

**MGO**  
**MT OWEN / GLENDELL**

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**GLENCORE**



# **Water Management Plan**

Departmental Approval Date: 03/10/2023

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# 1. Commitment and Policy

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## 1.1 Background

Mt Owen Glendell Operations (MGO) is located in the Hunter Valley of NSW. Current and approved operations within MGO consist of Mt Owen Mine (including the North Pit Continuation and Bayswater North Pit (BNP), Ravensworth East Mine) and Glendell Mine. Mining operations at MGO include the integrated use of the Mt Owen coal handling and preparation plant (CHPP), coal stockpiles and rail load-out facility.

MGO includes land within the catchments of Swamp Creek, Yorks Creek, Bowmans Creek, Main Creek, Stringybark Creek and Bettys Creek. Both Swamp Creek and Bettys Creek flow in a southerly direction into Bowmans Creek which discharges into the Hunter River. The upper reaches of Swamp Creek have been diverted into Yorks Creek to the west of MGO as part of the mine development. The upper reaches of Bettys Creek have been diverted into Main Creek to the east of MGO under existing licences from the Department of Primary Industries – Water (DPI – Water; refer to *Figure 1-2*).

Six modifications have been approved to SSD-5850, including:

- Modification 1 (MOCO MOD 1), to facilitate the construction of a water pipeline to convey mine water from Integra Underground Mine to MGO (Hansen Bailey 2017), which was granted on 15 September 2017;
- Modification 2 (MOCO MOD 2), to maximise reserve recovery within the Glencore mining tenements, whilst minimising the overall project disturbance area (Umwelt 2018a). MOCO MOD 2 was approved by the NSW Department of Planning and Environment (DP&E) on 4 September 2019;
- MOCO MOD 3, an administrative modification was approved by the Department of Planning, Industry and Environment (DPE) on 30 January 2020. There were no changes to statutory conditions associated with MOCO MOD 3;
- Modification 5 (MOCO MOD 5), as approved by DPE on 15 January 2021 to amend the MGO Biodiversity Offset Strategy (Umwelt 2020a); and
- Modification 6 (MOCO MOD 6), as approved by DPE on 3 June 2021. MOCO MOD 6 allows the construction and operation of an additional pipeline between MGO and Ravensworth Operations to transfer water under the already approved Greater Ravensworth Area Water and Tailings Sharing Scheme (GRAWTS) (Umwelt 2020b).
- Modification 7 (MOCO MOD 7), as approved by DPE on 15 May 2023/ MOCO MOD 7 allows for operational efficiencies between Liddell Coal Operations and MGO by facilitating more efficient water and tailings transfers. This would enable additional tailings emplacement within the South Cut Void at Liddell Coal Operations to minimise the overall size and depth of the final void, as well as minimise the need to establish additional tailings emplacement areas at Mount Owen and Ravensworth Operations.

DA 80/952 has been modified on four occasions, of which the following remain applicable:

- Glendell MOD2 was approved on 25 February 2008 and increased the production rate to 4.5 Mtpa of ROM coal and extended the period of mining until 30 June 2024;
- Glendell MOD3 was approved on 1 December 2016 and facilitated the realignment of a powerline; and
- Glendell MOD4 was approved on 4 March 2020 and allows for a minor extension of the western boundary of the approved pit shell in order to access an additional 2.5 million tonnes run of mine coal from the Barrett Pit within the duration of the current approval. This will result in the removal of approximately 7.7 ha from the approved disturbance area, resulting in a net increase (approximately 4.3 ha) in the overall disturbance area associated with the Glendell Mining operations (Umwelt, 2018b, 2019).

MGO manage water through an integrated Water Management Plan (WMP). In addition to this, MGO is an integral part of the GRAWTS with the adjacent Glencore mining operations, including Ravensworth Complex, Liddell Coal Operations and Integra Underground Mine. The GRAWTS allows greater flexibility in mine water management by the MGO. Recent modification to the MGO Consent (MOCO MOD 7) realises further efficiencies for the GRAWTS.

## 1.2 Scope

This WMP provides a framework for the management of water on-site at MGO. The WMP is one of a series of Environmental Management Plans that together form the Environmental Management System for MGO (refer to *Figure 1-1*).

The WMP outlines:

- the water management strategy;
- detailed performance criteria;
- the MGO water balance; and
- the MGO salt balance.

The WMP should also be read in conjunction with the following plans:

- Erosion and Sediment Control Plan;
- Surface Water Management and Monitoring Plan;
- Groundwater Management and Monitoring Plan;
- Surface and Groundwater Response Plan; and

- Creek Diversion Management Plan.

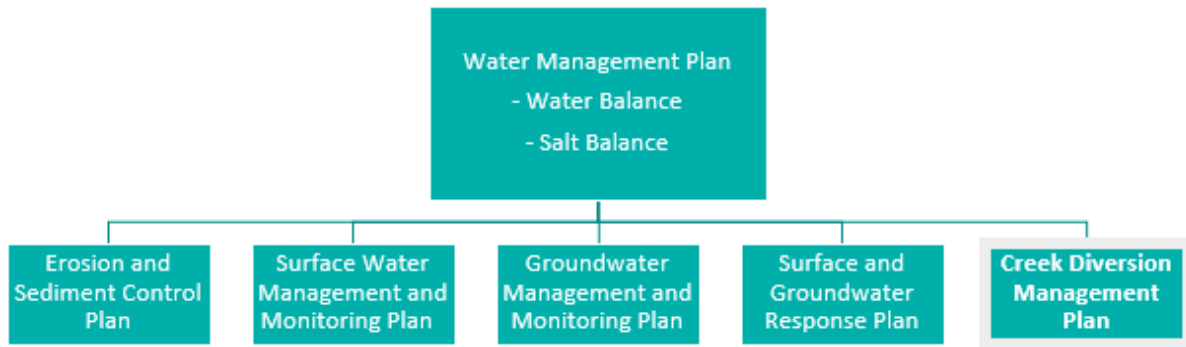


Figure 1-1

MGO Water Management Plan Structure

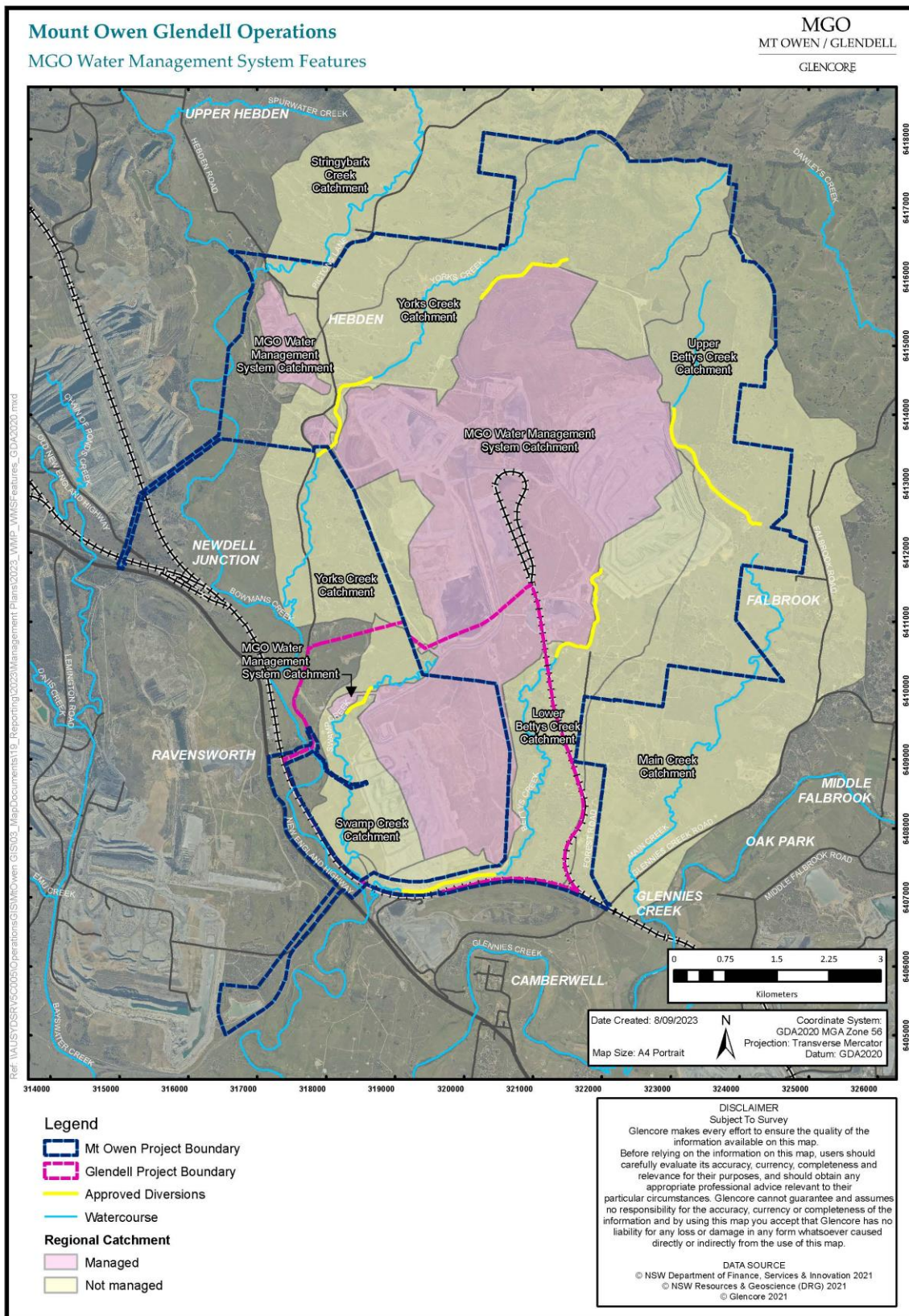


Figure 1-2 MGO Water Management System Features

## 1.3 Objectives of the Water Management Plan

MGO has an extensive water management system (WMS), which includes mine dewatering systems, creek diversions, water storages, sediment dams, tailings ponds, pumps and pipeline infrastructure, drains and earthen bunding around stockpiles, hardstand areas, haul roads and refuelling areas. The objectives of the MGO WMP and functions of the WMS are to:

- satisfy regulatory requirements, including meeting relevant performance criteria;
- divert clean water around mining operations to minimise capture of upslope runoff and separate clean water runoff from mining activities;
- segregate mine impacted water and runoff from undisturbed and revegetated areas with better water quality;
- capture and management of sediment laden water in accordance with relevant guidelines (refer to Erosion and Sediment Control Plan);
- reuse mine impacted water within the MGO WMS and within the GRAWTS to reduce reliance on raw/clean water (that is, extraction from Glennies Creek); and
- minimise adverse effects on downstream waterways (including hydrology and water quality impacts).

## 1.4 Requirements of the Water Management Plan

### 1.4.1 Statutory Requirements

#### 1.4.1.1 Development Consents

Both the Mt Owen Mine (SSD-5850) and Glendell Mine (DA 80/952) development approvals stipulate requirements related to this WMP (refer to Table 1.1). Water management performance measures are specified by Schedule 3, Condition 25 of SSD-5850 (as modified), and are reproduced in **Table 1.2**.

MOCO is also subject to approval EPBC 2013/6978 under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The conditions of EPBC 2013/6978 relevant to this WMP are listed in Table 1.3.

The Statements of Commitments for MGO development approvals relevant to this WMP are provided in Table 1.4 and Table 1.5 respectively.

#### 1.4.1.2 Environmental Protection Licences

Condition L1.1 of Environment Protection Licence (EPL) 4460 (Mt Owen Mine and Ravensworth East) and EPL 12840 (Glendell Mine) requires compliance with Section 120 of the *Protection of the Environment Operations Act 1997* (POEO Act), which prohibits pollution of waters. The implementation of the management measures outlined in **Section 3** of this WMP facilitates achievement of this objective.

Table 1.1 Relevant Development Consent Conditions

Mt Owen Continued Operations (SSD-5850, Schedule 2)	Glendell Mine (DA 80/952, Schedule 2)		
23	I	The Applicant must ensure that transfer of water and tailings to and from surrounding mines via the GRAWTS occurs generally in accordance with the documents referenced in Condition 2(a) of Schedule 2, in particular, SEE (Mod 2) and Modification Report (MOD 4)	<b>Section 3.3.2</b>
Mt Owen Continued Operations (SSD-5850, Schedule 3)	Glendell Mine (DA 80/952, Schedule 3)	Condition	Relevant Section of Plan
21	-	<p>The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations on site to match its available water supply.</p> <p>Notes:</p> <p>Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development prior to water take occurring.</p> <p>The Applicant should consult with DPE Water regarding the licensing requirements for the final landform and any associated impacts on the Bowmans Creek and Glennies Creek catchments.</p>	<b>Section 1.4.1.3</b> <b>Section 3.4</b>
22	-	<p>The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted (other than a negligible impact) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Secretary.</p> <p>The compensatory water supply measures must provide an alternative long term supply of water that is equivalent, in</p>	<b>Surface and Groundwater Response Plan</b>

		<p>quality and volume, to the loss attributable to the development. Equivalent water supply should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.</p> <p>If the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.</p> <p>If the Applicant is unable to provide an alternative long term supply of water, then the Applicant must provide compensation to the satisfaction of the Secretary.</p> <p>Note: The Water Management Plan (see condition 26) is required to include trigger levels for investigating potentially adverse impacts on water supplies.</p>	
23	–	<p>Unless an EPL or the EPA authorises otherwise, the Applicant must comply with Section 120 of the POEO Act.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>The Applicant is required to obtain any necessary approvals or licences under the EP&amp;A Act, POEO Act and/or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002 prior to discharging water or tailings off-site via the GRAWTS.</li> <li>The Applicant is required to comply with the relevant provisions of the POEO Act in relation to any unauthorised discharges.</li> </ul>	<b>Section 1.4.1.2</b>
24	–	The Applicant must construct, maintain and rehabilitate any approved creek diversions associated with the development, including the diversions of Bettys Creek around the Eastern Rail Pit and into Main Creek, to the satisfaction of the Secretary.	<b>Creek Diversion Management Plan</b>
25	–	The Applicant must comply with the performance measures in Table 8.	<b>Table 1.2</b>
26	–	The Applicant must prepare a Water Management Plan for the development. This plan must:	<b>Entire document</b>
26 (a)	–	be prepared in consultation with DPE Water and EPA, and submitted to the Secretary for approval prior to the commencement of development under this consent, unless the Secretary agrees otherwise;	<b>Section 1.5.2</b>
26 (b)	–	include detailed performance criteria and describe measures to ensure that the Applicant complies with the water management performance measures (see Table 8);	<b>Table 1.2</b>
26 (c) (i)	–	include a <u>Water Balance</u> that:	<b>Section 3.4</b>

26 (c) (i)	–	<ul style="list-style-type: none"> <li>• includes details of: <ul style="list-style-type: none"> <li>- sources and security of water supply, including contingency planning for future reporting periods;</li> </ul> </li> </ul>	<p><b>Section 3.4.1</b> <b>Section 3.4.6</b></p>
26 (c) (i)	–	<ul style="list-style-type: none"> <li>- water use and management on site;</li> </ul>	<b>Section 3.4.2</b>
26 (c) (i)	–	<ul style="list-style-type: none"> <li>- any off-site water transfers; and</li> </ul>	<b>Section 3.4.3</b>
26 (c) (i)	–	<ul style="list-style-type: none"> <li>- reporting procedures, including the preparation of a site water balance for each calendar year; and</li> </ul>	<p><b>Section 3.4</b> <b>Section 4.1.1</b></p>
26 (c) (i)	–	<ul style="list-style-type: none"> <li>• describes the measures that would be implemented to minimise clean water use by the development;</li> </ul>	<b>Section 3.4.2</b>
26 (c) (ii)	–	include a <u>Salt Balance</u> that:	<b>Section 3.5</b>
26 (c) (ii)	–	<ul style="list-style-type: none"> <li>• includes details of: <ul style="list-style-type: none"> <li>- sources of saline material on the site;</li> </ul> </li> </ul>	<b>Section 3.5.1</b>
26 (c) (ii)	–	<ul style="list-style-type: none"> <li>- saline material and saline water management on site; and</li> </ul>	<p><b>Section 3.4.3</b> <b>Section 3.4.4</b> <b>Section 3.5.1</b> <b>Section 3.5.2</b></p>
26 (c) (ii)	–	<ul style="list-style-type: none"> <li>- reporting procedures, including the preparation of a salt balance for each calendar year;</li> </ul>	<b>Section 3.5</b>
26 (c) (iii)	–	<p>include an Erosion and Sediment Control Plan, that:</p> <ul style="list-style-type: none"> <li>• is consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries, or its latest version;</li> <li>• identifies activities that could cause soil erosion, generate sediment or affect flooding;</li> <li>• describes measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk;</li> <li>• describes the location, function, and capacity of erosion and sediment control structures and flood management structures; and</li> <li>• describes what measures would be implemented to maintain the structures over time;</li> </ul>	<p><b>Erosion and Sediment Control Plan</b></p>
26 (c) (iv)	–	<p>include a Surface Water Management Plan, that includes:</p> <ul style="list-style-type: none"> <li>• relevant baseline data on channel stability, water flows and water quality in the sections and parts of creeks, rivers and waterbodies that are likely to experience a greater than negligible impact as a result of the development;</li> <li>• a detailed description of the water management system on site;</li> </ul>	<p><b>Surface Water Management and Monitoring Plan</b> <b>Surface and Groundwater Response Plan</b> <b>Creek Diversion Management Plan</b></p>

	<ul style="list-style-type: none"> <li>• a description of measures used to manage, monitor and report on the transfer of water and/or tailings under the GRAWTS;</li> <li>• an appropriately detailed description of the flood warning signage and flood conveyance measures to be installed along Hebden Road;</li> <li>• appropriately detailed plans, design objectives and performance criteria for: <ul style="list-style-type: none"> <li>- the Hebden Road realignment and upgrade works (including the construction of a new bridge over Bowmans Creek);</li> <li>- construction of an additional rail line and rail bridge crossing over Bettys Creek;</li> <li>- any approved creek diversions associated with the development;</li> <li>- any restoration works to be undertaken on creeks impacted by the development;</li> <li>- sediment and mine water dams;</li> <li>- the small height flood levee and proposed modifications to Dams 5 and 6 described in SEE (Mod 2);</li> <li>- the remediation of the dirty-water dam near Hebden Road, prior to its use as an offline flow detention area for Yorks Creek;</li> <li>- emplacement of tailings, acid forming and potentially acid forming materials, and saline and sodic materials;</li> <li>- re-establishment of free draining second and third order creeks, and their associated catchments, in the final post-mining landform; and</li> <li>- any final voids for the development (see the Rehabilitation Objectives in Table 10);</li> </ul> </li> <li>• surface water performance criteria, including trigger levels for investigating any potentially adverse impacts, for the following: <ul style="list-style-type: none"> <li>- the water management system, including mine water storages and sediment dams;</li> <li>- surface water user supplies;</li> <li>- downstream surface water quality;</li> <li>- downstream flooding impacts; and</li> <li>- stream and riparian vegetation health;</li> </ul> </li> <li>• a program to monitor and report on: <ul style="list-style-type: none"> <li>- the effectiveness of the water management system;</li> <li>- impacts on downstream water users (that are not negligible);</li> </ul> </li> </ul>	
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		<ul style="list-style-type: none"> <li>- surface water flows and quality, as well as stream and riparian vegetation health in the watercourses that are likely to experience a greater than negligible impact as a result of the development;</li> <li>- acid forming and potential acid forming materials, incorporating the recommendations in Appendix 11 of SEE (Mod 2); and</li> <li>- downstream flooding impacts; and</li> <li>• a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the development;</li> </ul>	
<p>26 (c) (v)</p>	<p>–</p>	<p>include a <u>Groundwater Management Plan</u>, that includes:</p> <ul style="list-style-type: none"> <li>• relevant baseline data on groundwater levels, yield and quality in the region and privately-owned groundwater bores that are likely to experience a greater than negligible impact as a result of the development;</li> <li>• a detailed description of the groundwater management system on site;</li> <li>• appropriately detailed plans, design objectives and performance criteria, for:             <ul style="list-style-type: none"> <li>- emplacement of tailings, acid forming and potentially acid forming materials, and saline and sodic materials;</li> <li>- any final voids for the development (see the Rehabilitation Objectives in Table 10);</li> </ul> </li> <li>• groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts, for the following:             <ul style="list-style-type: none"> <li>- Main Creek, Glennies Creek, Bettys Creek, York Creek, Swamp Creek and Bowmans Creek alluvial aquifers and the Permian hard rock aquifer;</li> <li>- groundwater user bores;</li> <li>- groundwater inflows to the mining operations;</li> <li>- seepage/leachate from water storages, emplacements, backfilled voids and final voids; and</li> <li>- groundwater dependent ecosystems;</li> </ul> </li> <li>• a program to monitor and report on:             <ul style="list-style-type: none"> <li>- groundwater inflows to the mining pits;</li> <li>- seepage/leachate from water storages, emplacements, backfilled voids and final voids;</li> <li>- background changes in groundwater yield/quality against mine-induced changes;</li> <li>- impacts of the development on:                 <ul style="list-style-type: none"> <li>- regional and local (including alluvial) aquifers;</li> </ul> </li> </ul> </li> </ul>	<p style="text-align: center;"><b>Groundwater Management and Monitoring Plan</b></p> <p style="text-align: center;"><b>Surface and Groundwater Response Plan</b></p>

		<ul style="list-style-type: none"> <li>- groundwater supply of potentially affected landowners;</li> <li>- groundwater dependent ecosystems and riparian vegetation;</li> <li>• a Trigger Action Response Plan to respond to any exceedances of the groundwater assessment criteria, and mitigate any adverse groundwater impacts of the development (including a protocol to install a low permeability barrier in the event that the Main Creek alluvial aquifer is intercepted or a significant decline in alluvial water levels is detected which may be attributable to mining operations); and</li> <li>• consideration of the cumulative groundwater interactions of the development and other nearby mines, including the Glendell Mine and Integra Underground Mine;</li> </ul>	
26 (c) (vi)	–	a program to periodically validate the water balance, salt balance, surface water take and groundwater model for the development, and compare monitoring results with modelled predictions, unless otherwise agreed by the Secretary;	<b>Section 4.3</b>
26 (c) (vii)	–	a protocol to report on the measures, monitoring results and performance criteria identified above, in the annual review referred to in condition 5 of Schedule 5; and	<b>Section 4.1.1</b>
26 (c) (viii)	–	<p>a protocol that has been prepared, using all reasonable endeavours, in consultation with the owners of any nearby mines (including the Glendell, Liddell, Ravensworth Operations, Integra Underground and Rix’s Creek North Mines) to:</p> <ul style="list-style-type: none"> <li>• minimise cumulative water quantity and quality impacts;</li> <li>• review opportunities for water sharing between the mines;</li> <li>• co-ordinate water quality monitoring programs where practicable; and</li> <li>• undertake joint investigations/studies in relation to complaints/exceedances of trigger levels where cumulative impacts are considered likely.</li> </ul>	<b>Section 3.3</b>
–	25	The Applicant must only discharge mine water from the site in accordance with the provisions of an EPL or the <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i> .	<b>Section 3.4.3</b>
	26	The Applicant must design, construct, maintain, and rehabilitate the proposed diversion of Bettys Creek and Swamp Creek, to the satisfaction of the Secretary.	<b>Creek Diversion Management Plan</b>

	27	Within one month of completing the construction of the Bettys Creek and Swamp Creek diversions, the Applicant must submit an as-executed report, certified by a practising registered engineer, to the Secretary and DPE Water.	<b><i>Creek Diversion Management Plan</i></b>
	28	Prior to destroying the original creek lines, the Applicant must demonstrate that the Bettys Creek and Swamp Creek diversions are operating successfully, in consultation with DPE Water, and to the satisfaction of the Secretary.	<b><i>Creek Diversion Management Plan</i></b>
–	29	The Applicant must prepare a Site Water Management Plan for the development to the satisfaction of the Secretary. This plan must:	<b><i>Entire document</i></b>
–	29 (a)	be prepared in consultation with EPA and DPE Water by suitably qualified expert/s whose appointment/s have been approved by the Secretary;	<b><i>Section 1.5.2</i></b>
–	29 (b)	be submitted to the Secretary for approval by the end of April 2008; and	<b><i>Section 1.5.2</i></b>
–	29 (c)	include: <ul style="list-style-type: none"> <li>• a Bettys Creek and Swamp Creek Diversion Plan/s;</li> </ul>	<b><i>Creek Diversion Management Plan</i></b>
–	29 (c)	<ul style="list-style-type: none"> <li>• a Site Water Balance;</li> </ul>	<b><i>Section 3.4</i></b>
–	29 (c)	<ul style="list-style-type: none"> <li>• an Erosion and Sediment Control Plan;</li> </ul>	<b><i>Erosion and Sediment Control Plan</i></b>
–	29 (c)	<ul style="list-style-type: none"> <li>• a Surface Water Management and Monitoring Plan;</li> </ul>	<b><i>Surface Water Management and Monitoring Plan</i></b>
–	29 (c)	<ul style="list-style-type: none"> <li>• a Ground Water Monitoring Program; and</li> </ul>	<b><i>Groundwater Management and Monitoring Plan</i></b>
–	29 (c)	<ul style="list-style-type: none"> <li>• a Surface and Ground Water Response Plan.</li> </ul>	<b><i>Surface and Groundwater Response Plan</i></b>
–	30	The Bettys Creek and Swamp Creek Diversion Plan/s must include: <ol style="list-style-type: none"> <li>a vision statement for the creek relocation;</li> <li>an assessment of the water quality, ecological, hydrological and geomorphic baseline conditions in the creek;</li> <li>the detailed design specifications for the creek relocation;</li> </ol>	<b><i>Creek Diversion Management Plan</i></b>

		<p>(d) a construction program for the creek relocation, describing how the work would be staged, and integrated with mining operations;</p> <p>(e) a revegetation program for the relocated creek using a range of suitable native species;</p> <p>(f) water quality, ecological, hydrological and geomorphic performance and completion criteria for the creek relocation based on the assessment of baseline conditions; and</p> <p>(g) a program to monitor and maintain the water quality, ecological, hydrological and geomorphic integrity of the creek relocation.</p>	
–	31	The Site Water Balance must:	<b>Section 3.4</b>
–	31 (a)	include details of: <ul style="list-style-type: none"> <li>sources and security of water supply;</li> </ul>	<b>Section 3.4.1</b> <b>Section 3.4.6</b>
–	31 (a)	<ul style="list-style-type: none"> <li>water use on site;</li> </ul>	<b>Section 3.4.2</b>
–	31 (a)	<ul style="list-style-type: none"> <li>water management on site;</li> </ul>	<b>Section 3.4.2</b> <b>Section 3.4.3</b>
–	31 (a)	<ul style="list-style-type: none"> <li>off-site water transfers; and</li> </ul>	<b>Section 3.4.4</b>
–	31 (b)	investigate and describe measures to minimise water use by the development.	<b>Section 3.4.2</b>
–	32	<p>The Erosion and Sediment Control Plan must:</p> <p>(a) be consistent with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries, or its latest version;</p> <p>(b) identify activities that could cause soil erosion and generate sediment, including activities on waterfront land (within 40 metres of a watercourse);</p> <p>(c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;</p> <p>(d) describe the location, function and capacity of erosion and sediment control structures; and</p> <p>(e) describe what measures would be implemented to maintain these structures over time.</p>	<b>Erosion and Sediment Control Plan</b>
–	33	<p>The Surface Water Management and Monitoring Plan must include:</p> <p>(a) detailed baseline data on surface water flows and quality in creeks and other waterbodies that could potentially be affected by the development;</p>	<b>Surface Water Management and Monitoring Plan</b>

		<ul style="list-style-type: none"> <li>(b) surface water and stream health impact assessment criteria;</li> <li>(c) a program to monitor surface water flows, quality and impacts on water users (upstream and downstream of the development in Bettys Creek, Swamp Creek and Bowmans Creek);</li> <li>(d) a program to assess stream health conditions in Bettys Creek, Swamp Creek and Bowmans Creek;</li> <li>(e) a program to monitor channel stability in Bettys Creek, Swamp Creek and Bowmans Creek; and</li> <li>(f) reporting procedures for the results of the monitoring program.</li> </ul>	
-	34	<p>The Groundwater Monitoring Program must include:</p> <ul style="list-style-type: none"> <li>(a) detailed baseline data, based on sound statistical analysis, to benchmark the pre-mining natural variation in groundwater levels, yield and quality (including privately-owned groundwater bores within the predicted drawdown impact zone);</li> <li>(b) groundwater impact assessment criteria (including for monitoring bores);</li> <li>(c) a program for accurately delineating the boundary of the Bettys Creek and Swamp Creek alluvial aquifers in any areas intersected by mining;</li> <li>(d) a program to monitor:                             <ul style="list-style-type: none"> <li>• impacts on the groundwater supply of potentially affected landowners;</li> <li>• impacts on the Bettys Creek and Swamp Creek alluvial aquifers;</li> <li>• connectivity and groundwater leakage to/from Bettys Creek and Swamp Creek following diversion;</li> <li>• impacts on groundwater dependent ecosystems and riparian vegetation;</li> <li>• the volume of groundwater levels and quality in the alluvial, coal seam, and overburden/interburden aquifers; and</li> <li>• the groundwater pressure response in the surrounding coal measures;</li> </ul> </li> <li>(e) procedures for the verification of the groundwater model; and</li> <li>(f) reporting procedures for the results of the monitoring program and model verification.</li> </ul>	<p><b><i>Groundwater Management and Monitoring Plan</i></b></p>
-	35	<p>The Surface and Ground Water Response Plan must include:</p> <ul style="list-style-type: none"> <li>(a) a protocol for the investigation, notification and mitigation of any exceedances of the surface water,</li> </ul>	<p><b><i>Surface and Groundwater Response Plan</i></b></p>

	<p>stream health and groundwater impact assessment criteria;</p> <p>(b) measures to mitigate and/or compensate potentially affected landowners for the loss of surface water flows in Bettys Creek, Swamp Creek and Bowmans Creek downstream of the development;</p> <p>(c) measures to minimise, prevent or offset groundwater leakage from the Bettys Creek and Swamp Creek alluvial aquifers;</p> <p>(d) measures to mitigate any direct hydraulic connection between the backfilled open cuts and the Bettys Creek and Swamp Creek alluvium if the potential for adverse impacts is detected; and</p> <p>(e) the procedures that would be followed if any unforeseen impacts are detected during the development.</p>	
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Table 1.2 Water Management Performance Measures

<b>Feature</b>	<b>Performance Measure</b>	<b>Relevant Section of Plan</b>
<b>Water management – General</b>	<ul style="list-style-type: none"> <li>Minimise the use of clean water on site</li> <li>Minimise the need for make-up water from external supplies (other than the GRAWTS)</li> </ul>	<b>Section 2.2</b> <b>Section 3.4.2</b>
<b>Main, Glennies and Bowmans Creek alluvial aquifers</b>	<ul style="list-style-type: none"> <li>Negligible environmental consequences to the alluvial aquifer as a result of the development, including: <ul style="list-style-type: none"> <li>negligible change in groundwater levels;</li> <li>negligible change in groundwater quality; and</li> <li>negligible impact to other groundwater users, beyond those predicted in the documents listed in condition 2(a) of Schedule 2</li> </ul> </li> </ul>	<b>Groundwater Management and Monitoring Plan</b>
<b>Construction and operation of infrastructure</b>	<ul style="list-style-type: none"> <li>Design, install and maintain erosion and sediment controls generally in accordance with the series Managing Urban Stormwater: Soils and Construction including Volume 1, Volume 2A – Installation of Services, Volume 2C – Unsealed Roads, Volume 2D – Main Road Construction and Volume 2E Mines and Quarries</li> <li>Design, install and maintain any infrastructure within 40 metres of watercourses generally in accordance with the <i>Guidelines for Controlled Activities on Waterfront Land (2007)</i>, or its latest version</li> </ul>	<b>Section 2.2.2 &amp; 2.2.3</b> <b>Erosion and Sediment Control Plan</b> <b>Surface Water Management and Monitoring Plan</b>

<b>Feature</b>	<b>Performance Measure</b>	<b>Relevant Section of Plan</b>
	<ul style="list-style-type: none"> <li>Design, install and maintain any creek crossings generally in accordance with the Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries 2003) and Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003), or their latest versions</li> </ul>	
<b>Clean water diversion and storage infrastructure</b>	<ul style="list-style-type: none"> <li>Design, install and maintain the clean water system to convey the 100 year, 24 hour average recurrence interval (ARI) event</li> <li>Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site</li> </ul>	<b>Section 0 Surface Water Management and Monitoring Plan</b>
<b>Sediment dams</b>	<ul style="list-style-type: none"> <li>Design, install and maintain the dams generally in accordance with the series Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries</li> </ul>	<b>Surface Water Management and Monitoring Plan</b>
<b>Mine water storages</b>	<ul style="list-style-type: none"> <li>Design, install and maintain mine water storage infrastructure to ensure no discharge of mine water to the off-site environment</li> <li>On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and maintained (including to minimise permeability)</li> <li>Ensure adequate freeboards within all pit voids at all times to minimise the risk of discharge to surface waters</li> </ul>	<b>Section 3.1 Surface Water Management and Monitoring Plan</b>
<b>Tailings storages</b>	<ul style="list-style-type: none"> <li>Design and maintain tailings storage areas to encapsulate and prevent the movement of tailings seepage/leachate offsite</li> </ul>	<b>Section 3.4.2 Tailings &amp; Water Management</b>
<b>Overburden emplacements</b>	<ul style="list-style-type: none"> <li>Design, install and maintain emplacements to encapsulate and prevent migration of tailings, acid forming and potentially acid forming materials, and saline and sodic material</li> <li>Design, install and maintain out-of-pit emplacements to prevent and/or manage long term saline groundwater seepage</li> </ul>	<b>Section 2.2 Water Categories and Design Criteria</b>
<b>Chemical and hydrocarbon storage</b>	<ul style="list-style-type: none"> <li>Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standards</li> </ul>	<b>Section 2.2.3</b>
<b>Creek realignment and restoration works</b>	<ul style="list-style-type: none"> <li>Diverted creek lines are hydraulically and geomorphologically stable</li> </ul>	<b>Creek Diversion Management Plan</b>

<b>Feature</b>	<b>Performance Measure</b>	<b>Relevant Section of Plan</b>
	<ul style="list-style-type: none"> <li>Incorporate erosion control measures based on vegetation and engineering revetments</li> <li>Incorporate persistent/permanent pools for aquatic habitat</li> <li>Revegetate with suitable native species</li> </ul>	
<b>Aquatic and riparian ecosystems</b>	<ul style="list-style-type: none"> <li>Develop site-specific in-stream water quality objectives in accordance with ANZECC (2000) and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW procedures</i> (2006), or its latest version</li> </ul>	<b>Surface Water Management and Monitoring Plan</b>

Table 1.3 EPBC Act 1999 Approval Conditions

<b>Condition</b>	<b>Description</b>	<b>Relevant Section of Plan</b>
<b>1c</b>	Implement environmental performance conditions 21, 23-26, 28, 31, and 43-45 of schedule 3 of the state development consent, where the conditions relate to avoiding, mitigating, managing, offsetting, monitoring or recording, or reporting on impacts to protected matters	<b>Entire document</b>
<b>1d</b>	Notify the Department in writing of any proposed change to the conditions of the state development consent referred to in Conditions 1a – 1c, within 14 days of formally proposing a change or becoming aware of any other proposed change.	<b>Section 4.2</b>
<b>1e</b>	Notify the Department in writing of any change to conditions of the state development consent referred to in Conditions 1a – 1c, within 14 days of a change to conditions being finalised.	<b>Section 4.2</b>
<b>4</b>	Unless otherwise agreed to in writing by the Minister, the person taking the action must publish all management plans and strategies required by conditions 26, 31, 43 and 45 of the state development consent on their website. Each management plan and strategy must be published on the website within 1 month of being approved by the Secretary.	<b>Section 1.5.2</b>
<b>5</b>	The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans and strategies required by conditions 26, 31, 43 and 45 of the state development consent, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval.	<b>Section 3.7 Surface Water Management and Monitoring Plan Groundwater Management and Monitoring Plan</b>

Condition	Description	Relevant Section of Plan
6	Within three months of every 12 month anniversary of the commencement of the action, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans and strategies required by conditions 26, 31, 43 and 45 of the state development consent. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published. The person taking the action must continue to publish the report until such time as agreed in writing by the Minister.	<b>Section 4.1.1</b>
7	The person taking the action must notify the Department by email (to <a href="mailto:EPBCMmonitoring@environment.gov.au">EPBCMmonitoring@environment.gov.au</a> or an email advised by the Department) of any actual or potential non-compliance with the conditions of this approval, including any management plan or strategy required by conditions 26, 27, 31, 43 and 45 of the state development consent within 7 days of the person taking the action becoming aware of the actual or potential non-compliance.	<b>Section 4.1.2</b>

Table 1.4 Statement of Commitments for Mt Owen Mine

Commitment	Relevant Section of Plan
Mount Owen will continue to manage operations in accordance with the WMP, the EPL and the Hunter River Salinity Trading Scheme (HRSTS).	<b>Entire document</b> <b>Surface Water Management and Monitoring Plan</b>
Erosion and sediment controls will be monitored during construction and operation in accordance with the Blue Book (Landcom 2004 and DECC 2008).	<b>Erosion and Sediment Control Plan</b>
As part of the water balance monitoring for the Mount Owen water management system, water imported to the site, water used on site and water discharged from site will be monitored in accordance with Water Reporting Requirements for Mines (NOW undated).	<b>Section 0</b>
Within 12 months of approval, the Surface Water Monitoring Plan will be revised to include a trigger for analysis of metal/metalloid concentration in sediment dam water should a significant change in pH be noted as part of the routine monitoring program.	<b>Surface Water Management and Monitoring Plan</b>
Monitoring and remediation of erosion within watercourses outside of the active mining and emplacement areas will continue to be managed as set out in the MGO Landscape Management Plan.	<b>Erosion and Sediment Control Plan</b>

Commitment	Relevant Section of Plan
Mount Owen will install a new monitoring point on Main Creek (MC3). Monitoring at MC3 will commence upon Project Approval. In addition, Mount Owen will continue to monitor water quality during HRSTS discharge events as set out in the EPL.	<b><i>Surface Water Management and Monitoring Plan</i></b>
Within 12 months of Project Approval, Trigger Action Response Plans (TARPs) will be developed (or where already present, revised) to deal with the unlikely eventuality that the Project impacts on water quality in all downstream creek systems (which have existing monitoring points located on it).	<b><i>Surface Water and Groundwater Response Plan</i></b>
Should a discharge point be required at the MGO, a variation to the EPL will be sought, subject to gaining relevant approvals at that time.	<b><i>Discharge point not required</i></b>
Mount Owen will operate the Project in accordance with the <i>Hunter Regulated River Water Sharing Plan 2004</i> for extractions from Glennies Creek.	<b><i>Surface Water Management and Monitoring Plan</i></b>
Mount Owen will continue to provide a summary of the surface water monitoring results as part of the Annual Review.	<b><i>Section 4.1.1 Surface Water Management and Monitoring Plan</i></b>
Mount Owen proposes to, within three years of Project Approval, review the MGO water balance and interactions with GRAWTS.	<b><i>Section 3.4 Section 4.3</i></b>
Mount Owen will continue to undertake groundwater monitoring in accordance with the MGO Groundwater Monitoring Program. The MGO Groundwater Monitoring Program and Surface Water and Groundwater Response Plan will be updated within 12 months of Project Approval to include the additional management and monitoring requirements identified in the EIS and <i>Section 2.5</i> of the Response to Submissions Report B including: monitoring requirements for both alluvial groundwater levels and ecological condition of vegetation communities potentially impacted by changes in alluvial groundwater levels (i.e. Bettys and Main Creeks). Monitoring will include both hard rock and alluvial aquifers and include the installation of additional piezometers in area of maximum predicted drawdown in Main Creek and Bettys Creek and the identification of triggers that may indicate greater than predicted impacts.	<b><i>Groundwater Management and Monitoring Plan Surface Water and Groundwater Response Plan</i></b>
TARPs will be developed for any unexpected impacts on groundwater systems as well as impacts on riparian vegetation.	<b><i>Surface Water and Groundwater Response Plan</i></b>
Mount Owen will continue to extract groundwater from hard rock aquifers that flow into the Mount Owen and Ravensworth East Mines under the existing Part 5 licences under the <i>Water Act 1912</i> .	<b><i>Groundwater Management and Monitoring Plan</i></b>
The results of groundwater monitoring will be subject to an annual review and reported in the MGO Annual Review. The groundwater model will be periodically updated and refined as additional data and monitoring results become available.	<b><i>Section 4.1.1</i></b>

Table 1.5 Statement of Commitments for Glendell Mine

	<b>Commitment</b>	<b>Relevant Section of Plan</b>
<b>1.10.1</b>	Design surface water controls to ensure that clean runoff is separated from runoff within disturbed mining and infrastructure areas. Design sediment and erosion controls to ensure any runoff from disturbed areas is appropriately treated.	<b><i>Erosion and Sediment Control Plan</i></b>
<b>1.10.2</b>	The proposed diversions of Swamp and Bettys Creeks will be designed and constructed in accordance with the conceptual designs developed in the water resources assessment.	<b><i>Creek Diversion Management Plan</i></b>
<b>1.10.3</b>	The Applicant will install cut off embankments along Bettys Creek to restrict alluvium inflows into the proposed pit area in accordance with the conceptual design developed in the water resources assessment.	<b><i>Groundwater Management and Monitoring Plan</i></b>
<b>1.10.4</b>	The Applicant will prepare a Groundwater Management Plan to detail the monitoring and management commitments relating to the Swamp Creek alluvial system, prior to mining occurring within this alluvial area.	<b><i>Groundwater Management and Monitoring Plan</i></b>
<b>1.10.5</b>	The Applicant will continue the groundwater monitoring at the existing groundwater monitoring locations within the alluvium of Swamp and Bettys Creek, aside from monitoring location NPz14 which will be impacted by the proposed Glendell operations.	<b><i>Groundwater Management and Monitoring Plan</i></b>
<b>1.10.6</b>	If groundwater monitoring indicates it is required, a barrier cut off wall within the alluvium associated with Swamp Creek will be constructed to limit groundwater seepage into the mine.	<b><i>Groundwater Management and Monitoring Plan</i></b>
<b>1.10.7</b>	The Applicant will extend its existing surface water monitoring program	<b><i>Surface Water Management and Monitoring Plan</i></b>

Commitment	Relevant Section of Plan
	<p>to include surface water monitoring to be undertaken at Glendell, as follows:</p> <p>two additional surface water monitoring locations on Bowmans Creek upstream and downstream of the confluence with Swamp and Bettys Creeks;</p> <p>two additional sites on Swamp Creek upstream and downstream of the proposed open cut pit; and</p> <p>two additional sites on Bettys Creek upstream and downstream of the open cut pit.</p>

#### 1.4.1.3 Surface Water and Groundwater Licences

MGO holds licences under the Water Act 1912 for the operation of extraction and monitoring bores, which are summarised in **Table 1.6**. MGO also holds water access licences (WALs), water supply works and water use approvals under the Water Management Act 2000 for extraction of water from Glennies Creek (Glennies Creek management zone, under the Water Sharing Plan for the Hunter Regulated River Water Source 2016), and the diversions of Bettys and Swamp Creeks, which are summarised in Table 1.7. Specific details and requirements of these licences are presented in the **Surface Water and Groundwater Management and Monitoring Plans**.

Table 1.6 Water Licences held by MGO under Water Act 1912

Licence Number	Licensed Activity
20BL170294	Groundwater extraction for dewatering purposes of Eastern Rail Pit up to 220 ML/year
20BL170295	Groundwater extraction for dewatering purposes of Ravensworth East pits up to 800 ML/year
20BL168209	Saline water extraction bore (Liddell Water Supply Bore)
20BL169544	Saline water extraction bore (Liddell Water Supply Bore)
20BL168116	Monitoring bore
20BL169332	Monitoring bore
20BL169333	Monitoring bore
20BL169334	Monitoring bore
20BL169335	Monitoring bore
20BL169336	Monitoring bore

Licence Number	Licensed Activity
20BL171534	Monitoring bore
20BL171535	Monitoring bore
20BL171536	Monitoring bore
20BL171537	Monitoring bore
20BL171538	Monitoring bore
20BL171539	Monitoring bore
20BL171540	Monitoring bore
20BL171541	Monitoring bore
20BL171542	Monitoring bore
20BL171543	Monitoring bore
20BL171544	Monitoring bore
20BL171545	Monitoring bore
20BL171546	Monitoring bore
20BL171547	Monitoring bore

Table 1.7 Water Licences held by MGO under the Water Management Act 2000

Licence Number	Approval Number	Licensed/Approved Activity
<b>High Security Water Access Licences (Glennies Creek Management Zone)</b>		
WAL7814 <sup>1</sup>	20WA200723	Licence to pump 1000 units
WAL704	20CA200608	Licence to pump 3 units
WAL1118	20CA201623	Licence to pump 3 units
WAL9521	20WA201228	Licence to pump 50 units
<b>General Security Water Access Licences (Glennies Creek Management Zone)</b>		
WAL612	20CA200382	Licence to pump 147 units
WAL613	20CA200390	Licence to pump 192 units
WAL637	20CA200445	Licence to pump 384 units
WAL705	20CA200608	Licence to pump 27 units

Licence Number	Approval Number	Licensed/Approved Activity
WAL1119	20CA201623	Licence to pump 60 units
WAL1215	20CA201862	Licence to pump 48 units
<b>Supplementary Water Access Licences (Glennies Creek Management Zone)</b>		
WAL1364	20CA201623	Licence to pump 2.2 units
WAL1420	20CA200382	Licence to pump 29 units
<b>Domestic and Stock Licences (Glennies Creek Management Zone)</b>		
WAL706	20CA200608	Licence to pump 8 units
WAL1218	20WA201868	Licence to pump 3 units
WAL7823	20WA201677	Licence to pump 9 units
WAL754	20WA200727	Licence to pump 16 units and middle diversion of Bettys Creek
WAL7817	20CA200779	Licence to pump 3 units
<b>Unregulated River Licences (Jerrys Water Source)</b>		
WAL18310	20WA210993	Licence to pump 200 units and upper diversion of Swamp Creek
<b>Additional Water Supply Works Approvals (Jerrys Water Source)</b>		
N/A	20WA211429	Diversion dam on Yorks Creek
N/A	20WA211425	Middle diversion of Swamp Creek
N/A	20WA211430	Lower diversion of Swamp Creek
N/A	20WA212187	Upper and middle diversion of Bettys Creek
N/A	20WA212660	Lower diversion of Bettys Creek

### Note

WAL 7814 is a high security licence to pump 1,000 ML from Glennies Creek. MGO and Integra Underground (both owned by Glencore) will share the access rights under this licence in accordance with the requirements of DPI – Water.

## 1.4.2 GCAA Requirements

The Glencore Coal Assets Australia (GCAA) **Water Management Protocol** (CAA HSEC PCL 0022 11.03) outlines the following principles, which focus on effective water management which is critical to

supporting operations. Water management planning assists in managing a number of aspects, such that:

- our environmental obligations are met;
- we can demonstrate to external stakeholders that the local and regional surface and groundwater water resources are used efficiently;
- our operations are protected from flooding; and
- adequate water supplies are available for mining and processing operations.

## 1.5 Consultation

### 1.5.1 Consultation with Internal (MGO) Stakeholders

This WMP has been reviewed by members of the Mt Owen Glendell Operations EMS Committee and endorsed at the meeting of 28 November 2016. Details of Training and Communication arrangements are outlined in **Section 3.6**.

### 1.5.2 Consultation with External Stakeholders

This document represents a revision of the originally approved MGO WMP, which was submitted to the then Department of Environment and Climate Change (DECC) and the then Department of Water and Energy in 2008.

The WMP was revised in December 2016 following approval of the Mt Owen Continued Operations SSD-5850 in consultation with DPE and DPI – Water. A copy of the consultation records is provided in **Appendix A**.

The Greater Ravensworth Area Water and Tailings Scheme (GRAWTS), that includes the protocol described in **Section 3.3**, was prepared in consultation with the General Manager Northern Region Glencore and the Operations Managers of Ravensworth Operations, Liddell Coal Operations and Integra Underground. No formal consultation with neighbouring operations has been undertaken during the development of this WMP, however water supply agreements are currently in place with Rixs Creek North Mine and Ashton Coal Mine.

The final draft of the current revision of the WMP was submitted to Department of Planning and Environment (DP&E) in January 2017.

The WMP was updated following approval of MOCO MOD 2 and submitted to DPE on 4 December 2019, following consultation with the EPA and DPE – Water. However, approval of the plan by DPE was put on hold in anticipation of impending approvals to Glendell MOD 4 and MOCO MOD3. Following the receipt of these approvals, the WMP has been reviewed and updated to incorporate these modifications. This has resulted in administrative changes only and therefore further consultation with external stakeholders is not considered necessary. This previous revision of the WMP was approved by DPE in September 2020.

An update to the WMP was undertaken in June 2021 following approval of MOCO MOD6.

The latest revision of the WMP was undertaken in August 2023. This documents was updated following approvals of MOCO Mod7 in May 2023, but as the changes were minor or administrative in nature, no further consultation was made in accordance with Schedule 2 condition 18 of SSD-5850 (MOD7).

DPE's approval of the latest WMP is presented in **Appendix B**.

Version and revision history of this document is provided in *Section 8*

From November 2019, consultation records can be found on the DPE major projects website.

The approved WMP is published on the MGO website.

## 2. Planning

### 2.1 Catchment Context

MGO is located within the catchments of Bowmans Creek and Glennies Creek. Both Bowmans Creek and Glennies Creek flow into the Hunter River to the south of the site. The Bowmans Creek catchment includes the sub-catchments of Stringybark Creek, Yorks Creek, Swamp Creek and Bettys Creek. The Glennies Creek catchment includes the sub-catchment of Main Creek. Bettys Creek has been the subject of three approved diversions known as the Upper, Middle and Lower Bettys Creek diversions. Both Yorks Creek and Swamp Creek have also been the subject of approved diversions (refer to **Creek Diversion Management Plan**).

### 2.2 Water Management Strategy

MGO defines three categories of water (clean, dirty and mine) to effectively manage water across the complex and to mitigate any potential for environmental harm to occur. Each category of water requires different management measures to minimise the risk of contamination of downstream drainage systems. A description of the water quality and potential sources for the three categories of water are summarised in **Table 2.1**. Detailed performance criteria and associated TARPs are included in the **Surface Water Management and Monitoring Plan** and the **Surface Water and Groundwater Response Plan** respectively.

Table 2.1 Water Categories and Design Criteria

Water Category	Description	Target Design Criteria
<b>Clean Water</b>	Runoff from undisturbed or rehabilitated areas where vegetation is fully established and where the water quality is suitable for release/discharge; and raw water imported under licence.	Suitable for release, where practicable, to downstream environment.
<b>Dirty Water</b>	Runoff from disturbed areas, such as active overburden emplacement areas or overburden emplacement areas where vegetation is not fully established. These areas have the potential for elevated suspended solids.	Managed in line with the Blue Book (Managing Urban Stormwater: Soils and Construction Volume 1 and Volume 2E).
<b>Mine Water</b>	Water exposed to coal or used in coal processing and runoff within Mining Infrastructure Areas. Mine water includes water associated with groundwater inflows into open cut pits. This water may be highly saline and/or contain pollutants such as hydrocarbons.	Contained for events up to and including the 1% AEP, 24 hour storm event (equivalent to the 100 year ARI, 24 hour storm event).

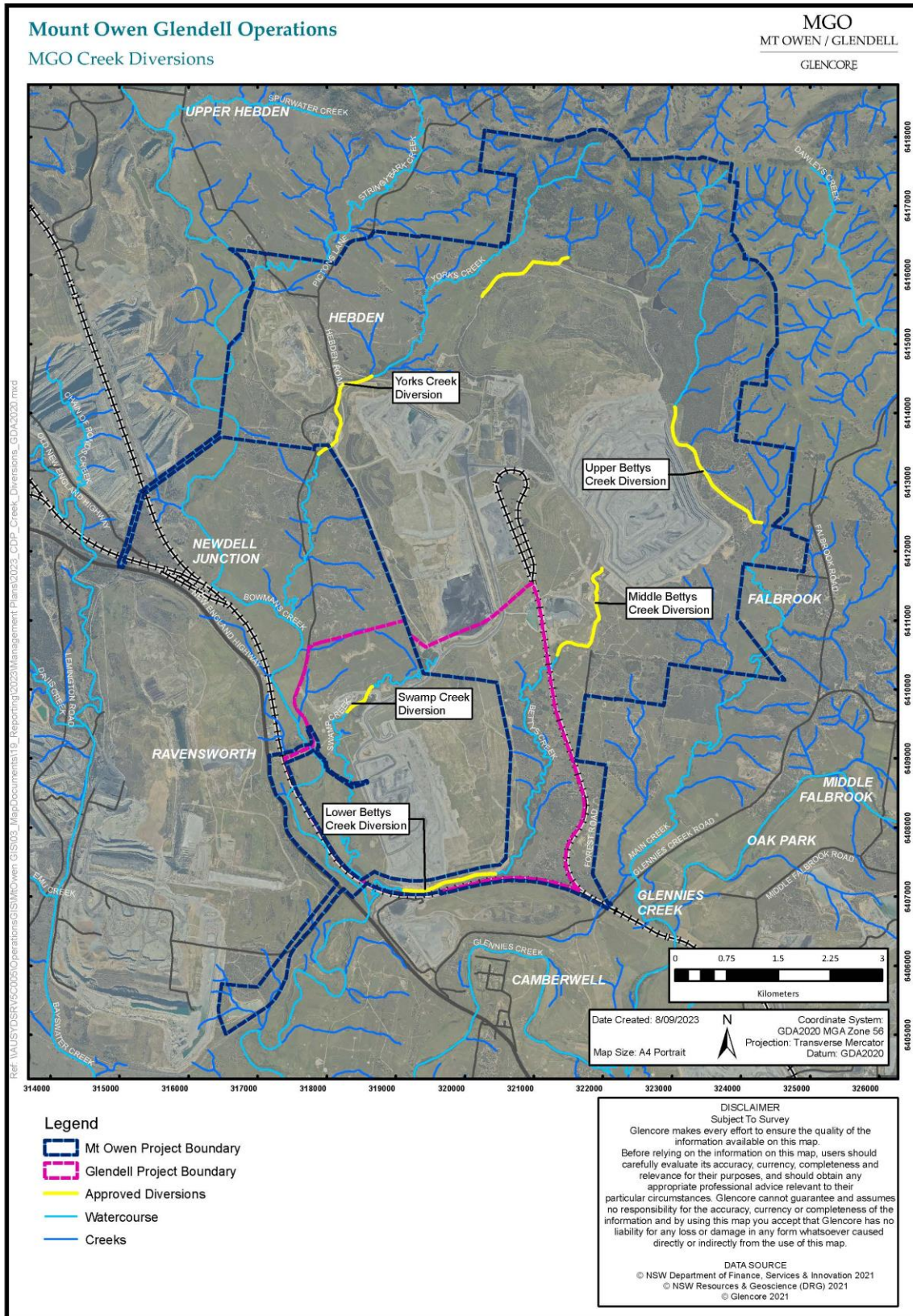


Figure 2-3 MGO Creek Diversions

## 2.2.1 Clean Water Management

The clean WMS includes a series of diversion and catch drains and clean water dams around the perimeter of the operation in order to capture and maximise diversion of upstream catchment runoff away from active mining areas. Diversion drains will be sized to convey the 1% AEP, 24 hour storm event (equivalent to the 100 year ARI, 24 hour storm event) and will be constructed to enable design flow velocities to be non-scouring. Rock protection will be used where necessary to prevent erosion.

## 2.2.2 Dirty Water Management

Dirty water will be managed using a series of catch drains and sediment basins located to capture and manage runoff from disturbed areas. The dirty WMS is designed generally in accordance with Managing Urban Stormwater: Soils and Construction including Volume 1, Volume 2A – Installation of Services, Volume 2C – Unsealed Roads, Volume 2D – Main Road Construction and Volume 2E Mines and Quarries; to manage runoff from the 5 day, 95th percentile rainfall event.

Further information on the management of dirty water is contained within the MGO ***Erosion and Sediment Control Plan*** and ***Surface Water Management and Monitoring Plan***.

## 2.2.3 Mine Water Management

Mine water will be contained within the WMS in storages (including pit voids) suitably designed, installed and maintained to convey and contain runoff from the 1% AEP, 24 hour storm event (equivalent to the 100 year, 24 hour ARI storm event). The mine WMS is designed to minimise the risk of uncontrolled discharges of mine water to downstream watercourses.

Tailings storage areas will be suitably designed, installed and maintained to encapsulate and prevent the migrating of tailings seepage offsite. Overburden will be monitored for saline seepage as per the ***Surface Water Monitoring and Management Plan***.

Water exposed to hydrocarbons within the pit-top facilities (mine infrastructure area) is treated by an oil-water separator. To reduce the risk of spills, chemical and hydrocarbon products are stored in bunded areas in accordance with the relevant Australian Standards.

The GRAWTS has facilitated sharing of water between MGO and the surrounding mining operations. MGO has approval for the following transfers:

- Receipt of mine water from Integra Underground (approved under MOCO MOD1); and
- Two-way sharing of water with Liddell Coal Operations (LCO) and Ravensworth Operations (approved under MOCO MOD7).

The following pipeline infrastructure has been approved through modifications:

- MOCO MOD1 authorised the construction of a pipeline from Integra Underground to Mt Owen MIA;
- MOCO MOD6 authorised realignment of the Narama Pipeline to the south of the Barrett Pit; and
- MOCO MOD7 authorised additional pipelines from the Mt Owen MIA to LCO.

Where relevant, pipelines are constructed in accordance with the Guidelines for Controlled Activities on Waterfront Land (DPI, 2007) and erosion and sediment controls are installed in accordance with Managing Urban Stormwater: Soils and Construction (Landcom 2004). Further information is found within the approved Mount Owen Complex ***Erosion and Sediment Control Management Plan***.

## 3. Implementation

### 3.1 Water Management System

The key components of the MGO WMS are presented in *Figure 3-1* and are outlined in Table 3.1. These include mine water storages, sediment dams and tailings storage facilities. The main changes to the WMS features are the progressive rehabilitation of the decommissioned tailings dams (Stage 2 Tailings Dam, TP1, ERP and RW Pit), the commissioning of BNP as void water storage following the completion of mining around 2023 and the progressive construction of various sediment dams as mining and rehabilitation progress. Decommissioned tailings dams will be managed for captured rainfall and catchment runoff.

Conceptual water management system layouts were prepared to support the EIS/Approval Processes for the MOCO Project and the Glendell Mine Approval (refer to *Figure 3-2* to *Figure 3-4* and *Figure 3-5* to *Figure 3-7* respectively). These layouts provide a strategic overview of water management on site. Actual water management may vary from what is proposed in these layouts.

Table 3.1 MGO Water Management System Features

Dam Name	Status	Water Category	Capacity (ML)	Maximum Surface Area (ha)
Raw Water Dam (RWD)	Active	Mining	96	2.6
Environmental Control Dam (ECD)	Active	Mining	294	5.8
Rail Loop Dam (RLD)	Active	Mining	100	4.8
Fresh Water Dam (FWD)	Active	Clean	8	0.5
Western Rail Dam (WRD)	Active	Mining	449	4.8
Dam 22	Active	Mining	50	1.2
Dam 5	Active	Mining	14	2.0
Bayswater North Pit (BNP)	To be commissioned as void storage in 2023-24 following completion of mining	Mining	Approximately 35,000 <sup>^</sup>	Approximately 60
West Pit	Active tailings void	Mining	Reduces as tailings are deposited	12.8
Stage 2 Tailings Dam	Decommissioned tailings dam	Mining	–	12.4

Dam Name	Status	Water Category	Capacity (ML)	Maximum Surface Area (ha)
RW Pit	Decommissioned tailings dam	Mining	–	5.6
ERP	Decommissioned tailings dam	Mining	–	16.8
TP1	Decommissioned tailings dam	Mining	–	45.5
Industrial Dam	Active	Mining	10	0.3
Pollution Control Dam (PCD)	Active	Mining	1	0.1
Transfer Dam (TD)	Active	Mining	1	0.1
Dam 23	Active	Mining	4	0.5
Dam 24	Active	Mining	2	0.2
Sediment dams	Various	Dirty	Various	Various

^ Estimated maximum storage capacity (i.e. volume of spill crest) of BNP

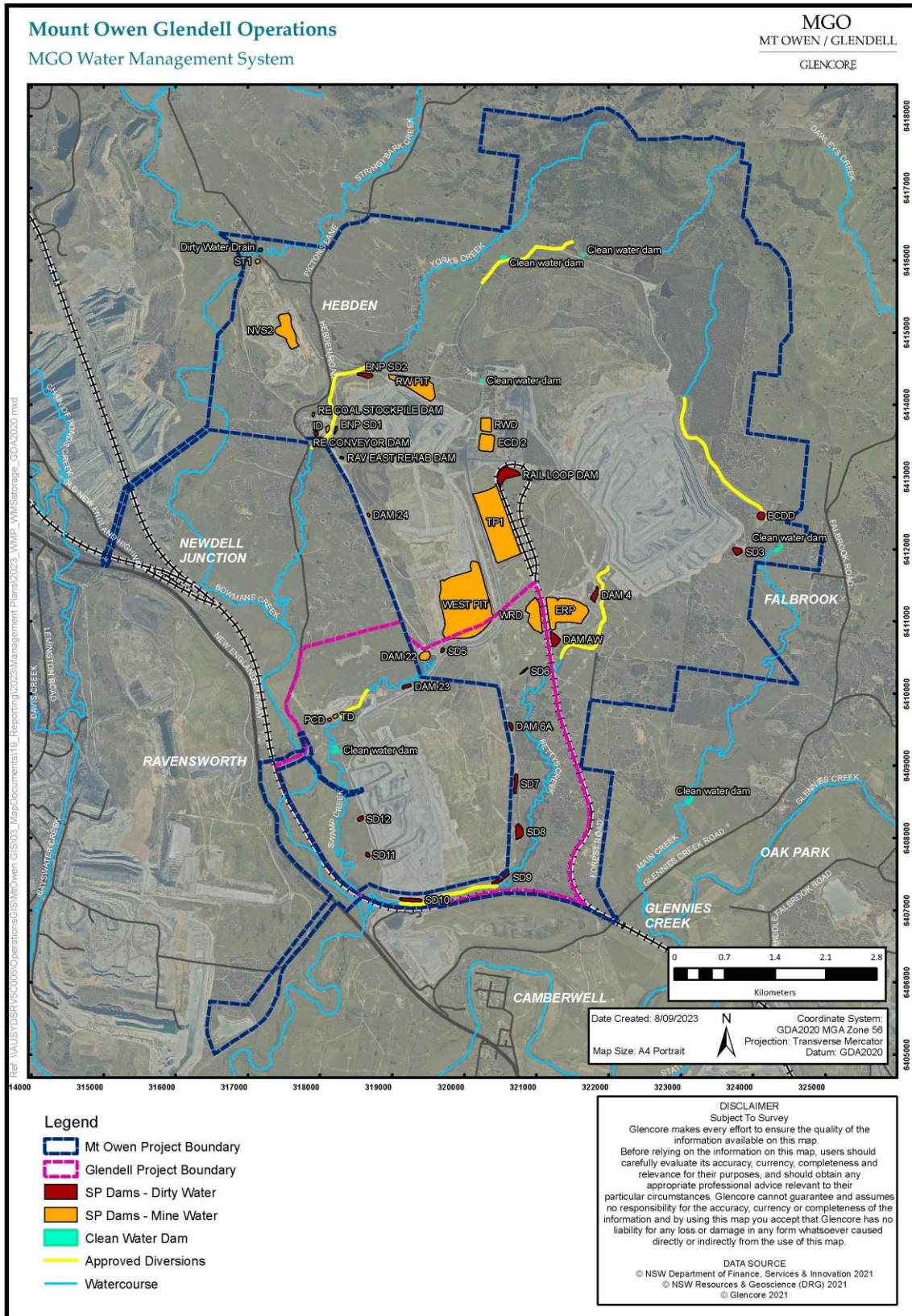


Figure 3-1 MGO Water Management System

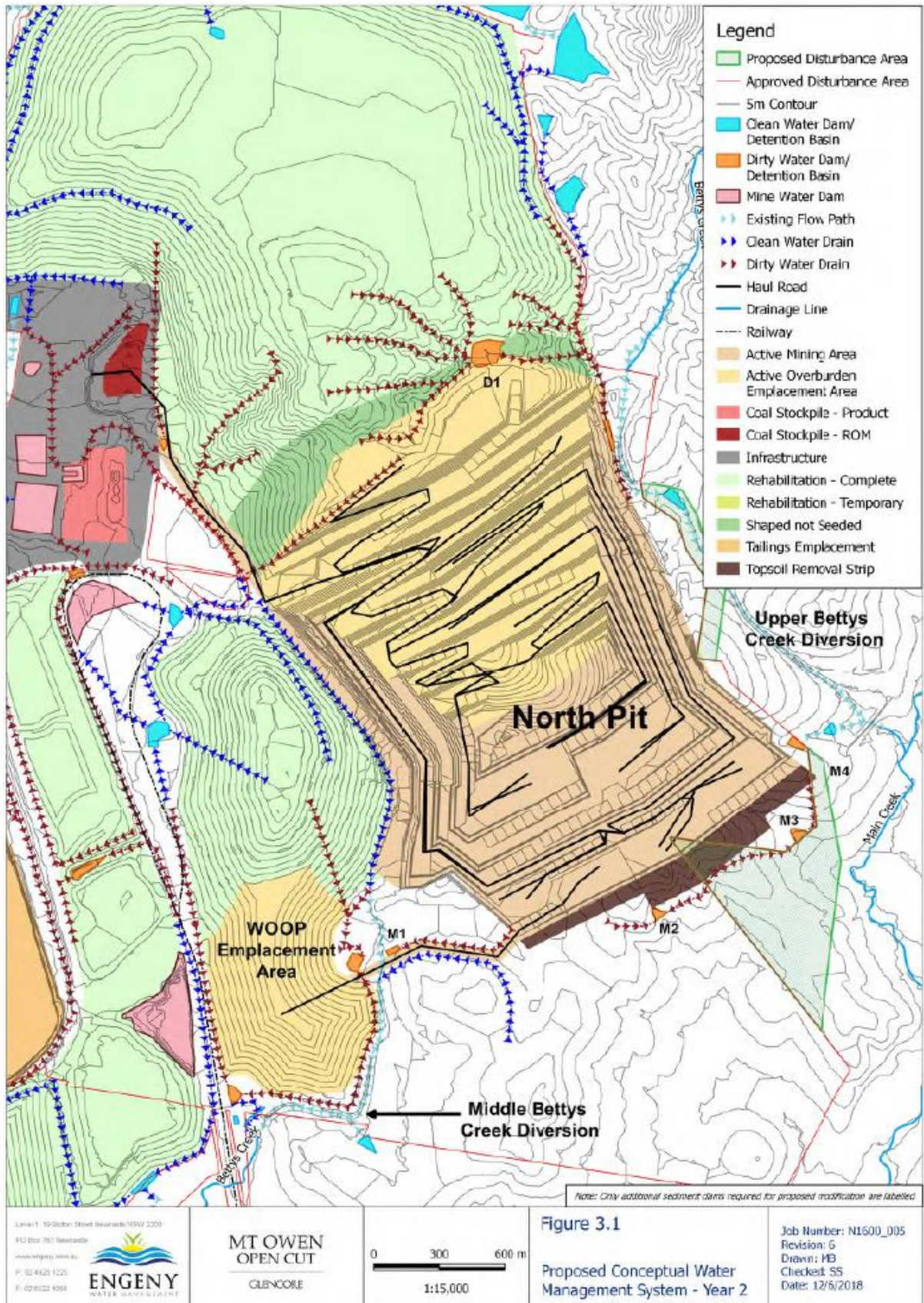


Figure 3-2 Conceptual WMS – MOCO Project – Year 2

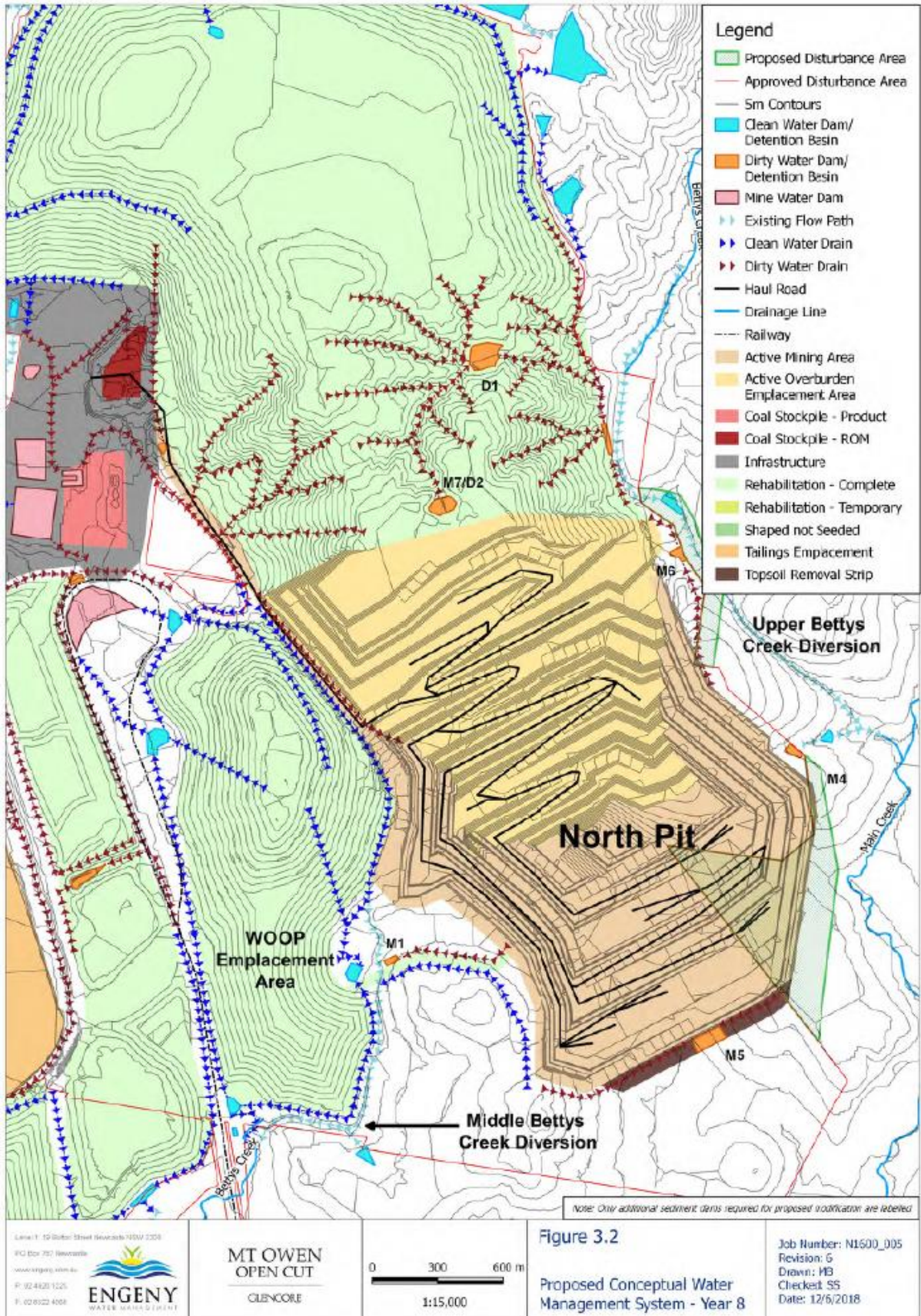


Figure 3-3 Conceptual WMS – MOCO Project – Year 8

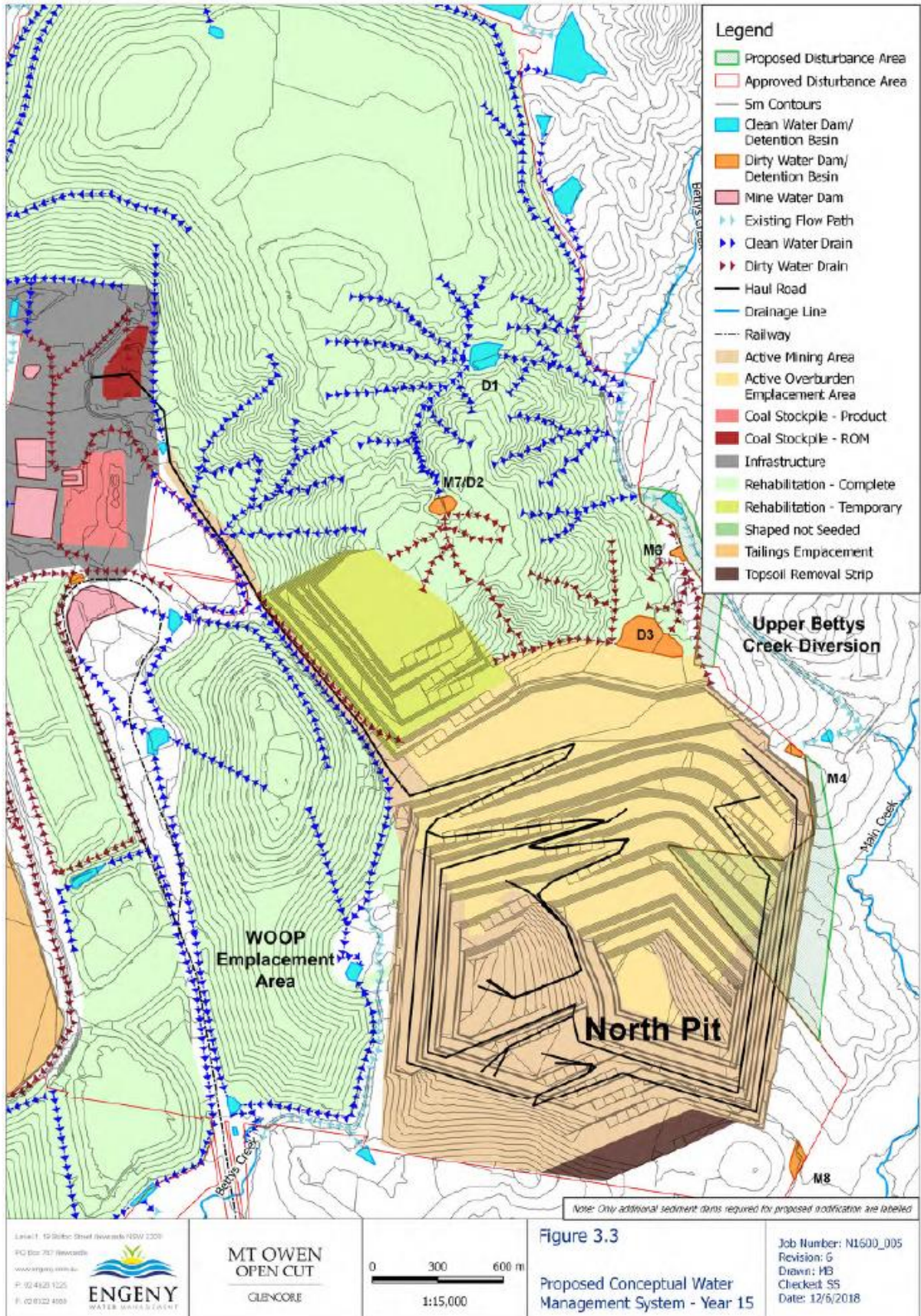


Figure 3-4 Conceptual WMS – MOCO Project – Year 15

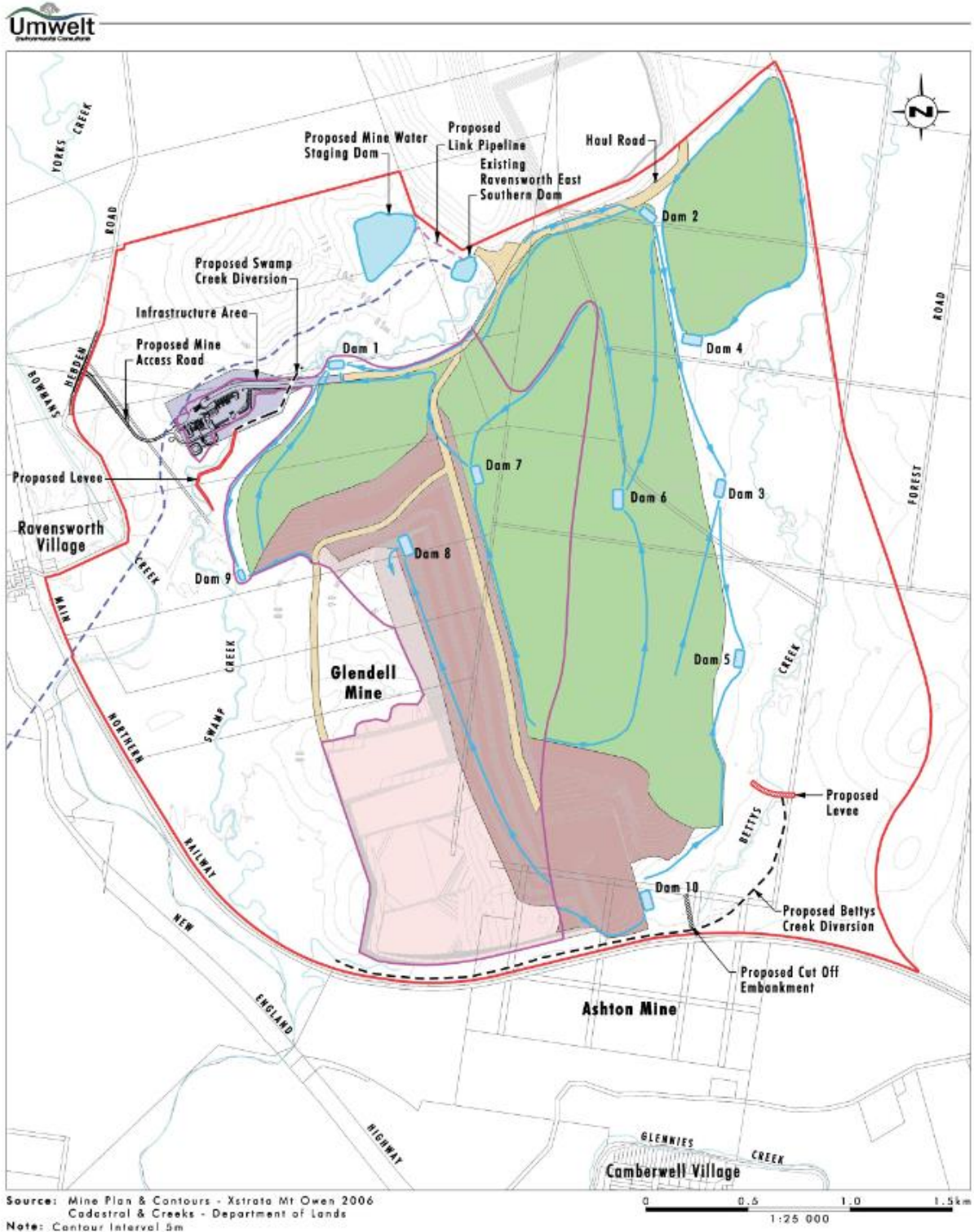


Figure 3-5 Conceptual WMS – Glendell Mine – Year 9

FIGURE 3.4  
 Concept for Proposed Water Management Controls Year 9

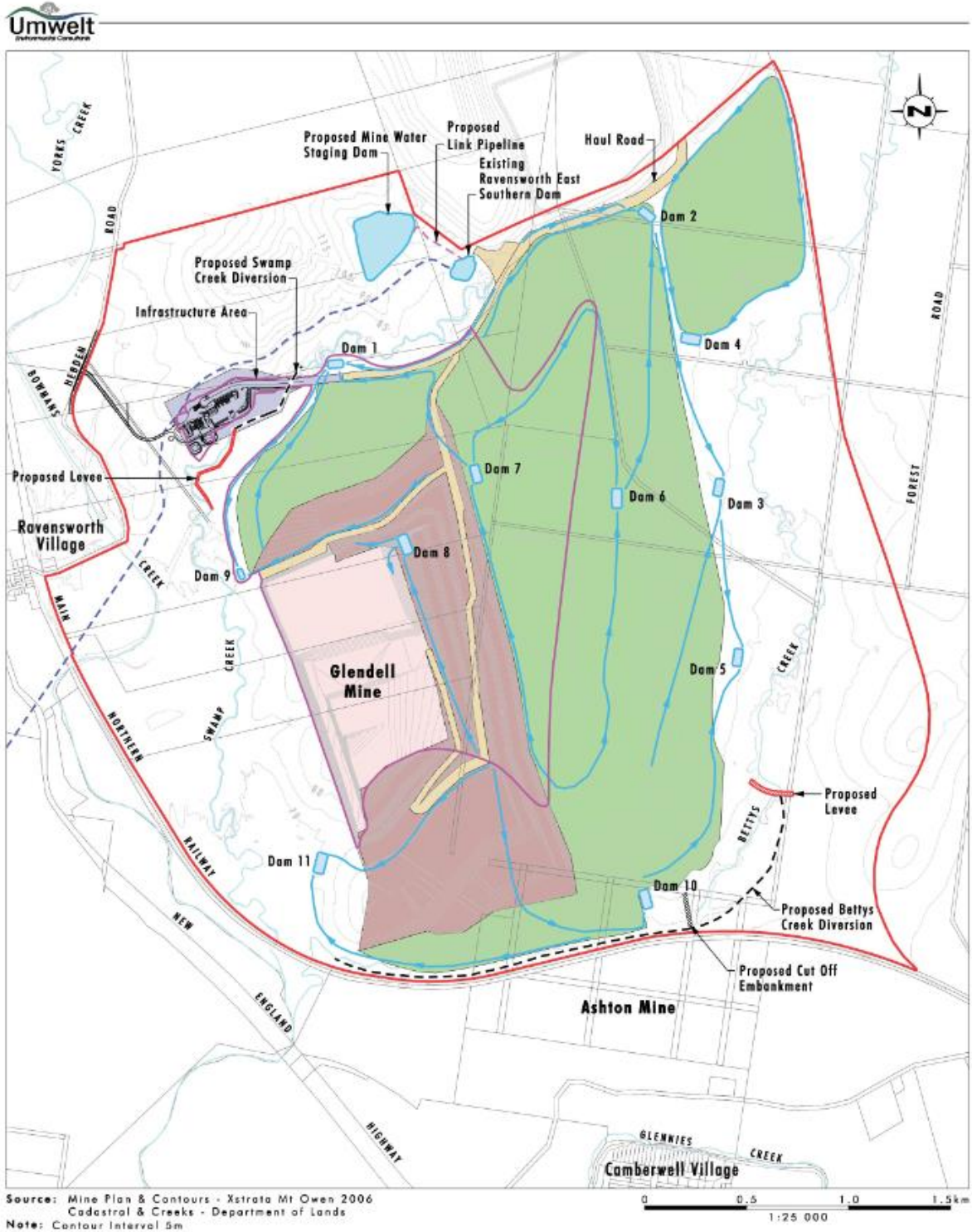
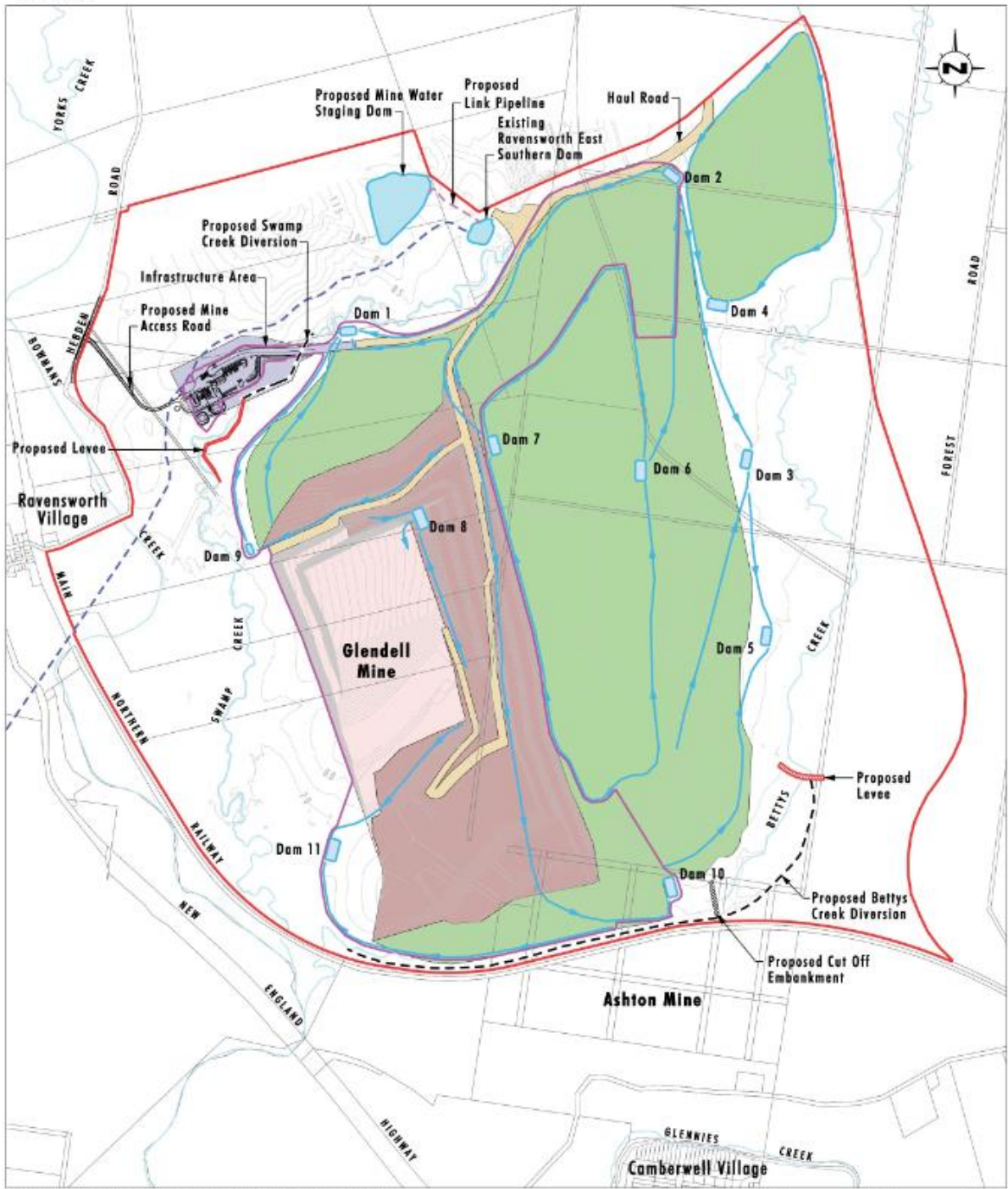


Figure 3-6 Conceptual WMS – Glendell Mine – Year 12



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- Legend**
- Glendell DA Boundary
  - Active Mining Area
  - Glendell Infrastructure Area
  - Haul Road
  - Unshaped Overburden Area
  - Rehabilitation
  - Dam
  - Mine Water Management System Catchment
  - Catch/Diversion Drains
  - Nerama Pipeline
  - Link Pipeline
  - Creek Diversion
  - Creek

**Concept for Proposed Water Management Controls Year 15**

Figure 3-7 Conceptual WMS – Glendell Mine – Year 15

## 3.2 Water Management Infrastructure

Water is transferred around site using the MGO pump and pipeline infrastructure. Pipelines are inspected regularly as per the GCAA **Pipeline Protocol** (CAA HSEC PCL 0010 11.02 Pipeline Management). The Integra Underground water transfer pipeline (as approved under MOCO MOD1), Narama Pipeline (as approved under MOCO MOD6) and operational efficiencies between LCO and MGO (as approved under MOCO MOD 7) will be managed and monitored in accordance with the **GCAA Pipeline Protocol**. Inspection frequency is risk based depending on water quality being transferred and the environment in which the pipeline is located. The pipeline network is quite dynamic and may change over time based on need and location of mining and in-pit water.

## 3.3 Regional Water Impacts Management Protocol

MGO forms part of the GRAWTS which involves transfer of water between MGO, Ravensworth Operations, Liddell Coal Operations and Integra Underground Mine. Water transfers are managed with operational triggers and the management of the scheme is reviewed on a monthly basis. Management of the GRAWTS is discussed at regular Greater Ravensworth management meetings in conjunction with the Greater Ravensworth Water and Tailings Manager.

GCAA also has an existing arrangement with Rixs Creek North Mine to review cumulative impacts and water sharing opportunities on a semi-regular basis. Under this arrangement, the GRAWTS has opportunity for reuse of the excess water at Rixs Creek North Mine from groundwater make during drier than average climatic conditions.

### 3.3.1 Cumulative Impacts

The existing GRAWTS allows for water excesses and deficits at individual sites to be offset by transfers between sites as part of normal operations. This maximises the reuse of mine water in the system as a whole, which therefore minimises extractions from water sources and discharges to the environment.

GRAWTS participates in the HRSTS. This scheme shares and schedules the discharge of saline water at times of high river flows such that salinity targets are not exceeded. By participating in this scheme, MGO minimises cumulative impacts on water quality in the Hunter River downstream of MGO and nearby mines.

### 3.3.2 Water Sharing

The existing GRAWTS allows for water excesses and deficits at individual sites to be offset by transferring and storage of water between sites as part of normal operations. MOCO MOD 1 has further approved the transfer of mine water from Integra Underground to MGO for the purposes of storage within the GRAWTS. MOCO MOD7 facilitated unlimited sharing of water with LCO and Ravensworth Operations (in both directions). Water sharing is also available with Rix's Creek North Mine which has allowed the transfer of additional water into GRAWTS to further reduce the requirement to import water from other sources such as Glennies Creek.

### 3.3.3 Coordination of Water Quality Monitoring

To characterise the quality of water from nearby mines, in isolation of the operations at MGO, a record of the water quality in the storages at nearby mines from which water is directly transferred is included in the MGO water quality monitoring program.

### 3.3.4 Joint Investigations

If the trigger levels described in any of the sub-plans listed in *Section Error! Reference source not found.* are exceeded and cumulative impacts are considered likely, MGO will liaise with the relevant nearby mines to undertake a joint investigation of the exceedance.

## 3.4 Site Water Balance

The development consent conditions for MOCO and Glendell Mine specify requirements for the preparation of a site water balance. The site water balance for MGO is used to assist in the management and reporting of water use at the site and in the assessment of water supply. The site water balance is reviewed on an annual basis and the results are reported in the Annual Review (refer to *Section 4.1.1*).

An aerial map of all of the MGO water storage locations is provided in Figure 3-1 while a schematic showing the interactions of the key mine WMS components is presented in *Figure 3-8*.

The sources, uses, disposal of water and the site water balance are outlined in *Section 3.4.1*, *Section 3.4.2*, *Section 3.4.3* and *Section 3.5* respectively.

### 3.4.1 Water Sources

The sources of water supply to MGO are:

- direct rainfall onto the surface of water storages (clean water);
- Runoff captured from undisturbed or rehabilitated areas (clean water);
- runoff captured from the footprint of the mining disturbance area by the WMS (mine water), including seepage from overburden emplacement areas (potentially saline);
- water captured via Sedimentation Dams (dirty water);
- water imported from the GRAWTS or a nearby mine (mine water);
- water extracted from Glennies Creek in accordance with a Water Access Licence (clean water); and
- groundwater inflows to the open cut mining pits (mine water).

#### 3.4.1.1 Runoff from Mining Disturbance (Mine Water)

The respective catchment areas over the course of mining are influenced by the following assumptions:

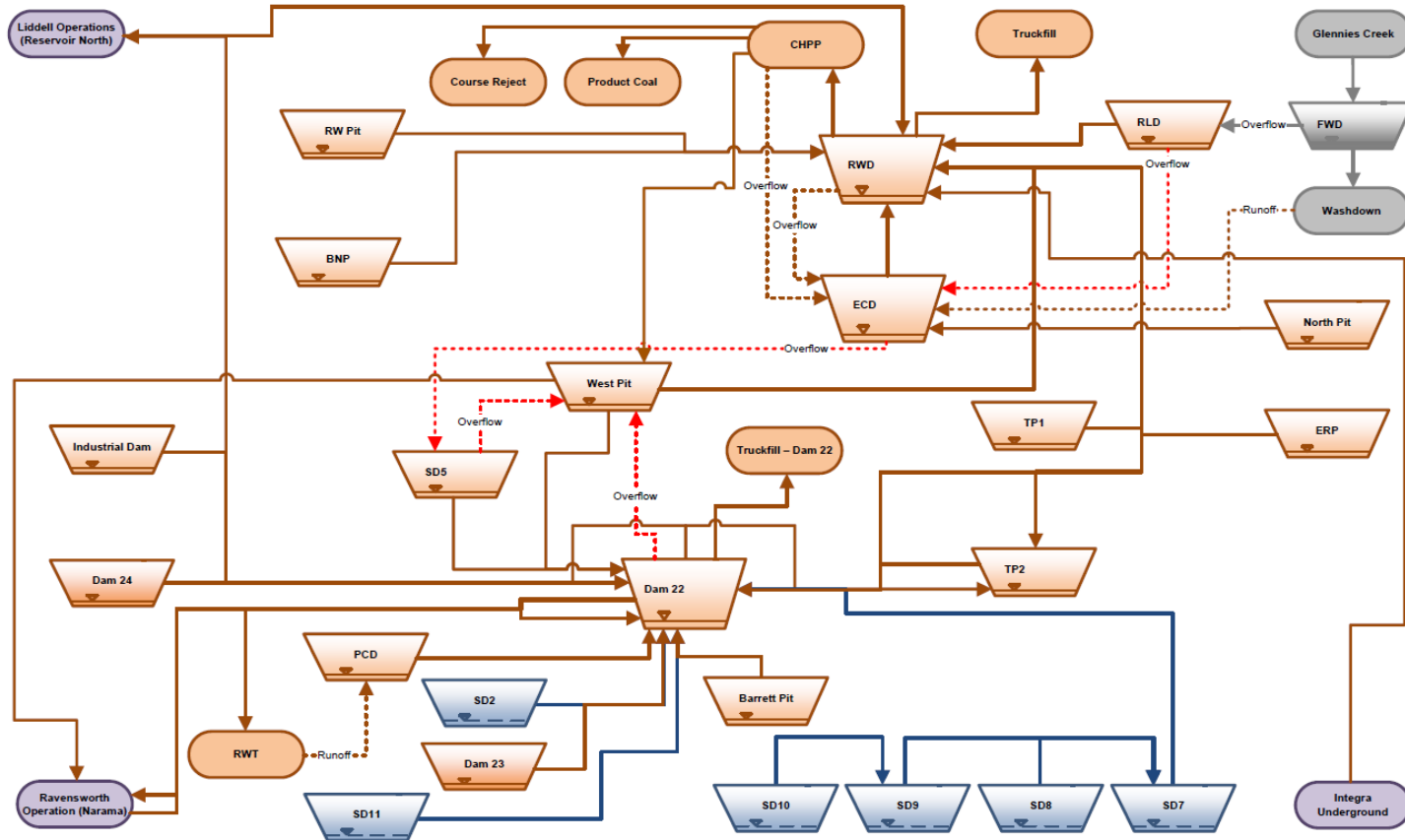
- the West Pit void will be utilised as a tailings emplacement area for the Mt Owen CHPP and for the GRAWTS;
- mining will cease in the BNP in approximately 2022, with the void to be utilised as a potential future water or tailings storage area with rehabilitation of the area to be completed in line with the Mining Operations Plan (MOP);
- North Pit catchment area is rehabilitated and runoff from established rehabilitation areas will be diverted off-site in accordance with the Mt Owen Continued Operations Project Environmental Impact Statement (EIS);

- Western Out of Pit (WOOP) Dump and associated Rail Loop Dam catchment areas will be fully rehabilitated and diverted off site in accordance with the Mt Owen Continued Operations Project EIS;
- Stages 1 and 2 catchment areas are fully rehabilitated, however, these will continue to contribute to the MGO WMS catchment area;
- Eastern Rail Pit catchment area is fully rehabilitated and does not contribute to the MGO WMS catchment area;
- Glendell Mine catchment area and out-of-pit dump will be rehabilitated and diverted off site in accordance with the Environmental Assessment for Modification of Glendell Mine Operations (Umwelt, 2007) (Glendell MOD2).

Rainfall is recorded at the two weather stations located at the MGO. However, long term rainfall records used in developing the water balance were sourced from the Bureau of Meteorology station at Jerrys Plains, which is located approximately 15 km from the MGO which has records that date back to 1898. The typical annual rainfall for the area is approximately 650 mm per annum.

#### 3.4.1.2 Sedimentation Dams (Dirty Water)

Sedimentation dams will be managed in accordance with the requirements of *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom 2004) and *Volume 2E Mines and Quarries* (DECC 2008). Permanent sediment dams will be maintained with adequate capacity to contain the site specific 5 day, 95th percentile rainfall depth. Any water with less than adequate water quality (with total suspended solids concentration greater than 50 mg/L) will be pumped back to the mine WMS and reused on site. More detail on management of sedimentation dams is contained in the MGO ***Erosion and Sediment Control Plan***.



- LEGEND**
- Surface water transfer
  - ▭ Storage
  - ▭ Dirty water system
  - ▭ Mine water system
  - ▭ Fresh water system

Figure 3-8 MGO Water and Salt Balance Flow Paths

### 3.4.1.3 Imported water via the GRAWTS (Mine Water)

Where practical, MGO seeks to use surplus mine water from other operations in preference to fresh water from Glennies Creek or clean catchment runoff. Infrastructure is in place via the GRAWTS to transfer mine water between GCAA mining operations in the Greater Ravensworth Area (that is, Liddell Coal Operations, MGO, Ravensworth Operations and Integra Underground). MGO is continually seeking new opportunities to introduce mine water sharing schemes with other mines. Communication across operations as part of GRAWTS will be managed through the **Greater Ravensworth Water Operations Manual** which requires confirmation by all involved operations prior to transfer. Water is also imported to MGO within the tailings received as part of the GRAWTS. Bleed water from the tailings is recovered and reused in the CHPPs at Mt Owen and Ravensworth Operations.

### 3.4.1.4 Water Extracted from Glennies Creek (Clean Water)

MGO holds WALs to extract up to 1056 units of high security water and 858 units of general security water from Glennies Creek (refer **Table 1-7**). WAL 7814 is a high security licence allowing extraction of 1,000 ML from Glennies Creek. MGO and Integra Underground (both owned by Glencore) will share the access rights under this licence in accordance with the requirements of DPI – Water and will report water take in the Annual Review.

Water extracted from Glennies Creek is generally used for potable water activities such as use in the administration offices, workshop, bath houses and for the fire-fighting system and washdown of plant and vehicles.

### 3.4.1.5 Groundwater Inflows (Mine Water)

Open cut mining within the MGO intercepts the groundwater system. Saline groundwater that accumulates within mining pits is pumped to surface storages for reuse within the mine WMS.

## 3.4.2 Water Use and Management

The water uses on site include:

- gross water requirements for the CHPP, which includes water lost to product coal, coarse rejects and tailings, washdown water and water for stockpile dust suppression;
- dust suppression of haul roads, stockpiles, etc.;
- exported water via the GRAWTS; and
- potable water uses (refer to **Section 3.4.1.4**).

The main water losses are attributable to evaporation from the surfaces of water storage dams/pits and tailings dams.

Managing water demand and maximising reuse of water on-site, so as to minimise the import/use of potable/clean water, is an important aspect of the water management strategy at MGO.

### 3.4.2.1 CHPP

The Mt Owen CHPP is the major water user at the MGO. Water from the coal handling and preparation process either remains within the product coal (9.8% moisture) or coarse reject material (14 % moisture) or pumped as tailings slurry (pumped tailings solids 31.6% by weight) to tailings emplacement areas. Most of the water entrained in tailings is salvaged from the tailings emplacement areas and recirculated into the mine WMS. However, some water remains bound in with the tailings

and is not recoverable. The gross water requirement of the CHPP is approximately 400 L/tonne of ROM coal. However, the net water loss, once recycling from the tailings is accounted for, is approximately 200 L/tonne ROM coal.

#### 3.4.2.2 Tailings Water

Tailings emplacement areas can retain between 25% and 50% (by weight) water. The balance of the water is decanted from the tailings and reused in the mine WMS. Typically, the design of the tailings emplacement areas results in a 'beach' forming at one end of the emplacement area and a pond where the water is recovered at the other. Active and planned tailings dams at MGO are detailed in **Table 3.2**.

Table 3.2 Tailings Emplacement Areas at MGO

Tailings Dam	Area (Ha)	Planned Decommissioning	Capping Completed	Rehabilitation Completed
NVS1	11	Complete	Complete	Complete
NVS2	34	Complete	2029	2033
TP1	42	Complete	2028	2032
RW Pit	10	Complete	2027	2031
ERP	19	Complete	2025	2029
West Pit	76	End of Mine Life	End of Mine Life	End of Mine Life

#### Note

All timeframes indicated in Table 3.2 are indicative only. Factors that may influence this plan include drying rates of the tailings dams and approvals.

#### 3.4.2.3 Tailings & Water Management

Alternative methods of managing tailings and water may be implemented as required depending on the needs of the operation. While this may result in variations to piping and pumping infrastructure, any changes will remain within the current operational areas, project approval boundaries and approved tailings disposal areas. Such innovations may be implemented if feasible and superior to the currently available technologies and methods, and the environmental impacts of such Technologies and methods are generally in accordance with the Modification.

#### 3.4.2.4 Dust Suppression

The volume of water required for dust suppression will vary according to prevailing climatic conditions, the extent of haul road development and the usage of the haul roads. Dust suppression water use is reported each year in the Annual Review.

### 3.4.2.5 Potable Water Usage

MGO holds WALs to extract water from Glennies Creek for use as potable water in the administration offices, workshop and bath house. Potable water is imported via trucks at Glendell and Ravensworth East for use in the administration, bath house and workshop areas.

### 3.4.2.6 Wastewater Effluent Disposal

Wastewater from the administration offices, workshop and bath houses is collected and treated on site in a number of aerated wastewater treatment plants. At the Mt Owen Mine administration offices and workshop complex the effluent is then used to irrigate a 3 ha tree-lot. At the Ravensworth East Mine workshop, the effluent is handled by the site waste contactor and treated at an offsite facility. At the Glendell infrastructure area, the wastewater is treated then reused within the mine WMS.

## 3.4.3 Discharges

No saline water discharges to the surrounding creek systems are authorised under the EPLs for the MGO.

MGO will share water with other Glencore operations via the GRAWTS (refer to Section 3.4.4 for management of off site water transfers). Where the GRAWTS is in surplus to requirements for all operations, discharges may be required. These discharges will occur via the licensed discharge points at either Ravensworth Operations or Liddell Coal Operations (LCO) which are also part of the GRAWTS. Discharges from the Ravensworth Operations and LCO will be managed by these operations and undertaken in accordance with the relevant conditions of their respective EPLs. There is no current intention to discharge directly from MGO.

## 3.4.4 Off Site Water Transfers

Water can be imported to and exported from the MGO WMS to neighbouring GCAA-owned operations including Ravensworth Operations, LiCO and Integra Underground Mine. There is also a commercial agreement for water sharing with Rixs Creek North Mine.

MOCO MOD7 removed volumetric limitations on transfers between MGO, LCO and Ravensworth Operations. Indicative transfer rates are provided in **Table 3-3**.

Table 3.3 Potential Water Impact and Export Rates

Operation	Indicative Rates from MGO		Indicative Rates to MGO	
	Daily Rate		Daily Rate	
Liddell Coal Operations	13.82 ML/day		18.9 ML/day	
Ravensworth Operations	13.82 ML/day		86.92 ML/day	
Integra Underground Mine	N/A		9.94 ML/day	

## 3.4.5 Water Balance Predictions

A site water balance model has been developed to simulate the proposed mining and coal handling characteristics. This model considers existing and future operations and is used to predict water

surplus and requirements into the future. The model allows detailed analysis and calibration of the MGO water balance and considers:

- direct rainfall onto dam/water storage surfaces;
- water loss due to evaporation from water storages and pits;
- runoff from natural, rehabilitated and disturbed catchment areas;
- groundwater inflow to open cut pits;
- water lost to product coal through the CHPP and ROM coal through the crusher;
- water used for on-site dust suppression (haul roads and stockpiles);
- transfers to and from other sites via the GRAWTS; and
- extraction from Glennies Creek.

This model forms part of a water and salt balance model for the Greater Ravensworth Area. The WMS is simulated using a historical time series of daily rainfall data to represent a wide range of possible rainfall conditions.

A summary of the average inputs and outputs for the WMS is provided in **Table 3.4**.

*Table 3.4 Summary of Average Water Balance Results*

Water Management Element	2017 (ML/year)	2020 (ML/year)	2025 (ML/year)
<b>INPUTS</b>			
Direct rainfall and catchment runoff	2,085	2,225	2,275
Groundwater inflows into open cut pits	704	1,154	494
Imports from GRAWTS	2,504	3,292	3,276
Extractions from Glennies Creek	161	175	146
Bleed water recovered from tailings	4,753	6,102	1,057
<b>Total inputs</b>	<b>10,206</b>	<b>12,949</b>	<b>7,248</b>
<b>OUTPUTS</b>			
Evaporation from storages	486	528	629
CHPP usage	5,568	5,829	2,872
Dust suppression usage	1,099	1,071	647
Exports to GRAWTS	1,597	5,064	2,782
Release from Sediment Dams	77	71	80
<b>Total Outputs</b>	<b>8,826</b>	<b>12,563</b>	<b>7,010</b>
<b>CHANGE IN STORAGE</b>	<b>1,380</b>	<b>385</b>	<b>238</b>

Water Management Element	2017 (ML/year)	2020 (ML/year)	2025 (ML/year)
BALANCE	0	0	0

Figure 3-9 presents the total stored water volume at MGO predicted by the site water balance model. Note that the total capacity for water storage steadily declines from 2020 due to the filling of West Pit with tailings and increases in 2023 due to the completion of mining in BNP, which then becomes available for the storage of water.

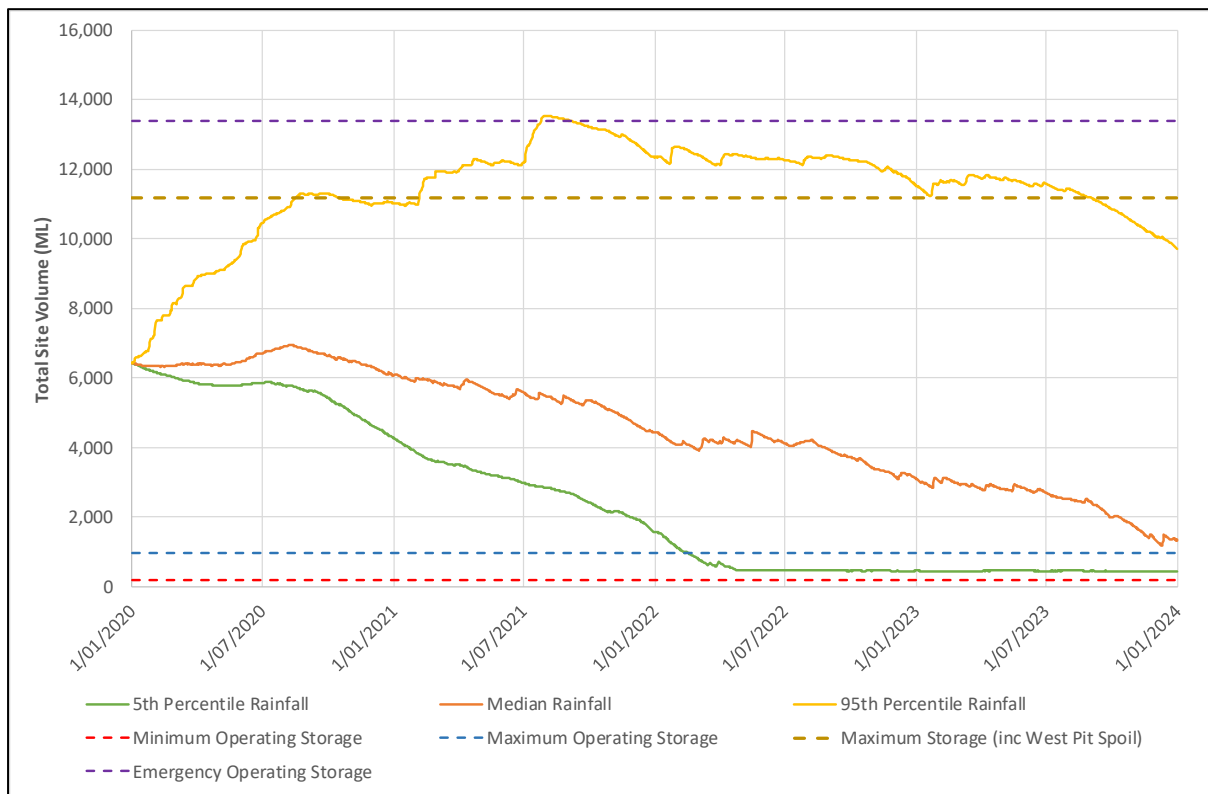


Figure 3-9 Predicted Stored Water Volume

### 3.4.6 Security of Supply

As discussed in Section 3.4.1, water is supplied to MGO from rainfall and catchment runoff captured in surface storages, imported from the GRAWTS and extracted from Glennies Creek under licence. The site water balance model results predict that MGO will have a water surplus which is stored on site in surface water storages or exported to the GRAWTS. The risk of a shortfall of water to meet the daily operational requirements at MGO is low.

In the event that extended dry periods or drought lead to a water shortage, MGO will either reduce production to a level to suit water availability or additional water will be sourced from external sources, including additional water allocations or from other mining operations. Any additional water sources would be obtained in accordance with any relevant approvals and licences.

### 3.4.7 Net Harvestable rights

The total contiguous landholdings at the MGO are currently approximately 8560 ha. Based on the maximum harvestable rights calculator (WaterNSW, 2023), this entitles MGO to capture up to 30% of the annual average runoff from the property by means of dams sited on first or second order streams

with a total volume of no more than 1797 ML. MGO is entitled to capture 30% of the runoff (as opposed to standard of 10%) as it is located within a coastal-draining catchment.

Existing water storages on the contiguous landholdings outside of the water management system at MGO have a total catchment area of about 20.6 ha, with an estimated volume of 165 ML, based on typical average depth of 2 m. This total volume is well within the maximum harvestable rights of MGO, based on the current contiguous landholdings, affording an estimated net harvestable rights entitlement of 1632 ML

### 3.4.8 Decommissioning and Final Landform

Sedimentation dams will be retained until all other rehabilitation measures have been completed and the final landform is stable. Sedimentation dams will be infilled, reshaped and rehabilitated with suitable vegetation covering consistent with the surrounding final landform. Local erosion and sediment control measures will be implemented during this process. Prior to construction activities, Construction Management Plans detailing the specific inspection maintenance and revegetation will be implemented. An overview is included in the MGO **Surface Water Management and Monitoring Plan** with the details of these works being defined further within the Rehabilitation Management Plan (RMP)/Forward Plan and Mine Closure Plans associated with the relevant areas.

Final design of water management structures in the final landform will ensure that water captured is within the licensable allocation that exists at the completion of rehabilitation. As required, this would be achieved through rationalisation of the conceptual final landform WMS as identified in **Appendix C**. This conceptual framework includes:

- consideration of available water allocation calculated in accordance with the harvestable rights provisions and the applicable WAL availability over the life of MGO;
- consideration of the relevant applicability criteria and exemptions that occur for water management structures under these regulatory regimes;
- accurate delineation of water allocation based on volume (harvestable rights) and water take (WAL) to correctly design water management structures within this framework; and
- conceptual licence and accounting framework which includes consideration of final void water licensing requirements to ensure that all relevant water management structures and features in the final landform are captured in an integrated manner.

## 3.5 Site Salt Balance

A site salt balance has been developed as an extension of the site water balance for the Greater Ravensworth Area (refer **Section 3.5**). The salt balance model allows the salt load and salinity of water exported from MGO as part of the GRAWTS to be predicted, which is an important consideration for the management of discharges from Ravensworth Operations under the HRSTS.

Salt transfers were simulated within the site water balance model in parallel with the water transfers. The site salt balance provides the expected salt loads and concentration of salt associated with each water transfer within the model. The site salt balance is reviewed on an annual basis, in association with the review of the site water balance, and the results are reported in the Annual Review (refer **Section 4.1.1**).

### 3.5.1 Saline Material

Saline material is any material moved on site that has the potential to generate saline water. Salt is chemically released by weathering and then has the potential to be transported by water. The sources of saline material at MGO are:

- overburden and interburden;
- ROM coal;
- product coal;
- coarse coal rejects; and
- tailings.

Saline material has the potential to generate saline water through contact. Saline material will be managed through storage and emplacement such that the saline water that is generated is contained in the WMS. The details of the management of the different source of saline material are summarised in **Table 3.5**.

Table 3.5 Management of Saline Material

Source	Management
<b>Overburden and interburden</b>	Emplaced in dumps that are constructed such that runoff is contained in the water management system before being capped and revegetated
<b>ROM coal</b>	Stored in stockpiles before being processed in the CHPP. Stockpiles are constructed such that runoff is contained in the water management system.
<b>Product coal</b>	Stored in stockpiles before being exported off-site. Stockpiles are constructed such that runoff is contained in the water management system.
<b>Coarse coal rejects</b>	Emplaced in dumps that are constructed such that runoff is contained in the water management system. Such dumps are capped and revegetated.
<b>Tailings</b>	Emplaced in tailings dams that are constructed such that runoff is contained in the water management system. Such dams are capped and revegetated.

### 3.5.2 Saline Water

The sources of saline water at MGO are:

- runoff – in addition to the salt released by weathering of the saline material, salt also accumulates by deposition from rainfall in soil. The salt on the surface of the soil or material is dissolved by rainfall and enters the WMS dissolved in runoff;
- groundwater inflows into open cut pits;
- water imported from the GRAWTS; and
- direct rainfall onto mine water storages.

As salt lost via evaporation is negligible, salt concentrates in the water stored and used at MGO. Once dissolved, the salt remains in solution as it is transferred through the MGO WMS, unless the water is discharged via the Ravensworth Complex discharge point (as part of the GRAWTS), in which case the salt is returned to the environment.

Salt passes through the CHPP in solution and either remains with the product coal or coarse reject material or is pumped as tailings slurry in proportion to the water volumes. Salt dissolved in the tailings slurry is either retained in the tailings or transferred in solution with decant water in proportion to the water volumes. Salt dissolved in water used for dust suppression accumulates on the haul roads as the water evaporates. The salt is redissolved when runoff occurs and re-enters the WMS. Salt dissolved in wastewater effluent accumulates on the surface of the irrigation area before being dissolved in runoff.

The sources of saline water at MGO are shown in *Table 3.6*, along with representative salinity values. Runoff parameters were calibrated to observed water quality monitoring. Imported water from the GRAWTS, Glennies Creek and groundwater inflows were derived from monitoring data.

*Table 3.6 Typical Salinity of Water at MGO*

Source	Typical Salinity
Direct rainfall	20 mg/L
Runoff from natural surfaces	250 mg/L
Runoff from rehabilitated surfaces	1,000 mg/L
Runoff from hardstand surfaces	1,500 mg/L
Runoff from tailings	1,500 mg/L
Runoff from open cut pits	2,000 mg/L
Runoff from spoil	2,000 mg/L
Imports from the GRAWTS	3,300 mg/L
Imports from Integra Underground Mine	5,360 mg/L
Groundwater inflows to North Pit	6,400 mg/L
Groundwater inflows to West Pit	5,120 mg/L
Groundwater inflows to BNP	6,400 mg/L
Groundwater inflows to Barrett Pit	5,120 mg/L

### 3.5.3 Salt Balance Predictions

The summary of the predicted salt balance for MGO is shown in *Table 3.7*

Table 3.7 Summary of Average Salt Balance Results

Water Management Element	2017 (tonne/year)	2020 (tonne/year)	2025 (tonne/year)
<b>INPUTS</b>			
Direct rainfall and catchment runoff	2,626	2,728	2,385
Groundwater inflows into open cut pits	3,898	2,483	2,528
Imports from GRAWTS	10,356	18,495	16,906
Extractions from Glennies Creek	60	45	41
Bleed water recovered from tailings	22,627	12,097	4,013
<b>Total inputs</b>	<b>39,567</b>	<b>35,847</b>	<b>25,873</b>
<b>OUTPUTS</b>			
CHPP usage	23,644	21,015	10,736
Dust suppression usage	4,074	2,403	2,636
Exports from GRAWTS	11,261	12,792	12,312
Release from Sediment Dams	60	58	69
<b>Total Outputs</b>	<b>39,039</b>	<b>36,248</b>	<b>25,752</b>
<b>CHANGE IN STORAGE</b>	<b>529</b>	<b>-401</b>	<b>120</b>
<b>BALANCE</b>	<b>0</b>	<b>0</b>	<b>0</b>

The predicted mean salinity of all water stored on site is shown in **Figure 3.10**.

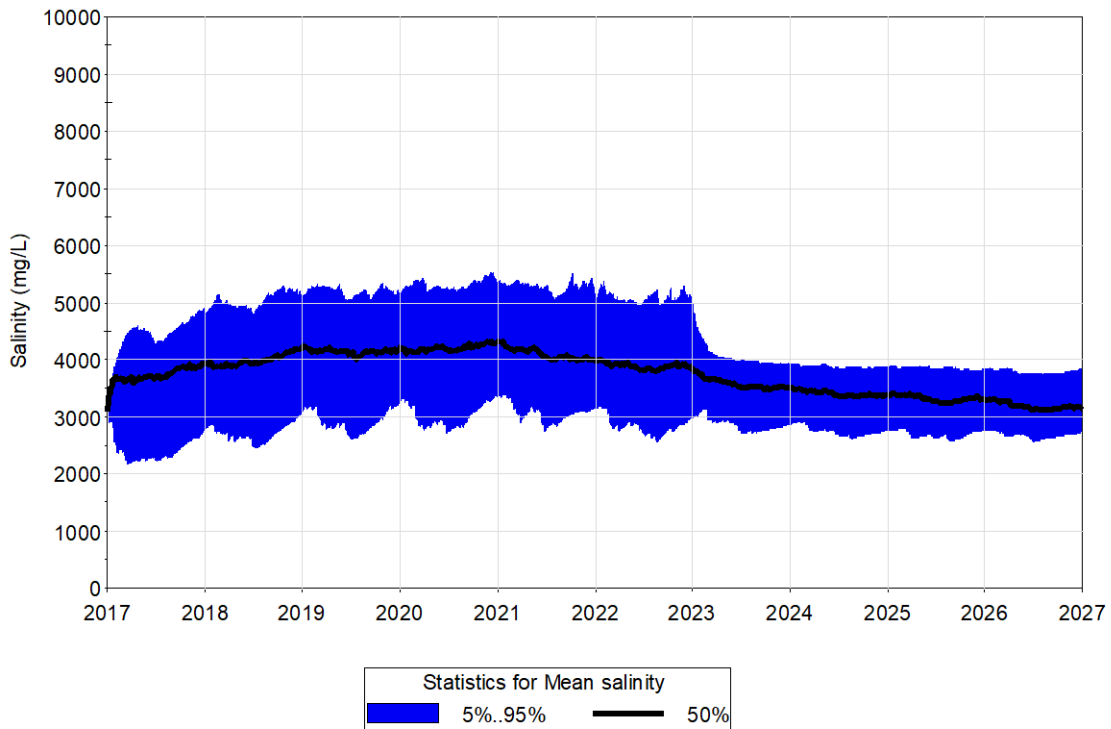


Figure 3-10 – Predicted Mean Salinity of Stored Water

The salinity is generally in the range of 3,000  $\mu\text{S}/\text{cm}$  to 5,000  $\mu\text{S}/\text{cm}$ , and increases gradually due to salt load imported in the tailings emplaced in West Pit, before gradually decreasing. The variability of mean salinity is constrained after 2023 due to increased volume of water present in BNP, which buffers climatic and operational variability. Mean salinity is expected to reduce gradually over time as more catchment area is rehabilitated.

### 3.6 Training and Communication

Generic training on the aspects of the WMP is provided to all employees and contractors through the GCAA **Generic Surface Induction** and the **Site Familiarisation** process.

Regular workforce communication days and toolbox talks allow for discussion of the objectives and requirements of this and any other relevant Plans.

Selected site personnel whose duties directly involve the management of water at the MGO will undertake specific training regarding site Operational Procedures which incorporate water management measures. This training will be undertaken as needed. Measurement and Evaluation

### 3.7 Monitoring and Maintenance Requirements

#### 3.7.1 Water and Salt Balance

As part of the WMS, MGO monitors rainfall, water usage, fresh water imported to site, mine water transferred to or from site, the transfers of water around site and the volume and salinity (or electrical conductivity) of water stored in designated storages on the site.

The monitoring data is used to update the site water and salt balance annually and track water inventory. The results from the site water and salt balance are reported in the Annual Review.

### 3.7.2 Groundwater Inflows to Mining Pits

As part of the ongoing water balance monitoring the groundwater inflows to the mining pits will be reviewed quarterly. This will be undertaken by review of available data (including flow metering data or pump hours); site daily rainfall data; and site survey data) to estimate groundwater inflows to each pit at MGO.

Groundwater inflows will be compared to predicted inflows as outlined in the MGO **Groundwater Management and Monitoring Plan**.

### 3.7.3 Water Structure Inspections

Routine inspections of water structures, including dams, drop structures, diversion drains and erosion and sediment control structures, as well as inspections following significant rainfall events (greater than 25 mm in 24 hours), will be conducted by MGO personnel. Water structures are inspected to assess the capacity, structural integrity and effectiveness and advise on any maintenance requirements. Monitoring of creek diversions will be undertaken in accordance with approved plans. Further detail can be found in the MGO **Erosion and Sediment Control Plan**.

### 3.7.4 Water Monitoring

Water sampling and monitoring is undertaken on a monthly basis on key water storages, catchments and creek lines around MGO. Refer to MGO **Surface Water Management and Monitoring Plan** for further detail.

Water sampling and monitoring is undertaken on a quarterly basis for groundwater levels and quality as part of the groundwater monitoring program. Refer to MGO **Groundwater Management and Monitoring Plan** for further detail.

Monitoring results are reported in the Annual Review (refer **Section 4.1.1**) and made available on the MGO website.

### 3.7.5 Complaints

The MGO operates a dedicated complaints hotline. The details of this hotline are advertised in local newspapers, in a newsletter distributed the residents living in the locality of the mine and on the MGO website. A procedure for handling complaints has been implemented as part of the MGO Environmental Management System (EMS) to ensure a consistent approach to handling any complaint. All legitimate complaints will be thoroughly investigated by the MGO Environment and Community (E&C) Manager.

In accordance with the condition M4 of EPL 4460 and EPL 12840, MGO keep a record of any complaints made to MGO or any employee or agent of MGO in relation to pollution arising from any site activities. The record of complaint is kept for at least four years and includes the following details:

- the date and time of the complaint;
- the method by which the complaint was made;
- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by MGO in relation to the complaint, including any follow-up contact with the complainant; and

- if no action was taken by MGO, the reasons why no action was taken.

## 4. Review and Improvement

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### 4.1 Reporting

#### 4.1.1 Annual Review

The MGO E&C Manager will be responsible for reporting any significant findings regarding the implementation of this Plan in the Annual Review, including:

- any amendments to licensing or statutory approvals;
- a summary of any complaints or incidents relating to the performance of the WMS over the reporting period;
- a summary of monitoring results collected over the reporting period and assessment against the relevant performance measures and criteria;
- a summary of water extracted from Glennies Creek during the relevant water reporting period/s;
- an evaluation of any trends in monitoring results over the life of the operation;
- any non-compliance recorded during the reporting period and the actions taken to ensure compliance;
- identification of any discrepancies between the predicted and actual impacts of MGO and an analysis of the potential cause of any significant discrepancies; and
- a summary of the management actions to be implemented over the next year to improve the environmental performance of the site.

The Annual Review will be submitted to DPE and other relevant agencies and will be made available on the MGO website when DPE confirm it generally satisfies the reporting requirements of the consent.

The Minerals Council of Australia (MCA) has developed the Water Accounting Framework (WAF) to report on the water use in a consistent manner across the mining industry. GCAA has adopted the WAF as the water reporting tool for all operations and has committed to the MCA to provide water reporting data using this tool. The WAF is consistent with Global Reporting Initiative and broadly consistent with the water reporting component of Glencore Corporate Practice (GCP). MGO collects and reports data required in accordance with the GCAA requirements outlined in the GCAA **Water Accounting Framework Procedure** (CAA HSEC PRO 0015 11.03 Water Accounting Framework).

#### 4.1.2 Incidents

Any incident which occurs within the site boundary or is associated with MGO operations will be immediately reported by the employee or contractor who has been associated with or witnessed the incident. The method for reporting incidents is outlined in the **Pollution Incident Response Management Plan** (GLD SD PLN 0037 Mt Owen Complex Pollution Incident Response Management Plan) and MGO **Environmental Management Strategy (Framework)**. MGO will immediately notify DPE and any other relevant agencies of any incident that has or has the potential to cause environmental harm. A detailed report on the incident will be provided to DPE and any other relevant agencies within seven days as well as any other further reports that may be requested.

In accordance with condition R2 of EPL 4460 and EPL 12840 and the **MGO Pollution Incident Response Management Plan**, MGO will notify the EPA of incidents that have caused or threaten to cause

material harm to the environment immediately after the person becomes aware of the incident. Notifications will be made by telephoning the Environment Line service on 131 555. MGO will also provide written details about the notification to the EPA within seven days of the incident.

## 4.2 Plan Review

This WMP and associated documents will be reviewed in accordance with the MGO **Environmental Management Strategy (Framework)** and SSD-5850 Schedule 5, Condition 6. This will occur within three months of:

- the submission of an Annual Review (refer **Section 4.1.1**);
- the submission of an incident report (refer **Section 4.1.2**);
- the submission of an independent environmental audit; or
- any modification to the conditions of development consent for Mt Owen Continued Operations (SSD-5850) or Glendell Mine (DA 80/952).

Glencore will review and if necessary, revise this WMP every year or earlier if required. The WMP will reflect any changes in environmental requirements, technology and operational procedures.

## 4.3 Validation of Predictions

As part of the Annual Review process (refer **Section 4.1.1**), the site water balance, site salt balance, and groundwater model will be validated by comparing predicted results to monitoring results collected over the life of the development. Models and predicted impacts will be revised as necessary following the results of the validation.

## 5. Commitments

All commitments outlined within this WMP are detailed in *Table 5.1*. Management commitments requiring actioning will be entered into the MGO Compliance Management System and actioned. Records of documentation associated with the management commitments will also be maintained within the Compliance Management System.

*Table 5.1 Water Management Plan Commitments*

<b>Number</b>	<b>Commitment</b>	<b>Relevant Section of Plan</b>
<b>1</b>	New components of the water management system will be designed to meet requirements of <b>Section 2.2</b> and the Ground Disturbance Permit process.	<b>Section 2.2</b>
<b>2</b>	Tailings storage areas will be designed and maintained to encapsulate and prevent the migrating of tailings seepage offsite.	<b>Section 2.2.3</b>
<b>3</b>	Overburden will be monitored for saline seepage as per Surface Water Monitoring and Management Plan.	<b>Section 2.2.3</b>
<b>4</b>	Any water exposed to hydrocarbons within pit-top facilities (e.g. mine infrastructure area) will be treated by an oil-water separator.	<b>Section 2.2.3</b>
<b>5</b>	Any chemical and hydrocarbons products will be stored in bunded areas in accordance with the relevant Australian Standards.	<b>Section 2.2.3</b>
<b>6</b>	Decommissioned tailings dams will be managed for captured rainfall and catchment runoff.	<b>Section 3.1</b>
<b>7</b>	MGO pump and pipeline infrastructure will be inspected as per the GCAA Pipeline Protocol (CAA HSEC PCL 0010 11.02 Pipeline Management).	<b>Section 3.2</b>
<b>8</b>	Management of the GRAWTS will be reviewed in conjunction with the Greater Ravensworth Water and Tailings Manager	<b>Section 3.3</b>
<b>9</b>	If any trigger levels are exceeded and cumulative impacts are considered likely by a groundwater or surface water expert, MGO will engage with relevant nearby mines to undertake a joint investigation of the exceedance.	<b>Section 3.3.4</b>
<b>10</b>	The site water balance will be reviewed on an annual basis with the results reported in the Annual Review.	<b>Section 3.4</b>
<b>11</b>	Dirty and mine water will preferentially be reused within the WMS and GRAWTS over raw water from Glennies creek and clean catchment runoff.	<b>Section 3.4.1</b>
<b>12</b>	Sedimentation dams will be managed in accordance with the requirements of Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom 2004) and Volume 2E Mines and Quarries (DECC 2008).	<b>Section 3.4.1.2</b>

Number	Commitment	Relevant Section of Plan
13	The site salt balance will be reviewed on an annual basis with the results reported in the Annual Review.	<b>Section 3.5</b>
14	Generic training on the aspects of the WMP will be provided to all employees and contractors through the GCAA <b>Generic Surface Induction</b> and the <b>Site Familiarisation</b> process. Selected site personnel whose duties directly involve the management of water at the MGO will undertake specific training in regard to site operational procedures which incorporate water management measures.	<b>Section 3.6</b>
15	Rainfall, water usage, fresh water imported to site, mine water transferred to or from site, the transfers of water around site and the volume and salinity (or electrical conductivity) of water stored in designated storages on the site will be monitored.	<b>Section 4.1.1</b>
16	<p>MGO will report on the following aspects of this plan in the Annual Review</p> <ul style="list-style-type: none"> <li>• any amendments to licensing or statutory approvals;</li> <li>• a summary of any complaints or incidents relating to the performance of the WMS over the reporting period;</li> <li>• a summary of monitoring results collected over the reporting period and assessment against the relevant performance measures and criteria;</li> <li>• a summary of water extracted from Glennies Creek during the relevant water reporting period/s;</li> <li>• an evaluation of any trends in monitoring results over the life of the operation;</li> <li>• any non-compliance recorded during the reporting period and the actions taken to ensure compliance;</li> <li>• identification of any discrepancies between the predicted and actual impacts of MGO and an analysis of the potential cause of any significant discrepancies; and</li> <li>• a summary of the management actions to be implemented over the next year to improve the environmental performance of the site.</li> </ul>	<b>Section 5.1.1</b>
17	The WAF will be used to report on water use on site. Data will be collected and reported in accordance with the GCAA requirements outlined in the GCAA <b>Water Accounting Framework Procedure</b> (CAA HSEC PRO 0015 11.03 Water Accounting Framework).	<b>Section 5.1.1</b>

## 6. Accountabilities

Table 6.1 outlines the accountabilities associated with this WMP.

Table 6.1 Accountabilities

Role	Accountabilities for this document
<b>Operations Manager</b>	Provide adequate resources for the implementation of this Plan.
<b>Environment and Community Manager</b>	Implement the WMP. Ensure that monitoring, periodic environmental inspections and visual assessments after high rainfall events are undertaken. Provide that the Training and Communication, Monitoring and Review and Improvement requirements of this Plan are met. Investigate and report all incidents involving the failure or damage to Water Management Structures.
<b>Environment and Community Coordinator / Officer</b>	Assist the E&C Manager as required in implementation of this Plan. Investigate and report all incidents involving the failure or damage to Water Management Structures.
<b>Task Coordinators</b>	Provide that the requirements of this Plan are met through compliance with Ground Disturbance Permit (GDP) procedures. Report all incidents involving the failure or damage to Water Management Structures.
<b>All contractors</b>	Undertake works in accordance with the objectives and principles of this Plan and GDP (where relevant). Report all incidents involving the failure or damage to Water Management Structures.
<b>All personnel</b>	Undertake works in accordance with the objectives and principles of this Plan and GDP (where relevant). Report all incidents involving the failure or damage to Water Management Structures.

## 7. Definitions

Term	Definition
AEP	Annual exceedance probability
ARI	Average recurrence interval
BNP	Bayswater North Pit
CHPP	Coal handling and preparation plant
DA	Development application
DECC	Department of Environment and Climate Change
DPE	Department of Planning and Environment
DPE – Water	Department of Planning and Environment – Water
E&C	Environment and Community
EIS	Environmental Impact Statement
EMS	Environment Management System
EPA	Environment Protection Authority
EPL	Environment Protection Licence
GCAA	Glencore Coal Assets Australia
GCP	Glencore Corporate Practice
GDP	Ground Disturbance Permit
GRAWTS	Greater Ravensworth Area Water and Tailings Scheme
Ha	Hectares, equivalent to 10,000 m <sup>2</sup>
HRSTS	Hunter River Salinity Trading Scheme
MCA	Minerals Council of Australia
ML	Megalitres or millions of litres, e.g. 5 ML is the same as 5 million litres
MGO	Mt Owen Glendell Operations
MOP	Mining Operations Plan
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RMS	NSW Roads and Maritime Service

Term	Definition
ROM	Run of mine
SSD	State significant development
TARP	Trigger Action Response Plan
WAF	Water Accounting Framework
WAL	Water access licence
WMP	Water Management Plan
WMS	Water management system
WOOP	Western Out of Pit
µS/cm	Microsiemens per centimetre is the standard measure of electrical conductivity.

## 8. Document Information

### 8.1 Relevant Legislation

The following legislation is relevant to this Plan:

- *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 Sharing Plan for the Hunter Regulated River Water Source 2016;* and
- *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009.*

### 8.2 Related Documents

Related documents, listed in **Table 8.1** below, are internal documents directly related to or referenced from this document. Internal procedures have not been reviewed or endorsed by DPE and Glencore is responsible for verifying these procedures are in accordance with this management plan and generally in accordance with the Project Approval.

*Table 8.1 – Related Documents*

Reference	Title
<b>GCAA</b>	
<b>11.01</b>	Annual Environment and Community Risk Assessments
<b>11.02</b>	Pipeline Management
<b>11.03</b>	Water Management
<b>11.03</b>	Water Accounting Framework
<b>11.05</b>	Dams and Diversions
<b>11.06</b>	Erosion and Sediment Control
<b>6.0</b>	Incident
<b>Mt Owen Glendell Operations</b>	
<b>Erosion and Sediment Control Plan</b>	
<b>Surface Water Management and Monitoring Plan</b>	
<b>Groundwater Management and Monitoring Plan</b>	

Reference	Title
	Surface and Groundwater Response Plan
	Environmental Management Strategy
	Environmental Monitoring Program
	Creek Diversion Management Plan
<b>Other</b>	
James Bailey and Associates, 2023	Greater Ravensworth Area Water and Tailings Scheme Modification. Submissions Report- Stage 2
GHD, 2019	Glendell Continued Operations Project, EIS – Surface Water Assessment.
Umwelt (Australia) Pty Limited, 2016	Mount Owen Continued Operations Project Response to PAC Review Report.
Umwelt (Australia) Pty Limited, 2016	Mount Owen Continued Operations Project Clarification of Project and Assessment Findings Report.
Hansen Bailey, 2015	Greater Ravensworth Area Tailings Pipeline Modification Environmental Assessment
Umwelt (Australia) Pty Limited, 2015	Environmental Impact Statement Mt Owen Continued Operations
Umwelt (Australia) Pty Limited, 2015	Mount Owen Continued Operations Project Response to Submission: Report A (including Addendum dated October 2015)
Umwelt (Australia) Pty Limited, 2015	Mount Owen Continued Operations Project Response to Submission: Report B
Umwelt (Australia) Pty Limited, 2015	Response to Queries Raised by Agencies Following Response to Submissions
Umwelt (Australia) Pty Limited, 2007	Environmental Assessment for Modification of Glendell Mine
Umwelt (Australia) Pty Limited, 2003	Environmental Impact Statement Mt Owen Operations

### 8.3 Reference Information

Reference information, listed in **Table 8.2** below, is information that is directly related to the development of this document or referenced from within this document.

Table 8.2 Reference Information

Reference	Title
DAWE, 2018	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
ANZECC, 2006	ANZECC Guidelines and Water Quality Objectives in NSW procedures
DECC, 2008	The Blue Book, Managing Urban Stormwater: Volume 2A – Installation of Services
DECC, 2008	The Blue Book, Managing Urban Stormwater: Volume 2C – Unsealed Roads
DECC, 2008	The Blue Book, Managing Urban Stormwater: Volume 2D – Main Road Construction
DECC, 2008	The Blue Book, Managing Urban Stormwater: Volume 2E Mines and Quarries
DPI – Water, 2012	Guidelines for Controlled Activities on Waterfront Land
Landcom, 2004	The Blue Book, Managing Urban Stormwater: Soils and Construction – Volume 1
NSW EPA, 2002	Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation
NSW Fisheries, 2003	Policy and Guidelines for Fish Friendly Waterway Crossings
NSW Fisheries, 2003	Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings

## 8.4 Change Information

A summary of the document history is provided in **Table 8.3** below.

Table 8.3 Change Information

Version	Date	Review team (consultation)	Change Summary
1	November 2008	E&C Coordinator HSEC Manager	New Document
2	November 2011	MGO E&C Manager E&C Coordinator	Update with current practices and applicable standards
3	November 2012	MGO E&C Manager MGO Operations Manager Glendell Operations Manager	Update with current practices and applicable standards

Version	Date	Review team (consultation)	Change Summary
4	September 2013	MGO E&C Manager	Update to remove Xstrata references and general review of document.
5	May 2014	MGO E&C Manager Glendell ECC Thiess Senior Environmental Advisor	Updated document to reflect Department of Planning and Infrastructure's comments on Sept version and updated to reflect current practice.
6	November 2014	MGO E&C Manager	Updated document to include removal of the Mt Owen licensed discharge point, updates to Table 1 and updates to Tailings Dam Capping timeframes.
7	October 2015	MGO E&C Manager Glendell E&C Coordinator	Updated the document in line with the GCAA Water Management protocol and put it into the GCAA template and included updates from comments from DP&E.
8	December 2016	MGO EMS Steering Committee	Updated to address the Mt Owen Continued Operations development consent (SSD-5850) conditions and revised development consent for Glendell Mine (DA 80/952 MOD 3).
9	October 2017	MGO E&C Manager MGO E&C Coordinator	Updated to address changes following MOD1 to SSD-5850.
9.1	March 2018	MGO E&C Manager	Updates to commitment register and associated plan text to streamline commitments.
<b>New SharePoint</b>			
1.0	November 2019	MGO E&C Coordinator	Updated to address changes following MOD2 to SSD-5850.

Version	Date	Review team (consultation)	Change Summary
2.0	March 2020	MGO E&C Manager MGO E&C Officer	Updated to address changes following MOD4 to DA 80/952.
3.0	October 2020	MGO E&C Officer	DPE approved revision post MOCO MOD 2 & 3 and GLD MOD 4.
4.0	July 2021	MGO E&C Manager	Review and update following approval of MOCO MOD 5 and MOD 6 to SSD-5850.
5.0	October 2023	MGO E&C Manager	Review and update following approval of MOD 7 to SSD-5850.

## Appendix A - Water Management Plan Consultation



Contact Hannah Grogan  
Phone 02 4904 2516  
Email [hannah.grogan@dpi.nsw.gov.au](mailto:hannah.grogan@dpi.nsw.gov.au)  
Our ref V15/3875-2#18 & OUT17/20871

Mount Owen Complex

Email: [vicki.mcbride@glencore.com.au](mailto:vicki.mcbride@glencore.com.au)

**Attention: Vicki McBride**

Dear Ms McBride,

### Mount Owen Complex – Water Management Plan Suite

I refer to your email dated 17 January 2017 seeking the Department of Primary Industries – Water’s (DPI Water) comments on the Water Management Plan Suite (WMP) for the Mt Owen Continued Operations Project (SSD 5850). DPI Water has reviewed the WMP and our comments are as follows. Detailed comments are outlined in **Attachment A**.

DPI Water considers that the groundwater assessment criteria require further development to ensure that objects and principles of the *Water Management Act 2000* are met. This is important to ensure that the beneficial use class of the alluvial aquifer is maintained and monitored.

In addition it is recommended that further consultation occurs regarding proposed diversion design to ensure long term geomorphic function.

### Recommendations:

DPI Water recommends that:

1. Water dependent assets (including GDEs, groundwater users and the associated surface water systems) within and around the Mount Owen Complex (MOC) will have different impact risk including proximity to open cut pits, void structures and emplacement areas. The groundwater assessment criteria needs to be further developed in consultation with DPI Water. The criterion is to consider water quality and water level triggers for investigating any potentially adverse groundwater impacts. The proponent should address these different risks and set the trigger levels based on representative data for the appropriate area, noting a decline in salinity can be an equally important indicator for a change in hydrological connection between aquifers.
2. The WMP has used the term ‘significant’ or ‘significantly’ to define a level of impact change relating to mine inflows and alluvial seepage. These terms require a

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prescriptive definition that warrants an investigation so that there is no ambiguity between the proponent and regulator.

3. It is noted in the Groundwater Management and Monitoring Plan (GMMP) Table 2.1 'Mine Inflows' that there is a sharp increase in pit inflows at the Glendell Mine for year 2020. Clarification is requested as to the driver for the sharp increase in inflow in year 2020 and any additional licensing requirements that may arise subject to the source of increased inflows.
4. As the overall salinity in the alluvium is reported to be higher than the hardrock/coal aquifers, which is a peculiarity, a check of the bore log construction, history of data observations and mining should be undertaken to evaluate the representatives of a trigger site before selection. DPI Water recommends the provision of downhole salinity EC profiles and charge balance error assessments for major ions to assist in the alluvial aquifer resource conceptualisation and data validity. This will assist DPI Water in providing advice on the groundwater assessment criteria.
5. Further clarification is required within the GMMP to demonstrate how groundwater monitoring links with the Biodiversity Plan and how this will assist in the management and protection of GDEs.
6. Further detail is required to understand the extent of discrepancy required between water balance and evaporative losses that would lead to triggering an investigation of water losses from storages and tailings emplacements. Consideration should be given to linking this trigger to the bore water quality and level monitoring.
7. It is recommended that the proposed diversion be redeveloped in consultation with DPI Water. It is considered that the currently proposed hydraulically smooth channel, grass lined and over-steepened channel bed is not sufficient for promoting geomorphic processes and preventing erosion and scour. This review must include increased channel roughness elements such as large woody debris tied to rock bed level controls. This is important to protect revegetation of the channel bed and banks and to form elements to capture and incorporate sediment transported from upstream into channel geomorphic features and hydraulic elements including runs, glides and pools.
8. Revegetation of the diversion should be designed in accordance with DPI Water Guidelines for Controlled Activities on Waterfront Land (2012).
9. Commitment 19 should consider appropriate indicators of geomorphic change.

Please contact Hannah Grogan, Water Regulation Officer (Newcastle) on (02) 4904 2516 or [Hannah.grogan@dpi.nsw.gov.au](mailto:Hannah.grogan@dpi.nsw.gov.au) if you have further enquiries regarding this matter.

Yours sincerely,



Irene Zinger  
**Regional Manager - Metro  
Water Regulatory Operations**

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## Appendix B - Water Management Plan Approval

Department of Planning and Environment



Our ref: SSD-5850-PA-88

Sebastien Moreno  
Environment and Community Manager  
Mt Owen Pty Ltd  
158 Hebden Road  
Ravensworth NSW 2330

03/10/2023

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**Subject: Approval of Water Management Plan**

Dear Mr Moreno

I refer to the revised Water Management Plan which has been submitted in accordance with condition 26 of Schedule 3 of the development consent for the Mt Owen Mine (SSD-5850) and condition 29 of Schedule 3 of the development consent for the Glendell Mine (DA 80/952).

The Department has carefully reviewed the document and is satisfied that it meets the requirements of the relevant conditions of SSD-5850 and DA 80/952, noting the changes were mostly administrative in nature.

Accordingly, as nominee of the Planning Secretary, I approve the revised Water Management Plan (version 5.0, dated October 2023). In addition, the Planning Secretary agrees, in accordance with condition 18 of Schedule 2 of SSD-5850 and condition 17 of Schedule 2 of DA 80/952, that consultation with the relevant parties listed in the development consents is not required given the administrative nature of the changes.

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

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

If you wish to discuss the matter further, please contact me on (02) 4908 6896.

Yours sincerely

A handwritten signature in black ink, appearing to read "Joe Fittell".

**Joe Fittell**  
**Team Leader**  
**Resource Assessments**

As nominee of the Planning Secretary

# Appendix C - Conceptual Final Landform Water Management System

