



DRAYTON MINE

EAST PIT TAILINGS EMPLACEMENT & EXPLOSIVE SSTORAGE FACILITY ENVIRONMENTAL ASSESSMENT

for

Anglo Coal (Drayton Management) Pty Limted

July 2011

Hansen Bailey

ENVIRONMENTAL CONSULTANTS

DRAYTON MINE

EAST PIT TAILINGS EMPLACEMENT & EXPLOSIVES STORAGE FACILITY MODIFICATION

ENVIRONMENTAL ASSESSMENT

Prepared by

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PO Box 473

SINGLETON NSW 2330

July 2011

For

ANGLO COAL (DRAYTON MANAGEMENT) PTY LIMITED

PMB 9

MUSWELLBROOK NSW 2333

ENVIRONMENTAL ASSESSMENT STATEMENT

Submission of Environmental Assessment (EA)

Under Section 75W of the *Environmental Planning and Assessment Act 1979*

EA Prepared by	
Name:	James Bailey
Qualifications:	B. Natural Resources, MBA
Address:	Hansen Bailey PO Box 473 SINGLETON NSW 2330
In Respect Of:	Drayton Mine East Pit Tailings Emplacement & Explosives Storage Facility Modification
Applicant Name:	Anglo Coal (Drayton Management) Pty Limited
Applicant Address:	Thomas Mitchell Drive MUSWELLBROOK NSW 2333
Land to be Developed:	As per the Drayton Mine Extension Environmental Assessment (2007)
Proposed Development:	Tailings disposal & development of an Explosives Storage Facility as outlined in **Section 3** of the attached Environmental Assessment.
Environmental Assessment:	An Environmental Assessment for the Project is attached.
Certification:	I certify that I have prepared the contents of this EA, and to the best of my knowledge: • It is in accordance with Sections 75E and 75F of the *Environmental Planning and Assessment Act 1979*; • It contains all available information that is relevant to the environmental assessment of the activity to which the statement relates; and • The information contained in the statement is neither false nor misleading.
Signature:	
Name:	James Bailey Director
Date:	July 2011

EXECUTIVE SUMMARY

BACKGROUND

Drayton Mine is operated by Anglo Coal (Drayton Management) Pty Ltd and is located in the Upper Hunter Valley, approximately 13 km south of Muswellbrook. Project Approval 06_0202 was granted by the Minister for Planning on 1 February 2008 under the *Environmental Planning & Assessment Act 1979* to allow the extension of open cut coal mining operations at Drayton Mine and associated infrastructure upgrades and modifications. Project Approval 06_0202 allows Drayton Mine to extract coal via open cut methods up to 8 Million tonnes per annum to 2017. Project Approval 06_0202 is supported by the *Drayton Mine Extension Environmental Assessment* (Hansen Bailey, 2007).

A modification to Project Approval 06_0202 was granted by the Minister for Planning on 16 October 2009 to allow an 8 hectare extension of the approved mining disturbance footprint to the north and the establishment of a new conservation area to provide an appropriate offset for this additional disturbance. The supporting document to the Project Approval is the *Drayton Mine Project Approval Modification Environmental Assessment* (Hansen Bailey, 2009).

MODIFICATION

Anglo Coal (Drayton Management) Pty Ltd seeks approval from the Minister for Planning for a modification to Project Approval 06_0202 under Section 75W of the *Environmental Planning & Assessment Act 1979*. Specifically, the modification is required to facilitate the emplacement of raw tailings within the East Pit void, rather than a co-disposed dry tailings product as is currently approved (the Modification).

The Modification also seeks approval for the construction and operation of an explosives storage facility at Drayton Mine, remote from near neighbours and infrastructure, on land owned by Drayton. The facility will house storage containers for materials required for blasting operations, a site office, bathroom facilities and a truck-port. The facility will ensure that Drayton has an ongoing supply of materials required for blasting, as the currently utilised Mt Arthur Coal facility nears capacity.

No other changes to Drayton Mine's operations are sought. The Modification activities will be carried out generally in accordance with Project Approval 06_0202.

STAKEHOLDER CONSULTATION

Stakeholder consultation was undertaken for the Modification including with relevant regulators. The consultation process included personal briefings, presentations and correspondence with relevant stakeholders including the Department of Planning, with all issues raised in relation to the Modification addressed in this Environmental Assessment.

Extensive consultation was carried out with Macquarie Generation regarding the change of use of the East Pit void on Macquarie Generation owned land. This consultation resulted in a legal Deed of Agreement being reached between both parties in regard to the Modification.

Notification of the Modification will be provided to Drayton's near neighbours via the distribution of a brief letter outlining the Modification and provides relevant contact details should further information be required. Notification of the Modification will also be provided to Drayton's Community Consultative Committee. Anglo Coal (Drayton Management) Pty Ltd will continue the ongoing consultation process through maintaining contact with regulatory and community stakeholders via regular meetings and the release of public documents reporting on environmental performance.

IMPACT ASSESSMENT AND MITIGATION

Relevant environmental impact assessments of the Modification were undertaken in relation to air quality, noise, ecology, groundwater, rehabilitation and final landform, surface water, spontaneous combustion, visual, heritage (both Aboriginal and Non-Aboriginal), traffic management, socio-economic and waste. These assessments were undertaken in accordance with relevant State Government technical and policy guidelines and where necessary, involved the review of the assessments undertaken for the Drayton Mine Extension Environmental Assessment and Drayton Mine Project Approval Modification Environmental Assessment.

The impact assessments undertaken for the environmental issues outlined above determined that the activities associated with the Modification are consistent with those approved in the Drayton Mine Extension Environmental Assessment, Drayton Mine Project Approval Modification Environmental Assessment and Project Approval 06_0202. For the matters assessed, it is anticipated that the existing management and mitigation measures developed for the Drayton Mine will be effective in minimising environmental impacts from the Modification.

CONCLUSION

The Modification sought relates to the emplacement of raw tailings in the East Pit void and is required primarily as a result of upgrades to the Coal Treatment Unit which will create a higher quality coal product to be developed and hence will produce a greater quantity of tailings.

The Modification application also seeks approval for the construction and operation of an explosives storage facility at Drayton Mine, remote from near neighbours and infrastructure, due to capacity constraints at the Mt Arthur Coal storage facility. The proposed explosives storage facility will ensure a reliable ongoing supply of blasting materials for mining operations at Drayton into the future.

The review of the environmental impact assessments and principles of Ecologically Sustainable Development completed for this Environmental Assessment have confirmed that the impacts from the activities described for the Modification are minor in nature and are consistent with those already approved by the Drayton Mine Project Approval 06_0202.

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1 BACKGROUND

This section provides an introduction to the Environmental Assessment, provides details of the proponent and summarises the report structure.

1.1 INTRODUCTION

Drayton Mine (Drayton) is located approximately 13 km south of Muswellbrook and approximately 120 km north-west of Newcastle in NSW. Drayton is managed by Anglo Coal (Drayton Management) Pty Ltd, a division of Anglo American (Anglo American). Drayton is located west of the New England Highway, north-west of Liddell and Bayswater Power Stations and south-west of the rural-residential Estate of Antiene. Drayton is located immediately to the east of Mt Arthur Coal and is within the Muswellbrook Local Government Area (LGA) (see **Figure 1**).

Drayton commenced production in 1983 and currently holds Project Approval (PA) 06_0202 (approved 1 February 2008) to provide predominantly steaming coal to export and domestic markets at a maximum of 8 Million tonnes per annum (Mtpa) of Run-of-Mine (ROM) coal to 2017. The supporting document to the Project Approval is the *Drayton Mine Extension Environmental Assessment* (Drayton EA) dated August 2007 (Hansen Bailey, 2007). An overland conveyor transports domestic coal to Macquarie Generation for electricity production, whilst the Antiene Rail Spur (approved under Development Consent 106-04-00) (Antiene Rail Spur DA) is utilised to transport export steaming coal to the Port of Newcastle via the Main Northern Railway Line.

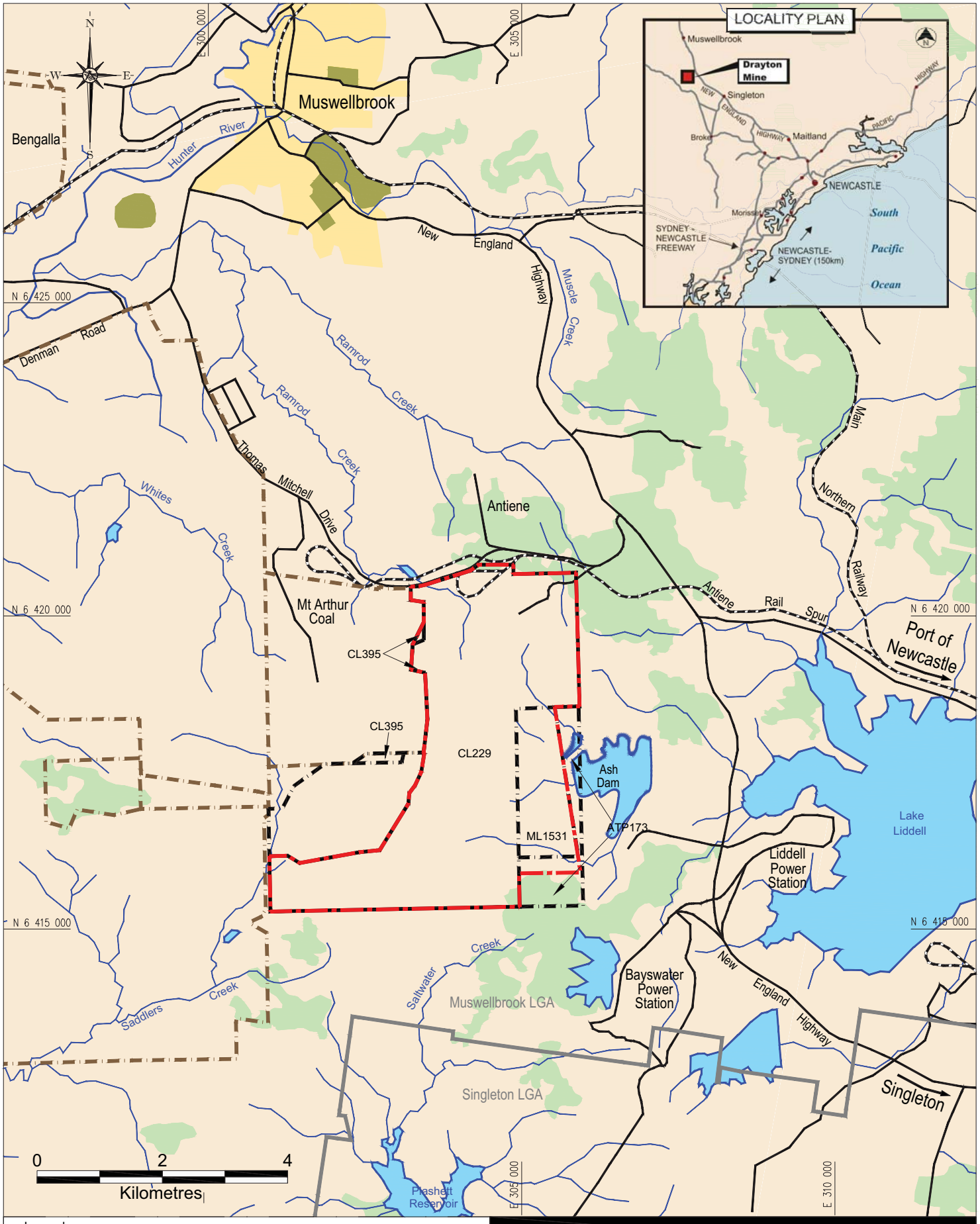
A modification to PA 06_0202 (MOD 1) was granted by the Minister for Planning on 16 October 2009 to allow an 8 hectare extension of the approved mining disturbance footprint to the north and the establishment of a new conservation area to provide an appropriate offset for this additional disturbance. The supporting document to the Project Approval is the *Drayton Mine Project Approval Modification Environmental Assessment* (Drayton Modification EA) dated July 2009 (Hansen Bailey, 2009).

1.2 PROPONENT

Anglo American is the management company for the Drayton Joint Venture Partnership which consists of:

- Anglo American Metallurgical Coal Pty Limited (88.2 %);
- Mitsui Coal Development (Australia) Pty Limited (3.8%);
- NCE Australia Pty Limited (3.0%);
- Hyundai Australia Pty Limited (2.5%); and
- Daesung Australia Limited (2.5%).

Anglo American is one of Australia's largest coal producers and has extensive coal mining interests and development prospects in both QLD and NSW.



Legend

- EA Boundary
- Drayton Mining Tenements
- Other Mining Tenements
- Roads
- Railways
- Creeks
- Local Government Boundary

Hansen Bailey

AngloAmerican

Co-ordinate System: MGA Zone 56

DRAYTON MINE MODIFICATION

Regional Location

Cad File: 06964A.dwg	Date: 23.11.2010	Drawn: CP	Figure 1

1.3 DOCUMENT PURPOSE

Drayton seeks approval from the Minister for Planning for a modification to PA 06_0202 under Section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to facilitate the development of an explosives storage facility and the disposal of raw tailings within the Drayton East Pit void, rather than co-disposed dry product as currently approved (the Modification).

This Environmental Assessment (EA) has been prepared to support the Application which will be lodged with the Department of Planning and Infrastructure (DOP&I) for determination by the Minister for Planning (or delegate). A description of the activities that the Modification Application seeks approval for is provided in **Section 3**.

The Modification as sought is otherwise consistent with Drayton EA and PA 06_0202 (as Modified). The schedule of land to which this EA applies is also consistent with the Drayton EA and PA 06_0202.

1.4 DOCUMENT STRUCTURE

This EA includes the following sections:

- **Section 2** provides detail on the existing approved operations at Drayton;
- **Section 3** includes a description of the various components of the Modification;
- **Section 4** discusses the regulatory framework relevant to the Modification;
- **Section 5** summarises the stakeholder engagement undertaken and any issues raised during that process;
- **Section 6** provides the findings of the risk assessment adopted to rank all identified environmental issues;
- **Section 7** outlines impacts identified in relation to the Modification and provides management and mitigation measures to be implemented by Drayton in response;
- **Section 8** lists management commitments to be implemented as a result of the Modification;
- **Section 9** provides a justification for the Modification as sought;
- **Section 10** provides a list of abbreviations referenced in this EA; and
- **Section 11** provides a list of documents referenced in this EA.

2 EXISTING OPERATIONS & ENVIRONMENT

This section of the EA provides a summary of the existing operations of Drayton as approved under PA 06_0202.

2.1 APPROVED MINING ACTIVITIES

Mining activities at Drayton are undertaken in accordance with PA 06_0202, the Drayton EA and the Drayton Modification EA which support PA 06_0202. Drayton has approval to mine up to 8 Mtpa of ROM coal until 2017. Drayton holds three mining tenements relevant to the mining operation, being Mining Lease (ML) 1531 and Coal Leases (CL) 229 and CL 395 as shown on **Figure 1**.

Drayton is an open cut mining operation where mining advances based on dragline strips. Pre-stripped overburden is removed by loader and/or excavator and trucks in advance of the dragline operation. Loaders and/or excavators are utilised for subsequent coaling from the Brougham, Grasstrees, Thiess, Puxtrees and Balmoral target seams of the Greta coal measures up to a depth of 110 m below the surface. Mining is conducted up to 24 hours per day, 7 days per week.

Drayton produced 4.13 Mt of ROM coal and directly employed approximately 328 personnel in 2009. Approximately 80% of all current Drayton employees reside within the Muswellbrook or immediately adjacent Shires.

2.2 INFRASTRUCTURE & COAL HANDLING

Drayton is serviced by surface facilities as shown on **Figure 2** which includes an administration office, bathhouse, workshop, warehouse facilities, Coal Handling Plant (CHP), stacker, stockpile reclaimers, rail facilities and an overland conveyor to Bayswater Power Station.

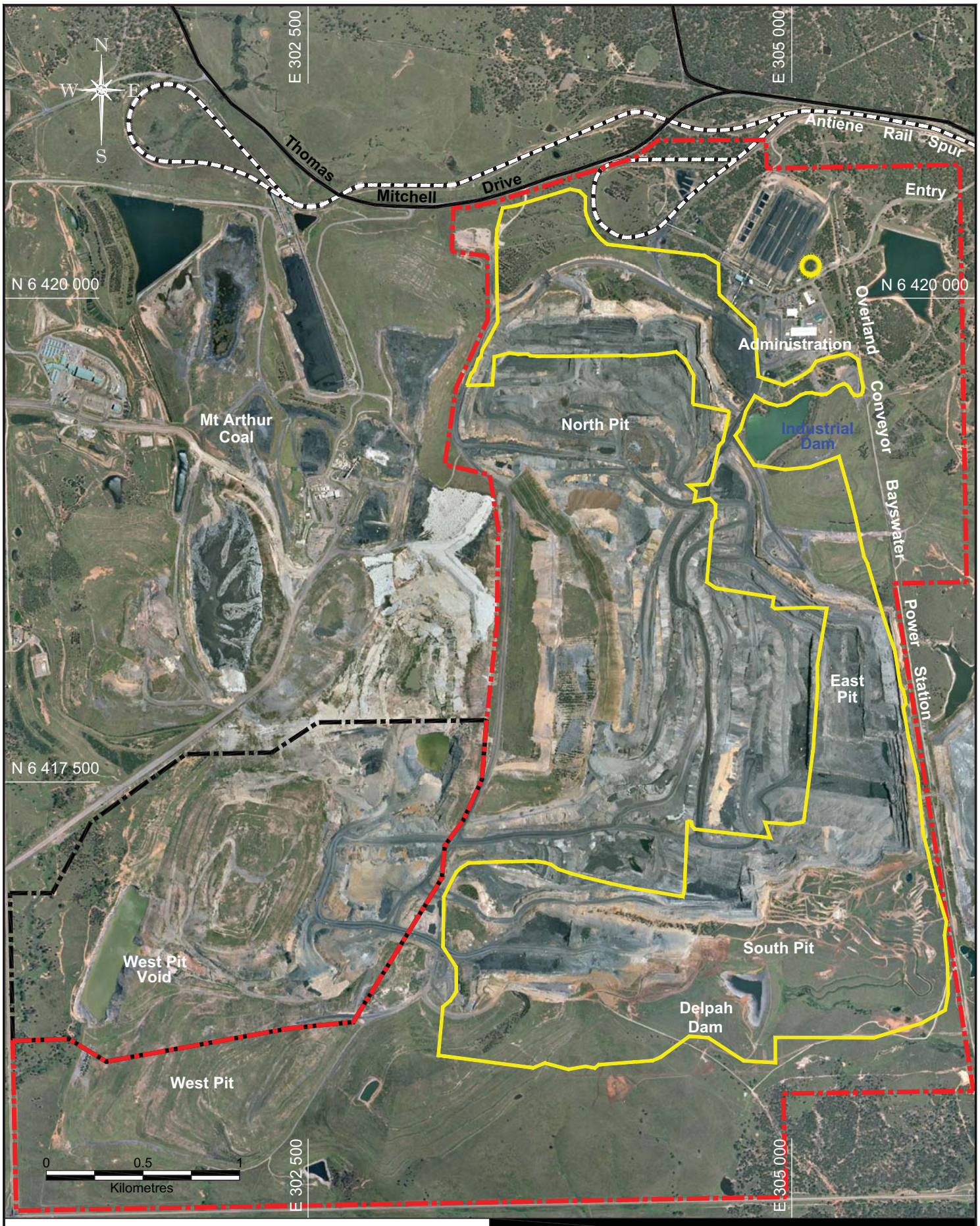
2.3 ENVIRONMENTAL MANAGEMENT SYSTEM

Drayton operates under a Safety, Health, Environment and Community Management System (SHECMS) accredited to *International Standards Organisation 14001* standards. The SHECMS is designed to enable Drayton to:

- Effectively manage its environmental issues;
- Ensure compliance with regulatory requirements;
- Continually improve its environmental performance; and
- Address the expectations of stakeholders.

Drayton's SHECMS is founded on the Anglo American Safety and Sustainable Development Policy, the Anglo American SHECMS, a series of regulatory required management plans and external and internal environmental standards and procedures.

Drayton also has a comprehensive Environmental Monitoring Program (EMP) in place as shown in **Figure 3**. This EMP ensures that regulatory expectations are met and allows for the identification and management of environmental risks. The EMP incorporates requirements of Drayton's Environmental Protection Licence (EPL) 1323 and SHECMS procedures.



Legend

- EA Boundary
- MAC Sub-lease
- Approved Mining Disturbance Footprint

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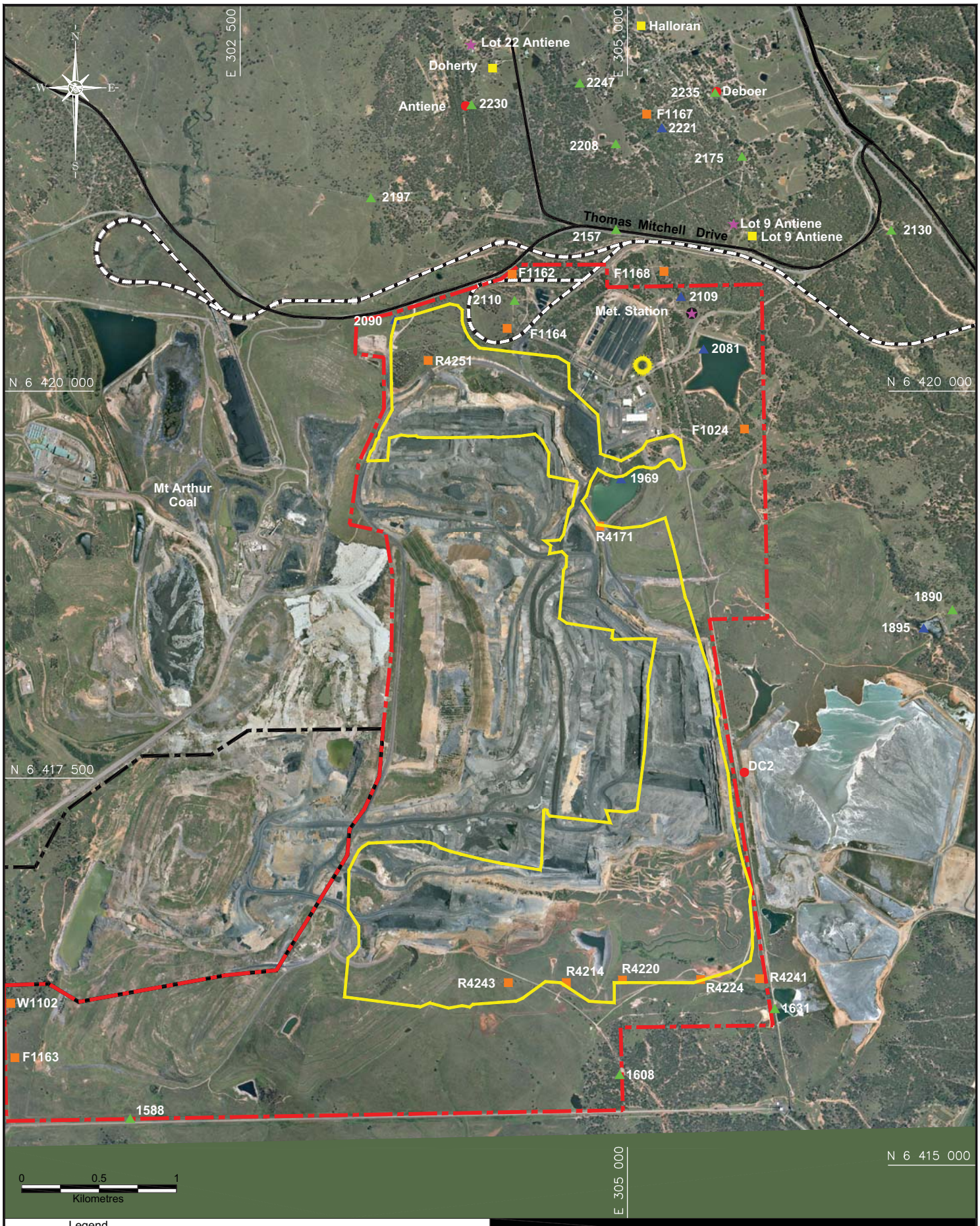
Co-ordinate system: MGA Zone 56
Aerial: May 2009

DRAYTON MINE MODIFICATION

Approved Mining Operations

Cad File: 06965A.dwg	Date: 23.11.2010	Drawn: CP	Figure 2



Legend

- EA Boundary
- MAC Sub-lease
- Approved Mining Disturbance Footprint
- Background Noise Monitor
- Blast Monitor
- Monthly Water Sampling Site
- Dust Deposition Gauge
- High Volume Air Sampling Site
- Meteorological Station
- Ground Water Monitor

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Co-ordinate system: MGA Zone 56
Aerial: May 2009

DRAYTON MINE MODIFICATION

Environmental Monitoring Network

Cad File: 06966A.dwg	Date: 23.11.2010	Drawn: CP	Figure 3

As a requirement of PA 06_0202, Drayton has revised its EMS and a number of management documents to ensure consistency with the Drayton EA and Drayton Modification EA, including:

- A Noise Monitoring Program, which has been approved by DOP&I;
- A Road Closure Management Plan for Thomas Mitchell Drive, which has been approved by DOP&I in consultation with Muswellbrook Shire Council;
- A Blast Monitoring Program, which has been approved by DOP&I in consultation with the Office of Environment and Heritage (OEH);
- A Spontaneous Combustion Management Plan, which has been approved by DOP&I in consultation with OEH and the Department of Trade, Investment, Regional Infrastructure & Services - Mineral Resources (DTIRIS-MR);
- An Air Quality Monitoring Program, which has been approved by DOP&I in consultation with OEH;
- A Site Water Management Plan, which has been approved by DOP&I in consultation with OEH and NOW;
- An Aboriginal Archaeology & Cultural Heritage Management Plan which has been approved by DOP&I in consultation with OEH;
- A Flora and Fauna Management Plan, which has been approved by DOP&I;
- A Greenhouse and Energy Efficiency, which has been approved by DOP&I;
- A Mine Closure Plan (as part of the overall Landscape Management Plan), which has been approved by DOP&I in consultation with the DTIRIS-MR;
- A Final Void Management Plan (as part of the overall Landscape Management Plan), which has been approved by DOP&I in consultation with the DTIRIS-MR; and
- A Consolidated Offset Strategy (presenting both offset areas for the Drayton Extension EA and the Drayton Modification EA) and Rehabilitation & Offset Management Plan which has been approved by DOP&I.

2.4 LAND OWNERSHIP

Table 1 lists property ownership surrounding the EA Boundary and indicates if a receiver (residence) is located on the property with a square. **Table 1** should be read in conjunction with **Figure 4** which illustrates land ownership and receivers adjacent to the EA Boundary.

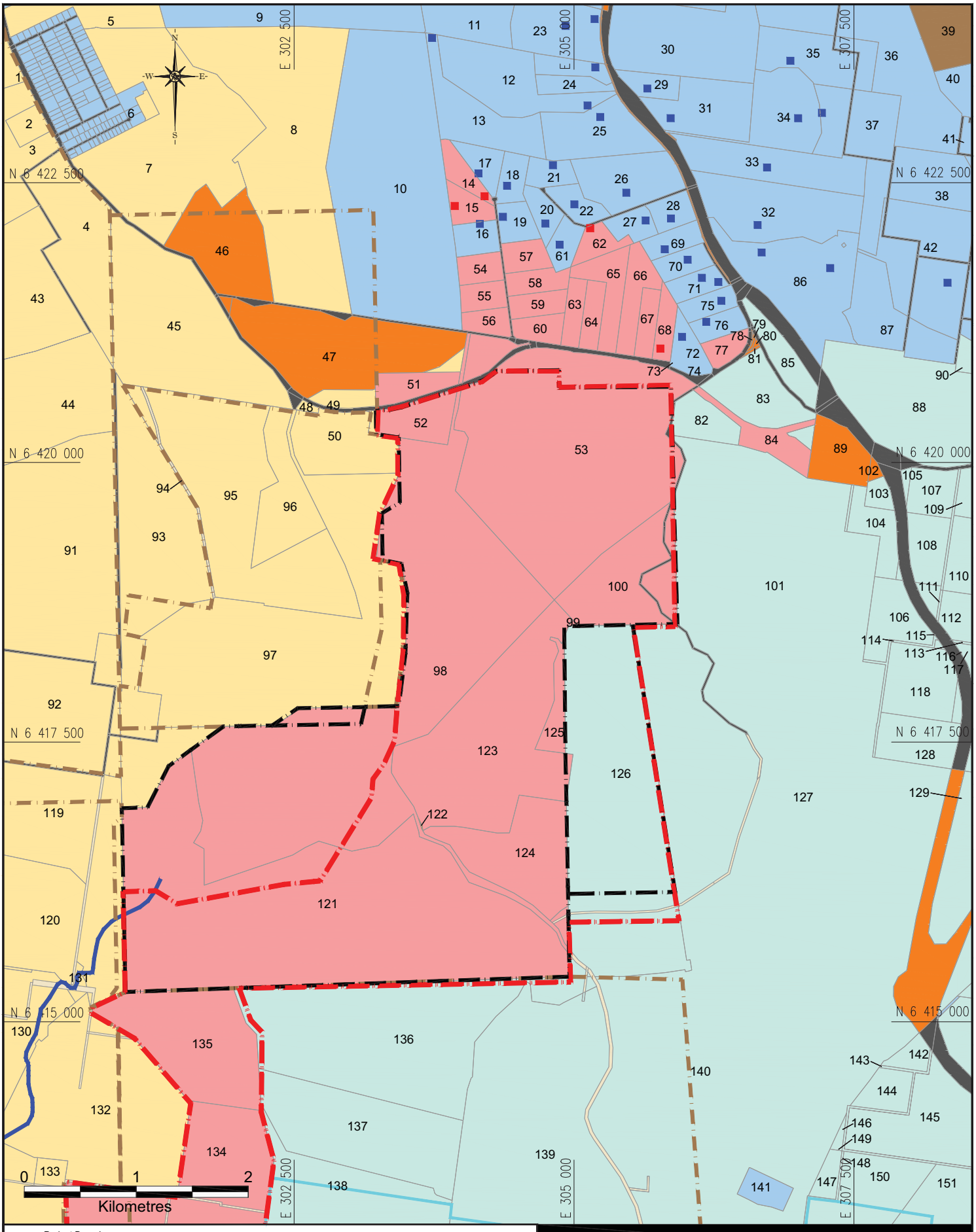
The majority of land within the EA Boundary is owned by Drayton (and its subsidiaries). A small area of land in the south-east of the EA Boundary, and the area within which the East Pit is located is owned by Macquarie Generation.

Table 1
Land Ownership

ID	Name	Receiver	ID	Name	Receiver	ID	Name	Receiver
1	Coal Operations Australia		54	Drayton Coal		106	Macquarie Generation	
2	Coal Operations Australia		55	Drayton Coal		107	Macquarie Generation	
3	Coal Operations Australia		56	Drayton Coal		108	Macquarie Generation	
4	Coal Operations Australia		57	Drayton Coal		109	Macquarie Generation	
5	Coal Operations Australia		58	Drayton Coal		110	Macquarie Generation	
6	Muswellbrook Shire Council		59	Drayton Coal		111	Macquarie Generation	
7	Coal Operations Australia		60	Drayton Coal		112	Macquarie Generation	
8	Coal Operations Australia		61	RC & LT Skinner	■	113	Macquarie Generation	
9	F & I Webber		62	Anglo Coal (Drayton Management) Pty Limited	■	114	Macquarie Generation	

ID	Name	Receiver	ID	Name	Receiver	ID	Name	Receiver
10	EM Casben		63	Drayton Coal		115	Macquarie Generation	
11	Yarramalong Stud Pty Ltd		64	Drayton Coal		116	Macquarie Generation	
12	K Newton		65	Drayton Coal		117	Macquarie Generation	
13	CS Jacobsen		66	Drayton Coal		118	Macquarie Generation	
14	Anglo Coal (Drayton Management) Pty Limited		67	Drayton Coal & Anglo Coal		119	Hunter Valley Energy Coal Ltd	
15	Drayton Coal		68	Drayton Coal		120	Hunter Valley Energy Coal Ltd	
16	MF & AV Doherty		69	P & K Clifton		121	Drayton Coal & Anglo Coal	
17	BC & SR Page		70	BD & B Jones		122	Drayton Coal	
18	SR Page		71	DW & LM Hunter		123	Drayton Coal & Anglo Coal	
19	CJ & LE Duck		72	BJ & NH Robertson		124	Drayton Coal	
20	RD & DA Osborn		73	Muswellbrook Shire Council		125	Drayton Coal	
21	WJ Reynolds		74	Muswellbrook Shire Council		126	Macquarie Generation	
22	RB & LJ Halloran		75	EJ & MC Sharman		127	Macquarie Generation	
23	SJ & J Jackson		76	PG Horder		128	Macquarie Generation	
24	J Newton		77	Drayton Coal		129	Macquarie Generation	
25	PJ & KJ Collins		78	Crown land		130	Hunter Valley Energy Coal Ltd	
26	RE & ID Baxter		79	Crown land		131	Hunter Valley Energy Coal Ltd	
27	GJ & PH De Boer		80	Crown land		132	Hunter Valley Energy Coal Ltd	
28	MJ Bird		81	Crown land		133	Hunter Valley Energy Coal Ltd	
29	MJ & EJ Wallman		82	Macquarie Generation		134	Anglo Coal Australia Pty Ltd	
30	JM & BB & PS Mitchelhill & HB Rivett & IB Vineburg		83	Macquarie Generation		135	Anglo Coal Australia Pty Ltd	
31	RJ & IA Summerville		84	Drayton Coal		136	Macquarie Generation	
32	K & KI Cross		85	Macquarie Generation		137	Macquarie Generation	
33	CL & JA Fisher & CI Dennis		86	Wild Group Pty Ltd		138	Macquarie Generation	
34	BT & JE Davis		87	P Wild		139	Macquarie Generation	
35	GM Wilson		88	Macquarie Generation		140	Macquarie Generation	
36	JM Mitchelhill & HB Rivett & IB Vineburg		89	Crown land		141	TransGrid	
37	BJ & TL King		90	Macquarie Generation		142	Macquarie Generation	
38	NP & CJ O'Brien		91	Coal Operations Australia		143	Macquarie Generation	
39	Xstrata Coal Pty Limited		92	Coal Operations Australia		144	Macquarie Generation	
40	PS & TG Adams		93	Hunter Valley Energy Coal Ltd		145	Macquarie Generation	
41	M & P Clifton		94	Bayswater Colliery Company		146	Macquarie Generation	
42	H Ray		95	Bayswater Colliery Company		147	Macquarie Generation	
43	Coal Operations Australia		96	Bayswater Colliery Company		148	Macquarie Generation	
44	Coal Operations Australia		97	Bayswater Colliery Company		149	Macquarie Generation	
45	Coal Operations Australia		98	Drayton Coal & Anglo Coal		150	Macquarie Generation	
46	Crown land		99	Drayton Coal		151	Macquarie Generation	
47	Crown land		100	Drayton Coal				
48	Hunter Valley Energy Coal Ltd.		101	Macquarie Generation				
49	Hunter Valley Energy Coal Ltd.		102	Crown land				
50	Coal Operations Australia		103	Macquarie Generation				
51	Drayton Coal		104	Macquarie Generation				
52	Drayton Coal		105	Macquarie Generation				
53	Drayton Coal & Anglo Coal							

** A coloured square denotes a receiver on the property. Each colour correlates to the shading used on **Figure 4**.*



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DRAYTON MINE MODIFICATION

Land Ownership

Cad File: 07545B.dwg	Date: 30.06.11	Drawn: CP	Figure 4

3 THE MODIFICATION

This section of the EA provides a description of all of the components of the Modification for which Drayton is seeking approval under Section 75W of the EP&A Act.

3.1 BACKGROUND

Drayton currently has approval for Macquarie Generation to place fly ash within the East Pit void. They also have approval to emplace wet tailings within designated tailings drying areas prior to the material being co-disposed in pit. However, due to a change in clean coal specifications and coal quality issues, Drayton needs to be able to more thoroughly wash the coal which will result in a larger volume of wet tailings waste by-product. There is a need to dispose of these wet tailings via pipeline into the East Pit void.

Explosives required for Drayton's operations are transported by a licensed contractor from Newcastle to the Mt Arthur Coal storage facility. A private haul road between Drayton and Mt Arthur Coal is then utilised to obtain the required explosives for daily mining operations at Drayton. However, the Mt Arthur Coal storage facility is approaching capacity and thus, has necessitated the requirement for Drayton to develop its own explosives storage facility.

As such, Drayton is now seeking approval for a Modification to the existing PA 06_0202 under section 75W of the EP&A Act to enable these Modifications.

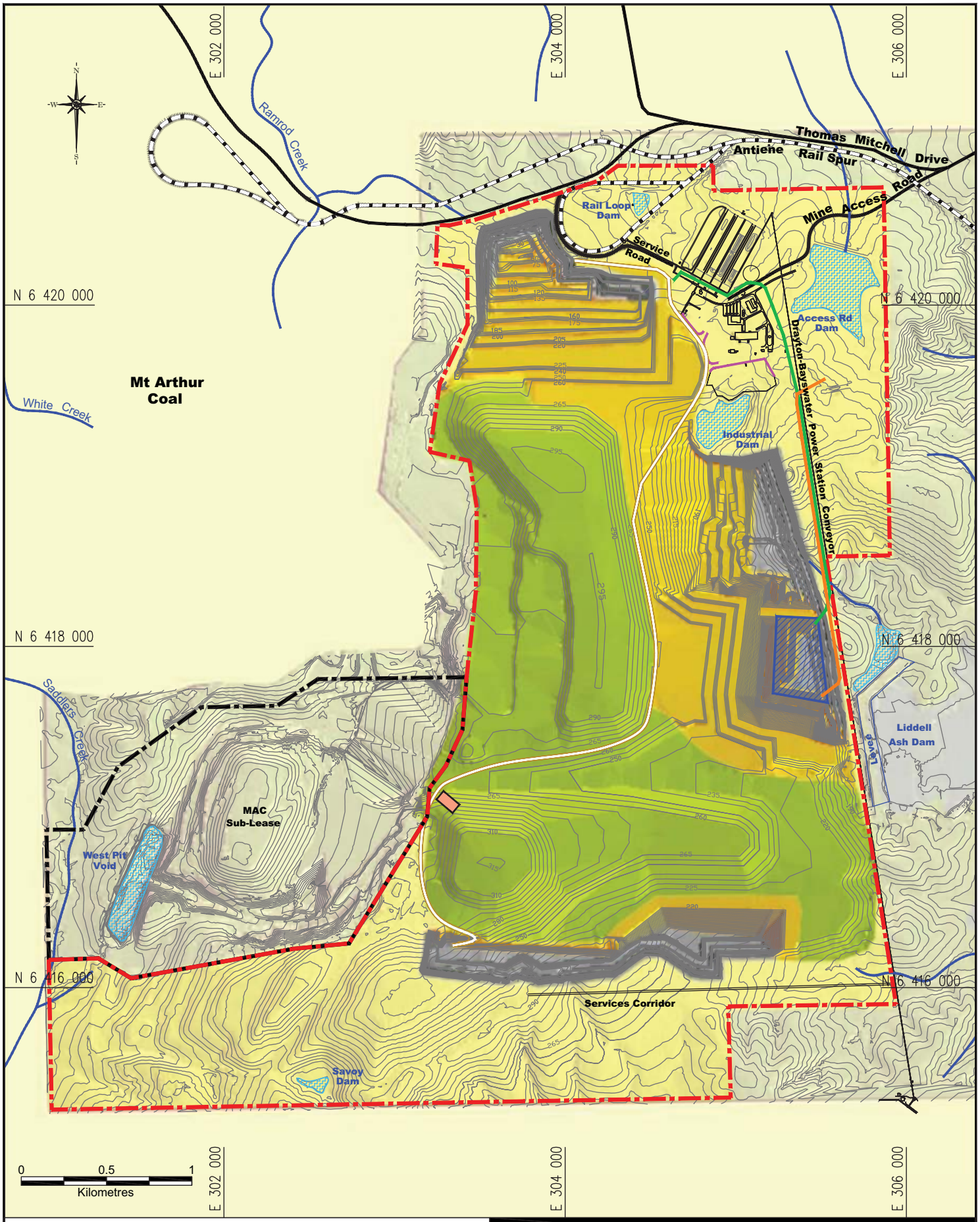
3.2 DESCRIPTION

3.2.1 East Pit Tailings Emplacement

The CTU upgrade will result in the production of a greater amount of wet tailings in contrast to the dry tailings which are currently co disposed in pit. The Modification is required to facilitate disposal of wet tailings via a pipeline into the East Pit void. The pipeline system includes the following components:

- Installation of a tailings slurry pump within the existing Coal Treatment Unit (CTU);
- Construction of a pipeline from the CTU to the Eastern Void;
- Installation of a mid-pipeline diesel or electric powered booster pumping station (if required); and
- Disposal of wet tailings to fill approximately 8 to 10% of the Eastern Void over the remaining mine life.

Approximately 3 million m^3 of dewatered tailings is proposed to be emplaced in the East Pit void to 2017. Tailings emplacement will be up to RL 104. Subsequently, 1,500 ML of water will be stored and increase the level to RL114 behind an in situ pillar to enable mining to the north. Following the tailings emplacement, Macquarie Generation would then complete filling the void to the currently approved design level with fly ash material or alternatively the void will be capped to DTIRIS-MR standards. No changes to Drayton's currently approved mining operations, extraction limits or transport arrangements are sought for the Modification.



Legend

- EA Boundary
- MAC Sub-lease
- Rail
- Roads
- Creeks
- Haul Roads
- ROM Stockpile Wall & Berm
- Tailings Emplacement Area
- Water bodies
- Active Pit
- Unshaped Overburden
- Proposed Rehabilitation
- Tailings Pipe
- Recovery Pipe
- Explosive Facility

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Co-ordinate system: MGA Zone 56
Source: Pegasus Technical (2007)

DRAYTON MINE MODIFICATION

Proposed Modification

Cad File: 06967E.dwg	Date: 19.05.2011	Drawn: CP	Figure 5

3.2.2 Explosives Storage Facility

The proposed explosives facility will be approximately 120 meters x 60 metres and will be located to the south of Drayton's open cut mining operations. The area will be fenced around its perimeter with a 2.1 metre high man-proof fence, including barbed wire extension with two security gates at either end.

The proposed location of the facility is shown on **Figure 5**. The location for the facility was chosen for a number of reasons including:

- Close proximity to services such as power and all-weather roads;
- The area satisfies regulatory requirements for distances from major infrastructure, neighbouring residences, public roads and the explosives magazine;
- The area is located on Drayton-owned land to the south of its mining operations and is zoned appropriately for the proposed works; and
- The location will enable the facility to cater for Drayton's needs in the future as mining progresses.

The facility will be constructed in stages to accommodate the following:

- Portable office building and workshop with amenities;
- Three Ammonium Nitrate storage bins (Class 5.1 Oxidising Agent) with a combined capacity of 165 t;
- Two Ammonium Nitrate Emulsion storage bins (Class 5.1 Oxidising Agent) with a combined capacity of 160 t;
- 68,000 litre self-bund diesel tank;
- 60,000 litre self-bund canola tank;
- 20,000 litre potable water tank with pressure pump;
- A waste water system including a septic tank and pump out holding tank;
- Storage containers for Gasser solution on bunded pallets;
- Storage containers for Companion solution on bunded pallets;
- Clean water and dirty water systems with sediment control, to direct all runoff into the mine's water management system; and
- General waste and recycling management facilities.

The main access roads, park-up areas and other trafficable areas within the facility will be covered with stabilised truck pavements and will be capable for all weather use.

Construction

Due to the remote location of the facility, construction is proposed to occur 24 hours per day. Construction will occur in two phases: civil works and mechanical works. The civil works for the Proposal are expected to take approximately six weeks. Works to be carried out within this phase includes the main earthworks such as construction of roads, park-up areas and drainage, formation of the facilities pad, all concreting works, and the connection of clean water and dirty water drainage systems. The civil works will involve a range of earthmoving and transport equipment including dozer, grader, vibrating pad foot roller, vibrating smooth drum roller, hydraulic tracked excavator, backhoe and Semi tippers.

The mechanical works and fit-out are expected to take approximately six weeks. These works will be carried out using 20 t & 50 t mobile hydraulic cranes along with a franna type crane, and will involve the assembly of all required components.

Operation

All bulk materials will be transported to the explosives storage facility in semi-trailers by a licensed contractor. These semi-trailers will have appropriate signage displayed in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (the ADG Code) and relevant NSW legislation. There will be no change to public road traffic volumes, as these vehicles currently transport explosives materials for Drayton to the Mt Arthur Coal storage facility.

The explosives storage facility will be operated and managed by a licensed explosives supply contractor.

The Ammonium Nitrate Emulsion and canola/diesel will be pumped directly from the delivery vehicles, while the Ammonium Nitrate will be dumped into a hopper and conveyed into the storage containers.

Vehicles called Mobile Manufacturing Units (MMU) will continue to be used to transport materials required for blasting. These MMU's have separate compartments for canola/diesel, Ammonium Nitrate Emulsion and Ammonium Nitrate which enables the separation of these ingredients until they are pumped into each blast hole and stemmed for a blast.

The canola/diesel will be pumped into its compartment in the MMU from a standard petrol bowser. The Ammonium Nitrate Emulsion and Ammonium Nitrate will be gravity fed into the MMU's from the storage containers. Each MMU will travel to the designated blast area, pumping each blast hole with required amounts of product in readiness for blasting.

3.3 ALTERNATIVES CONSIDERED

Alternatives were considered during the planning and development stages of the Modification. The principles of Ecologically Sustainable Development (ESD) have been applied throughout the preparation of the EA.

3.3.1 East Pit Tailings Emplacement Alternatives

In regard to the emplacement of tailings in the East Pit void, options investigated were limited to the following:

- Option 1 – dispose approximately 3 million m^3 of dewatered tailings into the East Pit void via pipeline (the Modification); or
- Option 2 – The continued drying of the wet tailings in the currently approved tailings drying areas prior to its excavation, cartage and placement in the east pit void, the 'Do Nothing' approach.

Option 1 (the Modification) is required as a result of a change in clean coal specifications and coal quality issues. The approved CTU upgrade will facilitate greater control of product ash content resulting in an increase in export capabilities and greater market opportunities. Option 2 would result in a loss of market opportunities due to an inability to attain the higher quality of product coal which will result from the upgrade.

When applying the principle of ESD, Option 1 is considered to be the appropriate option as it will facilitate the production of a cleaner coal with minimal social and environmental impacts.

3.3.2 Explosives Storage Facility Alternatives

In regard to the development of the proposed explosives storage facility, options investigated were limited to the following:

- Option 1 – develop an explosives storage facility at Drayton, away from major infrastructure and private residences and on land owned by Drayton (the Modification);
- Option 2 – expand the existing explosive storage facility at Mt Arthur Coal; or
- Option 3 – develop an explosives storage facility in an alternate off-site location.

Option 2 would require additional land dedication to facilitate an expansion of the existing storage facility at Mt Arthur Coal. Due to mining and development constraints in the immediate vicinity of the existing storage facility, this option was not considered feasible.

Option 3 would result in additional social and environmental impacts, due to increased transport requirements on public roads. Further, investigations identified that the acquisition of a suitable site which is remote from private land and infrastructure and in close proximity to Drayton Mine was not obviously available.

When applying the principle of ESD, Option 1 is considered to be the appropriate option as it will facilitate a continued supply of required explosive materials for Drayton Mine with minimal social and environmental impacts.

4 REGULATORY FRAMEWORK

This section of the EA describes the regulatory framework relevant to the modification of PA 06_0202 as sought and provides detail in relation to the legislative considerations relevant to the Modification.

4.1 ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979

This application seeks to modify PA 06_0202 (as modified) which was originally granted for the purpose of carrying out surface coal mining activities at Drayton under Part 3A of the EP&A Act.

4.1.1 EP&A Act Amendment (Part 3A Repeal) Bill 2011

The *EP&A Act Amendment (Part 3A Repeal) Bill 2011* was passed by the NSW parliament on 22 June 2011, to be commenced on a day yet to be proclaimed. When enacted, the Part 3A Repeal Bill will repeal the whole of Part 3A of the EP&A Act. Under this bill, Drayton Mine (as PA 06_0202 was approved under Part 3A of the EP&A Act) will be a "transitional Part 3A Project".

As a transitional Part 3A project, Drayton Mine will be regulated by the provisions of Schedule 6A which provides that Part 3A continues to apply to such projects irrespective of its repeal. Similarly, all SEPPs and declarations, orders, determinations etc relevant to the Project continue to apply after the repeal of Part 3A.

4.1.2 Section 75W Power to Modify

Section 75W of the EP&A Act provides for the modification of planning approvals issued under Part 3A of the Act as follows:

> *"(2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*
>
> *(3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*
>
> *(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification."*

4.1.3 Approval Process under Section 75W

Due to the above, the determination of the Modification must follow the process as specified under Section 75W of Part 3A of the EP&A Act where the application must be considered as a 'Project Application'. This requires that all procedural aspects of Part 3A in respect of a Project Application apply to the Modification application.

4.1.4 Consistency of the Modification with Objects of the EP&A Act

This EA has been prepared to ensure that the Modification is consistent with the objectives as specified in Section 5 of the EP&A Act.

Section 7 of this EA provides (at least): consideration of the management, development and conservation of resources to promote social and economic welfare of the community; the orderly and economic use of the land; and the protection of the environment. Stakeholder involvement for the Modification has been encouraged throughout the preparation of this EA, with a summary of key issues provided in **Section 5**.

The key principals of ESD have also been considered throughout the EA process and the Modification is consistent with these principles.

4.1.5 Approvals that do not Apply

Section 75U of the EP&A Act provides that certain authorisations normally required under various statutes are not required for "*an approved project*" and that the provisions of any Act that prohibit an activity without such an authority do not apply to "*an approved project*".

4.2 COAL MINE HEALTH AND SAFETY ACT 2002

The establishment of any tailings disposal requires an approval under Section 100 of the *Coal Mine Health and Safety Act 2002* (CMHS Act). Drayton will obtain this approval as required for the Modification.

4.3 OCCUPATIONAL HEALTH AND SAFETY REGULATION 2001

Chapter 6A of the *Occupational Health and Safety Regulation* (2001) (OHS Regulation) requires Drayton to notify NSW Work Cover of its intention to store quantities of dangerous goods greater than the threshold amounts provided in Schedule 5 of the OHS Regulation.

The licensed explosives supply contractor will apply and hold the dangerous goods licence for the proposed explosive storage facility. Drayton will continue to hold a licence relating to other dangerous goods on the mine.

4.4 RELEVANT PLANNING INSTRUMENTS

Under Section 75J(3) of the EP&A Act, the Minister for Planning "*may (but is not required to) take into account the provisions of the environmental planning instrument that would not (because of Section 75R) apply to the project, if approved*". Further, the Modification sought under this Application is not prohibited by reason of clause 8O of the EP&A Regulation.

The following sections provide a review of the environmental planning instruments that are relevant to the Modification.

4.4.1 Muswellbrook Local Environmental Plan 2009

The Muswellbrook *Local Environmental Plan 2009* (LEP) is an environmental planning instrument which, under section 75R, does not apply to or in respect of an approved project. Drayton Mine is an approved project for the purposes of section 75R.

The EA Boundary is partly located within Muswellbrook LEP zoning 'RU1 – Primary Production' and partly within 'SP2 – Infrastructure'. The proposed explosives facility is located on land zoned 'RU1 – Primary Production', whilst the East Pit void is located on land zoned 'SP2 – Infrastructure'. Mining is permissible with Development Consent in Zone RU1 – Primary Production and is prohibited in Zone SP2 – Infrastructure. However, as a result of Section 75J(3) of the EP&A Act, the Minister has the authority to grant the Project Approval as sought.

4.4.2 SEPP (Mining, Petroleum & Extractive Industries)

The objectives of *SEPP (Mining Petroleum & Extractive Industries)* (SEPP Mining) are:

(a) "…to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and

(b) to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and

(c) to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources".

As stated above, the land for which the Modification is sought is zoned RU1 – Primary Production under the Muswellbrook LEP. In accordance with clause 7 of SEPP (Mining), the carrying out of development for the purpose of mining as a use is permissible with development consent.

The Modification as sought will meet the objectives of SEPP Mining.

4.4.3 SEPP No 33 - Hazardous and Offensive Development

SEPP 33 requires the consent authority to consider whether an industrial project is a potentially hazardous industry or a potentially offensive industry. The main hazards associated with the development of the explosives storage facility were leaks or spills, fires, explosions and theft. The environmental assessments presented in **Section 7** of this document found that when appropriate controls are in place, all hazards identified were considered to be low risk.

5 STAKEHOLDER ENGAGEMENT

A relevant consultation program was undertaken with the aim of identifying stakeholder issues in relation to the Modification and ensuring that these issues were addressed as part of the Modification.

5.1 REGULATORY ENGAGEMENT

During the preparation of this EA, Drayton have consulted with DOP&I with the aim of identifying specific issues and developing appropriate mitigation strategies to manage impacts associated with various components of the Modification.

Drayton will continue to consult with regulators through its environmental management and reporting processes, in accordance with the requirements of PA 06_0202. This includes regular contact with regulators and the preparation of the Drayton Annual Environmental Management Report (AEMR) which provides detailed information on environmental performance.

5.2 INDUSTRY ENGAGEMENT

Extensive consultation has occurred with Macquarie Generation in regard to the emplacement of tailings in the East Pit void on Macquarie Generation owned land. This consultation resulted in legal Deed of Agreement being reached between both parties in regard to the Modification.

5.3 COMMUNITY ENGAGEMENT

Notification of the Modification will be provided to Drayton's near neighbours shown on **Figure 4** via the distribution of a brief letter outlining the Modification and providing relevant contact details to discuss the Modification further. Notification of the Modification will also be provided to Drayton's Community Consultative Committee (CCC).

Drayton also maintains a number of formal and informal methods for community consultation to provide ongoing updates on environmental and operational performance. Consultation with the local community is generally undertaken through:

- Quarterly meetings of Drayton's CCC;
- The Drayton AEMR document (discussed with the CCC and released publicly) and community newsletters;
- Presenting environmental data, reports and CCC meeting minutes on the Drayton website;
- A 24-hour hotline for all environmental enquiries; and
- Drayton's involvement in and support of a variety of community-based events.

Drayton will continue to engage with all relevant stakeholders on the Modification and the mining operations in general.

6 RISK ASSESSMENT

A preliminary Environmental Risk Assessment (ERA) was undertaken for the Modification by Hansen Bailey to identify potential environmental issues.

The key risks identified with the Modification were analysed in accordance with the Anglo American risk matrix, based on probability and potential consequences. Each potential environmental issue was ranked as either being high, medium, low or very low risk to the environment.

The environmental issues considered for the Modification and their respective environmental impact risk rankings are presented in **Table 2** and below in **Section 7**.

Table 2
Environmental Impact Risk Rankings

High Risk	Medium Risk	Low Risk	Very Low Risk
None	Noise	Air Quality	Traffic & Transport
	Groundwater	Spontaneous Combustion	Visual
	Surface Water	Waste	Socio-Economics
	Dangerous and hazardous materials	Rehabilitation & Final Landform	Aboriginal Archaeology
			Aboriginal Cultural Heritage
			Non-Aboriginal Heritage
			Ecology

7 IMPACTS, MANAGEMENT & MITIGATION

This section provides detail on the potential environmental impacts identified in relation to the Modification and measures for their management and mitigation. The issues considered for the Modification and provided in this section include those assessed for the Drayton EA.

7.1 AIR QUALITY

An air quality impact review was undertaken for the Modification by PAE Holmes and is included in **Appendix A**.

The review considered the Modification and its potential impacts on air quality in the vicinity of Drayton. Due to the wet nature of the tailings, and the proposed disposal via pipeline, no deleterious impacts on air quality are anticipated.

Drayton will continue to manage air quality and greenhouse gas emissions in accordance with the SHECMS, approved Air Quality Monitoring Program and Greenhouse and Energy Efficiency Plan. In particular, Drayton will ensure that appropriate dust control measures are implemented during the construction of the explosives storage facility, such as maintaining trafficked areas in a damp condition and using equipment in a manner to minimise dust generation.

Drayton will continue to monitor and manage spontaneous combustion in accordance with the approved Spontaneous Combustion Management Plan detailed further in **Section 2.3**.

7.2 NOISE

A noise impact review was undertaken for the Modification by Bridges Acoustics and is included in **Appendix B**. This review considered potential noise sources and worst case sound power levels associated with the emplacement of tailings in the East Pit void, which included:

- A tailings pump within the CTU – a centrifugal unit with a direct coupled electric motor producing a sound power level of 90 dBA; and
- A pipeline booster pump – a diesel driven centrifugal unit producing a sound power level of 104 dBA, or an electric unit producing up to a sound power level of 90 dBA, if required.

A conservative criterion of 25 LAeq,15min, which is 10 dBA lower than the existing intrusive noise criteria, has been adopted for the proposed tailings disposal system to ensure the system is not audible at any noise sensitive receivers and does not affect existing noise levels from Drayton.

A sound power level of 90 dBA within the CTU would produce an expected noise level of less than 10 dBA. A sound power level of up to 104 dBA for a diesel powered booster pump, assuming the pump is located halfway along the pipeline at a minimum distance of 1,800 m from the closest Antiene residence, would produce a sound power level of 31 dBA assuming the pump is located on elevated ground and is acoustically visible from the closest residence. Location of the pump in a shielded location that would not be visible from any residence (ignoring trees or vegetation), would result in a received noise level less than 25 LAeq,15min.

An electric booster pump on the pipeline, if installed, would be approximately 14 dBA quieter than a diesel pump and would therefore produce acceptable noise levels at all receivers.

The noise impacts associated with the emplacement of tailings in the East Pit void as detailed above and in **Appendix B**, indicate that with appropriate location of any required booster pump, no increases in noise levels at any noise sensitive receiver will occur.

The review also determined that the noise generated during the construction and operation of the explosives storage facility would be significantly less than active open cut mining operations at Drayton. No specific mitigation or control measures have been recommended. All contractors will continue to minimise unnecessary noise and travel to and from the site during the construction phase of the explosives storage facility.

7.3 GROUNDWATER

A groundwater impact study was completed by Australian Groundwater & Environmental Consultants Pty Ltd (AGE) to determine the impacts of the proposed Modification on the groundwater regime and is included in **Appendix C**. This study included a review of the Drayton EA groundwater study.

As part of the Drayton EA, AGE modelled two scenarios for the East Pit:

- Scenario 1 which described the recovery of the water table under the assumption that all pits would remain as open voids and would develop final void lakes; and
- Scenario 2 which assessed the long term impact of ash disposal from a Macquarie Generation owned Power Station to the East Void.

Scenario 2 is of relevance to the Modification and as such a comparison of the impacts of this Scenario and the Modification was conducted. It is assessed that leachate generated from tailings disposal in the East Pit void will have the same flow path and travel time as that predicted for the fly ash leachate. Thus, the key difference between the disposal of wet tailings and (the approved) fly ash slurry will be associated with the quality of the leachate.

An analysis of leachate from the tailings was carried out and is outlined in **Appendix C**. The analysis indicates that the tailings leachate has a slightly alkaline pH of between 7.62 and 7.68 compared to a pH of between 10 and 12 for the fly ash. Analysis indicated the tailings leachate has a salinity of around 4,600mg/L compared to a salinity of 5,500mg/L for the fly ash slurry.

Weathered fly ash has a lower pH and lower salinity than the tailings leachate however, as the fly ash is fresh when disposed in the void it can be concluded that the leachate from the wet tailings is of better quality than that of the approved emplacement of fly ash leachate.

The Modification will not result in any additional impacts to the groundwater systems surrounding Drayton greater than those currently approved under PA 06_0202.

The existing groundwater monitoring network in place at Drayton as displayed in **Figure 3** would not be impacted by the Modification. Groundwater monitoring will continue to be undertaken at Drayton in a manner consistent with the management commitments of the SHECMS and as required by the Drayton Water Management Plan.

Consistent with the Drayton EA and the Statement of Commitments, all necessary water access licences and incidental groundwater make approvals were granted by the Department of Water & Energy (now NSW Office of Water) in 2008. No further groundwater make is anticipated as a result of the Modification, and as such the current water access approvals will not be required to be modified.

7.4 REHABILITATION AND FINAL LANDFORM

Rehabilitation of the East Pit and explosives storage facility will be carried out in accordance with the currently approved final landform and Drayton EA commitments. As outlined in the SHECMS, the pit once filled with fly ash from Macquarie Generation will be capped with inert materials and rehabilitated. If not filled with fly ash the tailings in the void will be capped and rehabilitated.

7.5 SURFACE WATER

A surface water study has been carried out by Water Solutions Pty Ltd to determine the impacts of the Modification on the water management system.

7.5.1 Background

The study was undertaken on the Year 10 mine development stage. The adopted water demands, CHP production rates, catchment definitions and associated land classifications are representative of the expected mine configuration at Year 10.

The study made a comparison between the existing CHP / tailings disposal configuration and the proposed CHP / tailings disposal configuration. An OPSIM model has been developed to simulate the operations of all major components of the water management system at Drayton, including:

- Climatic variability – rainfall and evaporation;
- Catchment runoff and collection;
- Pit dewatering;
- Pump and gravity transfers;
- Water storage filling, spilling, evaporation and leakage; and
- Industrial water extraction, usage and return.

Greater detail of the model design and its assumptions is provided in **Appendix D**.

7.5.2 Model Development

CHP / tailings configuration

The existing CHP / tailings configuration at Year 10 indicates that approximately 476 kL/day (174 ML/a) will be required as the overall process handling plant makeup. The proposed CHP / tailings configuration in the same year would require an overall process handling plant makeup of 2,924 kL/day (1,068 ML/a). The current model has assumed a fine tailings decant return rate of 40%.

A comparison between the existing and proposed CHP / tailings configurations indicates a significant increase in water demands for the process plant makeup (~2,450 kL/day) for the proposed configuration as a result of water being retained within the tailings.

Groundwater Inflows

Groundwater inflow rates into active pits and the East Pit void have been adopted from the approved Drayton EA and are presented in **Table 3**. To account for the void being in-filled with tailings material (approximately 10% in-fill), a nominal reduction in groundwater inflows into the East Pit void of 10% has been applied.

Table 3
Drayton Mine Groundwater Inflows (Year 10)

Location	Groundwater Inflows (kL/day)	
	Existing CHP / Tailings Configuration	Proposed CHP / Tailings Configuration
North Pit Void	1,070	1,070
East Pit Void	1,270	1,143
South Pit Void	350	350
TOTAL	**2,690**	**2,563**

7.5.3 Impact Assessment

The OPSIM model was used to assess the potential impact of the Modification.

The Modification will result in an increase in water usage for coal processing at Drayton. For a nominal 10% AEP, at least 850 ML/a of additional water will be required to meet the operational needs for the Modification. This water will be sourced from the Drayton West Pit void (capacity of 1,000 ML), adjacent mines or power stations. In the unlikely event that sufficient water is not available, coal beneficiation will be modified or curtailed.

7.5.4 Mitigation and Management

All water with the potential to be contaminated at the proposed explosives facility will be collected and treated prior to discharge from site. All other water runoff from the explosives storage facility area with the potential to be contaminated will be diverted to the mine's existing water management system.

During construction of the proposed explosives facility, appropriate sediment controls will be installed including sediment fencing and hay bales in drains. All areas disturbed areas outside of the fenced area and off access roads will be revegetated as soon as practical.

The existing surface water monitoring network in place at Drayton, as displayed in **Figure 3**, would not be impacted by the Modification. Surface water monitoring will continue to be undertaken at Drayton in a manner consistent with the management commitments of the SHECMS and as required by the Drayton Water Management Plan.

7.6 SPONTANEOUS COMBUSTION

The deposition of tailings in the East Pit will be carried out in a manner consistent with current approvals and methods. Drayton has implemented a range of measures for the management of spontaneous combustion on site in accordance with the SHECMS and a Spontaneous Combustion Management Plan (Anglo Coal, 2009) developed in consultation with MSC, DTIRIS-MR and OEH. These techniques for the management of spontaneous combustion will continue to be used for the Modification.

7.7 VISUAL

The Drayton EA included the identification of the visual impacts associated with the mine plans approved under PA 06_0202 and the assessment of the cumulative impacts of the operation and surrounding visual setting (Integral, 2006). This assessment was reviewed against the mining operations proposed for the Modification to determine the potential for impacts to surrounding visual receivers in addition to those currently approved at Drayton.

The proposed explosives storage facility is located to the south of active mining operations and will not be visible to privately owned near neighbours or residences.

The Modification represents utilisation of an existing void and construction of a pipeline within the approved mining disturbance area. The Modification to tailing emplacement will be undertaken in a manner consistent with the approved mining operations. The currently approved final land form will not be altered. The Modification will not result in an increase in the height of the landform approved under PA 06_0202. No visual impacts are anticipated as a result of the Modification.

All visual and lighting impacts created by Drayton will continue to be managed in accordance with the SHECMS.

7.8 ECOLOGY

As stated in **Section 3**, no additional surface disturbance is required as a result of the Modification. Ecological offsets at Drayton are established in accordance with those described in the Drayton EA and Drayton Modification EA and approved under PA 06_0202. The Modification will not result in any impact on ecology in the locality.

7.9 ABORIGINAL ARCHAEOLOGY & CULTURAL HERITAGE

The Aboriginal archaeological impact assessment for the Drayton EA (Hamm, 2006) identified a number of sites within and surrounding the EA Boundary. This report was reviewed as part of this EA to determine the extent of any Aboriginal sites located in close proximity to the East Pit. The review established that no known Aboriginal sites are located in close proximity to the East Pit.

As no disturbance will result from the Modification, no impact is anticipated with regard to Aboriginal Archaeology or cultural heritage. The Drayton Aboriginal Cultural Heritage Management Plan (2008) will continue to be implemented as approved.

7.10 NON-ABORIGINAL HERITAGE

An assessment was undertaken for the Drayton EA to identify any non-Aboriginal heritage items remaining within the EA Boundary and to determine the potential for impacts to these sites due to that Project (Veritas Archaeology & History Service, 2005).

A review of this assessment found that none of the non-Aboriginal heritage sites previously identified at Drayton are located in the vicinity of the Modification. As no surface disturbance is proposed, no additional management or mitigation measures will be required.

7.11 TRAFFIC & TRANSPORT

As stated in **Section 3**, site operations for the Modification shall be undertaken generally in accordance with those described in the Drayton EA and Drayton Modification EA and approved under PA 06_0202, with no increase in road or rail traffic movements sought. The Modification will reduce travel distances for the explosives supply vehicles, as the material will be supplied directly to Drayton Mine, rather than via Mt Arthur Coal. Therefore, no impacts to the transport networks surrounding the EA Boundary will result from the Modification.

7.12 SOCIO-ECONOMICS

The Modification will not result in any increase in coal extraction, life of mine, or the level of employees in addition to those approved under PA 06_0202. It will however facilitate an improved product coal quality ensuring the competitiveness of Drayton Mine into the future promoting social and economic welfare within the community and the orderly and economic use of the land.

7.13 WASTE & HAZARDOUS MATERIALS

Drayton has a comprehensive Waste, Overburden and Hazardous Materials Management System in place which addresses all issues relevant to the management of waste and hazardous materials from its operations. Tailings are currently approved to be pumped via pipeline from the CHP into the Tailings Drying Area (TDA). Once dry, tailings are then relocated to the pit for co-disposal with overburden.

Tailings disposal in the East Pit void will result in approximately 3 million m^3 of tailings being placed in the void, equating to approximately 8-10% of the available void space. As the Modification will alter the method of disposal of tailings, the Waste, Overburden and Hazardous Materials Management System will be updated to reflect the altered procedure. In addition, the Mining Operations Plan (MOP) will be updated in order to reflect the alterations to the method of tailings disposal.

8 STATEMENT OF COMMITMENTS

Management commitments to be implemented for the Modification in addition to those already appended to PA06_0202 are listed in **Table 4**.

Table 4
Statement of Commitments

Ref	Description	EA Section
1.	The Waste, Overburden and Hazardous Materials Management System will be updated to reflect the revised tailings management strategy for emplacement into the East Pit void and the explosives storage facility.	**7.13**
2.	Drayton's Mining Operations Plan (MOP) will be updated in order to reflect the alterations to the method of tailings disposal.	**7.13**

9 JUSTIFICATION

The Modification sought primarily relates to the emplacement of waste tailings in the East Pit void. This is required due to a recent upgrade to the Coal Treatment Unit which now creates a higher quality coal product hence resulting in a greater quantity of tailings being produced.

The Modification also seeks approval for the construction and operation of an explosives storage facility at Drayton Mine. The facility will ensure that Drayton has an ongoing supply of materials required for blasting, as the currently utilised Mt Arthur Coal facility nears capacity.

Extensive consultation was carried out with Macquarie Generation regarding the change of use of the East Pit void on Macquarie Generation owned land. This consultation resulted in legal Deed of Agreement being reached between both parties in regard to the Modification.

Significant planning has been undertaken to locate and design the explosives storage facility so as to minimise impacts on the neighbouring community and the surrounding natural environment. The proposed facility is located more than 4 km from any public place. It has been designed in accordance with NSW legislation and Australian Standards in relation to the storage of dangerous goods and explosive material with due consideration given to any potential environmental impacts.

The review of the environmental impact assessments and principles of Ecologically Sustainable Development completed for this Environmental Assessment have confirmed that the impacts from the activities described for the Modification are minor in nature and are consistent with those already approved by the Drayton Mine Project Approval 06_0202.

10 ABBREVIATIONS

Abbreviation	Description
Anglo American	Anglo American Metallurgical Coal Pty Limited
CL	Coal Lease
DOP&I	NSW Department of Planning and Infrastructure
Drayton EA	Drayton Mine Extension Environmental Assessment (Hansen Bailey, 2007)
DTIRIS-MR	Department of Trade, Investment, Regional Infrastructure & Services– Mineral Resources
MOD 1	Drayton Mine Project Approval Modification Environmental Assessment
EA	Environmental Assessment
EEC	Endangered Ecological Community
EPI	Environmental Planning Instrument
EPL	Environmental Protection Licence
EP&A Act	*Environmental Planning and Assessment Act 1979*
ha	hectare
LA_{eq}	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period
LEP	Local Environment Plan
ML	Mining Lease
MSC	Muswellbrook Shire Council
Mtpa	Million tonnes per annum
PA	Project Approval
Receiver	Property adjacent the EA Boundary containing a residence
SEPP	State Environmental Planning Policy
SHECMS	Safety, Health, Environment and Community Management System
OEH	Office of Environment and Heritage

11 REFERENCES

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- Australasian Groundwater & Environmental Consultants Pty Ltd (2006) *Report on Drayton Mine Extension; Groundwater Impact Assessment*, prepared for Hansen Bailey Pty Ltd.
- Bridges Acoustics (2009) *Drayton Mine Section 75W Modification to Development Consent Environmental Noise Review*.
- Cumberland Ecology (2009) *Ecological Assessment of 75W Modification for Drayton Mine*.
- GSSE (2006) *Drayton Mine Extension EA Soil Survey and Land Resource Assessment Report*.
- Hamm, G. (2006) *Aboriginal Archaeology & Cultural Heritage Assessment Report of Drayton Mine Extension; A report to Anglo Coal (Drayton Management) Pty Ltd*.
- Hansen Bailey (2008) *Drayton Mine Extension Environmental Assessment*, Volumes 1-2.
- Integral Landscape Architecture & Visual Planning (2006) *Drayton Mine Extension EA for Anglo Coal (Drayton Management) Pty Ltd, Visual Impact Assessment Study*.
- Kovac, M. and Lawrie, J.M. (1991) *Soils Landscapes of the Singleton 1:250,000 Sheet*, Soil Conservation Service, NSW.
- Veritas Archaeology & History Service (2005) *Drayton Extension Non-Aboriginal Heritage Assessment*.

APPENDIX A

Air Quality Assessment

9 December 2010

Melissa Walker
Hansen Bailey Pty Ltd
Via email: mwalker@

Re: Drayton Tailings Modification – impacts on air quality (Job No. 1043)

Dear Mel

It is understood that Drayton is preparing a minor Modification to their existing consent to allow for disposal of tailings within their East Pit Void which is currently designated for fly ash emplacement. This letter provides an assessment of the potential for air quality impacts due to the proposed Modification.

The specific details of the Modification are as follows:

- The Modification to Drayton's existing Project Approval 06_0202 will be sought under Section 75W of the *Environmental Planning and Assessment Act 1979*.
- Drayton currently has approval to emplace dry tailings within designated Tailings Drying Areas, prior to the material being co-disposed in pit.
- Due to a change in clean coal specifications and coal quality issues, Drayton is now required to more thoroughly wash the coal, resulting in a wet tailings waste by-product. There is a need to dispose of these tailings via pipeline in the Eastern void.
- It is proposed to emplace approximately 3 Million m^3 of tailings via pipeline within the Eastern Void, in addition to fly ash emplacement. This volume of tailings emplacement equates to approximately 8-10% of the available void space within the Eastern void.
- The Eastern void has previously been identified for the disposal of fly ash by Macquarie Generation.
- Once tailings emplacement from Drayton is completed, the Eastern void may be utilised for fly ash emplacement from Macquarie Generation as approved.
- There will be no change in the final landform as a result of the Modification.
- As the Modification proposes to replace a volume of fly ash emplacement with tailings emplacement, it is envisaged that the EA will only need to be qualitative in nature.
- It is envisaged that there will be no material environmental impact associated with this Modification (as tailings characteristics are more inert than fly ash).

Due to the wet nature of the tailings, and the proposed disposal via pipeline, there will be no additional impact on air quality as a result of the Modification.

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BRISBANE

GOLD COAST

TOOWOOMBA

A PEL COMPANY

Please do not hesitate to contact me should you require any further information.

Kind regards

Judith Cox
Senior Air Quality Engineer

APPENDIX B

Noise Assessment

BRIDGES ACOUSTICS
ABN: 73 254 053 305

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10 December 2010
Ref: J0130-35-L3

Hansen Bailey Pty Ltd
P.O. Box 473
SINGLETON NSW 2330

Attn: Ms Melissa Walker

Dear Mel,

RE: DRAYTON TAILINGS DISPOSAL - NOISE ISSUES

This report describes an acoustic assessment of the proposed wet tailings disposal system to be installed at the existing Drayton Open Cut Coal Mine (Drayton Mine) operated by Anglo Coal (Drayton Management) Pty Ltd (ACDM) in the Hunter Valley of NSW. The proposal includes the following components:

- Installation of a tailings slurry pump within the existing Coal Treatment Unit (CTU);
- Construction of a pipeline from the CTU to the Eastern Void;
- Installation of a mid-pipeline diesel or electric powered booster pumping station if required, and
- Disposal of wet tailings to fill approximately 8 to 10% of the Eastern Void over the remaining mine life.

The report has been commissioned by Hansen Bailey on behalf of ACDM to form part of an Environmental Assessment for the Modification.

NOISE CRITERIA

Intrusive noise criteria applied to existing Drayton Mine noise emissions, at closest Antiene residential receivers, range from 35 to 37 LAeq,15min. A conservative criterion 10 dBA lower, or 25 LAeq,15min, has been adopted for the proposed tailings disposal system to ensure the system is not audible at any noise sensitive receiver and does not increase existing noise levels from Drayton Mine.

PROPOSED NOISE SOURCES

The following noise sources and worst case sound power levels have been assumed:

- Tailings pump within the CTU – a centrifugal unit with direct a coupled electric motor producing a sound power level of 90 dBA; and
- Pipeline booster pump – a diesel driven centrifugal unit producing a sound power level of 104 dBA, or an electric unit producing a sound power level of 90 dBA, if required.

CALCULATED NOISE LEVELS

A sound power level of 90 dBA within the CTU, ignoring any shielding or other effects, would produce a sound level of 18 dBA at the closest residence located approximately 1500m from the CTU. Given the tailings

pump would be located within the CTU and would be at least partly shielded behind other CTU equipment and coal stockpiles, a noise level less than 10 dBA would be expected.

A sound power level of up to 104 dBA for a diesel powered booster pump, assuming the pump is located approximately half way along the pipeline at a minimum distance of 1800m from the closest Antiene residence, would produce a sound level of 31 dBA assuming the pump is located on elevated ground and is acoustically visible from the closest residence. Locating the pump in a shielded location that would not be visible from any residence (ignoring trees or other vegetation), would result in a received noise level less than 25 LAeq,15min.

An electric booster pump on the pipeline, if installed, would be approximately 14 dBA quieter than a diesel pump and would therefore produce acceptable noise levels at all receiver locations.

Apart from the pump(s), the pipeline itself is not expected to produce audible noise.

CONCLUSION

This assessment indicates the proposed tailings disposal system including a tailings pump within the CTU and, if required, an electric booster pump approximately half way along the pipeline, would produce acceptable noise levels at any noise sensitive receiver property.

Any diesel powered booster pump that may be required should be installed in a location that would not be visible from any Antiene residence to ensure noise levels from the pump would remain inaudible.

Please contact the undersigned for further information or discussion.

Yours faithfully,

BRIDGES ACOUSTICS

MARK BRIDGES BE (Mech) (Hons) MAAS
Principal Consultant

APPENDIX C

Groundwater Assessment

Australasian Groundwater & Environmental Consultants Pty Ltd
ABN 64 080 238 642
36 Jeays Street, Bowen Hills, Qld. 4006 Australia
Phone (617) 3257 2055 Fax (617) 3257 2088
email: brisbane@ageconsultants.com.au
web: www.ageconsultants.com.au

EHB/ae
Project No. G1535
29 November 2010

Hansen Bailey Pty Ltd
PO Box 473
SINGLETON N.S.W. 2330

Attention: Ms Melissa Walker

Dear Melissa,

DRAYTON MINE – TAILINGS DISPOSAL MODIFICATION EA
GROUNDWATER IMPACT

1.0 Introduction

Anglo Coal (Drayton Management) Pty Ltd (ACDM) currently has approval to dispose of fly ash from the Macquarie Generation Power Stations within the Eastern Void (open cut pit), at their Drayton Coal Mine in the Upper Hunter Valley of New South Wales. They also have approval to emplace dry tailings within designated Tailings Drying Areas prior to the material being co-disposed in pit. However due to a change in clean coal specifications and coal quality issues, ACDM is now required to more thoroughly wash the coal which results in a wet tailings waste by product, and there is a need to dispose of the wet tailings via pipeline into the Eastern Void. As such ACDM is now seeking approval for a Modification to the existing Project Approval 06-0202, under Section 75W of the *Environmental Planning and Assessment Act 1979*.

It is proposed that about 3 million cubic metres of wet tailings will be disposed in the Eastern Void as opposed to fly ash emplacement, equating to 8-10% of the available void space. Once the tailings emplacement is complete the void may subsequently be used for fly ash emplacement.

This brief report has been prepared by Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) at the request of Hansen Bailey Pty Ltd on behalf of their client ACDM, to address the potential impact of the modification request on the groundwater regime, that is, the impact of disposal of wet tailings in 8-10% of the void volume rather than fly ash.

2.0 Previous Groundwater Study

AGE (2006)[1] undertook a detailed groundwater impact study as part of an Environmental Assessment under which Project Approval 06-0202 for the current mining operations was granted. The hydrogeological study involved development of three-dimensional, transient, groundwater flow model of the study area, and predictive simulations of the impact of the Project on the groundwater regime. With respect to the Eastern Void, two scenarios were modelled, viz:

[1] Australasian Groundwater and Environmental Consultants Pty Ltd, (Oct. 2006), *"Report on Drayton Mine Extension – Groundwater Impact Assessment",* Project No. G1341.

- Scenario 1 which described the recovery of the water table under the assumption that all pits would remain as open voids and would develop final void lakes, and
- Scenario 2 which assessed the long term impact of ash disposal from a Macquarie Generation Power Station to the Eastern Void.

Scenario 2 is of significance to the current modification request to dispose of 5Mt of wet tailings in the Eastern Void, and therefore *Section 12.5.3, Scenario 2 – Ash Disposal and Final Voids* from the AGE (2006)[1] report is repeated below.

Section 12.5.3 – Ash Disposal and Final Voids

Scenario 2 analyses the impact of the disposal of ash from a Macquarie Generation Power Station in the Eastern final void of the Extension Project. Essentially the ash, produced as a by-product during the combustion of coal by the Power Stations, consists of fly ash, which is collected from the air during combustion. However, a minor proportion consists of bottom ash which is collected at the bottom of the combustion chamber. The ash is mixed with water forming a slurry that is proposed to be pumped to the Eastern Void for disposal via pipeline.

Woodward Clyde (1997)[2] compared the hydraulic properties of fly ash to a silty sediment with a hydraulic conductivity of 1 x 10^{-7}m/s to 1 x 10^{-9}m/s and a total porosity of 23% to 27%.

An investigation carried out for fly ash disposal from Bayswater Power Station in the Ravensworth Mine void, south-east of Lake Liddell in 1993[3] rated the chemical properties of the ash as being similar to the mineral material of the coal seams, and the neighbouring hardrock.

The Ravensworth Mine study indicated that the short-term quality of ash leachate is characterised by a pH of 10 to 12, salinity of around 5500mg/L, concentration of specific minor elements in the milligram per litre range, and others in the sub milligram per litre range. Leachate tests on weathered ash resulted in a pH of 6 to 7, a salinity of 2000mg/L and a concentration of fluoride in the milligram per litre range. Concentrations of minor elements were in the sub milligram per litre range.

It is therefore concluded from a hydrochemical point of view, that the above data indicates that ash disposal may cause additional input of salt and of specific minor elements into the groundwater system. Furthermore the hydrochemical equilibrium in the surroundings of the ash disposal may be disturbed by the high alkalinity of the leachate. These conclusions are based on the assumption that the geological settings at Ravensworth Mine and the ash quality of Bayswater Power Station are similar to Drayton.

A numerical groundwater flow simulation was conducted to analyse the long-term movement of leachate from the ash disposal into the surrounding groundwater system, independently of its actual hydrochemistry. It is assumed that the Eastern Void will be completely filled with ash and that the top of the fill will be sealed to avoid any additional seepage of rainwater and leaching of the disposed ash. Any transport of leachate products will take place by groundwater flow through the ash filled voids. To simulate a worst-case scenario it is assumed that the Northern and Southern final voids are filled with inert material of low hydraulic conductivity. For this scenario the Northern and Southern Voids cannot act as sinks for groundwater flow and leachate from the Eastern Void.

---

[2] Woodward Clyde (May 1997), *"Investigation of Environmental Impact of Ash Disposal Facilities Stanwell Power Station."*

[3] Pacific Power (August 1993), *"Bayswater Power Station Fly Ash Disposal n Ravensworth No.2 Mine Void and Mine Rehabilitation."*

Based on a long-term, steady state, post mining groundwater table, pathlines were simulated that track the movement of groundwater from the ash filled void to the nearest groundwater sink, as shown in Appendix A - Drawing No. 12, (Figure 1). *To estimate the travel time of the leachate it is assumed that the transport-effective porosity of the aquifer system is equal to the storativity assigned to the groundwater flow model. A porosity of 5% was assumed for the ash, which is higher than for typical silt sediment, since the ash has been disposed as a fully saturated slurry.*

The simulation results indicate that discharge of leachate from the Eastern Void flows partially towards Liddell Ash Dam and discharges into small unnamed creeks running towards the dam. However, as the Liddell Ash Dam itself infiltrates water into the ground it cannot act as a groundwater sink. In fact the groundwater mound that has developed beneath Liddell Ash Dam diverts the leachate outflow towards Lake Liddell. It is estimated the ash leachate from the dam will take around 50 to 100 years to reach Lake Liddell. The simulated travel times assume that the cone of depression caused by the mining operation has already totally recovered.

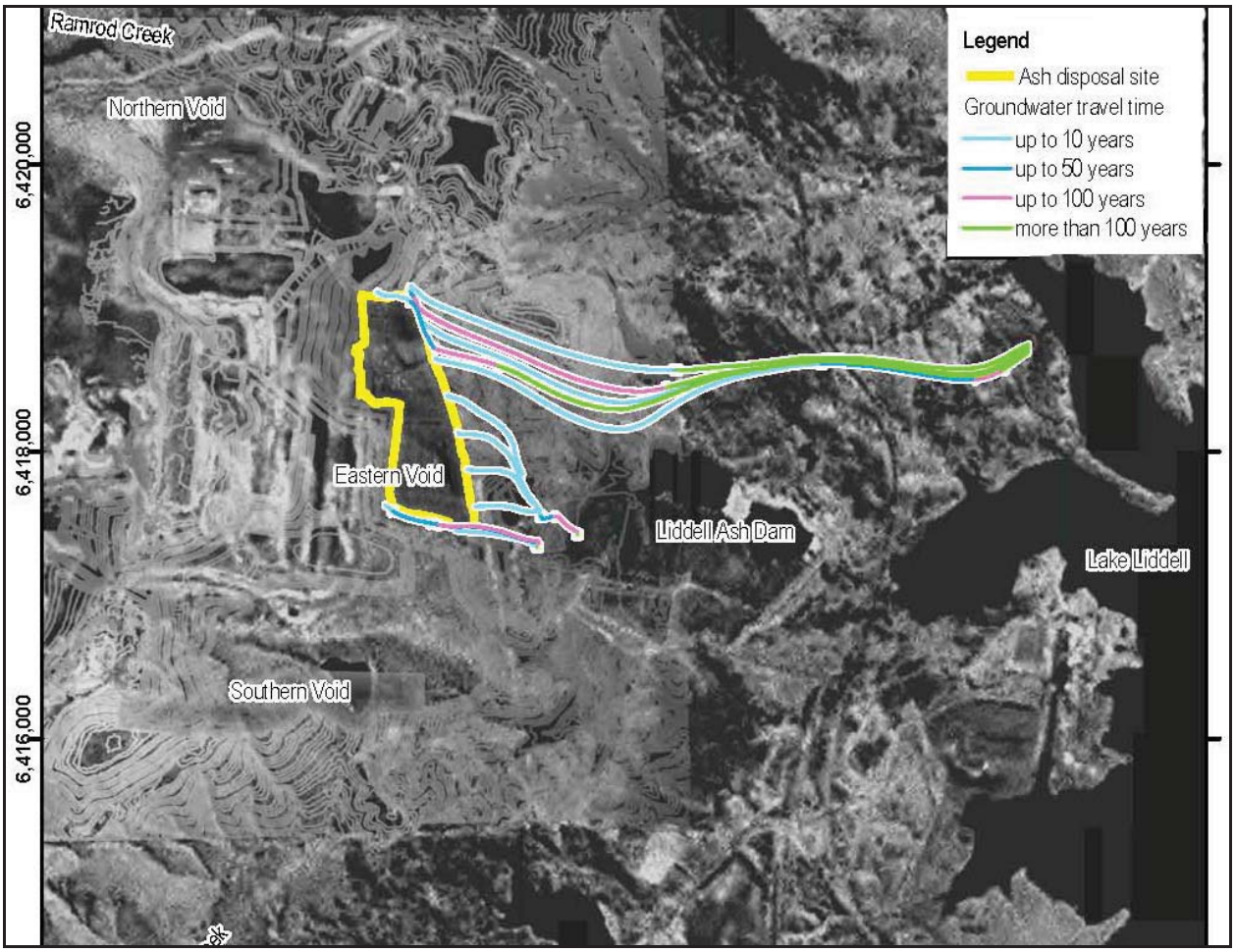

Figure 1: Ash Disposal in Eastern Void – Leachate/Groundwater Travel Times

3.0 Impact of Proposed Wet Tailings Disposal

It is proposed that the wet tailings be disposed in the Eastern Void as discussed. Based on the above discussion of the predicted fly ash leachate travel directions and time, on which Project Approval for the current operations was granted, it is assessed that leachate generated from tailings disposal in the same void will have the same flow path and travel time.

The prime difference in impact between the disposal of wet tailings and a fly ash slurry will therefore be associated with the quality of the leachate. Leachate from the tailings was analysed by ALS Laboratory Group on 11 November 2010 as summarized in Table 1 below.

Table: LEACHATE TAILINGS ANALYSIS

Compound	LOR	Unit	Tailings Thickener	Tailings Pipe	Tailings – End of Pipe
pH Value	0.01	pH	7.62	7.64	7.68
Electrical Conductivity @ 25º	1	µS/cm	4630	5220	3700
Total Dissolved Solids @ 180ºC	1	mg/L	4500	4680	4400
Arsenic	0.001	mg/L	0.089	0.074	0.032
Barium	0.001	mg/L	5.17	5.20	0.088
Beryllium	0.001	mg/L	0.020	0.017	0.110
Cadmium	0.0001	mg/L	0.0053	0.0044	0.0283
Cobalt	0.001	mg/L	0.560	0.455	3.20
Chromium	0.001	mg/L	0.533	0.444	0.578
Copper	0.001	mg/L	1.22	1.00	1.89
Manganese	0.001	mg/L	6.22	5.26	26.5
Nickel	0.001	mg/L	1.31	1.08	7.90
Lead	0.001	mg/L	0.362	0.312	<0.010
Selenium	0.01	mg/L	0.11	0.10	<0.10
Vanadium	0.01	mg/L	0.86	0.69	0.91
Zinc	0.005	mg/L	1.96	1.56	10.5
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001

The analyses indicate a pH of between 7.62 and 7.68 which is slightly alkaline compared to a highly alkaline pH of fresh fly ash of 10-12 and a slightly acid to neutral pH of weathered fly ash of 6-7.

The salinity or Total Dissolved Salts (TDS) of the tailings leachate varies between 4400 – 4680mg/L which is less than the salinity of the fresh fly ash leachate of around 5500mg/L but higher than leachate generated from weathered fly ash of 2000mg/L. With the exception of Copper (1.0 – 1.89mg/L), Nickel (1.08 -7.90mg/L), Zinc (1.56 -10.5mg/L) and Manganese (5.26 – 26.5mg/L), metals in the tailings leachate are in the sub milligram per litre range similar to the fly ash leachate.

4.0 Summary and Conclusions

ACDM proposed to fill 8-10% of the Eastern Pit void space with a wet tailings rather than whole of the void with a fly ash slurry, for which approval has been granted. Predictive modelling undertaken by AGE (2006)[1] indicates that leachate from the fly ash will travel to the east with eventual discharge after 50 -100 years, to Lake Liddell. It is assessed that leachate generated by the wet tailings will have a similar flow path and travel time.

Analysis of the leachate generated by the wet tailings indicates that it has a slightly alkaline pH compared to a pH of 10-12 for the fly ash slurry, and a salinity of around 4600mg/L compared to a salinity of 5500mg/L for the fly ash slurry. Weathered fly ash has a lower pH and lower salinity but as the fly ash is fresh when disposed in the void, it can be concluded that the leachate from wet tailings is of overall better quality than the fly ash leachate.

Therefore it is concluded that disposal of tailings in the Eastern Void will not create an impact that is worse than that of the currently approved fly ash disposal in the void.

Yours faithfully,

ERROL H. BRIESE
Principal Hydrogeologist / Managing Director
Australasian Groundwater and Environmental Consultants Pty Ltd

APPENDIX D

Surface Water Assessment

Water Solutions Pty Ltd
ACN 070 875 553

Report to

HANSEN BAILEY PTY LTD

on

DRAYTON MINE – TAILINGS DISPOSAL MODIFICATION EA

WATER MANAGEMENT IMPACT ASSESSMENT

Prepared for:

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Job No WS0745.1004.001
Doc No WS100622
Revision 2, 2 February 2011

Innovation in Engineering

HANSEN BAILEY PTY LTD
DRAYTON MINE – TAILINGS DISPOSAL MODIFICATION EA
WATER MANAGEMENT IMPACT ASSESSMENT

EXECUTIVE SUMMARY

Hansen Bailey Pty Ltd (HB) has engaged Water Solutions Pty Ltd (WSPL) to provide assistance for water management activities, including assessment of the proposed tailings disposal modification works at Drayton Mine.

Drayton Mine's currently approved tailings disposal method comprises drying tailings within designated Tailings Drying Areas, prior to the material being disposed in-pit. It is understood that due to changes in clean coal specification and coal quality issues, Drayton are now proposing to change its coal washing method, resulting in a wetter tailings product being produced. It is proposed that in order to address the required changes to the coal handling process, the wet tailings will be deposited directly into the Eastern Void.

This assessment focussed on the impact of the tailings modification works for the Year 10 development stage, which represents the maximum proposed production rate and associated water demand at Drayton Mine. The adopted water demands, Coal Handling Preparation (CHP) production rate, catchment definitions and associated land classification are representative of the expected mine configuration at the Year 10 development stage. Refer to Section 3 for details of the adopted model parameters.

It should be noted that, based on advice from Hansen Bailey, the current investigations into the Drayton Mine water management system has been undertaken in isolation to the Drayton South mining operations. That is, only the Drayton mining area has been considered for this assessment.

Key items addressed by current investigations have included:

- Surface water assessment of Drayton operations for the Year 10 scenario.
- Assessment includes operational performance of the Drayton Mine site for both the existing and proposed tailings disposal methods.

Current investigations have utilised the Drayton 2009 Operational Simulation OPSIM model as a baseline for the Year 10 water impact assessment. Investigation outcomes have concluded that the proposed tailings disposal modification works have the following impacts on the Drayton Mine water management system:

- A significant reduction in the risk of pit inundation in North and South Pits *(900ML volume in-pit at least 10% of the time for the proposed case, compared with 14,500ML volume in-pit for the existing case).* This is primarily due to the increased losses in the tailings decant circuit and reduced groundwater inflow to East Void for the proposed case (refer to Section 5.2).
- Little impact on site spill frequencies, with the exception of a reduced risk of discharge at the Rail Loop Dam (refer Section 5.3).

- An increase in additional water requirements at Drayton Mine to meet site demand operational reliability.
  - For a nominal 10% AEP (i.e. 10% risk of exceedance, or 90% operational reliability) at least 850ML/yr of additional water is required for the proposed case.
  - This compares with a zero makeup requirement for the existing case.

This is primarily associated with the increased losses in the tailings decant circuit for the proposed configuration (refer Section 5.4).

HANSEN BAILEY PTY LTD
DRAYTON MINE – TAILINGS DISPOSAL MODIFICATION EA
WATER MANAGEMENT IMPACT ASSESSMENT

INDEX

HANSEN BAILEY PTY LTD
DRAYTON MINE – TAILINGS DISPOSAL MODIFICATION EA
WATER MANAGEMENT IMPACT ASSESSMENT

1 INTRODUCTION

Hansen Bailey Pty Ltd (HB) has engaged Water Solutions Pty Ltd (WSPL) to provide assistance for water management activities, including assessment of the proposed tailings disposal modification works at Drayton Mine.

Drayton Mine's currently approved tailings disposal method comprises drying tailings within designated Tailings Drying Areas, prior to the material being disposed in-pit. It is understood that due to changes in clean coal specification and coal quality issues, Drayton are now proposing to change its coal washing method, resulting in a wetter tailings product being produced. It is proposed that in order to address the required changes to the coal handling process, the wet tailings will be deposited directly into the Eastern Void.

This assessment focussed on the impact of the tailings modification works for the Year 10 development stage, which represents the maximum proposed approved production rate and associated water demand at Drayton Mine. The adopted water demands, Coal Handling Preparation (CHP) production rate, catchment definitions and associated land classification are representative of the expected mine configuration at the Year 10 development stage. Refer to Section 3 for details of the adopted model parameters.

Key items addressed by this investigation have included:

- Surface water assessment of Drayton operations for the Year 10 scenario.
- Assessment includes operational performance of the Drayton Mine site for both the existing and proposed tailings disposal methods.

Current investigations have utilised the Drayton 2009 OPSIM model as a baseline for the Year 10 water impact assessment. Background information for the previous model is presented in the WSPL Document WS100128 (Ref 3).

Key personnel involved with the investigations to-date are:

- *Hansen Bailey Pty Ltd*
  - Mr. James Bailey, Director
  - Ms. Melissa Walker, Senior Environmental Scientist
- *Water Solutions Pty Ltd*
  - Dr. John Macintosh, Director/Principal Water Engineer
  - Mr. Matthew Briody, Senior Water Engineer

2 PROJECT OVERVIEW

It is understood that, due to changes in clean coal specification and coal quality issues, Drayton are proposing to modify the current tailings disposal method. Currently, tailings are dried within designated Tailings Drying Areas, prior to being disposed in-pit. Drayton are now proposing to change to an alternative coal washing method which results in a wetter tailings product. It is proposed to dispose the wetter tailings product directly into the Eastern Void.

Based on information provided by Hansen Bailey, the current assessment has focussed on the impact of the tailings modification works for the Year 10 development stage, which represents the maximum proposed production rate and associated water demand at Drayton Mine. The water demands, CHP production rate, catchment definitions and associated land classification as described in Section 3 are representative of the expected mine configuration at the Year 10 development stage.

This investigation assessed two scenarios, namely:

- Existing CHP/tailings disposal configuration; and
- Proposed CHP/tailings disposal configuration.

Further details on each of the modelling scenarios are presented in Section 3.

It should be noted that, based on advice from Hansen Bailey, the current investigations into the impact of modified tailings disposal methods on the Drayton Mine water management system has been undertaken in isolation to the future proposed Drayton South mining operations. That is, only the Drayton mining area has been considered for this assessment.

3 PROJECT DATA

3.1 Rainfall

Long-term daily rainfall and evaporation has been obtained for the Drayton Mine site from the Queensland Department of Environment and Resource Management (DERM) using their Data Drill service (Ref 2). The Data Drill accesses grids of synthesised rainfall data interpolated from point observations by the Bureau of Meteorology (BOM).

Statistical analysis of the long-term Data Drill records for Drayton Mine is listed in Table 3.1, alongside the Jerrys Plains (Station No. 061086) Bureau of Meteorology station data – which lies approximately 20km to the south of Drayton.

Table 3.1 – Average Rainfall Depth (mm) Statistics (1889 - 2009)

Station	No. Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Data Drill	121	70	65	54	43	37	46	39	35	37	48	52	63	587
Jerrys Plains	126	77	73	59	44	40	48	43	36	42	52	60	68	642

Review of Table 3.1 shows reasonable comparison between the Jerrys Plains and Data Drill monthly rainfall records. As presented in Figure 3.1, the Data Drill and Jerrys Plains cumulative rainfall match closely until a large storm event in April 2009. The observed increase in minesite storage inventory corresponded with the size of the storm recorded in the Jerrys Plains data set. The Jerrys Plains rainfall data for 2008 to 2009 was previously used as part of OPSIM verification.

This investigation has adopted the Data Drill rainfall for long term operational simulation as it is consistent with the Jerrys Plain rainfall dataset (with the exception of the April 2009 event) and is assumed to be representative of expected rainfall patterns. In addition, the Data Drill rainfall contains an extended rainfall dataset (120 years).

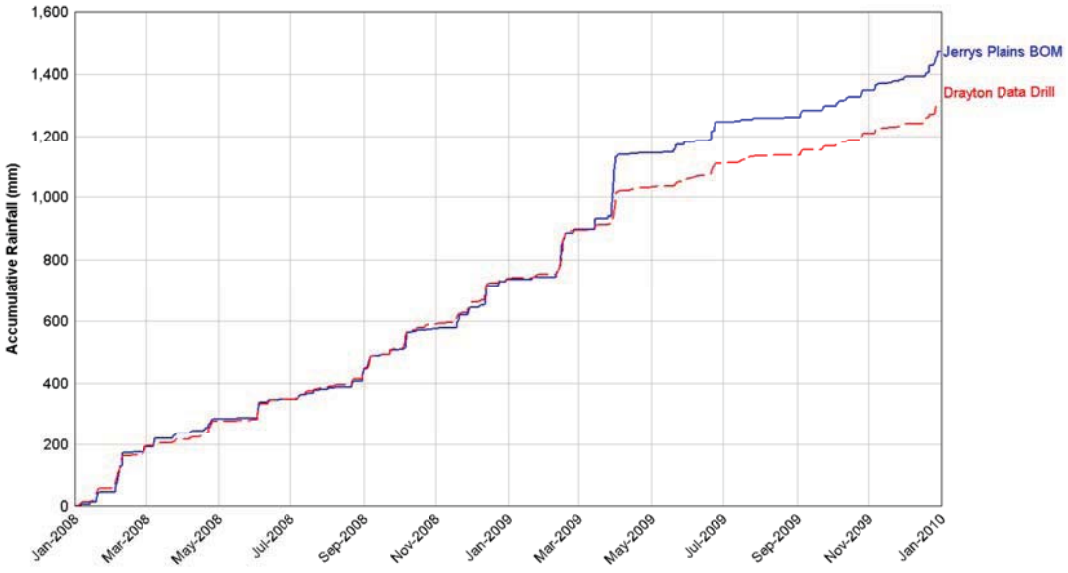


Figure 3.1 – Cumulative Rainfall 2008-2009 – Jerrys Plains BOM vs. Drayton Data Drill

3.2 Evaporation

Average pan evapotranspiration rates and pan factors for the location of Drayton are listed in Table 3.2. These values are based on long-term information obtained from the DERM Data Drill system.

Table 3.2 – Average Site Pan Evapotranspiration Rates & Lake Pan Factors (mm)

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Monthly	211	167	148	106	71	53	62	87	117	156	182	215	1,576
Lake Pan Factor	0.90	0.92	0.93	0.87	0.83	0.77	0.78	0.84	0.88	0.92	0.92	0.89	0.89

It is worth noting that the average annual potential evaporation is significantly higher (i.e. around 2.7 times) than the long-term average annual rainfall.

Estimates of open water evaporation and soil moisture evapotranspiration have been defined through application of the factors presented in Table 3.3.

Table 3.3 – Adopted Evaporation Factors

Factor	Adopted Value	Comment
Open Water Evaporation Factor	1.0	Factor to convert evaporation data to lake evaporation. In this case, evaporation data is lake evaporation.
Mining Pit Evaporation Factor	0.7	Factor used to reduce evaporation in mining pits due to wind effects etc. WSPL expectation based on similar operations.
Rain Day Evaporation Factor	1.0	Factor which is only applied to the evaporation rate on a day on which rainfall occurs. Assumed that rain is not over a full day and adopted as 1.
AWBM Evapotranspiration Factor	0.99	Factor to convert open water (lake) evaporation to areal evapotranspiration. Based on Morton's evaporation rates from long term Data Drill.

4 OPSIM MODEL SETUP

4.1 Drayton Model Overview

Current investigations have utilised the Drayton 2009 OPSIM model as a baseline for the current Year 10 water management impact assessment. Background details for the Drayton 2009 OPSIM model including model setup are contained in the WSPL Doc. WS100128 (Rev 4).

The model has been designed to simulate the operations of all major components of the water management system at Drayton, including:

- Climatic variability – rainfall and evaporation;
- Catchment runoff and collection;
- Pit dewatering;
- Pump and gravity transfers;
- Water storage filling, spilling, evaporation and leakage; and
- Industrial water extraction, usage and return.

A locality plan of the current site water management system at Drayton is presented in Figure 4.1.

The baseline model (Drayton 2009 OPSIM model) has been reconfigured based on advice from Hansen Bailey and the following Year 10 scenarios have been assessed:

- Existing CHP/Tailings Configuration

  The existing CHP/tailings scenario is defined by the following:

  - Updated catchment areas and land classifications according to the Year 10 pit progression;
  - Updated pit storage characteristics;
  - Prorated CHP water demands based on the Drayton 2008 OPSIM model, for a 4.8 million tonnes per annum (Mtpa) CHP throughput;
  - Site water demands based on the approved Drayton EA Surface Water Impact Assessment (Ref 1); and
  - Tailings emplacement remains as drying and co-disposal in-pit.

- Proposed CHP/Tailings Configuration

  The proposed CHP/tailings scenario is defined by the following:

  - Updated catchment areas and land classifications according to the Year 10 pit progression;
  - Updated pit storage characteristics;
  - CHP water demands based on the plant water balance information provided by Hansen Bailey, for a 4.8 million tonnes per annum (Mtpa) throughput;
  - Site water demands based on the approved Drayton EA Surface Water Impact Assessment (Ref 1); and
  - Tailings emplacement is diverted to the East Void with nominal tailings return rate of 40%. Tailings decant return is directed to the Industrial Dam.

Aerial Photography supplied by Hansen Bailey Pty Ltd
Assumed current as of 2010

0 0.5 1
Kilometres

Hanson Bailey Pty Ltd
Drayton Mine Tailings Disposal Modification EA
Water Management Impact Assessment
Drayton Mine Locality Plan

Job No. WS0745.1004	Revision: 2	**Figure 4.1**

File Name: WS100622_Fig4_1.cdr

4.2 Model Schematic

Schematic layouts of the Drayton OPSIM model for the existing and proposed CHP/tailings configuration are presented in Figure 4.2 and 4.3 respectively. A review of the diagram indicates that the model comprises a collection of functional nodes, each representing a specific operational feature of the mine's water management system. Functional specifications for the various OPSIM node types are presented in the OPSIM program documentation.

The key difference between Figure 4.2 and Figure 4.3 is the configuration of the tailings disposal stream and associated decant return.

4.3 Drayton CHP

4.3.1 Existing CHP/Tailings Configuration

Drayton coal handling facilities consist of a coal preparation plant (CPP) and an additional coal treatment unit (CTU). These have been considered as one plant (CHP) for the purpose of the Drayton OPSIM model and net inputs and outputs considered. The overall throughput for CHP is nominally 8Mtpa, however it is understood that only 60% of the ROM coal is washed, with the remaining 40% being crushed direct to the product stockpile. That is, the design CHP washed throughput is 4.8Mtpa.

Plant operating rates for the Year 10 scenario have been prorated based on a raw feed rate of 4.53Mtpa adopted for the Drayton 2008 OPSIM model (i.e. plant demands have been prorated by 4.80/4.53). For the purpose of assessing the Year 10 existing CHP/tailings configuration, the Drayton 2008 OPSIM plant operational characteristics have been adopted and are summarised below.

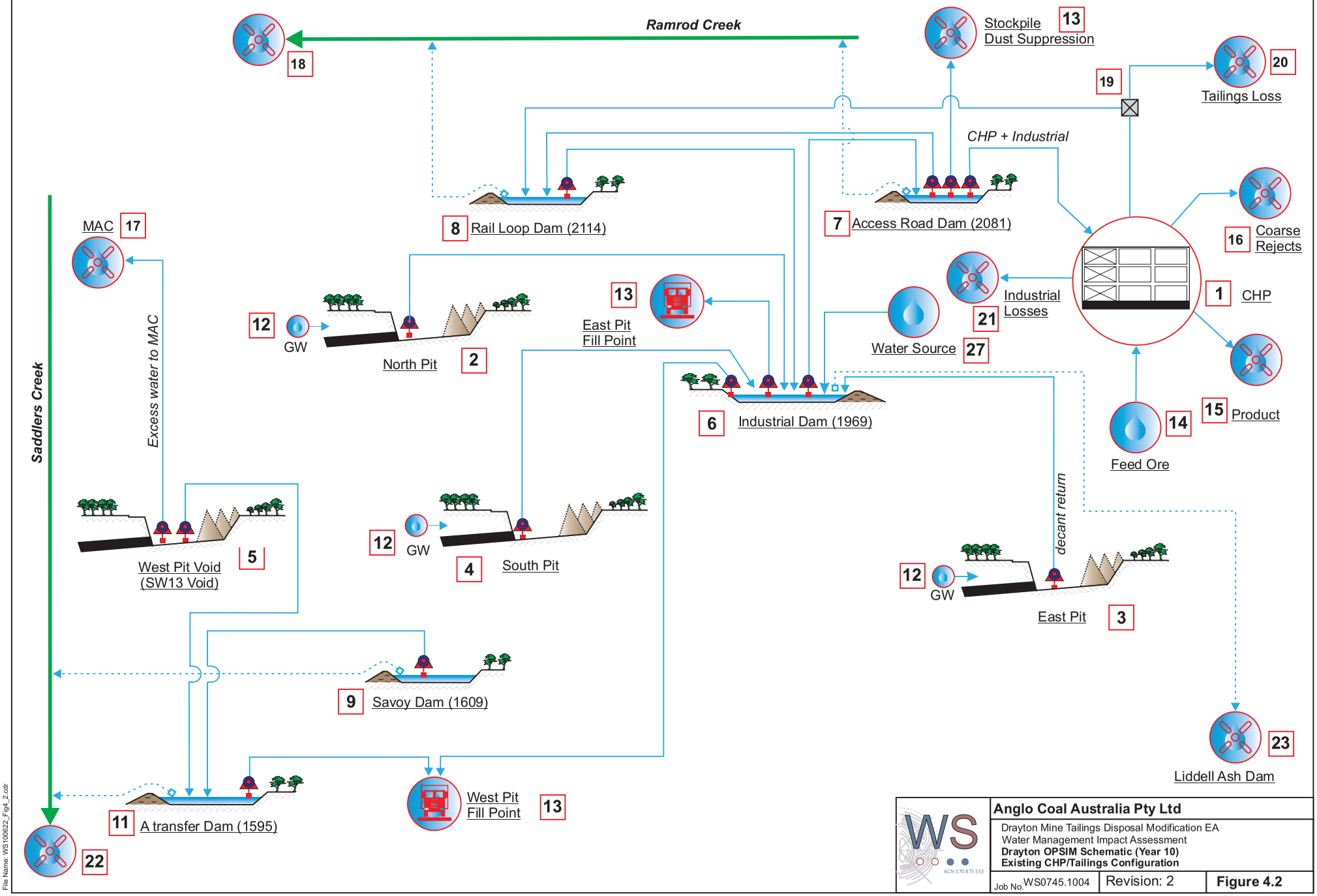
- Raw feed coal total moisture content: 7.6% (by weight);
- Product coal total moisture content: 8.0% (by weight);
- Coarse reject total moisture content: 15.0% (by weight);
- Fine tailings total moisture content: 76.0% (by weight).
- Fine tailings split i.e. ratio of fine/coarse rejects: 92.47% (dry solids)

The required process makeup has been estimated from the CHP moisture balance outcomes for the Year 10 existing CHP/tailings configuration and is presented in Tables 4.1.

Table 4.1 – Drayton CHP Balance –Existing CHP/Tailings Configuration (Year 10 Scenario)

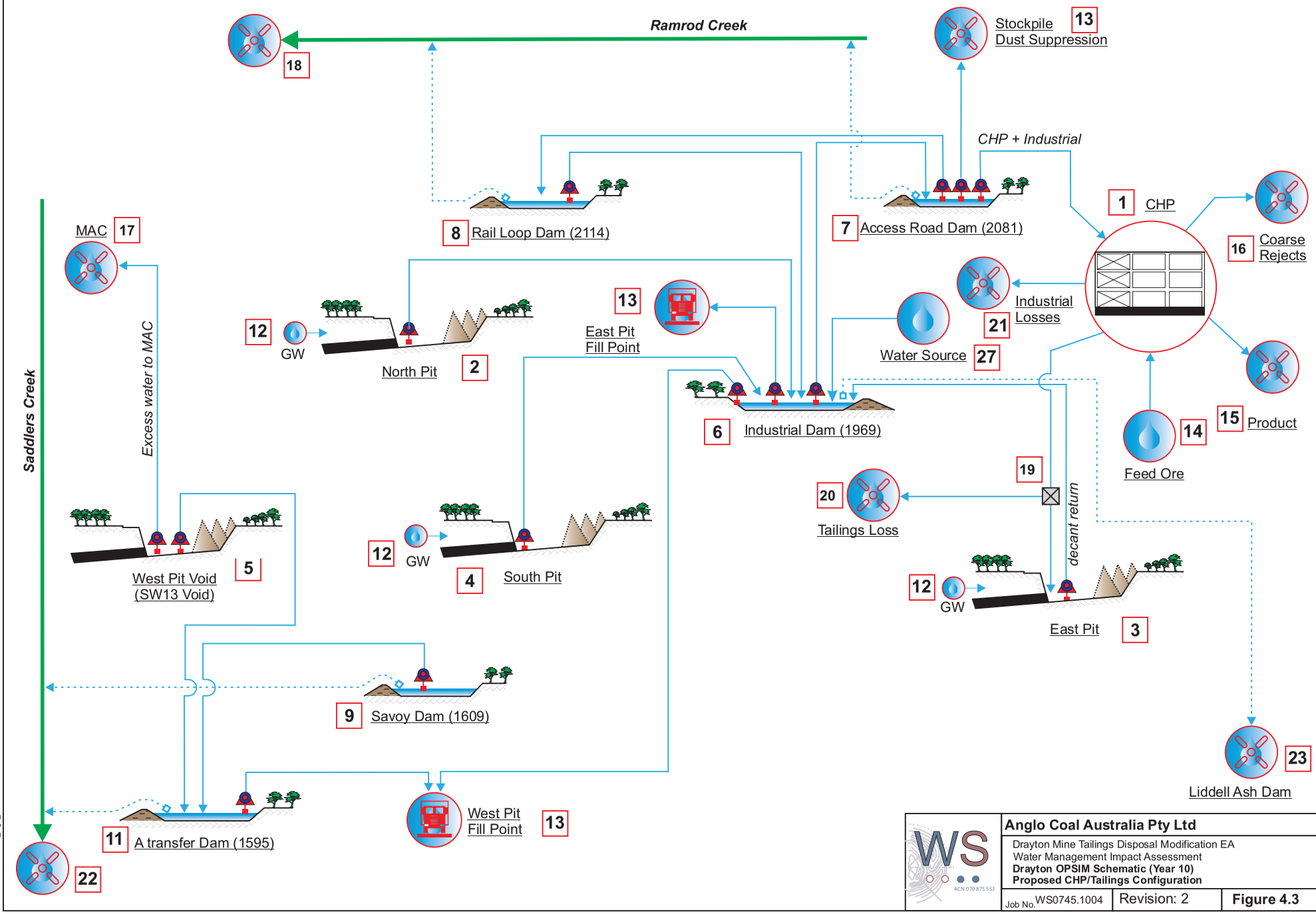
Item	Mtpa (wet)	t/day (wet)	Moisture Content (%)	Dry Solids (t/day)	Moisture (kL/d)
Raw Feed	4.80	13,142	7.6	12,143	999
Product Coal	4.46	12,212	8.0	11,235	977
Coarse Rejects	0.34	935	15.0	795	140
Tailings	0.17	471	76.0	113	358
Process Plant Makeup Requirement					**476**

Review of Table 4.1 indicates an overall process handling plant makeup requirement of 476kL/day (174ML/a), all of which will be sourced from the Industrial Dam.



Anglo Coal Australia Pty Ltd		
Drayton Mine Tailings Disposal Modification EA Water Management Impact Assessment **Drayton OPSIM Schematic (Year 10)** **Existing CHP/Tailings Configuration**		
Job No. WS0745.1004	Revision: 2	**Figure 4.2**

File Name: WS100622_Fig4_2.cdr



Anglo Coal Australia Pty Ltd

Drayton Mine Tailings Disposal Modification EA
Water Management Impact Assessment
Drayton OPSIM Schematic (Year 10)
Proposed CHP/Tailings Configuration

Job No. WS0745.1004 | Revision: 2 | **Figure 4.3**

File Name: WS100622_Fig4_3.cdr

4.3.2 Proposed CHP/Tailings Configuration

For the Year 10 proposed CHP/tailings configuration, site operational characteristics have been determined based on the 4.8Mtpa (washed) raw feed rate as well as information provided by Hansen Bailey. Plant moisture rates provided by Hansen Bailey are as follows:

- Raw feed moisture: 41.0 L/CHP Feed Tonne
- Product coal moisture: 49.9 L/CHP Feed Tonne
- Coarse reject moisture: 40.8 L/CHP Feed Tonne
- Fine tailings moisture: 152.4 L/CHP Feed Tonne
- Wash down moisture: 20.2 L/CHP Feed Tonne

CHP process demands for the Year 10 proposed CHP/tailings configuration have been made based on the following assumptions:

- Plant efficiency (Dry): 60% (i.e. 40% raw coal is coarse/fine tailings)
- Fine tailings split (Dry): 14% of total rejects

The required process makeup has been estimated from the CHP moisture balance outcomes for the Year 10 proposed CHP/tailings configuration and is presented in Tables 4.2.

Table 4.2 – Drayton CHP Balance -Proposed CHP/Tailings Configuration (Year 10 Scenario)

Item	Mtpa (wet)	t/day (wet)	Moisture Content (%)	Dry Solids (t/day)	Moisture (kL/d)
Raw Feed	4.80	13,151	4.1	12,612	539
Product Coal	3.00	8,223	8.0	7,567	656
Coarse Rejects	1.78	4,875	11.0	4,338	537
Tailings	0.99	2,710	73.9	706	2,004
Washdown					266
Process Plant Makeup Requirement					**2,924**

Review of Table 4.2 indicates an overall process handling plant makeup requirement of 2,924kL/day (1,068ML/a), all of which will be sourced from the Industrial Dam.

Based on advice provided by Hansen Bailey, a fine tailings decant return rate of 40% has been assumed for current investigations.

A comparison between the existing and proposed CHP/tailings configuration indicates a significant increase in the process plant makeup requirement (~2,450kL/day) for the proposed configuration.

4.4 Drayton Site Water Demands

Drayton site water demands for the Year 10 scenarios have been based on the approved Drayton EA Surface Water Impact Assessment (Ref 1). Adopted site demands are presented in Table 4.3.

Table 4.3 – Site Operational Water Demands (Year 10)

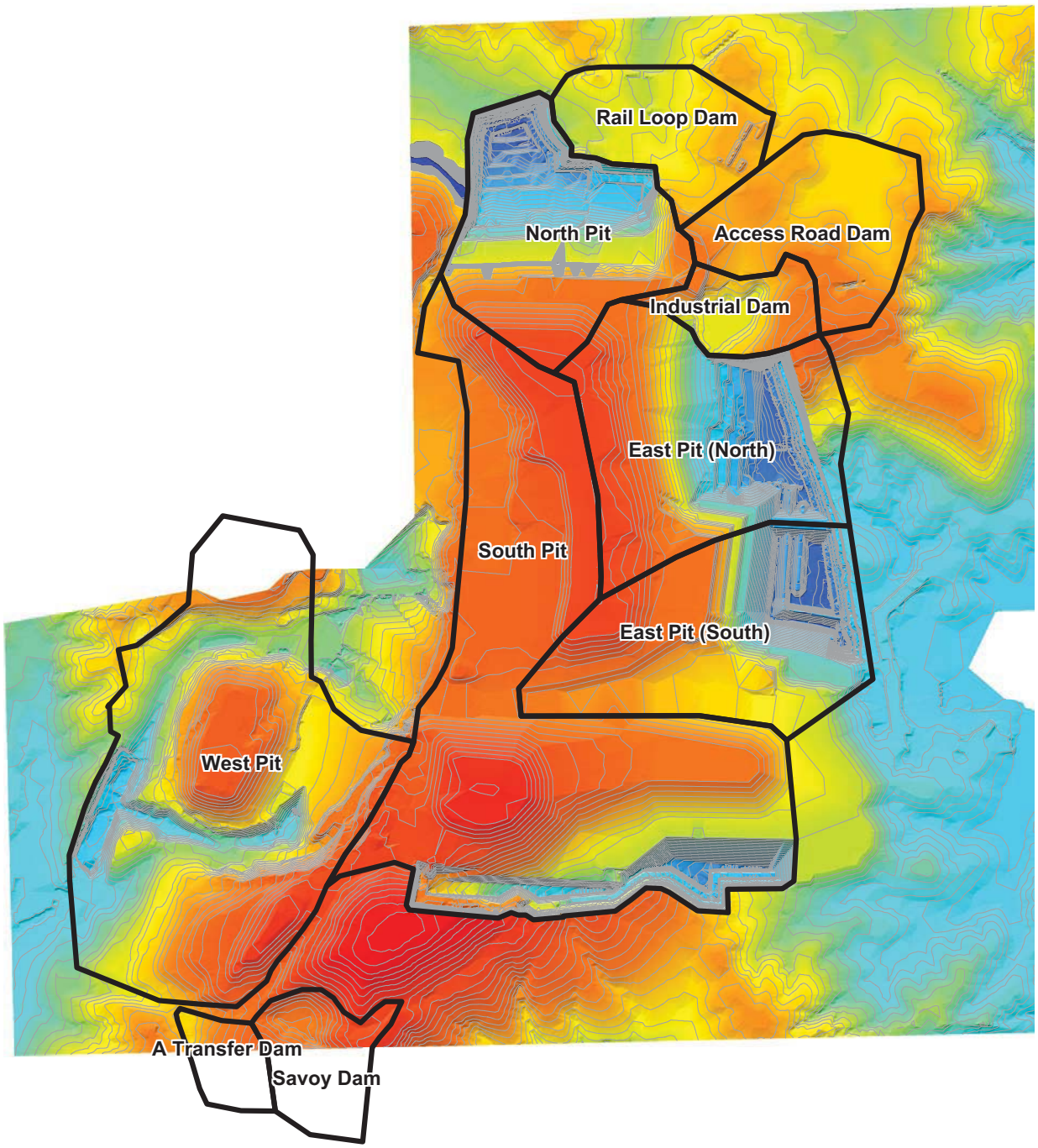
Item	(ML/yr)	(kL/day)
Miscellaneous Industrial Use	400	1,095
Haul Road Watering	600	1,643
Stockpile Dust Suppression	50	137
Total	**1,050**	**2,875**

4.5 Catchment Areas & Land Classifications

Catchment areas and land classifications on site for the Year 10 scenario have been determined based off information provided by Hansen Bailey. Catchment boundaries and associated land classifications for the Year 10 scenario are presented in Figure 4.4 and 4.5 respectively and are summarised in Table 4.4.

Table 4.4 – Drayton Catchment & Land Use Classifications (Year 10).

Storage Name	Land Classification (ha)					Total Area (ha)
	Undisturbed	Mining Pit	Spoil (Unrehab)	Spoil (Rehab)	Roads/ Industrial	
North Pit		17	88	24		129
East Pit	26	37	156	102		321
South Pit	19	41	14	299		373
Industrial Dam	29				6	35
West Pit	267	40				307
Savoy Dam	42				1	43
A Transfer Dam	20				1	21
Rail Loop Dam	41				25	66
Access Road Dam	48				40	88
TOTAL	**492**	**135**	**258**	**425**	**73**	**1383**



Note: Survey data supplied by Drayton.

0 0.5 1
kilometres

LEGEND

- Catchment Boundary
- 5m contours

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Water Management Impact Assessment

Drayton Catchment Plan (Year 10)

Job No. WS0745.1004 | Revision: 2 | **Figure 4.4**

File Name: WS100622_Fig4_4.WOR

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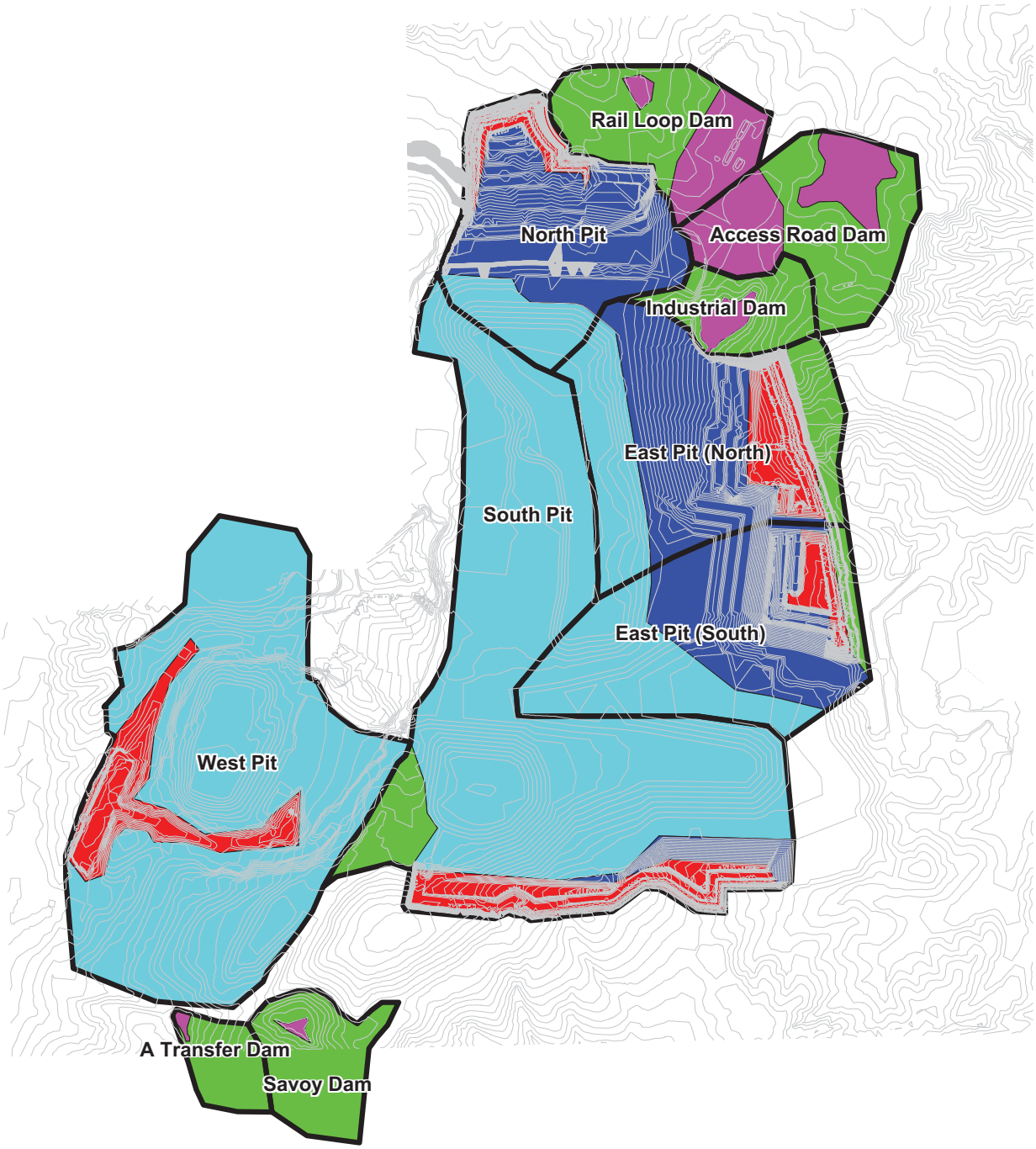

LEGEND

- Catchment Boundary
- Rehabilitated Spoil
- Undisturbed
- Unrehabilitated Spoil
- Mining Pit
- Roads/Industrial

0 0.5 1
kilometres

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Drayton Mine Tailings Disposal Modification EA
Water Management Impact Assessment

Drayton Land Classifications (Year 10)

Job No. WS0745.1004 | Revision: 2 | **Figure 4.5**

File Name: WS100622_Fig4_5.WOR

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4.6 Groundwater inflows

Groundwater inflow rates into active pits and the East Void for the Year 10 Existing Configuration scenario have been adopted from the approved Drayton EA Surface Water Impact Assessment (Ref 1) and are presented in Table 4.5.

Based on advice from Hansen Bailey regarding the proposed configuration, a nominal 10% reduction in groundwater inflow into the East Pit Void has been applied to account for the increased volume of tailings material being deposited in the void.

Table 4.5 – Drayton Mine Groundwater Inflows (Year 10).

Location	Groundwater Inflows (kL/day)	
	Existing CHP/Tailings Configuration	Proposed CHP/Tailings Configuration
North Pit Void	1,070	1,070
East Pit Void	1,270	1,143
South Pit Void	350	350
TOTAL	**2,690**	**2,560**

4.7 Operational Guidelines

Preliminary guidelines have been developed for the purpose of current investigations through correspondence with Hansen Bailey personnel. These guidelines are used to establish representative operating rules that can then be simulated by the OPSIM model.

They should be taken as indicative and subject to future revision as more detailed understanding of the operational characteristics of the management system is achieved.

Adopted operating guidelines for the Year 10 proposed CHP/tailings configuration is summarised Tables 4.6. It is anticipated that the existing CHP/tailings configuration operates under the same guidelines as the proposed, with the exception of the tailings disposal method (drying and disposal in-pit).

Table 4.6 – Drayton OPSIM Operational Guidelines (Year 10) Proposed CHP/Tailings Configuration

Item	Operational Description	Operating Rules
1	**Supply to Demands**	
1.1	CHP Mine Water	❑ Supplied from the Access Road Dam at a rate of 2,924kL/d (4.8Mtpa ROM feed).
1.2	Miscellaneous Industrial Use	❑ Sourced from the Access Road Dam at a rate of 1,095kL/d (400ML/yr). ❑ 100% loss assumed.
1.3	Haul Road Dust Suppression	❑ 2 haul road fill locations: ➢ West Pit Fill Point is sourced from the A Transfer Dam and Industrial Dam at a rate of 822kL/d. ➢ East Pit Fill Point is sourced from the Industrial Dam at a rate of 822kL/d. ❑ 100% loss assumed.
1.4	Stockpile Dust Suppression	❑ Supplied from the Access Road Dam at a rate of 137kL/d. ❑ 100% loss assumed.
2	**Transfer of Mine Waters**	
2.1	North Pit	❑ Continuous pumping from pit dewatering pumps (when required) at a nominal maximum rate of 50L/s. ❑ Pit dewatering directed to Industrial Dam. ❑ Receives groundwater inflows at a rate of 1,070kL/d (390ML/yr).
2.2	South Pit	❑ Continuous pumping from pit dewatering pumps (when required) at a nominal maximum rate of 50L/s. ❑ Pit dewatering directed to Industrial Dam. ❑ Receives groundwater inflows at a rate of 350kL/d (128ML/yr).
2.3	East Pit (Tailings)	❑ Continuous pumping from pit dewatering pumps (when required) at a nominal maximum rate of 50L/s per unit (i.e. 100L/s total). ❑ Receives tailings moisture at a rate of 2,004kL/day (based on 8Mtpa production rate). ❑ Tailings decant directed to Industrial Dam at a rate of 8,640kL/day. ❑ Receives groundwater inflows at a rate of 1,143kL/d (417ML/yr).

Item	Operational Description	Operating Rules
3	**Operation of Key Storages**	
3.1	Access Road Dam	❑ Primary mine water storage for CHP. ❑ Receives pumped transfers from Industrial Dam. ❑ Supplies to the following locations: ➢ Drayton CHP. ➢ Industrial area. ➢ Rail Loop Dam. ➢ Stockpile dust suppression. ❑ Storage overflows to Ramrod Creek.
3.2	Industrial Dam	❑ Mine water collection and transfer storage. ❑ Receives inflows from the following locations: ➢ Tailings decant from East Pit. ➢ Pumped transfers from North Pit. ➢ Pumped transfers from South Pit. ➢ Pumped transfers from Rail Loop Dam. ➢ External water source. ❑ Supplies to the following locations: ➢ East Pit Fill Point. ➢ West Fill Point (2nd priority). ➢ Access Road Dam. ❑ Storage overflows to Liddell Ash Dam.
3.3	Rail Loop Dam	❑ Mine water collection and transfer storage. ❑ Receives inflows (pumped transfer) from Access Road Dam. ❑ Supplies to Industrial Dam (as required). ❑ Storage maintained at 80% of capacity. ❑ Storage overflows to Ramrod Creek.
3.4	Savoy Dam	❑ Mine water collection and transfer storage. ❑ Supplies to A Transfer Dam (as required). ❑ Storage overflows to Saddlers Creek.
3.5	West Pit Void (SW13)	❑ Shared buffer storage – subleased from MAC. ❑ Supplies to the following locations: ➢ Mount Arthur Coal (MAC) (as required). ➢ A Transfer Dam (as required).
3.6	A Transfer Dam	❑ Mine water collection and transfer storage. ❑ Receives inflows from the following locations: ➢ Pumped transfers from West Pit Void. ➢ Pumped transfers from Savoy Dam. ❑ Supplies to the following locations: ➢ West Pit Fill Point. ❑ Storage overflows to Saddlers Creek.
4	**General**	❑ All storages and pits receive local catchment runoff and lose water through evaporation.

5 SYSTEM PERFORMANCE APPRAISAL

5.1 Overview

Investigations have used the revised Drayton OPSIM model to assess the expected impact of the proposed tailings disposal modification work against the following key performance indicators:

- Pit inundation characteristics;
- Off-site discharge frequency (spills); and
- Volumes of additional raw water required.

Assessment outcomes are presented in the following sub-sections.

5.2 Pit Inundation Characteristics

5.2.1 Methodology

Expected pit inundation characteristics have been assessed for all mining pits on a percentage of time basis, for the combined volume of water in the North and South pits. The data presented has been derived from long-term OPSIM analysis (i.e. 121 years simulation) and in this case has been determined on the basis that the pits do not dewater if the receiving storages are full.

5.2.2 Modelling Outcomes

Pit inundation characteristics for the combined North and South Pits for the existing and proposed CHP/tailings disposal configurations for the Year 10 development stage are presented in Figure 5.1.

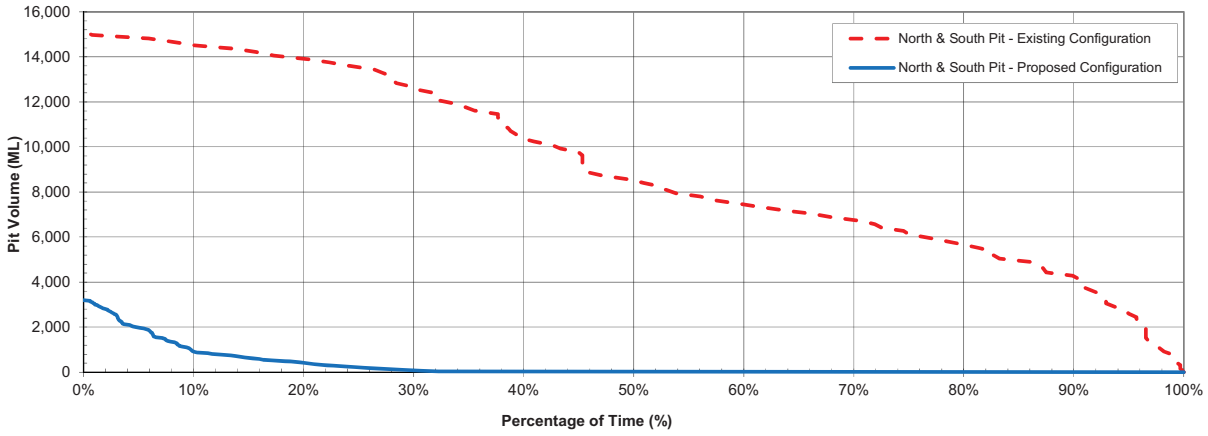

Figure 5.1 – Drayton Mine Pit Inundation Characteristics

Review of the results presented in Figure 5.1 indicates the following:

- For the existing configuration, it is expected that there would be at least 14,500ML of water in the North and South pits for 10% of the time; and
- For the proposed configuration, it is expected that there would be at least 900ML of water in the North and South pits for 10% of the time.

Based on the assessment outcomes presented above, the proposed modification to the tailings disposal significantly reduces the risk of pit inundation in North and South pits. This is primarily due to the increased overall site water consumption and reduction in groundwater inflow to the East Void for the proposed case.

5.3 Discharge Characteristics

5.3.1 Methodology

Expected discharge characteristics have been assessed on the basis of simulated spillway overflows from key site storages. Expected storage discharge characteristics have been presented with respect to the Annual Exceedence Probability (AEP) of the spill event, derived from long-term OPSIM analysis (i.e. 120 year simulation).

5.3.2 Results

Expected site discharge characteristics for Drayton operations are listed in Table 5.1.

Table 5.1 – Expected Discharge Characteristics

Storage	Risk of One or More Spillway Discharges AEP 1 in Y, (%)		Comment
	Existing CHP/Tailings Configuration	Proposed CHP/Tailings Configuration	
Industrial Dam	*No Modelled Discharges*		Discharges off-site to Liddell Ash Dam
Access Road Dam	*No Modelled Discharges*		Discharges off-site to Ramrod Creek
Rail Loop Dam	1 in 2 (50%)	1 in 4 (25%)	Discharges off-site to Ramrod Creek
A Transfer Dam	1 in 40 (2.5%)	1 in 40 (2.5%)	Discharges off-site to Saddlers Creek
Savoy Dam	*No Modelled Discharges*		Discharges off-site to Saddlers Creek

Review of the results presented in Table 5.1 indicates the following:

- There are no modelled discharges for Industrial Dam, Access Road Dam and Savoy Dam for both modelling scenarios.
- The long-term expected spill frequency for Rail Loop Dam provides a better environmental outcome as a result of the proposed tailings modification, reducing from a 50% AEP to a 25% AEP risk of discharge.
- The long-term expected spill frequency for A Transfer Dam is the same for both modelling scenarios, at 2.5% AEP risk of discharge.

Overall, the proposed tailings modification works has little impact on site spill frequencies, with the exception of Rail Loop Dam.

5.4 Additional Water Requirements

5.4.1 Methodology

Additional water requirements at Drayton Mine have been assessed for the existing and proposed CHP/Tailings configurations. Additional water was assumed to be supplied directly from a pipeline to supply the demand and as such potential losses due to evaporation etc. which may be associated with the storage of this water on site have not been accounted for.

5.4.2 Modelling Outcomes

Annual additional water requirement results for the both the existing and proposed tailings disposal configurations are presented in Figure 5.2, expressed as an Annual Exceedence Probability (AEP). Operational reliability expressed as an AEP represents the risk of requiring at least the nominated amount of additional water in any one year.

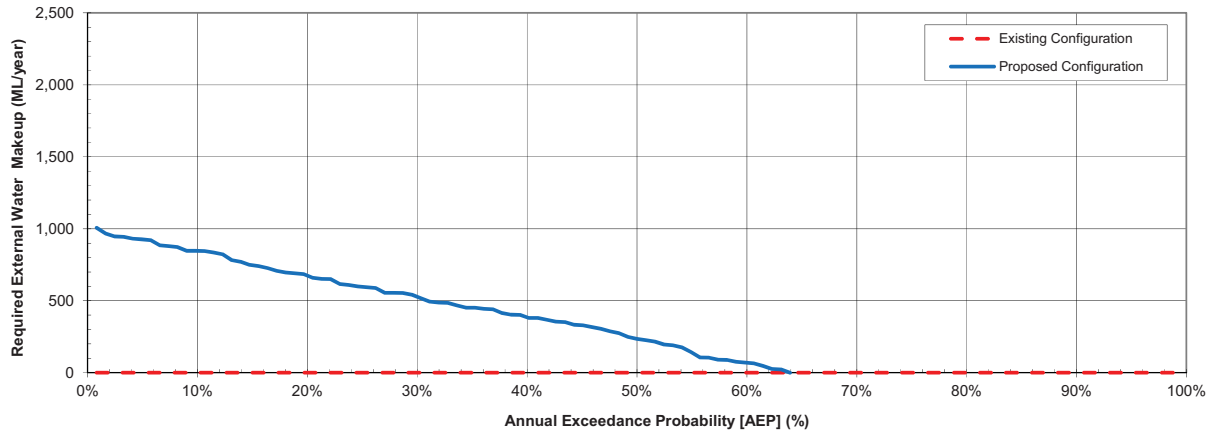

Figure 5.2 – Drayton Mine - Additional Water Requirements

Review of the results presented in Figure 5.2 indicates the following:

- No modelled makeup requirement for the existing CHP/tailings disposal configuration.
- The proposed modification to the tailings disposal configuration has a significant impact on the expected additional water requirements to meet full supply reliability for AEP less than 65%.
- For the proposed configuration, additional water is required in order to meet site operational reliability for Drayton operations. For example, for a nominal 10% AEP (i.e. 10% risk of exceedance, or 90% operational reliability), at least 850ML/yr of additional water is required.

The increase in additional water requirements is primarily associated with the increased losses in the tailings decant circuit.

6 SUMMARY & CONCLUSIONS

Current investigations assessed the expected impact of the proposed CHP/tailings disposal modification works on the Drayton Mine water management system.

The assessment considered the impact of the tailings modification works for the Year 10 development stage, which represents the maximum proposed production rate and associated water demand at Drayton Mine. The adopted water demands, CHP production rate, catchment definitions and associated land classification are representative of the expected mine configuration at the Year 10 development stage. Refer to Section 3 for details of the adopted model parameters.

Key items addressed by current investigations have included:

- Surface water assessment of Drayton operations for the Year 10 scenario.
- Assessment includes operational performance of the Drayton mine site for both the existing and proposed tailings disposal methods.

Investigation outcomes have concluded that the proposed tailings disposal modification works has the following impacts on the Drayton Mine water management system:

- A significant reduction in the risk of pit inundation in North and South Pits *(900ML volume in-pit for 10% of the time for the proposed case, compared with 14,500ML volume in-pit for the existing case).* This is primarily due to the increased overall site water consumption and reduced groundwater inflow to East Void for the proposed case (refer to Section 5.2).
- Little impact on site spill frequencies, with the exception of a reduced risk of discharge at Rail Loop Dam (refer Section 5.3).
- An increase in additional water requirements at Drayton Mine to meet site demand operational reliability.
  - For a nominal 10% AEP (i.e. 10% risk of exceedance, or 90% operational reliability) at least 850ML/yr of additional water is required for the proposed case.
  - This compares with a zero makeup requirement for the existing case.
- This is primarily associated with the increased losses in the tailings decant circuit for the proposed configuration (refer Section 5.4).

7 REFERENCES

1. Hansen Bailey, *Drayton Mine Extension – Surface Water Impact Assessment,* December 2009.
2. *SILO Datadrill Data System*, Department of Environment and Resource Management http://www.longpaddock.qld.gov.au/silo.
3. Water Solutions Pty Ltd, *Drayton Mine Extension – OPSIM Surface Water Assessment – Drayton & Drayton South,* May 2009.