design of flood levee (accepted levels of flow impacts)

Control Type	Impact Type	Management Measure	Trigger / Evidence / Status
Water Source Planning	Changes more extensive or significant than predicted	<p>United Wambo will consider the following mitigation measure, in consultation with government:</p> <ul style="list-style-type: none"> • injection of water into the depressurised aquifers; • grouting and cut off measures; • sourcing of additional water from other sources; • obtaining additional water licence allocations; or • treatment of mine water for reuse within the water management system. 	<p>Works approval Designs Construction reports Water take reporting</p>

4.3.1 Creek Diversions

There are currently no creek diversions in place for the United Wambo Open Cut operation.

There is one creek diversion that was approved by a development consent prior to SSD 7142. The creek diversion is managed by Wambo Underground under DA-305-7-2003. The North Wambo Creek Diversion has its headwaters in the Wollemi escarpment and was first approved for construction in 2006, in accordance with the approved North Wambo Creek Diversion Plan. Refer to the **Wambo Surface Water Management Plan** for more details.

4.3.2 Flood Protection Levee

The flood levee for Redbank Creek is situated at the northeast of the operation, between United Pit and the Golden Highway. It was designed to protect mining areas from a 0.1% AEP flood event and to ensure no adverse effect on roads or privately-owned land. The flood levee was designed:

- to suit the 1,000-year ARI flood level in Redbank Creek, which is governed by backwater from flooding in the Wollombi Brook and the Hunter River;
- with a minimum design crest of RL60.9, which is nominally one metre freeboard above the peak 1 000-year ARI flood level (RL59.9); and
- to be incorporated into the design of the proposed Light Vehicle Access Road that is located to the north-east of United Pit.
- The extent of the flood levee is shown on **Figure 4-1**. Construction of the levee was completed in 2020.

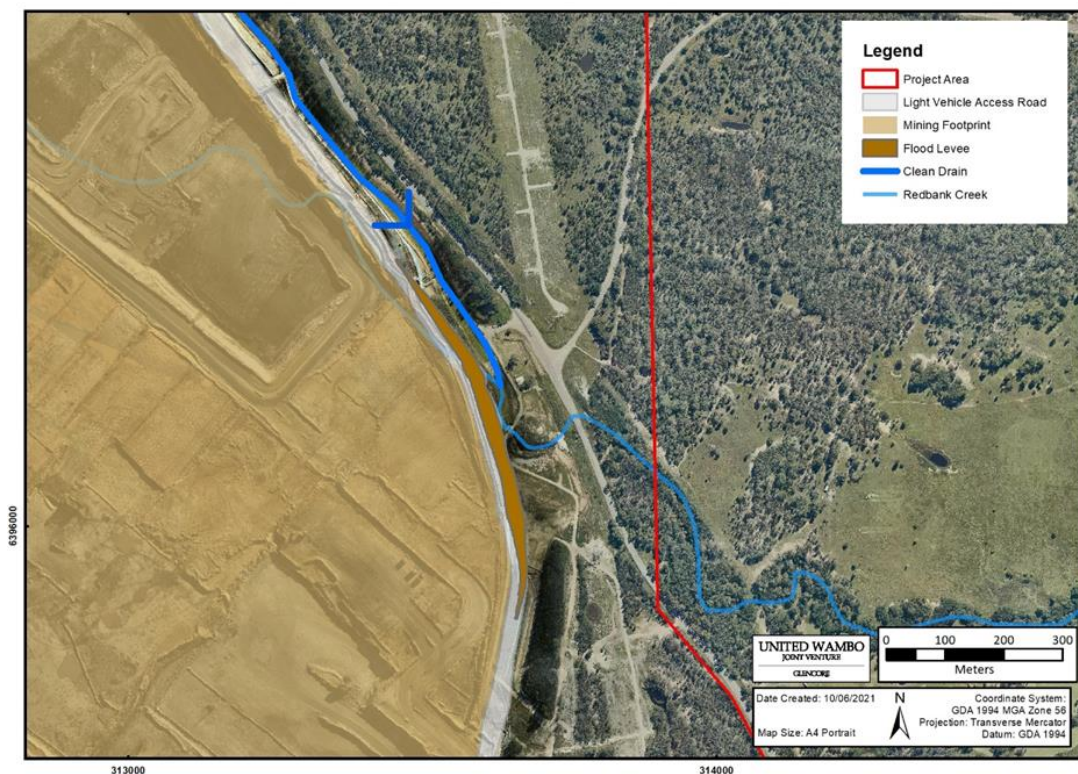


Figure 4-1 Flood Levee

4.3.3 Other available mitigation measures

If monitoring indicates changes in surface waters are more extensive or significant than predicted, United Wambo can consider the following mitigation measures in correspondence with relevant government authorities:

- injection of water into the depressurised aquifers;
- grouting and cut off measures;
- sourcing of additional water from other sources;
- obtaining additional water licence allocations; or
- treatment of mine water for reuse within the water management system.

5. Measurement and Evaluation

5.1 Monitoring

United Wambo has established a surface water monitoring program to monitor surface water quality and condition to:

- detect potential residual impacts identified in **Section 3.2 Surface Water Impacts**.
- assess the performance of the project against performance criteria
- ensure that relevant legislative and policy requirements are met

The surface water monitoring locations have been chosen to be representative of the surrounding areas, shown in **Figure 5-1**. Data collected through these programs will:

- Be used in the continued development and refinement of surface water investigation triggers (see **Table 3-6** and **Table 3-7**); and
- Provide input to annual reviews of surface water monitoring data and the site water balance and salt balance (see **Section 5.5**).

The surface water monitoring program for United Wambo is detailed in this section, including those points with trigger criteria shown in **Section 3.3.1**. The combined monitoring program for the Complex (United Wambo and Wambo Underground) is outlined in the combined **WMProg**. That plan includes all surface water monitoring points, trigger values, responsibility of each monitoring site and monitoring methodologies.

5.1.1 Surface Water Quality

Surface water quality monitoring is undertaken by UWJV at the locations shown in **Figure 5-1** and listed in **Table 5-1**. The table includes frequency of monitoring and analytes tested.

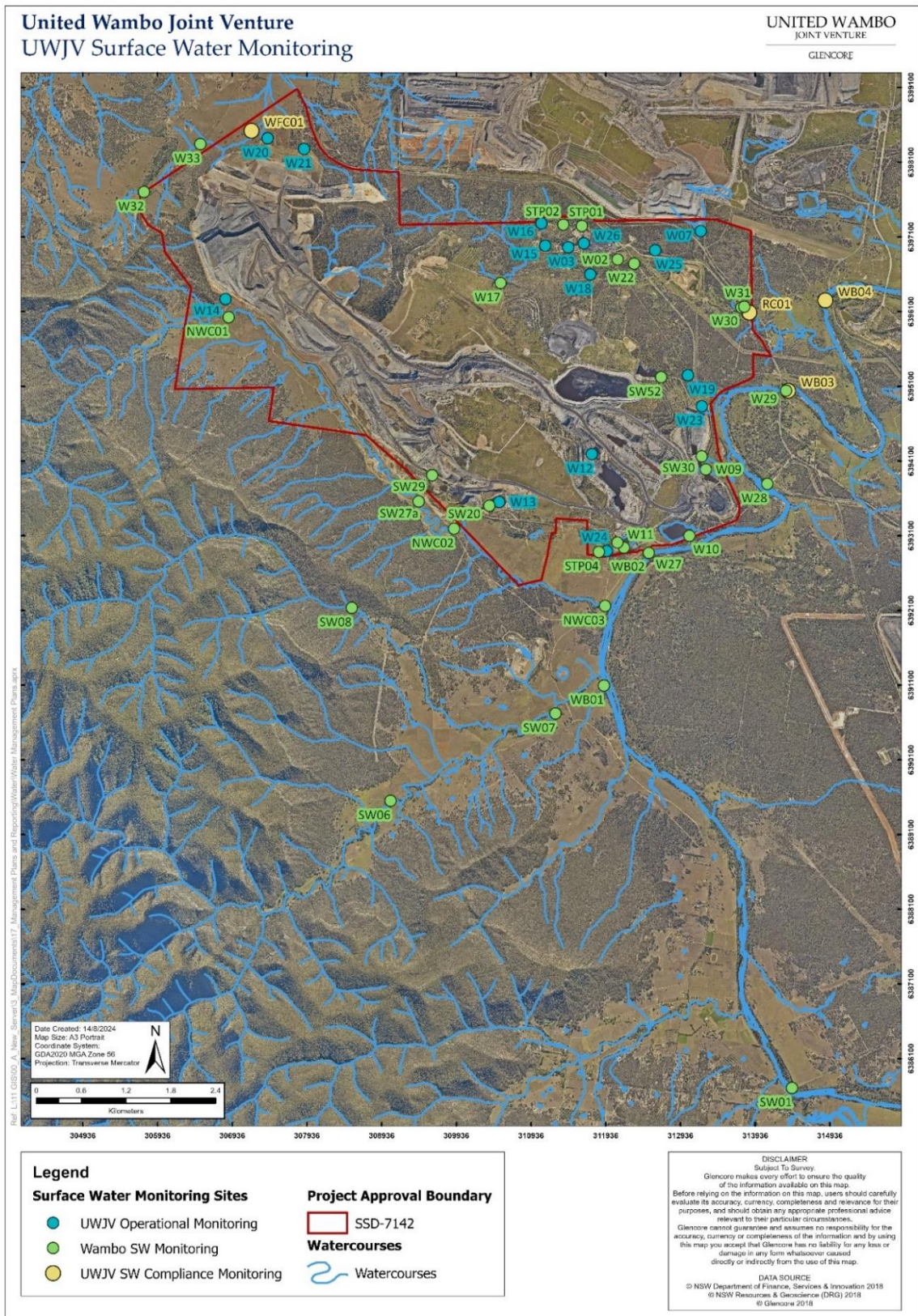


Figure 5-1 Surface water monitoring locations

Table 5-1 Surface Water Monitoring Locations

Site ID	Site Description	Easting ³	Northing ³	Former Wambo Site ID	Former United Site ID	Monitoring Program Frequency	
						Basic Water Quality	Detailed Water Quality
CREEKS							
WB03 ⁴	Wollombi Brook - Warkworth	314376	6395037	SW02	SW04	M	A
WB04 ⁴	Wollombi Brook - Downstream	314874	6396247	-	-	M	A
RC01 ⁴	Redbank Creek - Downstream	313672	6396168	-	SW05	M	A
WFC01 ⁴	Waterfall Creek	307194	6398519	SW39	-	M	A
OPERATIONAL DAMS AND STORAGEES¹							
W03	United UG Boxcut	311432	6396959	-	-	2M	A
W07	Dam 14	313207	6397177	-	Dam 14	2M	A
W12	Homestead Pit	311750	6394190	SW38	-	2M	A
W13	West Cut Dam	310510	6393550	SW12	-	2M	A
W14	Montrose Pit Inflows	306848	6396266	SW54	-	2M	A
W15	Dam 7	311126	6396981	-	Dam 7	2M	A
W16	Dam 15	311075	6397280	-	Dam 15	2M	A
W18	U2	311727	6396595	-	-	2M	A
W19	U3	313035	6395248	-	-	2M	A

Site ID	Site Description	Easting ³	Northing ³	Former Wambo Site ID	Former United Site ID	Monitoring Program Frequency	
						Basic Water Quality	Detailed Water Quality
W20	ME1 Sed Dam	307409	6398418	-	-	2M	A
W21	ME2 Sed Dam	307897	6398274	-	-	2M	A
W23	Plover Sed Dam	313222	6394832	-	-	2M	A
W24	MIA Sediment Dam	311947	6392892	-	-	2M, oil & grease	A
W25	United Pit	312595	6396920	-	-	2M	A
W26	Turkeys Nest Dam	311642	6397011	-	-	2M, oil & grease	A
EFFLUENT							
STP03	South MIA STP	312092	6393009	-	-	Q + Faecal coliforms	-
STP04	South MIA STP Discharge	311843	6392884	-	-	-	-

Notes to table:

- 1 Data from these monitoring locations is used for operational purposes and is reported internally as required. This data is not reported publicly
- M Monthly monitoring frequency
- 2M Every second month monitoring frequency
- A Annual monitoring frequency
- Q Quarterly
- Basic water quality Field pH, EC, TSS, TDS and Flow conditions by observation (i.e. high, medium or low flow; or no flow)
- Detailed water quality Full water quality suite – see **Table 5-2**
- 3 Coordinates are in MGA94 Zone 56
- 4 EPL 3142 monitoring point, monitored in accordance with the **EPA Approved Methods Publication**

Table 5-2 details the surface quality testing suites for the monitoring sites and frequencies specified in **Table 5-1**.

Table 5-2 Groundwater quality testing suites at United Wambo

Description	Type	Parameters	Typical Frequency ¹
Basic water quality	Physico-chemical indicators	pH, EC, TDS Flow conditions by observation (i.e. high, medium or low flow; or no flow).	Monthly
Detailed Water Quality (Full suite)	Physico-chemical indicators	pH, EC, TDS	Annually
	Nutrients	Total phosphorous (P), Nitrite, Nitrate, Total Kjeldahl Nitrogen (TKN), Total nitrogen (Total N); and	
	Ions	Chloride (Cl), Bicarbonate (CaCO ₃), Sulphate (SO ₄).	
	Total metals	Aluminium (Al), Arsenic (As), Cobalt (Co), Copper (Cu), Iron (Fe), Manganese (Mn), Nickel (Ni), Selenium (Se), Zinc (Zn), Mercury (Hg), Lead (Pb), Potassium (K), Silver (Ag), Flouride (Fl), Boron (B), Calcium (Ca), Barium (Ba), Magnesium (Mg), Cadmium (Cd), Sodium (Na)	

Notes to table:

- 1 Frequency dependent on individual site. Refer to **Table 5-1**

United Wambo are responsible for coordinating the monthly review of the monitoring results and associated trends in water quality, for sites shown in **Table 5-1**. Measured values will be compared to background trends in water quality and an investigation of potential cause undertaken when a deviation from background trends is identified and/or when water quality parameters record levels outside the surface water impact assessment criteria presented in **Section 3.3.1**.

5.1.2 Surface Water Flows

Wambo Underground will continue to monitor flow in the North Wambo Creek, Stony Creek and South Wambo Creek using continuous flow monitoring stations, in accordance with the **WMPProg**. Surface water flow monitoring data for Wollombi Brook is sourced from DPE Water operated flow gauging stations, located at Warkworth (FM10) and Bulga (FM11).

Data for surface water flows monitored by Wambo is shared with United Wambo.

5.1.3 Impacts on Water Supply for Other Water Users

As discussed in **Section 3.1.3**, there are no known licensed non-mining water users on waterways directly downstream of United Wambo along Wollombi Brook, its tributaries (Wambo Creek, North Wambo Creek and Redbank Creek) or Waterfall Creek. As such, no monitoring program of impacts on water supply for other water users is required.

Should non-mining waters users commence taking water on waterways directly downstream of the site, United Wambo will develop a program to monitor any mining related impacts.

5.1.4 Erosion and Sediment Control

As well as collecting background water quality data and identifying potential mining impacts, surface water quality monitoring sites are strategically located to enable the effectiveness of erosion and sediment control measures. The implementation, maintenance and monitoring of erosion and sediment control structures is undertaken in accordance with the requirements of the **United Wambo Erosion and Sediment Control Plan**.

5.1.5 Monitoring of Licensed Discharges under the HRSTS

There is no Licenced Discharge Point nominated in EPL 3141 managed by United Wambo. If this is to be installed in future, monitoring will be consistent with the program specified in the EPL.

5.1.6 Watercourse Stability Monitoring and Management

United Wambo conduct photo monitoring program for Wollombi Brook, Redbank Creek and Waterfall Creek. The program involves taking photos at each location upstream and downstream and identifying any changes in:

- stream and riparian vegetation cover;
- bed condition;
- active erosion points; and
- potential areas of instability determined by the creek line inspections.

Photo monitoring locations are included in **Table 5-3** below.

Table 5-3 Photo Monitoring Locations

Site ID	Site Description	Easting	Northing
W27	Wollombi Brook - Upstream	312512	6392870
W28	Wollombi Brook – Downstream 1	314099	6393793
W29	Wollombi Brook – Downstream 2	314349	6395042
W30	Redbank Creek - Upstream	313752	6396155
W31	Redbank Creek - Downstream	313790	6396166
W32	Waterfall Creek - Upstream	306510	6398342
W33	Waterfall Creek - Downstream	305756	6397701

This monitoring is undertaken annually. If upon a desktop review, there are noticeable changes, further field investigations will take place. These investigations will include (but not be limited to) a review of:

- current meteorological conditions;

- meteorological conditions for the last 12 months;
- any identified structure changes (i.e. fallen trees, erosion, evidence of a high flow event); and
- any unauthorised anthropogenic activities.

If the cause of the changes cannot be determined, a suitability qualified individual will be engaged to assist in the investigation.

All changes will be noted and compared to the TARP in **Appendix E**. If United Wambo are identified as the sources of the impacts, the Unforeseen Impacts Protocol will be implemented as per **Section 3.3.3 Criteria Exceedance and Unforeseen Impacts Protocols**.

As per the **Wambo Water Management Plan**, Wambo monitors the channel stability of Wambo Creek and North Wambo Creek in accordance with the Riparian Vegetation and Bed Bank Stability Monitoring Program. Results are shared with United Wambo as required.

5.1.7 Seepage and Leachate Monitoring

Water quality testing detailed in **Table 5-2** assist United Wambo to determine if leachate is captured in water storages. Seepage is also monitored during inspections detailed in **Table 5-4**.

5.2 Compliance Management

Compliance is an ongoing process and is conducted in accordance with the **United Wambo EM Strategy** – which provides the process for planning and a compliance program. The main assurance process conducted by United Wambo include:

- workplace interactions and planned task observations
- inspections
- audits
 - validation of monitoring data
 - internal audits
 - external audits

For further details, refer to the **United Wambo EM Strategy**.

5.2.1 Inspections

Specific inspections related to the verification of surface water management compliance are shown in **Table 5-4** below.

Table 5-4 Surface water inspections to assist with compliance management

Inspection Type	Frequency	Intent of Inspection
All site ESC controls	Monthly	Assess effectiveness of nominated infrastructure to ensure function as per the design, e.g. Dams – capacity, silt levels, overtopping, structural integrity, slips, slumps, spillway obstructions

Inspection Type	Frequency	Intent of Inspection
		<p>Drains – capacity, scour, sedimentation, vegetation and/or riprap protection</p> <p>Levees – structural integrity, scour, vegetation protection</p> <p>Assess integrity and performance of temporary erosion and sediment controls specified in active Ground Disturbance Permits (as required), including revegetation progress</p> <p>Identify the presence of hydrocarbons in ESC areas</p> <p>Verify no sediment laden dirty water has left site through failed controls.</p> <p>Identify required maintenance of nominated ESC e.g. dam de-silting, silt build-up removal, replacement of worn temporary controls</p>
All site ESC controls	Greater than 25 mm rainfall received in 24-hours	Ensure effectiveness of ESC controls (as above) after high intensity storm events and/or large volumes of runoff generated.
Surface water storages	Monthly	<p>Assess effectiveness of nominated infrastructure to ensure function as per the design.</p> <p>Monitor mine water storages for seepage/leachate.</p>
Flood preparation	Weather warning for potential flooding	<p>Allow adequate preparation for flooding conditions</p> <p>Inspection of floodways and structures to prepare for severe weather</p> <p>Assess integrity and performance of flood management structures</p>

5.3 Complaint Management

All complaints received by United Wambo are managed in accordance with the **United Wambo EM Strategy**, which details the process to ensure complaints are properly documented and handled in accordance with statutory requirements and company policy. A summary of complaint and grievance management includes:

- acknowledging all complaints by contacting the complainant to discuss the details of the complaint within 24 hours of receipt, where requested/practicable;
- investigating complaints impartially giving proper consideration to the facts and the circumstances prevailing at the time;
- implementing corrective actions if required;
- reporting investigation outcomes and corrective actions taken to the complainant; and
- all complaints are recorded in the compliance management system.
- Community members can raise a complaint/grievance 24 hours/7 days a week by calling the community response line on 1800 801 440.

For further details, refer to the **United Wambo EM Strategy**.

5.4 Incident and Non-Compliance Management

All incidents recorded at United Wambo are managed in accordance with the **United Wambo EM Strategy**, which details the process to ensure incidents are properly documented, investigated and reported in accordance with statutory requirements and company policy. Incident and non-compliance management includes:

- all personnel (United Wambo employees and contractors) are required to report environmental incidents/non-compliances to their immediate supervisor/site contact;
- the Supervisor or site contact contacts a member of the United Wambo Environment and Community Department (E&C Department), immediately after becoming aware of the incident/non-compliance;
- the E&C Department determines the appropriate corrective or preventative action required to remediate or prevent a reoccurrence of the incident/non-compliance; and
- the details and final investigation results from all environmental incidents/non-compliance are recorded in the site compliance system

For further details, refer to the **United Wambo EM Strategy**.

Refer to **WMP** for water related reportable incidents.

5.5 Reporting / Access to Information

Reporting of surface water monitoring results and performance will be undertaken in accordance with the schedule outlined in the **EM Strategy** and the **UWJV WMP**.

5.6 Record Keeping

All environmental monitoring data is maintained in accordance with the **EM Strategy** and maintained on the premise for a period of four years.

6. Review and Improvement

6.1 Continuous Improvement

Where possible, United Wambo will implement all reasonable and feasible best practice surface water impacts mitigation measures. The basis for continuous improvement of surface water impacts mitigation measures will be through the ongoing monitoring of surface water impacts and the corrective/preventative action process outlined in **Section 5.4.1.3** of the **United Wambo EM Strategy**.

The main avenues for continuous improvement are through site evaluation processes, which includes:

- Monitoring (**Section 5.1**)
- Compliance Management (**Section 5.2**)
- Complaint Management (**Section 5.3**)

Incident and Non-compliance Management (**Section 5.4**)

6.2 Plan Review

This SWMP and associated documents will be reviewed in accordance with **SSD 7142** and the United Wambo **EM Strategy**. Where changes to the SWMP (including management measures or monitoring programs) are required, the DPE will approve the proposed changes prior to implementation.

6.3 Change Management

All changes to operations, facilities, plant equipment and production processes are required to be assessed in accordance with the change management process.

Change management will be undertaken at United Wambo in accordance with the **United Wambo EM Strategy**, which provides the process for managing the risks associated with change. For further details, refer to the **United Wambo EM Strategy**.

7. Accountabilities

Refer **United Wambo Water Management Plan**.

8. Acronyms and Definitions

The below table summarises the acronyms and definitions relating to this SWMP.

Table 8-1: SWMP Acronyms and Definitions

Term	Description
DPHI	NSW Department of Planning, Housing and Industry
EPA	NSW Environment Protection Authority
EPL 3141	Environment Protection Licence 3141
SSD7172	Development Consent SSD7142
EIS	Environmental Impact Statement
WMP	Water Management Plan
SWMP	Surface Water Management Plan
GWMP	Groundwater Water Management Plan

Term	Description
ESCP	Erosion and Sediment Control Plan

9. Document Information

Relevant legislation, standards and other reference information must be regularly reviewed and monitored for updates and should be included in the site management system. Related documents and reference information in this section provides the linkage and source to develop and maintain site compliance information.

9.1 Relevant Guidelines and Legislation

The following legislation and guidelines are relevant to this Plan:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000);
- Approved Methods for Sampling and Analysis of Water Pollutants in New South Wales (DEC, 2004);
- Guidelines for Controlled Activities on Waterfront Land (DPE 2022);
- Australian Standard/New Zealand Standard (AS/NZS) 5667:1998 Parts 1, 4 and 6;
- Environmental Planning and Assessment Act 1979;
- Fisheries Management Act 1994;
- Local Government Act 1993;
- Protection of the Environment Operations Act 1997;
- Water Act 1912;
- Water Management Act 2000;
- Water Management (General) Regulation 2018;
- Water Sharing Plan for the Hunter Regulated River Water Source 2016; and
- Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009.

9.2 Related Documents

Related documents, listed in **Table 9-1** below, are *documents* directly related to or referenced from within this document.

Table 9-1 – Related documents

Number	Title
GCAA-625378177-10320	GCAA 11.03 Water Management Protocol
GCAA-625378177-10596	GCAA 11.03 Water Accounting Framework Procedure
GCAA-625378177-10248	GCAA 11.02 Pipeline Management Protocol
UWOC-1689771511-360	United Wambo Environmental Management Strategy

Number	Title
UWOC-1689771511-374	United Wambo Pollution Incident Response Management Plan
UWOC-1689771511-365	United Wambo Water Management Plan
UWOC-1689771511-370	United Wambo Groundwater Management Plan
UWOC-1689771511-369	United Wambo Erosion and Sediment Control Plan
-	United Wambo Open Cut and Wambo Water Monitoring Program

9.3 Reference Information

Reference information, listed in **Table 9-2** below, is *information* that is directly referred to for the development of this document.

Table 9-2 - Reference Information

Reference	Title
Umwelt 2016a	<i>United Wambo Open Cut Coal Mine Project – Surface Water Assessment (Umwelt, 2016a)</i>
AGE 2016	<i>United Wambo Open Cut Coal Mine Project – Groundwater Impact Assessment (AGE, 2016)</i>
Umwelt 2016b	<i>United Wambo Open Cut Coal Mine Project – Environmental Impact Statement (EIS) (Umwelt 2016b)</i>
Umwelt 2017a	<i>United Wambo Open Cut Coal Mine Project – Response to Submissions (RTS) (Umwelt, 2017a)</i>
Umwelt 2017b	<i>United Wambo Open Cut Coal Mine Project – Response to Request for Further Information (RtRfI) (Umwelt, 2017b).</i>
Arkhil Engineers 2018	<i>United Wambo Open Cut Surface Water Management – Operating Strategy (Arkhil Engineers, 2018).</i>

9.4 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in below.

Table 9-3 Change Information

Version	Date	Change Details
1.0	September 2019	New document developed by Engeny and United

Version	Date	Change Details
1.1	December 2019	Updated to address comments received from Department of Planning, Industry and Environment. Reviewed by Engeny Approved 16/12/2019
2.0	May 2020	Glencore format change, updated template. Minor changes to document including sentence structure and definitions, references in Appendix A. Approved 13/7/2020
3.0	August 2020	Updated for Phase 2 operations. Reviewed by Umwelt. Approved 20/11/2020
4.0	June 2021	Updated following submission of Independent Environmental Audit Report and Annual Review. Changes made to SW monitoring program.
5.0	April 2022	Reviewed and updated in accordance with Condition E7 – Modification 1
6.0	September 2022	Minor formatting and revision of version number
7.0	August 2025	Transferred content into new template – formatting and revision of content.

Appendix A - Requirements Relating to the SWMP

A.1 Approval Obligations

Table A-1 SSD7142 Conditions and where they are addressed in the SWMP

Condition	Condition Details
SSD 7142 Condition B46	The Applicant must ensure that all surface discharges from the site comply with: <ol style="list-style-type: none"> a) discharge limits (both volume and quality) set for the development in any EPL; or b) relevant provisions of the POEO Act or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.
SSD 7142 Condition B49	The Applicant must ensure that the development complies with the performance measures in Table 4.
SSD 7142 Condition B50	The performance measures in Table 4 do not apply to water management structures constructed under previous consents
SSD 7142 Condition B52	The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: <ol style="list-style-type: none"> a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary; b) be prepared in consultation with DPIE Water and the EPA; c) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 4); d) utilise existing data from nearby mines and build on existing monitoring programs, where practicable; e) include a: <ol style="list-style-type: none"> i. Site Water Balance that includes details of: <ul style="list-style-type: none"> • predicted annual inflows and outflows on the site; • sources and security of water supply for the life of the development (including authorised entitlements and licences); • water storage capacity; • water use and management on the site, including any water transfers or sharing with neighbouring mines; • licensed discharge points and limits; and • reporting procedures, including the annual preparation of an updated site water balance; ii. Salt Balance that includes details of: <ul style="list-style-type: none"> • sources of saline material on the site; • saline material and saline water management on the site; • measures to minimise discharge of saline water from the site; and • reporting procedures, including the annual preparation of an updated salt balance;

Table A-2 EPL3141 Conditions and where they are addressed in the SWMP

Schedule	Condition
Schedule 2 Condition P1	P1 Location of Monitoring/discharge points and areas P1.3 The following points referred to in the table are identified in this licence for

Schedule	Condition
	the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.
Schedule 3 Condition L1	L1 Pollution of Waters L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.
Schedule 5 Condition M2.1	M2 Requirement to monitor concentration of pollutants discharged M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns
Schedule 5 Condition M2.2	M2.2 Water and/ or Land Monitoring Requirements
Schedule 5 Condition M3	M3 Testing Methods – Concentration Limits M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

A.2 Commitments from the EA relating to the SWMP

Table A-3 Commitments from the Environmental Assessment relating to Surface Water Management

Commitment Reference	Commitment Details
SOC_8.0_Management Measures_040	<p>United will prepare and implement a Water Management Plan (WMP) for the Project in consultation with DPI Water and DPE. Subject to the requirements of the conditions of consent, the WMP will include:</p> <ul style="list-style-type: none"> • a water balance including details of water supply, use, management and transfers • an Erosion and Sediment Control Plan that is consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries, or its latest version • a Surface Water Management Plan, including <ul style="list-style-type: none"> ○ relevant baseline data on channel stability and water quality ○ a description of the water management system on site including design objectives and performance criteria ○ trigger levels for investigating any potentially adverse impacts ○ a surface water monitoring program • a Groundwater Management Plan, including <ul style="list-style-type: none"> ○ relevant baseline data on groundwater levels, yield and quality ○ groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts ○ a groundwater monitoring program.

Commitment Reference	Commitment Details
SOC_8.0_Management Measures_041	The WMP will include a revised surface water and groundwater monitoring program, building on the existing monitoring program in place at United and Wambo.
SOC_8.0_Management Measures_042	United will construct a flood levee to protect the United Open Cut from flood inundation along Redbank Creek from Wollombi Brook.
SOC_8.0_Management Measures_071	Surface drainage systems will be designed to prevent spills or runoff from hazardous materials storage areas entering surrounding land/waterways.
SOC_6.08_Water_001	<p>Section 6.8.1.4 SWA 4.1.1.1 Page 36</p> <p>To protect the United Open Cut from flooding it is proposed to construct a flood levee (refer to Figure 3.23). The flood levee will be designed to provide flood protection to the United Open Cut for flood events up to and including the 0.1per cent AEP flood event (i.e. the 1000year Average Recurrence Interval (ARI) flood event).</p>
SOC_6.08_Water_002	<p>Section 6.8.1.6 SWA 4.1.3 Page 38</p> <p>Mine water storages to have sufficient freeboard to contain runoff for events up to and including the 1 per cent 24 hour AEP (annual exceedance probability) storm event.</p>
SOC_6.08_Water_004	<p>Section 6.8.1.7 SWA 9.1 Page 87</p> <p>A Project Water Management Plan (WMP) will be prepared to guide the overall management of water as part of the Project. This plan will also consider the integration of the water management of the Project with the Wambo Mine. The Project WMP and associated sub plans will be developed in consultation with DPI Water and DPE. Subject to the requirements of the conditions of consent, the WMP will include:</p> <ul style="list-style-type: none"> • a water balance including details of water supply, use, management and transfers; • an Erosion and Sediment Control Plan that is consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries, or its latest version; • a Surface Water Management Plan, including: <ul style="list-style-type: none"> ○ relevant baseline data on channel stability and water quality ○ a description of the water management system on site including design objectives and performance criteria ○ trigger levels for investigating any potentially adverse impacts ○ a surface water monitoring program. • Groundwater Management Plan.
SOC_6.08_Water_006	<p>Section 6.8.1.7 SWA 9.1 Page 88</p> <p>The existing monitoring programs at the operations will be updated as part of the implementation of the Project, including development of specific triggers around pH and associated monitoring of metals/metalloids. These programs will be documented in the Project Surface Water and Groundwater Monitoring Program.</p>

Commitment Reference	Commitment Details
SOC_6.08_Water_007	<p>Section 6.8.1.7 The key management measures for the Project in regard to surface water are the Project WMS which includes the flood levee to protect the United Open Cut from flood inundation along Redbank Creek from Wollombi Brook.</p>
SOC_6.08_Water_016	<p>SWA 4.1.1 Page 36 Clean drains will be sized to safely convey the 1 per cent AEP storm event flows and proposed pump flows from upstream clean water dams to each of the respective clean water catch dams or downstream receiving catchment area.</p>
SOC_6.08_Water_020	<p>SWA 9.2.2 Page 88 As part of the water balance monitoring, water imported to site, water used on site and water discharged from site will be monitored in accordance with Water Reporting Requirements for Mines (NOW undated).</p>
SOC_6.08_Water_021	<p>SWA 9.2.4 Page 89 It is proposed to:</p> <ul style="list-style-type: none"> • Monitor and document the existing water quality upstream and downstream of the Project Area using the water quality parameters, frequency of sampling and water quality triggers as for the existing approved operations (refer to Section 2.3). • Monitor and document water quality within the WMS as required for pH, electrical conductivity, total suspended solids, total dissolved solids, oil and grease and for a suite of metals, metalloids and ions within, downstream and, where possible, upstream of the Project Area. • Monitor water quality during HRSTS discharge events as set out in the EPL.
SOC_6.08_Water_021	<p>Include in the surface water management plan a trigger for monitoring metals/metalloids based on recorded pH.</p>
SOC_6.08_Water_021	<p>Reporting of monitoring results in the Annual Review, and as required by the EPL (refer to Section 9.5).</p>
SOC_6.08_Water_022	<p>SWA 9.2.6 Page 89 The Water Management Plan will include plans to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the development. This will include, for the operational phase of the Project, the hazards to be managed, incident management processes, notification procedures, and other key information to address incidents.</p>
SOC_6.08_Water_023	<p>SWA 9.2.6.3 Page 90 In the event of an unforeseen spillage associated with incidents such as accidental damage, operational failures or extreme catastrophic occurrences, the hazard notification protocols in the Project's Water Management Plan (refer to Section 9.1) will be followed. Should the incident involve the potential for material harm, the Pollution Incident Response Management Plan to be prepared for the Project will be followed.</p>
SOC_6.08_Water_026	<p>GIA 10.1 Page 113 Yearly reporting of the water level results from the monitoring network will be included in the annual review. The annual review will also identify if any</p>

Commitment Reference	Commitment Details
	additional monitoring sites are required, or if optimisation of the existing monitoring sites should be undertaken.
SOC_6.08_Water_029	<p>GIA 10.2 Page 113 Similar to the water level monitoring yearly reporting of the water quality results from the monitoring network should be included in the annual review. The annual review should consider if any additional monitoring sites are required, or if optimisation of the existing monitoring sites, frequency of sampling and analytical suite should be undertaken. The Water Management Plan should also consider the optimal sites for monitoring of groundwater quality during the life of the Project.</p>
SOC_6.08_Water_034	<p>GIA 10.4 Page 115 It is recommended that monitoring of mine water seepage be undertaken, particularly to identify seepage rates and quality. Samples should be collected of pumped seepage with the objective of providing an early indication of any mixing of shallow alluvial groundwaters with the Permian strata. Water quality analysis should be similar as for the groundwater monitoring bores. The seepage monitoring program should include:</p> <ul style="list-style-type: none"> • measurement of water pumped from the mining areas using flow meters or other suitable gauging apparatus; • monitoring quality of water pumped from the mining areas (full water quality suite); • correlation of rainfall records (and catchments) with mining area seepage records so groundwater and surface water can be separated; and • monitoring of coal moisture content.
SOC_RFAI_007	<p>Section 3 Page 54 The Water Management Plan prepared for the Project will include a Trigger Action Response Plan (TARP) for both surface water and groundwater. The TARPs will identify when rehabilitation measures may be required.</p>
SOC_RTS_A_039	<p>Section 3.1 United will develop a WMP and groundwater monitoring program for the Project in consultation with DPI Water. The WMP and groundwater monitoring program will outline mine closure planning requirements. This will include ongoing monitoring requirements to develop a robust dataset for predicting final void water quality prior to mine closure.</p>
SOC_RTS_A_044	<p>Section 3.1 Management of groundwater beneath and adjacent to the Project will involve the establishment of a robust surface and groundwater level and quality monitoring program, for relevant groundwater and surface water sources. Monitoring will include routine quarterly monitoring of groundwater levels and quality within all potentially affected bores on land not owned by Wambo or United, where access is provided by the relevant landholder. Results will be reviewed by a suitably qualified person on a quarterly basis for early detection of potential impacts. The results will also be documented within annual reporting for key stakeholders.</p>
SOC_RTS_A_045	<p>Section 3.1 Should monitoring indicate the changes in groundwater levels and quality, and surface waters are more extensive or significant than predicted, mitigation</p>

Commitment Reference	Commitment Details
	<p>measures will be considered. Mitigation measures that will be considered following discussion with relevant government authorities include:</p> <ul style="list-style-type: none"> • injection of water into the depressurised aquifers • grouting and cut off measures • sourcing of additional water from other sources • obtaining additional water licence allocations • treatment of mine water for reuse within the water management system.
<p>SOC_RTS_A_047</p>	<p>Section 3.1 Glencore has committed, as part of implementation of the Project, to develop a Project Water Management Plan (WMP) and associated sub-plans. These plans will include Trigger Action Response Plans (TARPs) for impacts on surface water and groundwater resources affecting private landholders, however, as noted above, adverse impacts on downstream water users are not predicted.</p>
<p>SOC_RTS_A_068</p>	<p>Section 3.5 As outlined in Section 6.8 of the EIS, a Project Water Management Plan (WMP) will be prepared to guide the overall management of water as part of the Project. This plan will also consider the integration of the water management of the Project with Wambo. The Project WMP and associated sub plans will be developed in consultation with DPI Water and DPE. Subject to the requirements of the conditions of consent, the WMP will include:</p> <ul style="list-style-type: none"> • a water balance including details of water supply, use, management and transfers • an Erosion and Sediment Control Plan that is consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries, or its latest version • a Surface Water Management Plan, including: <ul style="list-style-type: none"> ○ relevant baseline data on channel stability and water quality ○ a description of the water management system on site including design objectives and performance criteria ○ trigger levels for investigating any potentially adverse impacts ○ a surface water monitoring program.
<p>SOC_RTS_A_070</p>	<p>Section 3.5 The WMP will include a trigger action response plan. The aim of the trigger action response plan is to provide mine management with an early warning mechanism that identifies water trends departing from historical values allowing a response to be initiated.</p>
<p>SOC_RTS_A_071</p>	<p>Section 3.5 It is proposed to use this model, along with a site inspection undertaken by qualified water/soil engineers/scientists to meet the requirements of the Surface Water Management Plan as committed to in the Surface Water Assessment (refer to dot points above).</p>

Commitment Reference	Commitment Details
SOC_RTS_A_071	The surface water monitoring program will include measures to monitor potential changes to scour/erosion and sediment deposition within the creek channels as requested by DPE in its submission.
SOC_RTS_A_072	Section 3.5 The proposed clean water management dams are designed to assist in managing clean water runoff around the Project and will not be used to permanently store water for use within the Project.
SOC_RTS_B_001	Section 3.5 Page 195 Additional monitoring of metals/metalloids within both the WMS and the downstream receiving environment, as well as setting triggers for pH will be undertaken on an ongoing basis. This includes water quality monitoring for EC, pH and key AMD indicators. These include sulphate and key metals (Al, As, Co, Cu, Fe, Mn, Ni, Se and Zn), which are already captured within the proposed monitoring program for the Project.
SOC_RTS_B_002	Section 3.5 Page 195 Ongoing monitoring of the leachate generated from the waste emplacements will be undertaken and will include: <ul style="list-style-type: none"> • pH • salinity (EC) • TSS • Sulphate • acidity/alkalinity. Follow up elemental testing will be undertaken if any low pH conditions are detected to ensure that key water quality parameters remain within appropriate criteria.
SOC_RTS_B_004	Section 2 Page 77 It is considered that the new data that has come to light since the commencement of the Flood Assessment (i.e. new rating curve by DPI Water for Warkworth gauge and rating curve analysis/estimates undertaken for the BMT Draft Flood study) should be considered as part of the flood model updates for future design works for the proposed flood levee and highway alignments. This approach is generally consistent with the recommended conditions from OEH.
SOC_RTS_B_006	Section 2 Page 126 The WMP will include a prescriptive TARP for impacts on alluvial aquifers and private users, as well as rehabilitation measures for watercourses impacted as a result of the Project.
SOC_6.05_GHG_012	Section 6.5.5 - Table 6.10 GHGEA 5.3.2 Table 5.2 Page 27 Preventing unnecessary water ingress to reduce energy usage and associated emissions - The surface water management system is designed to maximise separation of clean and dirty water systems. Clean water will be diverted away from mining areas, consistent with the mine water management system design outlined in Section 6.8.
SOC_6.19_Waste_001	Section 6.19.2 Prior to disposal, a risk assessment will be undertaken and dams with an

Commitment Reference	Commitment Details
	increased risk of containing hydrocarbons or other potential environmental pollutants will be tested for these contaminants. Sediment that is not contaminated will be co-disposed with overburden in overburden emplacement areas. Any identified contaminated sediment material will either be treated on site and disposed of with overburden, or will be disposed off-site at an appropriately licensed facility.

Appendix B - Original Approval



**Planning,
Industry &
Environment**

**Planning and Assessments
Energy and Resource Assessments**
Contact: Melanie Hollis
Phone: (02) 8271 2043
Email: melanie.hollis@planning.nsw.gov.au

Ms Aislinn Farnon
Approvals Manager
United Wambo Coal JV Project

By email: Aislinn.Farnon@glencore.com.au

Dear Ms Farnon,

**United Wambo Open Cut Coal Mine (SSD 7142)
Environmental Management Plans**

I refer to your recent correspondence submitting the revised Noise Management Plan (NMP) for Phase 1A, in accordance with condition B5, and the revised Water Management Plan (WMP) for Phase 1A, in accordance with condition B52 of the United Wambo Open Cut Coal Mine development consent (SSD 7412).

The Department has reviewed the revised plans and considers that they adequately address the requirements of SSD 7412 in relation to Phase 1A operations. Consequently, the Department has approved these plans for the duration of Phase 1A.

The Department notes DPIE Water's comments (dated 9 December 2019) in relation to North Wambo Creek and considers that these comments should be addressed in future revisions of the WMP (insofar as these comments relate to the operational phases of the project).

The Department also notes that the revised NMP required prior to commencing Phase 1B of the operations will need to reflect the Noise Compliance Assessment Methodology (detailed in Appendix 1 of United Wambo's Response to the Request for Further Information dated September 2017) and be approved by the Secretary.

Should you have any enquiries in relation to this matter, please contact Melanie Hollis on the details listed above.

Yours sincerely,

16/12/2019

Matthew Spratt
Director
Resource Assessments
as nominee of the Secretary

Appendix C - Stakeholder Consultation

To be added upon approval of SWMP v7.

Appendix D - DPHI approval of SWMP

To be added upon approval of SWMP v7.

Appendix E - Surface Water Management TARPs

The aim of the trigger action response plan is to provide mine management with an early warning mechanism that identifies water trends departing from historical values allowing a response to be initiated.

Aspect	Normal State	Trigger 1	Trigger 2	Actions
<p>Surface water quality – Watercourses</p>	<p>Surface water quality within trigger values for all parameters.</p>	<p>Trigger: Surface water quality concentrations outside of the adopted trigger values (refer <i>Section 3.3.3</i>) at least one parameter for two or more consecutive monitoring rounds.</p> <p>Response: Implement Criteria Exceedance Protocol (<i>Section 3.3.3</i>). Repeat sampling. Investigate the source for the change in surface water quality and whether it was caused by mining-related activities.</p>	<p>Trigger: Surface water quality concentrations trending outside of the adopted trigger value (refer <i>Section 3.3</i>) for at least one parameter for three or more monitoring rounds.</p> <p>Response: Implement Criteria Exceedance Protocol (<i>Section 3.3.3</i>). Increase investigations to determine if the source for the change in surface water quality is mining-related. Undertake additional monitoring until water quality improves or source/cause is identified.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify E&C Coordinator/Manager. If exceedance mining related, notify external agencies in accordance with PIRMP requirements.</p>

Aspect	Normal State	Trigger 1	Trigger 2	Actions
<p>Surface water quality – On-site water storages</p>	<p>Surface water quality within historical range for all parameters.</p>	<p>Trigger: One or more monitoring results for pH outside of historical range.</p> <p>Response: Repeat sampling. Monitor for expanded suite of water quality parameters (metals and metalloids).</p>	<p>Trigger: Two or more monitoring results outside of the historical range.</p> <p>Response: Repeat sampling. Monitor for expanded suite of water quality parameters (metals and metalloids). Investigate the source for the change in surface water quality and whether it was caused by mining-related activities.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify E&C Manager.</p>
<p>Erosion and sediment control</p>	<p>No transfer of sediment from the site to downstream watercourses. All controls are appropriately in place and well maintained. Site inspections do not identify any unstable disturbance areas or migration of sediment away from disturbance areas.</p>	<p>Trigger: Controls are in place, however are not maintained. One or more areas have indicated surface erosion in the form of riling, bank erosion or other movement of sediment from an area of disturbance.</p> <p>Response: Seek to stabilise the area to stop the erosion process. Investigate works undertaken prior to the disturbance activities. Review adequacy of controls and inspection/maintenance schedule.</p>	<p>Trigger: Stage 1 trigger or other incident leading to sedimentation of a watercourse or off-site discharge (excluding discharges from sediment basins during rainfall events exceeding basin design capacity).</p> <p>Response: Isolate the problem area through diverting contributing surface flows to another appropriate storage, while the cause for the water quality exceedances are determined. Review adequacy of controls and inspection/maintenance schedule.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify external agencies in accordance with consent requirements.</p>

Aspect	Normal State	Trigger 1	Trigger 2	Actions
Channel stability	Watercourse monitoring indicates no areas of decreased stability from visual inspections compared to the previous inspection.	<p>Trigger: Channel stability monitoring indicates one or more areas of decreased stability in watercourses relative to the previous inspection.</p> <p>Response: Implement Criteria Exceedance Protocol (<i>Section 3.3.3</i>). Where possible, stabilise the instabilities, which may require advice from a geomorphic specialist. Investigate cause for instabilities and whether recent construction works or mining-related activities have created the instability.</p>	<p>Trigger: Channel stability monitoring indicates one or more areas of decreased stability in watercourses, causing sediment loads to migrate and/or impact to riparian vegetation, relative to the previous inspection</p> <p>Response: Implement Criteria Exceedance Protocol (<i>Section 3.3.3</i>). Where possible, stabilise the instabilities, which may require advice from a geomorphic specialist. Investigate cause for instabilities and whether recent construction works or mining-related activities have created the instability.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify external agencies in accordance with PIRMP requirements.</p>

Aspect	Normal State	Trigger 1	Trigger 2	Actions
Downstream water users	No complaints from downstream water users regarding loss of surface water or degradation of water quality.	<p>Trigger: Complaint from downstream water user regarding loss of water availability (quality and/or quantity).</p> <p>Response: Implement Complaints Management Protocol (<i>Section 5.3</i>). Review of relevant historical monitoring results (water quality and/or flow). Identification of any potential contributing factors. Investigate whether the change in water availability is due to mining-related activity. Provide feedback to complainant.</p>	<p>Trigger: Investigation into Trigger 1 identifies that change in downstream water availability is due to mining-related activity.</p> <p>Response: Implement Response Protocols for Unforeseen Impacts and Complaints Management (<i>Section 3.3.3</i>). Implement appropriate mitigation and management measures, which may include advice from independent water resource specialists. Undertake additional monitoring of mitigation and management measures. Provide compensatory water supply to any landowner whose water supply has been adversely and directly impacted.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Provide a response to complainant.</p> <p>Trigger 2: Notify DPE Water and DPE.</p>

Aspect	Normal State	Trigger 1	Trigger 2	Actions
<p>Flooding</p>	<p>No forecast severe weather event. Surface water system managed appropriately, with sufficient freeboard in all surface water storages.</p>	<p>Trigger: Forecast severe storm event Surface water system managed appropriately, with sufficient freeboard in all surface water storages.</p> <p>Response: Inspection of flood management structures to ensure integrity and absence of flow obstructions. Utilise portable pumps to dewater flooded areas into site water storages. Evacuate site if danger exists.</p>	<p>Trigger: Forecast severe storm event. Insufficient freeboard in surface water storages. Severe damage to flood management structures identified.</p> <p>Response: Undertake dewatering of relevant storages to areas where water storage capacity exists. Inspection of flood management structures to ensure integrity and absence of flow obstructions. Protect equipment and infrastructure. Utilise portable pumps to dewater flooded areas into sediment basins. Evacuate site if danger exists.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify emergency services as required.</p>

Aspect	Normal State	Trigger 1	Trigger 2	Actions
Riparian vegetation	Watercourse monitoring indicates no significant change in riparian vegetation quality or extent when compared with historical results and/or references sites.	<p>Trigger: Monitoring indicates significant change in riparian vegetation quality or extent.</p> <p>Response: Identify any potential contributing factors. Investigate the source for the change in riparian vegetation and whether it was caused by mining-related activities.</p>	<p>Trigger: Investigation into Trigger 1 identifies that change in riparian vegetation is due to mining-related activity.</p> <p>Response: Implement appropriate mitigation and management measures, which may include advice from independent specialists. Undertake additional monitoring of mitigation and management measures.</p>	<p>Trigger 1: Notify E&C Coordinator/Manager. Trigger 2: Notify external agencies.</p>