



DARTBROOK MINE

EROSION AND SEDIMENT CONTROL PLAN

for Dartbrook Operations Pty Ltd

22 February 2024

DOCUMENT CONTROL

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1. INTRODUCTION

1.1 BACKGROUND

Dartbrook Mine is owned by an unincorporated Joint Venture (Dartbrook Joint Venture) between Australian Pacific Coal (AQC) and Tetra Resources Pty Ltd (Tetra). Dartbrook Operations Pty Ltd (Dartbrook Operations) is the appointed operating management company and the Mine Operator under Section 5 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2022*. The Dartbrook Joint Venture will acquire AQC Dartbrook Management Pty Ltd (ABN 62 007 377 577) which is the holder of the Development Consent and Environment Protection Licence, and AQC Dartbrook Pty Ltd (ABN 46 000 012 813) which is the holder of the relevant mining and coal authorities.

Dartbrook Mine is located approximately 10 km north-west of Muswellbrook and 4.5 km south-west of the village of Aberdeen in New South Wales (see **Figure 1**). Dartbrook Mine operated as an underground longwall coal mine from 1993 until December 2006, when it was placed in care and maintenance by the previous owner, Anglo Coal (Dartbrook Management) Pty Ltd. The mine was acquired by AQC in 2017 and remained in care and maintenance throughout AQC's period of ownership.

Dartbrook Mine is authorised by Development Consent DA 231-07-2000 granted under the *Environmental Planning and Assessment Act 1979* (EP&A Act). DA 231-07-2000 was granted on 28 August 2001 and has been modified on seven occasions (as summarised in **Table 1**). DA 231-07-2000 enables mining operations to be carried out until 5 December 2027.

Dartbrook Operations is preparing to recommence mining activities in 2024, thereby transitioning Dartbrook Mine from care and maintenance back to an operational phase.

Table 1 Modifications to DA 231-07-2000

Modification	Approval Date	Activities
MOD 1	19 June 2002	MOD1 was an administrative modification to DA 231-07-2000 that altered the conditions regarding blasting notifications and structural inspections.
MOD 2	16 June 2003	MOD2 approved the construction and operation of an additional emergency tailings storage cell at the Coal Handling and Processing Plant (CHPP).
MOD 3	4 November 2003	<p>MOD3 proposed the following changes to the site access arrangements:</p> <ul style="list-style-type: none"> Continued use of Dartbrook Road to provide access to the West Site; and Use of local public roads by traffic associated with Dartbrook Mine. <p>Prior to construction of the Kayuga Mine Access Road, access to the West Site was via Dartbrook Road. It was envisaged that Kayuga Mine Access Road would replace Dartbrook Mine as the primary access to the West Site. However, the Kayuga Mine Access Road was being used by trucks to haul coal to the CHPP. To avoid interactions between haul trucks and private vehicles, MOD3 proposed that Dartbrook Road should continue to be used as the primary access road for mine personnel.</p> <p>MOD3 also sought approval for locally based employees to access the West Site via local roads (Kayuga Road, Dartbrook Road and Blairmore Lane). For employees residing in the surrounding areas, these local roads provide more convenient access than the Western Access Road.</p>

Modification	Approval Date	Activities
MOD 4	30 March 2004	DA 231-07-2000 allowed for truck haulage of coal to the CHPP over an 18-month period. Truck haulage was to be discontinued upon completion of the conveyor system for the Kayuga Seam, which would enable coal to be transferred to the CHPP via the Hunter Tunnel. MOD 4 extended the duration of truck haulage by 3 months to allow for haulage to continue until the completion of the Kayuga Seam conveyor system.
MOD 5	4 May 2005	MOD 5 facilitated changes to the rejects disposal system at Dartbrook Mine. The approved rejects disposal system involved the commissioning of a pipeline and pumping system for the transportation and disposal of reject materials. Engineering studies indicated that this method would pose significant technical risks due to the variability in relative quantities of coarse and fine rejects produced by the CHPP. MOD5 obtained approval for rejects to be transported to the Rejects Emplacement Area (REA) using trucks.
MOD 6	16 November 2005	MOD 6 provided approval for the following activities: <ul style="list-style-type: none"> • Establishment of four new Run of Mine (ROM) coal stockpiles and expansion of the existing emergency ROM coal stockpile at the CHPP; • Disposal of tailings within the Wynn Seam goaf; and • Operation of a Nitrogen Injection Plant to prevent the oxidation of coal.
MOD 7	11 March 2022	MOD 7 was determined by the NSW Independent Planning Commission (IPCN) on 9 August 2019. The IPCN approved the alternate mining method (bord and pillar mining) but not the proposed five-year extension to the duration of mining operations. Without the extension to operate under DA 231-07-2000 for a further five years, it was impractical to recommence mining at Dartbrook. In November 2019, an appeal was lodged against the IPCN's determination in the NSW Land and Environment Court. The court proceedings were resolved on 11 March 2022, with the proposed five-year extension of mining being approved. As a result, DA 231-07-2000 currently enables mining operations to be undertaken until 5 December 2027.

1.2 SITE LAYOUT

The Dartbrook Mine generally consists of the following main components:

- West Site surface facilities including workshop and maintenance facilities, administration building and underground mine portals;
- East Site surface facilities including the Coal Handling and Preparation Plant (CHPP), rail loop, train loading facilities and Rejects Emplacement Area (REA);
- Wynn Seam underground mine workings which are decommissioned and are used for tailings disposal and mine water storage;
- Kayuga Seam underground mine workings, which will be active mining domain upon recommencement; and
- Hunter Tunnel which connects the underground mine workings to the East Site surface facilities.

Figure 2 and Figure 3 shows the location of these features of the Dartbrook Mine.

1.3 PURPOSE

This Erosion and Sediment Control Plan (ESCP) documents the prevention and control measures to manage erosion and sedimentation for the Dartbrook operations. The primary objective of the plan is to minimise erosion on the mine site and subsequent sedimentation of downstream waterways. This objective will be met through the implementation of the control measures specified in **Section 3**.

1.4 MANAGEMENT PLAN REQUIREMENTS

This ESCP has been developed in accordance with the conditions of the current Dartbrook Development Consent (as modified). The specific requirements of the ESCP are contained in development consent conditions 3.6 (a) and (b). These requirements are listed in **Table 2** with a reference to where each specific requirement is addressed in the management plan.

Table 2 Management Plan Requirements

Development Consent Condition		Section of Document
3.6	Prevention of Soil Erosion	
(a)	The Applicant must, prior to the recommencement of construction or mining operations, prepare an Erosion and Sediment Control Plan for construction and ongoing use of surface facilities to the satisfaction of the Secretary.	This Plan
(b)	The Erosion and Sediment Control Plan must include but not be limited to:	Section 2
(i)	Details of temporary and permanent erosion and sediment control systems to be used during both construction and/or the expansion of the rejects emplacement area, including earthworks associated with landscaping;	
(ii)	Details of soil salinity management where relevant;	Section 3.6
(iii)	5 measures that will be employed to minimise soil erosion and the discharge of sediment and other pollutants to lands and/or waters during construction and/or the expansion of the rejects emplacement area. The Plan should be prepared in accordance with the requirements for such plans outlined in Managing Urban Stormwater: Soils and Construction (available from the Department of Housing) or its latest version;	Section 3.3.2
(iv)	The consideration of the location and purpose of structures in the erosion and sediment control plan to maximise similarities between predevelopment and post-development drainage networks with reference to catchment areas, drainage densities and discharge characteristics;	Section 3.2
(v)	Consideration and management of erosion and sedimentation of affected surface watercourses/waterbodies, including creeklines within the DA areas;	Section 3.2
(vi)	Measures to construct banks, channels and similar works to divert stormwater away from disturbed and contaminated land surfaces such as mine workings, coal handling areas and wastewater treatment facilities. All diversion banks, channels and points of discharge must be constructed or stabilised so as to minimise erosion and scouring; and	Section 3.1
(vii)	A program for reporting on the effectiveness of the erosion and sediment control systems and performance against objectives contained in the approved Erosion and Sediment Control Management Plan, and EIS.	Section 4.2

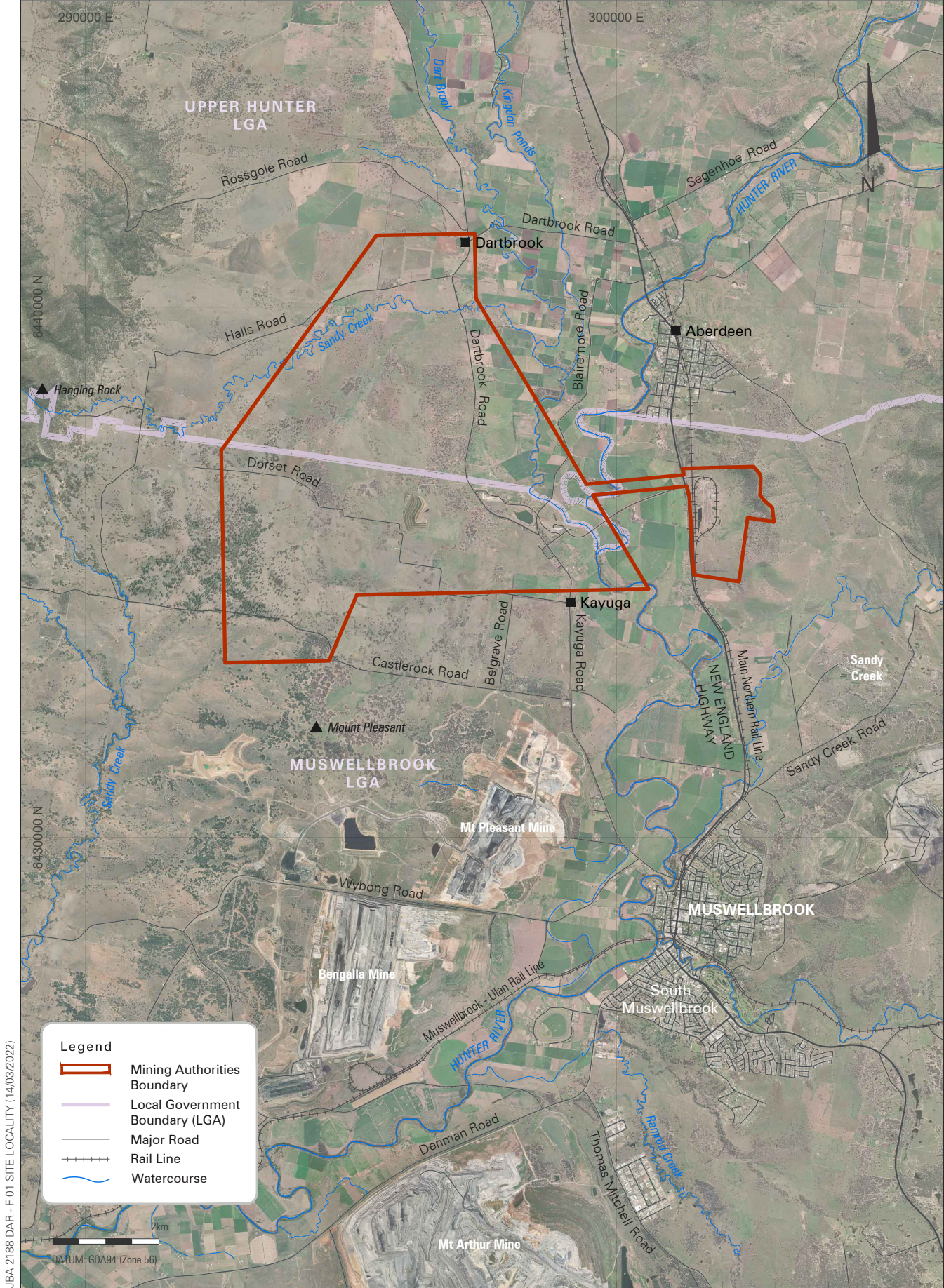
Development Consent Condition	Section of Document
<p>(c) The Applicant must also prepare a Soil Stripping Management Plan for the expansion of the rejects emplacement area, prior to the commencement of construction of the reject emplacement area, to the requirements of Resources Regulator and DPIE Water that must include, but not limited to:</p> <ul style="list-style-type: none"> (i) Details to ensure the maximum retrieval of suitable topdressing material and appropriate management of topsoil stockpiles including immediate revegetation to protect from soil erosion and to control potential weed problems; (ii) Details of the management of soil stockpiles, soil stripping techniques and scheduling; (iii) Control of weed infestation on topsoil stockpile material; (iv) Details of estimated quantities of suitable topdressing material required for subsequent respreading on rehabilitation land; and (v) A program for reporting on the effectiveness of the soil stripping methods and performance against objectives contained in the soil stripping management plan, and the documents referred to in Condition 1.1(a). 	Section 3.3.2
<p>(d) The company is to re-establish a post-mining drainage system which is comparable to the drainage density and discharge characteristics of the pre-mining land for each affected drainage line discharging from the area of the mining development. The design and implementation of the post-mining drainage system is to be prepared prior to the cessation of mining and to the satisfaction of DPIE Water.</p>	Section 3.1
<p>(e) The Applicant must install a flexible drop structure in Sandy Creek or its tributaries and undertake such other measures as required by DPIE Water when headward erosion of the creek bed becomes evident.</p>	Section 3.1
<p>(f) The Applicant must implement soil erosion mitigation measures at ventilation shafts to the satisfaction of DPIE Water, including a sedimentation structure to collect runoff from disturbed areas.</p>	Section 3.5 Section 3.1 Section 3.3.1
<p>4. Water Management and Monitoring</p>	
<p>4.1(b1) The Applicant must ensure that the development complies with the performance measures in Table 4.</p>	Section 2.1

Development Consent Condition		Section of Document										
<p><i>Table 4: Water management performance measures</i></p> <table border="1"> <thead> <tr> <th><i>Feature</i></th> <th><i>Performance Measure</i></th> </tr> </thead> <tbody> <tr> <td>Water management – General</td> <td> <ul style="list-style-type: none"> • Maintain separation between clean and mine water management systems • Minimise the use of clean and potable water on the site • Minimise the use of make-up water from external sources • Design, install, operate and maintain water management infrastructure in a proper and efficient manner </td> </tr> <tr> <td>Erosion and sediment control works</td> <td> <ul style="list-style-type: none"> • Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i>, <i>Volume 2A: Installation of Services (DECC, 2008)</i>, <i>Volume 2C: Unsealed Roads (DECC, 2008)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i> • Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land (DPI Water, 2012)</i> • Design, install and maintain any creek crossings generally in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013)</i> and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003)</i> </td> </tr> <tr> <td>Clean water diversions and storage infrastructure</td> <td> <ul style="list-style-type: none"> • Design, install and maintain the clean water system to capture and convey the 100 year Annual Recurrence Interval (ARI) flood • Maximise as far as reasonable the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site </td> </tr> <tr> <td>Sediment dams</td> <td> <ul style="list-style-type: none"> • Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i> </td> </tr> </tbody> </table>			<i>Feature</i>	<i>Performance Measure</i>	Water management – General	<ul style="list-style-type: none"> • Maintain separation between clean and mine water management systems • Minimise the use of clean and potable water on the site • Minimise the use of make-up water from external sources • Design, install, operate and maintain water management infrastructure in a proper and efficient manner 	Erosion and sediment control works	<ul style="list-style-type: none"> • Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i>, <i>Volume 2A: Installation of Services (DECC, 2008)</i>, <i>Volume 2C: Unsealed Roads (DECC, 2008)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i> • Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land (DPI Water, 2012)</i> • Design, install and maintain any creek crossings generally in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013)</i> and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003)</i> 	Clean water diversions and storage infrastructure	<ul style="list-style-type: none"> • Design, install and maintain the clean water system to capture and convey the 100 year Annual Recurrence Interval (ARI) flood • Maximise as far as reasonable the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site 	Sediment dams	<ul style="list-style-type: none"> • Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction</i> including <i>Volume 1: Blue Book (Landcom, 2004)</i> and <i>Volume 2E: Mines and Quarries (DECC, 2008)</i>
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Development Consent Condition		Section of Document
Mine water storages	<ul style="list-style-type: none"> Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharges to surface waters as far as reasonable and practicable 	
Mine water discharges	<ul style="list-style-type: none"> No discharges to surface waters except in accordance with an Environment Protection Licence, section 120 of the <i>Protection of the Environment Operations Act 1997</i> or <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i> 	
Chemical and hydrocarbon storage	<ul style="list-style-type: none"> Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard 	
Tailings storages	<ul style="list-style-type: none"> Design and maintain tailings storage areas to encapsulate and prevent the release of tailings seepage/leachate 	

1.5 STAKEHOLDER CONSULTATION

Condition 3.6 (a) of the Development Consent requires the ESCP be prepared to the satisfaction of the Secretary of the Department of Planning and Environment (DPE). Correspondence with DPE during the preparation of this plan is reproduced in **Appendix A**.



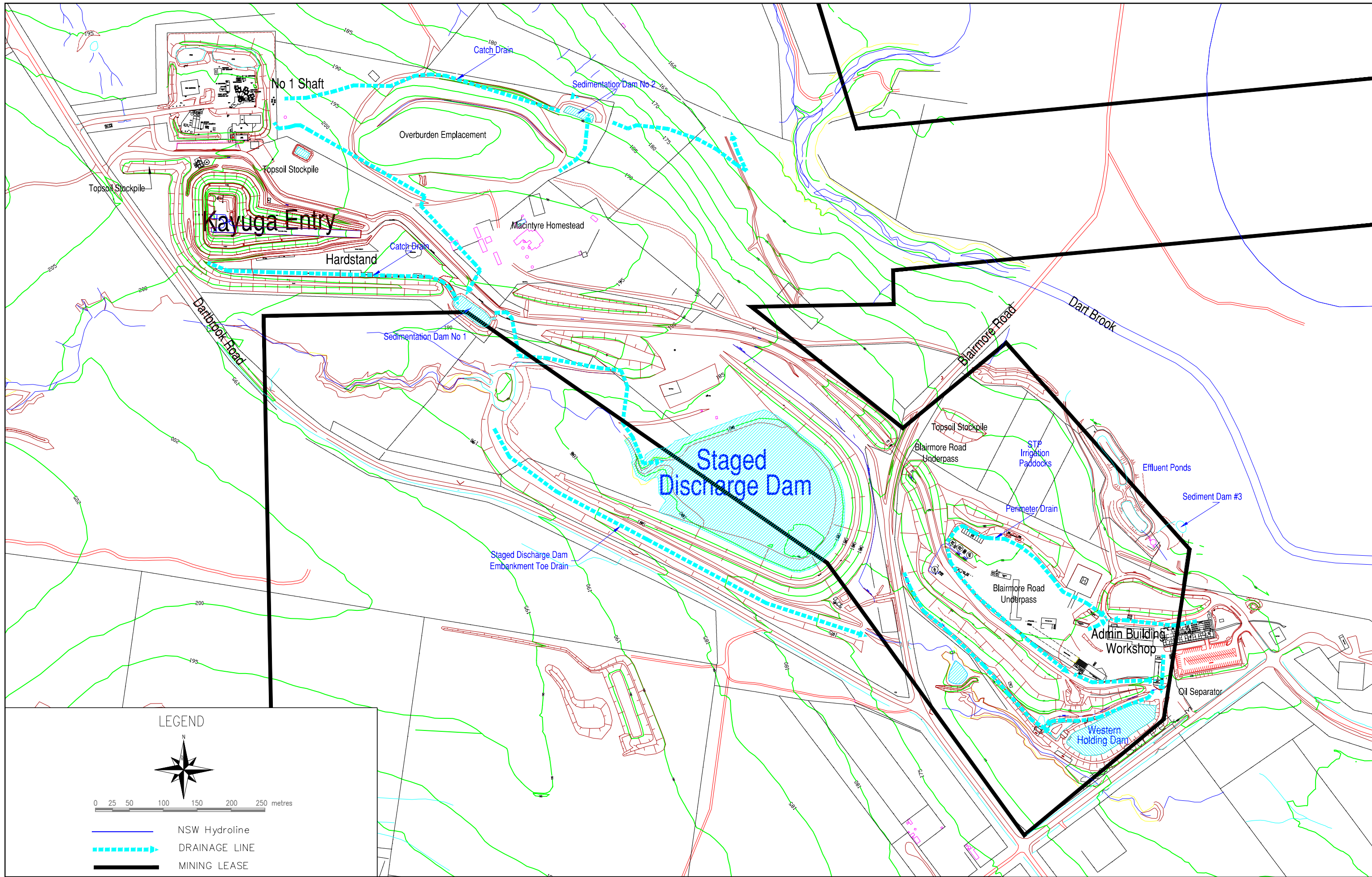
JBA 2188 DAR - F 01 SITE LOCALITY (14/03/2022)

DARTBROOK MINE



Regional Locality

FIGURE 1



LEGEND



0 25 50 100 150 200 250 metres

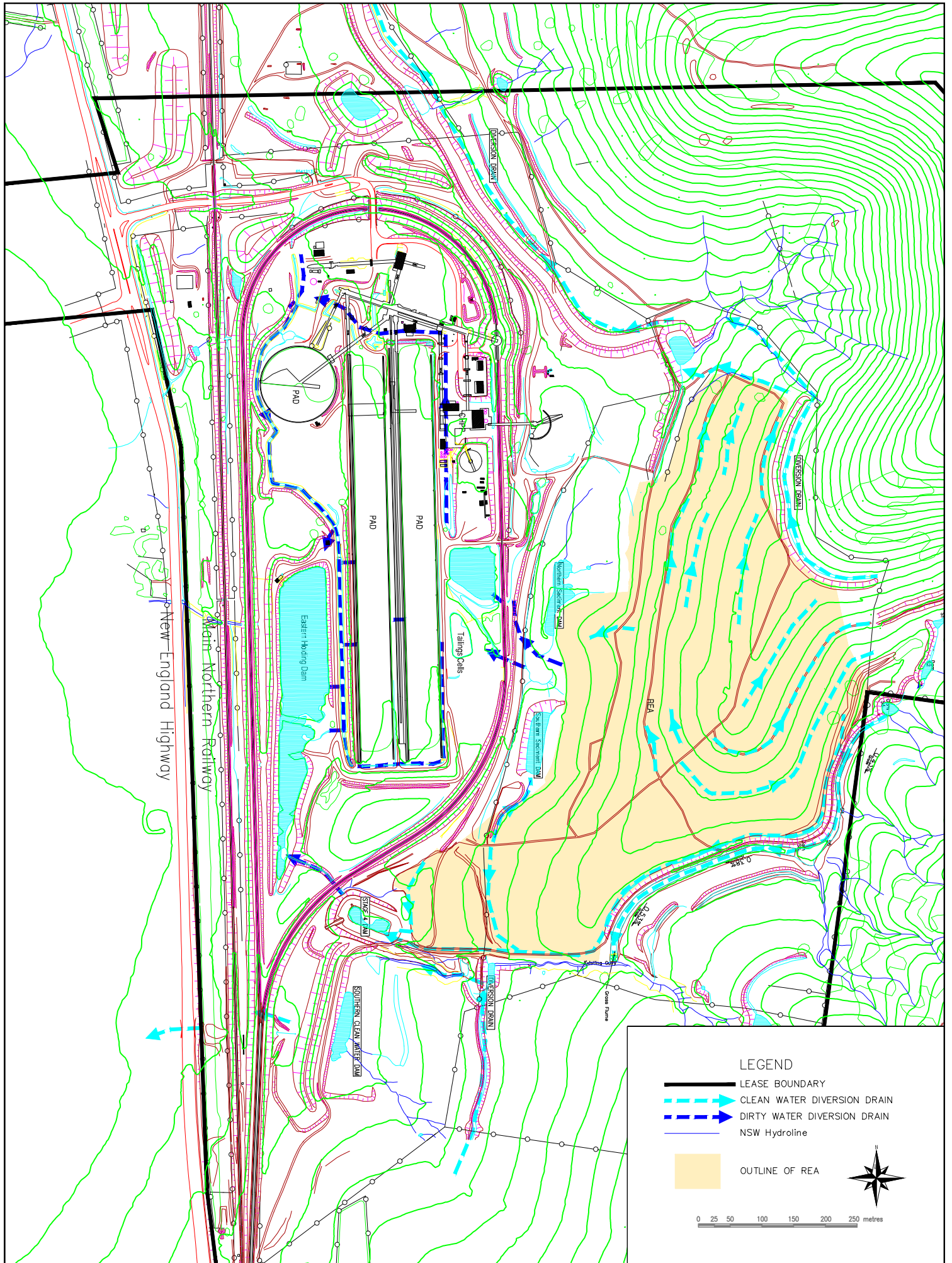
- NSW Hydroline
- - - - - DRAINAGE LINE
- MINING LEASE



DRAWN		A	22/12/22	PC	Revised Dwg29418 RevK	AW
PC						
22/12/22						
REV.	DATE	BY	DESCRIPTION			CHK.

Dartbrook mine
Water Management West Site
Figure 2

Datum :	AHD	SCALE	1:5,000	A3	DRG.	200002	REV.	A
GRID :								



LEGEND

- LEASE BOUNDARY
- CLEAN WATER DIVERSION DRAIN
- DIRTY WATER DIVERSION DRAIN
- NSW Hydroline
- OUTLINE OF REA

0 25 50 100 150 200 250 metres

REVISION	A	22/12/22	PC	Modified 23346 Rev M	
REV.	DATE	BY	DESCRIPTION	CHK.	
DRAWN	DATE	CHECKED	APPROVED		
PC	22/12/22				

2. CRITERIA

2.1 WATER MANAGEMENT PERFORMANCE CRITERIA

Water management performance criteria and performance measures are prescribed in Condition 4.1 (b1) of the Development Consent (see **Table 3**). Compliance with these performance measures will be maintained by the implementation of the control measures specified in **Section 3** and through monitoring and reporting outlined in **Section 4**.

Table 3 Development Consent Water Management Performance Measures

Feature	Performance Measure
Water Management – General	<ul style="list-style-type: none"> • Maintain separation between clean and mine water management systems • Minimise the use of clean and potable water on the site • Minimise the use of make-up water from external sources • Design, install, operate and maintain water management infrastructure in a proper and efficient manner
Erosion and Sediment Control Works	<ul style="list-style-type: none"> • Design, install and maintain erosion and sediment controls in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book</i> (Landcom, 2004), <i>Volume 2A: Installation of Services</i> (DECC, 2008), <i>Volume 2C: Unsealed Roads</i> (DECC, 2008) and <i>Volume 2E: Mines and Quarries</i> (DECC, 2008) • Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012) • Design, install and maintain any creek crossings generally in accordance with the <i>Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management</i> (DPI, 2013) and <i>Why Do Fish Need to Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries 2003)
Clean Water Diversions and Storage Infrastructure	<ul style="list-style-type: none"> • Design, install and maintain the clean water system to capture and convey the 100 year Annual Recurrence Interval (ARI) flood • Maximise as far as reasonable the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site
Sediment Dams	<ul style="list-style-type: none"> • Design, install and maintain sediment dams in accordance with the guidance series <i>Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book</i> (Landcom, 2004) and <i>Volume 2E: Mines and Quarries</i> (DECC, 2008)
Mine Water Storages	<ul style="list-style-type: none"> • Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharges to surface waters as far as reasonable and practicable
Mine Water Discharges	<ul style="list-style-type: none"> • No discharges to surface waters except in accordance with an Environment Protection Licence, section 120 of the <i>Protection of the Environment Operations Act 1997</i> or <i>Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002</i>
Chemical and Hydrocarbon Storage	<ul style="list-style-type: none"> • Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard
Tailings Storages	<ul style="list-style-type: none"> • Design and maintain tailings storage areas to encapsulate and prevent the release of tailings seepage/leachate

3. EROSION AND SEDIMENT CONTROL

3.1 INTRODUCTION

This section describes the drainage systems, and erosion and sediment control measures for relevant components of the Dartbrook mining operations. These are:

- West Site Surface Facilities, including the Mine Surface Facilities, Kayuga Seam Surface Facilities, Kayuga Seam Access Slot, Kayuga Seam Access Road and the Evaporation Ponds;
- Dartbrook East Site, including the REA and CHPP area;
- Surface areas historically affected by mining subsidence; and
- Minor infrastructure including ventilation shafts, the Wynn Seam goaf dewatering bores, associated electrical transformer station and return water pipelines, and other minor surface infrastructure areas (**Section 3.5**).

All components of the Dartbrook mining operations will be subject to the following general principles for erosion and sediment control:

- Runoff from undisturbed areas will be diverted around disturbed areas via diversion drains and allowed to drain around the site;
- Runoff from disturbed areas will be collected in catch drains and directed to sediment traps, and/or settling dams to remove suspended sediment prior to drainage from the site;
- Disturbed areas, not required for on-going mining operations, will be rehabilitated in accordance with industry best practice and the Rehabilitation Management Plan requirements;
- Erosion and sediment control works will be located to ensure that known Aboriginal sites are not impacted and to minimise the impact on flora and fauna;
- Erosion and sediment control structures will be inspected following significant runoff events;
- Maintenance of erosion and sediment control structures will be undertaken regularly in accordance with the guidance series *Managing Urban Stormwater: Soils and Construction* (DECC, 2008); and
- Erosion and sediment control structures will be maintained with sufficient freeboard to accommodate the relevant design storm event.

General design criteria are provided in **Table 4**

Table 4 **General Design Criteria**

Description	Design Criteria
Design Settling Capacity	6 hour, 1 in 10 year ARI ¹ Rainfall Event
Spillway Capacity	Peak 20 year ARI event
Minimum operating design capacity prior to desilting	90%

Note: 1. ARI = Average Recurrence Interval

3.2 DARTBROOK WEST SITE

The West Site Surface Facilities includes the Kayuga Entry and the Kayuga Access Road and the Mine Surface Facilities. The Mine Surface Facilities at the West Site include the Dartbrook Mine administration building, bathhouse, workshop, store yard lay-down area, diesel fuelling bay, wash-down area, and the Western Holding Dam. The drainage management plan for these facilities is illustrated in **Figure 3** and discussed below.

The West Site is located immediately west of Dart Brook near its confluence with the Hunter River. An unnamed tributary of the Hunter River passes through the West Site (see **Figure 3**). This tributary meanders to the south-east and enters the Hunter River downstream of Dartbrook Mine. There is a localised ridgeline which separates the catchments of Dart Brook and the unnamed Hunter River tributary. The West Site infrastructure is predominantly located west of this ridgeline and therefore lies within the catchment of the Hunter River tributary.

The No 1 and No 2 Shafts are located adjacent to unnamed tributaries of Dart Brook. These tributaries initially drain to the north but ultimately enter the Dart Brook main channel roughly due east of the No 1 Shaft.

Site runoff is collected in perimeter drains and directed to the Western Holding Dam (WHD). WHD water is contained on site and re-used for mine water supply. The Staged Discharge Dam (SDD) is constructed on the Hunter River tributary that passes through the West Site. Water in the SDD is stored for re-use as a mine water supply or may be discharged to the Hunter River in accordance with Dartbrook's Environment Protection Licence.

The Kayuga Entry and Kayuga Access Road were constructed in accordance with an approved Construction Erosion and Sediment Control Plan. The Kayuga Entry is surrounded by visual bund batters that were constructed at stable slopes and have been topsoiled and revegetated to minimise erosion. The Kayuga Entry overburden emplacement has been constructed with stable batters and has been topsoiled and fully revegetated with grass to minimise erosion.

Drainage is diverted away from the Kayuga Entry by a drain to the north, and the visual bund to the west. A sump has been installed in the base of the Kayuga Entry to collect runoff water. Sump water is pumped to the underground workings.

Topsoil stockpiles at the West Site form part of the bunding around the Kayuga Entry. These bunds were constructed with stable batters and revegetated with grass and legumes to minimise erosion. Runoff from the bunded area is captured and treated by Sediment Dam No 1. These measures ensure that sedimentation of the nearby tributaries is minimised.

The Access Road excavation and embankment batters have been constructed at stable slopes and stabilised/revegetated, where necessary. Runoff from the Access Road cutting in the vicinity of Blairmore Lane collects in sumps and drains to the Western Holding Dam. Western Holding Dam water is re-used for mine water supply.

There are four sediment dams located at the West Site: Sediment Dam No 1, Sediment Dam No 2, Sediment Dam No 3 and No 2 Vent Shaft Runoff Dam. Locations of these dams and their associated drains are shown on **Figure 2**.

Sediment Dam No 1 is located adjacent to the Hunter River tributary and captures runoff from the Kayuga Entry and part of the No 1 Shaft. It overflows to the SDD and therefore drains to the pre-mining Hunter River tributary. The area around the Kayuga Entry would also have drained to the Hunter River tributary under pre-mining conditions. As such, there is no change in the drainage pattern at the Kayuga Entry. The No 1 Shaft would have drained to a tributary of Dart Brook under pre-mining conditions. Bunds have been constructed to prevent sediment-laden runoff to this tributary. By directing runoff from the No 1 Shaft to Sediment Dam No 1, the current sediment controls re-direct some flows from the Dart Brook catchment to the Hunter River tributary catchment. However, given that the No 1 Shaft is at the upper catchment of a 1st order tributary, the volume of

flow being diverted is minimal. In any event, both the undisturbed Dart Brook and Hunter River tributary ultimately drain to the Hunter River.

Sediment Dam No 2 is located adjacent to an overburden bund and on the natural ridgeline. Runoff from the eastern part of the No 1 Shaft is directed to Sediment Dam No 2 by a constructed drain (see **Figure 3**). Under pre-mining conditions, runoff from the No 1 Shaft would have drained to Dart Brook via the adjacent 1st order tributary. Sediment Dam No 2 discharges treated water to Dart Brook, albeit via a constructed drain rather than a natural tributary.

Sediment Dam No 3 is located adjacent to the effluent ponds to treat runoff prior to it entering Dart Brook. This area would have drained to Dart Brook under pre-mining conditions. Therefore, this dam does not alter the natural drainage pattern.

The No 2 Vent Shaft Runoff Dam captures runoff from the No 2 Shaft and discharges the treated water to the adjacent tributary of Dart Brook. This dam does not alter the natural drainage pattern.

Table 5 Sedimentation Dams – Design Parameters

Description	Design Criteria
Nominal Catchment Area	< 5.5 ha
Design Settling Capacity	6 hour, 1 in 10 year ARI Rainfall Event
Storage Volume	1.35 ML
Spillway Capacity	Peak 20 year ARI event

Note: ARI = Average Recurrence Interval

3.3 DARTBROOK EAST SITE

The Dartbrook East Site is located on the western side of Browns Mountain (**Figure 1 Regional Locality**). The East Site is located within the catchment of the Hunter River and runoff drains to the main channel via a number of unnamed tributaries. The crest of Browns Mountain forms the catchment boundary. The Dartbrook East Site contains existing infrastructure, including the CHPP and existing REA. **Section 3.3.1** describes the approved drainage and sediment control works that are in place for the Dartbrook East Site infrastructure.

3.3.1 Existing Erosion and Sediment Controls

The East Site currently contains the CHPP, rail loop, existing Dartbrook REA, the Eastern Holding Dam (EHD) and product and ROM coal stockpiles. The existing drainage management plan for this area is shown in **Figure 2**.

The tributaries of the Hunter River that intersect the East Site can roughly be grouped into three 'branches': northern, central and southern. The northern branch includes one first-order tributary that is intercepted by the East Site and another two tributaries located immediately north of the disturbed area (see **Figure 3**). The tributary within the East Site is considered part of the dirty water catchment. Runoff from that tributary is directed by drains to the EHD. Dartbrook Mine has not altered the drainage paths for the tributaries located north of the East Site.

The tributaries within the central branch have predominantly been intercepted by the East Site and REA. The water management objective for these disturbed catchments is to contain the sediment-laden runoff on site. Runoff from the CHPP area is either captured in a sediment dam (Hardstand Dam or Collector Dam) or directly conveyed (via drains) to the EHD. The Hardstand Dam and Collector Dam both overflow to the EHD. Water from the EHD is contained on site and reused in the CHPP and in the stockpile spray system for dust control.

Water from the EHD can also be transferred to the WHD, SDD or to the Wynn Seam goaf (i.e. it is maintained within the mine water management system).

The central branch of tributaries is also intercepted by the REA. The drainage management strategy for the REA is explained in **Section 3.3.2**.

The southern branch of tributaries passes under the Dartbrook rail spur via culverts adjacent to the Southern Clean Water Dam. The flow paths of these tributaries are not altered from pre-mining conditions.

Topsoil stockpiles at the East Site are located within a bunded area to the north of the EHD. These stockpiles have been temporarily rehabilitated to minimise soil loss. Any runoff from these stockpiles will be contained within the water management system.

3.3.2 Rejects Emplacement Area Controls

The key components of the drainage plan for REA are illustrated in **Figure 2** and the design parameters for these structures are provided in **Table 6**.

Several of the tributaries that traverse through the East Site have been intercepted by the REA. However, the upper reaches of some tributaries are located upstream of the REA. Drainage from these undisturbed sub-catchments is diverted either north to Clean Water Dam 1 or south to REA Diversion Dam. This clean runoff then flows around the disturbed area via a network of catch drains and ultimately enters the Hunter River downstream of the East Site.

Runoff from disturbed catchments, including the rehabilitated REA, is directed via catch drains to sedimentation dams (Northern REA Dam, Southern REA Dam and Stage 4 Dam). These sedimentation dams ultimately report to the EHD. Catch drains have been constructed with sufficient storage and transfer pump capacity to ensure that they are unlikely to overflow.

Additional detail on the management of soil stockpiles is provided in the Soil Stripping Management Plan (SSMP). In accordance with Condition 3.6 (c) the SSMP will be prepared:

for the expansion of the REA, prior to the commencement of reconstruction of the REA, to the requirements of the NSW Resources Regulator and DPE Water. The SSMP must include, but not limited to:

- i) Details to ensure the maximum retrieval of suitable topdressing material and appropriate management of topsoil stockpiles including immediate revegetation to protect from soil erosion and to control potential weed problems;*
- ii) Details of the management of soil stockpiles, soil stripping techniques and scheduling;*
- iii) Control of weed infestation on topsoil stockpile material;*
- iv) Details of estimated quantities of suitable topdressing material required for subsequent respraying on rehabilitated land; and*
- v) A program for reporting on the effectiveness of the soil stripping methods and performance against objectives contained in the soil stripping management plan.*

Soil erosion will be managed by clearing only the minimum area required to be disturbed for the development of the REA and by progressively rehabilitating the REA with grass species appropriate for the control of soil erosion. The REA will be contour ripped and contour drains constructed to minimise the potential for erosion by limiting the effective slope length. Rehabilitated areas will be inspected periodically and any necessary maintenance, including re-sowing and/ or maintenance application of fertilisers will be conducted.

All sediment control works will be regularly inspected and maintained as per this Plan.

Table 6 REA Drainage Management Plan Components

Component/Purpose	Design/Construction Criteria
Diversion Drains	
Divert runoff from undisturbed catchment areas around disturbed areas.	<ul style="list-style-type: none"> • Drains constructed as either excavated channels and/or diversion banks depending on cross slope of the topography. • Maximum longitudinal grades of 0.5%. • Cross section batters constructed to stable slopes (< 3:1) and revegetated to minimise erosion. • Channel capacity designed for the 50 year ARI peak flow. • Maximum flow velocity of 1.5 m/s.
Contour Drain	
<ul style="list-style-type: none"> • Installed on all rehabilitated slopes to minimise the potential for erosion by limiting the effective slope length • Collect runoff from rehabilitated slopes and direct to sediment traps and settling dams prior to passive drainage from the site. 	<ul style="list-style-type: none"> • Installed every 10-20 m increase in elevation. • Maximum longitudinal grades of 0.5- 1.0%. • Channel capacity designed for the 50 year ARI peak flow. • Maximum flow velocity of 1.0 m/s.
Sediment Dams	
<ul style="list-style-type: none"> • Sediment dams - constructed on-site downstream of disturbed areas (rehabilitated areas and clay and topsoil stockpiles) to remove suspended sediment from runoff prior to passive drainage from the site. 	<ul style="list-style-type: none"> • Sediment dams - volume sufficient to cater for the hydraulic through rate equivalent to the average runoff rate for the 6 hour duration, 10 year ARI storm event. • Spillway sized for the 20 year ARI peak flow

3.4 SURFACE AREAS AFFECTED BY MINING SUBSIDENCE

Only two drainage catchments have been affected by subsidence to some degree caused by the Kayuga Seam workings as part of the mining operations. All drainage lines within the area affected by subsidence are low order (1st or 2nd order), and ephemeral. The main channels of Sandy Creek, Dart Brook and the Hunter River have not been affected by subsidence. As such, these watercourses have not experienced any changes in streambed gradient that would increase erosion.

Subsidence of land overlying Dartbrook longwall panels took place progressively over the life of the mine. Subsidence resulted in the formation of shallow trough depressions (relative to existing topography) above longwall panels. Minor surface cracking has also occurred due to tensile strain on the ground surface. Total surface subsidence in the Dartbrook mining area appears to range from 1 m to 1.5 m.

The surface drainage effects of subsidence have varied as follows:

- Initiation of erosion due to surface cracking;
- Localised alteration of surface drainage paths;
- Initiation of stream bed erosion due to local steepening of stream bed grades; and
- Formation of ponding areas.

As necessary, remedial drainage, and erosion and sediment control works were conducted to mitigate the effects of subsidence. Such remedial works included:

- Rehabilitation of surface cracks by ripping and seeding;
- Remedial drainage works to redirect drainage paths, where necessary;
- Cut and/or fill drainage earthworks to re-establish free drainage in ponding areas; and
- Drainage works or stabilisation works to remediate any areas prone to erosion.

It should be noted that a significant surface area that has been undermined, and subject to subsidence effects, is privately owned. All impacts on private properties, including erosion and sediment control measures, were managed in accordance with Property Subsidence Management Plans that were developed in accordance with the Development Consent conditions and in consultation with the landowners. There were no erosion and sediment control measures implemented on privately owned property without the agreement of the landowner.

Any areas affected by mining subsidence on mine owned land will be inspected in accordance with the Extraction Plan, prepared under Condition 3.3 of the Development Consent. The active subsidence phase was found to only last up to 12 months after undermining with no significant subsidence observed since.

There is no further subsidence expected as a result of proposed bord and pillar mining.

3.5 VENTILATION SHAFTS AND OTHER MINOR INFRASTRUCTURE AREAS

Of the two ventilation shafts originally constructed only shaft No1 remains operational. Each shaft has a relatively small surface footprint of approximately 60 m x 60 m. Other minor surface infrastructure, such as gas drainage plants and pipelines, mine dewatering boreholes and drop-holes have generally been decommissioned and rehabilitated.

The November 2005 Development Consent modification also approved the installation of a Nitrogen Injection Plant, Wynn Seam goaf dewatering bores and associated electrical sub-station and return water pipelines. The Nitrogen Injection Plant has since been removed and the site successfully rehabilitated.

The general principles for erosion and sediment control described in **Section 3.1** will be adopted in the design and construction, and eventual removal, of any remaining infrastructure, where necessary.

3.6 EVAPORATION PONDS

The Evaporation Ponds overlying the underground workings are used to manage surplus mine water. When it is necessary to reduce the storage volume in the Wynn Seam goaf, water is pumped from the underground workings to the surface ponds for passive disposal via evaporation. The dissolved salts in mine water are left behind by the evaporation process. As a result, there is significant accumulation of saline material within the Evaporation Ponds.

Water management controls are implemented to prevent saline soils from entering the surrounding environment. Mine water is only pumped from the Wynn Seam goaf to the Evaporation Ponds when there is sufficient receiving capacity in the ponds. In the event of a large storm, the Evaporation Ponds would spill to the adjacent Overflow Dam. If required, water can be pumped from the Overflow Dam to other mine water storages (including back to the Wynn Seam goaf) to prevent uncontrolled discharges. That is, saline soils and residues within the Evaporation Pond can be contained within the mine water management system.

No naturally occurring sources of saline soils are present at Dartbrook Mine.

4. MONITORING AND REPORTING

4.1 MONITORING

The following monitoring will be conducted to ensure that effective erosion and sediment control is implemented and maintained during Dartbrook operations:

- Mine surface infrastructure areas will be inspected after significant runoff events to ensure that erosion and sedimentation are being effectively controlled. Any areas that are eroding will have appropriate controls installed. A significant run-off event is taken to be a rainfall event where >20mm of rainfall is received within a 24-hour period.
- Drainage and sediment control structures will be inspected after significant runoff events to check for scouring of diversion drains and sedimentation of sediment traps and settling dams. Sediment control structures will be desilted as necessary as per the General Design Criteria (see **Table 4**) and any scouring of drains will be stabilised.
- Mine owned land affected by mining subsidence will be inspected bi-monthly during the active subsidence phase and appropriate erosion and sediment controls will be installed, if necessary.
- Erosion and sediment control on privately owned land affected by mining subsidence will be monitored in accordance with the monitoring program specified in landowner agreements, developed in consultation with the landowner.

Details of erosion and sediment control measures implemented during recommencement of construction and operations will be reported in the Annual Review, as discussed in **Section 4.2**.

4.2 CONTINGENCY PLAN

The dirty water management system has been designed such that all runoff from disturbed areas is captured and either contained on-site or treated for passive release (using sediment dams). Accordingly, it is not expected that sediment-laden runoff will be discharged off-site. However, if there is an event that causes an unanticipated erosion or sedimentation issue, following contingency plan will be implemented:

- Suspend any activities that may be contributing to the unanticipated event;
- Conduct an investigation into the cause of the unanticipated event, with assistance from experts (where necessary);
- If the investigation determines that Dartbrook Mine has contributed to the unanticipated event, appropriate response measures will be developed;
- Notify the Secretary and relevant agencies of the unanticipated event, the outcomes of the investigation and the proposed response measures;
- Undertake the recommended response measures in consultation with the relevant agencies; and
- Update this management plan with the proposed response measures to mitigate against similar impacts occurring in the future.

If the investigation determines that the unanticipated event is not caused by activities at Dartbrook Mine, regular operations can recommence without any further action.

4.3 ANNUAL REPORTING

In accordance with Condition 9.2 of the Development Consent, an Annual Review will be prepared by the end of March, each year and submitted to the Secretary. This review will:

- (i) *Describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;*
- (ii) *Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the:*
 - *Relevant statutory requirements, limits or performance measures/criteria;*
 - *Requirements of any plan or program required under the Development Consent;*
 - *Monitoring results of previous years; and*
 - *Relevant predictions in the documents referred to in Condition 1.1(a) of the Development Consent;*
- (iii) *Identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance or incident and avoid reoccurrence;*
- (iv) *Evaluate and report on:*
 - *The effectiveness of the noise and air quality management systems;*
 - *Socio-economic impact of the development including the workforce characteristics of the previous calendar year; and*
 - *The surveillance of any prescribed dam on the site to the satisfaction of the DSC;*
 - *The outcome of the water budget for the year, the quantity of water used from water storages and details of discharge of any water from the site; and*
 - *Compliance with the performance measures, criteria and operating conditions in this consent;*
- (v) *Identify any trends in the monitoring data over the life of the development;*
- (vi) *Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and*
- (vii) *Describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.*

Copies of the Annual Review will be submitted to the Department of Housing and Infrastructure (DPHI), Muswellbrook Shire Council, Upper Hunter Shire Council and made available to the Community Consultative Committee and any interested person upon request.

A comprehensive summary of water monitoring results and the Annual Review will also be made publicly available on the Dartbrook Website, in accordance with Condition 13 of the Development Consent.

4.4 INCIDENT AND NON-COMPLIANCE REPORTING

In the event that an incident occurs, Dartbrook will immediately notify DPHI and other relevant authorities of the incident in accordance with Condition 9.3 (a) of the Development Consent.

In the event that a non-compliance occurs, Dartbrook will notify DPHI in accordance with Condition 9.3 (b) of the Development Consent.

As per **Section 4.2** all incidents and non-compliances will be reported in the Annual Review.

5. RESPONSIBILITIES

The Environmental Officer will be responsible for ensuring that the requirements of this management plan are implemented. Specific responsibilities of the Environmental Officer will include:

- Ensuring that all personnel are given adequate training in environmental awareness, legal responsibilities, and erosion and sediment control methods;
- Ensuring mine personnel are aware of the appropriate erosion and sediment control works required to be installed in areas disturbed by mining operations;
- Erosion and sediment control monitoring in accordance with **Section 4**; and
- Undertaking inspections to ensure erosion and sediment control works are adequately maintained.

6. REVIEW REQUIREMENTS

Condition 3.2 (f) (viii) of the Development Consent requires that all management plans include a protocol for periodic review of the plan. Further to this, Condition 3.2 (k) requires:

...the suitability of existing strategies, plans and programs be reviewed within three months of:

- *The notification of an incident under Condition 9.3 (a);*
- *The submission of an Annual Review under Condition 9.2 (a);*
- *The submission of an Independent Environmental Audit (IEA) under Condition 8.1 (a); or*
- *The approval of any modification of the conditions of this consent (unless the condition specifies otherwise), the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.*

Condition 3.2 (l) of the Development Consent, also states:

... if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary. Where revisions are required, the revised document must be submitted to the Secretary for approval within six weeks of the completion of the review on Condition 3.2 (j).

This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.

This ESCP will be reviewed (and revised if necessary) in accordance with the above and/or prior to any changes in mining.

REFERENCES

- DPI Water (2012). *Controlled Activities on Waterfront Land*.
- DPI (2013). *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management*.
- Hansen Bailey (2018). *Environmental Assessment, Modification 7, Kayuga Seam Bord and Pillar Mining Operations*.
- Hansen Bailey (2021). *Modification 7 Updated Response to Contentions*.
- HLA-Envirosciences (2000). *Dartbrook Extended Environmental Impact Statement*.
- Landcom (2004). *Managing Urban Stormwater: Soils and Construction – Volume 1: Blue Book*.
- NSW DECC (2008). *Managing Urban Stormwater: Soil and Construction – Volume 2A: Installation of Services*.
- NSW DECC (2008). *Managing Urban Stormwater: Soil and Construction – Volume 2C: Unsealed Roads*.
- NSW DECC (2008). *Managing Urban Stormwater: Soil and Construction – Volume 2E: Mines and Quarries*.
- NSW Fisheries (2003). *Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings*.
- Muswellbrook Shire Council (2009). *Muswellbrook Shire Development Control Plan, Section 20 Erosion and Sediment Control*.

ABBREVIATIONS

Abbreviation	Meaning
AQC	Australian Pacific Coal
CCC	Community Consultative Committee
CHPP	Coal Handling and Preparation Plant
DA	Development Application
Dartbrook Operation	Dartbrook Operations Pty Ltd
DPE	Department of Planning & Environment (now DPHI)
DPHI	Department of Planning, Housing and Infrastructure
EHD	Eastern Holding Dam
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
ESCP	Erosion and Sediment Control Plan
IPCN	Independent Planning Commission NSW
REA	Rejects Emplacement Area
ROM	Run of Mine
SDD	Staged discharge Dam
SSMP	Soil Stripping Management Plan
Tetra	Tetra Resources Pty Ltd
WHD	Western Holding Dam

APPENDIX A
STAKEHOLDER CONSULTATION

Our ref: DA231-07-2000-PA-9

Jeff Beatty
General Manager
AQC Dartbrook Management Pty Ltd
6 Stair Street
Kayuga NSW 2333

18 January 2023

Subject: Approval of Erosion and Sediment Control Plan

Dear Mr Beatty

I refer to the Dartbrook Mine Erosion and Sediment Control Plan (Version 12, dated December 2022), which has been prepared in accordance with condition 3.6 (a) and (b) of DA231-07-2000.

The Department has carefully reviewed the revised Erosion and Sediment Control Plan and is satisfied that it addresses the relevant requirements of the development consent.

Accordingly, the Planning Secretary has approved the revised Erosion and Sediment Control Plan (Version 12, dated December 2022).

You are reminded that if there are any inconsistencies between the Erosion and Sediment Control Plan and the conditions of approval, the conditions prevail. Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Joe Fittell on 02 4908 6896.

Yours sincerely



Stephen O'Donoghue
Director
Resource Assessments
as nominee of the Secretary