

# DARTBROOK MINE

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## REHABILITATION MANAGEMENT PLAN

*for Australian Pacific Coal Limited*

*12 August 2022*



## DOCUMENT CONTROL

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# 1. INTRODUCTION TO MINING PROJECT

The *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021* commenced on 2 July 2021 and introduced new standard mining lease conditions for mine rehabilitation, including the requirement for a Rehabilitation Management Plan (RMP, this document). This RMP has been prepared in accordance with the prescribed “*Form and Way: Rehabilitation Management Plan for Large Mines*” (NSW Resources Regulator, 2021) and *Clauses 9 of Schedule 8A of the Mining Regulation 2016*.

## 1.1 HISTORY OF OPERATIONS

AQC Dartbrook Management Pty Limited (AQC) is the proprietor and operator of the Dartbrook Mine, which is an underground coal mine located in the Upper Hunter region of New South Wales. AQC is a subsidiary of Australian Pacific Coal Limited.

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.

**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 to alter 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"><li>Continued use of Dartbrook Road to provide access to the West Site; and</li><li>Use of local public roads by traffic associated with Dartbrook Mine.</li></ul> <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>
MOD 4	30 March 2004	DA 231-7-2000 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

Modification	Approval Date	Activities
		rejects to be transported to the Rejects Emplacement Area (REA) using trucks.
MOD 6	16 November 2005	<p>MOD 6 provided approval for the following activities:</p> <ul style="list-style-type: none"> <li>• Establishment of four new ROM coal stockpiles and expansion of the existing emergency ROM coal stockpile at the CHPP;</li> <li>• Disposal of tailings within the Wynn Seam goaf; and</li> <li>• Operation of a Nitrogen Injection Plant to prevent the oxidation of coal.</li> </ul>
MOD 7	11 March 2022	<p>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.</p>

AQC acquired ownership of Dartbrook Mine in May 2017. Dartbrook Mine has been under care and maintenance for the entire period of AQC's ownership. As such, AQC has not conducted any significant surface disturbance activities at the site.

Previous surface disturbance at Dartbrook has occurred primarily through the construction of surface infrastructure, which includes the following:

- The West Site, which includes the administration office, workshop, mine portals, and water management infrastructure;
- The East Site, which include the CHPP, coal stockpiles, train loadout facility, rail loop, rehabilitated Reject Emplacement Area (REA) and water management infrastructure; and
- Two ventilation shafts.

Most of this infrastructure was constructed in the mid-1990s under the previous development consent (DA 30/91).

DA 30/91 also authorised longwall mining of the Wynn Seam, which was conducted from 1996 to May 2004. Longwall mining activities were then relocated to the Kayuga Seam and conducted in accordance with DA 231-07-2000 until October 2006. DA 231-07-2000 also authorises longwall mining of the Mt Arthur and Piercefield coal seams, however neither seam has been extracted to date. No mining activities have been undertaken since Dartbrook was placed under care and maintenance by the previous owner in December 2006.

The REA is located on the slopes of Browns Mountain adjacent to the East Site. The REA was progressively developed during previous longwall mining activities. Previous disturbance associated with the REA has been rehabilitated.

Various exploration programs have been undertaken within the Dartbrook mining authorities since the early 1980s, including the most recent exploration program undertaken by AQC in 2018. Historical exploration boreholes have been sealed and rehabilitated, exception for some boreholes that are currently used for groundwater monitoring.

## 1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

**Table 2** lists the Development Consent, mining authorities and other regulatory approvals and licences held by AQC.

**Table 2** Dartbrook Approvals

Name	Grant Date	Expiry Date
<b>Development Consent</b>		
DA 231-7-2000	28 August 2001	5 December 2027
<b>Mining Authorities</b>		
Coal Lease 386	19 December 1991	19 December 2033
Mining Lease 1381	23 October 1995	23 October 2016*
Mining Lease 1456	27 September 1999	26 September 2020
Mining Lease 1497	6 December 2001	5 December 2022
Authorisation 256	16 December 1980	2 May 2015*
Exploration Licence 4574	13 August 1993	7 April 2015*
Exploration Licence 4575	13 August 1993	23 May 2016*
Exploration Licence 5525	22 September 1998	21 September 2016*
<b>Emplacement Area Approvals</b>		
Emplacement Area Approval C95/2265 (s126 approval)	13 March 1996	N/A
Stage 4 Reject Emplacement Approval C95/2265 (s126 approval)	2 January 2000	N/A
Approval for 14° slopes in the REA Stage 4 (s126 approval)	18 December 2003	N/A
Application for Discontinuance of Use of Emplacement Areas (s101 approval)	13 August 2007	N/A
<b>Licences</b>		
Environmental Protection Licence (EPL) 4885	30 November 2000	N/A
Notification to Work Cover for storage and handling of Dangerous Goods	10 November 2005	N/A
Notification and Declaration to WorkCover that no dangerous goods stored or handled at Dartbrook Mine	Submitted 13 December 2006	N/A
Radiation Licence 5061080	1 July 2013	14 August 2022

*Note: \*Renewal sought*

Given that Dartbrook is currently under care and maintenance, the working requirement under AQC's mining leases has been suspended.

Prior to Dartbrook being placed under care and maintenance, the previous owner held discussions with the Department of Planning (as it was then) regarding the applicability of DA 231-07-2000 during suspension of

mining operations. It was agreed that Dartbrook Mine should continue to operate within the “spirit and intent” of the Development Consent with some minor adjustments to specific conditions commensurate with the level and nature of activities during care and maintenance.

## 1.3 LAND OWNERSHIP AND LAND USE

### 1.3.1 Land Ownership

Prior to 2022, AQC owned that land containing the Dartbrook Mine surface infrastructure. In early 2022, AQC sold most of its landholdings to a private joint venture that was interested in using the land for post-mining agricultural activities.

The land within the western extent of the mining authorities is owned by MACH Energy Australia Pty Limited (MACH Energy), which is the owner of the neighbouring Mount Pleasant Mine.

The parcels of land located within the mining authorities are listed in **Table 3** and the ownership of this land is depicted in **Figure 1**.

**Table 3** Schedule of Land Ownership

ID	Lot	Section	DP	Ownership
5	164		750951	Private Freehold
6	164		750951	Private Freehold
8	165		750951	Private Freehold
14	1771		1175346	Private Freehold
15	1770		1175346	Private Freehold
16	1772		1175346	Private Freehold
17	176		750951	Private Freehold
18	2		1103375	Private Freehold
19	1		1103375	Private Freehold
20	195		750951	Private Freehold
21	204		750951	Private Freehold
22	196		750951	Private Freehold
23	191		750951	AQC
24	190		750951	Private Freehold
25	2		1001266	Private Freehold
26	1		1001266	Private Freehold
27	167		750951	Private Freehold
32	178		750951	Private Freehold
34	181		750951	Private Freehold
35	178		750951	Private Freehold
36	180		750951	Private Freehold
37	179		750951	Private Freehold
38	183		750951	Private Freehold



ID	Lot	Section	DP	Ownership
39	192		750951	Private Freehold
40	10		789319	Private Freehold
41	11		789319	Private Freehold
42	2		578034	Private Freehold
43	1852		582597	Private Freehold
44	186		750951	Private Freehold
45	187		750951	Private Freehold
46	188		750951	Private Freehold
47	189		750951	Private Freehold
48	168		750951	Private Freehold
51	169		750951	Private Freehold
53	171		750951	Private Freehold
54	172		750951	Private Freehold
55	173		750951	Private Freehold
57	174		750951	Private Freehold
58	175		750951	Private Freehold
68	110		873834	Private Freehold
69	110		873834	Private Freehold
70	A		940118	Private Freehold
73	A		389101	Private Freehold
74	2		709576	Private Freehold
75	1		709576	Private Freehold
76	1		601918	Private Freehold
81	1		105260	Private Freehold
82	1		961491	Private Freehold
84	153		752485	Private Freehold
85	2		601918	Private Freehold
94	2		835733	Private Freehold
100	1		997444	Private Freehold
101	111		714211	AQC
107	111		714211	AQC
132	101		1124883	Private Freehold
133	166		750926	MACH Energy
134	167		750926	MACH Energy
136	102		1124883	MACH Energy
137	102		1124883	MACH Energy

ID	Lot	Section	DP	Ownership
138	163		750926	MACH Energy
139	164		750926	MACH Energy
140	203		750926	MACH Energy
141	2		223787	MACH Energy
142	165		750926	MACH Energy
143	109		750926	MACH Energy
144	102		1124883	MACH Energy
145	11		253397	Private Freehold
146	12		253397	Private Freehold
147	13		253397	Private Freehold
148	160		750926	Private Freehold
149	159		750926	Private Freehold
150	158		750926	Private Freehold
151	155		750926	Private Freehold
152	157		750926	Private Freehold
153	156		750926	Private Freehold
154	14		253397	Private Freehold
155	15		253397	Private Freehold
156	113		750926	Private Freehold
157	108		750926	Private Freehold
158	1		505544	Private Freehold
159	2		505544	Private Freehold
160	111		873834	Private Freehold
161	111		873834	Private Freehold
162	114		750926	Private Freehold
163	24		750926	Private Freehold
164	22		750926	Private Freehold
165	23		750926	Private Freehold
166	14		750926	Private Freehold
167	183		750926	Private Freehold
168	25		750926	Private Freehold
169	277		750926	Crown
170	1		835733	AQC
171	7301		1146826	Crown
172	1		835733	AQC
173	1	23	758554	Private Freehold

ID	Lot	Section	DP	Ownership
174	14	23	758554	Private Freehold
175	2	23	758554	Private Freehold
176	13	23	758554	Private Freehold
177	3	23	758554	Private Freehold
178	12	23	758554	Private Freehold
179	4	23	758554	Private Freehold
180	11	23	758554	Private Freehold
181	5	23	758554	Private Freehold
182	10	23	758554	Private Freehold
183	6	23	758554	Private Freehold
184	9	23	758554	Private Freehold
185	7	23	758554	Private Freehold
186	8	23	758554	Private Freehold
187	1	16	758554	Private Freehold
188	8	16	758554	Private Freehold
189	1		835733	AQC
190	286		729019	Private Freehold
191	4	22	758554	Private Freehold
192	7	22	758554	Private Freehold
193	5	22	758554	Private Freehold
194	6	22	758554	Private Freehold
195	1	17	758554	Private Freehold
196	10	17	758554	Private Freehold
197	2	17	758554	Private Freehold
198	9	17	758554	Private Freehold
199	3	17	758554	Private Freehold
200	8	17	758554	Private Freehold
201	4	17	758554	Private Freehold
202	7	17	758554	Private Freehold
203	5	17	758554	Private Freehold
204	6	17	758554	Private Freehold
205	1	21	758554	Private Freehold
206	10	21	758554	Private Freehold
207	2	21	758554	Private Freehold
208	9	21	758554	Private Freehold
209	3	21	758554	Private Freehold

ID	Lot	Section	DP	Ownership
210	8	21	758554	Private Freehold
211	4	21	758554	Private Freehold
212	7	21	758554	Private Freehold
213	5	21	758554	Private Freehold
214	6	21	758554	Private Freehold
215	832		599850	Private Freehold
216	1		835733	AQC
217	244		750926	Private Freehold
218	243		750926	Private Freehold
219	1		835733	Private Freehold
220	3	2	758554	Private Freehold
221	4	2	758554	Private Freehold
222	5	2	758554	Private Freehold
223	285		750926	Private Freehold
224	1	20	758554	Private Freehold
225	10	20	758554	Private Freehold
226	2	20	758554	Private Freehold
227	9	20	758554	Private Freehold
228	3	20	758554	Private Freehold
229	8	20	758554	Private Freehold
230	4	20	758554	Private Freehold
231	7	20	758554	Private Freehold
232	5	20	758554	Private Freehold
233	6	20	758554	Private Freehold
234	7302		1146788	Crown
235	284		750926	Private Freehold
236	2	19	758554	Private Freehold
237	1	19	758554	Private Freehold
238	1		1043519	Private Freehold
239	8	19	758554	Private Freehold
240	4	19	758554	Private Freehold
241	7	19	758554	Private Freehold
242	5	19	758554	Private Freehold
243	6	19	758554	Private Freehold
244	1	13	758554	Private Freehold
245	1	9	758554	Private Freehold

ID	Lot	Section	DP	Ownership
246	2	9	758554	Private Freehold
247	3	9	758554	Private Freehold
248	4	9	758554	Private Freehold
249	5	9	758554	Private Freehold
250	6	9	758554	Private Freehold
251	12	9	758554	Private Freehold
252	11	9	758554	Private Freehold
253	10	9	758554	Private Freehold
254	9	9	758554	Private Freehold
255	8	9	758554	AQC
256	7	9	758554	Private Freehold
257	1	3	758554	Private Freehold
258	2	3	758554	Private Freehold
259	3	3	758554	Private Freehold
260	4	3	758554	Private Freehold
261	5	3	758554	Private Freehold
263	1	12	758554	MACH Energy
264	2	12	758554	MACH Energy
265	3	12	758554	MACH Energy
266	4		666721	MACH Energy
267	1		113230	Private Freehold
268	5	12	758554	Private Freehold
269	6	12	758554	Private Freehold
270	11	12	758554	Private Freehold
271	10	12	758554	Private Freehold
272	9	12	758554	Private Freehold
273	8	12	758554	Private Freehold
274	7	12	758554	Private Freehold
275	1		112745	Private Freehold
276	2		112745	Private Freehold
277	1	10	758554	Private Freehold
278	2	10	758554	Private Freehold
279	3	10	758554	Private Freehold
280	4	10	758554	Private Freehold
281	5	10	758554	Private Freehold
282	6	10	758554	Private Freehold

ID	Lot	Section	DP	Ownership
283	7303		1146789	Crown
284	11	10	758554	Private Freehold
285	10	10	758554	Private Freehold
286	9	10	758554	Private Freehold
287	8	10	758554	Private Freehold
288	7	10	758554	Private Freehold
289	287		823092	Private Freehold
290	1	11	758554	Private Freehold
291	2	11	758554	Private Freehold
292	3	11	758554	Private Freehold
293	4	11	758554	Private Freehold
294	1		823126	Private Freehold
295	3		835733	Private Freehold
296	1		835733	AQC
297	3		835733	Private Freehold
298	1		835733	AQC
299	18		844652	Private Freehold
300	17		844652	Private Freehold
301	16		844652	Private Freehold
302	1453		628493	Private Freehold
305	63		833348	AQC
306	63		833348	AQC
309	1		823759	Private Freehold
310	63		833348	AQC
326	207		750926	MACH Energy
327	21		870608	Private Freehold
328	22		870608	Private Freehold
329	200		750926	Private Freehold
330	110		750926	MACH Energy
331	155		750926	Private Freehold
332	154		750926	Private Freehold
333	153		750926	Private Freehold
334	94		665393	Private Freehold
335	1		312392	MACH Energy
336	74		750926	Private Freehold
337	73		750926	Private Freehold

ID	Lot	Section	DP	Ownership
338	45		750926	MACH Energy
339	152		750926	Private Freehold
340	86		750926	Private Freehold
341	13		750926	Private Freehold
342	12		659924	Private Freehold
343	11		1051153	Private Freehold
344	28		750926	MACH Energy
345	36		1108421	MACH Energy
348	11		112742	Private Freehold
355	7		112742	Private Freehold
357	1		911212	Private Freehold
358	10		750926	Private Freehold
359	3		112745	Private Freehold
360	9		750926	Private Freehold
363	1	28	758554	Private Freehold
364	8	28	758554	Private Freehold
365	2	28	758554	Private Freehold
366	7	28	758554	Private Freehold
367	3	28	758554	MACH Energy
368	6	28	758554	MACH Energy
369	4	28	758554	MACH Energy
372	1	29	758554	Private Freehold
373	2	29	758554	Private Freehold
374	3	29	758554	Private Freehold
382	1	1	2770	Private Freehold
383	2	1	2770	MACH Energy
384	3	1	2770	Private Freehold
387	3	2	2770	Private Freehold
450	128		750926	MACH Energy
451	129		750926	MACH Energy
452	130		750926	MACH Energy
453	131		750926	MACH Energy
454	131		750926	MACH Energy
455	185		750926	MACH Energy
456	192		750926	MACH Energy
457	176		750926	MACH Energy

ID	Lot	Section	DP	Ownership
458	132		750926	MACH Energy
459	186		750926	MACH Energy
460	191		750926	MACH Energy
461	175		750926	MACH Energy
462	133		750926	MACH Energy
479	A		174071	MACH Energy
480	93		750926	MACH Energy
481	B		174071	MACH Energy
549	15		112742	MACH Energy
550	13		112742	MACH Energy
553	14		112742	MACH Energy

### 1.3.2 Land Use

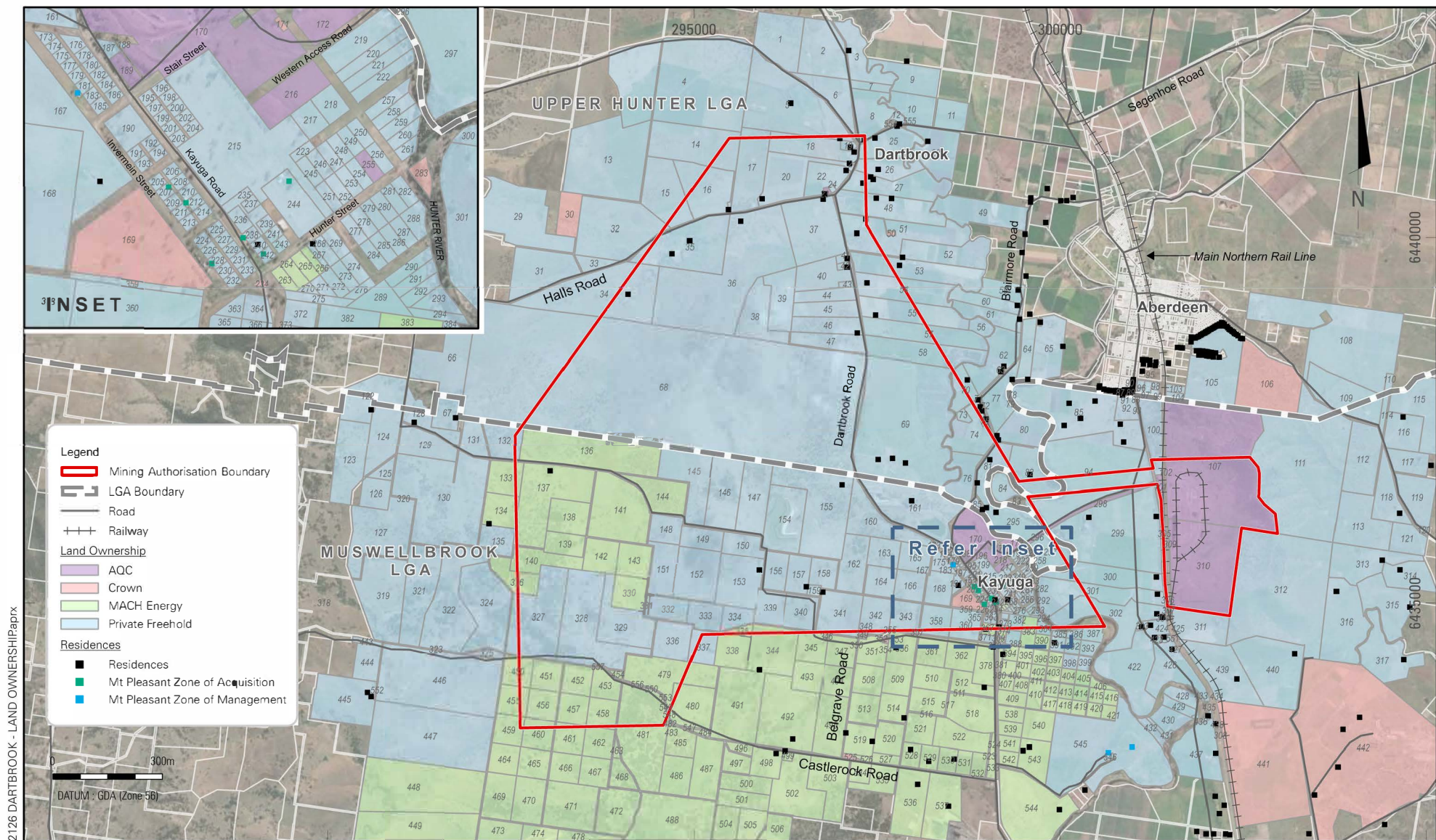
The land at Dartbrook Mine was historically used for dryland cattle grazing. Land within the Hunter River floodplain is suitable for intensive agriculture, dairy farming, and irrigated crop cultivation.

The existing surface facilities are located outside of the Hunter River floodplain and are currently used exclusively for mining purposes. Land that is not required for mining purposes is used for agricultural purposes, wherever possible. A cattle grazing trial was successfully conducted within the rehabilitated REA in 2015/2016.

The Garoka Dairy occupies the land between the East Site and West Site, and is an amalgamation of four farms to the east of the Hunter River and one farm at the confluence of the Hunter River and Dart Brook. The Garoka Dairy has been operational since 1992 and in recent years, has been managed by licensees of AQC. The dairy can support approximately 700 head of dairy cattle.

The new owners of the land previously held by AQC have indicated that their intention is to use the land for agricultural activities following mine closure.





## 2. FINAL LAND USE

This section identifies the intended post-mining land use and outlines the regulatory requirements that are applicable to mine closure.

### 2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

**Table 2** lists the regulatory approvals that relate to Dartbrook Mine. **Table 4** lists the conditions of these approvals that are relevant to rehabilitation.

Although Dartbrook Mine is currently under care and maintenance, DA 231-07-2000 allows for mining operations to be conducted until 5 December 2027. Given that there is the opportunity for further mining to be undertaken, rehabilitation activities will only commence after the approved period of mining operations.

**Table 4** Regulatory Requirements

Condition	Requirement	Applicable Area	Timing
<b>DA 231-07-2000</b>			
Schedule 2, Condition 3.7	<p>(a) The Applicant must rehabilitate the site to the satisfaction of the Resources Regulator. The rehabilitation must be generally consistent with the proposed rehabilitation activities described in the documents referred to in Condition 1.1(a) and comply with the objectives in Table 3.</p> <p>(b) The rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by all underground mining as part of the development and to all surface infrastructure components of the development.</p> <p>(c) Where remediation of watercourses is likely to cause environmental consequences greater than those that require rehabilitation, alternative equivalent works may be undertaken within the affected watercourse.</p> <p>(d) The applicant must rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable steps must be taken to minimise the total area exposed at any time. Interim stabilisation and temporary vegetation strategies must be employed when areas prone to dust generation, soil erosion and weed incursion cannot be permanently rehabilitated.</p> <p><i>Note: This condition does not prevent further disturbance at some later stage of the development of areas that have been rehabilitated.</i></p>	Entire Site	Mine closure phase
<b>Mining Leases (CL386, ML1381, ML1456, ML1497)</b>			

Condition	Requirement	Applicable Area	Timing
New standard condition	<p><b>Rehabilitation to occur as soon as reasonably practicable after disturbance</b></p> <p>The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.</p>	Entire site	Mine closure phase
New standard condition	<p><b>Rehabilitation must achieve final land use</b></p> <p>(1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area.</p> <p>(2) The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1).</p> <p>(3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1).</p> <p><i>Note— Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause.</i></p> <p>(4) In this clause—</p> <p><b>final land use</b> for the mining area means the final landform and land uses to be achieved for the mining area—</p> <p>(a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and</p> <p>(b) for a large mine—as spatially depicted in the final landform and rehabilitation plan, and</p> <p>(c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease—as stated in the condition.</p> <p><b>planning approval</b> means—</p> <p>(a) a development consent within the meaning of the <i>Environmental Planning and Assessment Act 1979</i>, or</p> <p>(b) an approval under that Act, Division 5.1.</p>	Entire site	Mine closure phase
<b>Exploration Licences (A256, EL4574, EL4575, EL5525)</b>			
Schedule 1, Condition 6	The licence holder must carry out rehabilitation of all disturbance caused by activities carried out under this licence in accordance with the requirements in Part B of the Exploration Code of Practice Rehabilitation ( <i>NSW Department of Industry</i> ) to the satisfaction of the Minister.	Entire site	Mine closure phase

Table 3 of DA 231-07-2000 prescribes specific rehabilitation objectives for different areas of the site. These rehabilitation objectives are reproduced in **Table 5**.



**Table 5 Rehabilitation Objectives under DA 231-07-2000**

Feature	Objective
All areas of the site affected by the development	<ul style="list-style-type: none"> <li>• Safe, stable and non-polluting</li> <li>• Fit for the intended post-mining land use/s</li> </ul>
Areas proposed for native ecosystem re-establishment	<ul style="list-style-type: none"> <li>• Establish self-sustaining ecosystems comprising flora species selected to re-establish and complement local and regional biodiversity</li> </ul>
Areas proposed for agricultural or pastoral use	<ul style="list-style-type: none"> <li>• Nominated land capability classification is achieved and is self-sustaining</li> </ul>
Final landform	<ul style="list-style-type: none"> <li>• Consistent with surrounding topography to minimise visual impacts</li> <li>• Incorporate relief patterns and design principles consistent with natural drainage</li> </ul>
Rehabilitation materials	<ul style="list-style-type: none"> <li>• Soil and vegetative materials from areas disturbed under this consent (including topsoils, substrates and seeds) are recovered, managed and used as rehabilitation resources</li> </ul>
Surface infrastructure of the development	<ul style="list-style-type: none"> <li>• Decommissioned and removed, unless the Resources Regulator agrees otherwise</li> <li>• All surface infrastructure sites are to be revegetated consistent with the post-mining land use</li> </ul>
Portals and vent shafts of the development	<ul style="list-style-type: none"> <li>• To be decommissioned and made safe and stable</li> <li>• Retain habitat for threatened species (e.g. bats), where practicable</li> </ul>
Watercourses subject to mine water discharges and/or subsidence impacts or environmental consequences that are greater than negligible	<ul style="list-style-type: none"> <li>• Hydraulically and geomorphologically stable</li> <li>• Aquatic ecology and riparian vegetation that is the same or better than prior to grant of this consent</li> </ul>
Water quality	<ul style="list-style-type: none"> <li>• Water retained on the site is fit for the intended post-mining land use/s</li> <li>• Water management is consistent with the regional catchment management strategy</li> </ul>
Built features damaged by mining operations	<ul style="list-style-type: none"> <li>• Repair to pre-mining condition or equivalent unless the: <ul style="list-style-type: none"> <li>○ Owner agrees otherwise; or</li> <li>○ Damage is fully restored, repaired or compensated for under the <i>Coal Mine Subsidence Compensation Act 2017</i></li> </ul> </li> </ul>
Cliffs, minor cliffs, rock face features and steep slopes	<ul style="list-style-type: none"> <li>• No additional risk to public safety compared to prior to mining</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Ensure public safety</li> <li>• Minimise adverse socio-economic effects associated with mine closure</li> </ul>

## 2.2 FINAL LAND USE OPTIONS ASSESSMENT

The conditions of DA 231-07-2000 and AQC's mining leases that are relevant to rehabilitation and mine closure are listed in **Table 4**. None of these conditions prescribe a specific post-mining land use for the land at Dartbrook Mine.

In early 2022, AQC sold most of its landholding to a party that intends to conduct grazing operations, both during the remainder of the mine life and post-mining. As such, agriculture is the intended post-mining land use.

AQC retains ownership of the land that contains the existing surface infrastructure (i.e. East Site and West Site). Following completion of mining, these assets will be dealt with in accordance with this Plan to achieve the intended post-mining land use.

Dartbrook Mine is located within the Muswellbrook and Upper Hunter Local Government Areas (LGAs). The portion of Dartbrook Mine in the Muswellbrook LGA is located on land zoned as RU1 (Primary Production) and C3 (Environmental Management). The *Muswellbrook Local Environmental Plan 2009* (Muswellbrook LEP) states that agriculture is permissible within both these zones.

The portion of Dartbrook Mine in the Upper Hunter LGA is located on land zoned as RU4 (Primary Production Small Lots). The *Upper Hunter Local Environmental Plan 2013* (Upper Hunter LEP) states that agriculture is permissible in zone RU4.

Throughout the life of Dartbrook Mine, grazing has been undertaken on lands that are not required for operational activities. Grazing has successfully been conducted on land affected by subsidence as well as the rehabilitated REA. As such, agriculture is a suitable post-mining land use at the site.

## 2.3 FINAL LAND USE STATEMENT

### 2.3.1 Overview

The intended post-mining land use for the land at Dartbrook Mine is agriculture (primarily grazing). This post-mining land use has been determined in consultation with the new landowner. These discussions have identified that several items of infrastructure would be of utility for the post-mining land use. These assets will be retained for future agricultural uses, as explained in **Section 2.3.2**.

The rail loop and spur at the East Site is proposed to be retained for the benefit of Australian Rail Track Corporation (ARTC).

The infrastructure items that are not proposed to be retained will be decommissioned and removed. These disturbed areas will generally be restored to Land Capability Classes III, IV, V or VI, which are suitable for dryland grazing and occasional cropping.

As such, the following infrastructure is proposed to be retained for future agricultural use:

- Administration building and car park;
- West Site workshop and store;
- Western Access Road; and
- Water management infrastructure.

### 2.3.2 Assets to be Retained

**Table 6** lists the assets that are proposed to be retained, and the potential future uses of these assets.

**Table 6** Assets to be Retained

Asset	Potential Future Uses
Administration building and car park	To be used by the new landowner for their agricultural enterprises. The function of these structures is likely to be unchanged (i.e. offices, amenities and parking).

Asset	Potential Future Uses
West Site workshop and store	To be used by the new landowner for their agricultural enterprises. The function of these structures is likely to be unchanged (i.e. storage and maintenance facilities).
Sediment dams	Will maintain their function as sediment dams.
Mine water dams	<ul style="list-style-type: none"> <li>The Eastern Holding Dam, Western Holding Dam and Staged Discharge Dam will be re-purposed as clean water storages for agricultural use. This will require the removal of mine water, removal of residual sediment/sludges, and rehabilitation of the disturbed catchment.</li> <li>The existing discharge pipeline from the Staged Discharge Dam to Dart Brook will be retained. Instead of being used for discharge, this pipeline will be used for licensed extraction of water (i.e. the pumping direction is reversed). The Staged Discharge Dam may require some modifications to facilitate inflow of water from the pipeline.</li> </ul> <p>The re-purposing of these water storages will improve the drought resilience of the future agricultural enterprises.</p>
Western Access Road	The Western Access Road is a private road that provides access to the West Site. It is proposed that the road will be retained as a private access road for the new land owner.
Rail loop and spur	The rail infrastructure is currently leased to Australian Rail Track Corporation (ARTC). Following mine closure, it is envisaged that ARTC will continue the existing lease or acquire ownership of the asset.

### 2.3.3 Assets to be Decommissioned

The infrastructure components that are not required for post-mining land uses will be decommissioned and removed.

#### *East Site*

The following infrastructure at the East Site is proposed to be decommissioned:

- CHPP including conveyors, transfer stations and ancillary buildings;
- Coal stockpiles (including stackers and reclaimers);
- Rail loadout facility;
- Workshop and store; and
- Eastern Portal (to be sealed).

The East Site includes topsoil stockpiles and bunds constructed from previously excavated materials. These stockpiles and bunds may need to be excavated during mine closure to provide material for landform establishment and rehabilitation.

#### *West Site*

Most of the assets at the West Site are proposed to be retained, however the following infrastructure is proposed to be decommissioned and rehabilitated:

- Evaporation ponds;
- Ventilation shafts;

- Mine entries (Kayuga Entry and Western Drift);
- Gas drainage and service boreholes; and
- Goaf dewatering facilities.

Topsoil stockpiles and bunds at the West Site may need to be excavated during mine closure to provide material for landform re-establishment and rehabilitation.

## 2.4 FINAL LAND USE AND MINING DOMAINS

### 2.4.1 Final Land Use Domains

Given that the intended post-mining land use is agriculture, the land within the Dartbrook mining leases will generally be returned to grassland, except for the following:

- Some infrastructure assets will be retained for future agricultural use;
- Rail infrastructure will be retained for ARTC's future use; and
- The existing Forestry Area and River Red Gum Restoration Areas will remain as native ecosystem areas.

**Table 7** identifies the proposed final land use domains at Dartbrook Mine, as well as the potential land uses that these domains will facilitate. These land uses conform to the definitions in the Muswellbrook LEP and Upper Hunter LEP.

**Table 7 Final Land Use Domains**

Domain	Code	Description	Final Land Use
Native ecosystem	A	Forestry Area and River Red Gum Restoration Area	Environmental protection works
Agricultural – grazing	B	Existing grassland areas and rehabilitated infrastructure areas.	Agriculture
Water storages	G	Water management dams converted to water supply dams for future agricultural uses.	Agriculture
Water management areas	F	Riparian corridors along the Hunter River and Dart Brook	Environmental protection works
Infrastructure	I	Mine infrastructure retained for future agricultural uses.	Agriculture
		Rail loop and spur retained for future use by ARTC.	Freight transport facility

### 2.4.2 Mining Domains

The operational areas at Dartbrook Mine have been categorised into the mining domains identified in **Table 8**. As an underground mine, Dartbrook Mine has a significantly smaller disturbance footprint than the surrounding open cut mining operations. The land overlying previous longwall mining is included as an operational area. This land has been subject to subsidence but is not classified as disturbed land.

**Table 8      Mining Domains**

Mining Domain	Code	Description
Infrastructure	1	Existing surface infrastructure including the East Site (excluding CHPP), West Site, ventilation shafts, Western Access Road and minor borehole sites.
Water management area	3	Water management structures including industrial dams (Eastern Holding Dam, Western Holding Dam, Staged Discharge Dam), sediment dams and the Evaporation Ponds.
Overburden Emplacement Area	4	Excavated material from the construction phase was stockpiled in bunds. The REA has been rehabilitated.
Underground Mining Area	6	Land overlying previous longwall mining activities.
Beneficiation Facility	7	The CHPP at the East Site and its associated stockpiles and ancillary buildings.



### 3. REHABILITATION RISK ASSESSMENT

*This section provides a summary of the rehabilitation risk assessment undertaken to inform the preparation of this RMP.*

A rehabilitation risk assessment (RRA) was undertaken in March 2022 to identify potential risks to achieving the post-mining land use. The RRA was facilitated by James Bailey & Associates (JBA) with assistance from the following technical specialists:

- Mine Advice provided advice on matters associated with underground infrastructure;
- Minesoils provided advice on matters associated with soils and rehabilitation;
- Australasian Groundwater and Environmental Consultants provided advice on matters associated with hydrogeology;
- Douglas Partners provided advice on matters associated with the REA;
- Miner Details provided surveying assistance; and
- Sparke Helmore Lawyers provided advice on the legal and regulatory aspects of the proposed final land use.

The RRA was conducted via a workshop on 24 March 2022. The workshop considered all assets at Dartbrook Mine, including both surface and underground infrastructure. Each asset was assigned its relevant rehabilitation objectives under the Development Consent (see **Table 5**). For each asset, the risks to achieving the relevant rehabilitation objectives were identified and control measures were recommended (where appropriate).

**Table 9** includes a summary of the rehabilitation risks identified by the RRA and the recommended controls.

**Table 9 Rehabilitation Hazards, Relevant Locations, and Mitigation Measures**

Hazard	Relevant Locations	Existing Controls	Current Risk	Further Controls Recommended
The proposed final land use is not permitted due to planning/regulatory controls	Rail loop	Rail infrastructure can be undertaken by a public authority (ARTC) without consent under Section 2.91 of SEPP (Transport and Infrastructure) 2021.	ARTC does not wish to acquire ownership of the rail loop.	Consultation with ARTC regarding future leasing or transfer of the asset.
	West Site buildings	Located on land zoned RU1. "Farm buildings" are permissible within consent in RU1 under the Muswellbrook LEP.	Council objects to proposed development.	Development Application may be required for change in use from mining to "farm buildings".
	East Site (excluding rail loop)	Located on land zoned RU1 or C3. "Extensive agriculture" permissible without consent.	Non-risk.	N/A.
	HRSTS Pipeline	Located on land zoned RU1. "Water supply systems" are permissible with consent in RU1 under	Council objects to proposed development.	Pipeline meets definition of "water supply work" (Development consent may be required but the

Hazard	Relevant Locations	Existing Controls	Current Risk	Further Controls Recommended
		the Muswellbrook LEP.		development is permissible).
	Western Access Road	Located on land zoned RU1. "Roads" are permissible with consent in RU1 under the Muswellbrook LEP.	Council does not agree to acquiring ownership of the road.	If council does not wish to acquire the road, it will remain as a private access road. DA potentially required but "roads" are permissible in zone RU1.
Instability/failure of remaining coal pillars	Wynn Seam workings, Kayuga Seam workings	Pillars assumed to be adequately designed. Majority of remaining pillars are associated with main headings, which are designed to higher stability requirements than pillars associated with bord and pillar mining. Within Mine Subsidence District (future buildings require approval)	Flooding of mine workings and time related deterioration result in reduced pillar size and/or strength. [Although this may be offset by the buoyancy effect of water].	Further investigation into standards that the pillars were designed to.
Failure of existing underground seals	Wynn Seam workings, Kayuga Seam workings	Existing seals are assumed to be equipped with appropriate valves/pipes that allow flow from one side to the other.	The existing seals may fail as the mine floods (due to groundwater pressure). If this occurs, the sudden flow of groundwater into the deeper mine workings may exert suction pressures on the surface seals (i.e. drifts and shafts).	Further investigation into design of existing seals. If the seals are fitted with valves, these can be opened to relieve the hydrostatic pressure on the seals. Design surface seals to accommodate suction pressures (if required) and remediate seals (if required).
Instability of Hunter Tunnel	Hunter Tunnel	Existing supports in Hunter Tunnel (stable under current conditions)	Possibility of roof fall over time and as the mine floods. Based on the shallow depths of cover, a roof fall may result in sinkhole propagation to the surface.	Backfill sections of Hunter Tunnel inbye of New England Highway up to surface (~200m section). Extent of backfilling to be determined in further assessment. Assess height of failure in event of roof fall.
Groundwater egress from the underground mine	Ventilation shafts, mine entries and portals, Hunter Tunnel	All portal entries are above RL of alluvium and 1% AEP flood	Non-risk	N/A

Hazard	Relevant Locations	Existing Controls	Current Risk	Further Controls Recommended
Gas egress from underground mine	Mine entries, ventilation shafts, goaf drainage boreholes, goaf dewatering system	Regulatory requirement to seal all portals, shafts, and boreholes. Previous borehole audits. Flooding of workings will create a "water gas seal"	Risk of gas escape if there are unknown or unidentified boreholes.	Final audit of borehole sealing records, including ground truthing of any boreholes where the sealing status is uncertain. Surface seals to be designed in accordance with relevant guidelines.
Mobilisation of tailings (impact on groundwater quality)	Wynn seam goaf	Water level in the Wynn Seam workings is currently managed through dewatering. Existing seals installed in Wynn Seam. Tailings material is non-acid forming and lower salinity than the Permian groundwater. Sulfate and possibly Molybdenum are the only analytes that are higher in the leachate.	Movement of tailings leachate to alluvial groundwater may eventually occur, but unlikely to alter beneficial use of alluvial water.	N/A
Mobilisation of chemicals (impact on groundwater quality)	Wynn seam goaf, Kayuga seam goaf	Water level currently managed in Wynn Seam.	Movement of chemicals in groundwater may eventually occur, but unlikely to alter beneficial use category of alluvial water.	N/A
Seepage from REA towards Hunter River alluvium	REA	Monitoring bores in REA. Area Reject leachate is NAF, relatively low salinity.	Movement of reject leachate to alluvial groundwater may occur, but unlikely to alter beneficial use of alluvial water.	Further investigation into REA monitoring bores to assess likelihood of impact.
Inadequate water licensing		AQC holds sufficient licences to account for its current water take.	Non-risk	Consultation with regulators regarding future water accounting, given that future take is predicted to incrementally decrease.
Soil quality unsuitable for rehabilitation	Evaporation Ponds	Existing study (GSS, 2005) recommended treatment options for unsuitable soils	The current soil quality is not suitable for vegetation due to salinity and	Further soil testing to determine depth at which soil becomes suitable for rehabilitation.

Hazard	Relevant Locations	Existing Controls	Current Risk	Further Controls Recommended
			alkalinity. Salinity is predominantly in the top 2cm, but may extend deeper.	Possible management measures include: <ul style="list-style-type: none"> <li>• Removal of saline soils;</li> <li>• Capping saline soils with 0.5m of suitable soil; and/or</li> <li>• Sowing of salt tolerant species.</li> </ul>
Land contamination	Workshops, CHPP, administration building, effluent ponds & irrigation area stockpiles, train loadout	Areas of hydrocarbon contamination identified and treatment recommended.	Approximately 3m <sup>3</sup> of contaminated soil has been identified. This soil would not be suitable for grazing.	Removal and safe disposal of identified contaminated soil.
Stockpiled topsoil not of suitable quality for rehabilitation	Mine entries, CHPP, stockpiles, train loadout	Topsoil stockpiles Testing of stockpiled topsoil quality conducted by RJ Connelly (2017)	The stockpiled topsoil resources include some sodic soils, which are not suitable for rehabilitation.	Sodic soils can be treated through gypsum or other ameliorants.
Insufficient topsoil for rehabilitation	Evaporation Ponds, mine entries, shafts, CHPP, coal stockpiles, train loadout	Existing topsoil stockpiles	Quantity of topsoil in existing stockpiles has not been calculated. There is a risk of insufficient topsoil resources.	Calculate volumes of topsoil in existing stockpiles. Calculate areas that require a capping soil layer. Explore alternatives if the topsoil balance indicates a shortage of material.
Insufficient backfill material	Kayuga Entry, rail loop, evaporation ponds	Excavated material from previous construction is stored in stockpiles	Non-risk, although some material containing carbonaceous material may need to be excluded.	Further investigation of stockpiled material to identify carbonaceous rock.
Weed infestation	All infrastructure areas to be rehabilitated	Routine weed management activities	Weed infestation may affect growth of the desired vegetation.	Ongoing weed management as required
Landform instability	Reject emplacement area	Existing vegetation Routine geotechnical inspections	The REA is generally stable, except for an area around an existing culvert. If this inlet	Backfilling of the gully surrounding the culvert

Hazard	Relevant Locations	Existing Controls	Current Risk	Further Controls Recommended
			becomes blocked, the resultant ponding may lead to instability.	
Spontaneous combustion	Reject emplacement area	Spontaneous Combustion Management Plan Rejects capped with at least 1200mm of inert material Compaction Temperature monitoring	Spontaneous combustion is unlikely to occur of its own accord, but may be triggered by bushfire	Further testing of reject areas for calorific content (involving in situ sampling). Confirm thickness of capping layer. Extra capping if material found to possess high combustibility.
	Tailings cells within REA	Spontaneous Combustion Management Plan Rejects capped with at least 1200mm of clay Compaction Temperature monitoring	Spontaneous combustion is unlikely to occur in isolation, but may be triggered by bushfire	Further testing of reject areas for calorific content (involving in situ sampling). Confirm thickness of capping layer. Extra capping if material found to possess high combustibility.
Bushfire caused by on-site activities	East Site, West Site, gas drainage bores	Asset Protection Zones (>10m) Emergency response procedures	Residual risk that fires may be ignited, but due to limited fuel loads, the spread is unlikely to become uncontrolled.	Existing asset protection zones are for mining infrastructure. APZ requirements may need to be reconsidered for agricultural activities.
Scour of Staged Discharge Dam inlet pipeline	Staged Discharge Dam	Dam design standards	Risk of scour if the discharge pipeline is used instead as a water supply pipeline	Additions/modifications to the dam (e.g. energy dissipators, rock lining)

## 4. REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

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*This section provides an overview of Dartbrook Mines rehabilitation objectives and criteria, including agency consultation and rehabilitation completion criteria.*

### 4.1 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

#### 4.1.1 Rehabilitation Objectives

DA 231-07-2000 prescribes specific rehabilitation objectives for various features at Dartbrook Mine (reproduced in **Table 5**). These rehabilitation objectives have been attributed to the relevant final land use domains, as shown in **Table 10**. AQC has developed completion criteria, indicators and validation methods to evaluate whether rehabilitation efforts have achieved the relevant rehabilitation objectives.

The final landform includes areas within the “native ecosystem” final land use domain. This domain is comprised of the Forestry Area and the River Red Gum Restoration Area. Neither of these areas was disturbed by mining operations and as such, no rehabilitation objectives are applicable to this domain.

The riparian corridors along the Hunter River and Dart Brook are designated as “water management areas” in the final landform. Mining operations have not resulted in any disturbance or subsidence of these riparian corridors. As such, no rehabilitation objectives are applicable to this domain.

The final land use domains and mining domains at Dartbrook Mine are shown in the plans attached to this RMP.

### 4.2 REHABILITATION OBJECTIVES AND REHABILITATION CRITERIA – STAKEHOLDER CONSULTATION

The rehabilitation objectives for Dartbrook Mine are prescribed by DA 231-07-2000. These rehabilitation objectives were most recently amended through Modification 7 to the DA 231-07-2000. AQC consulted with the following stakeholders during the application process for Modification 7:

- Department of Planning & Environment (as it was then);
- Division of Resources and Geoscience (as it was then);
- Department of Industry – Water;
- Muswellbrook Shire Council;
- Upper Hunter Shire Council;
- Dartbrook Community Consultative Committee and neighbouring landowners; and
- Registered Aboriginal parties.

Previous Mining Operations Plans (MOPs) have anticipated that the post-mining land use for Dartbrook Mine will be agriculture. Consultation with the new landowner has confirmed that agriculture (primarily grazing) is the intended land use. These discussions have also identified structures that the owner wishes to be retained for future agricultural use. The final land use domains have been defined in accordance with consultation with the landowner.

AQC has previously entered into a memorandum of understanding with ARTC regarding control of the rail loop and spur.

**Table 10 Rehabilitation Objectives and Rehabilitation Completion Criteria**

Asset	Final Land Use Domain	Associated Mining Domain	Rehabilitation Objectives	Indicator	Proposed Completion Criteria	Validation Methods
Ventilation shafts and fan houses	Agricultural – grazing	Infrastructure	To be decommissioned and made safe and stable Retain habitat for threatened species (e.g. bats), where practicable Fit for the intended post-mining land uses Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Land capability class Condition of vegetation	Shafts sealed to the satisfaction of Resources Regulator Disconnection of services to infrastructure Surface infrastructure is decommissioned and removed Class IV land capability Vegetated areas are self-sustaining	Inspection report
Mine Entries and Portals	Agricultural – grazing	Infrastructure	To be decommissioned and made safe and stable Retain habitat for threatened species (e.g. bats), where practicable Fit for the intended post-mining land uses Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Land capability class Condition of vegetation	Shafts sealed to the satisfaction of Resources Regulator. Backfill of Kayuga Box Cut. Disconnection of services to infrastructure. Surface infrastructure is decommissioned and removed. Class IV land capability. Vegetated areas are self-sustaining.	Inspection report
East Site infrastructure (excluding rail loop and spur)	Agricultural – grazing	Infrastructure & Beneficial Area	Decommissioned and removed, unless the Resources Regulator agrees otherwise All surface infrastructure sites are to be revegetated consistent with the post-mining land use Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Land capability class Condition of vegetation	Disconnection of services to infrastructure. Surface infrastructure is decommissioned and removed. Class IV land capability. Woodland areas are self-sustaining.	Inspection report

Asset	Final Land Use Domain	Associated Mining Domain	Rehabilitation Objectives	Indicator	Proposed Completion Criteria	Validation Methods
Goaf dewatering system	Agricultural – grazing	Infrastructure	Decommissioned and removed, unless the Resources Regulator agrees otherwise All surface infrastructure sites are to be revegetated consistent with the post-mining land use Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Land capability class Condition of vegetation	Disconnection of services to infrastructure. Surface infrastructure is decommissioned and removed. Class IV land capability. Woodland areas are self-sustaining.	Inspection report
Gas drainage wells	Agricultural – grazing	Infrastructure	Decommissioned and removed, unless the Resources Regulator agrees otherwise All surface infrastructure sites are to be revegetated consistent with the post-mining land use Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Land capability class Condition of vegetation	Disconnection of services to infrastructure. Surface infrastructure is decommissioned and removed. Class IV land capability. Woodland areas are self-sustaining.	Inspection report
Topsoil and overburden stockpiles	Agricultural – grazing	Overburden emplacement area	Soil and vegetative materials from areas disturbed under this consent (including topsoils, substrates and seeds) are recovered, managed and used as rehabilitation resources	Reuse of stockpiled materials Land capability class	Stockpiled material reused as fill Unused stockpiles will be rehabilitated to grassland (Class IV land capability)	Inspection report
Evaporation Ponds	Agricultural – grazing	Water management area	Decommissioned and removed, unless the Resources Regulator agrees otherwise All surface infrastructure sites are to be revegetated consistent with the post-mining land use Nominated land capability classification is achieved and is self-sustaining	Decommissioning of infrastructure Final landform Land capability class Condition of vegetation	Saline water and sludges are removed. Landform compatible with surroundings (i.e. backfill excavations) Surface infrastructure is decommissioned and removed. Class IV land capability.	Inspection report



Asset	Final Land Use Domain	Associated Mining Domain	Rehabilitation Objectives	Indicator	Proposed Completion Criteria	Validation Methods
					Revegetated areas are self-sustaining.	
West Site buildings (administration building, workshop, store and associated hardstands)	Infrastructure	Infrastructure	Decommissioned and removed, unless the Resources Regulator agrees otherwise	Retention of infrastructure	Resource Regulator's concurrence to retaining infrastructure for post-mining use	Consultation with the Resources Regulator
Rail loop and spur	Infrastructure	Infrastructure	Decommissioned and removed, unless the Resources Regulator agrees otherwise	Retention of infrastructure	Agreement with ARTC Resource Regulator's concurrence to retaining infrastructure for post-mining use	Consultation with the Resources Regulator and ARTC
Western Access Road	Infrastructure	Infrastructure	Decommissioned and removed, unless the Resources Regulator agrees otherwise	Retention of infrastructure	Resource Regulator's concurrence to retaining infrastructure for post-mining use	Consultation with Resources Regulator
Industrial dams (Eastern Holding Dam, Western Holding Dam and Staged Discharge Dam) and	Water storages	Water management area	Decommissioned and removed, unless the Resources Regulator agrees otherwise Water retained on the site is fit for the intended post-mining land use/s	Retention of infrastructure Condition of vegetation	Saline water and sludges are removed. Disturbed catchment is rehabilitated. Resource Regulator's concurrence to retaining infrastructure for post-mining use	Consultation with Resources Regulator Inspection report
Sediment dams and stock watering dams	Water storages	Water management area	Decommissioned and removed, unless the Resources Regulator agrees otherwise	Retention of infrastructure	Resource Regulator's concurrence to retaining infrastructure for post-mining use	Consultation with Resources Regulator

Asset	Final Land Use Domain	Associated Mining Domain	Rehabilitation Objectives	Indicator	Proposed Completion Criteria	Validation Methods
Reject Emplacement Area	Agricultural – grazing	Overburden emplacement area	Safe, stable and non-polluting Fit for the intended post-mining land use Nominated land capability classification is achieved and is self-sustaining	Landform stability Land capability class	Geotechnically and geochemically stable Class VI or VII land capability	Inspection report

## **5. FINAL LANDFORM AND REHABILITATION PLAN**

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The final land use domains and final landform for Dartbrook Mine are presented in the broad scale plans attached to this RMP. Finer scale plans are available on the NSW Mine Rehabilitation Portal.

## 6. REHABILITATION IMPLEMENTATION

### 6.1 LIFE OF MINE REHABILITATION SCHEDULE

DA 231-07-2000 allows for mining operations to be carried out until 5 December 2027. This RMP assumes that Dartbrook Mine will remain under care and maintenance until the end of the operational phase. Under this scenario, no further disturbance will occur at the site. A revised RMP will be prepared if further mining is proposed.

The existing infrastructure will remain in place until the end of the operational phase. These assets will then be retained or decommissioned in accordance with **Section 2.3**.

The REA was used for disposal of reject materials generated by previous longwall mining operations. The developed extent of the REA has subsequently been rehabilitated to grassland. The water management structures established within the REA will be retained for future agricultural uses. No further rehabilitation is required within the REA except for minor remediation works.

### 6.2 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

The various rehabilitation phases at Dartbrook Mine are described in **Table 11**. Rehabilitation phases refer to the stages of actions required to rehabilitate disturbed areas to facilitate the desired final land use. These rehabilitation phases have been developed to align with those described within the "*Guideline: Rehabilitation Management Plans for Large Mines*" (Resources Regulator, 2021b).

**Table 11** Rehabilitation Phases

Phase	Description
Active Mining	The process of undertaking mining and associated activities including controls implemented to manage risks and enhance rehabilitation outcomes.
Decommissioning	The process of removing plant and equipment from active services and rendering the area safe including removal and/or remediation of contaminants and hazardous materials.
Landform Establishment	The process of shaping unformed rock and other sub-stratum material to produce the approved final landform. This includes earthworks activities such as cut and fill, rock raking, water storage and drainage construction.
Growth Medium Development	The process of establishing and enhancing the physical structure, chemical properties, and biological properties of a soil stratum suitable for plant growth. This includes contour ripping, placing, and spreading soil and application of ameliorants.
Ecosystem and Land Use Establishment	The process of seeding, planting and transplanting plant species to establish the desired vegetation communities.
Ecosystem and Land Use Development	The process of applying management techniques to encourage an ecosystem to grow and develop towards a desired and sustainable post mining land use outcome and ensure they meet the Rehabilitation Objectives and Completion Criteria.
Rehabilitation Completion	When rehabilitation areas can be demonstrated that they achieve their Rehabilitation Objectives and Completion Criteria, an application will be submitted to the NSW Resources Regulator for final sign off.

### 6.2.1 Active Mining Phase

Dartbrook Mine is currently in the active mining phase, albeit under care and maintenance status. The active mining phase will continue until 5 December 2027. The mining domains at Dartbrook Mine are shown in the plans attached to this RMP.

The RMP assumes that no further mining will be undertaken, although the option to re-commence mining remains valid under DA 231-07-2000. A revised RMP will be prepared if further mining is proposed.

### 6.2.2 Decommissioning

The decommissioning phase will commence upon the conclusion of the active mining phase (i.e. after 5 December 2027). The infrastructure that is proposed to be decommissioned is identified in **Section 2.3.3**.

The RRA considered the risks associated with decommissioning of both surface and underground infrastructure. The following identified risks are associated with the decommissioning phase:

- Instability of coal pillars in the underground workings;
- Failure of underground seals;
- Instability of the Hunter Tunnel;
- Groundwater and gas egress from the underground mine; and
- Land contamination.

The recommended controls for these risks are outlined in **Table 9**. The RRA determined that the recommended controls will be effective at mitigating these risks.

Unauthorised access to the site is currently managed through perimeter fencing, warning signs and security personnel. These security measures will continue to be implemented during the decommissioning phase.

### 6.2.3 Landform Establishment

As an underground mine, only relatively minor earthworks are required to produce the final landform. Previously excavated materials have been stored in bunds and stockpiles near or within the surface infrastructure areas. The RRA determined that this volume of stockpiled overburden (fill material) will be sufficient for the proposed landform establishment works. That is, there will be no need to import fill material to the site.

The existing erosion and sediment controls will be retained, as these drains and dams will be beneficial for future agricultural uses. These existing controls will be sufficient to manage erosion and sedimentation during the landform establishment phase.

The existing REA was capped and rehabilitated prior to 2007. Geotechnical inspections of the REA are undertaken at least every three years, as required by the Section 126 Emplacement Area Approval (see **Table 4**). These inspections have determined that the REA is geotechnically stable, although a localised area within the REA will require remediation works. This risk was considered in the RRA and the recommended controls will be implemented during the landform establishment phase.

### 6.2.4 Growth Medium Development

Topsoils stripped during previous construction activities have been stored in stockpiles at the East Site and West Site. The RRA considered the adequacy of the stockpiled resources for future rehabilitation activities and identified the following risks:

- The quantity of topsoil may not be sufficient to achieve the ideal soil depths for the target land capability classes; and

- The topsoil stockpiles may include sodic soils, which are not suitable for rehabilitation.

The RRA has recommended further investigations during rehabilitation to confirm the quantity and quality of the stockpiled soils. Supplementary growth media and amelioration of topsoils may be required to achieve the target land capability.

### **6.2.5 Ecosystem and Land Use Establishment**

To facilitate the final land use of agriculture, decommissioned infrastructure areas will be revegetated primarily with pasture species.

The final landform includes two areas within the native ecosystem domain. These areas are the River Red Gum Restoration Area and the Forestry Area. Both are established woodland areas, and no further plantings are required following mine closure.

Weed and pest controls will continue to be undertaken during the post-mining phase.

### **6.2.6 Ecosystem and Land Use Development**

Once an acceptable level of pasture has been established, management of the land will be transferred to the landowner. The ongoing management of the grassland ecosystem will occur through grazing and other agricultural practices.

## **6.3 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE**

Previous longwall mining operations were suspended in 2006. All subsidence effects associated with past mining have already occurred. Minor remediation works have been undertaken to repair subsidence impacts such as surface cracking.

All perceptible impacts of previous subsidence have been repaired and given that no further longwall mining is envisaged, no further rehabilitation will be required in subsidence areas.

## 7. REHABILITATION QUALITY ASSURANCE PROCESS

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### 7.1 IMPLEMENTATION

The decommissioning and rehabilitation phases of Dartbrook Mine will be conducted under the guidance of experts in the relevant disciplines, including those disciplines included in the RRA (see **Section 3**). An updated RRA will be undertaken at the end of the active mining phase. The RRA may recommend further investigations such as soil testing, water quality sampling or other monitoring. Such investigations are also required to be completed before the commencement of decommissioning.

A Rehabilitation Management Register (RMR) will be developed prior to commencing decommissioning activities. The RMR will include the following:

- Rehabilitation objectives for the domains that require further rehabilitation;
- Completion criteria for the domains that require further rehabilitation;
- Controls recommended by the RRA; and
- Controls recommended by investigations or studies associated with the RRA.

After each phase of rehabilitation, the completed work will be assessed against the RMR to ensure that the relevant controls have been implemented and that the domain is progressing towards the completion criteria.

The Environmental Manager will be responsible for implementation of the RRA.

### 7.2 ASSURANCE PROCESS

The assessments against the RMR at each phase of rehabilitation will ensure that issues (if any) are detected and mitigated at any early stage. A final audit against the RMR will be undertaken at the completion of the Ecosystem and Land Use Establishment phase. Rehabilitated areas must satisfy all of the relevant rehabilitation objectives and completion criteria in the RMR before management of the land is handed over to the landowner.

## 8. REHABILITATION MONITORING PROGRAM

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### 8.1 ANALOGUE SITE BASELINE MONITORING

Grazing activities have been undertaken within and immediately surrounding Dartbrook Mine throughout the active mining phase. As such, there are ample locations that would be suitable analogue sites for rehabilitation monitoring purposes.

A grazing trial was undertaken within the rehabilitated REA in 2015. The trial included monitoring of pasture growth, including both ground cover and species composition. The results of the 2015 grazing trial provide useful baseline monitoring data for future rehabilitation.

In addition to the results of the grazing trial, additional analogue sites will be established at two years before the cessation of mining operations (i.e. established by December 2025). If practicable, at least one analogue site should be established within the Hunter River floodplain, as such a site would be indicative of high-quality agricultural land. The Garoka Dairy includes land within the floodplain.

Given that the intended final land use is agriculture, the key parameters for rehabilitation monitoring are ground cover (%) and presence of weeds. Monitoring of analogue sites should continue until management of the land is relinquished to the landowner.

### 8.2 REHABILITATION ESTABLISHMENT MONITORING

Monitoring of rehabilitation areas will commence at the Ecosystem and Land Use Establishment phase. It is recommended that at least four rehabilitation monitoring sites are established, including:

- Two sites at the East Site;
- One site at the West Site; and
- One site within the footprint of the Evaporation Ponds.

No further monitoring is required within the REA as the 2015 grazing trial has demonstrated that this area is suitable for the post-mining land use.

Wherever practicable, rehabilitation monitoring will be undertaken at annual intervals. Rehabilitation in a particular area will be considered successful if the following criteria are satisfied at two consecutive monitoring rounds:

- Ground cover exceeds 70%; and
- Less than 10% of vegetation is composed of undesirable species (weeds).



## 9. REHABILITATION RESEARCH, MODELLING AND TRIALS

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### 9.1 CURRENT REHABILITATION RESEARCH AND TRIALS

In 2015, a cattle grazing trial was undertaken on the rehabilitated REA to demonstrate that rehabilitated land at Dartbrook Mine can sustain grazing by livestock, be productive and blend with the adjacent land use (Hansen Bailey, 2016).

In April 2015, 27 Angus and Angus / Herefords Cross steers were introduced as weaner steers, with average mass of 274 kg. These cattle were weighted 7 times throughout the year and reached an average of 462 kg in December 2015. The rate of weight gain was reduced in the winter when it was cold and dry (Hansen Bailey, 2016).

Pasture growth was also monitored on five occasions at five sites to coincide with weighing of the steers. Sites 1 and 4 were Rhodes Grass dominant pasture, exceeding 80% coverage throughout the year. Site 2 hayed off more than other sites with some lodging of the tall Rhodes Grass. Site 3 and Site 5 were dominated by other species including kikuyu, couch and medics (Hansen Bailey, 2016). The latter were significant in providing palatable high protein feed in July to September period when summer growing species were dormant. Phalaris, Green Panic and Lucerne are widespread throughout the REA and many native grasses were observed sporadically including Queensland Blue Grass, Plains Grass, Chloris spp., Wallaby Grass, Wiregrass, Barbwire Grass and Sporobolus spp. (Hansen Bailey, 2016).

Trials at several Hunter Valley coal mines have found that grazing activities conducted on rehabilitated land have compared favourable to grazing conducted on undisturbed land. The REA grazing trial produced similar conclusions. Due to the success of the trial, the REA continues to be grazed periodically.

### 9.2 FUTURE REHABILITATION RESEARCH

Given that grazing has successfully been undertaken on the buffer lands within and surrounding the Dartbrook mining leases, no further rehabilitation research is considered necessary to inform future rehabilitation activities.

The 2015 grazing trial was undertaken as the rehabilitated REA possessed two characteristics that are atypical of grazing lands:

- It is located on steep topography; and
- The area included capped reject materials.

The lands that will be rehabilitated during the mine closure phase do not possess either of these characteristics. Rehabilitation of lands at the East Site and West Site will be typical of rehabilitation at mine sites. As such, no specific trials are deemed to be necessary.

## 10. INTERVENTION AND ADAPTIVE MANAGEMENT

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By implementing the recommendations of the RRA and its associated studies, the likelihood of adverse rehabilitation outcomes is minimised. However, if any adverse or unexpected outcomes occur, the Trigger Action Response Plan (TARP) in **Table 12** will be implemented.

**Table 12** Trigger Action Response Plan

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
Landform	Slope Gradient	Trigger	Slope: REA Stage 4/bunds: 0-14% <sup>1</sup> Other Areas: 0-10%, Class IV land capability	Slope: REA Stage 4: 14-18% Other Areas: 10-18%	Slope: Over 18%
		Response Action	No Action. Continue Monitoring.	Minor reshaping to achieve rehabilitation objectives if it does not meet criteria. Monitor signs for potential stability issues (poor ground cover, inadequate drainage, cracking or slumping and erosion and sediment controls). Repair any issues to provide a stable landform.	Reshape (via blasting or earthworks) or secure with security fencing/signage.
	Erosion Control	Trigger	No evidence of rill, sheet, gully or tunnel erosion. Controls are effective.	Minor evidence of rill, sheet, gully or tunnel erosion (less than 300mm deep or localised impact).	Significant (e.g. >300mm deep or widespread) gully or tunnel erosion present. Widespread rill or sheet erosion present.
		Response Action	No action. Continue to monitor as required.	Monitor erosion. May require remediation. Examples may include: minor earthworks (minor reshaping and drainage control, re-seeding repaired area),	Inspection by appropriately qualified person. Remediation actions may involve more complex earthworks and drainage design, re-establishment of suitable groundcover (potentially incorporating a temporary groundcover such as mulch or cover crop). Ongoing monitoring until stability and/or groundcover established.

<sup>1</sup> Approval for 14° slopes in the REA Stage 4 (s126 approval) dated 08/04/2004 from DP&E.

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
Quality of spoil/waste	Drainage Design	Trigger	2% slope, stable and comparable drainage systems.	Minor issues with drainage that do not impact on rehabilitation success.	Significant drainage system failure impacting on rehabilitation success.
		Response Action	No action. Continue to monitor as required.	Site inspection by a suitably trained person. Investigate the root cause of the issue/s and implement recommended remedial actions as appropriate. Monitor.	Review drainage design with input from qualified person/s. Implement recommended remedial actions as soon as practicable. Monitor.
	Mine Subsidence	Trigger	No evidence of subsidence impacts (i.e. no evidence of scarring from loss of ground cover, no large cracks, no pot holes/slumping activity).	Minor surface cracks or undulations. Landform remains stable/safe.	Cracks opening and/or inadequate drainage resulting in potential for long term issues (e.g. stock injury, inadequate drainage, and inconsistent ground cover).
		Response Action	No action. Continue to monitor and respond to any issues as required.	Inspect area to determine appropriate controls. May require remediation. Examples may include: minor earthworks (shallow ripping, re-seeding repaired area).	Inspection by appropriately qualified person. Recommended actions may involve more complex earthworks/plugs and drainage design, re-establishment of suitable groundcover. Ongoing monitoring until stability and/or groundcover established.
	Spoil/Waste Quality	Trigger	No evidence of plant toxicity, heating, leaching or contaminated material outside design parameters/controls.	Localised evidence of poor vegetation health/poor germination, early indication of potential heating (via thermocouple readings), elevated analyte levels but contained within management system.	More widespread evidence of poor vegetation health/poor germination, evidence of heating (observation or via thermocouple readings), contaminants leaching through capping or outside of controls.

Aspect	Threat	Action	Normal	Level 1 Trigger	Level 2 Trigger
Vegetation/ Growing Conditions (weather, soil)		Response Action	No action. Continue to monitor (e.g. thermocouples in REA, rehabilitation inspections, water sampling) and respond to any issues as required.	Inspection and review of results by appropriately qualified person. May require further controls such as review of capping material, ensuring runoff/leachate water from pipes is contained and monitored for any trends. Additional testing/amelioration as required.	Inspection and review of results by appropriately qualified person. Development and implementation of action plan. May include earthworks to manage heating. Construction of additional drainage collection or pumps. Possibly adding more capping material, growth media and ameliorative application/re-seeding. Ongoing monitoring, report regulators and Annual Review.
	Poor vegetation Growth	Trigger	70% groundcover established	Less than 70% groundcover established	Less than 50% groundcover established
		Response Action	No response. Monitor as required. Continue cattle grazing (in areas) to show stocking rates can be achieved.	Investigate cause. Implement recommended remedial actions (e.g. minor preparation and re-seeding).	Investigate cause. May need to further investigate growth medium parameters and species selection/timing of seeding. Implement recommended remedial actions.
	Presence of Weeds	Trigger	No significant weed infestations within 2 years	10% to 25% cover of undesirable species within 2 years.	> 25% cover of undesirable species within 2 years.
		Response Action	No response required other than routine rehabilitation inspections and maintenance.	Certified weed management contractor to apply correct weed control measures. Record location/continue to monitor and re-treat as required. May involve re-seeding with desirable species.	Certified weed management contractor to apply correct weed control measures. Record location/s and continue to monitor and re-treat as required. May involve livestock exclusion for defined period. Potential re-seeding with cover crop and desirable species.

## **11. REVIEW, REVISION AND IMPLEMENTATION**

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### **11.1 PERIODIC REVIEW OF THIS PLAN**

This RMP has been prepared based on the assumption that Dartbrook Mine remains under care and maintenance for the remainder of the operational phase. In the event, that AQC proposes to undertake an activity that is not consistent with this assumption, this RMP will be reviewed and amended to accommodate the proposed activity.

Performance against the RMP is also reviewed annually and reported in the Annual Review (which is required under DA 231-07-2000). This annual review process will also be used as an opportunity to determine whether any revisions to the RMP are required.

### **11.2 ROLES AND RESPONSIBILITIES**

The RMP will be implemented by the Dartbrook Safety, Health, Environment and Community Coordinator (or their delegate). The Care and Maintenance Mine Manager will be responsible for ensuring adequate resources are available to effectively implement this RMP.

## REFERENCES

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- Hansen Bailey (2016), *Dartbrook Mine Annual Review 2015*.
- NSW Resources Regulator (2015), *Environmental Code of Conduct: Rehabilitation*.
- NSW Resources Regulator (2021a), *Form and Way: Rehabilitation Management Plan for Large Mines*.
- NSW Resources Regulator (2021b), *Guideline: Rehabilitation Management Plans for Large Mines*.

## ABBREVIATIONS

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Abbreviation	Meaning
AQC	AQC Dartbrook Management Pty Limited
ARTC	Australian Rail Track Corporation
CHPP	Coal Handling and Preparation Plant
EP&A Act	<i>Environmental Planning &amp; Assessment Act 1979</i>
IPCN	Independent Planning Commission NSW
LGA	Local Government Area
MOP	Mining Operations Plan
Muswellbrook LEP	<i>Muswellbrook Local Environmental Plan 2009</i>
IPCN	NSW Independent Planning Commission
REA	Reject Emplacement Area
RMP	Rehabilitation Management Plan
RMR	Rehabilitation Management Register
RRA	Rehabilitation Risk Assessment
TARP	Trigger Action Response Plan
Upper Hunter LEP	<i>Upper Hunter Local Environmental Plan 2013</i>



# PLANS

