

# MANGOOLA OPEN CUT

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GLENCORE



## Water Management Plan

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0	November 2008	Mangoola Coal	Initial Mangoola Coal WMP approved by DoP on 5th January 2009
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3	February 2013	Mangoola Coal, Susan Shield (Umwelt)	3-yearly review and Modification 4 update – submitted for approval February 2013.
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5	July 2014	Mangoola Coal Leah Cook (Glade Consulting), DP&E	Modification 6 update. Approved 22 <sup>nd</sup> December 2014.
6	January 2017	Mangoola Coal NSW EPA DPI Water Stephen Downes as per approved appointment by the Secretary on 10/02/2017	Revision included: <ul style="list-style-type: none"> <li>• Inclusion of relevant regulatory requirements;</li> <li>• Revision of management strategy to meet harvestable rights requirements;</li> <li>• Response to Independent Environment Audit 12<sup>th</sup> December 2016 and Joint Agency High Risk Dam Audit 1<sup>st</sup> September recommendations</li> <li>• General update of operational information.</li> </ul>
7	May 2017	Mangoola Coal	Updated following consultation with DPI Water.
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			<p>Section 3.5 and Table 3.2 updated to reflect 2019 revision of Harvestable Rights.</p> <p>Updated with recommendations from Mangoola's Independent Environmental Audit 2019</p> <ul style="list-style-type: none"> <li>• Include evidence of consultation as per Schedule 3 Condition 28 (a)</li> <li>• Remove stock and domestic water licenses from Appendix G</li> <li>• Include Water Balance Model reporting requirements – Section 9.</li> </ul> <p>Updated Water Access License conditions in Appendix B Table G.</p> <p>Updated Appendix C – Erosion and Sediment Control Plan</p> <p>Updated Appendix D – Surface Water Monitoring Plan</p> <p>Updated Appendix F – Surface Water Groundwater Response Plan</p>
11	May 2020	Mangoola Coal Stephen Downes as per approved appointment by the Secretary on 10 February 2017	<p>Updated Section 3.2 to include the saline seepage interception system as part of the RWD.</p> <p>Update to new Glencore document template.</p>
12	September 2021	Mangoola Coal	<p>Review and completion of minor administrative updates to permit construction activities associated with SSD 8642.</p> <p>Draft WMP submitted to DPIE for review</p>
13	November 2021	Mangoola Coal	<p>Final WMP prepared in response to feedback from DPIE.</p>

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# 1. Introduction

Mangoola Coal Operations Pty Limited (Mangoola Coal) operates an open cut coal mine located near Wybong, approximately 20 kilometres west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area (refer to **Figure 1**).

## 1.1 Project Description

In accordance with Project Approval (PA) 06\_0014, Mangoola Coal has a maximum production rate of 13.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal over a mine life of 21 years. The primary mining method utilises hydraulic excavators loading rear dump trucks assisted by dozer push and cast blasting of overburden where appropriate. Dump trucks haul ROM coal to the coal handling facilities along haul roads. The general mining sequence includes the stripping of topsoil, removal of overburden, extraction of coal resource, in pit overburden emplacement and progressive rehabilitation.

In April 2021, Mangoola was granted Development Consent for State Significant Development (SSD) 8642 by the Independent Planning Commission (IPC) for continued operations at the Mangoola Coal Mine. SSD 8642 enables the continuation of mining at Mangoola Coal Mine at up to 13.5 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal through to 2030. The Project Boundary for Mangoola Coal Mine is presented on **Figure 2**.

In accordance with SSD 8642 operations permitted to be undertaken at Mangoola Coal Mine generally comprise:

- Open cut mining at up to 13.5 Mtpa ROM coal using truck and excavator mining methods through to 2030
- Continued operations within the existing Mangoola Coal Mine including the use of existing infrastructure facilities
- Mining operations in a new mining area located north of the existing Mangoola Coal Mine, Wybong Road, south of Ridglands Road and east of the 500 kilovolt (kV) Electricity Transmission Line (ETL)
- Construction of a haul road overpass over Big Flat Creek and Wybong Road
- Establishment of an out-of-pit overburden emplacement area
- Realignment of a portion of Wybong Post Office Road or equivalent financial contribution to Council.

Mining operations, coal handling and washing, rail load out and all associated activities operate on a 24 hours per day, seven days per week basis with the exception of the mobile gravel crushing plant which is restricted to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays with no operations on public holidays or Sundays. In accordance with PA 06\_0014 and EPL 12894 conditions, Mangoola shall only carry out blasting on site between 9.00 am and 5.00 pm Monday to Saturday inclusive. Blasting is only allowed on Sundays, public holidays, or at any other time under certain circumstances and with the written approval of the EPA.

A detailed description of the approved operations at Mangoola Coal Mine is provided in Chapter 3 of the **Mangoola Coal Continued Operations (MCCO) Project Environmental Impact Statement** (EIS) (Umwelt 2019). An overview of the water assessment findings can be found in Chapter 6.7 and Chapter 6.8 of the EIS. A description of the construction water management infrastructure is provided in **Section 4**.

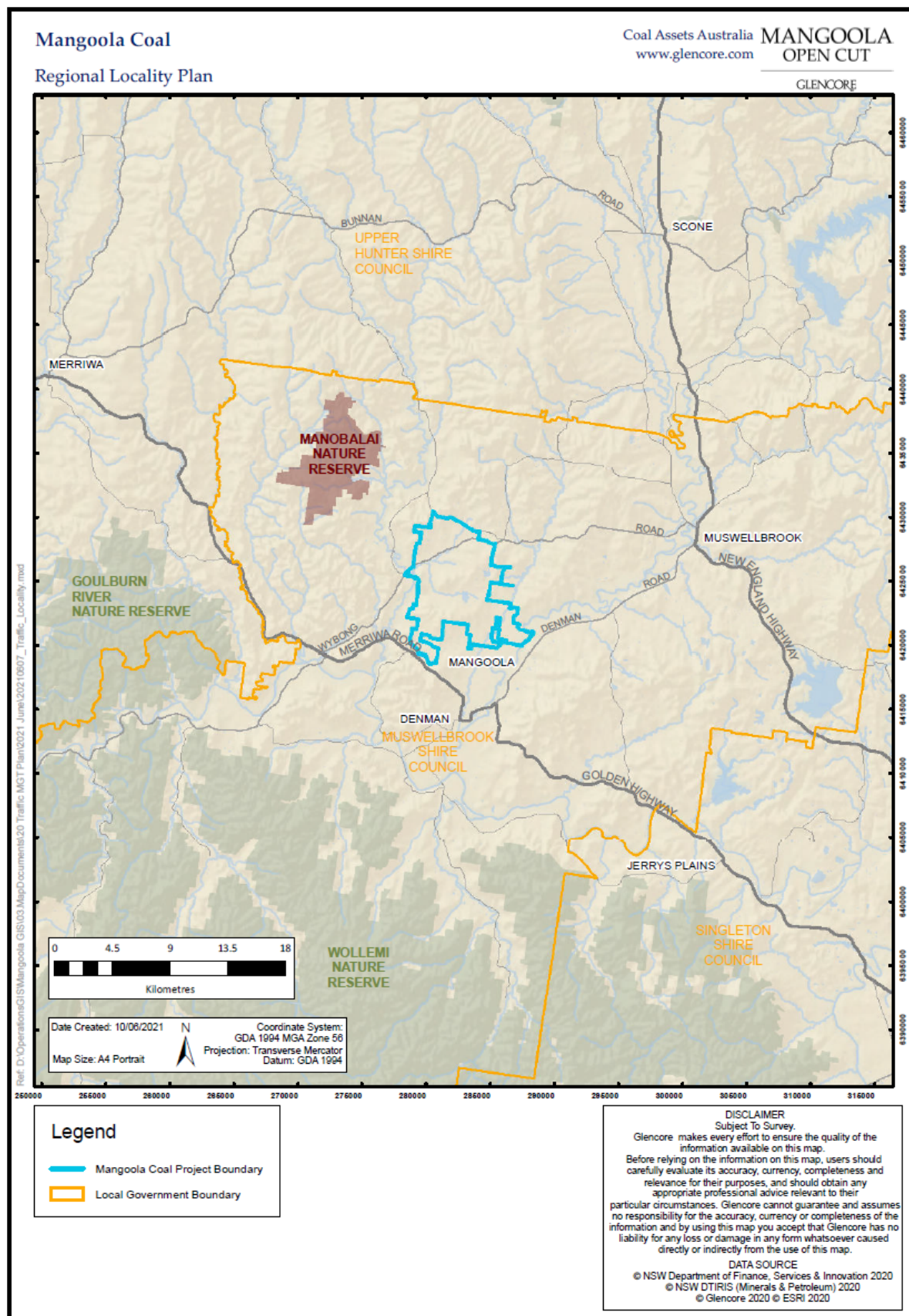


Figure 1 Regional Locality Plan

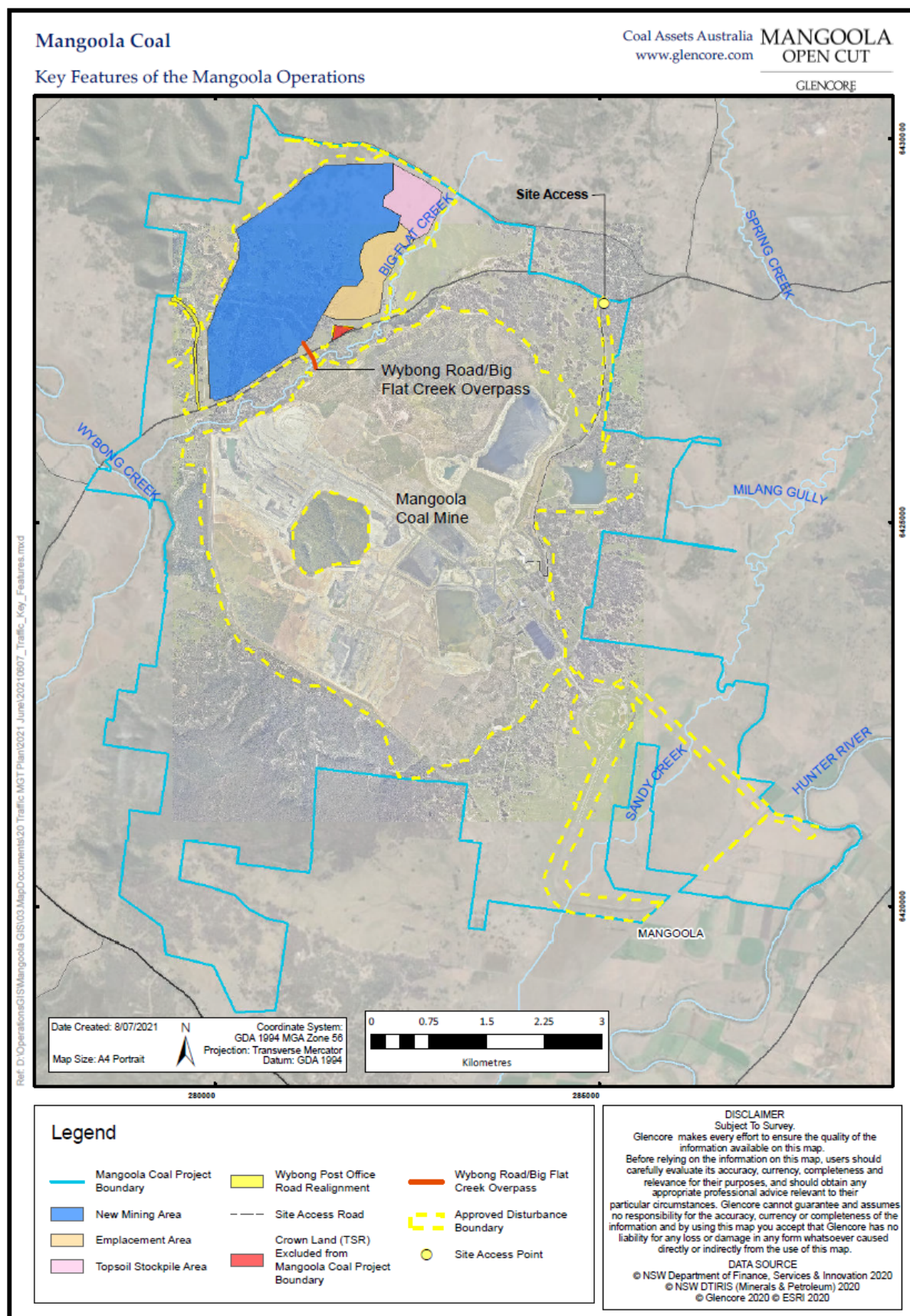


Figure 2 Key Features

## 1.2 Purpose and Scope

This Water Management Plan (WMP) has been prepared to fulfil the requirements of PA 06\_0014 and EPL 12894 under which Mangoola Coal operates and to fulfil other relevant statutory requirements that are applicable to Mangoola Coal (refer to **Section 1.5**).

As stated in **Section 1.1**, Mangoola was issued Development Consent for SSD 8642 on 26 April 2021. Condition A24(a) of SSD 8642 provides that, with approval from the Planning Secretary, Mangoola may prepare any strategy, plan or program required by SSD 8642 on a staged basis if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy plan or program. In addition, A24(c) of SSD 8642 provides that any strategy required by SSD 8642 may be combined with that strategy required under PA 06\_0014.

Furthermore, in accordance with Condition A25 of SSD 8642, management plans requiring minor administrative amendments may be completed without consultation being undertaken with all parties required to be consulted in the relevant condition.

In this regard, Mangoola sought, and was granted approval, from a delegate of the Planning Secretary for the approach to consultation and the staged development of the WMP required in accordance with SSD 8642 (see **Appendix A**) and outlined in **Table 1**. This WMP will be consolidated into the revised WMP to be prepared to address SSD 8642 Condition B50 which is required to be approved by the Planning Secretary prior to the commencement of mining operations north of Wybong Road.

Implementation of the WMP will be staged to account for the transition from approved operations under PA 06\_0014 (Stage 1) to SSD 8642 through the development and construction phase of the MCCO Project (Stage 2). In accordance with A13(a) and A13(b) of SSD 8642 the Department will be notified at least two weeks prior to the commencement of development and construction under SSD 8642.

In summary, this WMP has been subjected to minor administrative updates to include approved activities and inclusive of any commitments (Umwelt, 2019a and Umwelt, 2019b) required to implemented prior to the commencement of development and construction activities associated with SSD 8642.

*Table 1 Staged Approach to Water Management Plan Revision*

Management Plan	Approach Prior to Commencement of Construction under SSD 8642	Approach Prior to Mining North of Wybong Road
Water Management Plan	Minor administrative updates to the existing WMP – <b>This Document</b>	Development of a Water Management Plan to address requirements of SSD 8642 Condition B50
	No consultation associated with minor administrative update*	Consultation in accordance with Condition B50(b) of SSD 8642

\*As agreed with the Planning Secretary (see **Appendix A**).

## 1.3 Objectives

The primary objectives of this WMP are to:

- Provide a site water balance
- Ensure that the quality of water leaving the site meets the appropriate quality standards (refer to **Section 3.6** and **Appendix D**);
- Define the structures, strategies and procedures to be implemented to ensure that all environmental impacts associated with site water management are minimised, based on the

principle of separating water streams into dirty, clean and saline water (refer to **Section 3**, **Appendix C** and **Appendix D**);

- Define a program to monitor and assess impacts on surface water and groundwater (refer to **Appendix D** and **Appendix E**); and
- Define how the mine will mitigate and respond to potential impacts on surface water and groundwater (refer to **Appendix F**).

## 1.4 Structure of the Water Management Plan

In accordance with the conditions of PA 06\_0014, this WMP includes four additional plans:

- Erosion and Sediment Control Plan (ESCP) (**Appendix C**);
- Surface Water Monitoring Plan (SWMP) (**Appendix D**);
- Groundwater Monitoring Plan (GWMP) (**Appendix E**); and
- Surface Water and Groundwater Response Plan (SWGWRP) (**Appendix F**).

These additional plans are contained within the appendices listed above supported by the overarching WMP.

## 1.5 Regulatory Requirements

### 1.5.1 Project Approval & Development Consent

Approval for Mangoola Coal was gained under the EP&A Act from the Minister for Planning on 7 June 2007 and from the IPC for SSD 8642 on 26 April 2021. PA 06\_0014 and SSD 8642 conditions relating to water management, and where they are addressed within this document is included in Table A and Table B of **Appendix B** respectively.

As required by Condition A15 of SSD 8642, PA 06\_0014 will be surrendered within 12 months of the date of commencement of development under SSD 8642, or other timeframe agreed by the Planning Secretary. In accordance with Condition A16, upon the commencement of development under SSD 8642, and before the surrender of PA 06\_0014, conditions of SSD 8642 will prevail to the extent of any inconsistency.

In accordance with Condition A31 of SSD 8642 all employees, contractors (and their sub-contractors) will be made aware of, and are instructed to comply with, the applicable conditions of SSD 8642 relevant to activities they carry out in respect of the development.

### 1.5.2 Environmental Protection Licence

Mangoola Coal holds EPL 12894 which contains seven monitoring points in relation to surface water, including three monitoring points for discharge events under the HRSTS, and groundwater management. EPL 12894 conditions related to water management are outlined in Table B in **Appendix B**. EPL 12894 licensed water monitoring points are listed in Table C in **Appendix B**.

Mangoola has sought a variation to Mangoola's existing EPL 12894 to accommodate the commencement of SSD 8642. As required by Condition D6 of SSD 8642 this WMP may be required to be updated to ensure consistency with EPL 12894.

### 1.5.3 Mining Lease 1626

Mangoola Coal holds Mining Lease (ML) 1626 for the Mangoola Coal operations.

### 1.5.4 Exploration Lease 5552

Mangoola Coal holds Exploration Lease (EL) 5552 for an area north of the current operations..

### 1.5.5 Assessment Lease 9

Mangoola holds Assessment Lease (AL) 9 for the external buffer area surrounding current operations.

### 1.5.6 Mining Lease Applications

Mangoola Coal has sought mining lease applications (MLA) for MLA 599 and MLA600 pursuant to the *Mining Act 1992* and consistent with approved activities in SSD 8642. These applications were subsequently approved and final Instruments of Grant issued as follows:

- MLA 599 becomes ML 1817 dated 27 October 2021; and
- MLA 600 becomes ML 1815 dated 29 September 2021

ML 1815 is for the purposes of ancillary mining activities in relation to the construction of the clean water diversion drain (see **Section 4**).

### 1.5.7 North Coast Fractured and Porous Rock Groundwater Source 2016

All surface and groundwater associated with Mangoola Coal is now governed under the Water Management Act 2000 with the commencement of the North Coast Fractured and Porous Rock Groundwater Sources Water Sharing Plan on the 1 July 2016 as detailed in **Section 1.5.8**.

Mangoola Coal holds a Water Access licence under the North Coast Fractured and Porous Rock Groundwater Source Sharing Plan 2016 for the extraction of groundwater via the open cut pits and the monitoring of boreholes. Mangoola Coal holds water licence WAL 41561 for the extraction of 700ML per 12-month period (and the available water determination) commencing 1 July.

### 1.5.8 Water Management Act 2000

The surface waters of Mangoola Coal and the alluvial, colluvial and hardrock groundwater of Big Flat Creek, Anvil Creek and Clarks Gully are governed by the *Water Management Act 2000*. Extraction from the Hunter River is also governed by the *Water Management Act 2000*.

The majority of Mangoola Coal lies within the Wybong Creek catchment (refer to Section 2.5) and as such is managed under the Unregulated and Alluvial Water Sources Water Sharing Plan 2009. In accordance with Schedule 3, Condition 25 of PA 06\_0014 Mangoola Coal will not use any licensable water from the Wybong Creek Water Source for mining purposes other than that incidentally collected by approved mining operations. The proposed water management system will result in the incidental collection of runoff from several operational areas with clean runoff where diversions are not feasible. Mangoola will transfer unused water allocation from existing surface water licenses within the Wybong Creek catchment where there is a shortfall in harvestable rights provisions for this incidental collection (refer to Section 3.6).

Mangoola also has three water access licences (WAL 11085, 37027 and 37028) under the Hunter Unregulated and Alluvial Water Sources Water Sharing Plan 2009 for the extraction of groundwater

from the Wybong Creek aquifer. These are all listed as miscellaneous works approvals. The conditions of these water access licences are outlined in Table G in Appendix B.

All water extraction from the Hunter River is undertaken in accordance with the water access licences held by Mangoola Coal. Works Approval 20WA211008 applies to all water access licences held by Mangoola Coal for Hunter River water extraction. The conditions of this water licence are outlined in Table H in Appendix B. Water Access Licenses (WAL) connected with this works approval are listed in **Table 2** below.

*Table 2 WAL for Hunter River supply to mining operations*

WAL	Water Use Approval	Reference Number	Lot//DP	Share Component	Category
503	20WA211008	20AL200112	12//594674	159	General Security
644	20WA211008	20AL200456	12//594674	3	High Security
645	20WA211008	20AL200457	12//594674	432	General Security
691	20WA211008	20AL200578	12//594674	50	General Security
735	20WA211008	20AL200676	12//594674	72	General Security
822	20WA211008	20AL200912	12//594674	3	High Security
823	20WA211008	20AL200913	12//594674	310	General Security
824	20WA211008	20AL200915	12//594674	175	General Security
830	20WA211008	20AL200933	12//594674	306	General Security
897	20WA211008	20AL201085	12//594674	55	General Security
933	20WA211008	20AL201156	12//594674	43	General Security
1159	20WA211008	20AL201722	12//594674	159	General Security
1349	20WA211008	20AL202949	12//594674	8	Supplementary
6571	20WA211008	20AL201639	12//594674	111	General Security
6576	20WA211008	20AL201869	12//594674	600	General Security
9061	20WA211008	20AL203156	12//594674	6	High Security
9062	20WA211008	20AL203157	12//594674	18	General Security
9986	20WA211008	20AL203182	12//594674	5	High Security
9987	20WA211008	20AL203183	12//594674	82	General Security
11216	20WA211008	20AL203370	12//594674	86	General Security
13083	20WA211008	20AL203454	12//594674	100	General Security
41561		20AL219023	201//706571	700	Hard Rock Aquifer Interference

As described in **Section 1.5.7** the groundwater associated with the hardrock aquifers (i.e. coal seams) at Mangoola Coal is governed under by the Water Management Act 2000 and is managed under the North Coast Fractured and Porous Rock Groundwater Sources Water Sharing Plan which commenced on 1 July 2016. All licences currently held under the Water Act 1912 relating to this water are to be transferred by the DPI-Water to water access licences under the Water Management Act 2000. Until this has been completed Mangoola Coal continues to comply with conditions of the existing licences under the Water Act 1912.

A full list of WAL held by Mangoola is included in **Appendix G**.

## 1.5.9 Dam Safety Act 2015

Mangoola Coal has a number of dams listed as prescribed dams according to the Dams Safety Act 2015, these are the Pit Water Dam, Raw Water Dam, Tailings Dam 1 and Tailings Dam 2. Specific management requirements are addressed in the respective Dam Safety Emergency Plans and Operation and Maintenance Manuals developed for each dam.

## 1.5.10 Guidelines

The following guidelines have been utilised during the preparation of this WMP and accompanying documents:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000);
- Managing Urban Stormwater – Soils and Construction, Volume 1 (Blue Book) (Landcom 2004);
- Managing Urban Stormwater – Soils and Construction, Volume 2E Mines and Quarries (DECC 2008).
- NSW Aquifer Interference Policy (2012)
- NSW Guidelines for controlled activities on waterfront land (2012)

## 1.5.11 Council Approval

Mangoola Coal holds Muswellbrook Shire Council approval WTA No: 5/2010 for the operation of an on-site sewage management system.

## 1.5.12 Agency Consultation

As per Schedule 3, Condition 28(a) of PA 06\_0014, this Water Management Plan has been prepared in consultation with the Department of Primary Industries (DPI) Water (formerly NSW Office of Water) and the EPA.

The evidence of consultation with both DPI and the EPA regarding the WMP can be found in **Appendix A**.

As stated in **Section 1.2** minor updates have been completed to this WMP to account for construction associated with SSD 8642 without consultation as agreed with the Planning Secretary (see **Appendix A**).

## 1.6 Roles and Responsibilities

The relevant roles and responsibilities associated with this management plan are outlined in **Table 3** below.

Table 3 – Roles and Responsibilities

Role	Responsibility
<b>Operations Manager</b>	<ul style="list-style-type: none"> <li>ensure that sufficient resources are allocated for the implementation of this management plan.</li> </ul>
<b>Environment and Community Manager (ECM) or delegate i.e, Environment and Community Coordinator (ECC) or Environment and Community Officer (ECO)</b>	<ul style="list-style-type: none"> <li>facilitate the effective implementation of this plan;</li> <li>ensure that the results of monitoring are systematically evaluated and reported to relevant personnel;</li> <li>ensure all internal and external reporting requirements are met;</li> <li>develop and implement a system to monitor compliance against this plan; and</li> <li>maintain a copy of this management plan on the Mangoola Coal website;</li> <li>manage and respond to community complaints/enquiries relating to water management;</li> <li>conduct inspections to check compliance against this plan;</li> <li>monitor corrective actions from inspections or non-compliance and ensuring they are closed out and effective;</li> <li>coordinate incident investigation processes including associated reporting requirements; and</li> <li>provide adequate training to employees and contractors regarding their responsibilities under this plan.</li> </ul>
<b>Department Managers</b>	<ul style="list-style-type: none"> <li>maintain water management infrastructure;</li> <li>report hazards and incidents related to this plan to the E&amp;C Department; and</li> <li>communicate effectively with the Mangoola Coal E&amp;C Department to manage water quality associated with activities on site.</li> </ul>
<b>All employees and contractors</b>	<ul style="list-style-type: none"> <li>prepare, implement and maintain activity specific water management and erosion control sediment plans that conform directly with the requirements of this plan and associated documents;</li> <li>undertaking all activities in accordance with this plan; and</li> <li>report all water pollution incidents associated with their activities immediately.</li> </ul>

## 1.7 Definitions

The terminology and acronyms utilised within this WMP and appendices is defined in **Table 4**.

Table 4 – Terminology Utilised Within the WMP

Term	Definition
<b>µs/cm</b>	microSiemens per centimetre - The standard measure of electrical conductivity and is used to indicate the salinity level of water
<b>ARI</b>	Average Recurrence Interval- The average, or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration
<b>AEMR/AR</b>	Annual Environmental Management Report as per ML1626/Annual Review prepared as per Schedule 5, Condition 6 of PA 06_0014.
<b>AHD</b>	Australia Height Datum. Used to indicate elevation.
<b>Alluvial</b>	Sediment deposited by a flowing stream or floods in a valley typically consisting of silt, sand, clay and gravel.
<b>Aquifer</b>	A water bearing rock formation
<b>ANZECC</b>	Australia and New Zealand Environment Conservation Council
<b>Blue Book</b>	Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2 (Landcom 2004 & DECC 2008)
<b>BOD</b>	Biochemical Oxygen Demand
<b>Bore/ Borehole</b>	A hole formed by boring or auguring
<b>COD</b>	Chemical Oxygen Demand
<b>Colluvium</b>	Soil or debris that accumulates at the base of a slope by mass-wasting or sheet erosion typically comprising of unsorted angular fragments close to the source.
<b>C-factor</b>	A factor relating to the vegetation coverage as outlined in Managing Urban Stormwater Volume 1: Soils and Construction (The Blue book) (Landcom 2004)
<b>Dirty water</b>	Water which has come into contact with area disturbed by operations and has the potential to have a high sediment load but has not come into contact with coal or saline water.
<b>EA</b>	Environmental Assessment
<b>EC</b>	Electrical Conductivity
<b>ESCP</b>	Erosion and Sediment Control Plan
<b>GWMP</b>	Groundwater Monitoring Plan

Term	Definition
<b>Groundwater</b>	Sub-surface water which is within the saturated zone and can supply wells and springs. The upper surface of this saturated zone is called the water table.
<b>High Rainfall Event</b>	Greater than 20 millimetres of rainfall within a 24hr period
<b>HRSTS</b>	Hunter River Salinity Trading Scheme
<b>Incident</b>	A set of circumstances that: causes or threatens to cause material harm to the environment; and/or breaches or exceed the limits or performance measures/criteria in this plan or associated approval
<b>kL</b>	Kilolitres or thousands of litres, e.g. 3 kL is the same as 3,000 litres.
<b>ML</b>	Megalitres or millions of litres, e.g. 5 ML is the same as 5,000,000 litres.
<b>N</b>	Nitrogen
<b>P</b>	Phosphorous
<b>pH</b>	A measure of acidity.
<b>Piezometer</b>	A small diameter bore lined with a slotted tube used for determining the standing water level for groundwater, particularly relating to dams
<b>Potable water</b>	Water that is considered safe for human consumption.
<b>Saline Water</b>	Water from the project's saline water management system as described in the Environmental Assessment.
<b>SWMP</b>	Surface Water Monitoring Plan
<b>SWGWRP</b>	Surface Water and Groundwater Response Plan
<b>Tailings</b>	Fine residual waste material separated during the coal preparation process.
<b>TARP</b>	Trigger Action Response Plan
<b>TDS</b>	Total Dissolved Solids
<b>TSS</b>	Total Suspended Solids
<b>V:H</b>	Vertical: Horizontal

## 2. Pre-mining Environment

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### 2.1 Land Use

Land use in the broader area surrounding Mangoola Coal includes residential, tourism, agricultural and mining activities and is typical of the land use throughout much of the Upper Hunter Valley. Much of the higher and steeper land in the region has not been cleared and is used either for low intensity grazing or for conservation purposes (refer to **Figure 3**) (Umwelt 2019, EMM 2019). The land uses immediately surrounding Mangoola Coal are predominantly a combination of rural residential, grazing and agriculture.

### 2.2 Topography

The topography of the area surrounding Mangoola Coal varies from lower slopes towards the Hunter River, through undulating and hilly lands to rocky outcrops. A notable topographical feature within the mining area is Anvil Hill which rises 70 metres above the surrounding area to a height of approximately 285m AHD (refer to **Figure 4**). Anvil Hill is located at the centre of the mining area and consists of two hills connected by a saddle. Anvil Hill is located within the Anvil Hill Offset Area in the centre of the disturbance boundary.

### 2.3 Soils

A total of eleven soil units have been identified within the disturbance boundary and surrounds during baseline studies, as shown on **Figure 5** and including recent detailed analysis of the MCCO Project Area completed for the MCCO Project EIS (EMM, 2019).

As identified in EMM 2019 the mining area north of Wybong Road identified the presence of four soil types including Tenosols, Dermosols, Sodosols and Kurosols. The mining area north of Wybong Road largely sits over a Sodosol soil type. Exposure of sodic subsoils in these soils will increase the erosive potential of the soil surface, particularly on steeper slopes.

The MCCO Project Area is situated on the edge of the Permian Singleton Coal Measures mapping with much of the surface geology being formed by the Triassic Narrabeen group (as determined both from regional geological mapping and from detailed geological investigations undertaken with the MCCO Project Area).

The detailed soil survey undertaken within the MCCO Additional Project Area found that the soils have mostly been derived from the Triassic Narrabeen group. The Sodosol and Tenosol soils found in the MCCO Additional Project Area generally support the soil landscape mapping done by Kovac and Lawrie (1991) Soil Landscapes of the Singleton 1:250,000 sheet (with some localised boundary readjustments). There are no clearly Permian derived soils within the MCCO Additional Project Area.

The Yellow Solodics, associated with the Sandy Hollow and Castle Rock soil landscapes, are the dominant soil unit of the existing mining operations area. The Sandy Hollow soil landscape covers the smooth and gentle rises and slopes in the central Goulburn Valley, the south-eastern part of Merriwa Plateau and the northern part of the southern mountains (Kovac and Lawrie, 1991). The main soils found within this landscape are red and yellow Solodic Soils on the upper and midslopes with yellow and brown Solodic Soils on the lower slopes. Red Earths occur midslope directly adjacent to sandstone benches with Siliceous Sands (Kovac and Lawrie, 1991). Alluvial soils occur along major drainage lines. Moderate gully erosion (<1.5 metres) can occur within this landscape in drainage lines, with minor sheet and rill erosion potentially occurring on slopes (Kovac and Lawrie, 1991). This soil profile

dominates the Anvil Creek and Big Flat Creek catchments within the approved disturbance areas for Mangoola Coal.

The Castle Rock soil landscape covers the undulating low hills and footslopes around the Castle Rock on areas of colluvium (Kovac and Lawrie, 1991). The main slopes are very stony yellow Solodic Soils on the footslopes and black Solodic Soils on the flatter areas with Alluvial Soils in the drainage lines. The lower areas have severe salting problems. Minor to severe sheet erosion, with gully erosion in many of the drainage lines, can occur. This can be exacerbated by salting on the flats (Kovac and Lawrie, 1991). This profile is the dominant soil profile within the portion of Sandy Creek catchment within the Mangoola Coal disturbance area.

In addition, laboratory testing conducted on construction materials for the Pit Water Dam (located within the Sandy Hollow soil profile within the Anvil Creek Catchment), indicated that soils in the area are highly dispersive, and thus more susceptible to erosion (ATC Williams 2009). As such, it is considered that there is potential for dispersive soils to occur over the majority of the site.

## 2.4 Hydrology

Mangoola Coal is located within the catchments of Sandy Creek and Big Flat Creek, including the sub catchment areas Anvil Creek and Clarks Gully. Anvil Creek and Clarks Gully are tributaries of Big Flat Creek. Big Flat Creek is a tributary of Wybong Creek, which in turn is a tributary of the Goulburn River.

A small part of the site is located in the Sandy Creek catchment. Sandy Creek is a fifth order (category three) stream and flows in the southerly direction to the Hunter River.

The existing mining area covers approximately 42 per cent of the Big Flat Creek catchment, including the entire catchment of both Anvil Creek and Clarks Gully. The operations will disturb less than 3 per cent of the Wybong Creek catchment, and less than 1 per cent of the Sandy Creek catchment.

There are no surface or groundwater extraction points downstream of Mangoola on Big Flat Creek or within 2 km downstream of Mangoola on Sandy Creek. Historically, there were 13 licensed surface water extraction points and ten licensed groundwater extraction points on Wybong Creek (Umwelt 2006). The water take associated with these licences is governed by the rules of the Wybong Water Source in the Hunter Unregulated and Alluvial Water Sources Water Sharing Plan 2009.

The MCCO Additional Project Area lies within the catchment of Big Flat Creek though a small portion, near its north-western limit, lies within the catchment of Wybong Creek. The main channel of Big Flat Creek parallels Wybong Road and separates the MCCO Additional Project Area from the existing approved operations. Big Flat Creek joins Wybong Creek to the south-west of the MCCO Additional Project Area. A number of small un-named drainage lines traverse the MCCO Additional Project Area from north to south and drain into Big Flat Creek to the south of the MCCO Additional Project Area. These drainage lines comprise mainly first and second order streams varying from wide open swales with no defined banks to eroding gullies (HEC, 2019).

The boundaries of the catchments are shown on *Figure 6* along with the additional disturbance area associated with approved mining operations north of Wybong Road.

## 2.5 Water Courses and Catchments

### 2.5.1 Anvil Creek

Anvil Creek is a second order tributary of Big Flat Creek, extending for approximately 6.5 kilometres from its headwaters in the south-east of the catchment, to the east of Anvil Hill, to its confluence with Big Flat Creek in the north-west of the catchment area. The catchment of Anvil Creek includes existing

mining operations and covers an area of approximately 1,400 hectares and the pre-mining landscape included forested areas and some grazing land.

The pre mining characteristics of original Anvil Creek was an ephemeral creek system with flows only occurring in the creek during storm events or after prolonged periods of heavy rain. Anvil Creek was characterised by a well-defined channel ranging in width from five metres in the upper reaches of the creek 22 metres in downstream areas. Bank height ranged from one metre to three metres with moderate to very steep grades.

### 2.5.2 Clarks Gully

The pre mining characteristics of original Clarks Gully was a minor, second order tributary of Big Flat Creek extending for approximately 3.6 kilometres from its headwaters in the east of the catchment, to the north-east of Anvil Hill, to its confluence with Big Flat Creek in the west of the catchment. The catchment of Clarks Gully covered an area of approximately 365 hectares, and includes existing mining operations, with the pre-mining landscape including forested areas and grazing land.

Clarks Gully was an ephemeral creek system with flows only occurring in the creek during storm events or after prolonged periods of heavy rain. Clarks Gully ranged from a narrow, single channel to a broad channel with widths in excess of 35 metres consisting of multiple low flow channels. Bank heights were generally in the order of one to three metres with little evidence of erosion.

### 2.5.3 Big Flat Creek

Big Flat Creek is a fourth order tributary of Wybong Creek and has a catchment area of approximately 5,040 hectares. Big Flat Creek flows in an approximately south-westerly direction to its confluence with Wybong Creek approximately 12 kilometres upstream of the confluence of Wybong Creek and the Goulburn River. The headwaters of Big Flat Creek are located approximately 9.8 kilometres north-east of its confluence with Wybong Creek in woodland areas in the vicinity of Black Jack Mountain.

Big Flat Creek is an ephemeral creek system with flows only occurring in the creek during storm events or after prolonged periods of heavy rain. Big Flat Creek is well defined with top of bank channel widths in the order of 20 metres to 80 metres and bank heights generally in the order of 2 to 6 metres. Erosion of banks and the channel was observed during site inspections and salt scalding of the adjacent floodplain was also evident during baseline studies. Big Flat Creek has been subject to extensive planting as outlined in the Mangoola Biodiversity and Offset Management Plan.

### 2.5.4 Wybong Creek

Wybong Creek is a major tributary of the Goulburn River, extending some 90 kilometres from its headwaters in the Liverpool Ranges in the north, to its confluence with the Goulburn River in the south of the catchment. The catchment of Wybong Creek covers an area of approximately 67,370 hectares at its confluence with Big Flat Creek. Wybong Creek has a total catchment area of approximately 80,040 hectares at its confluence with the Goulburn River.

Wybong Creek immediately upstream of its confluence with Big Flat Creek, and between Big Flat Creek and the Goulburn River, ranges in width between 80 and 100 metres. Bank heights in this area range from 2.5 metres to in excess of 20 metres in some locations with typical heights approximately 10 metres to 12 metres.

### 2.5.5 Sandy Creek

Sandy Creek is a fifth order tributary of the Hunter River extending for some 37 kilometres from its headwaters in the north to its confluence with the Hunter River in the south of the catchment area. The catchment of Sandy Creek covers an area of approximately 14,520 hectares and includes floodplain areas, grazing land, woodland and urban areas such as the township of Denman.

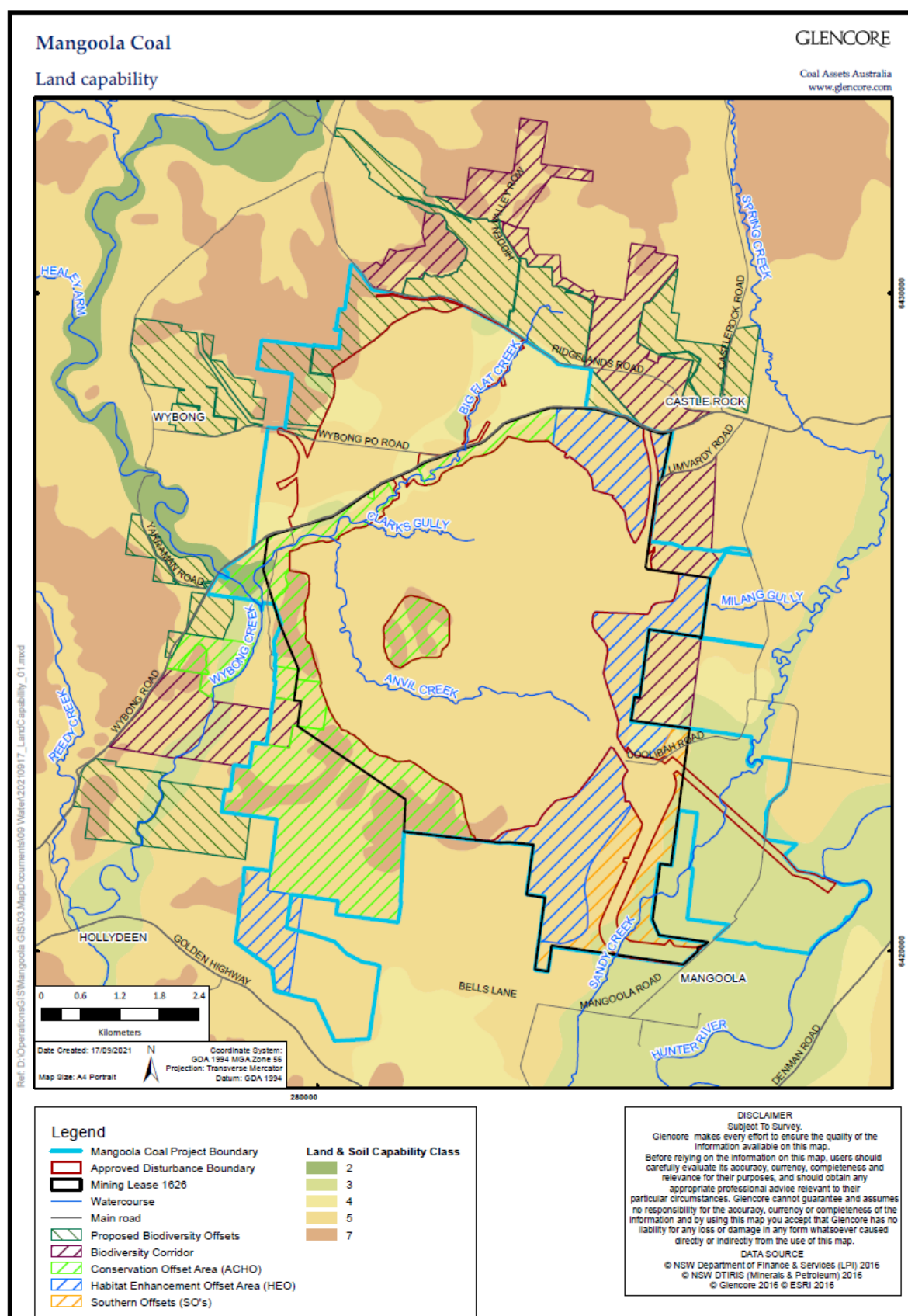


Figure 3 Land Capability

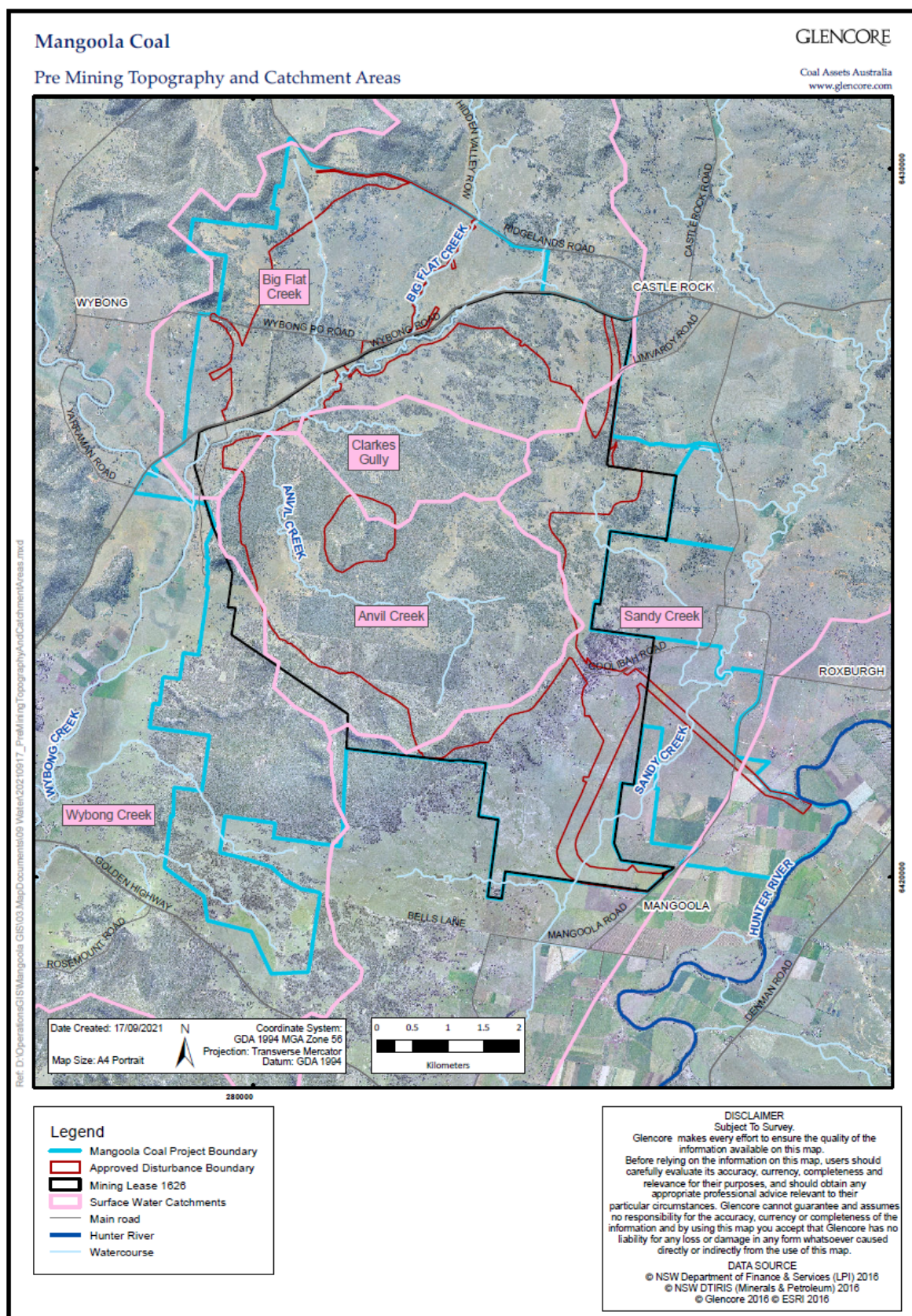


Figure 4 Pre Mining Topography and Catchment Areas

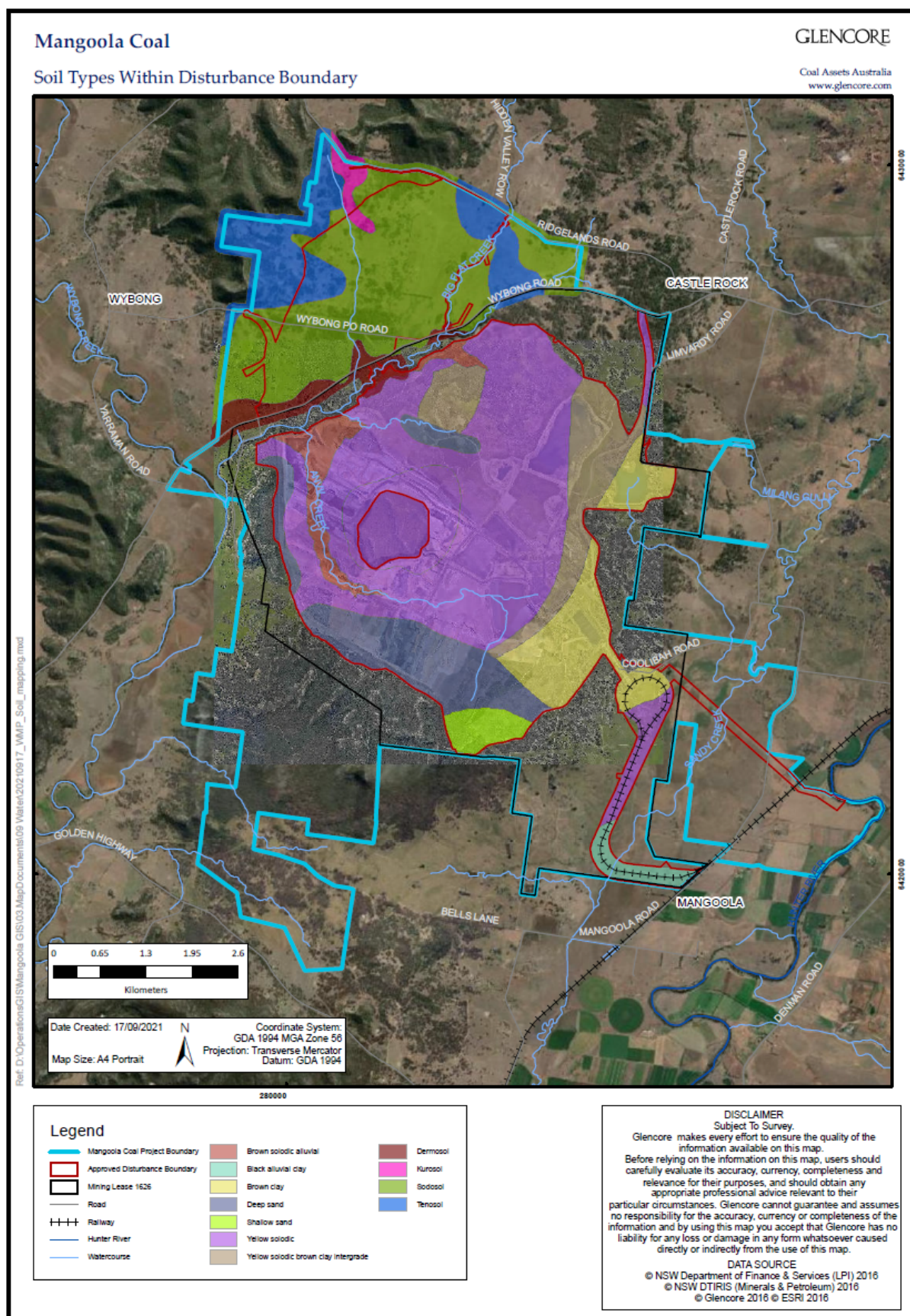


Figure 5 Soil Types

### 3. Surface Water Management

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The water management system at Mangoola Coal is managed in three separate systems:

- Dirty Water System - generally runoff from areas disturbed by mining operations and associated activities, including overburden emplacement areas (which are not part of the Saline Water System), that have not come into contact with coal or saline water and have potential to have high sediment loads.
- Saline Water System - consists of water that has been in contact with coal and subsequently has the potential to be saline. These areas include the open cut pits, internally draining overburden dump areas, Pit Water Dam (PWD), tailings dams, CHPP, ROM and product stockpile areas, rail loading facilities and coal haul roads. This includes all areas not draining to the Dirty Water System or Raw Water System. Water from this zone is used for process water and dust suppression within the saline water zone; and
- Clean Water System – refers to licensed input from the Hunter River, runoff water from the undisturbed upslope catchment area and water from rehabilitated areas that are fully established and stable.

These three water systems prevent the contamination of the clean water systems, including downstream natural drainage systems, by mining activities. The controls that have been implemented to achieve this are outlined in **Sections 3.1 to 3.7**.

The layout of the key water management structures is shown in **Figure 6**. The water management system consists of two main water storage dams, Pit Water Dam and Raw Water Dam, and a number of staging/sediment dams. Mangoola Coal has approval under PA 06\_0014 and SSD 8642 for the discharge of water from site under the Hunter River Salinity Trading Scheme (HRSTS), investigations into the construction of the necessary infrastructure to support this ability is currently underway as outlined further in this section and in **Section 3.6.3**. A schematic of the water management system for each of these individual systems is shown on **Figure 7**.

Additional water management infrastructure required to facilitate SSD 8642 is presented on **Figure 6** and discussed further in **Section 4**. Following commissioning, new sediment dams north of Wybong Road will be integrated into the Mangoola dirty water management system.

The water management system is designed to exclude the use of any licensable water from the Wybong Creek Water Source for mining purposes in accordance with Schedule 3 Condition 25 of PA 06\_0014. However, this restriction does not apply to water used outside the approved disturbance area for revegetation purposes associated with implementation of management plans under PA 06\_0014, or to any licensable water within the approved disturbance area that is collected as an incidental result of approved mining activities or to manage water quality.

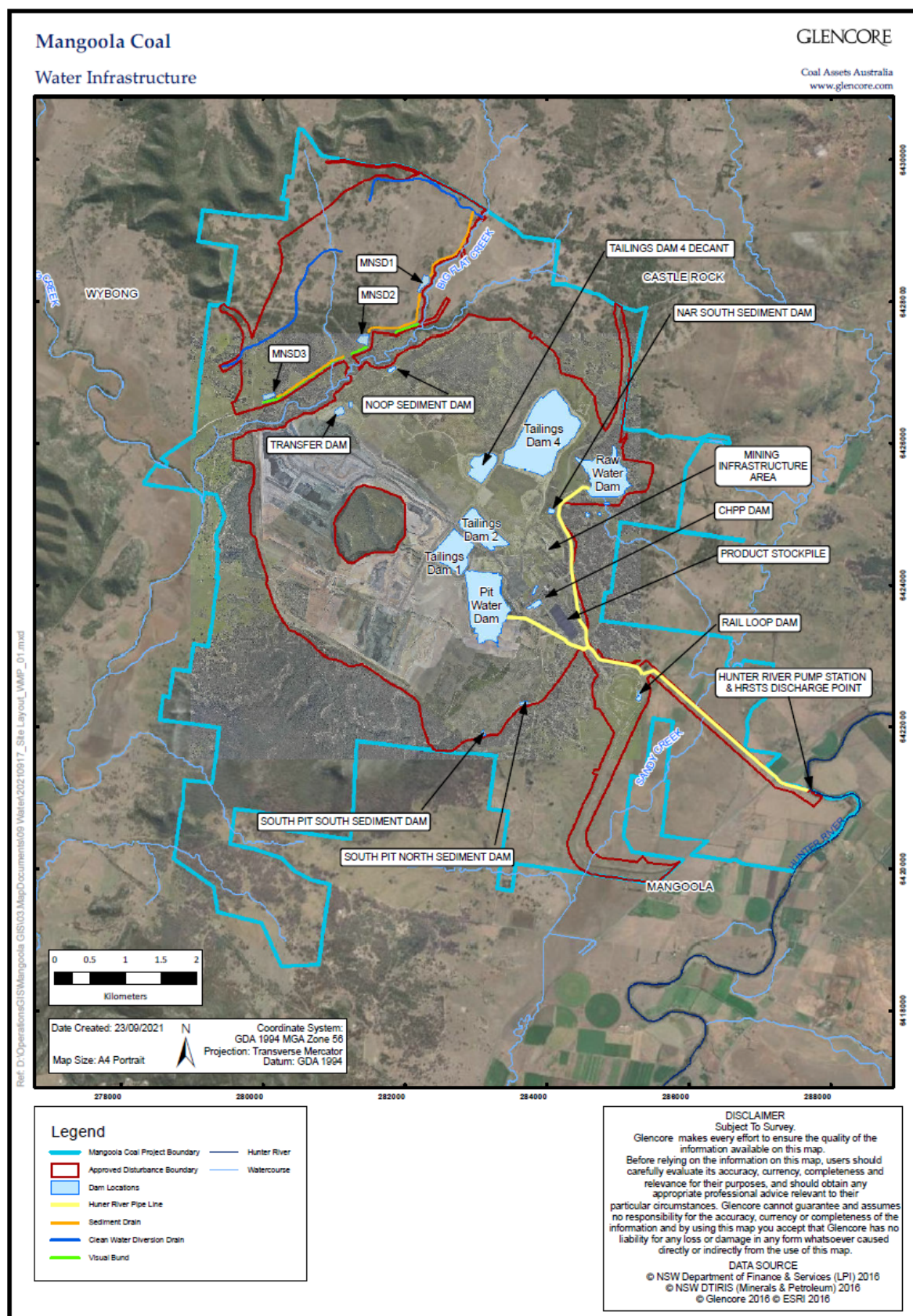


Figure 6 Water Infrastructure

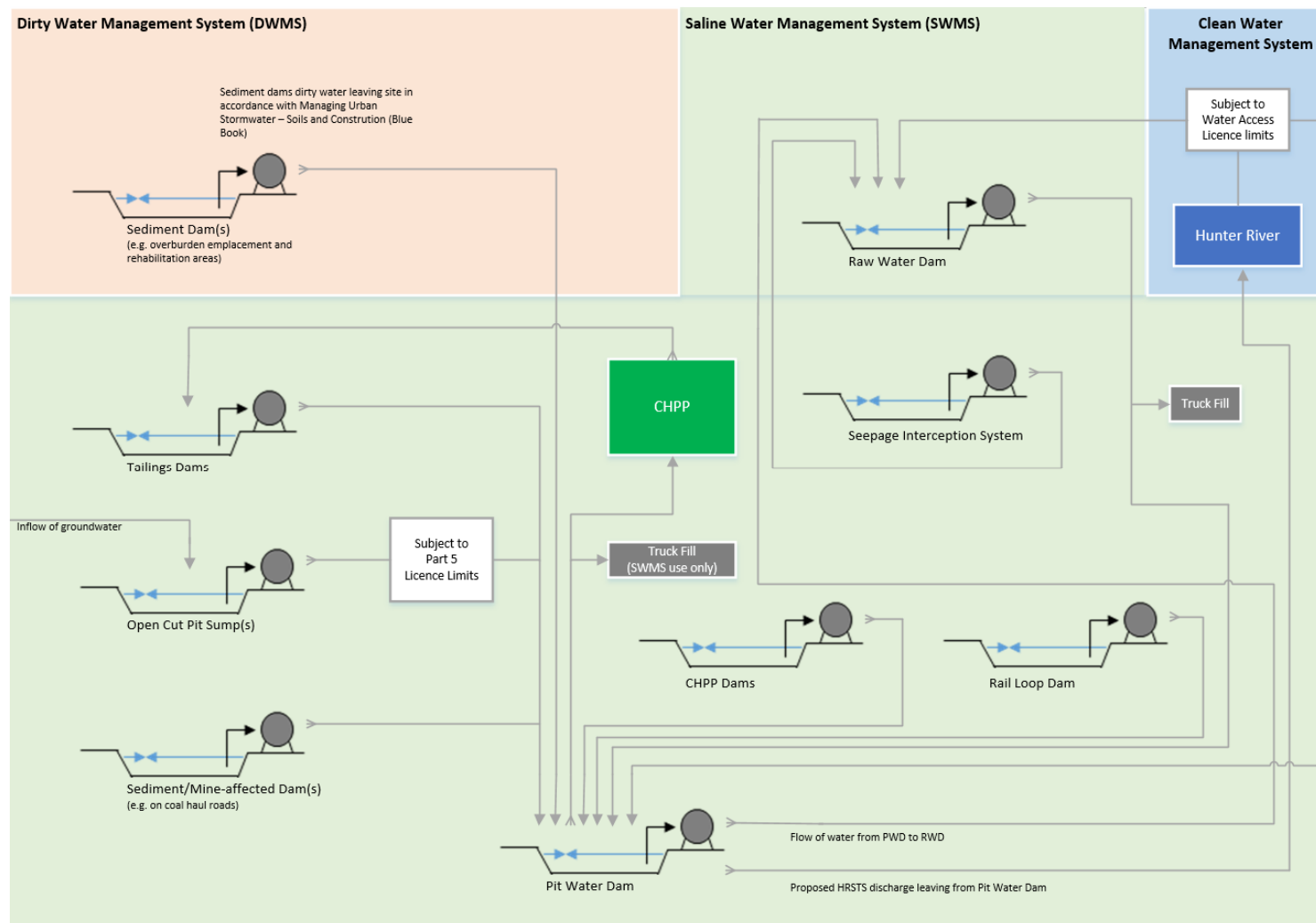


Figure 7 Water Management System

Water demands on site are proposed to be met from the following hierarchy of water sources:

1. On-site runoff from within the saline water system for preferential use for dust suppression and CHPP process water within the saline water system;
2. On-site runoff from within the dirty water system for use for dust within the entire site suppression and CHPP process water;
3. Groundwater inflows into the open cut pits for use for dust suppression and CHPP process water within the saline water system;
4. Clean water incidentally collected from undisturbed areas of the site for use for dust suppression and CHPP process water within the entire site under Harvestable Rights provisions (refer to **Section 3.4**); and
5. Water from the Hunter River using existing water access licences or purchased on the open market.

The water management system has been designed so there are no discharges of saline water from the mine site. However, a Hunter River Salinity Trading Scheme discharge point for Mangoola coal was approved by the DPIE under the Modification 6 assessment process, on 28th April 2014. PA 06\_0014 was amended accordingly (Condition 31 (g) to (i) of Schedule 3) however the conditions only apply once EPL 12894 for Mangoola Coal has been amended to allow discharges into the Hunter River. Investigation of a licensed discharge point is currently underway.

Runoff from overburden dumps and rehabilitated areas are channelled, stored and treated as required in various sediment ponds prior to reuse for dust suppression or discharge offsite in accordance with EPL 12894 (refer to **Section 3.6**).

Hunter River water required is imported to site, under licence, via the Hunter River pipeline as indicated in **Figure 7**.

### 3.1 Dirty Water System

Runoff from areas disturbed by operations is contained within the dirty water system. Sources of dirty water include overburden emplacement areas and areas where rehabilitation is not established. This water is considered to potentially have high sediment loads, and subsequently captured by sediment dams. Sediment dams are designed with sufficient capacity to treat and/or capture runoff from the design storm event in accordance with the requirements outlined in the ESCP in Appendix C. Dirty water sediment dams are pumped back to the Pit Water Dam. Dirty water is used on site for dust suppression and CHPP operation.

Water levels within the sediment dams are pro-actively managed to maintain stormwater capacity and to minimise spills from storm events (refer to **Section 3.6**).

To proactively manage water levels within sediment dams, the following is undertaken:

- Sediment dam design is to be in accordance with the ESCP in Appendix C of the WMP;
- Pumping systems are installed and operational to meet pumping requirements, in accordance with the ESCP in Appendix C of the WMP; and
- Maintaining freeboard prior to rainfall events.

In accordance with the Blue Book (Landcom, 2004), water to be discharged is to contain less than 50 mg/L of total suspended solids (TSS) and pH, conductivity and total dissolved solids are to be monitored (refer to the SWMP in Appendix D). Water quality is to be confirmed via sampling prior to discharge (refer to **Section 3.6**).

All water is discharged via designed spillways on dirty water management dams which are designed and operated as per the Blue Book (refer to ESCP in **Appendix C**).

## 3.2 Saline Water System

The saline water system consists of water that has been in contact with coal, and therefore is likely to be saline. The saline water system consists of:

- groundwater inflows;
- rainfall/runoff into the mine pit;
- runoff from coal haul roads;
- runoff from ROM pads;
- tailings decant water; and
- dirty water runoff from the CHPP, MIA, stockpiles and rail load out area which is pumped back to the Pit Water Dam.

Runoff from within the saline water management system is used for dust suppression within the saline water management system and CHPP operations. The Pit Water Dam has been constructed primarily for the storage of saline water.

The Raw Water Dam is located in the Sandy Creek catchment. Water is pumped from the Hunter River (under licence) via the Hunter River Pump Station to the Raw Water Dam. Water is pumped from the Raw Water Dam to re-supply the Pit Water Dam, when required, to supplement process water for the mining operations. There is also an off-take pipeline from the Hunter River pipeline which is be utilised as required to supply raw water directly to the Pit Water Dam. The Raw Water Dam has a saline seepage interception system which is managed in accordance with Figure 2.9 of the SWGWRP in **Appendix F**.

The Raw Water Dam is used as a secondary Saline Management System storage dam to increase out of pit water storage during periods of high rainfall.

## 3.3 Clean Water System

The clean water system consists of clean water diversions installed to minimise run off collected in the dirty and saline water systems. The clean water system will also consist of rehabilitated catchments where water quality monitoring indicates that the catchment is adequately rehabilitated in accordance with the Blue Book.

## 3.4 Water Storages

Water at Mangoola Coal is stored in surface dams, open cut pits, tailings dams and sediment dams. The major on-site dam storages are listed in **Table 5** and identified on **Figure 6**. Additional minor dams may be constructed from time to time to assist in the onsite site water management system.

Additional major sediment dams arising following the grant of SSD 8642 and proposed to be constructed are listed in **Table 5** and identified on **Figure 6**.

Table 5 – Major on-site Water Storages (&gt;10ML Capacity)

Storage	Capacity (ML)
Raw Water Dam	2566
Pit Water Dam	1707
CHPP Dam	25.1
Rail Loop Sediment Dam	28.3
Main Pit West Staging Dam <sup>#</sup>	51.6
NOOP Dam	46
South Pit Dam Staging 3 <sup>#</sup>	89
NAR South Sediment Dam	17
Decant Pit (Tailings Dams 3 & 4)	291
Tailings Pit 1 <sup>^</sup>	1800
Tailings Pit 2 <sup>^</sup>	4000
Tailings Pit 4	14300
MNSD1*	85.0
MNSD2*	80.0
MNSD3*	50.0
Transfer Dam*	32.5

<sup>#</sup> Water storage to be mined through over the life of the Water Management Plan.

\*Proposed and not yet constructed. Sizing subject to final detailed design.

<sup>^</sup> Tailings Dam 1 and Tailings Dam 2 to be capped in line with approved High Risk Activity notification.

### 3.5 Harvestable Rights Provisions

Under the Harvestable Rights regulations, landholders may harvest up to 10 per cent of the average regional runoff on the property. The conceptual surface water management layouts presented to support Modification 4 and Modification 6 (Umwelt, 2010 and WRM, 2013 respectively) presented a series of clean water diversions and sediment dams as part of the conceptual water management system. Both assessments also indicated that the collection of undisturbed/clean water runoff would be managed under Harvestable Rights Provisions.

Due to approved changes to the mine plan it is not feasible to construct the originally proposed clean water diversion drains in Anvil Creek catchment as a result of the topography. As such additional

runoff from undisturbed/clean catchments will be incidentally collected by the approved mining operations.

Mangoola conducted a review of harvestable rights entitlement in 2016 based on increased continuous landholdings. An additional review of the Harvestable Rights provision was completed in 2019 to account for the updated version of the NSW Governments Hydroline program. **Table 6** summarises the 2016 review and the 2019 appendix and highlights a maximum shortfall in harvestable rights during 2018. The shortfall further decreases in 2019 and 2020 with the reduced capture of clean water in the Anvil Creek catchment due to progression of mining.

*Table 6 – Summary of 2019 Harvestable Rights Review*

Step	Description	Volume		
		2018 <sup>1</sup>	2019	2020
<b>Determine Maximum Harvestable Rights Dam Capacity (MHRDC) as based on the Mangoola land holdings and associated average regional runoff rate published by DPI Water</b>	10,199 ha x 0.7 ML/ha x 10%	714 ML	714 ML	714 ML
<b>Identify existing farm dams that utilise part of the MHRDC (i.e. catchment dams or dams on 1st or 2nd order drainage lines that are not turkeys nest dams, pollution control or flood mitigation dams)</b>	319 dams identified from review of aerial photography, volumes estimated using DPINR (2004) methods	-307 ML <sup>1</sup>	-323 ML	-323 ML
<b>Sub-Total</b>		<b>407 ML</b>	<b>391 ML</b>	<b>391 ML</b>
<b>Identify clean water capture associated mining operations (100% capture at 0.7 ML/ha)</b>	135 ha upstream of Raw Water Dam	-95 ML	-95 ML	-95 ML
	30 ha on Anvil Hill	-21 ML	-21 ML	-21 ML
	708 ha Anvil Creek catchment during 2018	-496 ML	-355 ML	-329 ML
	507 ha Anvil Creek catchment during 2019			
	470 ha Anvil Creek catchment during 2020			
<b>Sub-Total</b>		<b>-612 ML</b>	<b>-471 ML</b>	<b>-445 ML</b>
<b>Total</b>	-	<b>-205 ML</b>	<b>-80 ML</b>	<b>-54 ML</b>

Schedule 3, Condition 25 of PA 06\_0014 states that:

*“The Proponent shall not use any licensable water from the Wybong Creek Water Source for Mining Purposes.*

*Note: this restriction does not apply to water used outside the project disturbance area for revegetation purposes associated with implementation of the Biodiversity Offset Strategy, or to any licensable water within the project disturbance area that is collected as an incidental result of approved mining activities.”*

The current mine design indicates that the worst-case year for collection of natural/undisturbed catchments into the water management system was 2018, when the operating pit mines through the lower reaches of Anvil Creek. During 2018, a maximum of approximately 706 hectares of undisturbed/natural catchment area within the Anvil Creek catchment was collected within the water management system. This area reduces to 470 hectares during 2020 and continues to reduce until development of the final landform which re-instates Anvil Creek.

Mangoola has licensed the 205 ML shortfall in harvestable rights provisions for water incidentally collected by approved mining by reallocating an unused proportion of the 798 shares held in the Wybong Creek Water Source (Unregulated River). Mangoola has transferred WAL 6296 (86 Shares) and WAL 9344 (164 Shares) to account for the temporary deficit in harvestable rights.

The 2019 analysis confirms the modelled reduction in the capture of clean water from 2018 to 2019 with the clean water take reducing beyond 2019. Additional sediment control dams required for the MCCO Project north of Wybong Road are exempt from licensing under the Water Management (General) Regulation 2018 because they are necessary for the purpose of control of soil erosion and capture, containment and recirculation of drainage to prevent the contamination of a water source (HEC 2019). Given the MCCO Project construction activities will not affect the harvestable right calculation and as the clean catchment is reducing in the current mining area in accordance with the approved mine designs, no further action is required. A further update to the harvestable rights calculation will be included in the revised WMP to be prepared in accordance with SSD 8642 Condition B50.

## 3.6 Water Discharge Management

### 3.6.1 Overview

During normal operation, on-site water storage dams (e.g. sediment dams) are maintained at low levels to ensure that adequate capacity is available in the event of a storm event or period of prolonged rainfall, in accordance with the ESCP (**Appendix C**). In the event that the freeboard in dams reduces to less than one metre, the following steps are taken to prevent the need for offsite discharge:

- cease water extraction from the Hunter River;
- dirty water management system
  - transfer water between sediment dams to maintain maximum freeboards;
- saline water management system
  - transfer water to Pit Water Dam (if sufficient freeboard);
  - transfer water to open cut pit; and/or
  - transfer water from Pit Water Dam to Raw Water Dam
  - Discharge to Hunter River via HRSTS

Should this procedure still not provide sufficient storage capacity, water is to be discharged in accordance with EPL 12894 and the procedure outlined in **Section 3.6.2**.

### 3.6.2 Controlled Discharge

Prior to rainfall events or during dam construction, it may be practical to treat this sediment-laden water and discharge the treated water to the natural environment. In accordance with the Blue Book (Landcom, 2004), water to be discharged will contain less than 50 mg/L of total suspended solids (TSS) and pH, conductivity and total dissolved solids is to be monitored (refer to the SWMP in **Appendix D**).

### 3.6.3 Discharge under Hunter River Salinity Trading Scheme

Mangoola Coal has approval under PA 06\_0014 and SSD 8642 for the discharge of water from site under the HRSTS. EPL 12894 has also been varied to include HRSTS requirements; however the discharge of saline water is not authorised by the EPA until Mangoola notifies the EPA in writing that the monitoring and telemetry equipment is installed as per the conditions of EPL 12894 (refer to Condition E1.4).

Following amendment EPL 12894 to include permissible discharge under the HRSTS, Mangoola Coal will amend this plan to include details of when mine water discharge is permitted under the HRSTS scheme from the Mangoola Coal discharge point and the monitoring requirements. Mangoola will implement all reasonable and feasible measures to minimise the need to use the HRSTS discharge point.

### 3.6.4 Uncontrolled Discharge

For all foreseen and unforeseen events related to an uncontrolled discharge, the response will be managed in accordance with the relevant TARP protocol under the SWGWRP (refer to **Appendix F**). Further details regarding the SWGWRP and TARP protocol is provided in **Section 9**.

## 3.7 Wastewater

Sewage treatment at the MIA facility is provided by dedicated Wastewater Treatment Plant (WWTP). The WWTP has a primary and secondary treatment system and is operated in accordance with Muswellbrook Shire Council approval WTA No: 5/2010. Effluent from the WWTP is reused on site for CHPP operation and dust suppression.

## 4. Construction Activities

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### 4.1 Construction Works

As discussed in **Section 1.1** Mangoola was granted SSD 8642 which requires the construction of necessary water management infrastructure in advance of the mining operation. It is expected that the construction phase for SSD 8642 will occur during the period 2021-2023 and includes the construction of a water management system to manage sediment laden water runoff, divert clean water catchment, provide flood protection from Big Flat Creek and provide for reticulation of mine water.

SSD 8642 provides an exemption from certain approval under the *Water Management Act 2000* for construction related activities as identified in Condition A2. In this regard a controlled works approval is not required for the MCCO Project. The guidance series for *Controlled Activities on Waterfront Land* (DPIE Water 2012) has been considered in relation to the MCCO Project construction works as appropriate.

Mangoola will implement erosion and sediment controls to mitigate the impacts of the operations on nearby watercourses and the surrounding environment. Standard erosion and sediment control techniques are utilised in accordance with the requirements of SSD 8642 Condition B48 and *Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Volumes 2A, 2C, 2D and 2E (DECC 2008)* (the Blue Book). All construction erosion and sediment control measures will utilise the existing Mangoola Erosion and Sediment Control Plan (MANOC-1772150304-6266) where applicable see **Appendix C**.

The following construction components in relation to water management include:

- Establishment of the Proposed Wybong Road/Big Flat Creek Overpass and haul road connection to Mangoola Coal Mine. Includes installation of culverts of appropriate size in Big Flat Creek and the temporary diversion drainage for Big Flat Creek while the culverts and overpass are being constructed.
- Construction of a water truck fill facility. This facility will be constructed at the northern extent of the existing Mangoola mining area.
- Establishment of water management infrastructure including sediment water diversion drains, sediment dams, pumps and pipelines.
- Construction of clean water diversion drains to capture and redirect the flow of clean water from the future mining area north of Wybong Road.
- Establishment of a clean water supply system to provide water for construction tasks from the existing Raw Water Dam to the key construction work areas.

Further detail regarding the above elements is providing in the following sections and an overview of proposed construction activities is provided in **Figure 6**.

#### 4.1.1 Clean Water Diversions

Two clean water diversions will be constructed as shown on **Figure 6** and will cater for a 1 in 100 (1%) AEP peak flow event design. Standard erosion and sediment control techniques will be applied in accordance with the requirements of SSD 8642 Condition B48 and *Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Volumes 2A, 2C, 2D and 2E (DECC 2008)* (the Blue Book).

#### 4.1.2 Big Flat Creek Culverts

Big Flat Creek Culverts will be designed in accordance with the MCCO Project EIS (Umwelt, 2019) and will permit 1 in 250 (0.25%) AEP peak flow. Consultation with MSC is ongoing regarding obtaining s138 approval under the *Roads Act 1993* including any necessary flood warning signage that may be required.

The Biodiversity Assessment Report completed for the MCCO Project EIS classified waterways in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013). Un-named tributaries occurring within the MCCO Additional Project Area have been classified as having an unrecognised habitat sensitivity type (i.e. not sensitive) and are not considered as a watercourse for fish passage in consideration of the *Why do fish need to cross the road? fish passage requirements for waterway crossings* (NSW Fisheries 2003). Big Flat Creek was classified as Class 3 minimal key fish habitats and Type 3 minimal habitat sensitive.

In accordance with the Class 3 Minimal Fish Habitat requirements the MCCO Project Big Flat Creek culverts have been designed to utilise "Low Flow Design" whereby the centre culvert is positioned

lower to maximise the geometric similarities of the natural channel profile to provide continual flow (where flow is present).

All construction activities, including those within the Big Flat Creek riparian corridor, will be subject to implementation of a Ground Disturbance Permit (GDP) including any appropriate controls. The extent of works within the Big Flat Creek riparian corridor will be demarcated so that areas of ecological value outside the approved disturbance area are not impacted.

#### 4.1.3 Water Truck Facility

Mine and road truck sized water truck fill facility will be located at northern extent of existing mining area and will service both the existing and proposed operations north of Wybong Road. Water supply for the water truck fill facility will be drawn and piped from the existing TD4 Decant Dam.

#### 4.1.4 Visual Bunds and Levies

Bunds varying in height will be constructed parallel to the mine pit crest (**Figure 6**) for visual screening of mine operations from public roads. Visual screening bunds will also channel Big Flat Creek in areas (acting as flood levee with the 1% AEP level not extending over the drain). Predicted flow velocities and depths are very low (HEC, 2019) therefore no erosion protection additional to established vegetation is required.

#### 4.1.5 Erosion and Sediment Control

Sediment retention basins and diversion drains will be constructed to protect downstream areas from sediment generated by MCCO Project and will be adapted as needed depending on the soily type, slope and catchment areas. A number of new dams would be constructed over the life of the MCCO Project for sediment control: Mangoola North Sediment Dam 1 (MNSD1), Mangoola North Sediment Dam 2 (MNSD2), Mangoola North Sediment Dam 3 (MNSD3) and Transfer Dam and have been sized in accordance with the 'Blue Book' (Landcom, 2004 and DECCW, 2008) guidelines to capture runoff from a 95th percentile, 5-day rainfall event (see **Table 5**) and identified on **Figure 6**. Following commissioning of water infrastructure these sediment dams will dewater via pumps and pipelines to the Transfer Dam and integrated into the Mangoola water management system. Sufficient pump capacity would be provided to enable dewatering of these storages to reinstate their design settling zone volume in five days as required by Landcom (2004).

### 4.2 Water Supply

Water supply for the construction phase is planned to be either sourced directly from site or pumped from the Raw Water Dam or existing sediment dams at the existing Mangoola Coal Mine via an above ground pipeline to either holding tanks or dams within the MCCO Additional Project Area north of Wybong Road. Mangoola has adequate supply within the existing water management system at Mangoola Coal Mine to meet the water requirements for the construction phase.

### 4.3 Water Quality and Sediment and Erosion Control

Although the construction works are not predicted to pose any impacts on water quality, monthly water sampling will be undertaken in accordance with the existing Surface Water Monitoring Plan (see **Appendix D**) at the existing surface water monitoring sites along Big Flat Creek, which are located upstream and downstream of the haul road overpass over Big Flat Creek and Wybong Road. Further detail of the surface water monitoring program is provided in **Section 7.1**.

Monitoring will also be undertaken for any areas of erosion risk, including the proposed upslope diversions and downstream of the Big Flat Creek and Wybong Road overpass.

Erosion and sediment control strategies and structures that will apply to construction are outlined in the Mangoola ESCP (**Appendix C**). All relevant management controls as outlined in the Mangoola ESCP must be implemented by the contractor and Mangoola personnel to minimise soil and water impacts.

All established erosion and sediment controls will be subject to routine inspections and following significant rainfall events. Appropriate maintenance works will be carried out as required in accordance with the Mangoola ESCP (see **Appendix C**).

Associated with the Mangoola Coal Continued Operations Project Response to Submissions (Umwelt 2019b) additional monthly groundwater quality monitoring along Big Flat Creek in the area adjacent the eastern flank of the out-of-pit emplacement is proposed to occur for a minimum of 12 months prior to the commencement of mining in the area north of Wybong Road. Further discussion regarding the expanded monthly groundwater monitoring program is discussed in **Section 7.2**.

## 4.4 Groundwater Bore Monitoring Notifications

Condition B39 of SSD 8642 requires that prior to commencement of construction the owners of the bores listed in **Table 7** may request monitoring of the listed bore to determine the level of drawdown from the development. In the event that monitoring data records drawdown of more than 2 metres as a result of the development, Mangoola must provide compensatory water in accordance with SSD 8642 conditions B41 to B45.

Correspondence was provided from Mangoola to the landowners listed in **Table 7** dated 17 May 2021 noting the offer for groundwater bore monitoring in accordance with the requirements of SSD 8642.

As shown in **Table 7** the only privately owned bore predicted to experience drawdown greater than 2 m is GW078502. Bore GW078502 is believed to be approximately 58 m deep, although exact construction details are unknown. It is possible that the bore is screened above the coal seams, which would reduce any potential drawdown impacts from mining. In accordance with Condition B40 prior to the commencement of mining operations north of Wybong Road Mangoola will notify the owner of GW078502 they may be eligible for compensatory water under Conditions B41 to B45.

*Table 7 Private Bore Monitoring*

Bore ID*	Receiver ID*	Predicted Groundwater Drawdown (m) <sup>#</sup>
<b>Bore 1</b>	R261	0.182
<b>Bore 2</b>	R157	1.296
<b>Bore 3</b>	R130	0.008
<b>GW080507</b>	R144	0
<b>GW201589</b>	R144	0.3
<b>GW078502</b>	R83	~7.5

\*The receiver IDs and bore locations are presented in SSD 8642 Appendix 3

<sup>#</sup>As outlined in the MCCO Project EIS (Umwelt 2019a) and as updated in the MCCO Project RTS (Umwelt 2019b).

## 5. Site Water Balance

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### 5.1 Water Balance Overview

The site water balance model for Mangoola Coal is based on current operational information and water flow data. A water balance is a representation of all inflows, outflows and changes in storage for the water management system. It provides an understanding of the need for water supply, storage and releases and the impacts of seasonal and climate change.

The site water balance is compiled to demonstrate compliance with the requirements of PA 06\_0014, EPL 12894 and water licence conditions under which Mangoola Coal operates. A detailed review of the site water balance to include the MCCO mining area will be completed to address SSD 8642 Condition B50(e) prior to the commencement of mining north of Wybong Road. The site water balance is based on the following data collected, including but not exclusively:

- daily rainfall;
- catchment areas;
- water usage (e.g. in CHPP);
- water used for dust suppression;
- water imported to site (including Hunter River water and potable water);
- pit water transfers and observations of groundwater make;
- tailings decant volumes;
- regular water levels in the major on-site water storages (refer to **Table 5**) and operational tailings dams;
- Production data; and
- HRSTS discharges (if applicable).

This data is collected from various gauges and meters on pumping systems and water level sensors and survey levels on dams.

The estimate of the volume of water sourced from the hard rock and alluvial aquifers requires supporting information from groundwater monitoring bores, and information provided by a suitably qualified specialist based on a groundwater model that covers the Mangoola Coal area (refer to Appendix E). **Section 5.4** outlines how the water balance model is also used to determine if surface water from Big Flat Creek has been captured in the pit.

The site water balance includes an estimated volume of water re-used on site, along with any new or updated reduction measures that have been implemented.

The site water balance is used to manage the risks associated with the management, storage and transfer of water for the operation of Mangoola Coal and the prevention of material harm to the surrounding environment.

Reporting of the water balance is undertaken in accordance with **Section 10.3** of this document. Reporting is also undertaken in accordance with the Appendix F – Surface Water Groundwater Response Plan for aspects of the water balance model when triggered.

## 5.2 Water Inputs and Outputs

The key water inputs are rainfall runoff, extraction from the Hunter River, groundwater inflow to the pit and tailings return water which is transferred to the Pit Water Dam. The primary water source for site water demands (including the primary site water demands of the CHPP and haul road dust suppression) is the Pit Water Dam. Raw water is transferred to the Pit Water Dam from the Raw Water Dam when water inflows are insufficient to match demands. Raw Water Dam water levels are maintained by pumping from the Hunter River when necessary.

The key water outputs at Mangoola Coal are direct evaporation, CHPP supply and consequent water entrained in product coal and tailings, and water cart usage for haul road dust suppression. Potential key water outputs are uncontrolled or controlled discharges from site dams to the natural environment. Water may be transferred from the Pit Water Dam to the Raw Water Dam and potentially discharged to the Hunter River.

In accordance with Schedule 3 Condition 27A of PA 06\_0014, Mangoola will implement all reasonable and feasible measures on the site to minimise the need to discharge saline water to the Hunter River under the Hunter River Salinity Trading Scheme. Mangoola implements measures to manage surplus saline water by reusing it for coal washing and dust suppression. Discharges to the Hunter River are not required under average climate conditions, only under period of prolonged wet weather.

## 5.3 Water Security and Reliability

To assist in determining the likely future water security and reliability of Mangoola Coal, a predicted water balance model for each of the conceptual mine plans for Years 2, 5 and 10 was undertaken using a daily time-step historical simulation water balance model, GOLDSIM. This model assists in determining the scale of the likely water deficit or surplus that is likely given the anticipated operations. The throughput of bypass coal product has a significant effect on the site water demand for CHPP operations. Accordingly, two primary scenarios were developed to assess the impact of the different water demands. The scenarios modelled for the water balance are presented below:

- Scenario 1 – high water demand. Assumes a maximum of 13.5 Mtpa of ROM coal washed through the CHPP. Maximum water demand would occur under this scenario; and
- Scenario 2 – low water demand. Assumes up to 8 Mtpa of ROM coal washed through the CHPP, with the remaining 5.5 Mtpa of ROM coal bypassing the CHPP as bypass coal product (i.e. unwashed).

These scenarios provide the likely potential upper and lower bounds of site water demand. A summary of the predicted water balance for Mangoola Coal for key mine years is shown in **Table 8**. The site water balance indicates a gross water deficit that is proposed to be met using water extracted from the Hunter River.

*Table 8 – Mangoola Coal Predicted Water Balance Summary (Average Rainfall Year)*

		Year 5	Year 10	Year 10 – high runoff
<b>Scenario 1 – high water demand</b>				
<b>Gross Water Inputs</b>	2,677	2,979	2,876	3,062
<b>Gross water Outputs</b>	3,176	3,405	3,309	3,382

		Year 5	Year 10	Year 10 – high runoff
<b>Gross Water Deficit</b>	499	425	432	284
<b>Scenario 2 – low water demand</b>				
<b>Gross Water Inputs</b>	2,141	2,490	2,385	2,699
<b>Gross water Outputs</b>	2,369	2,680	2,585	2,846
<b>Gross Water Deficit</b>	228	189	199	147

As shown in **Table 8**, Mangoola Coal proposes to utilise water from the Hunter River to meet the potential water deficit. This water deficit is supplemented with water stored on site during prolonged dry periods. Mangoola Coal currently holds approximately 2783 Hunter Regulated River water shares from the Hunter River Pumps Station (20WA211008), including 17ML of high security shares and 8ML of supplementary shares.

In addition to recycling water and utilising Hunter River allocation, Mangoola Coal intends to use a number of operational responses to address potential supply shortfalls. One or more of these actions could be investigated in the event of extended drought:

- Review of haul road dust suppression water demand by use of dust suppression agents;
- Review of CHPP water demand by increasing bypass coal (due to the significantly lower unit water demand compared to washed coal); and/or
- Investigate alternative water supplies.

To ensure sufficient water is available for all stages of the development, and if necessary, Mangoola will reduce the scale of production to match the available water supply.

## 5.4 Big Flat Creek Surface Water

Previous assessment have concluded that surface water from Big Flat Creek will not enter the mine water system and would only occur via groundwater seepage. The process to validate this prediction are:

- As part of the annual water balance model update, predictions of pit inflows will be compared with recorded pit pumping records.
- If the water balance cannot be resolved, the bimonthly water quality sampling will be examined using EC and nutrients levels in the Big Flat Creek surface waters, the colluvium and regolith bores in Big Flat Creek compared with the pit water quality.
- If the results indicate that there could have been inflows to the pit from Big Flat Creek a hydrogeologist will be engaged to reassess the groundwater model and the potential from inflows to the pit and surface water allocations will be obtained for the predicted loss.

## 6. Erosion and Sediment Control

Erosion and sediment control is to be undertaken in accordance with the ESCP provided in **Appendix C**. The ESCP applies to all activities undertaken by Mangoola Coal within the Mangoola Coal boundary. The purpose of the ESCP is to fulfil the requirements of PA 06\_0014 and EPL 12894 under which Mangoola Coal operates and to fulfil other relevant statutory requirements that are applicable to Mangoola Coal.

The objectives of the ESCP are to ensure that appropriate procedures and programs of work are in place to:

- meet the requirements of Managing Urban Stormwater: Soils and Construction (the Blue Book), Volume 1 and Volume 2 (Landcom 2004 and Department of Environment and Climate Change (DECC) 2008).
- identify activities that could cause soil erosion and generate sediment (refer to Section 2.2 of the ESCP);
- describe the location, function and capacity of erosion and sediment control structures required to minimise soil erosion and the potential for transport of sediment downstream (refer to Section 3.0 of the ESCP); and
- ensure erosion and sediment control structures are appropriately maintained (refer to Section 4.0 of the ESCP).

## 7. Monitoring

### 7.1 Surface Water

Surface water monitoring is to be undertaken in accordance with the SWMP provided in Appendix D. The SWMP outlines the baseline monitoring, impact assessment criteria and investigation and reporting protocols for potential surface water impacts at Mangoola Coal. The purpose of the SWMP is to fulfil the requirements of PA 06\_0014, EPL 12894 and other relevant statutory requirements that are applicable to Mangoola Coal (refer to **Section 1.5**). The existing SWMP will continue to apply following the commencement of development associated with SSD 8642. A detailed review of the SWMP to include the MCCO mining area will be completed to address SSD 8642 Condition B50(iv) prior to the commencement of mining north of Wybong Road. The key objectives of the SWMP include:

- detail the integrated surface water monitoring strategy for Mangoola Coal (refer to Section 3.0 of the SWMP);
- provide detailed historical baseline data on surface water quality in creeks and other waterbodies that could potentially be affected by Mangoola Coal operations (refer to Section 2 of the SWMP);
- provide methods to monitor and assess stream health and channel stability in creeks (refer to Section 3.4 and 3.5 of the SWMP);
- outline relevant surface water and stream health impact assessment criteria and establish a protocol for the assessment and response to monitoring data (refer to Section 2.2 of the SWMP and Appendix F);

- provide methods to assess compliance with conditions of PA 06\_0014, EPL 12894 and legislation relating to surface waters (refer to Section 4.0 of the SWMP);
- outline the monitoring protocol to be implemented in the event of the potential for any release from the site to determine whether the quality is suitable for discharge (refer to Section 3.7 of the SWMP);
- monitor the effectiveness of the Erosion and Sediment Control Plan as it relates to water quality (refer to Section 3.6 of the SWMP and **Appendix C**); and
- outline the reporting requirements for the results of the monitoring program including monitoring of the internal water transfer system comprising of Pit Water Dam, Raw Water Dam, Tailings Dam and other sediment dams located across the operation (refer to Section 5.0 of the SWMP).

The SWMP includes monitoring of the following elements of the Mangoola Coal water management system and surrounding creeks:

- surface water quality and flows in upstream and downstream watercourses;
- channel stability in upstream and downstream watercourses;
- stream health conditions in upstream and downstream watercourses;
- on site water management; and
- discharges of water from the site.

If an exceedance of water quality criteria or trigger levels is identified, then the SWGWRP provided in Appendix F is to be activated as detailed in Section 8.0.

\*Note that Schedule 3 Conditions 31 (g) – (i) only apply once the EPL for the project has been amended to allow discharges into the Hunter River.

## 7.2 Groundwater

Groundwater monitoring is undertaken in accordance with the GWMP provided in Appendix E. The GWMP outlines the baseline monitoring, impact assessment criteria and investigation and reporting protocols for potential groundwater impacts at Mangoola Coal. The purpose of the GWMP is to facilitate compliance with the conditions of the PA 06\_0014 and groundwater licences held by Mangoola Coal. The existing GWMP will continue to apply following the commencement of development associated with SSD 8642. A detailed review of the GWMP to include the MCCO mining area will be completed to address SSD 8642 Condition B50(v) prior to the commencement of mining north of Wybong Road.

The GWMP has also been developed to enable Mangoola Coal to measure, assess and respond to changes to the groundwater regime that may be attributable to the mining activities and are outside of the predicted impacts to groundwater. The key objectives of the GWMP are to:

- provide historical baseline monitoring data for the surrounding aquifers and regional groundwater (refer to Section 3 of the GWMP);
- provide groundwater impact assessment criteria (refer to Section 4 of the GWMP);
- provide a monitoring program for groundwater levels, groundwater quality and groundwater dependent ecosystems (refer to Section 3 of the GWMP);
- provide methods to estimate the groundwater contribution to the Mangoola Coal water balance through inflow into the open cut workings (refer to Section 3.3 of the GWMP);

- provide methods to monitor and assess groundwater pressure response in the surrounding coal measures (refer to Section 5.1 of the GWMP);
- provide methods to monitor and assess groundwater level response in the potential adjacent alluvial aquifers associated with Wybong Creek (refer to Section 5.1 of the GWMP); and
- outline the procedures for reporting results of the monitoring program and model validation (refer to Section 5 of the GWMP).

If an exceedance of any groundwater criteria or trigger levels is identified, then the SWGWRP provided in Appendix E is to be activated as detailed in Section 9.

Associated with the Mangoola Coal Continued Operations Project Response to Submissions (Umwelt 2019b) additional monthly baseline groundwater monitoring along Big Flat Creek in the area adjacent the eastern flank of the out-of-pit emplacement was proposed to occur for a minimum of 12 months prior to the commencement of mining in the area north of Wybong Road. This expanded monitoring is proposed to be conducted at a selection of the existing bores along Big Flat Creek that may include GW01, MN 1006, GW047877, REG001 and GW07. The monthly monitoring frequency is only proposed prior to the commencement of mining with the monitoring frequency and commitments made in the MCCO Project EIS (Umwelt 2019b) and Groundwater Impact Assessment (AGE, 2019) to be followed once the baseline program has been completed and mining commences.

In addition to the expanded groundwater monitoring, the MCCO Project EIS (Umwelt, 2019a) also included the commitment for the installation of new monitoring bores to confirm the VWP pressure changes, and also to monitor water levels in the Wybong Creek alluvium and GDEs prior to the commencement of mining in the MCCO Additional Project Area.

The expanded groundwater monitoring and additional bores proposed will be further outlined in the revised WMP prepared to address SSD 8642 Condition B50.

## 8. Inspections and Maintenance

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The inspection and maintenance of the water management system is essential to achieving the objectives of this plan. The specific inspection and maintenance requirements for each component of the water management system are addressed in the ESCP provided in **Appendix C** and the SWMP provided in **Appendix D**.

## 9. Surface Water and Groundwater Response

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The SWGWRP provided in Appendix F has been developed in accordance with Schedule 3, Condition 33 of PA 06\_0014. The existing SWGWRP will continue to apply following the commencement of development associated with SSD 8642. The existing SWGWRP will be reviewed, and where necessary consolidated, to address SSD 8642 Condition B50 prior to the commencement of mining north of Wybong Road.

The purpose of this SWGWRP is to outline the relevant TARP protocol response and investigation procedures to be implemented in the event of any adverse impacts or potential impacts on the surrounding surface water and groundwater environment. The objective of the SWGWRP is to provide:

- a protocol for the investigation, notification and mitigation of any exceedances of the surface water, stream health and groundwater impact assessment criteria;
- measures to mitigate and/or compensate potentially affected landowners with privately owned groundwater bores within the predicted drawdown impact zone identified in the EA, including provision of alternative supply of water to the affected landowner that is equivalent to the loss attributed to the project;
- measures to mitigate and/or compensate potentially affected landowners for the loss of surface water flows in Sandy Creek, Big Flat Creek and Wybong Creek downstream of the project;
- measures to minimise, prevent or offset groundwater leakage from the Big Flat Creek alluvium/colluvium that are inconsistent with the predicted impacts and licenses held by Mangoola Coal Operations;
- measures to mitigate any direct hydraulic connection between the backfilled open cuts and the Big Flat Creek alluvium/colluvium if the potential for adverse impacts is detected; and
- a contingency plan for isolating the Big Flat Creek alluvium/colluvium from Anvil Creek alluvium and mining areas in the event that it is required.
- Outline the site procedures to be followed if any potential impacts outside those predicted in the EIS are detected

The SWGWRP provides response protocols for the following potential impacts as identified in the EIS:

- exceedances of impact assessment criteria;
- surface water and groundwater impacts on adjacent landowners;
- interception of alluvial/colluvial aquifers, extraction above predictions and/or extraction above license limits; and
- overflow from water management system and/or unauthorised discharge.

## 10. Reporting and Review

### 10.1 Overview

As per Schedule 5, Condition 5 of PA 06\_0014, Mangoola Coal will publish monthly surface water quality monitoring, bi-monthly groundwater quality monitoring and groundwater level monitoring undertaken in accordance with **SWMP** and **GWMP** to the company website as a regular measure of performance. In accordance with SSD 8642 Condition A23 the existing monitoring requirements will continue to be implemented until the WMP is consolidated, and a review of the **SWMP** and **GWMP** completed, to address Condition B50 prior to commencement of mining north of Wybong Road.

### 10.2 Incident and Non- Compliance Reporting

All hazards, near misses and incidents are reported to the supervisor of the relevant work area immediately. In accordance with Schedule 5, Condition 4 of PA 06\_0014, Mangoola Coal will notify the Secretary and any other relevant agencies as soon as practicable of the incident and provide within seven days a detailed report on the incident. Incident reporting procedures relating an uncontrolled discharge are outlined in the SWGWRP (**Appendix F**).

Any incidents resulting or having the potential to result in material harm to the environment, as defined by Section 147 of the *Protection of the Environment Operations Act 1997* are managed in accordance with the Mangoola Coal Pollution Incident Response Management Plan (PIRMP).

Following commencement of development conditions of SSD 8642 will prevail to that of PA 06\_0014 and in accordance with Condition D9 Mangoola will notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing through the Department's Major Projects Website and identify the development (including the development applicant number and name) and set out the location and nature of the incident. Incident reporting procedures relating an uncontrolled discharge are outlined in the SWGWRP (*Appendix F*) and will continue to apply following commencement of development of SSD 8642.

In addition, Condition D10 of SSD 8642 provides that within seven days of becoming aware of a non-compliance, Mangoola must notify the Department of the non-compliance. The notification must be in writing through the Department's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it doesn't comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. It is noted that a non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

Mangoola will assess and manage operations to ensure there are no exceedances of the criteria and performance measures in SSD 8642. In the event of an exceedance of the of the criteria and performance measures in SSD 8642 then Mangoola will implement the actions as described in Condition D4(a) to D4(c).

## 10.3 Annual Review

The Annual Review is prepared in accordance with Schedule 5, Condition 6 of PA 06\_0014.

Water Balance Modelling is reported as part of the annual review as per Schedule 3, Condition 29 (a) of PA 06\_0014. Following the commencement of development under SSD 8642 the Annual Review will be prepared in accordance with SSD 8642 Condition D11 and will include water balance modelling as currently completed and reporting as required by Condition B38.

In accordance Condition D12 of SSD 8642 copies of the Annual Review will be submitted to Muswellbrook Shire Council and made available to the CCC and any interested person upon request. The Annual Review is also made available on the Mangoola website (see *Section 10.6*).

## 10.4 Community Complaints

Mangoola Open Cut maintains a centralised location to record details of relevant external stakeholder communications. A Community Response Line (1800 014 339) is in operation 24 hours per day, seven days a week and is regularly advertised in a local newspaper. Complaints are recorded and investigated. Follow up communication with the complainant is undertaken to communicate the outcome of complaint investigations. A monthly summary of complaints is uploaded to the website as per Schedule 5, Condition 11 of PA 06\_0014.

## 10.5 Water Management Plan Review

This WMP and supporting plans are reviewed and resubmitted to DPIE every three years, or earlier if required, for approval by the Secretary. Any changes made to the WMP as a result of the review is made in consultation with EPA and DPI Water. The WMP will reflect changes in environmental

requirements, technology and operational procedures. Updated versions of the approved WMP are made publicly available on the Mangoola Coal website ([www.mangoolamine.com.au](http://www.mangoolamine.com.au)) once approved by the Secretary.

In accordance with Schedule 5, Condition 9 of PA 06\_0014, Mangoola Coal will review, and if necessary revise, the strategies, plans, and programs required under PA 06\_0014 to the satisfaction of the Secretary within 3 months of:

- a) the submission for audit under Schedule 5, Condition 7 of PA 06\_0014;
- b) the submission for Annual Review under Schedule 5, Condition 6 of PA 06\_0014;
- c) the submission for incident report under Schedule 5, Condition 4 of PA 06\_0014; and
- d) any modification to the conditions of PA 06\_0014.

Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval. As outlined in **Section 1.2** this WMP will be consolidated to address SSD 8642 Condition B31 which is required to be approved by the Planning Secretary prior to the commencement of mining operations north of Wybong Road. However in the interim period, following commencement of development, this WMP will be subject to periodic review as per Conditions D7 and D8 of SSD 8642. The suitability of this WMP must be reviewed within three months of:

- The submission of an incident report;
- The submission of an Annual Review;
- The submission of an Independent Environmental Audit;
- The approval of any modification of the conditions of SSD 8642; or
- Notification of a change in development phase (as per Condition A13 of SSD 8642).

Review of the WMP is also required to either improve the environmental performance of the development or comply with a direction as per Condition A3 of SSD 8642.

In accordance with Condition D8, the revised WMP must be submitted to the Planning Secretary for approval within six weeks of the review. A summary of the WMP review history is maintained as per the Review History contained in this WMP.

As discussed in **Section 1.5.2** this WMP may be required to be updated to ensure consistency with EPL 12894.

## 10.6 Access to Information

In accordance SSD 8642 Condition D17, before the commencement of construction until the completion of all rehabilitation required under the consent Mangoola will make this WMP available on the Mangoola website. Mangoola will ensure that the applicable management plan is presented on the Mangoola website to account for the staged development of management plans required under SSD 8642.

In addition, the Annual Review will be made available on the Mangoola website which following, commencement of development, will be prepared to address requirements of SSD 8642 Condition D11. Water monitoring results as required by EPL 12894 and relevant PA 06\_0014 and SSD 8642 approval conditions will available on the Mangoola website.

## 10.7 Independent Environmental Audit

An Independent Environmental Audit will be conducted in accordance with Condition D13 and D14 of SSD 8642, this audit will encompass the Water Management Plan.

The IEA will be made available on the Mangoola website.

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## Appendix A - Authority Consultation



Planning,  
Industry &  
Environment

Planning & Assessment  
Resource Assessments

Contact: Joe Fittell  
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Mr Nathan Lane  
Environment and Community Manager  
Mangoola Coal Operations Pty Limited  
Muswellbrook NSW 2333

29/01/2021

Dear Mr Lane

**Mangoola Coal Project (PA 06\_0014)**  
**Approval of Site Water Management Plan**

I refer to the updated Site Management Plan, including the updated Surface Water and Groundwater Response Plan, which was submitted in accordance with condition 28 and condition 33 of Schedule 3 of the Mangoola Coal Project development consent (PA 06\_0014).

The Department has carefully reviewed the documents and is satisfied that they meet the requirements of the Project development consent.

Accordingly, the Planning Secretary has approved the updated Site Water Management Plan (version 11, dated May 2020), including the updated Surface Water and Groundwater Response Plan (version 8, dated April 2020). Please ensure that the approved plans are placed on the project website at your earliest convenience.

If you wish to discuss the matter further, please contact Joe Fittell at the details above.

Yours sincerely,

Matthew Sprott  
Director  
Resource Assessments (Coal & Quarries)

As nominee of the Planning Secretary

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Planning,  
Industry &  
Environment

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Mr Brian Pease  
Glencore Coal Assets Australia  
PO Box 495  
Muswellbrook NSW 2333

16/07/2021

Dear Mr Pease

**Mangoola Coal Continued Operations Project (SSD 8642)  
Staging of Management Plans**

I refer to your letter dated 15 July 2021 regarding the proposed staged approach to updating the management plans required under the Mangoola Coal Continued Operation Project development consent (SSD 8642).

The Department has reviewed the approach to updating the management plans provided in Attachment 1 of your letter and confirms it is satisfied that the staged approach is appropriate and would ensure compliance with the relevant conditions of consent. The Department also considers that the proposed approach to consultation with relevant parties detailed in your letter is appropriate.

Further to the above, the Department considers that implementation of the existing Environmental Management Strategy (EMS), prepared in accordance with the condition 1, Schedule 5 of PA 06\_0014, during the construction period is appropriate, and agrees that a revised EMS is only required to be prepared and approved prior to commencing mining operations north of Wybong Road in accordance with condition D2 of Schedule 2 of SSD 8642.

If you wish to discuss the matter further, please contact Joe Fittell at the details above.

Yours sincerely,

Matthew Sprott  
**Director**  
**Resource Assessments**  
*as the Planning Secretary's nominee*

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## Appendix B - Regulatory Requirements

**Table A: Project Approval 06\_0014 Conditions**

Project Approval Condition	Section of Document
<b>SCHEDULE 3</b> <b>WATER</b> <i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.</i> <b>Water Supplies</b> 25. The Proponent must not use any licensable water from the Wybong Creek Water Source for mining purposes.  <i>Note: This restriction does not apply to water used outside the project disturbance area for revegetation purposes associated with implementation of the Biodiversity Offset Strategy, or to any licensable water within the project disturbance area that is collected as an incidental result of approved mining activities.</i>	1.5.7  1.5.8  3.5
26. The Proponent must ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations to match its available water supply, to the satisfaction of the Secretary.	5.3
<b>Water Pollution</b> 27. Unless an EPL or the EPA authorises otherwise, the Proponent must comply with Section 120 of the POEO Act and the <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i> .  27.A The Proponent must implement all reasonable and feasible measure on the site to minimise the need to discharge saline water to the Hunter River under the Hunter River Salinity Trading Scheme.	3.6  5.2
<b>Site Water Management Plan</b> 28. The Proponent must prepare and implement a Site Water Management Plan for the project to the satisfaction of the Secretary. This plan must: <ul style="list-style-type: none"> <li>a) be prepared in consultation with EPA and DPI Water by suitably qualified expert/s whose appointment/s have been approved by the Secretary;</li> <li>b) include:               <ul style="list-style-type: none"> <li>• a Site Water Balance;</li> <li>• an Erosion and Sediment Control Plan;</li> <li>• a Surface Water Monitoring Plan;</li> <li>• a Ground Water Monitoring Program; and</li> <li>• a Surface and Ground Water Response Plan.</li> </ul> </li> </ul> The Proponent must implement the approved management plan as approved from time to time by the Secretary.	Appendix A  5 Appendix C Appendix D Appendix E Appendix F

Project Approval Condition	Section of Document
<b>Site Water Balance</b> 29. The Site Water Balance must: <ul style="list-style-type: none"> <li>a) include details of:               <ul style="list-style-type: none"> <li>• sources and security of water supply;</li> <li>• water use on site;</li> <li>• water management on site;</li> <li>• off-site water transfers;</li> <li>• reporting procedures; and</li> </ul> </li> <li>(b) investigate and describe measures to minimise water use by the project.</li> </ul>	5
<b>Erosion and Sediment Control</b> 30. The Erosion and Sediment Control Plan must: <ul style="list-style-type: none"> <li>a) be consistent with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual;</li> <li>b) identify activities that could cause soil erosion and generate sediment;</li> <li>c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;</li> <li>d) describe the location, function, and capacity of erosion and sediment control structures; and</li> <li>e) describe what measures would be implemented to maintain the structures over time.</li> </ul>	<b>Appendix C:</b> 3 2.2 3.3 3.4 5
<b>Surface Water Monitoring</b> 31. The Surface Water Management and Monitoring Plan must include: <ul style="list-style-type: none"> <li>a) detailed baseline data on surface water flows and quality in creeks and other water bodies that could potentially be affected by the project;</li> <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 project in Anvil Creek, Sandy Creek, Big Flat Creek and Wybong Creek);</li> <li>d) a program to assess stream health conditions in Anvil Creek, Sandy Creek, Big Flat Creek and Wybong Creek;</li> <li>e) a program to monitor channel stability in Anvil Creek, Sandy Creek and Big Flat Creek; and</li> <li>f) reporting procedures for the results of the monitoring program.</li> <li>g) a program to monitor, and a strategy to minimise, any saline water discharges to the Hunter River under the <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i>;</li> <li>h) a Saline Dispersion Study for discharges to the Hunter River prepared and implemented to the satisfaction of the EPA; and</li> <li>i) a program to notify all downstream landowners within 2 kilometres of the discharge point prior to discharging saline water to the Hunter River.</li> </ul> <p><i>Note: Conditions (g) – (i) only apply once the EPL for the project has been amended to allow discharges into the Hunter River.</i></p>	<b>Appendix D:</b> 2 2.2, 3.5 3.3 3.5 3.4 (WMP 9.0) 3.6.2 3.6.2 3.6.2

Project Approval Condition	Section of Document
<p><b>Groundwater Monitoring</b></p> <p>32. 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 identified in the EA);</li> <li>b) groundwater impact assessment criteria (including for monitoring bores and privately owned bores);</li> <li>c) a program for accurately delineating the boundary of the Big Flat Creek alluvial aquifer in any areas intersected by mining, including plans for isolation of the mining pit from the alluvium at least 6 months before mining within 150 metres of the alluvium;</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 Big Flat Creek and Wybong Creek alluvial aquifers;</li> <li>• impacts on groundwater dependent ecosystems and riparian vegetation;</li> <li>• the volume of ground water seeping into the open cut mine workings;</li> <li>• regional ground water 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>Appendix E:</b></p> <p>2</p> <p>5</p> <p>2.1, 6</p> <p>3</p> <p>5 (WMP 9.0)</p>
<p><b>Surface and Ground Water Response Plan</b></p> <p>33. 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, stream health and groundwater impact assessment criteria;</li> <li>b) measures to mitigate and/or compensate potentially affected landowners with privately owned groundwater bores within the predicted drawdown impact zone identified in the EA, including provision of alternative supply of water to the affected landowner that is equivalent to the loss attributed to the project;</li> <li>c) measures to mitigate and/or compensate potentially affected landowners for the loss of surface water flows in Sandy Creek, Big Flat Creek and Wybong Creek downstream of the project;</li> <li>d) measures to minimise, prevent or offset groundwater leakage from the Big Flat Creek alluvial aquifer;</li> <li>e) measures to mitigate any direct hydraulic connection between the backfilled open cuts and the Big Flat Creek alluvium if the potential for adverse impacts is detected;</li> <li>f) a contingency plan for isolating the Big Flat Creek alluvium from Anvil Creek alluvium and mining areas in the event that it is required; and</li> <li>g) the procedures that would be followed if any unforeseen impacts are detected during the project.</li> </ul>	<p><b>Appendix F:</b></p> <p>Figure 2.1, 2.2 &amp; 2.6</p> <p>Figure 2.8</p> <p>Figure 2.3, 2.5</p> <p>Figure 2.7</p> <p>Figure 2.7</p> <p>Figure 2.7 2.0</p>

Project Approval Condition	Section of Document
<p><b>Schedule 5 Condition 3</b></p> <p>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data (where available);</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> <li>the relevant statutory requirements (including any relevant approval, licence or lease conditions);</li> <li>any relevant limits or performance measures/criteria;</li> <li>the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;</li> </ul> <p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p> <p>(d) a program to monitor and report on the:</p> <ul style="list-style-type: none"> <li>impacts and environmental performance of the project;</li> <li>effectiveness of any management measures (see c above);</li> </ul> <p>(e) a program to investigate and implement ways to improve the environmental performance of the project over time;</p> <p>(f) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> <li>incidents;</li> <li>complaints;</li> <li>non-compliances with statutory requirements; and</li> <li>exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>(g) a protocol for periodic review of the plan.</p>	<p>WMP ESCP SWMP GWMP SWGWRP</p>
<p><b>Schedule 5 Condition 4</b></p> <p>The Proponent must immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Proponent must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	<p>WMP 9.2 SWGWRP</p>
<p><b>Schedule 5 Condition 5</b></p> <p>The Proponent must provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.</p>	<p>WMP 9.1</p>
<p><b>Schedule 5 Condition 6</b></p> <p>By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent must submit a report to the Department reviewing the environmental performance of the project to the satisfaction of the Secretary. This review must</p> <p>(a) describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;</p> <p>(b) include a comprehensive review of monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the:</p> <ul style="list-style-type: none"> <li>relevant statutory requirements, limits or performance measures/criteria;</li> <li>monitoring results of previous years;</li> <li>relevant predictions in the documents listed in condition 2 of Schedule 2;</li> </ul> <p>(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</p> <p>(d) identify any trends in monitoring data over the life of the project;</p> <p>(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential causes of any significant discrepancies; and</p> <p>(f) describe what measures will be implemented over the next year to improve the environmental performance of the project.</p>	<p>WMP 9.3</p>

Table B: SSD 8642 Conditions

Number	Description	Section of Document
<b>A3</b>	Consistent with the requirements in this consent, the Planning Secretary may make written directions to the Applicant in relation to: <ul style="list-style-type: none"> <li>(a) The content of any strategy, study, system, plan, program, review, audit, notification, report or correspondence submitted under or otherwise made in relation to this consent, including those that are required to be, and have been, approved by the Planning Secretary; and</li> <li>(b) The implementation of any actions or measures contained in any such document referred to in condition A3(a).</li> </ul>	Noted
<b>A13</b>	The date of commencement of each of the following phases of the development must be notified to the Department in writing, at least two weeks before that date: <ul style="list-style-type: none"> <li>(a) commencement of development under the consent;</li> <li>(b) commencement of construction under the consent;</li> <li>(c) commencement of mining operations under the, consent;</li> <li>(d) cessation of mining operations (i.e. mine closure); and</li> <li>(e) any period of suspension of mining operations (i.e. care and maintenance).</li> </ul>	1.2
<b>A24</b>	With the approval of the Planning Secretary, the Applicant may: <ul style="list-style-type: none"> <li>(a) prepare and submit any strategy, plan or program required by this consent on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program);</li> <li>(b) combine any strategy, plan or program required by this consent (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined);</li> <li>(c) combine any strategy, plan, program or Annual Review required by this consent with any similar strategy, plan, program or Annual Review required under the Mangoola Coal Project (PA 06_0014); and</li> <li>(d) update any strategy, plan or program required by this consent (to ensure the strategies, plans and programs required under this consent are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development).</li> </ul>	1.2
<b>A25</b>	If the Planning Secretary agrees, a strategy, plan or program may be staged or updated with minor administrative amendments without consultation being undertaken with all parties required to be consulted in the relevant condition in this consent.	1.2 and Appendix A
<b>A31</b>	The Applicant must ensure that all of its employees, contractors (and their sub-contractors) are made aware of, and are instructed to comply with, the conditions of this consent relevant to activities they carry out in respect of the development.	1.2
<b>B36</b>	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, reduce the scale of the development to match its available water supply.	4.2 and 5
<b>B37</b>	The Applicant must not use any licensable water from the Wybong Creek Water Source for mining purposes.  <i>Note: This restriction does not apply to water used outside the project disturbance area for revegetation purposes associated with implementation of the Biodiversity Offset Strategy, or to any licensable water within the project disturbance area that is collected as an incidental result of approved mining activities.</i>	3, 3.5
<b>B38</b>	The Applicant must report on water extracted from the site each year (direct and indirect) in the Annual Review, including water taken under each water licence.  <i>Note 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, including during rehabilitation and post mine closure.</i>	10.3

Number	Description	Section of Document													
B39	<p>Prior to commencing construction, the Applicant must notify the owners of the bores listed in Table 5<sup>a</sup> that they may request monitoring of the listed bore to determine the level of drawdown from the development. In the event that monitoring data records drawdown of more than 2 metres as a result of the development, the Applicant must provide compensatory water in accordance with conditions B41 to B45.</p> <p><b>Table 5:</b> Private bore monitoring</p> <table><tr><th>Bore ID<sup>b</sup></th><th>Receiver ID</th></tr><tr><td>Bore 1</td><td>R261</td></tr><tr><td>Bore 2</td><td>R157</td></tr><tr><td>Bore 3</td><td>R130</td></tr><tr><td>GW080507</td><td rowspan="2">R144</td></tr><tr><td>GW201589</td></tr><tr><td>GW078502</td><td>R83</td></tr></table> <p><sup>a</sup> The receiver ID's and bore locations referred to in Table 5 are shown in Appendix 3.</p>	Bore ID <sup>b</sup>	Receiver ID	Bore 1	R261	Bore 2	R157	Bore 3	R130	GW080507	R144	GW201589	GW078502	R83	4.4
Bore ID <sup>b</sup>	Receiver ID														
Bore 1	R261														
Bore 2	R157														
Bore 3	R130														
GW080507	R144														
GW201589															
GW078502	R83														
B40	Prior to the commencement of mining operations north of Wybong Road under this consent, the Applicant must notify owners of licensed privately-owned groundwater bores that are predicted to have a drawdown of greater than 2 metres as a result of the development that they may be eligible for compensatory water under conditions B41 to B45.	4.4													
B41	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 an impact that is minor or negligible) as a result of the development, in consultation with OPIE Water, and to the satisfaction of the Planning Secretary.	4.4													
B42	The compensatory water supply measures must provide an alternative long term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. The burden of proof that the impact on water supply is not due to mining, rests with the Applicant. 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.	4.4													
B43	If the Applicant and the landowner cannot agree on whether the impact on water supply is attributed to the development or 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 Planning Secretary for resolution.	4.4													
B44	<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 Planning Secretary.</p> <p><i>Note The Water Management Plan (see condition B50) is required to include trigger levels for investigating potentially adverse impacts on water supplies.</i></p>	4.4													
B45	In the event of any complaint relating to a privately-owned licenced groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or the provision of an alternative long term supply of water as required under conditions B41 and B42, to the satisfaction of the Planning Secretary.	Noted													
B46	<p>The Applicant must ensure that all surface discharges from the site comply with:</p> <p>(a) discharge limits (both volume and quality) set for the development in any EPL; or</p> <p>(b) relevant provisions of the POEO Act and Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.</p>	3.6.3													
B47	The Applicant must implement all reasonable and feasible measures on the site to minimise the need to discharge saline water to the Hunter River under the Hunter Rive1r Salinity Trading Scheme.	3.6.3													

Number	Description	Section of Document																												
B48	<p>The Applicant must ensure that the development complies with the performance measures in Table 6.</p> <p><b>Table 6:</b> <i>Water management performance measures</i></p> <table><tr><th>Feature</th><th>Performance Measure</th></tr><tr><td>Water management – General</td><td><ul style="list-style-type: none"><li>• Maintain separation between clean, dirty (i.e. sediment-laden) and mine water management systems</li><li>• Minimise the use of clean and potable water on the site</li><li>• Maximise water recycling, reuse and sharing opportunities</li><li>• Minimise the use of make-up water from external sources</li><li>• Design, install, operate and maintain water management systems in a proper and efficient manner</li><li>• Minimise risks to the receiving environment and downstream water users</li></ul></td></tr><tr><td>Alluvial aquifers</td><td><ul style="list-style-type: none"><li>• Negligible impacts to alluvial aquifers as a result of the development, beyond those predicted in the document/s listed in condition A2(c), 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,</li></ul></li><li>• Maintain appropriate setbacks in accordance with the <i>Aquifer Interference Policy</i> (DPI, 2012)</li></ul></td></tr><tr><td>Erosion and sediment control works</td><td><ul style="list-style-type: none"><li>• Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i>, <i>Volume 2A: Installation of Services (DECC, 2008)</i>, <i>Volume 2C: Unsealed Roads (DECC, 2008)</i>, <i>Volume 2D: Main Road Construction (DECC, 2008)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i></li><li>• Design, install and maintain any creek crossings in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013) and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries 2003)</li><li>• Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012)</li></ul></td></tr><tr><td>Clean water diversions and storage infrastructure</td><td><ul style="list-style-type: none"><li>• Design, install and maintain the clean water system to capture and convey the 100 year ARI flood</li><li>• Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site</li></ul></td></tr><tr><td>Flood protection works</td><td><ul style="list-style-type: none"><li>• Design, install and maintain flood levees to protect mining areas from a 100 year ARI flood event and ensure no increased flooding impacts on roads or privately-owned land beyond that predicted in the document/s listed in condition A2(c)</li><li>• Design the Wybong Road haul road overpass to include drainage measures to maintain appropriate flood management of Wybong Road, as described in the document/s listed in condition A2(c)</li></ul></td></tr><tr><td>Sediment dams</td><td><ul style="list-style-type: none"><li>• Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004)</i> and <i>2E Mines and Quarries (DECC, 2008)</i> and the requirements</li></ul></td></tr><tr><td></td><td>under the POEO Act or <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i></td></tr><tr><td>Mine water storages</td><td><ul style="list-style-type: none"><li>• Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water</li><li>• New storages designed to contain the 100 year ARI storm event and minimise permeability</li><li>• Ensure adequate freeboards within all mine water storage dams and voids at all times to minimise the risk of discharge to surface waters</li></ul></td></tr><tr><td>Raw water dam</td><td><ul style="list-style-type: none"><li>• Water levels must be managed so that the Raw Water Dam does not discharge water from the premises except in a 1 in 250 Annual Exceedance Probability 72-hour rainfall event or greater</li></ul></td></tr><tr><td>Chemical and hydrocarbon storage</td><td><ul style="list-style-type: none"><li>• Chemical and hydrocarbon products must be stored in bunded areas in accordance with the relevant Australian Standard</li></ul></td></tr><tr><td>Tailings storages</td><td><ul style="list-style-type: none"><li>• Design and maintain tailings storage areas to encapsulate and prevent the movement of tailings seepage/leachate</li></ul></td></tr><tr><td>Overburden emplacements</td><td><ul style="list-style-type: none"><li>• Design, install and maintain emplacements to encapsulate and prevent migration of 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 seepage</li></ul></td></tr><tr><td>Aquatic and riparian ecosystems</td><td><ul style="list-style-type: none"><li>• Ensure negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c)</li><li>• Maintain or improve baseline channel stability of Big Flat Creek</li><li>• Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC &amp; ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)</li></ul></td></tr></table>	Feature	Performance Measure	Water management – General	<ul style="list-style-type: none"><li>• Maintain separation between clean, dirty (i.e. sediment-laden) and mine water management systems</li><li>• Minimise the use of clean and potable water on the site</li><li>• Maximise water recycling, reuse and sharing opportunities</li><li>• Minimise the use of make-up water from external sources</li><li>• Design, install, operate and maintain water management systems in a proper and efficient manner</li><li>• Minimise risks to the receiving environment and downstream water users</li></ul>	Alluvial aquifers	<ul style="list-style-type: none"><li>• Negligible impacts to alluvial aquifers as a result of the development, beyond those predicted in the document/s listed in condition A2(c), 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,</li></ul></li><li>• Maintain appropriate setbacks in accordance with the <i>Aquifer Interference Policy</i> (DPI, 2012)</li></ul>	Erosion and sediment control works	<ul style="list-style-type: none"><li>• Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i>, <i>Volume 2A: Installation of Services (DECC, 2008)</i>, <i>Volume 2C: Unsealed Roads (DECC, 2008)</i>, <i>Volume 2D: Main Road Construction (DECC, 2008)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i></li><li>• Design, install and maintain any creek crossings in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013) and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries 2003)</li><li>• Design, install and maintain any new infrastructure within 40 metres of watercourses in in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012)</li></ul>	Clean water diversions and storage infrastructure	<ul style="list-style-type: none"><li>• Design, install and maintain the clean water system to capture and convey the 100 year ARI flood</li><li>• Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site</li></ul>	Flood protection works	<ul style="list-style-type: none"><li>• Design, install and maintain flood levees to protect mining areas from a 100 year ARI flood event and ensure no increased flooding impacts on roads or privately-owned land beyond that predicted in the document/s listed in condition A2(c)</li><li>• Design the Wybong Road haul road overpass to include drainage measures to maintain appropriate flood management of Wybong Road, as described in the document/s listed in condition A2(c)</li></ul>	Sediment dams	<ul style="list-style-type: none"><li>• Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004)</i> and <i>2E Mines and Quarries (DECC, 2008)</i> and the requirements</li></ul>		under the POEO Act or <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i>	Mine water storages	<ul style="list-style-type: none"><li>• Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water</li><li>• New storages designed to contain the 100 year ARI storm event and minimise permeability</li><li>• Ensure adequate freeboards within all mine water storage dams and voids at all times to minimise the risk of discharge to surface waters</li></ul>	Raw water dam	<ul style="list-style-type: none"><li>• Water levels must be managed so that the Raw Water Dam does not discharge water from the premises except in a 1 in 250 Annual Exceedance Probability 72-hour rainfall event or greater</li></ul>	Chemical and hydrocarbon storage	<ul style="list-style-type: none"><li>• Chemical and hydrocarbon products must be stored in bunded areas in accordance with the relevant Australian Standard</li></ul>	Tailings storages	<ul style="list-style-type: none"><li>• Design and maintain tailings storage areas to encapsulate and prevent the movement of tailings seepage/leachate</li></ul>	Overburden emplacements	<ul style="list-style-type: none"><li>• Design, install and maintain emplacements to encapsulate and prevent migration of 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 seepage</li></ul>	Aquatic and riparian ecosystems	<ul style="list-style-type: none"><li>• Ensure negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c)</li><li>• Maintain or improve baseline channel stability of Big Flat Creek</li><li>• Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC &amp; ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)</li></ul>	Construction related elements associated with minor update to WMP – Section 4
Feature	Performance Measure																													
Water management – General	<ul style="list-style-type: none"><li>• Maintain separation between clean, dirty (i.e. sediment-laden) and mine water management systems</li><li>• Minimise the use of clean and potable water on the site</li><li>• Maximise water recycling, reuse and sharing opportunities</li><li>• Minimise the use of make-up water from external sources</li><li>• Design, install, operate and maintain water management systems in a proper and efficient manner</li><li>• Minimise risks to the receiving environment and downstream water users</li></ul>																													
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B49	<p>The performance measures in Table 6 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.</p>	Noted																												

B50	<p>The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:</p> <p>(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;</p> <p>(b) be prepared in consultation with DPIE Water;</p> <p>(c) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 6);</p> <p>(d) utilise existing data from the Mangoola Coal Project, existing monitoring programs and, where practicable, other nearby mines;</p> <p>(e) include a:</p> <p>(i) Site Water Balance that includes details of:</p> <ul style="list-style-type: none"> <li>predicted annual inflows to and outflows from the site;</li> <li>sources and security of water supply for the life of the development (including authorised entitlements and licences);</li> <li>water storage capacity;</li> <li>water use and management on the site, including any water transfers or sharing with neighbouring mines;</li> <li>licensed discharge points and limits; and</li> <li>reporting procedures, including the annual preparation of an updated site water balance;</li> </ul> <p>(ii) Salt Balance that includes details of:</p> <ul style="list-style-type: none"> <li>sources of saline material on the site,;</li> <li>saline material and saline water management on the site;</li> <li>measures to minimise discharge of saline water from the site;</li> <li>a program to notify all downstream landowners within 2 kilometres of the discharge point prior to discharging saline water to the Hu1nter River; and</li> <li>reporting procedures, including the annual preparation of an updated salt balance;</li> </ul> <p>(iii) 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: Blue Book (Land com, 2004) and Volume 2E: Mines and Quarries (DECC, 2008);</li> <li>identifies activities that could cause soil erosion, generate sediment or affect flooding;</li> <li>includes a program to review the adequacy of existing flood protection works, and ensure they comply with the relevant performance measures listed in Table 6;</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 all erosion and sediment control structures and flood management structures; and</li> <li>describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;</li> </ul> <p>(iv) Surface Water Management Plan that includes:</p> <ul style="list-style-type: none"> <li>detailed baseline data on surface water flows and quality of watercourses and/or water bodies potentially impacted by the development, including: <ul style="list-style-type: none"> <li>stream and riparian vegetation health;</li> <li>channel stability (geomorphology); and</li> <li>water supply for other surface water users;</li> </ul> </li> <li>a detailed description of the surface water management system;</li> </ul>	<p>Not triggered See Section 1.2</p>
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	<ul style="list-style-type: none"> <li>• details of the water licensing requirements for all water storages (i.e. exempt, harvestable rights or licenced);</li> <li>• detailed plans, design objectives and performance criteria for water management infrastructure, including: <ul style="list-style-type: none"> <li>- any approved creek diversions or restoration works associated with the development;</li> <li>- water run-off diversions and catch drains;</li> <li>- water storages and sediment darns;</li> <li>- emplacement areas;</li> <li>- backfilled pits and any final voids, for the development; and</li> <li>- reinstated drainage networks on rehabilitated areas of the site;</li> </ul> </li> <li>• an erosion and scour monitoring and maintenance program for the Big Flat Creek riparian corridor;</li> <li>• surface water performance criteria, including trigger levels for identifying and investigating any potentially adverse impacts (or trends) associated with the development, for: <ul style="list-style-type: none"> <li>- water supply for other water users;</li> <li>- downstream surface water flows and quality;</li> <li>- downstream flooding impacts;</li> <li>- stream and riparian vegetation health; and</li> <li>- post-mining water pollution from rehabilitated areas of the site;</li> </ul> </li> <li>• a program to monitor and evaluate: <ul style="list-style-type: none"> <li>- compliance with the relevant performance measures listed in Table 6 and the performance criteria in this plan;</li> <li>- controlled and uncontrolled discharges and seepage/leachate from the site;</li> <li>- impacts on water supply for other water users;</li> <li>- surface water inflows, outflows and storage volumes, to inform the Site Water Balance; and</li> <li>- the effectiveness of the surface water management system and the measures in the Erosion and Sediment Control Plan;</li> </ul> </li> <li>• reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results; and</li> <li>• a trigger action response plan to respond to any exceedances of the relevant performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development;</li> </ul> <p>(v) Groundwater Management Plan that includes:</p> <ul style="list-style-type: none"> <li>• detailed baseline data of groundwater levels, yield and quality for groundwater resources and groundwater dependent ecosystems potentially impacted by the development, including groundwater supply for other water users;</li> <li>• a detailed description of the groundwater management system;</li> <li>• groundwater performance criteria, including trigger levels for identifying and investigating any potentially adverse groundwater impacts (or trends) associated with the development, on: <ul style="list-style-type: none"> <li>- regional and local aquifers (alluvial and hard rock); and</li> <li>- groundwater supply for other water users such as licensed privately-owned groundwater bores;</li> </ul> </li> <li>• a program to monitor and evaluate: <ul style="list-style-type: none"> <li>- compliance with the relevant performance measures listed in Table 6 and the performance criteria in this plan;</li> <li>- water loss/seepage from water storages into the groundwater system, including from any final voids;</li> </ul> </li> </ul>	
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Number	Description	Section of Document
	<ul style="list-style-type: none"> <li>- groundwater inflows, outflows and storage volumes, to inform the Site Water Balance;</li> <li>- the hydrogeological setting of any nearby alluvial aquifers and the likelihood of any indirect impacts from the development;</li> <li>- impacts on groundwater dependent ecosystems;</li> <li>- impacts on groundwater supply for other water users; and</li> <li>- the effectiveness of the groundwater management system;</li> </ul> <ul style="list-style-type: none"> <li>• a contingency plan for isolating the Big Flat Creek alluvium from Anvil Creek alluvium and mining areas in the event that it is required;</li> <li>• reporting procedures for the results of the monitoring program, including notifying other water users of any elevated results;</li> <li>• a trigger action response plan to respond to any exceedances of the relevant performance measures and groundwater performance criteria, and repair, mitigate and/or offset any adverse groundwater impacts of the development; and</li> <li>• a program to periodically validate the groundwater model for the development, including an independent review of the model every 3 years (unless otherwise agreed by the Planning Secretary), and comparison of monitoring results with modelled predictions; and</li> </ul> <p>(vi) a protocol to report on the measures, monitoring results and performance criteria identified above, in the Annual Review referred to in condition D11.</p>	
<b>B51</b>	The Applicant must not commence mining operations north of Wybong Road until the Water Management Plan is approved by the Planning Secretary.	Section 1.2
<b>B52</b>	The Applicant must implement the Water Management Plan as approved by the Planning Secretary.	Noted
<b>D4</b>	<p>The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and performance measures in this consent. Any exceedance of these criteria or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation.</p> <p>Where any exceedance of these criteria or performance measures has occurred, the Applicant must, at the earliest opportunity:</p> <ul style="list-style-type: none"> <li>(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</li> <li>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</li> <li>(c) implement reasonable remediation measures as directed by the Planning Secretary.</li> </ul>	10

Number	Description	Section of Document
D5	<p>Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:</p> <ul style="list-style-type: none"> <li>(a) summary of relevant background or baseline data;</li> <li>(b) details of: <ul style="list-style-type: none"> <li>(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);</li> <li>(ii) any relevant limits or performance measures and criteria; and</li> <li>(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</li> </ul> </li> <li>(c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);</li> <li>(d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;</li> <li>(e) a program to monitor and report on the: <ul style="list-style-type: none"> <li>(i) impacts and environmental performance → of the development; and</li> <li>(ii) effectiveness of the management measures set out pursuant to condition D4(c);</li> </ul> </li> <li>(f) a contingency plan to manage any unpredicted! impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</li> <li>(g) a program to investigate and implement ways to improve the environmental performance of the development over time;</li> <li>(h) a protocol for managing and reporting any: <ul style="list-style-type: none"> <li>(i) incident, non-compliance or exceedance of any impact assessment criterion or performance criterion;</li> <li>(ii) complaint; or</li> <li>(iii) failure to comply with other statutory requirements;</li> </ul> </li> <li>(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and</li> <li>(j) a protocol for periodic review of the plan.</li> </ul> <p><i>Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i></p>	Not triggered see Section 1.2
D6	The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.	1.5.2
D7	<p>Within three months of:</p> <ul style="list-style-type: none"> <li>(a) the submission of an incident report under condition D9;</li> <li>(b) the submission of an Annual Review under condition D11;</li> <li>(c) the submission of an Independent Environmental Audit under condition D12;</li> <li>(d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or</li> <li>(e) notification of a change in development phase under conditions A13; <ul style="list-style-type: none"> <li>• the suitability of existing strategies, plans and programs required under this consent must be review by the Applicant.</li> </ul> </li> </ul>	10
D8	If necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required document must be submitted to the Planning Secretary for approval within six weeks of the review.	Noted

Number	Description	Section of Document
<b>D9</b>	The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing through the Department's Major Projects Website and identify the development (including the development applicant number and name) and set out the location and nature of the incident.	10.2
<b>D10</b>	<p>Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing through the Department's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it doesn't comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.</p> <p>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</p>	10.2
<b>D11</b>	<p>By the end of March each year after the commencement of development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must:</p> <p>(a) describe the development (including any rehabilitation) that was carried out in the previous calendar, and the development that is proposed to be carried out over the current calendar year;</p> <p>(b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the:</p> <ul style="list-style-type: none"> <li>(i) relevant statutory requirements, limits or performance measures/criteria;</li> <li>(ii) requirements of any plan or program required under this consent;</li> <li>(iii) monitoring results of previous years; and</li> <li>(iv) relevant predictions in the document/s listed in condition A2(c);</li> </ul> <p>(c) identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;</p> <p>(d) evaluate and report on:</p> <ul style="list-style-type: none"> <li>(i) the effectiveness of the noise and air quality and greenhouse gas management systems;</li> <li>(ii) compliance with the performance measures, criteria and operating conditions of this consent; and</li> <li>(iii) the status of translocated plants and vegetation quadrat data from orchid monitoring sites;</li> </ul> <p>(e) identify any trends in the monitoring data over the life of the development;</p> <p>(f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies.; and</p> <p>(g) describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.</p>	1.2 and 10.3

Number	Description	Section of Document
<b>D13</b>	<p>Within one year of commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must:</p> <p>(a) be led by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Planning Secretary;</p> <p>(b) be conducted by a suitably qualified, experienced and independent team of experts (including any expert in field/s specified by the Planning Secretary) whose appointment has been endorsed by the Planning Secretary;</p> <p>(c) be carried out in consultation with the relevant ,agencies and the CCC;</p> <p>(d) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent, water licences and mining leases for the development (including any assessment, strategy, plan or program required under these approvals);</p> <p>(e) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals and this consent;</p> <p>(f) recommend appropriate measures or actions t&lt;&gt; improve the environmental performance of the development and any assessment, strategy, plan or program required under the abovementioned approvals and this consent; and</p> <p>(g) be conducted and reported to the satisfaction of the Planning Secretary</p>	10.7
<b>D14</b>	<p>Within three months of commencing an Independent Environmental Audit, or other timeframe agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary, and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of the recommendations. The recommendations must be implemented to the satisfaction of the Planning Secretary.</p>	10.7
<b>D17</b>	<p>Before the commencement of construction until the completion of all rehabilitation required under this consent, the Applicant must:</p> <p>(a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website:</p> <ul style="list-style-type: none"> <li>(i) the documents referred to in condition A2(c) of this consent;</li> <li>(ii) all current statutory approvals for the development;</li> <li>(iii) all approved strategies, plans and programs required under the conditions of this consent;</li> <li>(iv) the proposed staging plans for the development if the construction, operation or decommissioning of the development is to be staged;</li> <li>(v) minutes of CCC meetings;</li> <li>(vi) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;</li> <li>(vii) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;</li> <li>(viii) a summary of the current phase and progress of the development;</li> <li>(ix) contact details to enquire about the development or to make a complaint;</li> <li>(x) a complaints register, updated monthly;</li> <li>(xi) the Annual Reviews of the development;</li> <li>(xii) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report;</li> <li>(xiii) any other matter required by the Planning Secretary; and</li> </ul> <p>(b) keep such information up to date, to the satisfaction of the Planning Secretary.</p>	10.6

## Appendix C - Erosion and Sediment Control Plan

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The Erosion and Sediment Control Plan is published on the Mangoola Coal website -  
<https://www.mangoolamine.com.au/en/publications/Pages/management-plans.aspx>

## Appendix D - Surface Water Monitoring Plan

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The Surface Water Monitoring Plan published on the Mangoola Coal website -  
<https://www.mangoolamine.com.au/en/publications/Pages/management-plans.aspx>

## Appendix E - Groundwater Monitoring Plan

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The Groundwater Monitoring Plan published on the Mangoola Coal website -  
<https://www.mangoolamine.com.au/en/publications/Pages/management-plans.aspx>

## Appendix F - Surface Water and Groundwater Response Plan

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The Surface Water and Groundwater Response Plan published on the Mangoola Coal website - <https://www.mangoolamine.com.au/en/publications/Pages/management-plans.aspx>

## Appendix G - Mangoola Held WAL

WAL	Share Component	Category	Water Source
503	159	General Security	Hunter River
644	3	High Security	Hunter River
645	432	General Security	Hunter River
691	50	General Security	Hunter River
735	72	General Security	Hunter River
822	3	High Security	Hunter River
823	310	General Security	Hunter River
824	175	General Security	Hunter River
830	306	General Security	Hunter River
897	55	General Security	Hunter River
933	43	General Security	Hunter River
1000	3	High Security	Hunter Regulated River
1001	334	General Security	Hunter River
1057	509	General Security	Hunter River
1159	159	General Security	Hunter River
1239	40	Supplementary	Hunter Regulated River
1349	8	Supplementary	Hunter Regulated River
1387	40	Supplementary	Hunter Regulated River
6260	36	Miscellaneous Works	Wybong Creek

WAL	Share Component	Category	Water Source
6262	8	Miscellaneous Works	Wybong Creek
6264	30	Miscellaneous Works	Wybong Creek
6272	50	Miscellaneous Works	Wybong Creek
6276	12	Miscellaneous Works	Wybong Creek
6278	117	Miscellaneous Works	Wybong Creek
6294	39	Miscellaneous Works	Wybong Creek
6296	86	Miscellaneous Works	Wybong Creek
6298	39	Miscellaneous Works	Wybong Creek
6304	5	Unregulated	Wybong Creek
6305	74	Unregulated	Wybong Creek
6306	52	Unregulated	Wybong Creek
6316	175	Aquifer	Wybong Creek
6317	19	Aquifer	Wybong Creek
6322	5	Aquifer	Wybong Creek
6325	0	Aquifer	Wybong Creek
6327	30	Aquifer	Wybong Creek
6571	111	General Security	Hunter River
6576	600	General Security	Hunter River
7291	63	Miscellaneous Works	Wybong Creek
7292	44	Miscellaneous Works	Wybong Creek
9061	6	High Security	Hunter River

WAL	Share Component	Category	Water Source
9062	18	General Security	Hunter River
9343	25	Miscellaneous Works	Wybong Creek
9344	164	Miscellaneous Works	Wybong Creek
9986	5	High Security	Hunter River
9987	82	General Security	Hunter River
11085	128	Miscellaneous Works	Wybong Creek
11216	86	General Security	Hunter River
13083	100	General Security	Hunter River
13228	0	Unregulated	Wybong Creek
13229	77	Unregulated	Wybong Creek
18068	5	Aquifer	Hunter Regulated River Alluvial
18136	596	Aquifer	Hunter Regulated River Alluvial
18170	219	Aquifer	Hunter Regulated River Alluvial
18214	218	Aquifer	Hunter Regulated River Alluvial
18219	5	Aquifer	Hunter Regulated River Alluvial
18232	5	Aquifer	Hunter Regulated River Alluvial
18690	10	Aquifer	Muswellbrook Water Source
18695	131	Miscellaneous Works	Muswellbrook Water Source
18696	53	Aquifer	Muswellbrook Water Source
18701	28	Unregulated	Muswellbrook Water Source
18718	151	Aquifer	Muswellbrook Water Source

WAL	Share Component	Category	Water Source
20343	48	Unregulated	Wybong Creek
30247	98	Aquifer	Muswellbrook Water Source
37027	30	Miscellaneous Works	Wybong Creek
37028	96	Miscellaneous Works	Wybong Creek
39800	120	Miscellaneous Works	Sydney Basin-North Coast Groundwater Source
41561	700	Aquifer	Sydney Basin-North Coast Groundwater Source

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