Planning Services
Resource Assessments
Contact: Matthew Sprott
Phone: 8217 2054
Email: matthew.sprott@planning.nsw.gov.au

Mr Klay Marchant
MACH Energy Australia Pty Ltd

By email: klay.marchant@machenergy.com.au

Dear Mr Marchant,

Mount Pleasant Operation (DA 92/97)
Construction Water Management Plan – Water Pipeline Addendum

I refer to your letter dated 30 January 2017 requesting the Department's approval to append a revised figure to the currently approved Construction Water Management Plan (CWMP) for Mount Pleasant Operation (DA 92/97).

The CWMP was approved on 23 July 2012 and includes a figure (Figure B.1) showing the location of water management structures to be built during the construction stage of the mine. One of the structures is a water supply pipeline between the Hunter River and the Mount Pleasant Infrastructure Area. The Department understands that since this time, the water supply pipeline route has been revised and therefore an addendum figure is necessary to show the correct location of the pipeline so that construction can commence.

The Department has reviewed the proposed figure, Water Pipeline Alignment Figure B.1.A, and agrees that it remains consistent with the description in section 6.3.9 ii of the Environmental Impact Statement, which states that the water supply pipeline will follow the rail loop and connecting conveyor alignment to the Infrastructure Area. The revised pipeline alignment also remains within the conveyor/service corridor envelope approved under DA 92/97.

Considering the above, I wish to advise the Secretary approves of the Water Pipeline Addendum.

If you wish to discuss this matter further, please contact Matthew Sprott at the details listed above.

Yours sincerely

Howard Reed 8.2.17

Howard Reed
Director Resource Assessments
as the Secretary's nominee

NSW GOVERNMENT | Planning & Infrastructure

Contact: Scott Brooks
Phone: (02) 6575 3401
Fax: (02) 6575 3415
Email: scott.brooks@planning.nsw.gov.au
Our ref: 11/15323

The General Manager
Mount Pleasant Mine
Coal & Allied Operations Pty Ltd
P.O. Box 315
SINGLETON NSW 2330

Attention: Kirstin Macmillan

Dear Kirstin,

Mt Pleasant Mine Project – Management Plans

Thank you for forwarding the following management plans required under the following conditions of your Project Approval DA 92/97 for the Department's consideration:

- Rehabilitation Strategy, Sched 3, Cond 54;
- Landscape Management Plan, Sched 3, Cond 47;
- Construction Water Management Plan, Sched 3 Cond 28;
- Biodiversity and Rehabilitation Management Plan (Biodiversity portion only), Sched 3 Cond 56;
- Construction Waste Management Plan, Sched 3, Cond 52; and
- Environment Management Strategy, Sched 5, Cond 1.

The Department has reviewed the plans, including submitted correspondence confirming that Government agencies were consulted, and is satisfied that the plans generally address the requirements set out in Conditions outlined above the Project Approvals. Consequently, I advise that the Director-General has approved these plans.

Would you please forward finalised copies for the Department's records at your earliest convenience.

Should you have any enquiries on this matter please contact Scott Brooks on (02) 6575 3401.

Yours sincerely

Scott Brooks
Team Leader, Compliance Singleton
As Nominee for the Director-General
23rd July 2012.

EMM
EMGA Mitchell McLennan

Mount Pleasant Project
Construction Water Management Plan

Prepared for Coal & Allied Operations Pty Limited | 23 July 2012

Planning + Environment + Acoustics

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Mount Pleasant Project

Construction Water Management Plan

Final

Prepared for Coal & Allied Operations Pty Limited | 23 July 2012

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Mount Pleasant Project Construction Water Management Plan

Final

Report J11062CWMP | Prepared for Coal & Allied Operations Pty Limited | 23 July 2012

Reviewed by	**Duncan Peake**	Approved by	**Kirstin Macmillan**
Position	Associate Director, EMM	Position	Environmental Specialist – Mount Pleasant Project
Signature		Signature	Kmacmillan
Date	23 July 2012	Date	26/7/12

Document Control

Version	Date	Prepared by	Reviewed by
1	4 November 2011	WRM, Jacqui Lumsdaine - EMM	Duncan Peake - EMM
2	8 November 2011	WRM, Jacqui Lumsdaine - EMM	Duncan Peake - EMM
3	25 November 2011	WRM, Jacqui Lumsdaine - EMM	Duncan Peake - EMM
4	30 November 2011	WRM, Jacqui Lumsdaine - EMM	Duncan Peake - EMM
5	31 January 2012	WRM, Jacqui Lumsdaine - EMM	Duncan Peake - EMM
6	6 July 2012	Duncan Peake - EMM	Duncan Peake – EMM
7	23 July 2012	Duncan Peake - EMM	Duncan Peake – EMM

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1 Introduction

1.1 Description

This construction Water Management Plan (CWMP) has been developed per the Development Consent (DA 92/97) for Coal & Allied Operations Pty Limited's (Coal & Allied) Mount Pleasant Project (the Project). It forms part of the Environmental Management Strategy for the Project.

As permitted by Schedule 2, Section 13 of the Development Consent, the water management plan is submitted in a staged process. The CWMP will cover the construction stage, approximately the first 18 to 24 months of the project. This stage will cover the construction of all infrastructure, including the CHPP, roads, rail, conveyor, workshops and other buildings, dam walls, diversion drains, water pipelines, powerlines and pre-strip works. The CWMP excludes any coal handling or processing.

Groundwater impacts are not discussed in the CWMP as the proposed construction works do not impact on groundwater. The requirements of Schedule 3 Condition 28(d) will be covered in the operational management plan, which will be submitted prior to the Project commencing coal mining.

The Mount Pleasant Project is located in the Upper Hunter Valley, New South Wales (NSW) approximately 3 kilometres (km) to the west-north-west of Muswellbrook. The Hunter River and its catchment support agriculture, coal mining, power generation, commercial fishing and tourism. The Hunter River flows in a southerly direction approximately 1 km to the east of the Project area. Flows in this reach are regulated by Glenbawn Dam.

The Project is located on undulating terrain centred on the topographic feature named Mount Pleasant. Potentially disturbed areas drain north-east, east, south and west via a number of ephemeral drainage features (refer to Figure 1.1). Areas to the west and south drain to Sandy Creek and Dry Creek respectively. Both are tributaries of the Hunter River. All other areas drain directly to the Hunter River. The proposed works are located well outside of the Hunter River 1% annual exceedance probability (AEP) flood extent (ERM Mitchell McCotter, 1997).

The existing surface water environment was described in detail in the Mount Pleasant Mine EIS (ERM Mitchell McCotter, 1997). The following documents relating to water management, prepared previously for the Project, have been used in preparing this management plan:

- Development Consent 92/97;
- Mount Pleasant Mine EIS, ERM Mitchell McCotter (1997);
- Commissioners of Inquiry for Environment and Planning Report (1999);
- Mount Pleasant Mine Commission of Inquiry Submission in Reply (1999);
- Determination of Development Application (N95/00147; 1999);
- Mount Pleasant Project Modification Environmental Assessment, EMGA Mitchell McLennan (2010);
- First Order Objectives of the Catchment Blueprint (extract), Hunter Trust; and
- Rio Tinto Feasibility Studies:

- Mount Pleasant Coal Project – Review and Water Balance Model Simulation – Mount Pleasant Water Management System, Gilbert & Associates Pty Ltd (May 2007);

- Mount Pleasant Coal Project – Water Balance Model Simulation for Prefeasibility Studies – Mount Pleasant Water Management System, Gilbert & Associates Pty Ltd (May 2010);

- Engineering Report – Water Management, Parsons Brinckerhoff (June 2010);

- Mount Pleasant Project Prefeasibility Study Report – Chapter 9 Water Management, Rio Tinto (July 2010).

- Mount Pleasant Project Basis of Design Report, Parsons Brinckerhoff (March, 2011); and

- Mount Pleasant Project – Surface Water Management System Modelling, WRM Water & Environment (June 2011).

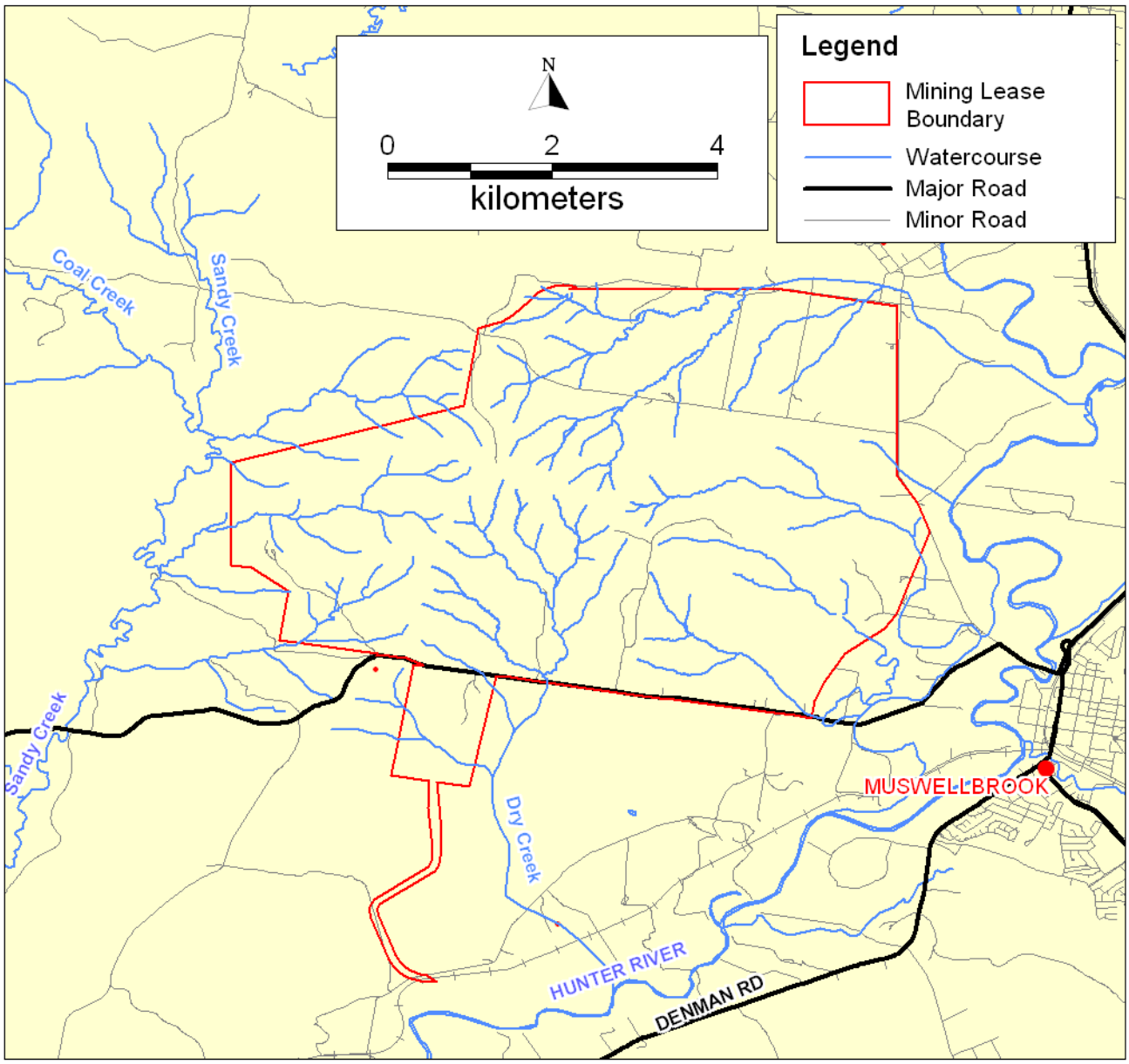

Figure 1.1 **Drainage features in the vicinity of the Mount Pleasant Project.**

i Baseline surface water data

Baseline surface water monitoring has been undertaken at the Project for several years, to benchmark natural variations in surface water quality. Surface water monitoring data has been obtained with in situ measurements of water quality parameters including electrical conductivity (EC), pH and total suspended solids (TSS). Table 1.1 shows a summary of water quality monitoring undertaken at several locations within the project area. The locations of these monitoring stations are shown in Figure C.1 (see Appendix C). The water quality data shows:

- EC throughout the project area ranges from 50 to 310µS/cm with one sample registering an EC of 930µS/cm. The median EC of all samples within the project area is 110µS/cm;
- pH ranges from 6.1 to 7.8 with a median value of 6.8; and
- TSS ranges from 8 to 670mg/L with a median value of 115mg/L.

Table 1.1 Mount Pleasant Project site runoff water quality

Monitoring Point		Electrical Conductivity	pH	Total Suspended Solids
		µS/cm		mg/L
W5	Count	2	2	2
	10th %ile	84	6.1	9.2
	Median	100	6.2	14.0
	90th %ile	116	6.3	18.8
W7	Count	1	1	1
	10th %ile	-	-	-
	Median	310	7.8	20.0
	90th %ile	-	-	-
W8	Count	5	5	5
	10th %ile	76	6.1	95.0
	Median	100	6.9	275.0
	90th %ile	614	7.1	341.6
W9	Count	2	2	2
	10th %ile	57	6.7	166.9
	Median	85	7.0	390.5
	90th %ile	113	7.2	614.1

Table 1.2 shows a summary of water quality monitoring undertaken at several locations on the Hunter River, Muscle Creek and Dry Creek. The locations of these monitoring stations are shown in Figure C.1 (see Appendix C). The water quality data shows:

- EC is significantly higher in Muscle Creek than the Hunter River with a median of 1,795µS/cm compared to 515µS/cm in the Hunter River;
- EC in the Hunter River is quite variable ranging from 270 to 947µS/cm with a median of 515µS/cm due to fluctuations in water level and flow;
- pH in the Hunter River is generally slightly higher than that recorded at the Mount Pleasant Project ranging from 7.1 to 8.7 with a median of 8.1;

- TSS is quite low in all three watercourses with all samples under 139mg/L. TSS in Muscle Creek has the lowest range between 2 and 24mg/L with a median of 6mg/L; and
- The Hunter River is subject to releases under the Hunter River Salinity Trading Scheme (HRSTS) and other releases from industrial users which impact on water quality within the river system.

Table 1.2 Mount Pleasant Project local watercourse quality

Catchment	Monitoring Point		Electrical Conductivity µS/cm	pH	Total Suspended Solids mg/L
Hunter River	W1	Count	19	19	20
		10th %ile	316	7.7	6.9
		Median	550	8.0	16
		90th %ile	680	8.4	39.2
	W2	Count	20	20	20
		10th %ile	328	7.9	3.9
		Median	490	8.0	18
		90th %ile	696	8.4	34
	W3	Count	5	0	0
		10th %ile	324.4	-	-
		Median	522	-	-
		90th %ile	784.2	-	-
	W6	Count	20	20	20
		10th %ile	328	7.8	7.7
		Median	495	8.0	14
		90th %ile	695	8.5	36.5
Muscle Creek	W4	Count	20	20	20
		10th %ile	960	7.4	2.9
		Median	1,795	8.0	6
		90th %ile	2,310	8.0	13.4
Dry Creek	W10	Count	1	1	1
		10th %ile	-	-	-
		Median	30	6.0	139
		90th %ile	-	-	-

1.2 Scope

This CWMP has been developed in accordance with the relevant conditions from Development Consent (92/97) which was granted for the Mount Pleasant Project in December 1999 and modified in September 2011. Condition 2 in Schedule 2 requires that the project be developed generally in accordance with the Mount Pleasant Mine EIS (ERM Mitchell McCotter, 1997) (inclusive of the environmental assessment of the modification), statement of commitments and conditions of the development consent.

This CWMP includes information on surface water management and erosion and sediment control requirements (refer to Appendix A: Mount Pleasant Project Construction Erosion and Sediment Control Plan) during the construction phase of the project. The construction phase comprises all infrastructure construction and pre-strip works including:

- upgrade of Wybong Road from Bengalla link road through to the mine access;
- installation of the Hunter River water supply and associated pipeline;
- establishment of site access roads and haul roads;
- installation of temporary buildings and infrastructure required during construction;
- construction of sediment dams and environment dams shown in Table B.1;
- construction of the CHPP and workshops ;
- construction of permanent site infrastructure and buildings including but not limited to the administration buildings, sediment dams, powerlines, water dam walls, diversion drains, storage areas and fuel farms;
- construction of the stand alone rail loop, and other necessary service infrastructure

Construction activities exclude the development of the box-cut and any extraction of coal.

Table B.1 shows the extent of disturbance during the construction phase. An operational phase WMP will be implemented prior to commencement of coal production after construction has been completed.

Relevant consent conditions for water management during construction and the sections in this document where they are addressed are shown in Table 1.3 and are addressed in Chapters 4 to 6 of this plan.

Table 1.3 Consent conditions relevant to water management during construction

	Consent condition	Section
Schedule 3 – Environmental Performance Conditions		
	SOIL & WATER *Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain water licences for the development.*	2.1.2
25	**Water supply** The Applicant shall ensure that it has sufficient water for all stages of development, and if necessary, adjust the scale of mining operations to match its available water supply, to the satisfaction of the Director-General.	2.1.2 & 2.2
26	**Water discharges** The Applicant shall ensure that any surface water discharges from the site comply with the: (a) discharge limits (both volume and quality) set for the development in any EPL [Environment Protection Licence]; or (b) relevant provisions of the POEO Act or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.	2.3, 2.4, App. B

Table 1.3 Consent conditions relevant to water management during construction

Consent condition		Section
27	**Compensatory water supply** The Applicant shall provide compensatory water supply to any landowner of privately-owned land whose water entitlements are adversely and directly impacted (other than an impact that is negligible) as a result of the development, in consultation with NOW, and to the satisfaction of the Director-General. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the development. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution. If the Applicant is unable to provide an alternative long-term supply of water, then the Applicant shall provide alternative compensation to the satisfaction of the Director-General.	2.1.5
28	**Water management plan** The Applicant shall prepare and implement a Water Management Plan for the development, to the satisfaction of the Director-General. This plan must be prepared in consultation with NOW and DRE, and be submitted to the Director-General for approval prior to carrying out any development on site. The plan must include: (a) a site water balance, which must: • include details of: o sources and security of water supply; o water use on site; o water management on site; o any off-site water transfers; and • investigate and implement all reasonable and feasible measures to minimise water use by the development; (b) an erosion and sediment control plan, which must: • identify activities that could cause soil erosion, generate sediment or affect flooding; • describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage flood risk; • describe the location, function, and capacity of erosion and sediment control structures and flood management structures; and • describe what measures would be implemented to maintain the structures over time; (c) a surface water management plan, which must include: • detailed baseline data on surface water flows and quality in creeks and other waterbodies that could potentially be affected by the development; • surface water and stream health impact assessment criteria including trigger levels for investigating any potentially adverse surface water impacts; • a program to monitor surface water flows and quality in the watercourses that could be affected by the project; and • reporting procedures for the results of the monitoring program. (e) a surface and ground water response plan, which must include: • a response protocol for any exceedances of the surface water and groundwater assessment criteria;	2.1.3 2.1.4 App. A 1.1.1 (i) App. B App. B App. B 3

Table 1.3 Consent conditions relevant to water management during construction

Consent condition		Section
	• measures to offset the loss of any baseflow to watercourses caused by the development; • measures to prevent, minimise or offset groundwater leakage from alluvial aquifers caused by the development; • measures to compensate landowners of privately-owned land whose water supply is adversely affected by the development; and • measures to mitigate and/or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation.	2.1.5 2.1.1
Schedule 5 – Environmental management, reporting and auditing		
2	**Management plan requirements** The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: • the relevant statutory requirements (including any relevant consent, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the development; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	1.1.1 (i) 2.2 4 & App. B 4 4 & App. B 4

Table 1.3 Consent conditions relevant to water management during construction

Consent condition		Section
3	**Annual review** By the end of July each year (or other such timing as agreed by the Director-General), the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous years; and • relevant predictions in the EIS; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the development	4
4	**Revision of strategies, plans and programs** Within 3 months of: (a) the submission of an annual review under condition 3 above; (b) the submission of an incident report under condition 7 below; (c) the submission of an audit under condition 9 below; and (d) any modification to the conditions of this consent, the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General. *Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.*	4
	REPORTING	
7	**Incident reporting** The Applicant shall notify the Director-General and any other relevant agencies of any incident associated with the development as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of becoming aware of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident.	2.4

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2 Management

2.1 Environmental aspects

The NSW Healthy Rivers Commission's May 2002 inquiry found that the overall condition of the Hunter catchment and its streams is generally worse than that of other NSW coastal streams, with significant impacts from catchment development on streamflow and river salinity. The inquiry found that while approximately 15% of the Hunter River salt load was attributable to land clearing and agriculture, mining activity contributes approximately 10%.

Construction activities need to manage two main aspects in relation to water management, the management of water on site to minimise offsite impacts, and the site water supply.

2.1.1 Site water management

Potential impacts of the mining project on surface water during construction include:

- pollution of the waters of the Hunter River and its tributaries (especially Sandy Creek) by stormwater runoff contaminated with sediment, coal, oil and other pollutants;
- increases in flood levels around the project;
- adverse effects on quantity and quality of water supply sources of surrounding downstream land holders; and
- erosion of batters and stream beds due to modification of drainage paths and the release of stored water.

The management of these impacts is discussed in Section 2.3.

The project will not significantly impact on riparian vegetation as the site has been heavily cleared for agriculture and there are no riparian zones within the project area.

2.1.2 Regulatory requirements

The following regulatory requirements are in force for surface water management at the Mount Pleasant Project:

- Development Consent (DA 92/97) – see Table 1.3;
- Environment Protection Licence (EPL);
- *Water Act 1912*;
- *Dams Safety Act 1978*; and
- *Water Management Act 2000*.

The following guidelines are also relevant to surface water management at the Mount Pleasant Project:

- 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); and
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

2.1.3 Site water supply

Water will be required during the construction phase for dust suppression, site preparation, potable water and concrete washing. Water demands will fluctuate during construction and will be low in the early phases, but may peak to 3 ML/day during the main construction phase, tapering off towards the end of construction.

During the early phases of construction, such as the Wybong Road Upgrade, the majority of water will be sourced from commercial water fill points in the light industrial area. Clean water may be sourced from farm dams located across the project area where possible, up to the harvestable rights limit of 278.7 ML/annum. Water captured in excess of this limit will be released downstream of the project to ensure that the water entitlements of landowners downstream of the project are not adversely and directly impacted. The construction of a temporary water pipeline from the Hunter River and one of the smaller water collection dams will occur early in the project life, and water pumped from the River will be stored in this collection dam until RW1 is completed, approximately a year into construction.

Water in the region is shared between consumptive users and environmental requirements through rules set out under the Hunter River Water Sharing Plan. The plan sets out how water licenses and allocations are managed and traded, and how dams are operated to regulate flows. Coal & Allied holds a portfolio of high security and general security water licences, which is further supplemented by supply agreements with other mining companies. Within this portfolio, 500 ML of high security entitlements are nominally held for Mount Pleasant Project, with further licence purchases under consideration. Construction of the Hunter River pumps and pipeline will commence early in construction to allow water to be drawn from the River as demand becomes higher.

Appendix B outlines the proposed water management system that will be constructed for operations. The following abbreviations are used for water storages at the Mount Pleasant Project:

- RW1 – Raw Water Dam 1;
- MWP1 – Mine Water Pond 1;
- MWP2 – Mine Water Pond 2;
- MWP3 – Mine Water Pond 3;
- MWP4 – Mine Water Pond 4;
- MW5 – Mine Water Dam 5;
- ED2 – Environment Dam 2;
- ED3 – Environment Dam 3; and
- RLD – Rail Loop Dam

The Mount Pleasant Project site water management system generally aims to separate clean and mine affected water runoff:

- Clean water includes runoff from undisturbed catchments and disturbed areas that have not been contaminated by mining activities.
    - Runoff from uncontaminated disturbed areas will be captured in sediment dams, which are designed to hold a 95 percentile, 5 day rain event, and released to the receiving environment where water quality allows. If the quality of water in a sediment dam is above the limits specified in the EPL or the POEO Act then the water will be returned to RW1 for reuse.
- Mine affected water includes runoff from contaminated catchments (including the mine infrastructure area, coal stockpiles and mining pits) is collected in water storages and returned to RW1 for reuse. The water storages will be constructed over time as they are required. Initially, as discussed at the start of this section, water will be captured and stored in a small collection dam in the CHPP area. RW1 will be used once it is completed.

2.1.4 Minimisation of water use

During the construction phase the following measures are proposed to reduce water take from the Hunter River and reduce water use at the site:

- harvest water from existing farm dams where possible;
- complete construction of proposed water storages as early as possible to increase site yield;
- reuse water captured in water storages for dust suppression and other non-potable demands; and
- limit the extent of disturbance to reduce dust suppression requirements.

Opportunities for the reduction of water take from the Hunter River and reduction of water use at the Mount Pleasant Project will be reassessed informally on a regular basis and formally during the development of the Operational Water Management Plan (OWMP).

2.1.5 Compensatory water supply

The construction of the water storage dams will reduce the volume of water flowing to Dry Creek by approximately 85 ML/a, and to Sandy Creek by approximately 186 ML/a. It is not anticipated that these reductions in flows will adversely affect downstream water users. During construction, the likely impacts on downstream users will be assessed, and the options for compensatory water supply will be investigated. This will occur in consultation with impacted users, and the NSW Office of Water (NOW), and prior to the impacts becoming critical. The outcomes of these discussions, in terms of the compensatory measure agreed with NOW, will be detailed in the OWMP.

2.2 Objective and performance criteria

The effectiveness of the implementation of the management actions will be determined by a series of key performance indicators (KPI) set for each parameter. These parameters will only be applicable after key infrastructures relevant to the parameter are constructed. Table 2.1 highlights the objectives and performance criteria.

Table 2.1 Performance criteria

Parameter	Target	KPI
Minimise draw from the Hunter River	Maximise recycling of water.	All mine affected water collected around site is returned to RW1 for recycling.
	Efficient management of water in RW1.	Do not discharge water from RW1 when stored water volume in RW1 is less than 1,000ML.
	Minimise high quality water usage.	Regularly review water use to identify areas for reduction of water use and identify best practice technologies to achieve those reductions. This is to be formally reviewed every year as part of the WMP review process.
Maintain water quality downstream	Minimise impacts on surface water from construction areas.	All water from construction areas is diverted into ED4, ED3, and other dams as required.
	No unplanned releases of polluted water from site when rainfall events are less than 1 in 100 year ARI 24hour volume.	No discharges observed at dam spillways, except during rainfall events greater than 1 in 100 year as measured at site weather station.
	All controlled discharges in compliance with HRSTS.	All discharge water quality in compliance with HRSTS.
	All water quality discharges are within impact levels or acceptable limits.	Water monitoring program developed and implemented.
	Manage water levels in mine water dams effectively to minimise unplanned overflows.	Cease all pumped inflows to RW1 when stored water volume exceeds 1,900ML.
		Cease all pumped inflows to MW5 when stored water volume in MW5 exceeds 50ML.
Maintain water flows downstream of the Project	Maximum release volumes of clean water from water storages where water quality complies with the EPL.	Implement a monitoring and release program to manage water release from water storages.
Manage erosion and sedimentation	Avoid increase in erosion and sedimentation is observable in watercourses downstream of the mine.	Refer to Mount Pleasant Project Construction Erosion and Sediment Control Plan (refer to Appendix A).

2.3 Management actions

The potential impacts of the project on surface water are managed through the site water management system, which is described in Appendix B. The following general principles will be applied in order to mitigate environmental impacts (see Table 2.2). These principles will only be applicable after key infrastructure relevant to the principle has been constructed.

Table 2.2 Management actions

Parameter	Action
Separation of clean water	Divert clean water runoff from natural, undisturbed catchments away from the open cut pit to downstream waterways using temporary clean water diversion drains.
Capture of potentially contaminated water	Sediment dams and environment dams will be constructed to minimise the impacts of disturbance occurring within the catchment area.
Construction water supply	Relatively small quantities of water will be required for construction phase activities. Initially, water will be drawn from existing farm dams and trucked in from commercial fill points. As demand increases and the pump is constructed, supplies will be transferred by pipeline from the Hunter River, and an existing dam will be used temporarily for storage until the main water dam (RW1) is commissioned.
Potable water supply	Treated potable water will be trucked to site and stored in on-site storage tanks with sufficient capacity to store 7 days of supplies. Potable water reticulated around the site will meet the requirements of the Australian Drinking Water guidelines.
Rainwater capture	Toilets within the administration building and bath house facility will be supplied with rainwater collected from the MIA building roofs. Captured rainwater will be stored in nearby tanks before being reticulated into the toilets and the mine water system. Rainwater will not be used for potable use.
Mine infrastructure area	Runoff from the mine infrastructure area (MIA) and the coal handling area will be intercepted by ED3 and pumped to RW1 for reuse.
Rail loop	Runoff from the coal loading area at the rail loop will be intercepted by the RLD and pumped to RW1 for reuse.
Fine rejects emplacement area	All runoff from the fine rejects emplacement area will be intercepted by dam ED2 and returned to the CHPP for reuse via RW1.
Waste water treatment	Sewage generated within the MIA will be piped to a suitably sized packaged sewage treatment plant. The plant will treat the sewage to meet the Australian Guidelines for Water Recycling, NSW Health Department, and local council requirements for local re-use or discharge to a local watercourse. Effluent will be removed from site by a suitably qualified contractor.
Erosion and sediment control	Sedimentation dams will be constructed at the DA boundary to capture sediment-laden runoff from disturbed catchment areas such as the environmental bund (during construction and rehabilitation). Water will be released from the sedimentation dams as outlined in Appendix A.
Discharge	RW1 will be the licensed discharge point for mine water from the Mount Pleasant Project. Discharge will occur via two 600 mm diameter pipes with manually operated gate valves. Downstream velocities will be controlled by a discharge structure designed to reduce water velocities in Dry Creek and minimise erosion. Release water captured in sediment dams as soon as water quality complies with licensed discharge limits.

2.4 Monitoring actions

In order to meet the objectives outlined in Section 2.2, monitoring of a number of parameters is required. The requirements for each objective are outlined in Table 2.3. The monitoring parameters listed below will only be applicable after key infrastructure relevant to the parameter has been constructed.

Table 2.3 Monitoring actions

Parameter	Monitoring	Timing
Minimise draw from the Hunter River	Levels in staging dams and flows of mine water into RW1 to ensure all water is being moved to RW1 for use.	Ongoing or if RW1 level drops below the trigger level specified in the Surface Water Management System.
Water quality downstream of mine	Integrity of clean water diversion structures.	Post rainfall events.
	Water quality of discharges.	As per protocol and prior to discharge.
Maintain flows downstream of the Project	Integrity of clean water diversion structures.	Post rainfall events.
Minimise erosion and sedimentation	Visual checks of discharge points	Post discharge event.

Monitoring of surface water will be undertaken regularly to ensure effectiveness of controls. The surface water monitoring programme (Appendix C) sets out the sites, parameters, sampling frequency, and monitoring period. The programme will be reviewed and updated as required independent of this document.

There will be 12 sites where monitoring will occur, including one in Sandy Creek to meet the requirement for an undisturbed reference catchment. Four of the 12 sites will be used to monitor offsite releases under the HRSTS.

Data from monitoring stations maintained by NOW will also be used to supplement the monitoring programme and supply further information on water flows in the Hunter River.

The monitoring programmes will be reviewed and updated where required, independent of this document, following any incidents or near misses, and in line with the annual review. The Director-General of the Department of Planning and Infrastructure (DP&I) and the Environment Protection Authority (EPA) will be notified as soon as practicable after monitoring has identified a discharge incident causing material environmental harm. A detailed report on the incident will be made available within seven calendar days after the incident was identified.

3 Contingency actions

3.1 Trigger and action table

The triggers and contingency actions listed below will only be applicable after key infrastructure relevant to the trigger has been constructed.

Table 3.1 Contingency actions

Trigger	Action
Pipeline (onsite water transfer pipelines, pipelines related to discharge points) flow meters indicate abnormally low flow rate	Check for pipeline damage and leakage.
Mechanical failure of pumping equipment prevents scheduled transfers of water to RW1	Ensure adequate spares are available. Source temporary equipment if possible.
Damage to water storage infrastructure	Regular visual inspection of infrastructure, especially following significant rainfall.
Failure of water storage structure	Notify residents downstream of the failed structure, Director-General of the DP&I and the EPA. Note, residents at risk of a failed water structure will be identified separately to this document, as required.
	Investigate the downstream impacts of the failure and complete a detailed report on the impacts of the failure and required remedial actions.
	Investigate the reason for failure of the structure and ensure the stability of other water storages at risk.
	Assess the effects of the failure on the water management system and implement mitigation measures.
Forecasts of significant rainfall or storm event	Pump water from any storages at risk of unlicensed discharges.
Water demands or catchment yield depart from assumed values used in modelling	Annual update of water balance.
	Review original assumptions and update as required.
Routine monitoring indicates siltation is causing loss of water storage capacity in water management dams	Undertake desilting operation to reinstate design storage volume.
Short-term water demand forecast at more than 90% of entitlement under high security water licences	Investigate the possibility of further improvements in water use efficiency.
	Procurement of additional water licences.
	Transfer of allocation from other Coal & Allied sites.
	Extraction of groundwater from existing or new bores (within licence conditions).
	Sourcing of water from mine sites adjacent to Mount Pleasant.
	Increased retention of site run off without discharge.

Table 3.1 Contingency actions

Trigger	Action
Water monitoring indicates an exceedance of the surface water license conditions in the EPL	Investigate the application of floating modules to reduce evaporation losses. Cease any controlled discharges which may be causing the non-compliance. Contain any contaminated water where possible to prevent or minimise environmental harm. Continue to monitor water quality in the area of interest Undertake an investigation, where necessary, to ascertain the cause of the non-compliance.
Uncontrolled discharge	Monitor water quality and quantity of the discharge and assess the potential for environmental harm. Contain any contaminated water where possible to prevent environmental harm. Investigate the cause of the discharge and modify the water management system where necessary to prevent future uncontrolled discharges.

4 Reporting of performance criteria

The surface water component of this management plan will be revised during the development of the OWMP, which will be submitted for approval prior to the end of construction works. Thereafter, the performance of the surface water management system will be reviewed annually (by the end of each calendar year) along with the environmental performance of the project. The review will:

- include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the:
    - relevant statutory requirements, limits or performance measures/criteria;
    - monitoring results of previous years; and
    - relevant predictions in the EIS.
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the development;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the performance of the water management system,

The water management plan will be reviewed within three months of the submission of the annual review and updated to the satisfaction of the Director-General of the DP&I where necessary. The plan will also be reviewed within three months of an incident report (as specified in the consent conditions and the EPL), the completion of an independent environmental audit or any modification to the consent conditions.

The *Protection of the Environment Operations Act 1997* requires pollution incidents causing or threatening material environmental harm to be reported to the relevant authorities. The relevant authorities for all activities licensed under the EPL are the EPA, the Ministry of Health, the WorkCover Authority, Muswellbrook Council, and Fire and Rescue NSW.

An Annual Return will be provided to the EPA within 60 days of the end of the reporting period as specified in the EPL.

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Appendix A

Mount Pleasant Project Construction Erosion and Sediment Control Plan

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A.1 Introduction

A.1.1 Description

This Construction Erosion and Sediment Control Plan (CESCP) has been developed in accordance with the Development Consent Condition 28(b) for Coal & Allied Operations Pty Limited's (Coal & Allied) Mount Pleasant Project. As permitted by Schedule 2, Section 13 of the Development Consent, the erosion and sediment control plan is submitted in a staged process. The CESCP will cover the construction stage, approximately the first 18 to 24 months of the project. This stage will cover the construction of all infrastructure, including the CHPP, roads, rail, conveyor, workshops and other buildings, dam walls, diversion drains, water pipelines, powerlines and pre-strip works. The CWMP excludes any coal handling or processing.

The CESCP is a component of the CWMP, which forms part of the Environmental Management Strategy of the proposed operations. This plan includes prevention and management of erosion impacts as well as implementation of a monitoring program to provide early detection of potential issues and to ensure the effectiveness of controls. A key focus is to minimise the requirement for reactive management and reduce the hydrological footprint of the operation by minimising sedimentation of clean water and maintaining sediment control structures.

The most relevant guidelines for erosion and sediment control are those presented in *Managing Urban Stormwater: Soils and Construction Vol. 1 and Vol. 2E - Mines and Quarries* (the Blue Book) (Landcom, 2004 and DECC, 2008).

A.1.2 Scope

This CESCP is to be applied throughout the construction phase of the Mount Pleasant Project. It will be used as a guide to erosion and sediment control management in the Development Consent area (DA 92/97), with a particular association to local water bodies, such as the Hunter River.

Activities occurring during construction that will require consideration for sediment and erosion control include:

- upgrade of Wybong Road from Bengalla link road through to the mine access;
- installation of the Hunter River water supply and associated pipeline;
- establishment of site access roads and haul roads;
- development of pads for temporary and permanent infrastructure;
- construction of sediment dams and environment dams shown in Figure B.1; and
- construction of the stand alone rail loop, and other necessary service infrastructure.

Construction activities exclude the development of the box-cut and any extraction of coal.

This plan covers the principles to be applied during construction. It does not cover the detailed plans that will be in place for each part of construction, as each contractor will be required to provide a detailed ESCP, based on these principles, to Coal & Allied for approval prior to any works going ahead.

This plan specifically focuses on erosion and sedimentation risks between the erosion source and sediment dam entry point. The design and linkage of site dams and other water infrastructure are to be detailed prior to construction in accordance with the conditions outlined in the CWMP.

This plan adheres to, but is not limited to, the requirements of Condition of Development Consent 28(b); Erosion and Sediment Control Plan. The following table highlights the consent conditions covered by this management plan, and lists the section within this document where they are addressed.

Table A.1 Consent conditions

Condition	Section of this plan
28. The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Director-General. The plan must include; b) An Erosion and Sediment Control Plan, which must; • Identify activities that could cause soil erosion, generate sediment or affect flooding; • describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters, and manage any flood risk; • describe the location, function, and capacity of erosion and sediment control structures; and • describe what measures would be implemented to maintain the structures over time.	A.2.2 Management Actions A.2.3 Design Plan A.2.4 Objective and Performance Criteria

The objectives of the CESCP include the following:

1. ensure that statutory requirements and corporate standards are met;

2. manage the activities in a way that minimises erosion and sedimentation impacts to the environment and neighbouring communities, and limits interference with construction works; and

3. protect natural and rehabilitated landforms and minimise erosion and sedimentation of natural water bodies and watercourses.

To satisfy Objectives 1 and 2, this management plan will ensure erosion and sediment controls are in place where required and maintenance activities of these structures are carried out as required.

To satisfy Objective 3, management actions contained in this plan will mitigate the potential for environmental detriment.

A.2 Management and design

A.2.1 Environmental aspects

Land disturbance associated with the construction phase of the Mount Pleasant Project may increase the risk of erosion and sedimentation in natural watercourses and water bodies as the permanent designed controls will not be in place and operating effectively. Sedimentation of watercourses can modify the abiotic environment, by changing water quality (TSS), and smothering aquatic habitats. In turn, this can have detrimental effects on the ecosystem of the near to immediate area, and have a connectivity effect on the geomorphology and ecology elsewhere in the catchment. (Note: water quality is addressed in the Mount Pleasant Project CWMP).

Activities that can contribute to erosion and sediment issues include:

- vegetation and topsoil clearing, especially on slopes;
- formation of pads, batters and stockpiles;
- water flows over cleared areas; and
- the nature of the soils being cleared.

In order to reduce the potential for degradation within the project area and adjoining lands, there are two zones of focus that must be adequately managed during the construction phase:

1. areas disturbed by construction; and
2. undisturbed areas.

A.2.2 Management actions

i Areas disturbed by construction

The following items will be adhered to in all areas of the site where disturbance from construction of the mine occurs:

- relevant internal and external approvals and permits will be obtained before commencement of surface disturbance in the construction stage (eg Ground Disturbance Permits);
- the extent of disturbance (including trafficable areas) will be identified and minimised using appropriate pegging, barriers or signage;
- prior to disturbance of land, appropriate erosion and sediment controls will be established and approved by environmental personnel. A combination of temporary and permanent measures may be necessary for disturbances associated with construction;
- clean water runoff from undisturbed catchments will be diverted around the disturbance areas via diversion drains and banks to discharge into natural watercourses, where practical;
- runoff from disturbed areas will be diverted into sediment dams (designed according to the Blue Book (2008));

- drains, diversion banks and channels will be stabilised and scour protection will be provided as necessary;
- temporary erosion and sediment control measures will be used onsite and may include silt fences, hay bales, jute mesh, check dams, cross banks, contour banks, armouring and straw mulching;
- appropriate design of access tracks (refer to Section 5.4, Volume 2C of the Blue Book (2008));
- temporary erosion and sediment control measures will remain in place until exposed areas resulting from construction are stabilised; and
- topsoil will be stockpiled for reuse and all stockpiles will be managed as described in the Mount Pleasant Project Soil Stripping Management Plan.

ii Undisturbed areas

As far as possible, encroachment on undisturbed areas will be minimised, for example, laydown areas will be clearly defined and equipment will not be stored on undisturbed areas outside the approved laydown, and construction activities will remain within approved boundaries. Sediment control will be in place to prevent sediment laden water impacting on undisturbed areas. No interference with the stability of watercourses/water bodies outside the DA areas will occur.

A.2.3 Design plan

Drainage considerations will be incorporated into the landform design plan to slow and direct water flow and minimise erosion. Diversion drains will be constructed as per the design plans. These designs have been introduced to efficiently mitigate erosion and sedimentation. The following design criteria will be applied to the design of temporary and permanent diversion drains during the construction phase:

i Temporary diversion drains

- Minimise channel grade where possible to reduce channel velocity and need for rock scour protection. Minimum channel grade of 0.5 % to be adopted;
- channel cross section to provide minimum construction widths for plant access;
- size with sufficient capacity to convey the peak flow from the 1 in 10 year average recurrence interval (ARI) storm event, without overtopping; and
- select channel linings so as to provide a stable channel for storm events up to the 1 in 10 year ARI event.

ii Permanent diversion drains

- Located immediately upstream of RW1 to divert external catchment around storage channel grade to be minimised where possible to reduce channel velocity and reduce extent of rock scour protection required. Minimum channel grade of 0.5 % to be adopted;
- channel cross section to provide minimum construction widths for plant access;
- need to be sized with sufficient capacity to convey the peak flow from the 1 in 100 year ARI storm event, without overtopping;

- channel linings to be selected to provide a stable channel for storm events up to the 1 in 50 year ARI event. It is assumed that maintenance would be required for a larger storm event;
- bed control works, batter stabilisation structures, and re-entry flow dissipation fixtures where required, in line with the Blue Book guidelines (2008); and
- measures such as de-silting, repair work, weed control and revegetation will be implemented to maintain erosion and sediment control structures over time.

The management actions described above will be subject to a monitoring strategy to ensure effectiveness. Table A.2 outlines how this monitoring will be undertaken.

Table A.2 Monitoring procedure

Parameter	Action	Monitoring during construction
Approvals and clearances	Updated and relevant to activity	Prior to disturbance
Minimise extent of disturbance	Use barriers and signage	Prior to and during disturbance - Check throughout construction that these remain in appropriate positions around site
Erosion and sedimentation controls	Design and construct erosion and sediment controls	Prior to disturbance – Plans approved by environmental personnel. Controls established and approved prior to work commencing. Monitoring during construction – Ongoing surveys, and additional inspections following heavy rain events.
Clean water runoff from undisturbed catchments	Divert clean water runoff around disturbance areas	Prior to disturbance - Ensure diversion drains and banks are in place and effective
Runoff from disturbed areas	Diverted into sediment dams	Prior to disturbance - Ensure all runoff is directed into sediment dams
Erosion and sediment control effectiveness	Maintain until exposed areas are stabilised	Post disturbance and rehabilitation (monthly inspections and following heavy or prolonged rainfall events) - Assess the condition of the structures.
Watercourses/ water bodies	Alleviate sedimentation through controls and monitor water condition	Prior to, during and following disturbance – Monitor water as outlined within the CWMP.

A.2.4 Objective and performance criteria

The effectiveness of the implementation of the erosion and sedimentation management actions will be determined by a series of KPI set for each parameter. Table A.3 highlights the objective and performance criteria.

Table A.3 Key performance indicators

Parameter	Target	KPI
Land clearing	Land clearance conducted in accordance with development consent	All land that is cleared is a part of the active construction area or associated facilities following clearing
	Clearing is minimised	Clearing area reviewed during GDP process and clearly delineated in field prior to clearing.
Revegetation	Minimise erosion through establishment of vegetation.	Fast growing, non-weedy seed stock (e.g. winter wheat) will be applied to areas of potential sediment sources (eg soil stockpiles, embankments) within 2 months of completion of the area.
Erosion and sedimentation controls	Structures are implemented prior to disturbance	Established in accordance with Blue Book designs and approved by environmental personnel
	Structures are maintained during construction	Structures will be inspected at least once a week by the relevant area supervisor, and after any rainfall event.
Clean water runoff from undisturbed catchments	Clean water runoff is diverted around disturbance areas	No clean water catchment runoff enters disturbance areas
Runoff from disturbed and rehabilitated areas	No impairment to local water quality upon release	All potential sediment laden runoff water enters appropriate sediment control structure
Temporary erosion and sediment controls	Alleviate any points of erosion that are expected to exist on a temporary basis	Established controls in accordance with Blue Book designs and approved by environmental personnel
Large rainfall events	Erosion and sediment controls to be designed for and effective under varying weather conditions	The integrity of structures remains during heavy rainfall events or within design parameters.

A.3 Contingency actions

A.3.1 Trigger/ action tables

Triggers have been developed to provide an early warning system and recommended actions to prevent exceedance of the erosion and sedimentation trigger parameters. These trigger parameters are defined in Table A.4 below, along with associated actions.

Table A.4 Triggers and response actions

Trigger parameters	Action
Land clearing in excess of minimal required area for construction is proposed.	During the review of ground disturbance permit, revisit management plan to ensure proper procedures are followed, and modify proposed area to be cleared if required.
Land clearing in excess of minimal required area for construction is undertaken.	Implement necessary erosion and sediment control measures to stop sedimentation from entering undisturbed areas. Implement rehabilitation activities on excess area that was cleared.
Clean water catchment runoff enters disturbance areas	Identify source of clean water runoff and implement additional diversion measures to prevent further incidence.
Areas that are usually stabile are identified as being subject to erosion	Implement temporary erosion and sediment controls and monitor the area. If area fails to restabilise permanent structures may need to be employed
Erosion and sedimentation rates are observed to be heightened during heavy or extended rainfall events	Review and inspect controls and if appropriate, redesign and institute additional measures to minimise future impacts

A.4 Reporting of performance criteria

Reporting on the effectiveness of the erosion and sediment control measures and performance against objectives will be conducted through internal monthly inspections and annual regulatory and corporate reporting. The performance of this management plan in the Mount Pleasant Project construction phase will be reviewed annually during construction and reported in the Annual Environmental Management Report. The minimum requirements to be recorded consist of the following:

- monitoring and inspection results;
- performance against implementation of control measures; and
- review of disturbance activities.

Details will be provided on the success of the CESCP implemented on site and any areas requiring modification will be highlighted with specific recommendations listed.

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Appendix B

Surface water site water management system

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B.1 Surface water management description

Since preparation of the Mount Pleasant Mine EIS (ERM Mitchell McCotter, 1997), there have been various refinements to the mine layout and the associated water management system. These revisions result in further reductions in the volumes of water captured within the site by diverting clean water from undisturbed catchments around the mine workings. The design principles for the currently proposed system are otherwise consistent with the principles applied in the Mount Pleasant Mine EIS design.

The water management system consists of a closed mine water system which captures runoff from active mining areas and groundwater inflow for re-use on site by the coal handling and preparation plant, and for dust suppression. Clean water runoff from natural catchments is diverted away from the open cut pit to downstream waterways.

The key components of the water management system are:

- the Raw Water Dam (RW1) will be the main water storage dam and will supply water for dust suppression and plant operation. RW1 will be located in the Dry Creek catchment upstream of Wybong Road, and will receive water captured in the open cut pit and raw water extracted from the Hunter River. RW1 will be the licensed discharge point for the site. Discharge will occur via two 600 mm diameter pipes with manually operated gate valves;

- Mine Water Dam (MW5) will be utilised as a staging dam for pumping between the open cut pits and RW1. Inflow sources will include runoff from the small upstream catchment, pit pumps in North and South Pits and water pumped from ponds formed behind the proposed environmental bund;

- a series of mine water ponds (MWP1, MWP2, MWP3 and MWP4) formed in natural drainage lines on the upslope side of the proposed environmental bund. Runoff from disturbed areas will be collected in these ponds and pumped to RW1 via MW5 when the water volume in RW1 drops below 300ML;

- the Rail Loop Dam (RLD) will capture runoff from the coal loading area to prevent coal fines and other contaminants discharging into Dry Creek;

- temporary clean water diversion drains will be used to divert runoff from undisturbed areas and manage pit inflows. As mining progresses west, temporary diversion drains will be constructed ahead of the advancing pits. Permanent clean water diversion drains will be constructed immediately upstream of RW1 to divert clean water runoff around the dam and into back into Dry Creek;

- portable pit pumps will transfer water to MW5. These will be positioned as required to minimise the inundation of pits;

- sedimentation dams will be constructed at the Development Consent boundary to capture sediment-laden runoff from disturbed catchment areas such as the environmental bund (during rehabilitation). Water will be released from the sedimentation dams to the following locations when water quality allows:

    - MWP4 and Sediment Dams 1 to 5 – Discharge to a high flow channel of the Hunter River via minor gullies;

    - MWP1 and Sediment Dam 6 – Discharge to the Hunter River via a minor gully;

- Sediment Dam 7 – Discharges to the Hunter River via a minor tributary; and

- Rail loop sediment dam – Discharges to the Hunter River via a minor tributary.

Sediment dams will be sized in accordance with the Blue Book (Managing Urban Runoff – Soils and Construction, Volume 2e Mines and Quarries). A low flow outlet structure will be located within each sedimentation dam to allow for drawdown of captured runoff over a five day period, when the water meets the relevant quality criteria of the EPL. A grated pit will be used to set the sediment storage zone where deposited sediment is stored until the basin is cleaned out. Outflow from the dam will be controlled by an orifice plate installed over the end of the outlet pipe.

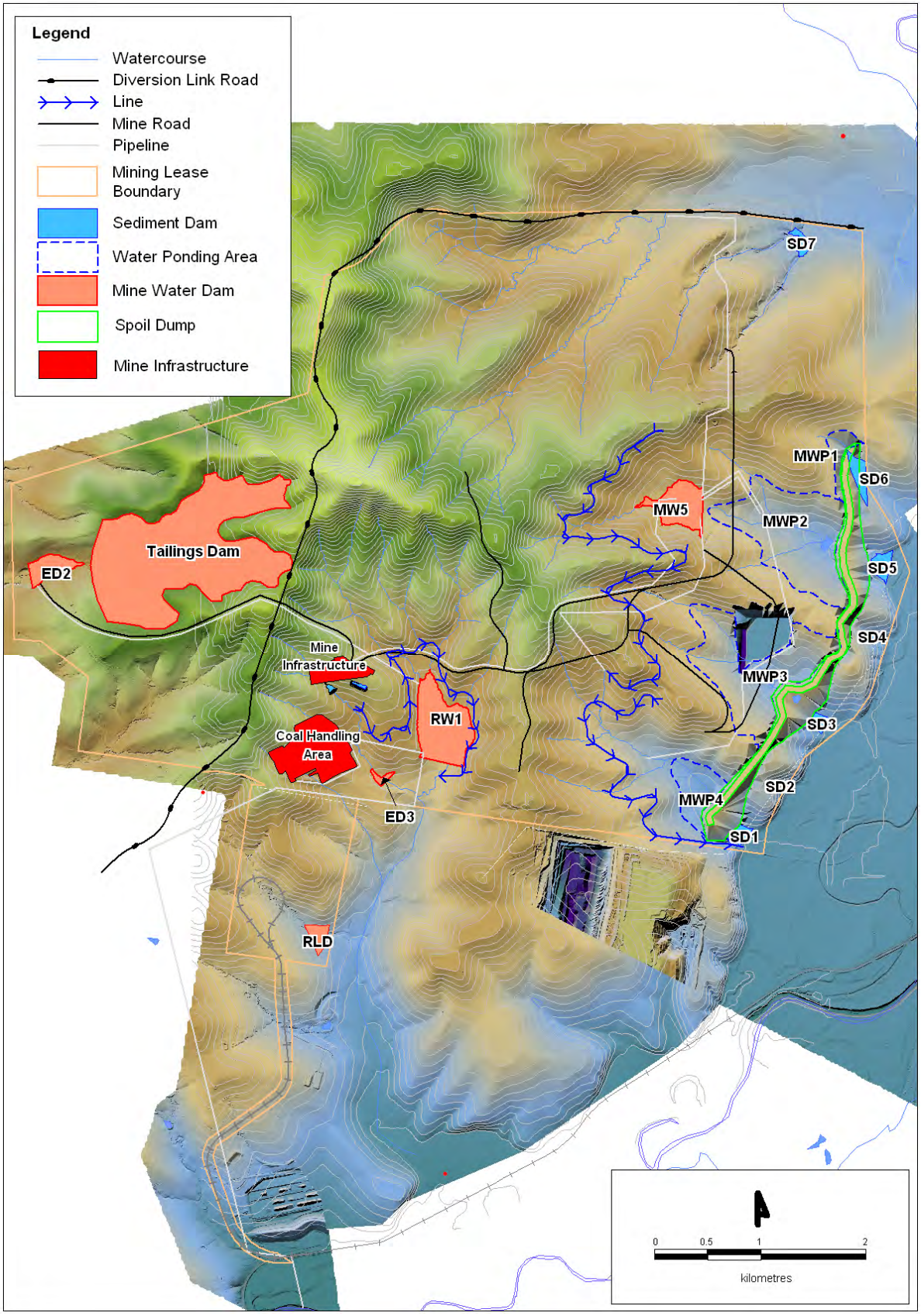
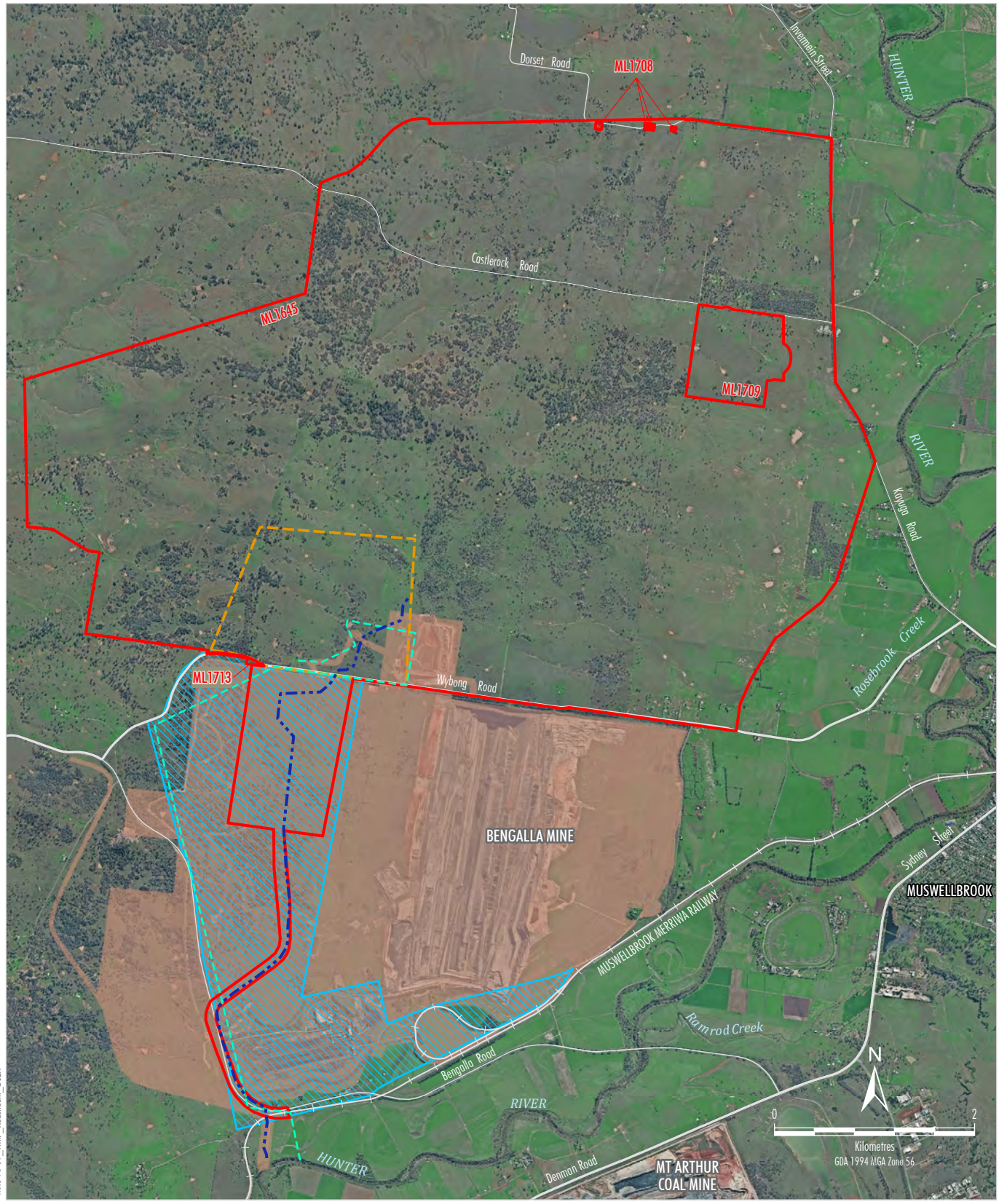


Figure B.1 **Mount Pleasant Project surface water management system**



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LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Conveyor/Services Corridor Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Superseded Water Pipeline Alignment
- Indicative Water Pipeline Alignment #

Note: # Final pipeline alignment subject to detailed design and landholder agreement. The final layout of infrastructure (including the Water Pipeline) within the Infrastructure Area Envelope is subject to change during final design.

Source: NSW Land & Property Information (2015); NSW Division Resources & Energy (2016); Department of Planning and Environment (2016)

MACHEnergy

MOUNT PLEASANT OPERATION

Water Pipeline Alignment

Figure B.1.A

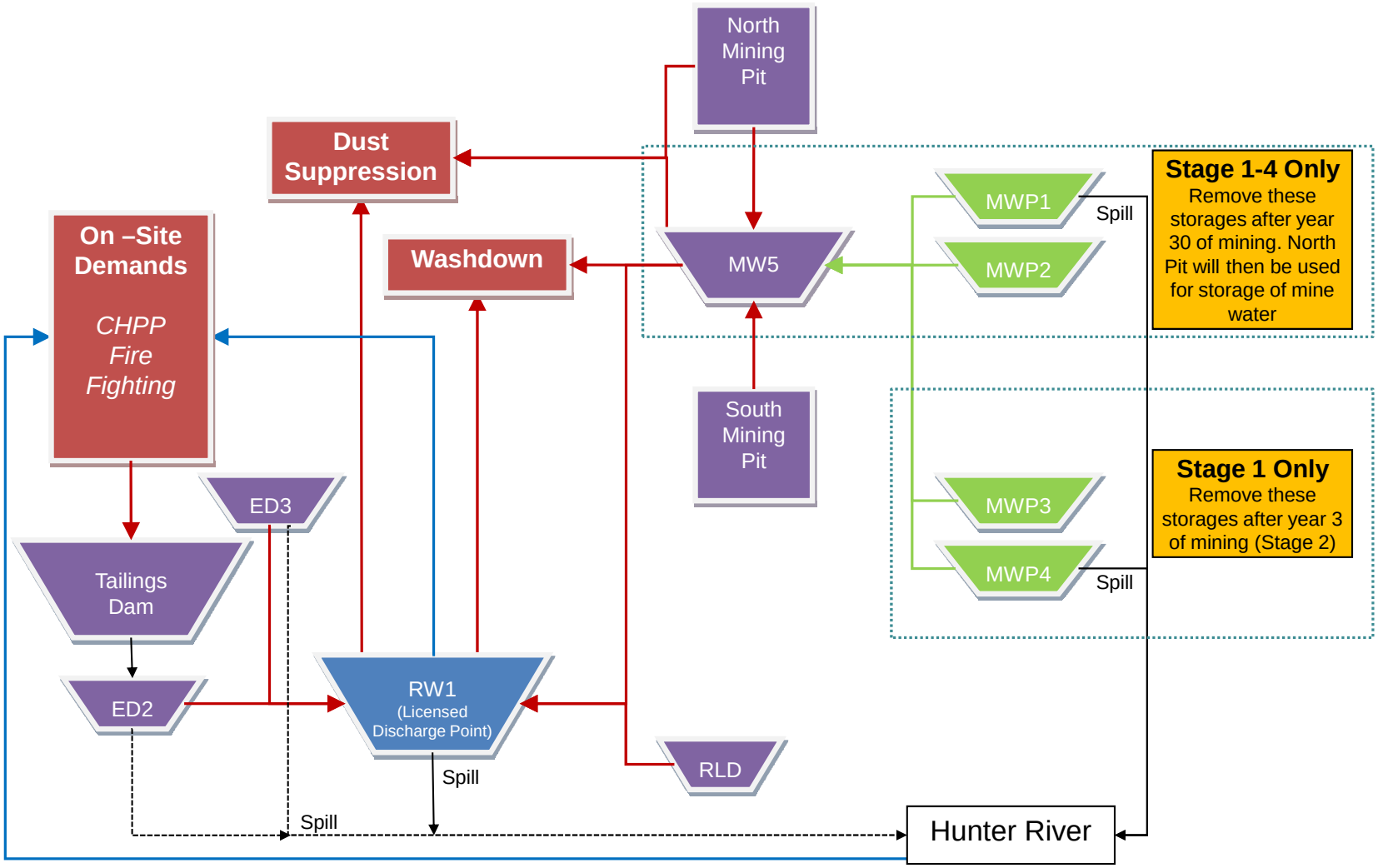

Figure B.2 **Mount Pleasant Project surface water management system layout.**

Appendix C

Surface water monitoring programs and protocols

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C.1 Surface water monitoring program and protocols

The surface water monitoring protocols will:

- ensure compliance with the HRSTS;
- ensure compliance with the EPL;
- minimise environmental harm;
- provide valuable information on the performance of the water management system; and
- meet internal (Rio Tinto Coal Australia) performance criteria.

There are a total of 15 surface water monitoring sites within the Mount Pleasant Project Surface Water Monitoring Plan (refer to Table C.1). The approximate locations of these stations are shown in Figure C.1. Further review of the monitoring program may result in some sites being relocated for safety of access. MTP-SW14 and MTP-SW15 will not be monitored until ED3 and RW1 respectively are constructed.

C.1.1 Water quality monitoring

Table C.1 lists the surface water monitoring stations and monitoring frequency. Water quality monitoring will be undertaken per the issued EPL. Field measurement of the parameters listed in Table C.1 will be undertaken during all monitoring campaigns at surface water monitoring locations. In addition, samples will be collected annually so that the parameters listed in Table C.2 can be analysed by an accredited laboratory.

Table C.1 Mount Pleasant Project surface water quality monitoring locations

Station Number	Description	Field Parameters	Monitoring Frequency
MTP-SW01	Hunter River Upstream	pH, EC Turbidity Total Solids	Monthly
MTP-SW02	Hunter River Central	pH, EC Turbidity Total Solids	Monthly
MTP-SW03	Hunter River Automated monitor	pH, EC Turbidity Total Solids	Monthly
MTP-SW04	Hunter River Kayuga Bridge	pH, EC Turbidity Total Solids	Monthly
MTP-SW05	Hunter River Downstream	pH, EC Turbidity Total Solids	Monthly
MTP-SW06	Sandy Creek Downstream	pH, EC Turbidity Total Solids	Monthly On rainfall trigger (40mm in 24 hrs)

Table C.1 Mount Pleasant Project surface water quality monitoring locations

Station Number	Description	Field Parameters	Monitoring Frequency
MTP-SW07	Sandy Creek Upstream	pH, EC Turbidity Total Solids	Monthly On rainfall trigger (40mm in 24 hrs)
MTP-SW08	ED2	pH, EC Turbidity Total Solids	Monthly On rainfall trigger (40mm in 24 hrs)
MTP-SW09	Dorset Road	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW10	MW5	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW11	MWP1	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW12	MWP4	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW13	Dry Creek	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW14	ED3	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)
MTP-SW15	RW1	pH, EC Turbidity Total Solids	On rainfall trigger (40mm in 24 hrs)

Table C.2 Water quality monitoring parameters

- Al, (Aluminium)
- As, (Arsenic)
- B, (Boron)
- Ba, (Barium)
- Ca, (Calcium)
- CaCO3 Total (Calcium Carbonate)
- Cd, (Cadmium)
- Cl, (Chloride)
- Co, (Cobalt)
- CO3, (Carbonate)
- Cu, (Copper)
- Fe (soluble), (Iron)
- HCO3, (Bicarbonate)
- Hg, (Mercury)
- K, (Potassium)
- Li, (Lithium)
- Mg, (Magnesium)
- Mn, (Manganese)
- Na, (Sodium)
- NH3 (Ammonia)
- Ni, (Nickel)
- NO2 (Nitrite)
- NO3 (Nitrate)
- OH, (Hydroxide)
- P, (Phosphorus)
- Pb,(Lead)
- Rb, (Rubidium)
- Se, (Selenium)
- Si, (Silica)
- SO4 (or S), (Sulphate or Sulphur)
- Sr, (Strontium)
- Zn. (Zinc)
- pH
- EC (Electrical Conductivity)
- TSS (Total Suspended Solids)
- Turbidity

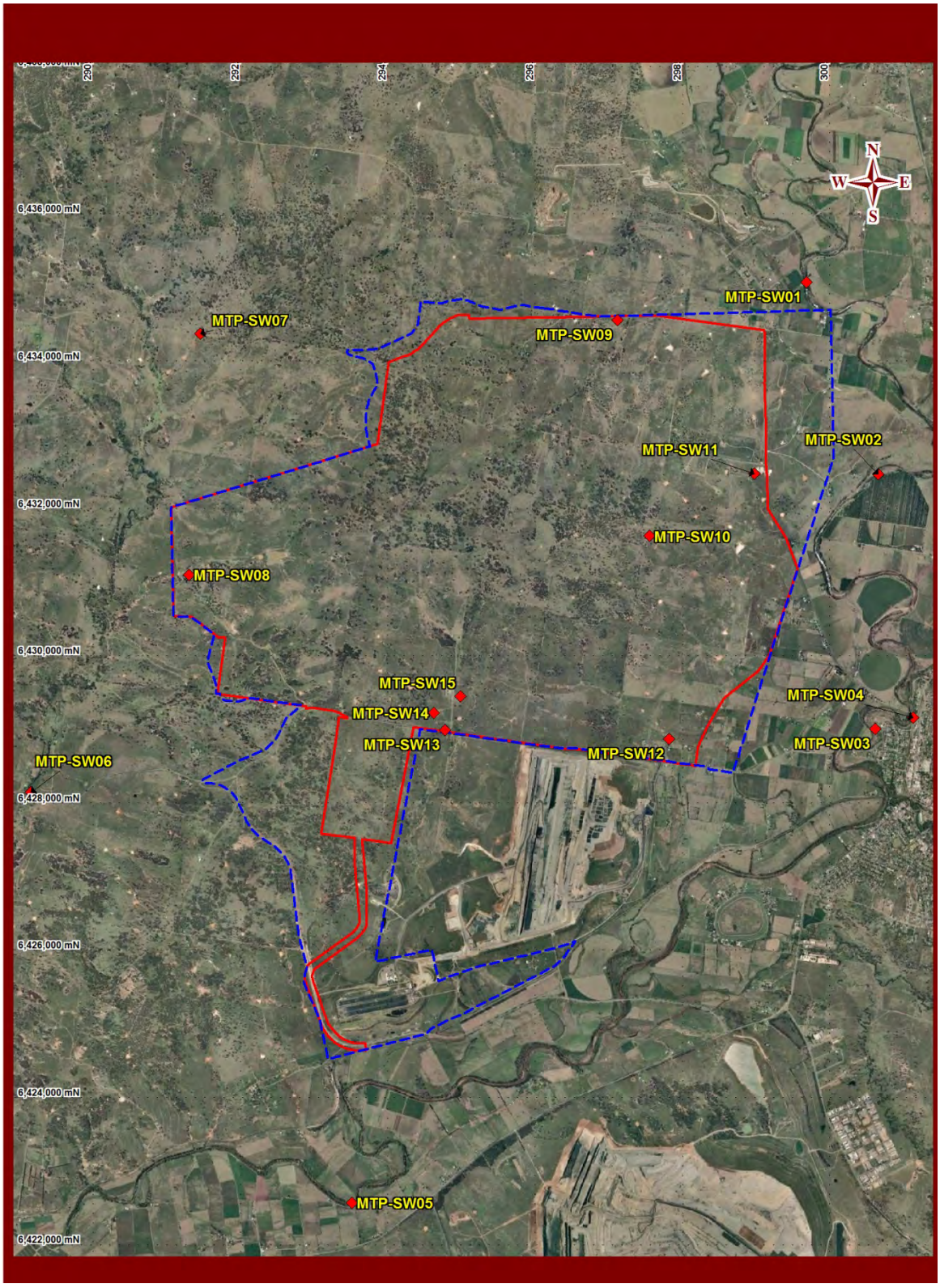

Figure C.1 Mount Pleasant Project surface water monitoring locations

C.1.2 Monitoring during discharges

Four of the 12 surface water monitoring stations will be used to monitor offsite water releases from RW1 under the HRSTS. These stations are listed in Table C.3. The parameters and monitoring frequencies required during discharges are also shown. HRSTS discharges are governed by the flow of water in the Hunter River:

- low flow – <1,000 ML/d;
- high flow – 1,000 to 4,000 ML/d; and
- flood flow – >4,000 ML/d.

All discharges from RW1 will comply with the conditions of both the HRSTS and the EPL.

Table C.3 Mount Pleasant Project HRSTS surface water monitoring locations

Station number	Description	Parameter	Monitoring frequency during discharge
MTP-SW01	Hunter River Upstream	pH, EC Turbidity Total Solids	Daily
MTP-SW05	Hunter River Downstream	pH, EC Turbidity Total Solids	Daily
MTP-SW13	Dry Creek	pH, EC Turbidity Total Solids	Twice Daily
MTP-SW15	RW1	pH, EC Turbidity Total Solids	Continuously

C.2 Impact assessment criteria

Table C.4 shows surface water and stream health impact assessment criteria which will be used as trigger values for assessing surface water impacts within and downstream of the Mount Pleasant Project. Due to the limited number of water quality samples available for analysis default impact assessment criteria for lowland rivers in slightly disturbed ecosystems in south-east Australia were adopted from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000). Site specific impact assessment criteria will be developed as sufficient baseline monitoring data becomes available.

Table C.4 Surface water quality impact assessment criteria

Water quality parameter	Trigger value
pH	6.5 – 8.0
Dissolved oxygen (% Saturation)	85 - 110
Salinity (µS/cm)	125 - 2200
Turbidity (NTU)	6 - 50

C.3 Surface water monitoring program reporting procedures

The *Protection of the Environment Operations Act 1997* requires pollution incidents causing or threatening material environmental harm to be reported to the relevant authorities. The relevant authorities for all activities licensed under the EPL are the EPA, the Ministry of Health, the WorkCover Authority, Muswellbrook Council, and Fire and Rescue NSW. Reporting and investigation of all potential pollution incidents will be undertaken to comply with the requirements of the EPL and the consent conditions.

An Annual Return will be provided to the EPA within 60 days of the end of the reporting period as specified in the EPL.

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