

CAMEBY DOWNS MINE  
PROGRESSIVE REHABILITATION AND CLOSURE PLAN



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- Appendix J Mine Waste Geochemical Characterisation
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- Appendix L PRCP Risk Assessment
- Appendix M Landform Design and Stabilisation

### 3 REHABILITATION PLANNING PART

#### 3.1 PROJECT PLANNING

On 30 June 2020, the Queensland Department of Environment and Science (DES), pursuant to section 754 of the *Environmental Protection Act 1994* (the EP Act), issued Syntech a Progressive Rehabilitation and Closure Plan Transition Notice (PRCP Transition Notice). The PRCP Transition Notice requires Syntech to prepare a Progressive Rehabilitation and Closure (PRC) Plan for the Cameby Downs Mine (CDM) which satisfies the requirements of sections 126C and 126D of the EP Act by 30 June 2021.

The CDM is an approved and operating open cut coal mine located approximately 360 kilometres (km) west-north-west of Brisbane, alongside the Warrego Highway approximately 16 km north-east of the township of Miles in the Western Downs Regional Council (WDRC) local government area (Figure 1). The CDM is owned and operated by Syntech Resources Pty Ltd (Syntech) and managed by Yancoal Australia Limited (Yancoal) in accordance with Environmental Authority (EA) EPML00900113.

In 2018, Syntech prepared and submitted a Major EA Amendment for the CDM Continued Operations Project (and associated Environmental Values Assessment [EVA]). The Continued Operations Project was approved in 2019. Figure 2 provides an overview of the approved layout of the CDM (i.e. including the Continued Operations Project). As part of the Continued Operations Project, Syntech defined the post-mining land uses (PMLUs) and non-use management areas (NUMAs) that would be achieved for the CDM.

In accordance with the *Progressive Rehabilitation and Closure Plans Guideline* (ESR/2019/4964) (DES, 2021) (the PRCP Guideline), the approved PMLUs, NUMAs and associated rehabilitation requirements (including outcomes for the land and associated criteria for achieving these outcomes) from the Continued Operations Project have been transitioned into this PRCP.

The objective of this PRC Plan is to provide a roadmap for progressive rehabilitation and closure of the CDM to achieve a safe, stable and non-polluting final landform which satisfies the requirements of sections 126C and 126D of the EP Act and other relevant legislation.

This PRC Plan and the associated PRCP Schedule supersede the existing Rehabilitation Operational Management Plan (Syntech, 2020) and Plan of Operations (1 April 2019 to 31 March 2021) (Syntech, 2019).

##### 3.1.1 Project Description

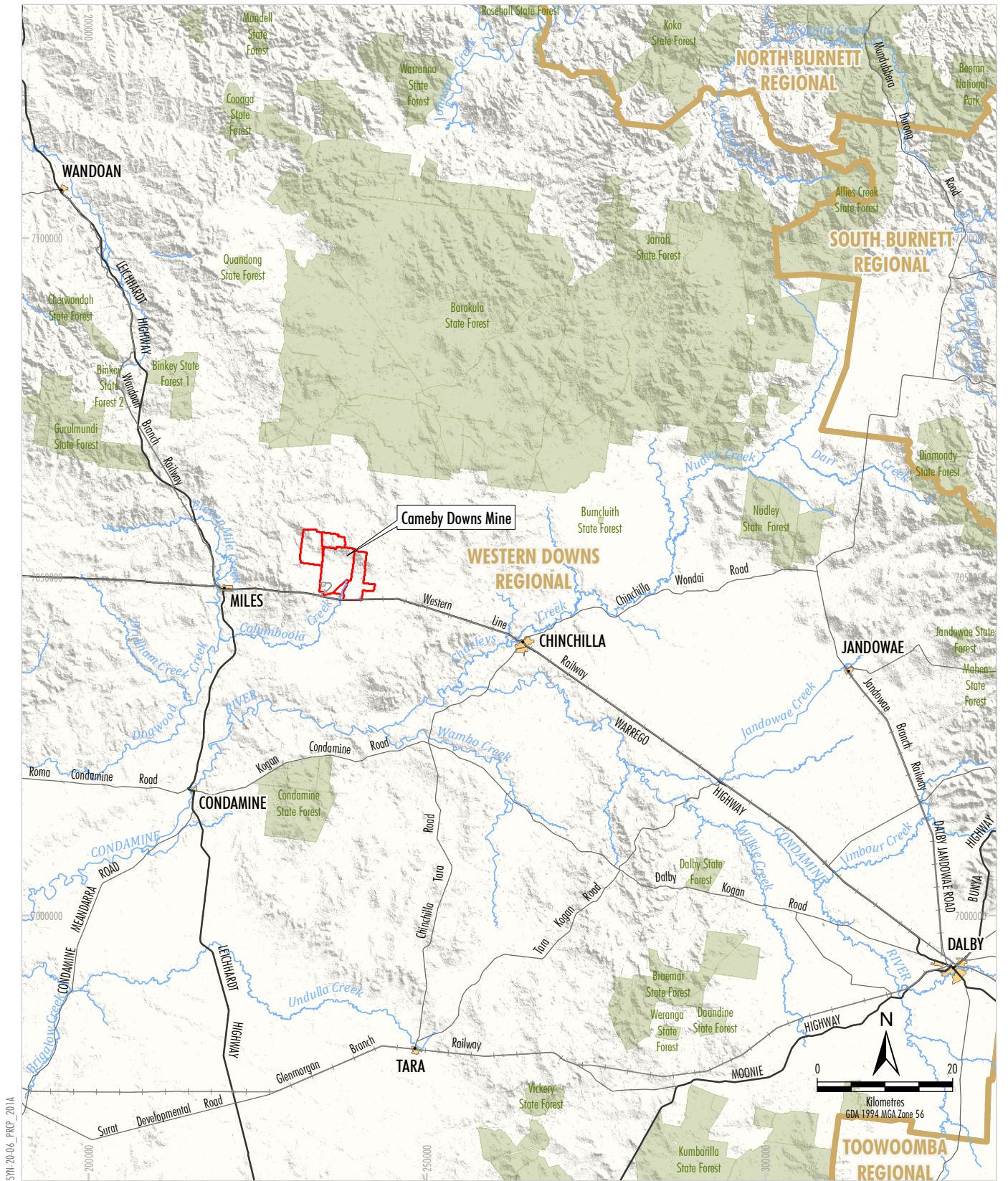
###### 3.1.1.1 *Type of Mining Operation*

The CDM is an open cut coal mine, with truck and shovel operations.

###### 3.1.1.2 *Duration of Mining Operations*

The CDM has been operating for approximately 10 years, with mining of overburden commencing in July 2010. The coal handling and preparation plant (CHPP) was commissioned in November 2010, with first product coal railed in December 2010.

Operations are approved to continue until 2093 (i.e. 75 years from the date EA EPML00900113 was amended to include the Continued Operations Project).



SYN-20-06\_PRC-201A

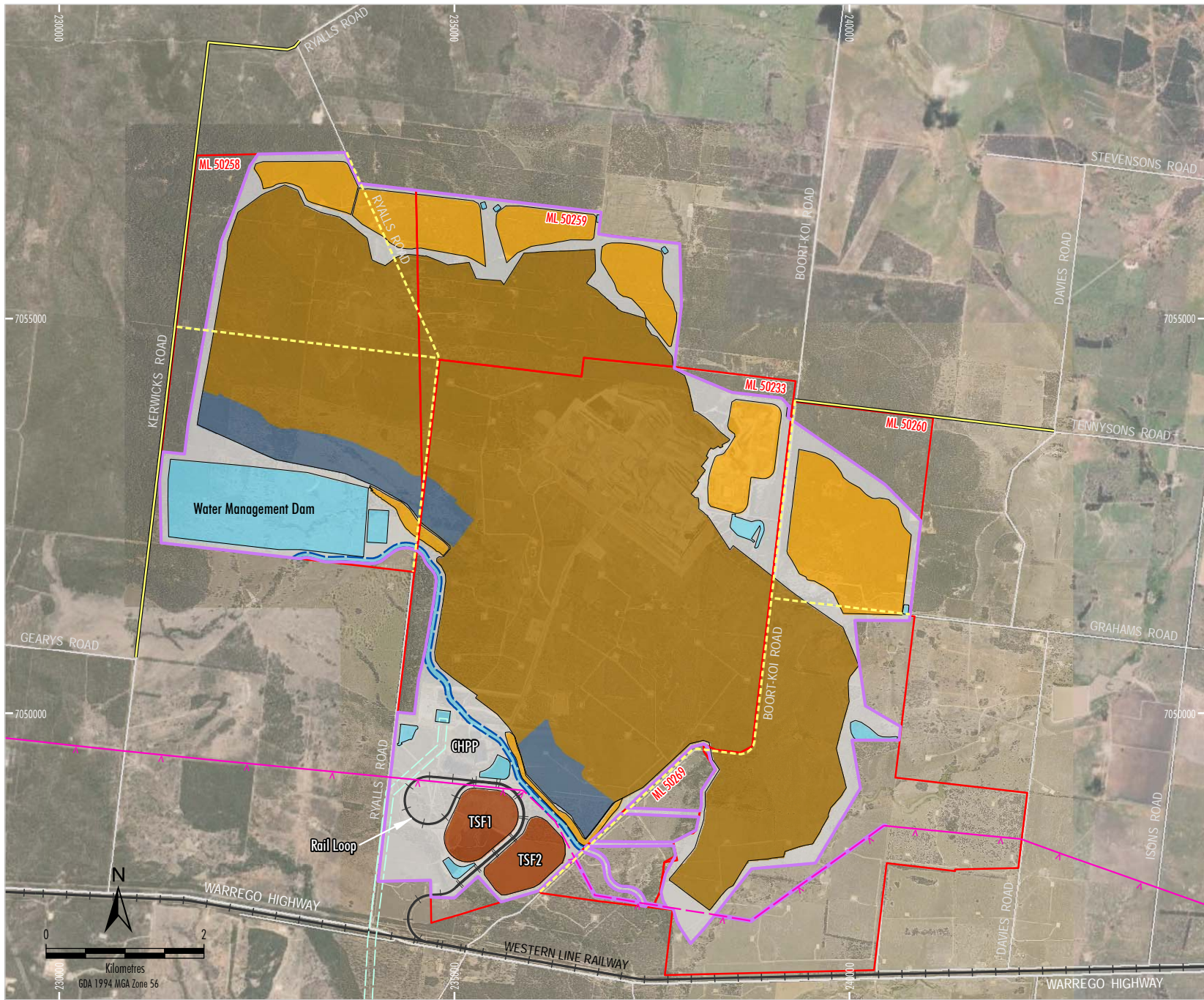
Source: The State of Queensland (2020); Syntech Resources (2021)



- LEGEND**
- Mining Lease Boundary
  - Local Government Area
  - Protected Area

 **Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
 Regional Location

**Figure 1**



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Existing Electricity Transmission Line
  - Realigned Electricity Transmission Line
  - Water Pipeline Easement
  - Railway
  - Drainage Line Diversion Corridor
  - Public Road/Easement Closure
  - Public Road Realignment
- Project Domains**
- Mine Infrastructure Area
  - Final In-pit Spoil
  - Tailings Storage Facility (TSF)
  - Out-of-pit Spoil Emplacement
  - Final Void
  - Water Management

Source: The State of Queensland (2020, 2021);  
 Syntech Resources (2021)  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
**Approved General Arrangement**

**Figure 2**

### 3.1.1.3 Mining Tenements

Table 1 identifies the CDM tenements and their status, and identifies overlapping Exploration Permit for Coal (EPC) tenures.

**Table 1  
Relevant Mining Tenements**

Permit	Holder	Granted	Expiry	Area (ha)	Overlapping Mining Tenure
Mining Lease (ML) 50233	Syntech	1 August 2008	31 July 2038	2,722.2	EPC 732 <sup>1</sup>
ML 50258	Syntech	26 April 2019	31 July 2038	1,550.0	EPC 732 <sup>1</sup>
ML 50259	Syntech	26 April 2019	31 July 2038	663.8	EPC 732 <sup>1</sup>
ML 50260	Syntech	26 April 2019	31 July 2038	1,690.0	EPC 1165 <sup>2</sup>
ML 50269	Syntech	26 April 2019	31 July 2038	190.8	EPC 1165 <sup>2</sup>

<sup>1</sup> EPC 732 is held by Syntech.

<sup>2</sup> EPC 1165 is held by Metrocoal Limited (49%) and Sino Coal Resources Pty Ltd (51%).

Syntech has an agreement in place with Metro Mining Limited and Sino Coal Resources for the overlapping EPC tenements.

In addition to overlapping mining tenures, the CDM also has overlapping petroleum tenements (Table 2).

**Table 2  
Overlapping Petroleum Tenements**

Petroleum Tenure	Holder of Petroleum Tenure	Overlapping Mining Lease
Exploration Permit for Petroleum (EPP) 676	Australian CBM Pty Ltd	ML 50233 ML 50259 ML 50260 ML 50269
EPP 747	Arrow Energy Pty Ltd (70%) and Arrow CSG (Australia) Pty Ltd (30%)	ML 50233 ML 50258
Petroleum Lease (PL) 472	BG International (Aus) Pty Ltd (80%) and QGC Pty Ltd (20%)	ML 50233 ML 50259 ML 50260 ML 50269
PL 458	BG International (Aus) Pty Ltd (80%) and QGC Pty Ltd (20%)	ML 50260 ML 50269

#### 3.1.1.4 Primary Mine Features and Infrastructure

The primary mine features and infrastructure associated with the CDM include:

- open cut truck and shovel mining operations at a mining rate of 3.5 million tonnes per annum run of mine (ROM) coal;
- processing of ROM coal at the CHPP;
- disposal of waste rock, comprising of overburden and interburden, in-pit or in out-of-pit waste rock emplacements as mining progresses;
- disposal of (coarse and fine) coal rejects in dedicated in-pit and out-of-pit rejects emplacement structures and in a final void;
- loading of product coal using rail loading infrastructure;
- transport of product coal via the existing rail system from the CDM to the Port of Brisbane and opportunistic transport via road to domestic customers;
- construction and operation of ancillary infrastructure in support of mining operations, including:
  - satellite mine service and infrastructure areas;
  - haul and access roads;
  - workshops;
  - diesel storage tanks;
  - electricity supply and communications infrastructure; and
  - water management infrastructure;
- closure of existing, and construction of new, local roads;
- realignment of existing 132 kilovolts electricity transmission line;
- 24-hour seven-days per week operations over a 75-year mine life;
- peak operational workforce of approximately 160 people;
- ongoing exploration activities within mining tenements;
- other associated minor infrastructure, plant and activities, where required; and
- progressive rehabilitation, as well as ultimate rehabilitation of the entire CDM area once the site has been decommissioned.

### 3.1.1.5 Environmentally Relevant Activities

Environmentally Relevant Activities (ERAs) (defined under the EP Act) are activities that will, or have the potential to, release contaminants into the environment which may cause environmental harm.

In accordance with EA EPML00900113, the CDM is approved to conduct the ERAs described within Table 3 until 2093 (i.e. 75 years from the date EA EPML00900113 was amended to include the Continued Operations Project).

**Table 3  
Approved Environmentally Relevant Activities**

Relevant Mining Lease	Environmentally Relevant Activity	Description
	ERA 13	<b>Mining Black Coal</b>
50233	ERA 31	<b>Ancillary – Mining processing, 2</b> Processing, in a year, the following quantities of mineral products, other than coke, (b) more than 100,000 t.
50258 50259 50260 50269	ERA 60	<b>Ancillary – Waste disposal, 1</b> Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a), (a) less than 50,000 t.
	ERA 63	<b>Ancillary – Sewage Treatment Plant, 1</b> Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme.

### 3.1.1.6 Relevant Legislation and Guidelines

#### **Environmental Protection Act 1994**

Table 4 provides a reconciliation of the relevant requirements of sections 126C and 126D of the EP Act and where they have been addressed in this PRC Plan.

**Table 4**  
**Reconciliation of Sections 126C and 126D of the EP Act**

Sections 126C and 126D of the EP Act	Section of this PRC Plan
<b>Section 126C – Requirements for PRC Plan</b>	
(1) A proposed PRC plan must	-
(a) be in the approved form; and	This PRC Plan
(b) describe the following –	-
(i) each resource tenure, including the area of each tenure, to which the application relates;	Section 3.1.1.3
(ii) the relevant activities to which the application relates;	Section 3.1.4.1
(iii) the likely duration of the relevant activities; and	Section 3.1.4.1
(c) include –	-
(i) a proposed PRCP schedule that complies with section 126D; and	Attachment 2
(ii) a detailed description, including maps, of how and where the relevant activities are to be carried out; and	Sections 3.1.3 and 3.1.4, Figures 10 to 22 and Attachment 2
(iii) details of the consultation undertaken by the applicant in developing the proposed PRC plan; and	Section 3.2.1
(iv) details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan; and	Section 3.2.2
(d) state the extent to which each proposed post-mining land use for land, or non-use management area, identified in the proposed PRCP schedule for the plan is consistent with –	-
(i) the outcome of consultation with the community in developing the plan; and	Sections 3.3.1 and 3.4.1
(ii) any strategies or plans for the land of a local government, the State or the Commonwealth; and	Sections 3.3.2 and 4.3.2
(e) for each proposed post-mining land use for land, state the applicant's proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP schedule; and	Section 3.5
(f) identify the risks of a stable condition for land mentioned in paragraph (e) not being achieved, and how the applicant intends to manage or minimise the risks; and	Section 3.6
(g) for each proposed non-use management area, state the reasons the applicant considers the area can not be rehabilitated to a stable condition because of a matter mentioned in section 126D(2); and	NA <sup>1</sup>
(h) for each matter mentioned in paragraph (g), include copies of reports or other evidence relied on by the applicant for each proposed non-use management area; and	NA <sup>1</sup>
(i) for each proposed non-use management area, state the applicant's proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP schedule for the area; and	Section 3.5
(j) include the other information the administering authority reasonably considers necessary to decide whether to approve the PRCP schedule for the plan.	This PRC Plan
(2) The matters mentioned in subsection (1), other than the matter mentioned in subsection (1)(c)(i), are the <b>rehabilitation planning part</b> of the proposed PRC Plan.	-

**Table 4 (Continued)**  
**Reconciliation of Sections 126C and 126D of the EP Act**

Sections 126C and 126D of the EP Act	Section of this PRC Plan
<b>Section 126D – Requirements for proposed PRCP schedule</b>	
(1) A proposed PRCP schedule must—	Attachment 2
(a) for the area of each resource tenure described in the PRC plan, state—	
(i) the proposed post-mining land use for the land; or	
(ii) that the applicant considers the land to be a non-use management area; and	
(b) for each proposed post-mining land use mentioned in paragraph (a)(i), state—	
(i) each rehabilitation milestone required to achieve a stable condition for the land; and	
(ii) when each rehabilitation milestone is to be achieved; and	
(c) for each non-use management area mentioned in paragraph (a)(ii), state—	
(i) each management milestone for the area; and	
(ii) when each management milestone is to be achieved; and	
(d) include maps showing the land mentioned in paragraphs (a), (b) and (c).	
(2) The PRCP schedule may state that land is a non-use management area only if—	NA <sup>1</sup>
(a) carrying out rehabilitation of the land would cause a greater risk of environmental harm than not carrying out the rehabilitation; or	NA <sup>1</sup>
(b) both of the following apply—	NA <sup>1</sup>
(i) the risk of environmental harm as a result of not carrying out rehabilitation of the land is confined to the area of the relevant resource tenure;	NA <sup>1</sup>
(ii) the applicant considers, having regard to each public interest consideration, that it is in the public interest for the land not to be rehabilitated to a stable condition.	NA <sup>1</sup>
(3) Despite subsection (2), if land the subject of the proposed PRCP schedule will contain a void situated wholly or partly in a flood plain, the schedule must provide for rehabilitation of the land to a stable condition.	NA <sup>1,2</sup>
(4) For subsection (1)(b)(ii), the PRCP schedule must provide for each rehabilitation milestone to be achieved as soon as practicable after the land to which it relates becomes available for rehabilitation.	Section 3.5.1 and Attachment 2
(5) For subsection (4), land is <b>available for rehabilitation</b> if the land is not being mined, unless—	Attachment 2
(a) the land is being used for operating infrastructure or machinery for mining, including, for example, a dam or water storage facility; or	
(b) the land is identified in the proposed PRCP schedule or the application for an environmental authority for relevant activities to which the schedule relates as containing a probable or proved ore reserve that is to be mined within 10 years after the land would otherwise have become available for rehabilitation; or	
(ba) the land is required for the mining of a probable or proved ore reserve mentioned in paragraph (b); or	
(c) the land contains permanent infrastructure identified in the proposed PRCP schedule as remaining on the land for a post-mining land use.	

<sup>1</sup> In accordance with section 754(3) of the EP Act, Syntech is not required to comply with a requirement under section 126C(1)(g) or (h) or 126D(2) or (3) for the proposed PRCP Schedule for the plan in relation to land as an outcome for the land has been identified under a land outcome document (EA EPML00900113 and the Rehabilitation Operational Management Plan [Syntech, 2020], made under a condition of EA EPML00900113), and the outcome for the land is the same as, or substantially similar to, the outcome for the land if it were a non-use management area under a PRCP Schedule.

<sup>2</sup> The approved final voids in the proposed PRCP schedule are not situated wholly or partly in a flood plain, as such, section 126D(3) of the EP Act does not apply to the CDM.

## **Environmental Protection Regulation 2019**

Schedule 8A of the *Environmental Protection Regulation 2019* (the EP Regulation) provides details of the PRCP objective assessment. The administering authority must consider whether the PRCP Schedule achieves each PRCP objective stated in Part 3 of Schedule 8A of the EP Regulation.

Based on the definitions provided in section 750 of the EP Act, the EA for the CDM (EA EPML00900113) and the Rehabilitation Operational Management Plan (Syntech, 2020) (made under a condition of EA EPLM00900113) are land outcome documents. Accordingly, section 213 of the EP Regulation outlines the following transitional provisions that apply:

### **213 Carrying out PRCP objective assessment for particular PRCP schedule decision**

- (1) *This section applies if, under section 754 of the Act, the administering authority has given a mining EA holder a notice requiring the holder to give the administering authority a proposed PRC plan.*
  - (2) *Schedule 8A, part 3, table 1 does not apply for conducting a PRCP objective assessment of the proposed PRCP schedule for the plan to the extent that—*
    - (a) *a land outcome document provides for an outcome for the land the subject of the proposed PRCP schedule; and*
    - (b) *the outcome for the land is the same as or substantially similar to the outcome for the land as if it were a post-mining land use or non-use management area under the plan.*
  - (3) *Also, the PRCP objective and PRCP performance outcomes stated in schedule 8A, part 3, table 2, entry for 'Rehabilitation Milestones' do not apply for conducting a PRCP objective assessment of the proposed PRCP schedule for the plan to the extent that—*
    - (a) *a land outcome document states criteria for achieving an outcome provided for in the document for land; and*
    - (b) *the same or substantially similar criteria are proposed in the plan for the outcome.*
  - (4) *In addition, the PRCP objective and PRCP performance outcomes stated in schedule 8A, part 3, table 3, entry for 'Management Milestones' do not apply for conducting a PRCP objective assessment of the proposed PRCP schedule for the plan to the extent that—*
    - (a) *a land outcome document states criteria for achieving an outcome provided for in the document for land; and*
    - (b) *the same or substantially similar criteria are proposed in the plan for the outcome.*
- ...

In summary, the outcomes for the land, and associated criteria for achieving these outcomes, that are identified in EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020), are not subject to assessment under the EP Regulation (as the land outcomes provided in this PRC Plan are the same as, or substantially similar to, those contained in the land outcome documents).

## **Progressive Rehabilitation and Closure Plans Guideline**

The PRCP Guideline assists applicants in developing a PRC Plan as part of a site-specific application for a new mining activity and for existing EA holders who will be required to develop a PRC Plan under section 754 of the EP Act.

The PRC Plan (the rehabilitation planning part of the PRCP) must meet the information requirements in sections 126C and 126D of the EP Act (unless otherwise stated) (Table 4) and must be written in accordance with the PRCP Guideline. The PRCP Schedule (Attachment 2) operates separately to the EA and contains milestones and conditions that relate to the completion of progressive rehabilitation and mine closure. Both the EA and the PRCP Schedule apply to the entire life of the mining activities, irrespective of when the underlying tenure expires. As per section 202E of the EP Act, where there is an inconsistency between an EA and a PRCP Schedule, the EA prevails to the extent of the inconsistency (DES, 2019).

Section 126C(1)(a) of the EP Act requires that '*A PRC Plan must be in the approved form*'. The approved form for a PRC Plan is provided by the DES Application Form *Submission of a progressive rehabilitation and closure plan* (ESR/2019/4957) (herein referred to as the PRCP Application Form). Section 6 of the PRCP Application Form provides a checklist which has been reproduced in Table 5.

This PRC Plan has been structured to be consistent with the requirements outlined in Appendix 1 of the PRCP Application Form. The structure of this PRC Plan is summarised below:

- Section 3.1:** Provides an overview of the objective of this PRCP, details of relevant legislation and an introduction to the CDM, including site location details and a description of the CDM.
- Section 3.2:** Provides information on stakeholder consultation including a community consultation register and community consultation plan.
- Section 3.3:** Describes the justification for the PMLU and details of each nominated PMLU.
- Section 3.4:** Describes the justification for the NUMA and details of each nominated NUMA.
- Section 3.5:** Includes information describing how the proposed rehabilitation and management methodologies have been developed and will be implemented.
- Section 3.6:** Provides details of the risk assessment undertaken to identify the risk of a stable condition for land not being achieved and also provides a risk treatment plan outlining how the risks will be managed or minimised.
- Section 3.7:** Provides a monitoring and maintenance program that identifies and describes the monitoring systems that will be undertaken to demonstrate a milestone and milestone criteria have been achieved.
- Section 3.8:** Lists the referenced cited in this PRC Plan.

**Table 5  
Progressive Rehabilitation and Closure Plan – Checklist**

PRC Plan Requirement <sup>1</sup>	Requirement Met? (Yes/NA)	Relevant Section Number	Justification <sup>2</sup>
<b>Project Description</b>			
Describe the following:	-	-	-
• each resource tenure, including the area of each tenure to which the application relates;	Yes	Section 3.1.4.1	-
• the relevant activities to which the application relates;	Yes	Section 3.1.4.1	-
• the likely duration of the relevant activities.	Yes	Section 3.1.4.1	-
Include a detailed description, including maps, of how and where the relevant activities are to be carried out.	Yes	Sections 3.1.3 and 3.1.4, Figures 10 to 22 and Attachment 2	-
<b>Consultation</b>			
Include details of the consultation undertaken by the applicant in developing the proposed PRC plan.	Yes	Section 3.2.1	-
Include details of how the applicant will undertake ongoing consultation in relation to the rehabilitation to be carried out under the plan.	Yes	Section 3.2.2	-
<b>Post-mining Land Use</b>			
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with the outcome of consultation with the community in developing the PRC plan.	Yes	Section 3.3.1 and Attachments 1 and 2	The PMLU identified in the PRCP Schedule is consistent with EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020).
State the extent to which each proposed post-mining land use identified in the proposed PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	Yes	Section 3.3.2 and Attachments 1 and 2	
<b>Non-use Management Area<sup>3</sup></b>			
State the extent to which each proposed non-use management area identified in the PRCP schedule for the plan is consistent with the outcome of consultation with the community in developing the PRC plan.	Yes	Section 3.4.1 and Attachments 1 and 2	The NUMAs identified in the PRCP Schedule are consistent with EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020).
State the extent to which each non-use management area identified in the PRCP schedule for the plan is consistent with any strategies or plans for the land of a local government, the State or the Commonwealth.	Yes	Section 3.4.1 and Attachments 1 and 2	
For each proposed non-use management area, state the reasons the applicant considers the area cannot be rehabilitated to a stable condition because of a matter mentioned in section 126D(2).	NA	Attachments 1 and 2	
For each matter mentioned in the requirement above, include copies of reports or other evidence relied on by the proponent for each proposed non-use management area.	NA	Attachments 1 and 2	

**Table 5 (Continued)  
Progressive Rehabilitation and Closure Plan – Checklist**

PRC Plan Requirement <sup>1</sup>	Requirement Met? (Yes/NA)	Relevant Section Number	Justification <sup>2</sup>
<b>Rehabilitation and Management Methodology<sup>4</sup></b>			
For each post-mining land use, state the applicant's proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP schedule.	Yes	Section 3.5.1	
For each non-use management area, state the applicant's proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP schedule for the area.	Yes	Section 3.5.1	
<b>Risk Assessment</b>			
Identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the applicant intends to manage or minimise the risks.	Yes	Section 3.6	-
<b>PRCP Guideline</b>			
Include any other information prescribed by the administering authority in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964).	Yes	This PRC Plan	-
Include the spatial information required in the Guideline – Progressive Rehabilitation and Closure Plans (ESR/2019/4964).	Yes	Section 3.1.3 and Figures 10 to 22	-
<b>Other Information</b>			
Include the other information the administering authority reasonably considers necessary to decide whether to approve the PRCP schedule.	Yes	This PRC Plan	-
<b>PRCP Schedule<sup>5</sup></b>			
Include a PRCP schedule prepared using the PRCP schedule template (ESR/2019/5103).	Yes	Attachment 2	-
Include maps showing all of the land mentioned in the PRCP schedule, as it relates to being progressively rehabilitated.	Yes	Section 3.1.3 and Figures 10 to 22	-

<sup>1</sup> As per the requirements of *Submission of a progressive rehabilitation and closure plan (ESR/2019/4957)*.

<sup>2</sup> Justification must be provided for any requirements for which the response is Not Applicable (NA).

<sup>3</sup> Note for Transitional PRC plans: *The holder is not required to comply with the requirements under section 126C(1)(g) or (h) or 126D(2) or (3) for the proposed PRCP schedule for the plan in relation to land if a land outcome document identifies the outcome for the land as the same, or substantially similar to, the outcome for the land if it were a non-use management area.*

<sup>4</sup> Note: section 3.5 of the PRCP Guidelines outlines the range of information that must be included as appendices to the rehabilitation planning part of the PRC plan.

<sup>5</sup> The proposed PRCP schedule must comply with section 126D of the EP Act, and be written in accordance with the PRCP Guideline. The administering authority will assess the proposed PRCP schedule in conjunction with the rehabilitation planning part of the PRC plan and other application documents, and decide whether to approve the proposed PRCP schedule, with or without conditions, or refuse the proposed PRCP schedule.

### 3.1.2 Baseline Information

In 2018, Syntech completed the CDM Continued Operations Project EVA (Syntech, 2018). Studies undertaken for the EVA that are relevant to this PRCP include:

- Surface Water Assessment (WRM Water & Environment [WRM], 2018a) (Appendix A).
- Flood Study (WRM, 2018b) (Appendix B).
- Groundwater Assessment (Australasian Groundwater and Environmental Consultants [AGE], 2018) (Appendix C).
- Terrestrial Flora Assessment (Ecosure, 2018a) (Appendix D).
- Terrestrial Fauna Assessment (Ecosure, 2018b) (Appendix E).
- Aquatic Ecology Assessment (DPM Envirosciences, 2018) (Appendix F).
- Soil Resources Review (LRS Environmental, 2018) (Appendix G).
- Contaminated Land Assessment (Environmental Earth Sciences, 2017) (Appendix H).
- Rejects Management Concept Study (Engeny Water Management [Engeny], 2018) (Appendix I).

To further support the studies undertaken for the EVA and to address the requirements of the PRCP Guideline, a contemporary Mine Waste Geochemical Characterisation (Geo-Environmental Management Pty Ltd [GEM], 2021) (Appendix J) was undertaken.

#### 3.1.2.1 Site Topography

Terrain within the CDM area is comprised of low sandstone hills in the north and gently undulating plains in the south. Elevation in the CDM area ranges from approximately 320 metres Australian Height Datum (mAHD) in the vicinity of Drainage Line 1, to approximately 370 mAHD in the north (Figure 2) (Syntech, 2018).

Overall, slopes (generally of less than two percent) and drainage lines trend in a south-southeast direction towards Columboola Creek located south of the Warrego Highway. The topography to the north gently slopes northwards along drainage lines towards Punch-Bowl Creek. The local terrain is predominantly cleared pasture containing patches (varying in size) of both remnant and regrowth vegetation (Syntech, 2018).

#### 3.1.2.2 Climate

The CDM site has a sub-tropical climate regime with distinct wet (October to March) and dry (April to September) seasons. The average daily minimum and maximum temperatures at Miles (approximately 16 km south-west of the CDM) range between 4°C (in July) and 33°C (in January).

The average monthly rainfalls at the CDM exhibit distinctly wet (October to March) and dry (April to September) seasons during the year, with a dry season low of 29.0 millimetres (mm) in August and a wet season high of 94.8 mm in January. The wet season average monthly rainfalls (53.2 mm to 94.8 mm) are significantly higher than the equivalent dry season average monthly rainfalls (29.0 mm to 38.6 mm). The recorded mean annual rainfall at the Miles Post Office site over the 128-year period is approximately 650 mm.

The average annual pan evaporation at the CDM site is estimated to be 1,885 mm, which is approximately three times the average annual rainfall. The evaporation rate is high throughout the year, with the highest evaporation rates occurring in the months between October and March. Evaporation rates are generally much higher than rainfall in all months.

Although understanding of climate change has improved markedly over the past several decades, climate change projections are still subject to uncertainties such as (CSIRO and BoM, 2015):

*...scenario uncertainty, due to the uncertain future emissions and concentrations of greenhouse gases and aerosols; response uncertainty, resulting from limitations in our understanding of the climate system and its representation in climate models; and natural variability uncertainty, the uncertainty stemming from unperturbed variability in the climate system.*

In Australia, the climate is projected to become warmer and drier.

Climate change may result in changes to rainfall patterns, runoff patterns and river flow. Based on the *Climate Change Projections for the central slopes* (CSIRO, 2015) the following changes are predicted at the CDCOP from 2090 onwards based on the RCP8.5 results:

- 80% of climate change models predicted that annual rainfall would change by between -23% (reduce by 145 mm) and 18% (increase by 113 mm); and
- 80% of climate change models predicted that annual evapotranspiration would change by between 9.8% (increase by 185 mm) and 18.1% (increase by 341 mm).

The potential implications of climate change to the residual void water balance and on design flood levels were considered in the CDM Continued Operations Project EVA (Syntech, 2018).

### 3.1.2.3 Geological Setting

The CDM is located on the eastern flank of the northern Surat Basin, which stratigraphically overlies the Bowen Basin. The Surat Basin comprises Jurassic to Cretaceous aged sandstones, siltstones and mudstones deposited in a predominantly fluvio-lacustrine depositional environment.

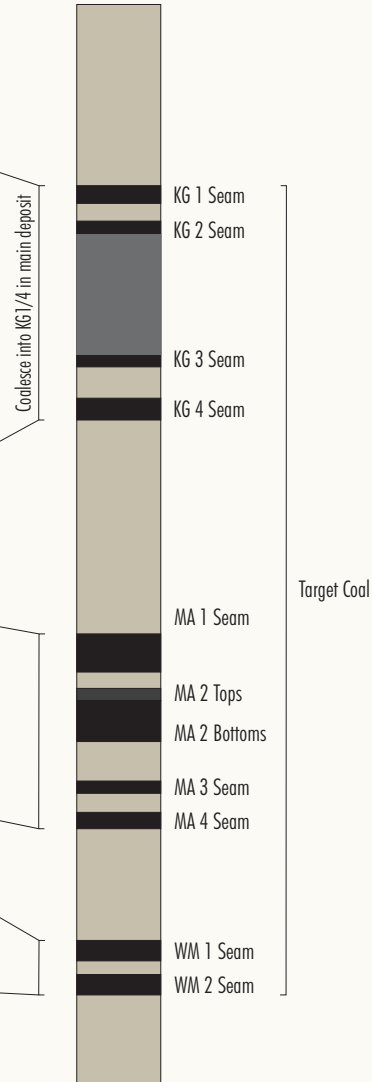
The main stratigraphic units occurring within the CDM area and immediate surrounds, from youngest to oldest, including corresponding hydrogeological systems are (Figure 3):

- Quaternary / Tertiary (unconsolidated alluvial sediments) – ephemeral groundwater where present.
- Late Jurassic (Springbok Sandstone [i.e. lowermost unit of the Kumbarilla Beds]) – unsaturated in the CDM area.
- Middle Jurassic (Walloon Coal Measures) – confined aquifer associated with coal seams between overburden/interburden aquitards.
- Early/Middle Jurassic (Hutton Sandstone and Precipice Sandstone) – confined aquifers at depth.

The physical and chemical properties of each of the above hydrogeological systems (where available) are described in the following subsections and are discussed further in Appendix C.

BASIN	PERIOD	GROUP/FORMATION	
NORTHERN SURAT	MIDDLE JURASSIC	JUANDAH COAL MEASURES	KOGAN HORIZON
			MACALISTER HORIZON
			WAMBO HORIZON

EPC 732 Representative Stratigraphic Column



Source: Syntech (2017); JB Mining Services (2009).

Note: Indicative depth only. Coal seam depth varies over the Project area.

 Cameby Downs Mine  
C A M E B Y D O W N S M I N E  
Juandah Coal Measures  
Representative Stratigraphic Column

### ***Quaternary Sediments***

Quaternary sediments associated with the Condamine River and its tributaries unconformably overlie the Springbok Sandstone and Tertiary Sediments (where present). The Condamine River alluvium is a broad term used to describe the alluvial and sheetwash deposits of the Condamine River and its tributaries.

Exploration drilling data indicates that, where present, the Quaternary sediments across the CDM area are thin and unsaturated. The Quaternary sediments comprise silty clay to sandy clay. Groundwater recharge to the Quaternary sediments occurs via direct rainfall. Where saturated, groundwater discharge is via downward leakage to the underlying hydrogeological systems.

Localised disconnected zones of saturated Quaternary alluvium may be present along Columboola Creek, approximately 1 km south-west of the CDM. Where groundwater is present in the alluvium, the flow direction is from north to south and follows topography away from the CDM.

Quaternary sediments are also associated with the Condamine River and its associated tributaries approximately 17 km south of the CDM. The Quaternary sediment consists primarily of thin sheetwash deposits of silty clay to sandy clay which are disconnected from the Condamine River alluvium.

No groundwater supply bores within the CDM or surrounds target the Quaternary sediments, due to the limited extent and general lack of saturation or reliable water supply in these sediments.

### ***Tertiary Sediments***

Tertiary sediments are present in the north-eastern part of the CDM and unconformably overlie the older Jurassic units of the Surat Basin.

The Tertiary cover is generally thin and comprises deeply weathered clayey sub-labile to quartzose sandstone, sandy claystone, laminated siltstone and minor conglomerate.

Groundwater recharge to the Tertiary sediments also occurs via direct rainfall. Where saturated, groundwater discharge is via downward leakage to the underlying hydrogeological systems.

No groundwater supply bores within the CDM or surrounds target the Tertiary sediments, due to the limited extent and general lack of saturation or reliable water supply in these sediments.

### ***Springbok Sandstone***

The Springbok Sandstone (i.e. lowermost unit of the Kumberilla Beds) outcrops in the north-eastern corner of the CDM and sub-crops below the Quaternary sediments elsewhere. The Springbok Sandstone gently dips and thickens to the south-west and comprises clayey lithic sub-labile to very lithic sandstone, calcareous in part, interbedded with carbonaceous mudstone and siltstone. Pre-Tertiary weathering has chemically altered the sediments resulting in silicified, kaolinised and ferruginised sandstone.

Exploration drilling indicates the Springbok Sandstone is generally unsaturated within the CDM. The Springbok Sandstone will become saturated as the unit dips below the regional water table to the south-west.

Recharge of the Springbok Sandstone occurs via direct rainfall in outcropping areas and diffuse rainfall seepage through the thin overlying Quaternary sediments. Regional groundwater flow in the Springbok Sandstone is down dip, towards the south-west. Where saturated, discharge is via downward leakage to underlying sediments and down gradient of the CDM.

To assist with understanding groundwater usage within and surrounding the CDM, ENRS conducted a bore census in October 2017 (ENRS, 2017).

There were no known groundwater users identified within the CDM or surrounds during the bore census targeting the Springbok Sandstone.

### **Walloon Coal Measures**

The Walloon Coal Measures are separated into three stratigraphic units. The uppermost unit at the CDM is the Juandah Coal Measures, with the Tangalooma Sandstones and Taroom Coal Measures forming a thick confining aquitard between the Juandah Coal Measures and the underlying Hutton Sandstone and Precipice Sandstone. The Juandah Coal Measures comprise lithic, labile sandstone interbedded with siltstone, mudstone and coal. Coal deposition is more frequent towards the top of the unit.

The Juandah Coal Measures contain the main economic coal seams for the CDM, and are up to 220 m thick within the CDM. The Juandah Coal Measures starts at depths of between 30 metres below ground level (mbGL) to 125 mbGL within the CDM area.

Exploration drilling has identified three coal horizons and 12 individual coal seams within the Juandah Coal Measures, including:

- Kogan (KG 1, KG 2, KG 3, and KG 4);
- Macalister (MA 1, MA 2 Tops, MA2 Bottoms, MA 3, and MA 4); and
- Wambo (WM 1, WM 2, and WM 3). Note that WM 3 is not shown on Figure 3.

The Macalister Coal seams comprise the main economic resource for the CDM, supplemented by the overlying Kogan Coal seams and underlying Wambo Coal seams. The target resource has been estimated at approximately 250 million tonnes of proven and probable in-situ thermal coal reserves.

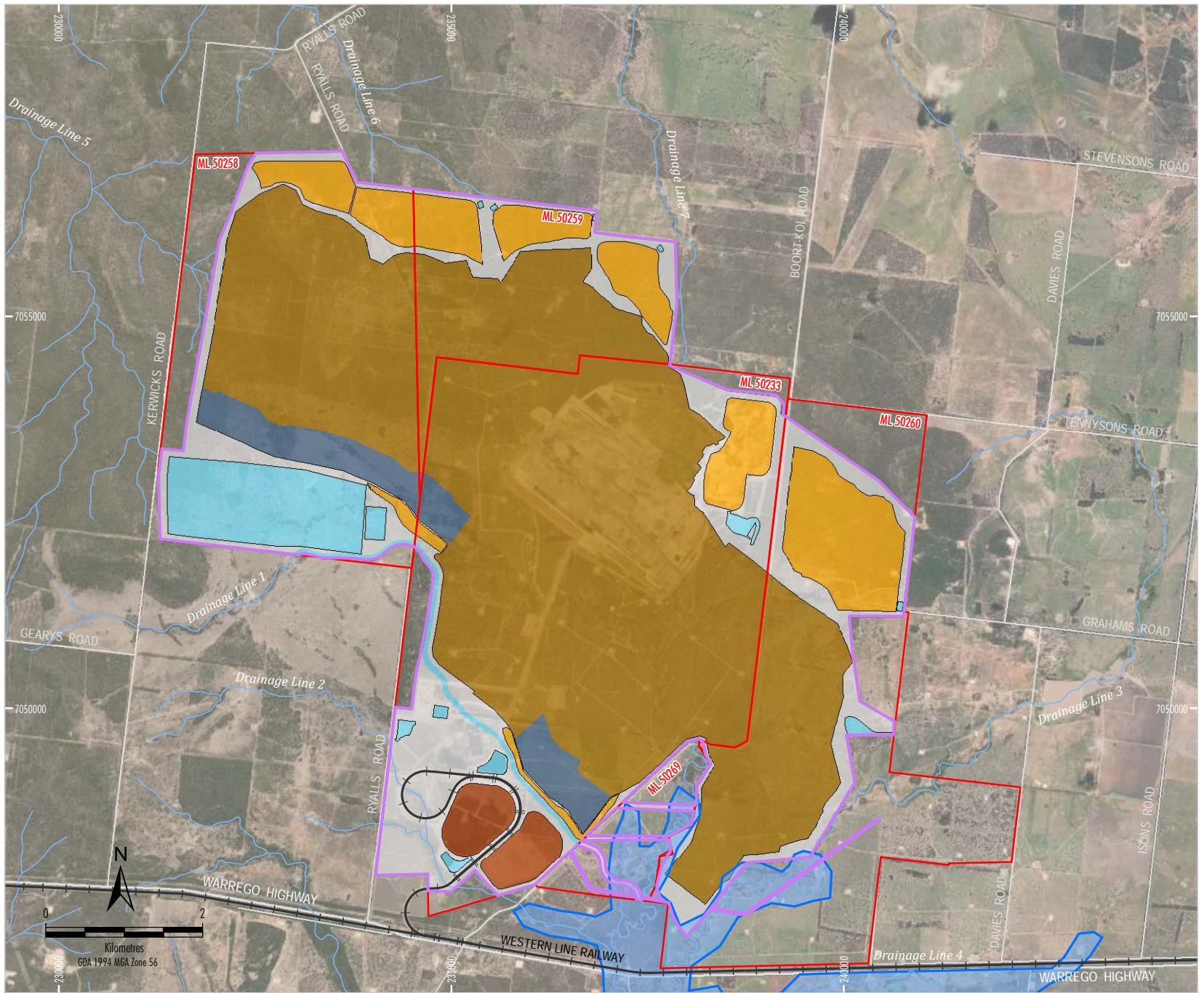
Regionally, the Walloon Coal Measures (including the Juandah Coal Measures) is separated from the overlying Springbok Sandstone by an aquitard approximately 15 m thick (OGIA, 2016).

The main water bearing units of the Walloon Coal Measures are the coal seams which comprise approximately 10% of the total thickness of the unit (OGIA, 2016). Hydraulic conductivity within the Walloon Coal Measures is generally associated with secondary porosity through fractures, and cleats within the coal seams.

#### **3.1.2.4 Site Hydrology and Fluvial Networks**

The CDM is located within the mid-reach of the Maranoa-Balonne River Basin, which is part of the headwaters of the Murray-Darling Basin. Locally, the majority of the CDM (southern portion) is located within the upper catchment of Columboola Creek, a tributary of Dogwood Creek. The remaining part of the CDM (northern portion) is located within the upper catchment of Punch-bowl Creek, which is also a tributary of Dogwood Creek. Dogwood Creek is a major tributary of the Balonne River (WRM, 2018a) (Figure 4).

Columboola Creek commences to the south of the CDM and drains in a westerly direction to Dogwood Creek. The majority of the CDM drains to Columboola Creek via three drainage features, namely: Drainage Line 1; Drainage Line 2; and Drainage Line 3. Another drainage feature (Drainage Line 4) reports to Columboola Creek to the south of the CDM. At its confluence with Dogwood Creek, Columboola Creek has a total catchment area of approximately 432 square kilometres (km<sup>2</sup>) (WRM, 2018a) (Figure 4).



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Queensland Floodplain Assessment Overlay
- Project Domains**
- Mine Infrastructure Area
  - Final In-pit Spoil
  - Tailings Storage Facility (TSF)
  - Out-of-pit Spoil Emplacement
  - Final Void
  - Water Management

Source: The State of Queensland (2020; 2021); Syntech Resources (2018); Ecosure (2018).  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Surface Water Features

**Figure 4**

The northern portion of CDM drains to Punch-bowl Creek via three headwater drainage features, namely: Drainage Lines 5, 6 and 7. At its confluence with Dogwood Creek, Punch-bowl Creek has a total catchment area of approximately 124 km<sup>2</sup> (WRM, 2018a).

Given the ephemeral nature of the drainage features within the CDM area and downstream watercourses, surface water use is generally restricted to stock watering when water is available (WRM, 2018a).

Figure 4 also shows the Queensland Floodplain Assessment Overlay. Of note, there are no final voids located within this area.

### 3.1.2.5 Groundwater Levels and Properties

#### **Groundwater Levels**

Groundwater level data has been collected from the groundwater monitoring bores within the vicinity of the CDM from 2004 to present. Plate 1 presents the groundwater level hydrograph for the groundwater monitoring bores, which screen the MA1 / MA2 coal seams. Groundwater levels are between 290 mAHD and 318 mAHD. As detailed in AGE (2018), the elevated water level readings for CD034C in the order of 330 mAHD is considered an anomaly and not representative of the formation groundwater level following bore construction. Natural groundwater level fluctuations would show a similar trend to the CRD. However, all bores show a slight decline relative to the CRD and therefore are impacted by either passive drainage to the existing open cut or CSG extraction near the CDM.

Additional groundwater level data from selected exploration bores across the CDM area was collected in June 2017 as part of ongoing studies for the Surat Cumulative Management Area by the OGIA and is presented in Appendix C. The data shows groundwater levels in these bores ranging between 292 mAHD and 308.2 mAHD. These boreholes are open holes with surface casing installed typically to the base of weathering. Therefore, the open section most probably intersects groundwater from other coal seam strata above and below the target Macalister (MA1 / MA2) coal seams.

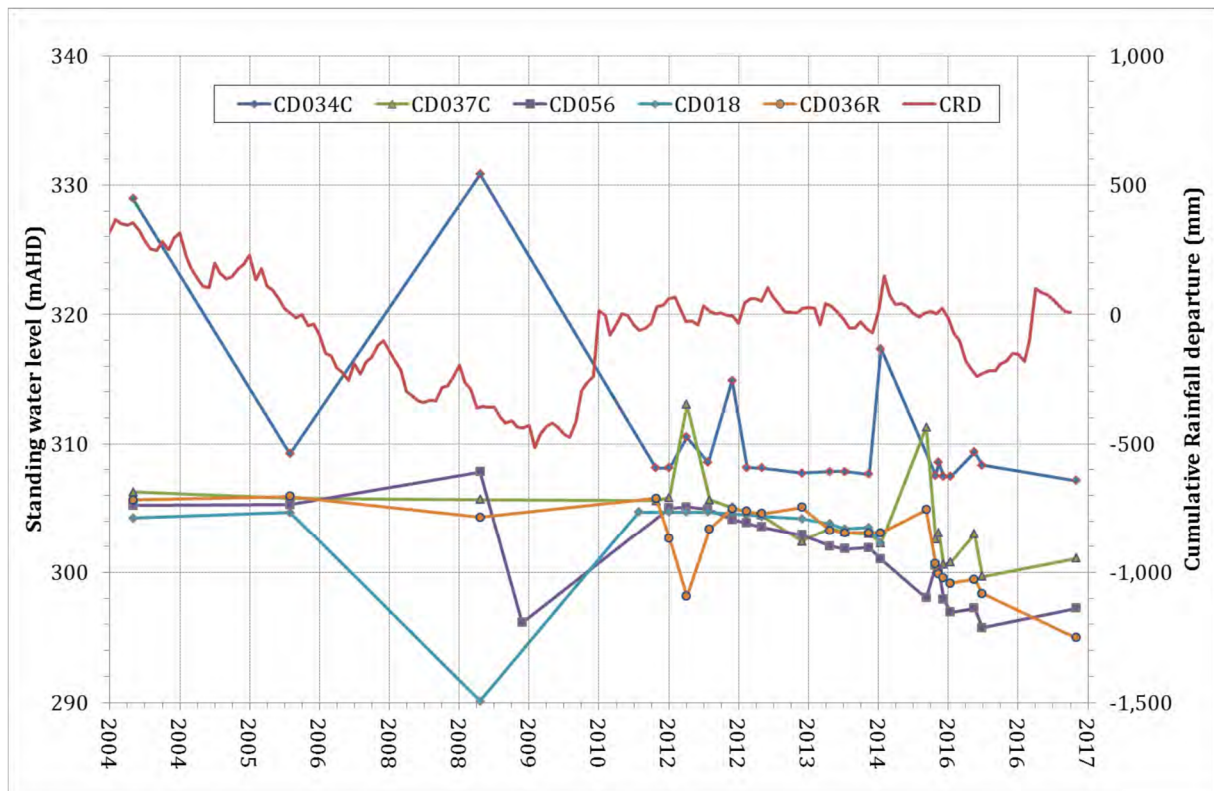
As such, the more elevated groundwater levels between 304 mAHD (CD14C) and 308.2 mAHD (CD419C) are considered a composite of all coal seam groundwater levels and do not reflect groundwater elevation specific to the Macalister (MA1 / MA2) coal seams.

#### **Groundwater Quality**

A review of 103 groundwater quality samples was completed by AGE (2018) for the EVA. The data reviewed included information provided by Syntech and from selected exploration bores across the CDM leases as part of ongoing studies for the Surat Cumulative Management Area by the Office of Groundwater Impact Assessment (OGIA) (OGIA, 2016). The samples were collected between April 2009 and June 2017 from five monitoring bores located within the CDM and five exploration bores selected as part of ongoing studies for the Surat Cumulative Management Area in 2017 (AGE, 2018).

The review indicated that groundwater in the coal seams is brackish to highly saline (median electrical conductivity of 13,790 microSiemens per centimetre [ $\mu\text{S}/\text{cm}$ ]) and, on this basis, is generally unsuitable for livestock watering. Concentrations of dissolved metals were either below the laboratory limit of reporting, or below the respective livestock watering (cattle) or drinking water guidelines (AGE, 2018).

Although groundwater quality in the GAB varies across aquifers, it is generally fresh to brackish and suitable for stock watering purposes, with salinity averaging 1,900 mg/L (OGIA, 2016).



Source: Figure 6.2 in AGE (2018).

### Plate 1 – Groundwater Level Hydrographs

#### Bore Census

A bore census (ENRS, 2017) was conducted across 30 privately-owned properties surrounding the CDM, encompassing an area of more than 150 km<sup>2</sup> (the bore census area). The bore census sought to identify and validate the presence of groundwater bores/features within the bore census area.

The bore census resulted in the identification (and inspection) of the following:

- one in-use stock groundwater bore (RN123511);
- two monitoring bores:
  - RN168040 (CDM monitoring bore CD036R); and
  - RN168041 (CDM monitoring bore CD018);
- one bore which was unable to be located (RN168059) assumed decommissioned/destroyed; and
- five groundwater bores confirmed to have been decommissioned:
  - RN10725;
  - RN12340;
  - RN13602 & RN168216 (duplicate records, same bore re-drilled);
  - RN13548; and
  - RN168075.

Other monitoring bores located within the CDM were not targeted during the bore census (as they were already known to exist).

The October 2017 bore census concluded that there was no significant use of groundwater by landholders surrounding the CDM, with the nearest water supply bore located approximately 6.5 km south and beyond the predicted zone of groundwater drawdown from the CDM (ENRS, 2017; AGE, 2018).

The predicted depressurised zone in the Walloon Coal Measures due to the CDM would extend a maximum of 5 km towards the south-west. In contrast, cumulative drawdown impacts attributable principally (up to 100%) to Coal Seam Gas (CSG) impacts extend across much of the model domain (towards the south-east, south and west) (AGE, 2018).

As such, no private-landholder water supply bores are located within the predicted drawdown extents attributable to the CDM (AGE, 2018).

Two registered groundwater bores (registered in the groundwater database) were identified within the predicted zone of depressurisation. These are RN168040 and RN168041, which are the CDM monitoring bores CD036R and CD018 (respectively), both of which are located within the CDM.

### 3.1.2.6 Soil Types, Properties and Productivity

#### **Soil Types and Properties**

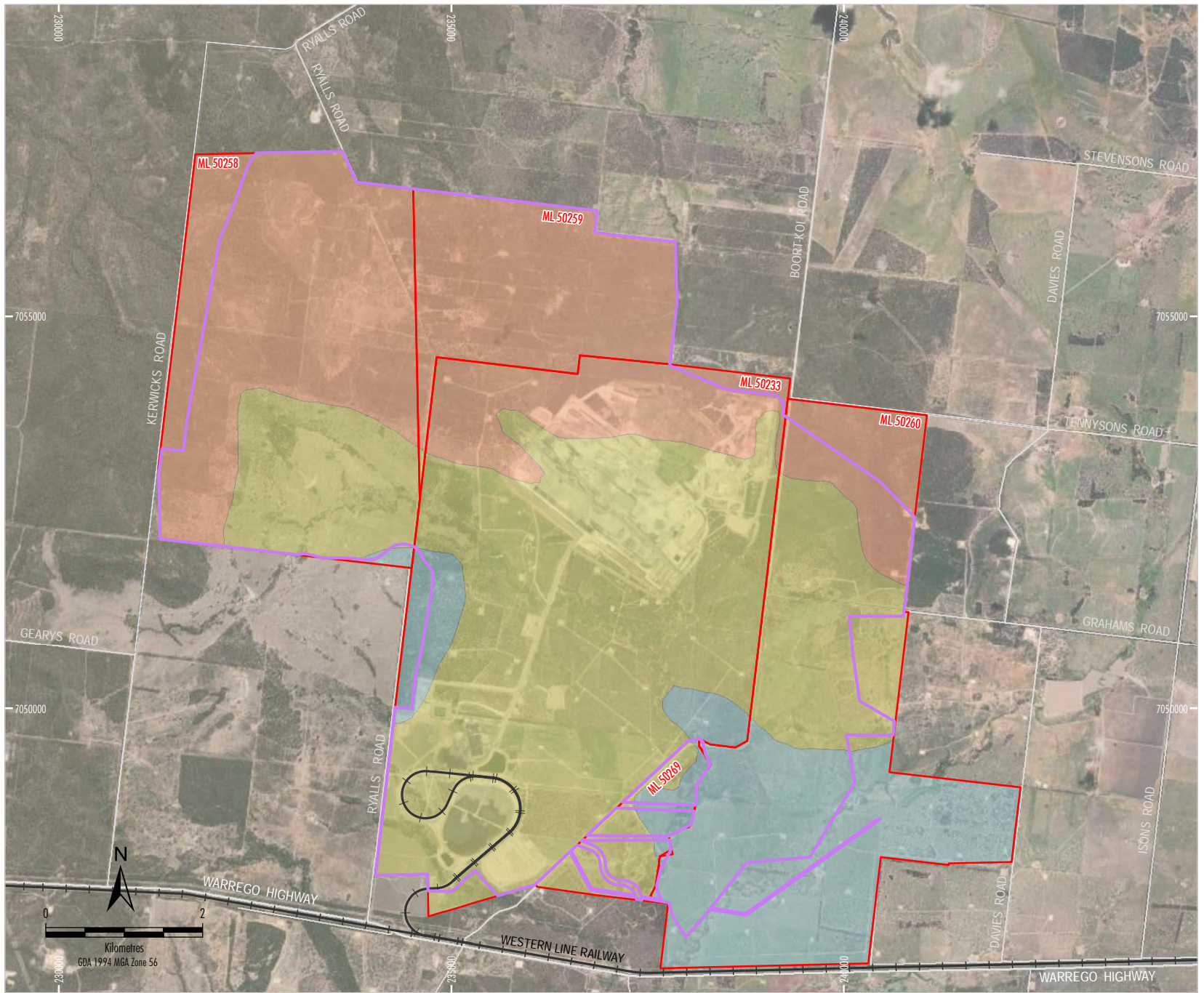
A number of soil investigations have been undertaken at the CDM including by GJR Holdings in 2006, AARC Pty Ltd in 2012, and LRS Environmental in 2018. The outcomes of these surveys are summarised in the Soil Resources Review (LRS Environmental, 2018) undertaken for the EVA (Appendix G).

GJR Holdings conducted field surveys during 2004 comprising 81 tested soil pits excavated by backhoe to various depths to where an impenetrable layer was reached (generally between 0.3 m to 1.3 m). General soil profile and site condition observations were recorded at all test soil pits with 39 sites subject to detailed field analysis, and 24 samples submitted for laboratory testing. AARC (2013) conducted additional field surveys between 2009 and 2012 comprising of 91 soil auger test sites, with 21 locations subject to laboratory analysis.

AARC (2013) nominated three broad soil units for the CDM, these are (Figure 5):

- Binkey Soil Unit – predominantly shallow sandy duplex soils on low sandstone ridges at the northern side of the site with low levels of plant nutrients and high levels of sodicity in the subsoil.
- Braemar Soil Unit – shallow sandy duplex soils on sandstone derived undulating plains with low levels of plant nutrients and high levels of sodicity in the subsoil.
- Tara Soil Unit – strongly structured deep cracking clays soils developed on the gently undulating plains at the southern side of the site with low to moderate levels of plant nutrients but the surface soils are considered sodic and thus with potential for dispersion.

LRS Environmental (2018) adopted the AARC (2013) soil mapping units for the CDM as part of their assessment. LRS Environmental (2018) also conducted further field surveys. LRS Environmental (2018) conducted soil surveys across 20 locations, using an excavator to create small trenches approximately 2 m by 0.5 m by 0.7-0.8 m. One side of each trench was prepared and analysed to identify depth of root growth at each site. The outcomes of the LRS Environmental (2018) assessment identified two broad groups of soils with prescribed soil stripping depths appropriate for rehabilitation of the CDM. The two soil groups are, the Duplex Soils (Binkey and Braemar Soil Mapping Units) and Cracking Clay Soils (Tara Soil Mapping Unit).



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint

**Soil Mapping Units**

- Binkey Soil Management Unit
- Braemar Soil Management Unit
- Tara Soil Management Unit

Source: The State of Queensland (2020); Syntech Resources (2018).  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Soil Unit Mapping

**Figure 5**

### **Soil Productivity**

CDM was assessed for suitability for light intensity grazing land uses and assigned land suitability classes as outlined by AARC (2012) and Department of Minerals and Energy (1995). The five-class system is based on physical and chemical limiting factors applied directly to specific uses and is described below:

- Class 1 – Suitable land with negligible limitations and is highly productive requiring only simple management practices;
- Class 2 – Suitable land with minor limitations which either reduce production or require more than simple management practices to sustain the use;
- Class 3 – Suitable land with moderate limitations which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use;
- Class 4 – Marginal land with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long term; and
- Class 5 – Unsuitable land with extreme limitations that preclude its use.

The land suitability classification identifies limitations of the different soil types present and identifies suitable uses. Land suitability class is determined by the highest ranking limiting factor or a combination of a number of factors. In this survey, the main limiting factors which determined dryland cropping and grazing suitability class include:

- plant available water capacity;
- water erosion;
- nutrient deficiency;
- salinity; and
- soil physical factors.

The pre-mining land suitability classes for the CDM were between Class 3 and Class 5.

### **Acid Sulphate Soils**

The *State Planning Policy 2/02 Planning and Managing Development Involving Acid Sulfate Soils* (Queensland Government, 2002) states that acid sulphate soils occur predominantly on coastal lowlands with elevations generally below 5 mAHD.

The elevation in the area ranges from approximately 320 mAHD to approximately 370 mAHD. In addition, soil investigations undertaken at the site indicated that the pH is moderately acidic to neutral and included no observations of corroded shell, jarosite horizons, iron oxide mottling, sulphurous smell or water-logged soils.

Environmental Earth Sciences conducted a Contaminated Land Assessment, including Acid Sulphate Soil Analysis in 2017. Their assessment concluded that the geology, elevation and soil type indicate no risk of acid sulfate soil occurrence at the CDM (Appendix H).

### **Contaminated Land**

A Site Investigation was undertaken for the EVA by Environmental Earth Sciences (2017) in accordance with the *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013* (National Environment Protection Council [NEPC], 2013) and the *Queensland Auditor Handbook for Contaminated Land Module 5* (Department of Environment and Heritage Protection [DEHP], 2015a).

The Site Investigation (Appendix H) identified evidence of contamination or historical contaminating activities on five properties. All of these locations were considered to be manageable with the implementation of the following measures:

- Former sheep dips and races – further investigation will be undertaken to determine the extent of contamination prior to undertaking activities in these areas. The requirement for remediation or off-site disposal of potentially contaminated soil will be determined based on the findings of the investigation.
- Hydrocarbon contaminated areas – the areas of soil will be excavated and disposed at a licensed facility.
- Burnt-out sheds – will be demolished and disposed at a licensed facility.
- Asbestos – all buildings to be demolished will be assessed for asbestos containing materials prior to demolition. Any asbestos containing materials will be removed by a licensed contractor prior to demolition.

The CDM will potentially disturb areas where evidence of contamination or historical contaminating activities has occurred. In addition, land uses that may result in land becoming contaminated are known as 'Notifiable Activities' and are listed in Schedule 3 of the EP Act. The following Notifiable Activities are relevant to the CDM:

- Notifiable Activity 7 – Chemical storage;
- Notifiable Activity 15 – Explosives production and storage;
- Notifiable Activity 20 – Landfill, disposing of waste (excluding inert construction and demolition waste);
- Notifiable Activity 24 – Mine wastes; and
- Notifiable Activity 29 – Petroleum product or oil storage, storing petroleum products or oil.

General measures to reduce the potential for contamination of land as a result of the CDM would include the following:

- Contractors transporting dangerous goods loads are appropriately licensed in accordance with the provisions of the Australian Code for the Transport of Dangerous Goods by Road and Rail (National Transport Commission, 2017).
- On-site consumable storage areas are designed with appropriate bunding and are operated, where applicable, in compliance with the requirements of *Australian Standard (AS) 1940-2017 The Storage and Handling of Flammable and Combustible Liquids* and *AS 2187.1 Explosives – Storage, Transport and Use – Storage*.
- Fuel and explosive storage areas are regularly inspected and maintained.
- Procedures for storage and use of chemicals and hydrocarbons on site are adhered to.
- General waste is removed to a licensed waste facility.

In addition, the two properties that could not be assessed as part of the Contaminated Land Assessment (i.e. Lots 17 and 19 RP187207) due to access restrictions would be inspected by a Suitably Qualified Person prior to undertaking activities in these properties.

### 3.1.2.7 Land Stability

The pre-mining land uses at the CDM are grazing and remnant vegetation. The stability and level of degradation of the existing site is consistent with other similar land uses in the area.

The site is drained by a network of ephemeral streams. Small amounts of local catchment erosion are present throughout the system. Bank stability is generally good, with 50-80% of the stream banks covered with vegetation (Appendix F). There is some potential for erosion within the system during extreme flooding. Riparian zone widths ranged from 10-15 m throughout the Cameby Downs Mine (Appendix F).

### 3.1.2.8 Vegetation Communities and Ecological Data

The CDM is located in the Barakula subregion of the Brigalow Belt Bioregion. This bioregion extends from Townsville in Queensland to the south of Dubbo in central-western New South Wales. There are no Bioregional (vegetated) corridors within the CDM, however Barakula State Forest, located approximately 12 km to the north, is associated with a Bioregional (vegetated) corridor (DEHP, 2015b). There is also another Bioregional (vegetated) corridor to the east of the CDM (DEHP, 2015b).

In a local context, the CDM is situated predominantly in the catchment area of Drainage Line 1. The low-lying portions of the CDM and surrounds are extensively cleared for grazing livestock with patches of remnant and regrowth woodland vegetation. The elevated portions are vegetated with woodland.

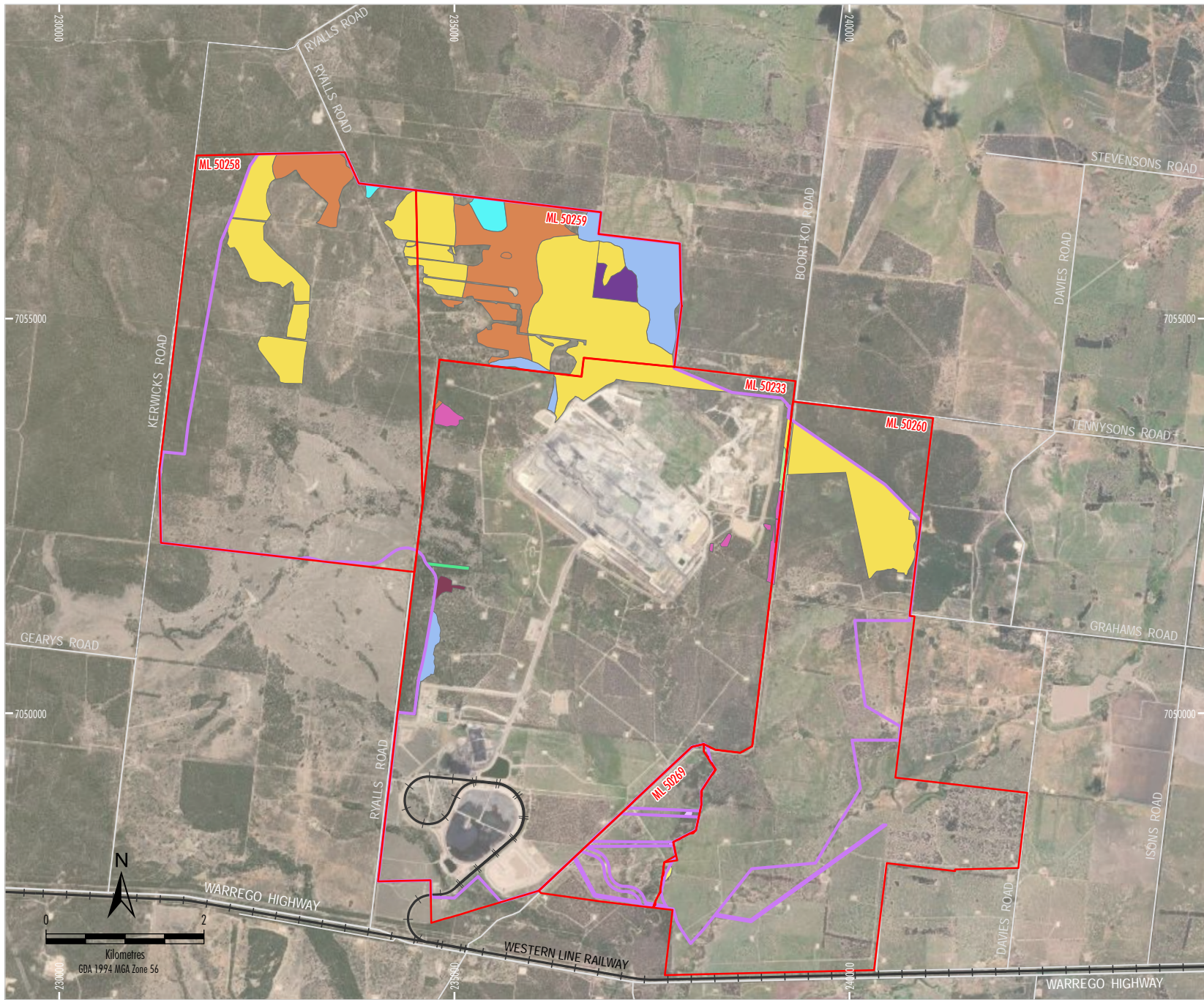
Due to past and ongoing agricultural activities (e.g. clearing, grazing, logging and thinning), approximately 78% (or 3,270 hectares [ha]) of the CDM area was comprised of grasslands and regrowth vegetation (non-remnant) (i.e. prior to mining activities) (Figure 6).

The terrestrial flora and fauna in the CDM area and its surrounds has been the subject of multiple studies since 2004. The first suite of surveys were undertaken by Biodiversity Assessment and Management Pty Ltd (BAAM) within ML 50233 during April and May of 2004 and again during January, October and November of 2005 (BAAM, 2006). These surveys were complimented by further surveys undertaken by Australasian Resource Consultants (AARC) in February, April, June and October of 2009 (AARC, 2013).


A range of standard survey methods were undertaken during both surveys, including: Elliott traps, cage traps, pitfall traps, bird surveys, active searching, nocturnal spotlighting, ultrasonic bat call detection, funnel traps and call playback (AARC, 2013; BAAM, 2006).

In 2016 and 2017, Ecosure Pty Ltd (Ecosure) and DPM Envirosiences undertook additional flora and fauna surveys in accordance with contemporary State and Commonwealth survey guidelines. Fauna surveys were undertaken in July and October 2016 and December 2017 and the flora surveys were undertaken in October 2016 and March 2017.

The field survey methodologies included a range of techniques to target conservation significant flora and fauna species listed under the *Nature Conservation Act, 1992* (NC Act) and the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
- Regional Ecosystems (Ground-truthed)**
- 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains
  - 11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines
  - 11.3.25/11.3.4 *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines / *Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains
  - 11.4.10 - *Eucalyptus populnea* or *E. woollsiana*, *Acacia harpophylla*, *Casuarina cristata* open forest to woodland on margins of Cainozoic clay plains
  - 11.4.3 - *Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains
  - 11.5.1 - *Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces
  - 11.5.1/11.5.1a - *Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces / *Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer
  - 11.7.2 - *Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone.
  - 11.7.4 - *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic lateritic duricrust
  - 11.7.7 - *Eucalyptus fibrosa* subsp. *nubilis* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust
  - 11.7.7/11.7.4 - *Eucalyptus fibrosa* subsp. *nubilis* +/- *Corymbia* spp. +/- *Eucalyptus* spp. woodland on Cainozoic lateritic duricrust / *Eucalyptus decorticans* and/or *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp., *Lysicarpus angustifolius* woodland on Cainozoic later
- Source: The State of Queensland (2020); Syntech Resources (2021); Ecosure (2018). Orthophoto: 2016; Esri, DigitalGlobe (2017)*

  
**C O M E B Y   D O W N S   M I N E**  
**Ground-truthed Regional Ecosystem Mapping**

**Figure 6**

### Endangered and Of Concern Regional Ecosystems

A total of nine individual regional ecosystems were ground-truthed within the CDM area (Table 6; Figure 7), represented by Eucalypt woodlands (mostly Ironbark woodlands) and small occurrences of acacia dominated woodlands (RE 11.4.3, RE 11.4.10 and RE 11.7.2).

The most predominant regional ecosystem is RE 11.7.7. A detailed description of each vegetation community is provided in Appendix D, along with datasheets and photos.

Of the nine regional ecosystems identified, two (RE 11.4.3<sup>1</sup> and RE 11.4.10) have a conservation status of 'Endangered' and two (RE 11.3.2 and RE 11.3.4) have a conservation status of 'Of Concern' under the *Vegetation Management Act, 1999* (VM Act) (Table 6; Figure 7) (Appendix D).

**Table 6**  
**Regional Ecosystems**

Regional Ecosystem	Short Description	BVG	VM Act Status
RE 11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	17a	Of Concern
RE 11.3.4*	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Woodland on alluvial plains	16c	Of Concern
RE 11.3.25*	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	16a	Least Concern
RE 11.4.3 <sup>A</sup>	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> shrubby open forest on Cainozoic clay plains	25a	Endangered
RE 11.4.10	<i>Eucalyptus populnea</i> or <i>Eucalyptus woollsiana</i> , <i>Acacia harpophylla</i> , <i>Casuarina cristata</i> open forest to woodland on margins of Cainozoic clay plains	25a	Endangered
RE 11.5.1	<i>Eucalyptus crebra</i> and/or <i>E. populnea</i> , <i>Callitris glaucophylla</i> , <i>Angophora leiocarpa</i> , <i>Allocasuarina luehmannii</i> woodland on Cainozoic sand plains and/or remnant surfaces	17a	Least Concern
RE 11.7.2	<i>Acacia</i> spp. Woodland on Cainozoic lateritic duricrust. Scarp retreat zone	24a	Least Concern
RE 11.7.4	<i>Eucalyptus decorticans</i> and/or <i>Eucalyptus</i> spp., <i>Corymbia</i> spp., <i>Acacia</i> spp., <i>Lysicarpus angustifolius</i> woodland on Cainozoic lateritic duricrust	12a	Least Concern
RE 11.7.7	<i>Eucalyptus fibrosa</i> subsp. <i>27ubile</i> +/- <i>Corymbia</i> spp. +/- <i>Eucalyptus</i> spp. Woodland on Cainozoic lateritic duricrust	12a	Least Concern

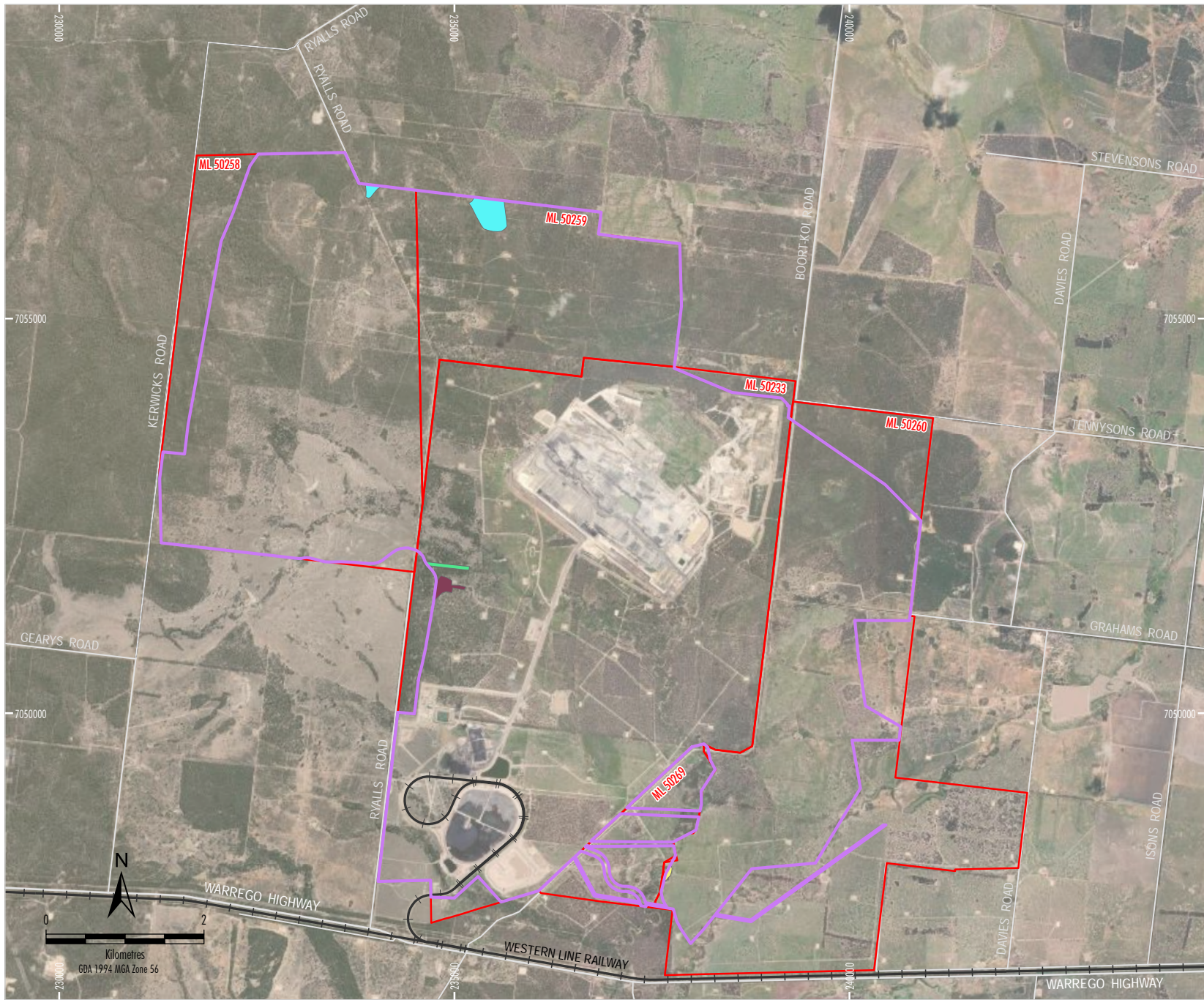
Source: Appendix D.

\* The vegetation patch is 0.4 ha in size comprising 50% RE 11.3.25 and 50% RE 11.3.4. As such, 0.2 ha has been assigned to each of RE 11.3.25 and RE 11.3.4 (Ecosure, 2018a).

<sup>A</sup> Listed as *Brigalow* (*Acacia harpophylla* Dominant and Co-dominant) Threatened Ecological Community under the EPBC Act.


BVG = Broad Vegetation Group. VM Act = *Vegetation Management Act 1999*.

<sup>1</sup> RE 11.4.3 (conforming to *Acacia harpophylla* Dominant and Co dominant) Threatened Ecological Community (Brigalow TEC) is the only TEC listed under the EPBC Act to have been recorded in the Project area or surrounds.



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Regulated Vegetation (Ground-truthed)**
  - 11.3.2 - *Eucalyptus populnea* woodland on alluvial plains
  - 11.3.25/11.3.4 *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines / *Eucalyptus tereticornis* and/or *Eucalyptus spp.* woodland on alluvial plains
  - 11.4.10 - *Eucalyptus populnea* or *E. woalsiana*, *Acacia harpophylla*, *Casuarina cristata* open forest to woodland on margins of Cainozoic clay plains
  - 11.4.3 - *Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains

Source: The State of Queensland (2020); Syntech Resources (2018); Ecosure (2018).  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

 **Comeby Downs Mine**  
**C A M E B Y D O W N S M I N E**  
**Endangered and Of Concern**  
**Regional Ecosystems**

**Figure 7**

### *Of Concern Regional Ecosystems*

RE 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains) occurs as a single patch on a tributary of Drainage Line 6 (Figure 7).

RE 11.3.4 (*Eucalyptus tereticornis* and/or *Eucalyptus spp.* Woodland on alluvial plains) occurs in combination with RE 11.3.25 (River Red Gum Woodland) along Drainage Line 2 (Figure 7).

### *Endangered Regional Ecosystems*

RE 11.4.3 (Brigalow Shrubby Open Forest) was ground-truthed in 2016 by Ecosure (2018a) within ML 50233 as a narrow stand (50 to 80 m wide and 23.5 ha in area) along Ryalls Road (Figure 7). Ecosure (2018a) concluded that although not mapped by the then Department of Science, Information Technology and Innovation (DSITI) (2018a) on the *Remnant Regional Ecosystem Map* as remnant, this community conformed to RE 11.4.3.

RE 11.4.10 (*Eucalyptus woollsiana* woodland) was ground-truthed in 2017 by Ecosure (2018a) as a single small patch (approximately 24 ha) (Figure 7). Ecosure (2018a) concluded that whilst this patch of RE 11.4.10 was previously mapped as regrowth (non-remnant) by DSITI (2018a), BAAM (2006) and AARC (2013), vegetation in ML 50233 had continued to mature since stock was removed from mining areas, and at the time of Ecosure's flora surveys, met the requirements of remnant vegetation as per the definition in Neldner *et al.* (2017).

Ecosure (2018a) also concluded that, due to the sparse presence of Brigalow (*Acacia harpophylla*) within this community (RE 11.4.10), the patch identified does not represent Brigalow TEC.

### **Conservation Significant Flora Species**

No conservation significant flora species listed under the NC Act or EPBC Act have been recorded in the CDM area. One conservation significant flora species was identified outside of the CDM area by Ecosure (2018a), namely a woody herb, *Rutidosis lanata*, which is listed as 'Near Threatened' under the NC Act. This herb was found in RE 11.5.1 (an Ironbark [*Eucalyptus crebra*] Woodland) (Ecosure, 2018a).

### **Aquatic Flora**

Wet season aquatic ecology surveys were previously undertaken at five locations within the CDM area by AARC over the period 19-23 January 2010 (AARC, 2013). Supplementary aquatic ecology surveys were undertaken by DPM Envirosiences (2018a) in July 2016, falling within the AusRivAS 'late wet' sampling season (May to July).

Survey techniques implemented by DPM Envirosiences (2018a) included a combination of AusRivAS protocols to establish descriptions of aquatic habitats and macroinvertebrate communities; presence/absence surveys for aquatic plants (macrophytes); and assessment of aquatic habitat attributes, measurement of in-situ physico chemical water quality, fish survey, turtle survey, and ground truthing mapped lacustrine waterbodies. DPM Envirosiences (2018a) identified two habitat types within the CDM area, Riverine Habitats and Wetland Habitats.

### *Riverine Habitats*

All waterways in the CDM area are ephemeral, with some pools expected to hold water for extended periods (Appendix F). DPM Envirosiences (Appendix F) describes that the waterways in the CDM area provide only marginal aquatic habitat (with a low aquatic habitat rating), with the exception of Drainage Line 1 (and associated pools) which provides moderate aquatic habitat.

### *Wetland Habitats*

DPM Envirosiences (2018a) ground-truthed the lacustrine waterbodies mapped by Queensland Wetlands Mapping (DSITI, 2018c) located within the CDM area as either farm dams or mine water dams (Figure 8). No lacustrine or palustrine wetlands occur in the CDM area (Appendix F).

There are no known, High Ecological Significance (HES) wetlands, springs or seeps within the CDM area and no aquatic Groundwater Dependent Ecosystems (GDEs) have been identified in field studies within the CDM area.

### **Groundwater Dependent Ecosystems – Terrestrial Vegetation**

Groundwater flow within the underlying aquifers is towards the south-west becoming deeper and confined as it moves further from the CDM. Groundwater levels are generally in excess of 35 mBGL and separated from surface waters, limiting potential to support GDEs. There are no springs from these deep confined aquifers within the CDM area or surrounds that would support aquatic GDEs.

Desktop mapping of potential GDEs throughout Queensland (DSITI, 2018b and Bureau of Meteorology [BoM], 2017<sup>2</sup>) indicated that areas of terrestrial vegetation and aquatic ecosystems in the CDM area and surrounds had potential to be GDEs. Specifically, the desktop GDE mapping (DSITI, 2018b; BoM, 2017) indicates (Appendix D):

- drainage features in the north of the CDM (mainly Drainage Lines 5 and 6 [and associated minor drainage features]) potentially receive surface expression of groundwater (possibly supporting an aquatic ecosystem) and are potentially associated with subsurface presence of groundwater (possibly supporting terrestrial riparian vegetation);
- a patch of terrestrial vegetation in ML 50233 (ground-truthed by Ecosure as RE 11.5.1) is potentially associated with subsurface presence of groundwater; and
- patches of terrestrial vegetation south of ML 50233 are potentially associated with the subsurface presence of groundwater.

The desktop GDE mapping (DSITI, 2018b and BoM, 2017) of the locality was not based on site specific work and had a moderate confidence level in regard to the potential for GDEs along the drainage features and a low confidence level in regard to the patches of terrestrial vegetation inside and south of ML 50233 (Appendix D).

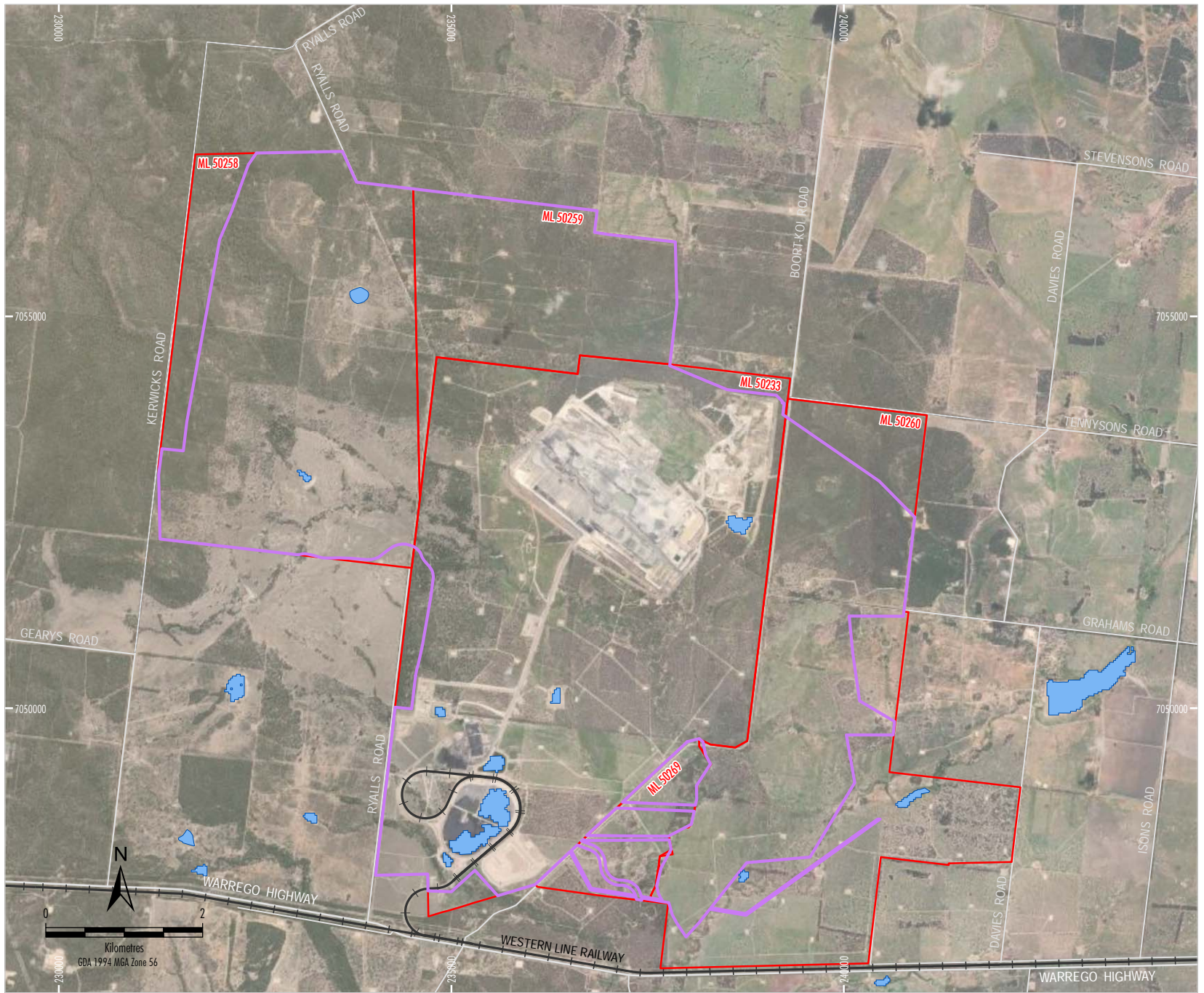
Based on the findings of the site survey it was established that there are no aquatic GDEs associated with watercourses, wetlands or springs in the CDM area or surrounds (Appendix D).

### **Environmentally Sensitive Areas**

The Environmentally Sensitive Areas (ESA) mapping tool (DEHP, 2014a) does not identify any Category A or C ESAs within the CDM area. However, as described above, two 'Endangered' REs constituting Category B ESAs were ground-truthed by Ecosure (2018a) (i.e. RE 11.4.3 and RE 11.4.10).

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<sup>2</sup> Note: Bureau of Meteorology (2017) mapping is based on the DSITI (2018b) mapping as of June 2017.



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Wetlands

\* As per land outcome document (EA EPML 00900113)

Source: The State of Queensland (2020); Syntech Resources (2018).  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Ground-truthed Wetlands

**Figure 8**

### Matters of State Environmental Significance

MSES prescribed under the *Environmental Offsets Regulation, 2014* are listed in Table 7 along with an assessment of the relevance to the CDM (Appendices D, E and F).

**Table 7**  
**Matters of State Environmental Significance – Flora**

Matters of State Environmental Significance		Relevance to the CDM Area	
Regulated Vegetation	'Endangered' or 'of concern' regional ecosystems <sup>A</sup> ;	RE 11.4.3 'Endangered'	This Brigalow Shrubby Open Forest occurs within ML 50233 as a narrow stand (50 to 80 m wide and 23.5 ha in area) along Ryall's Road (Figure 7).
		RE 11.4.10 'Endangered'	This ' <i>Eucalyptus woollsiana</i> Woodland occurs within ML 50233 as a single small patch (approximately 24 ha) (Figure 7).
		RE 11.3.2 'Of Concern'	This Poplar Box Woodland occurs as a single patch on a tributary of Drainage Line 6 (Figure 7).
		RE 11.3.4 'Of Concern'	This Red Gum Woodland occurs in combination with RE 11.3.25 (River Red Gum Woodland) along Drainage Line 2 (Figure 7).
	Regional ecosystems within mapped vegetation management wetlands	The CDM area does not contain any mapped vegetation management wetlands.	
Regional ecosystems within the defined distance of a vegetation management watercourse	Drainage Lines 1, 2 and 6 (and some related tributaries) in the CDM area are vegetation management watercourses with remnant riparian vegetation.		
Connectivity Areas		Remnant vegetation in the CDM area connects to remnant vegetation outside of the CDM area (Figure 6).	
Wetlands and Watercourses		The CDM area does not contain any wetlands or watercourses that are MSES.	
Designated Precinct in a Strategic Environmental Area		The CDM area is not in a designated precinct in a strategic environmental area.	
Protected Areas		There are no protected areas in the CDM area.	
Highly Protected Zones of State Marine Parks		There are no State marine parks in the CDM area.	
Marine Plants		Marine plants do not occur in the CDM area.	
Legally Secured Offset Areas		No legally secured offset areas occur in the CDM area.	

Source: Appendices D, E and F.

<sup>A</sup> RE 11.4.3 equates to the Brigalow TEC listed under the EPBC Act.

<sup>B</sup> The Yakka Skink and Koala are also listed under the EPBC Act.

### Matters of National Environmental Significance

The following Matters of National Environmental Significance (MNES) were considered to be relevant to the Continued Operations Project:

- Listed threatened species or any threatened ecological community.
- Listed migratory species.
- A water resource, in relation to coal/gas/mining.

On 28 September 2018, the Continued Operations Project was referred to the Australian Department of the Environment and Energy (now the Department of Agriculture, Water and the Environment) under the EPBC Act. On 5 February 2019, the Department of the Environment and Energy determined the Continued Operations Project not to be a controlled action (on the basis that there would be no significant impacts to any MNES) and issued EPBC 2018/8304.

### 3.1.2.9 Fauna Presence and Populations

#### **Terrestrial Fauna Habitat**

Prior to mining, the CDM area was predominantly comprised of grasslands and regrowth vegetation (non-remnant) (approximately 78%) (Appendix E). Most of the regrowth consists of juveniles of the dominant species which occurred prior to clearing and fast-growing species such as Acacias and grasses.

Amongst the cleared land are scattered patches of remnant woodland habitat, much of which has been disturbed by past logging and livestock grazing. Some of these remnant woodland patches are Brigalow habitat, although the Brigalow provides limited fauna habitat as it is small, narrow and isolated (Appendix E).

Elevated areas contain the less disturbed woodland habitat (mostly RE 11.7.4) on stony soils with occasional rocky outcrops (Appendix E). Abundant fallen timber occurs in this habitat type.

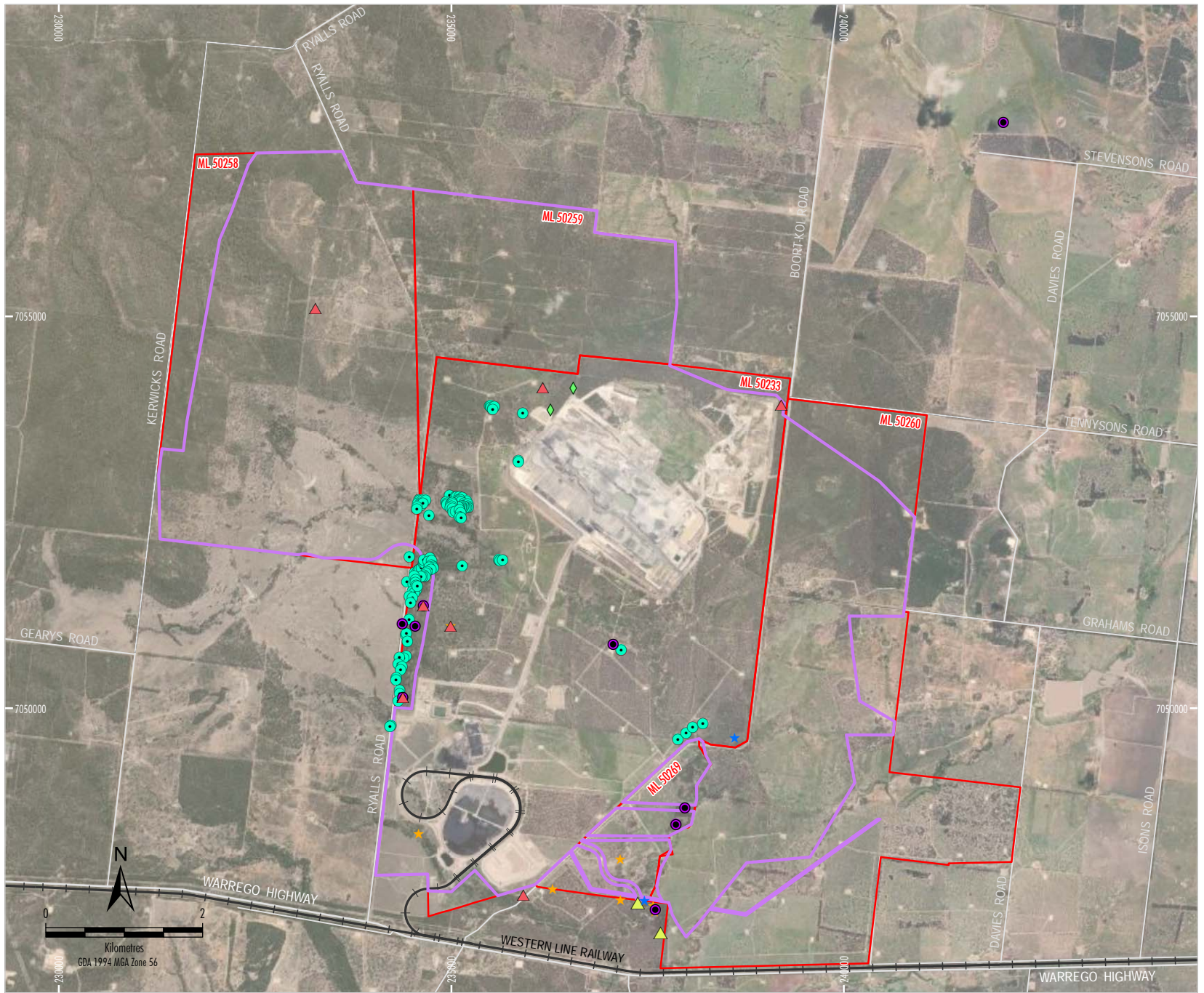
All waterways in the vicinity of the CDM are ephemeral, including Drainage Lines 1 to 7. Riparian woodland habitat is mostly confined to the lower reaches of Drainage Line 1, represented mainly by RE 11.3.25 (River Red Gum Woodland) (Appendix D). The upper reaches of Drainage Line 1 have been subject to previous clearance and thinning.

No natural lacustrine waterbodies or wetlands are present in the CDM area. DPM Envirosciences (Appendix F) ground-truthed lacustrine waterbodies mapped by *Queensland Wetlands Mapping* (DSITI, 2018c) as being either farm dams or mine water dams. These dams provide limited habitat for fauna (Appendix D).

#### **Conservation Significant Fauna Species Listed under the NC Act**

Fauna surveys (BAAM, 2006; Ecosure, 2018b) have recorded five threatened fauna species and one Special Least Concern species listed under the NC Act within the CDM and surrounding locality. The identified species were (Figure 9) (Appendix E):

- Yakka Skink (*Egernia rugosa*) – Vulnerable (EPBC Act), Vulnerable (NC Act);
- Grey Snake (*Hemiaspis damelii*) – Endangered (NC Act);
- Short-beaked Echidna (*Tachyglossus aculeatus*) – Special Least Concern (NC Act);
- Glossy Black-cockatoo (*Calyptorhynchus lathami*) – Vulnerable (NC Act);
- Koala (*Phascolarctos cinereus*) – Vulnerable (EPBC Act), Vulnerable (NC Act); and
- Brigalow Woodland Snail (*Adclarkia cameroni*) – Endangered (EPBC Act), Vulnerable (NC Act).



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
- Threatened Species Records**
- ◆ Yakka Skink
  - ★ Grey snake
  - Glossy Black-cockatoo
  - Evidence of Glossy Black Cockatoo
  - ▲ Short-beaked echidna
  - ★ Koala
  - ▲ Rufidosis lanata

Source: The State of Queensland (2020); Syntech Resources (2018); Ecosure (2018).  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Conservation Significant Species Records

**Figure 9**

### **Matters of State Environmental Significance**

MSES prescribed under the *Environmental Offsets Regulation, 2014* are listed in Table 8 along with an assessment of the relevance to the CDM (Appendices D, E and F).

**Table 8**  
**Matters of State Environmental Significance – Fauna**

<b>Matters of State Environmental Significance</b>		<b>Relevance to the CDM Area</b>
Protected Wildlife Habitat <sup>B</sup>	Brigalow Woodland Snail	The Brigalow Woodland Snail has been recorded at three locations within the CDM area, and a further 22 locations in the wider locality (Appendix E).
	Yakka Skink	A single Yakka Skink was recorded by BAAM (2006) in 2005 (Figure 9). Most remnant woodland areas in the CDM area represent potential habitat for the Yakka Skink (Figure 6).
	Grey Snake	The Grey Snake has been recorded at a number of locations in the CDM area (Figure 9). Potential habitat for this snake in the CDM area is limited to the riparian areas and patches of Brigalow (Figure 6).
	Glossy Black-cockatoo	The Glossy Black-cockatoo is relatively common in the wider locality and has been recorded in the CDM area (Figure 9).
	Short-beaked Echidna	The Short-beaked Echidna is relatively common in the wider locality and has been recorded in the CDM area (Figure 9).
	Koala	The Koala has been recorded in the more productive habitats (with primary koala food trees) associated with riparian vegetation (e.g. lower reaches of Drainage Line 1) (Figures 6 and 9).
Fish Habitat Areas		There are no areas of declared fish habitat in the CDM area (Appendix E).
Waterways Providing for Fish Passage		Drainage Line 1 provides fish movement.

Source: Appendices D, E and F.

<sup>A</sup> RE 11.4.3 equates to the Brigalow TEC listed under the EPBC Act.

<sup>B</sup> The Yakka Skink and Koala are also listed under the EPBC Act.

### **Matters of National Environmental Significance**

The following Matters of National Environmental Significance (MNES) were considered to be relevant to the Continued Operations Project:

- Listed threatened species or any threatened ecological community.
- Listed migratory species.
- A water resource, in relation to coal/gas/mining.

On 28 September 2018, the Continued Operations Project was referred to the Australian Department of the Environment and Energy (now the Department of Agriculture, Water and the Environment) under the EPBC Act. On 5 February 2019, the Department of the Environment and Energy determined the Continued Operations Project not to be a controlled action (on the basis that there would be no significant impacts to any MNES) and issued EPBC 2018/8304.

### 3.1.2.10 Pre-mining Land Use

Major land uses within the Surat Basin predominantly include agriculture, coal mining, CSG production and power generation.

The CDM is located within a rural area that historically has been predominately used for low intensity cattle grazing on unimproved pasture. Aerial imagery dating back to 1956 shows the CDM as predominantly cleared with some tracts of vegetation present in small patches or in narrow stands. More recently (prior to the development of the CDM), the area continued to be used for predominantly cattle grazing purposes. Other more recent land uses include CSG production, rural residences and remnant and regrowth vegetation.

Agricultural land uses on the CDM site include low intensity cattle grazing on unimproved pasture. No horticulture or cropping occurs on the CDM site.

Strategic Cropping Land (SCL) Validation Applications for properties on the CDM site were submitted in January 2013, and the Department of Natural Resources, Mines and Energy (DNRME) determined that the CDM area was non-SCL. Subsequently, the *Regional Planning Interests Act, 2014*, was updated to include additional areas of SCL in MLs 50258 and 50260. An exemption under Chapter 9, Part 3, Division 3 of the *Strategic Cropping Land Act, 2011* was however considered to apply to the CDM and therefore no Regional Interests Development Approval was required.

### 3.1.2.11 Underlying Landholders

#### **Tenements**

As described in Section 3.1.1.3, three underlying Petroleum Leases (PL) exist within the CDM area, PL 472 and PL 458, both held by QGC Upstream Holdings Pty Ltd, and PL 492, held by Arrow CSG (Australia) Pty Ltd. Two Exploration Permits for Coal (EPC) also exist within the CDM area. EPC 732 is held by Syntech, and EPC 1165 is held by Sinocoal Resources Pty Ltd.

No Mineral Development Licences or Mining Lease Applications exist within the CDM area.

#### **Native Title Claims/Applications**

According to the Native Title Tribunal (NTT) Register, no current/active Native Title Claims exist within the CDM area, however, one application on behalf of the Iman People #4 (QC2017/008) is currently active on the NTT Register.

Two Indigenous Land Use Agreements (ILUAs) currently exist over the CDM area, these are:

- QI2012/116 'Arrow Energy Western Downs Unclaimed Area ILUA' Agreement between Arrow Energy Pty Ltd and the Western Downs Unclaimed Area Native Title Group (registered September 2013); and
- QI2010/006 'Barunggam, Cobble Cobble, Jarowair, Western Wakka Wakka, Yiman and QGC ILUA' Agreement between QGC Pty Limited and representatives of the Barunggam, Cobble Cobble, Jarowair, Western Wakka Wakka and Yiman People (registered December 2010).

## Landholders

There are eight rural properties within the CDM area; the Cameby Downs; Avon Downs, Wilga Park, Alexander Downs, Gengyle, Cobar, Boola Downs and Dungaden Properties.

Table 9 below identifies the various Lots on Plan which intersect with the CDM. The primary landholders are Syntech and Mountfield Resources Pty Ltd (both are subsidiaries of Yanzhou Coal Mining Company Limited).

**Table 9**  
**Landholders (Lot and DP) within the CDM Area**

Lot on Plan	QLD Ref Number	Landholder
87 BWR294	12990165	Cann, Graham Frederick
88 BWR294	18304193	Syntech Resources Pty Ltd
73 BWR294	15500004	Syntech Resources Pty Ltd
72 BWR159	15500003	Syntech Resources Pty Ltd
14 BWR178	16852096	Syntech Resources Pty Ltd
4 BWR149	13205103	Syntech Resources Pty Ltd
9 RP187208	16393122	Syntech Resources Pty Ltd
22 RP187207	16396210	Syntech Resources Pty Ltd
21 RP187207	16396209	Syntech Resources Pty Ltd
20 RP187207	16396208	Syntech Resources Pty Ltd
19 RP187207	16396207	Syntech Resources Pty Ltd
18 RP187207	16396206	Syntech Resources Pty Ltd
17 RP187207	16396205	Syntech Resources Pty Ltd
15 RP187207	16396203	Syntech Resources Pty Ltd
14 RP187207	16396202	Syntech Resources Pty Ltd
13 BWR149	14448188	Mountfield Properties Pty Ltd
2 BWR149	15229006	Mountfield Properties Pty Ltd
65 BWR154	50874914	Mountfield Properties Pty Ltd
64 SP233211	50874914	Mountfield Properties Pty Ltd
1 RP893208	50091551	Mountfield Properties Pty Ltd
2 RP893208	50091552	Mountfield Properties Pty Ltd
3 RP893208	50091553	Mountfield Properties Pty Ltd
4 RP893208	50091554	Mountfield Properties Pty Ltd
5 RP893208	50091555	Mountfield Properties Pty Ltd
16 RP187207	16396204	Mountfield Properties Pty Ltd
13 RP187208	16393126	Mountfield Properties Pty Ltd

### 3.1.3 Designing for Closure

Transitional PRC Plans are not required to demonstrate how aspects of the mine site have been designed for closure for existing or approved disturbance.

Notwithstanding the above, as a component of mine planning, Syntech reviewed the rehabilitation objectives, rehabilitation practices, and the opportunity for integration of mine rehabilitation areas with the offset strategy.

The review made use of Syntech’s operational rehabilitation experience and considered leading guidelines and standards including:

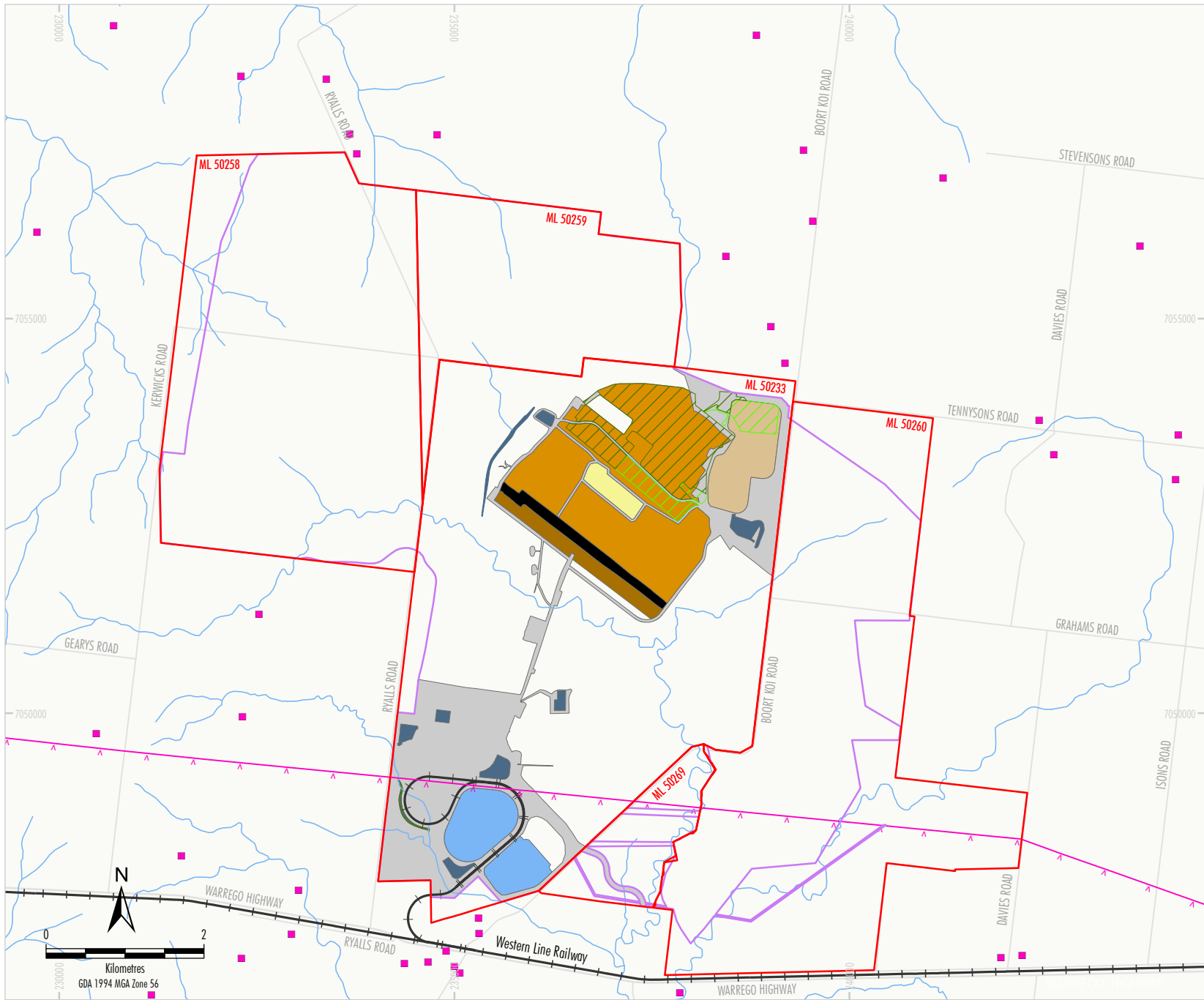
- *Mined Land Rehabilitation Policy* (DES, 2018a);
- *Rehabilitation requirements for mining resource activities* (DEHP, 2014b);
- *Application requirements for activities with impacts to land* (DES, 2018b);
- *Planning for Integrated Mine Closure: Toolkit* (International Council on Mining and Metals, 2008);
- *Strategic Framework for Mine Closure* (Australian and New Zealand Minerals and Energy Council and Minerals Council of Australia, 2000); and
- *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure* (Department of Industry, Innovation and Science, 2016).

In particular, the CDM has been designed to:

- Be rehabilitated to a safe and stable landform:
  - Waste rock emplacements have been designed with shallow slopes (approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used).
  - Final void highwalls would be treated (e.g. benched or blasted) so that they are geotechnically stable.
  - Final void highwalls would be bunded and or fenced to limit access and be located at least 10 m beyond the area potentially affected by any instability of the open cut pit edge.
- Not cause environmental harm:
  - The final landform would isolate final voids from all flood events, up to and including a Probable Maximum Flood (PMF) event.
  - The two final voids are located beyond the Queensland Floodplain Assessment Overlay extents.
  - Final voids would act as long-term groundwater sinks post-mining, preventing the migration of potentially saline final void water into adjacent aquifers and surface water features.
  - Final void water bodies would equilibrate well below the point at which they would spill to the surrounding environment.
- Sustain post-mining land uses:
  - Mine scheduling has maximised opportunities for progressive backfilling of open cut pits to improve final land use outcomes. Significant volumes of overburden material are proposed to be hauled large distances to completely backfill the majority of the open cut pits.
  - The areas proposed to be disturbed by the Project would be rehabilitated to sustain light intensity grazing with areas of native vegetation. The final voids would provide habitat for native fauna.

Figures 10 to 21 show the progressive development and rehabilitation of the CDM over the life of the mine including the approved final landform. Figure 22 defines specific rehabilitation and improvement areas and Figure 23 shows the approved PMLU (grazing). Progressive stage plans will continue to be developed at regular intervals to inform rehabilitation and operational activities over the life of the CDM.

Further information on the progressive development and rehabilitation of the CDM, including further detail on the rehabilitation/improvement areas is provided in Section 3.1.4.



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

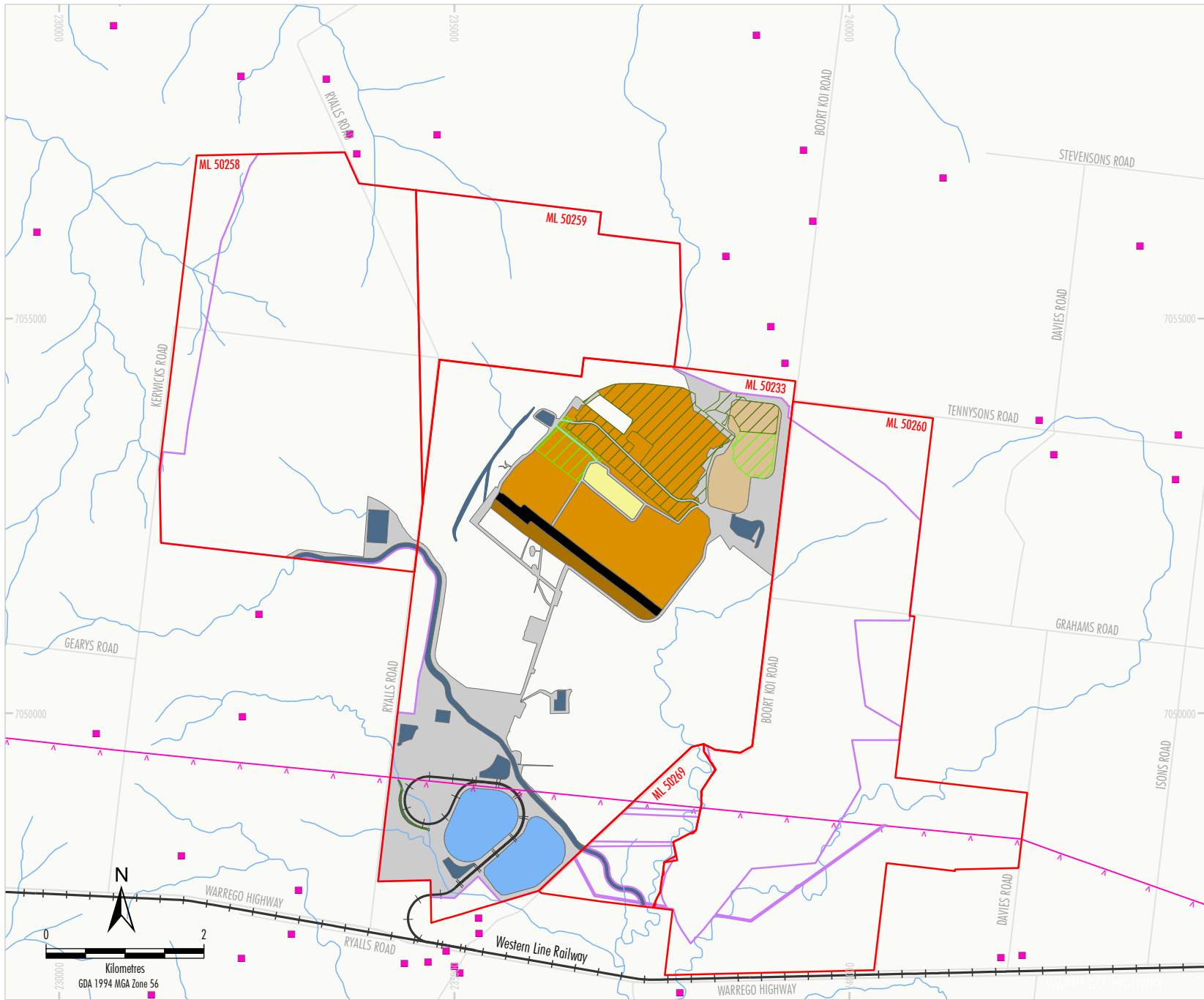
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2022**

**Figure 10**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- ~ Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

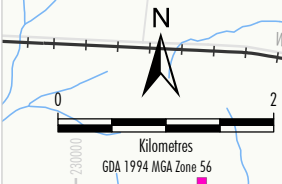
- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

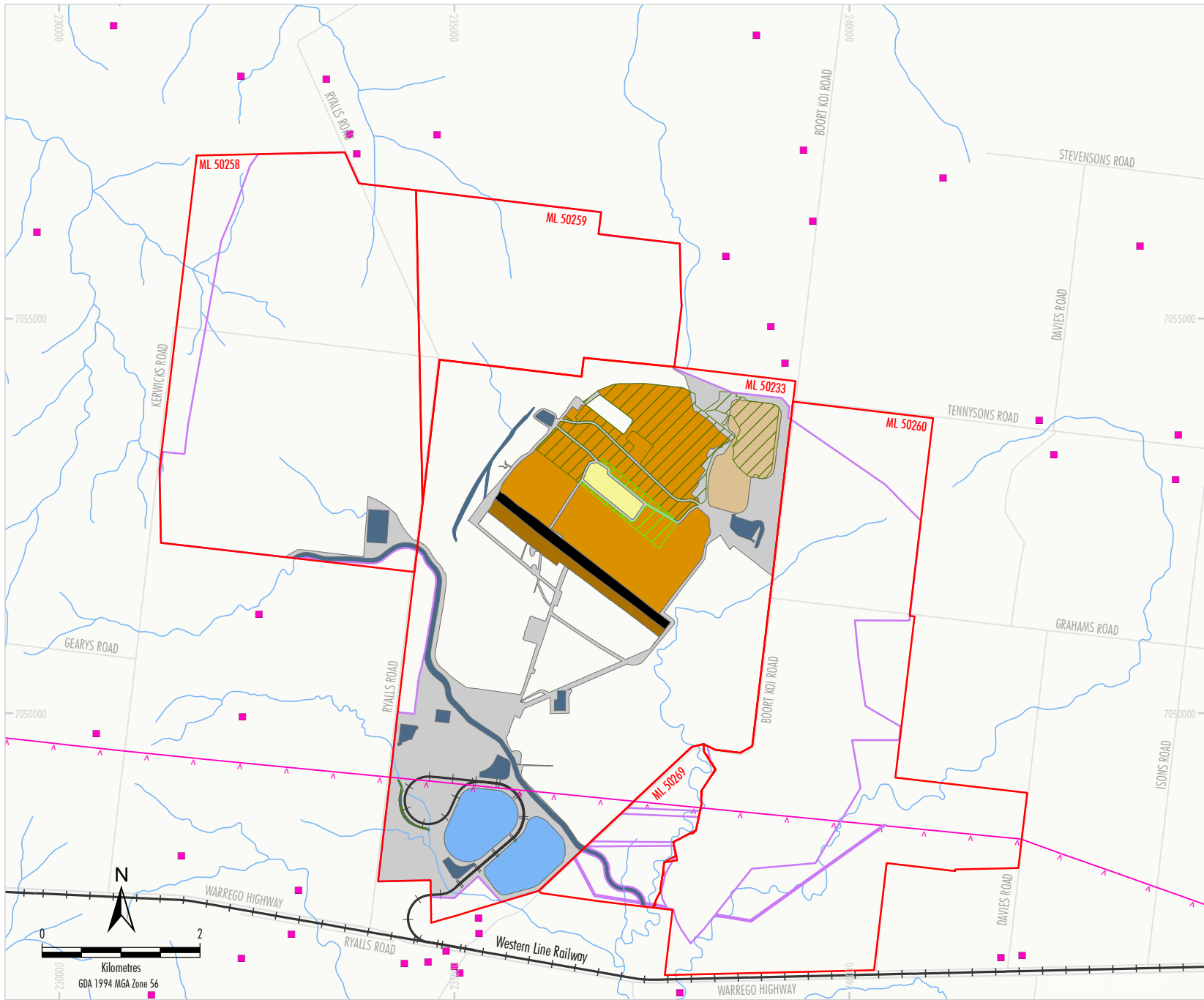
^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2023**



SYN-20-06\_PRCP\_223A

**Figure 11**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

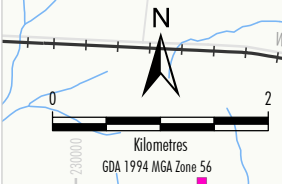
- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

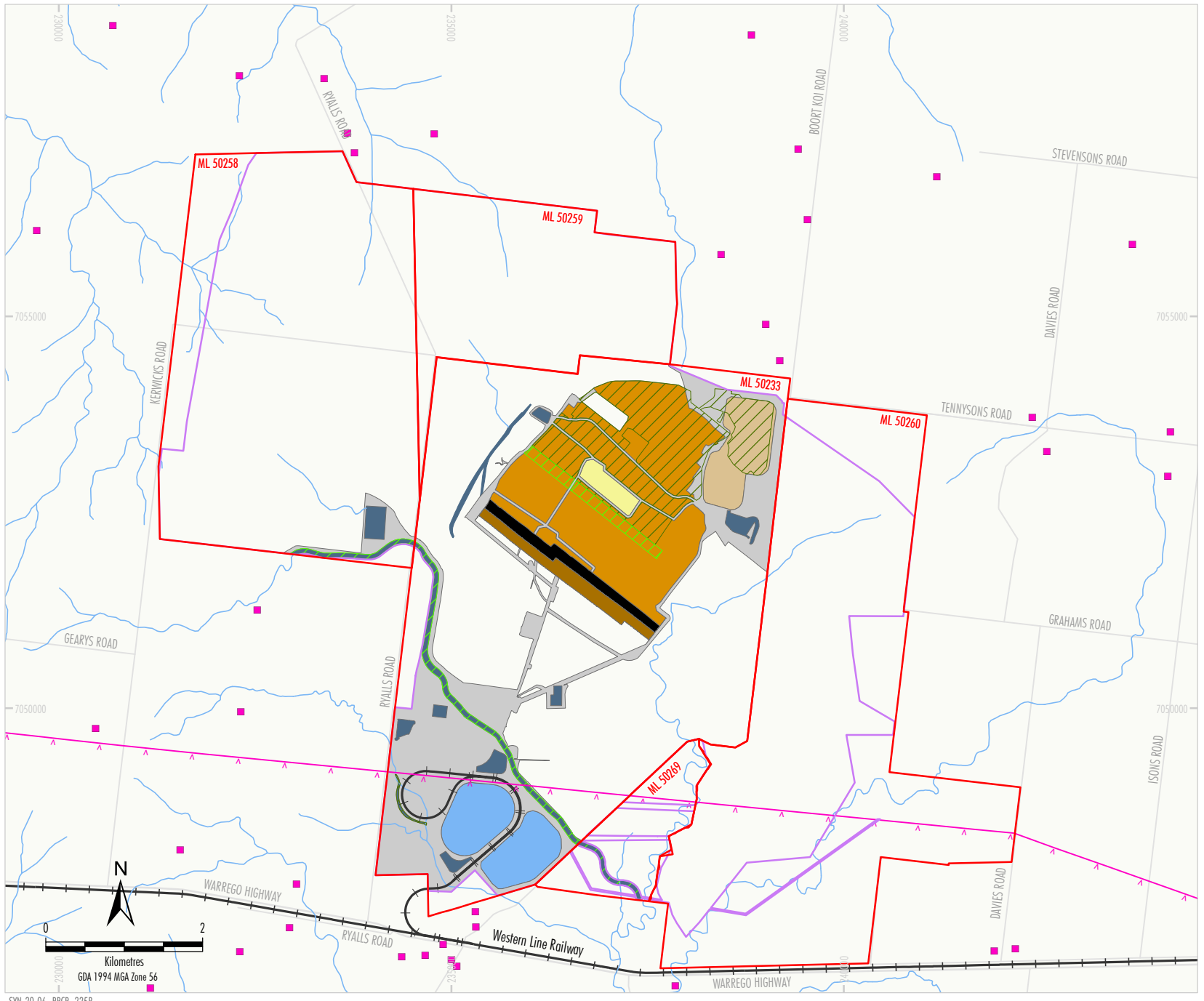
^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2024**



SYN-20-06\_PRCP\_224A

**Figure 12**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

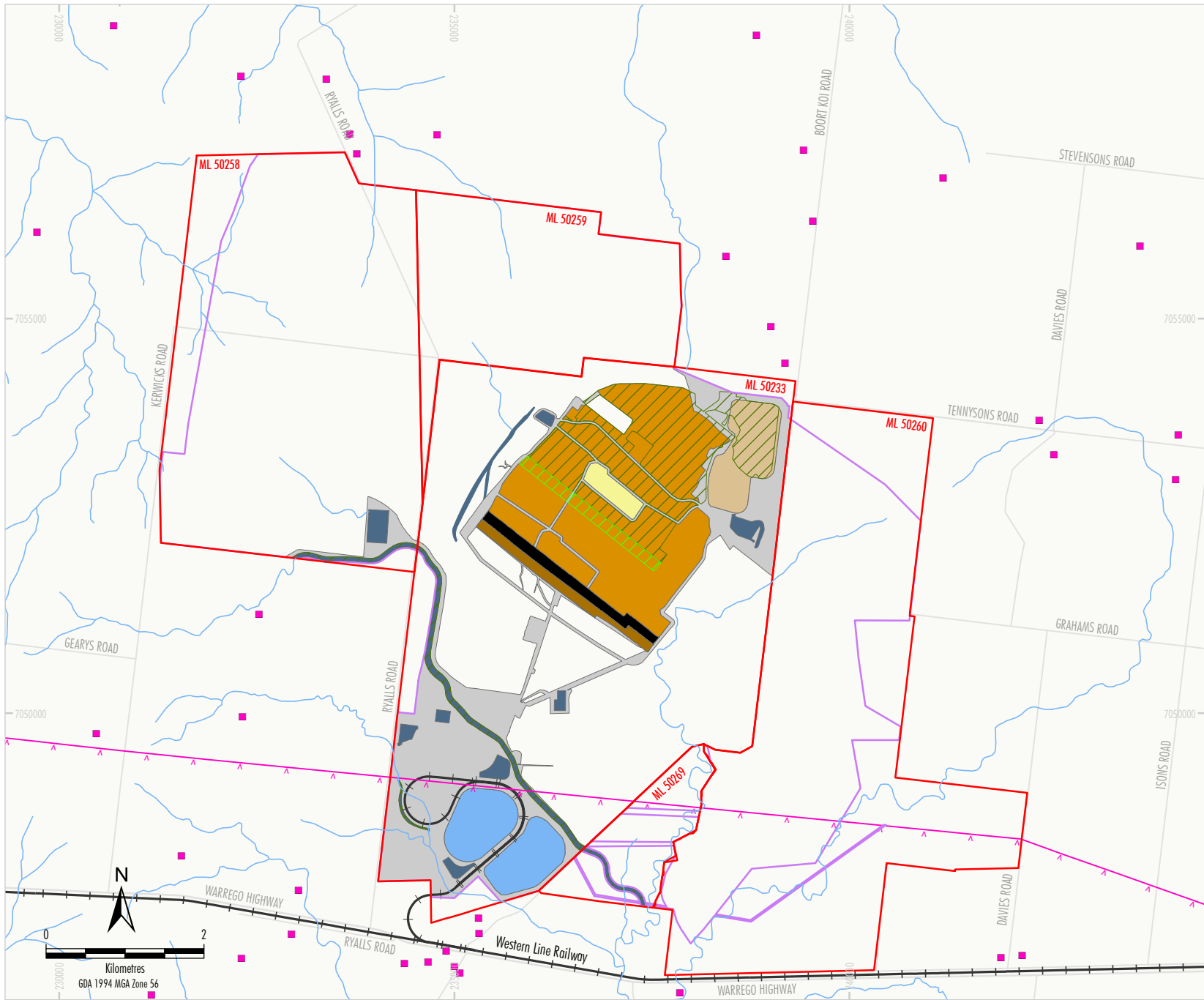
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2025**

**Figure 13**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

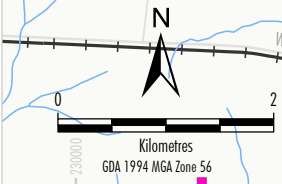
- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

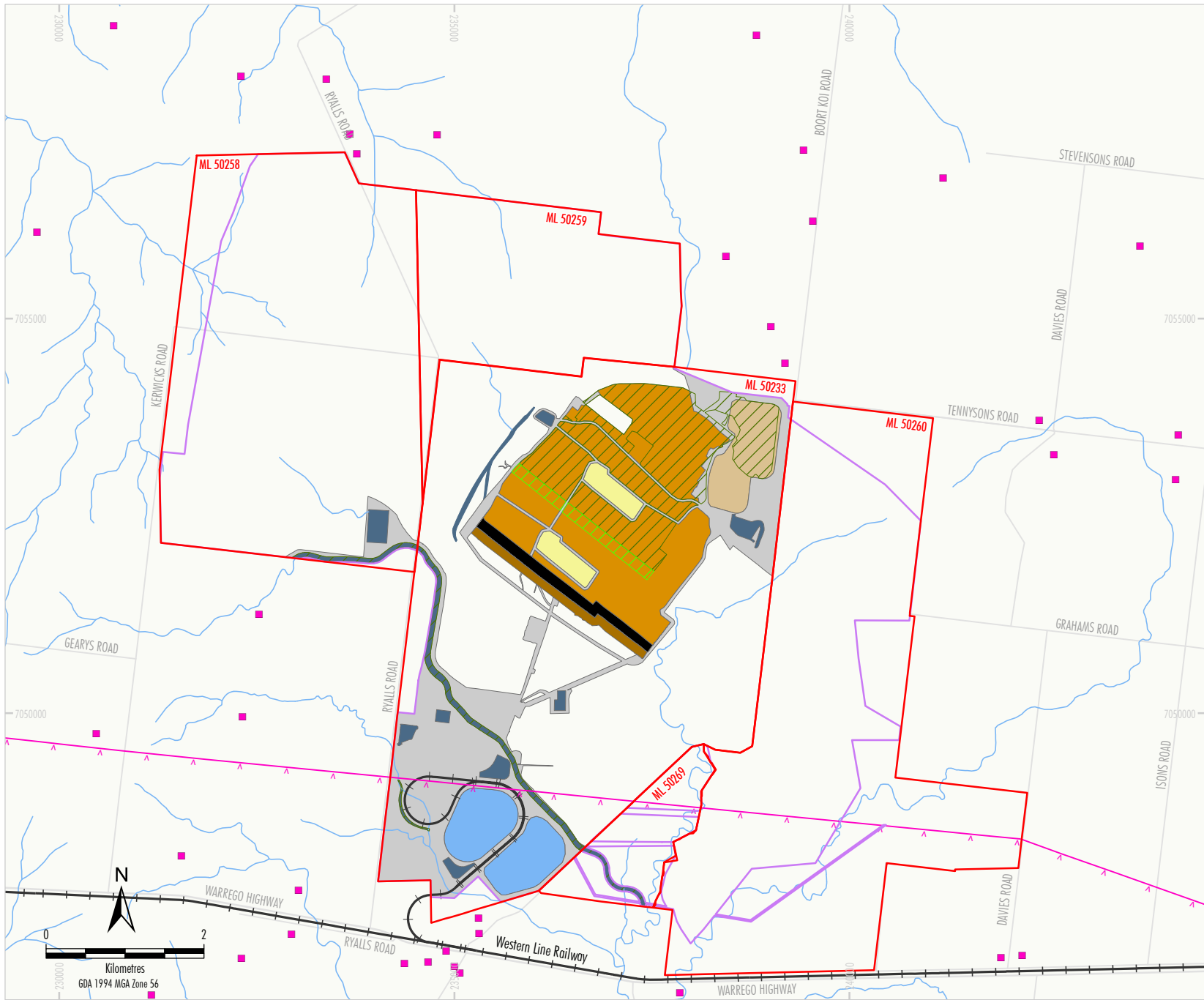
^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2026**



SYN-20-06\_PRCP\_226A

**Figure 14**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

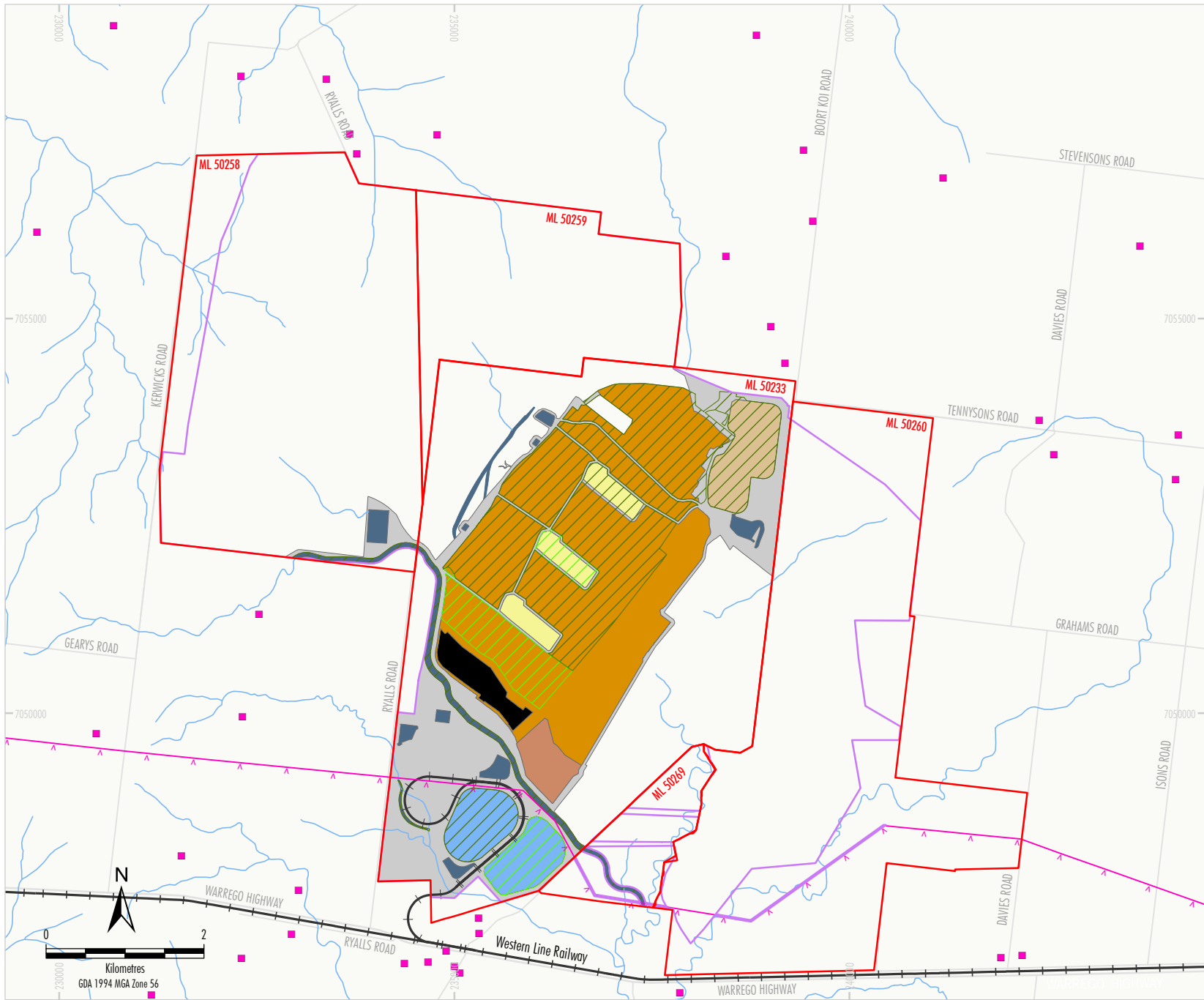
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2027**

**Figure 15**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- Existing and Realigned Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management
- Final Void

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

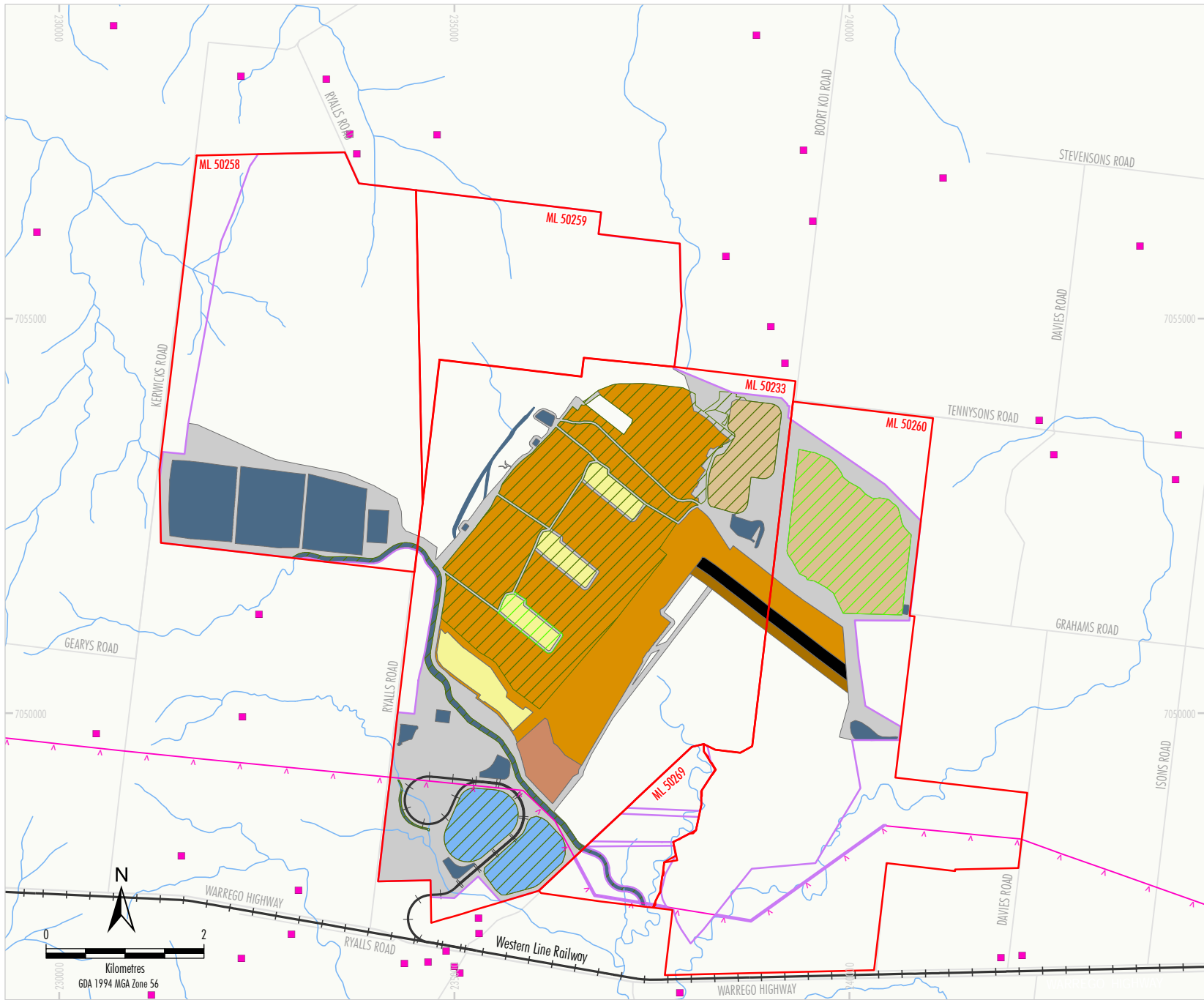
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2042**

**Figure 16**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing and Realigned Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management
- Final Void

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

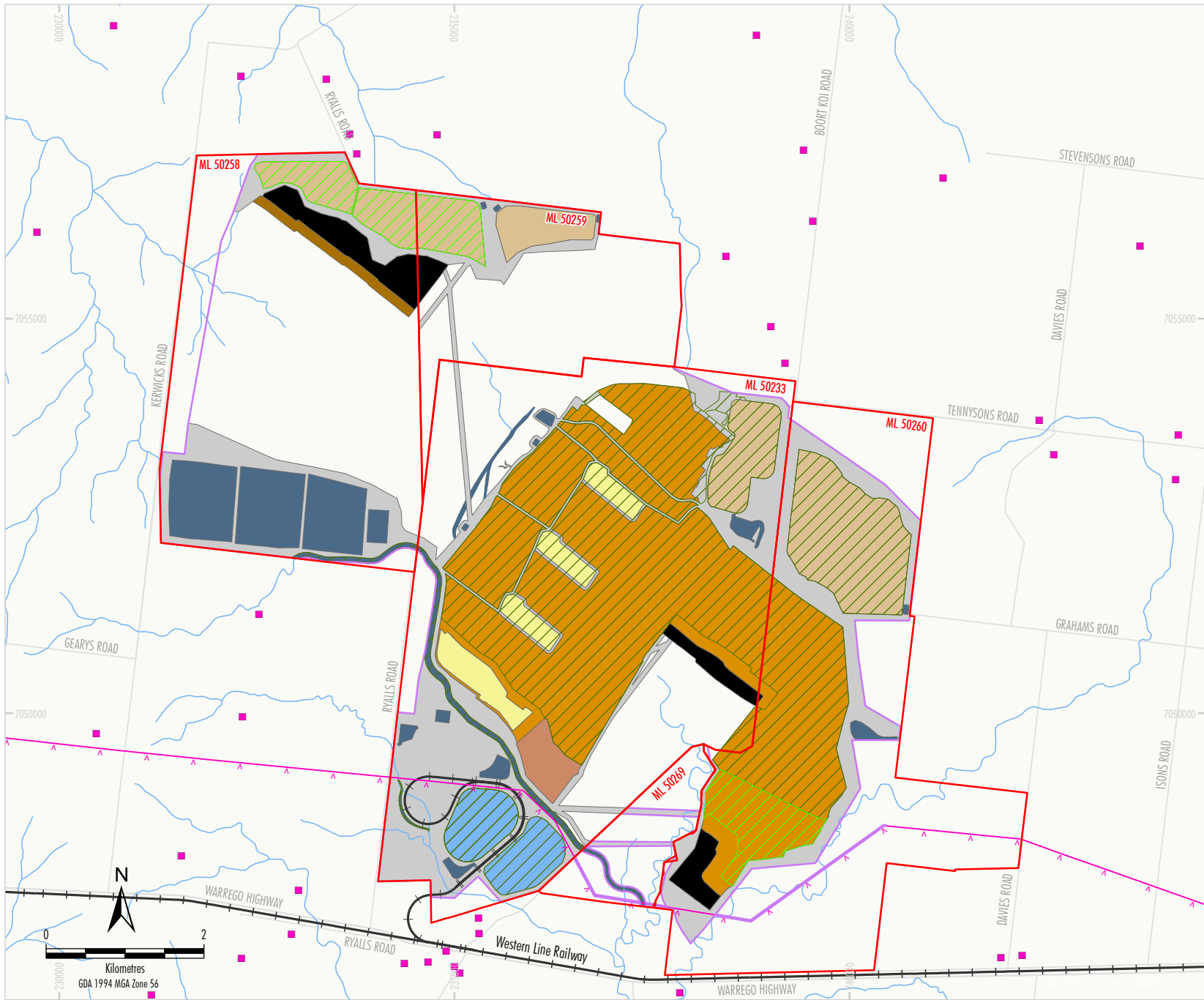
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2047**

**Figure 17**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing and Realigned Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management
- Final Void

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

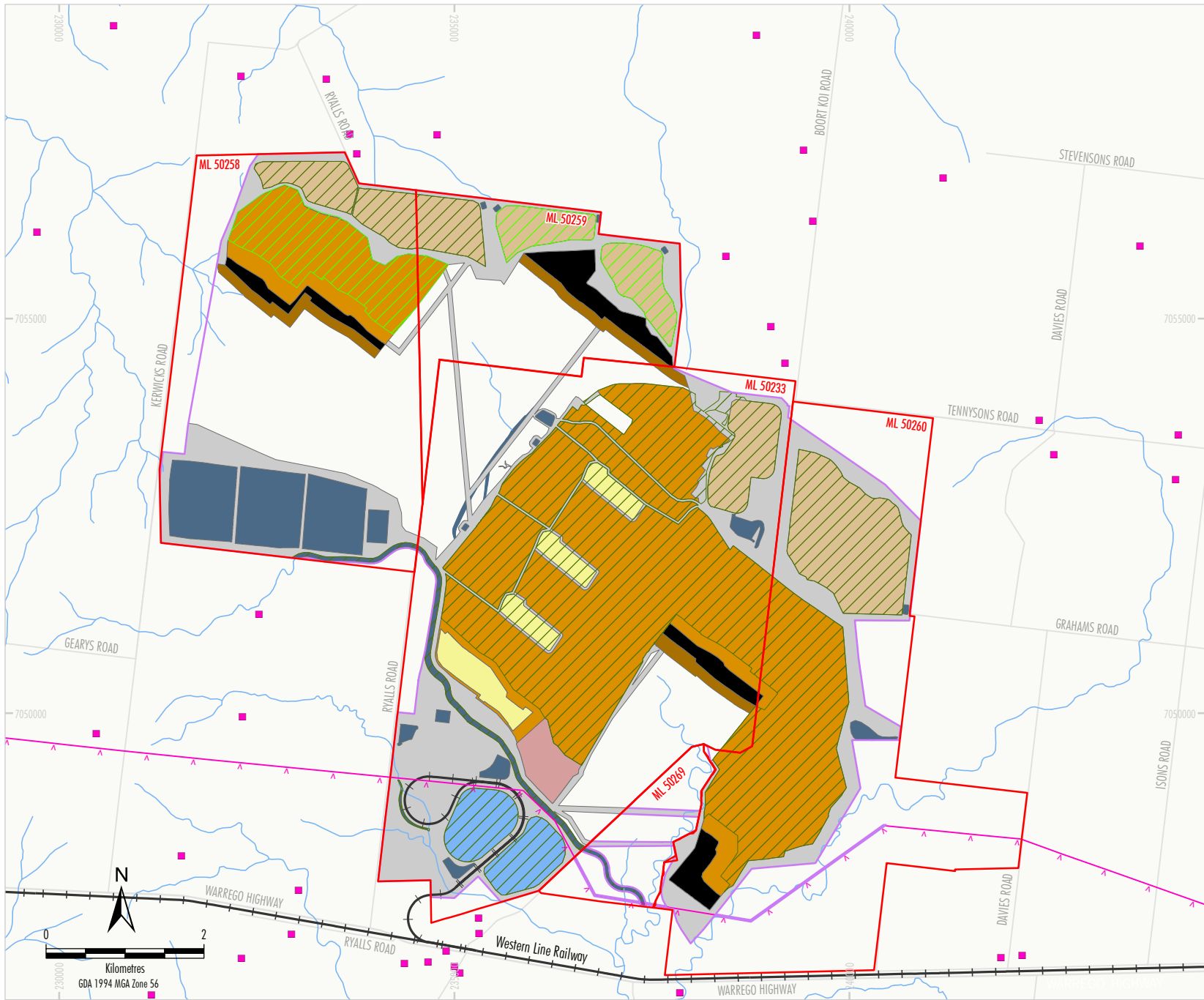
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2060**

**Figure 18**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- v Existing and Realigned Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- Soil Stripping
- Open Cut Area
- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management
- Final Void

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

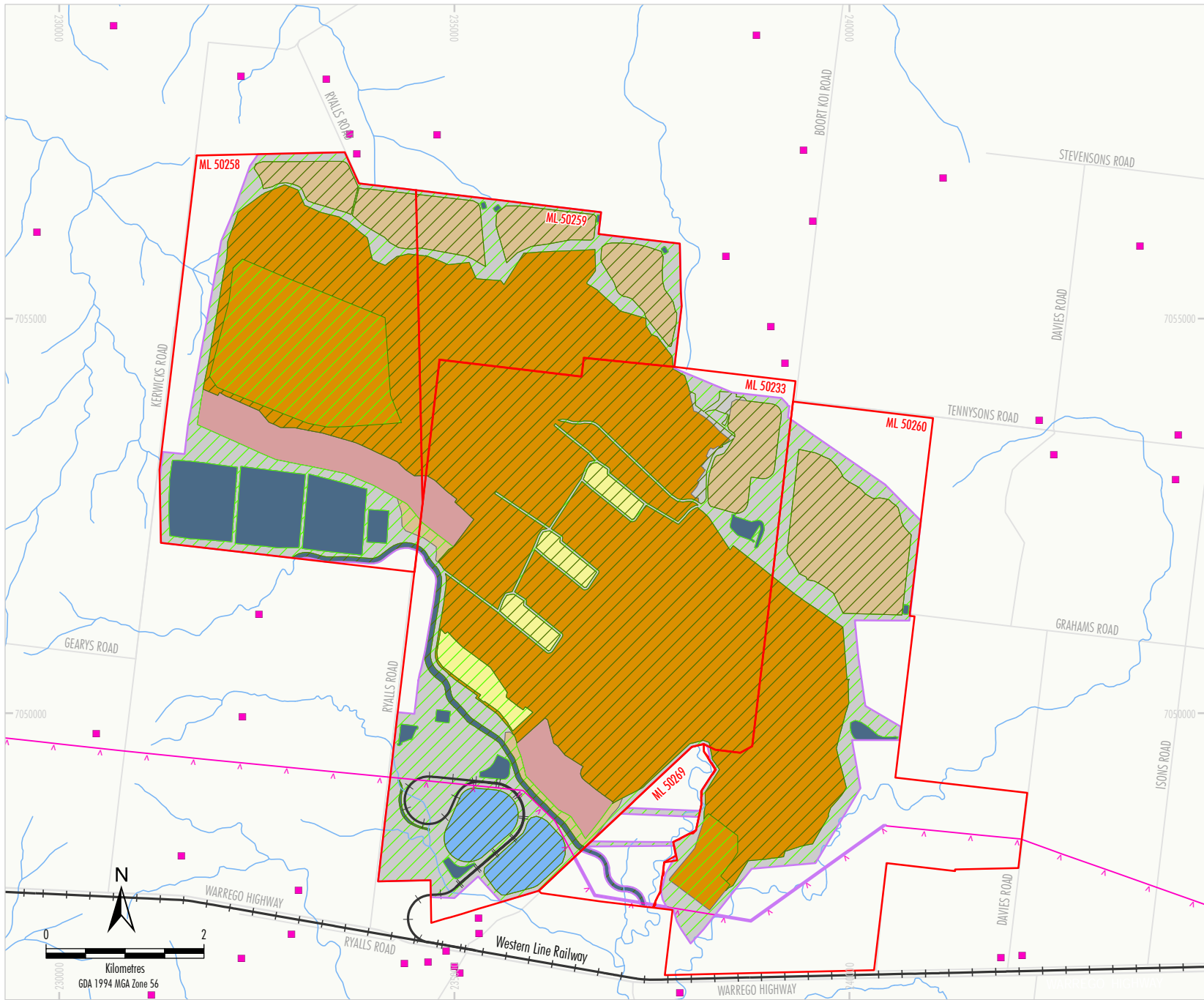
Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**CAMEBY DOWNS MINE**  
**Progressive Development and Rehabilitation 2066**

**Figure 19**



**LEGEND**

- Mining Lease Boundary
- Maximum Approved Disturbance Footprint
- Existing and Realigned Electricity Transmission Line
- Railway
- Sensitive Receptor - Dwelling

**Project Domain**

- In-pit Waste Rock Emplacement
- In-pit Rejects Emplacement
- Out-of-pit Waste Rock Emplacement
- Out-of-pit Rejects Emplacement
- Infrastructure Area\*
- Water Management
- Final Void

**Rehabilitation Areas**

- Indicative Area Available for Rehabilitation ^
- Active Rehabilitation Area

Source: The State of Queensland (2020, 2021); Syntech Resources (2021)

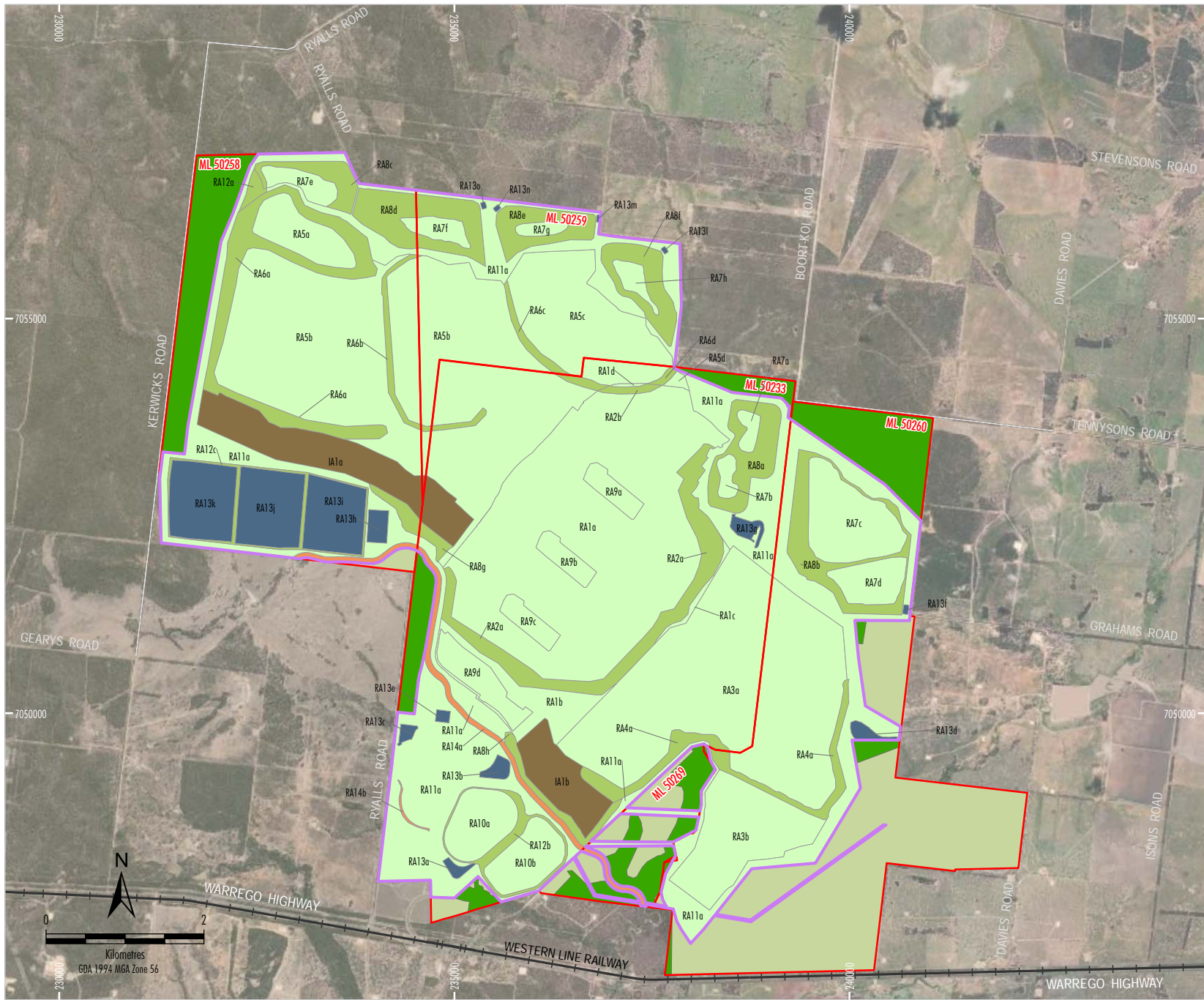
Note:\* Infrastructure Area includes the coal handling and preparation plant, coal stockpiles, administration buildings, rail loop, rail load-out infrastructure, haul roads, bunding, hardstands, minor water management infrastructure, access tracks, topsoil stockpiles, explosives magazine, power reticulation, temporary offices, other ancillary works (e.g. exploration activities) and construction disturbance.

^ Areas considered "Available for Rehabilitation" are indicative only based on estimated rates of rehabilitation. The location of rehabilitation undertaken in a given year may vary although the total areas would remain consistent with the PRCP Schedule.

**Cameby Downs Mine**  
**C A M E B Y D O W N S M I N E**  
**Progressive Development and Rehabilitation 2093**

**Figure 20**





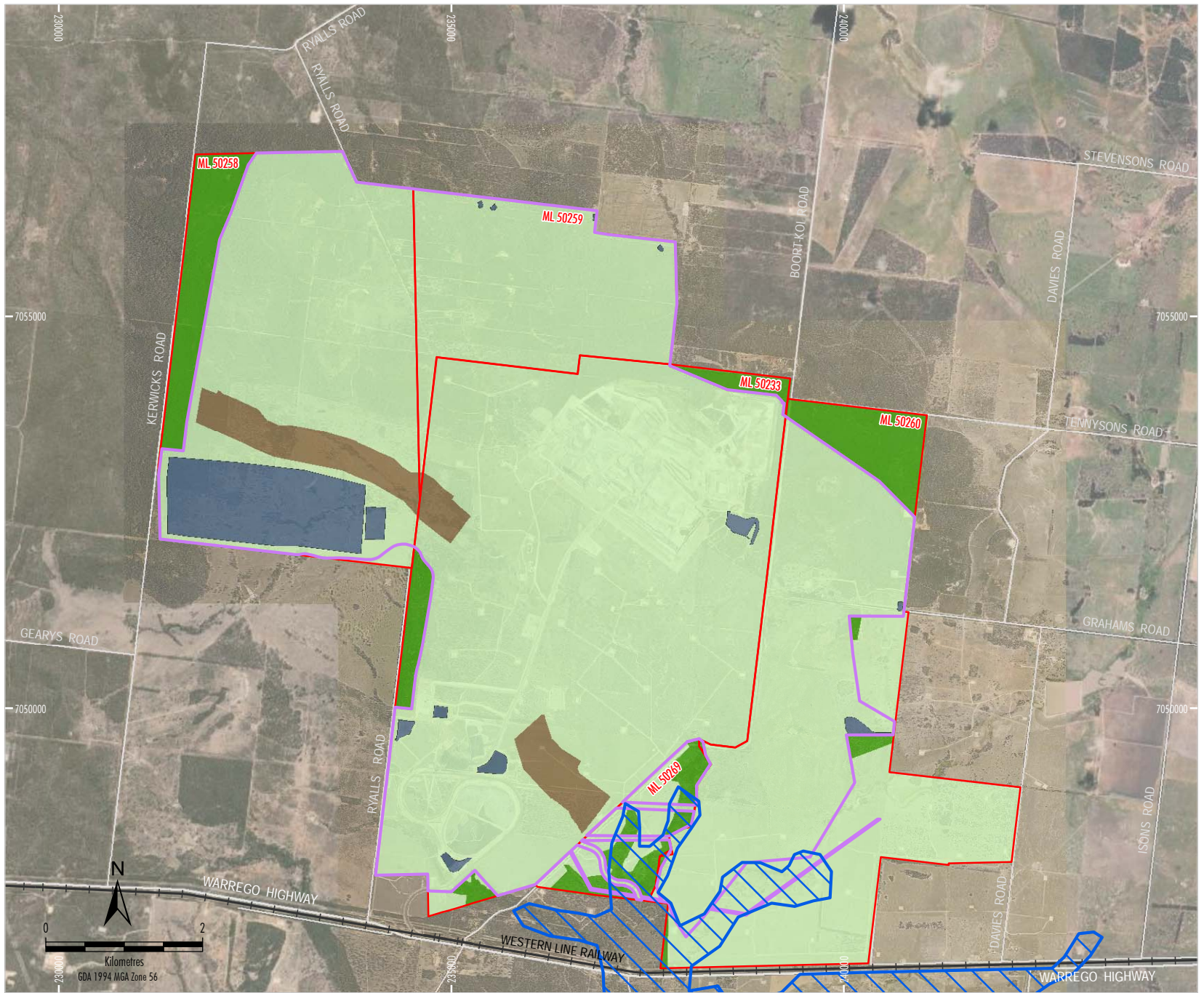
- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Post-mining Land Use Areas\***
  - Improvement Area
  - Flat Land with Grazing Pasture
  - Slopes with Grazing Pasture and Vegetation
  - Grazing Pasture with "Riparian Suited Vegetation"
  - Retained Water Management Infrastructure
  - Native Ecosystem
  - Existing Grazing Pasture

\* As per land outcome document (EA EPML 00900113)

Source: The State of Queensland (2020); Syntech Resources (2021)  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Rehabilitation Areas and  
 Improvement Areas

**Figure 22**



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
  - Queensland Floodplain Assessment Overlay
  - Post-Mining Land Uses
  - Grazing
  - Native Ecosystem
  - Water Storage
  - Non-Use Management Areas
  - Residual Void

Source: The State of Queensland (2020);  
 Syntech Resources (2021)  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

 **Comeby Downs Mine**  
**C A M E B Y D O W N S M I N E**  
**Approved Post-mining Land Uses and**  
**Non-use Management Areas**

**Figure 23**

### 3.1.4 Rehabilitation/Improvement Planning

Consistent with EA EPML00900113, the approved PMLU at the CDM is light intensity grazing, with areas of native vegetation and two final residual voids approved as NUMAs (Figure 23). Rehabilitation of disturbed areas at the CDM is completed in accordance with Conditions G1 to G25 of EA EPML00900113.

Condition G4 of EA EPML00900113 (reproduced below) provides the overall rehabilitation objective for the CDM:

*Land disturbed by the authorised mining activities must be rehabilitated to a safe and stable non-polluting landform, with a self-sustaining vegetation cover in accordance with:*

- a) *Attachment 6: Rehabilitation Requirements;*
- b) *Table G1: Approved Residual Void Design;*
- c) *Attachment 7: Approved Final Residual Voids Design; and*
- d) *The rehabilitation management plan required by condition G7.*

Further detail on the approved PMLU and NUMAs for the CDM is provided in Sections 3.3 and 3.4.

Mine planning is a structured process that takes into account a range of key variables that may influence a potential mining operation and its viability. Aspects considered in the mine planning process include safety, resource recovery, geotechnical constraints, management of potential environmental impacts (e.g. noise, air quality, water and coal rejects), community issues, risks to the operation, mining methods and rates, equipment requirements, infrastructure capacity, development timeframes and economics (i.e. capital and operating costs).

To facilitate progressive rehabilitation at the CDM, the mine planning process has aimed to maximise progressive rehabilitation by scheduling the commencement and completion of rehabilitation as soon as practicable after land becomes available. The CDM progresses steadily in one direction with a single pit active at a given time, allowing rehabilitation activities to follow behind the advancing open cut. The progressive development of the CDM is evident on Figures 10 to 21.

#### 3.1.4.1 Relevant Activities

For the purposes of this PRC Plan, Syntech has defined Rehabilitation Areas and Improvement Areas as outlined on Figure 22. These areas have been based on the progressive development and rehabilitation plans provided in Figures 10 to 20 and the approved final landform in Figure 21. These progressive plans are consistent with the approved outcomes from the EVA (Syntech, 2018).

Table 10 provides details of the relevant activities (i.e. predicted duration, size/extent and ability to progressively rehabilitate during the activity) that will be undertaken at each of the Rehabilitation Areas and Improvement Areas, throughout the life of the CDM.

**Table 10  
Relevant Mining Activities**

Area	Relevant Activity	Size of Area (ha)	Duration of Relevant Activity	Able to Progressively Rehabilitate
<b>Rehabilitation Areas</b>				
RA1	Pit 1, In-pit Emplacement Area	839.98	Commenced to 2093	Yes
RA2	Pit 1, In-pit Emplacement Area	122.82	Commenced to 2093	Yes
RA3	Pit 2, In-pit Emplacement Area	806.63	2048 to 2093	Yes
RA4	Pit 2, In-pit Emplacement Area	61.45	2054 to 2093	Yes
RA5	Pit 3, In-pit Emplacement Area	1179.92	2066 to 2093	Yes
RA6	Pit 3, In-pit Emplacement Area	170.66	2066 to 2093	Yes
RA7	Out-of-pit Waste Rock Emplacement Areas	245.09	2022 to 2076	Yes
RA8	Out-of-pit Waste Rock Emplacement Areas	383.20	2022 to 2093	Yes
RA9	Pit 1, In-pit Rejects Emplacement Area	110.51	2039 to 2098	Yes
RA10	Out-of-pit Rejects Emplacement Areas	122.80	2032 to 2053	Yes
RA11	Infrastructure Areas	944.92	Commenced to 2093	Yes
RA12	Infrastructure Areas	51.18	2093 to 2093	Yes
RA13	Water Management Infrastructure	273.64	2093 to 2093	Yes
RA14	Water Diversions	48.37	Commenced to 2027	Yes
<b>Improvement Areas</b>				
IA1	Pit 1, Pit 2 and Pit 3 Final Voids (two voids total)	239.27	2042 to 2094	No

### 3.1.4.2 Rehabilitation Undertaken to Date

Under section 126C(1)(j) of the EP Act, transitional PRC plans must also include the following details about any existing rehabilitation already completed at the time of submission of the proposed PRC plan:

- a description of the rehabilitation works previously carried out;
- when the rehabilitation works commenced and were completed; and
- whether the rehabilitation has been applied for or approved as progressively certified under the EP Act.

Existing rehabilitation at the CDM has been undertaken progressively. Rehabilitation works have commenced on approximately 165 ha at the CDM (Figure 10). The PRCP Schedule (Attachment 2) includes the status of the rehabilitation activities undertaken so far. Syntech has not applied for, or received, progressive certification for any of the rehabilitation completed to date.

## **3.2 COMMUNITY CONSULTATION**

### **3.2.1 Community Consultation Register**

During preparation of the EVA, consultation was conducted with the neighbouring landholders, local community, Aboriginal stakeholders, key State and Commonwealth government agencies, Western Downs Regional Council (WDRC), QGC (Shell Australia) and relevant infrastructure owners.

Consultation has also been undertaken with the relevant groups during the preparation of this PRCP.

A summary of the consultation undertaken to date (where relevant to the PRCP) is provided below. Details of any issues raised during consultation and how the issues were considered during the preparation of the PRCP are provided in Table 11.

#### *3.2.1.1 Local Community*

##### ***Community Reference Group***

A Community Reference Group (CRG) was established in 2010 comprising representatives from the Chinchilla and Miles communities, neighbouring landholders, WDRC and Syntech. The CRG provides a mechanism for ongoing communication between Syntech and the local community.

Syntech provided an initial overview of the CDM Continued Operations Project at the CRG meeting in December 2016. Details presented included information regarding the existing CDM operations, an overview of the Continued Operations Project and a summary of the environmental assessments and stakeholder consultation being undertaken.

Further updates on the CDM Continued Operations Project were provided to the CRG in June 2017, November 2017 and September 2018.

Syntech also met with the CRG in February 2020 and November 2020 where updates on the CDM rehabilitation, methodology and final land uses were provided. No issues or comments in relation to rehabilitation were raised by the CRG during these meetings.

During the preparation of the PRCP, Syntech met with the CRG on 4 February 2021 to provide an overview of the PRCP process and a summary of key elements including overall timing, final land use, NUMAs and the additional assessments being undertaken.

##### ***Adjacent/Underlying Landholders***

For the CDM Continued Operations Project, Syntech distributed consultation letters to neighbouring landholders located in the CDM area and immediate surrounds in December 2016. The consultation letter provided information regarding the existing CDM operations, an overview of the proposed Continued Operations Project and a summary of the environmental assessments being undertaken to support an amendment application under the EP Act for the Continued Operations Project. Briefing newsletters were also distributed to neighbouring (and other local) landholders in June 2017 and September 2018.

Syntech also consulted with neighbouring and other local landholders as part of a bore census (to inform the Groundwater Assessment) undertaken in October 2017.

Regular consultation has been undertaken with the neighbouring landholders regarding mitigation of potential impacts through a negotiated agreement or property acquisition.

**Table 11  
Community Consultation Register**

Stakeholder	Key Objectives and Information to be Provided	Consultation Activities and Engagement Method	Consultation Date	Issues Raised	How Issues Have Been Considered	Outcomes, Decisions and/or Commitments
<b>Government Agencies</b>						
Department of Environment and Science (DES)	Summary of key elements including overall timing, community consultation plan, final land use, NUMAs and assessments being undertaken. Key objectives for meeting are to confirm: <ul style="list-style-type: none"> <li>the approved final voids are pre-approved NUMAs;</li> <li>no public notification is required;</li> <li>the proposed PRCP scope (based on findings from gap analysis);</li> <li>confirm staging (e.g. annual and five yearly landforms) and agree on approach to maximise operational flexibility without having to amend PRCP; and</li> <li>the proposed community consultation plan.</li> </ul>	Pre-lodgement Meeting	24 Nov 2020	DES provided in-principle agreement that the final voids were pre-approved NUMAs. DES indicated that the final void design and the rehabilitation requirements outlined in the EA would need to be adopted consistently in the PRCP if public notification is to be avoided. DES confirmed that the 'no final voids in floodplains' requirement would not apply to Cameby Downs as the locations of the final voids are shown in the EA (i.e. pre-approved). DES confirmed that no public notification would be required if the final voids are pre-approved NUMAs and the final void design and rehabilitation requirements in EA Attachment 6 can be adopted consistently in the PRCP. DES supported the proposed consultation program and recommended that consultation should emphasise that the PRCP process is just the transfer of the approved project described in EVA into a PRCP (i.e. no need to justify proposed rehabilitation outcomes again).	Syntech considered the feedback provided by DES and has used this feedback to develop the PRCP document, consistent with previous commitments in EA EPML00900113 and the EVA.	The final void design and rehabilitation requirements have been adopted consistent with EA EPML00900113 and the EVA. Consultation with other parties has emphasised that this PRCP process is the transfer of the approved project as described in the EVA into a PRCP (i.e. there is no need to justify proposed rehabilitation outcomes as long as they are consistent with the EVA and EA EPML00900113).
	Correspondence with DES to clarify key issues identified and proposed approach for management of identified issues.	Email	4 Dec 2020	No issues raised.	-	-
	Draft PRCP Schedule provided to DES for review and feedback.	Email	31 March 2021	DES provided high-level advice on the content and presentation of the draft PRCP Schedule.	Syntech has considered the comments received from DES in the latest iteration of the PRC Plan and PRCP Schedule.	Updates to the content of the PRC Plan and PRCP Schedule were made as a result of the issues raised by DES.
	Draft PRC Plan and PRCP Schedule provided to DES for review and feedback.	Email	6 May 2021	DES provided high-level advice on the content and presentation of the draft PRC Plan and PRCP Schedule.	Syntech has considered the comments received from DES in the latest iteration of the PRC Plan and PRCP Schedule.	Updates to the content of the PRC Plan and PRCP Schedule were made as a result of the issues raised by DES.
Department of Resources (DoR)	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Email/Letter	Q1 2021	No issues raised to date.	-	-
<b>Local Government</b>						
Western Downs Regional Council (WDRC)	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Meeting	8 March 2021	Query 1 – queried whether the final landform would consist of just grazing or would there be trees as well?	Described the combination of grazing and native vegetation by using the map on slide 9. The darker green proposed to be vegetation on the slopes and grazing on the flatter areas	-
				Query 2 – Queries the proportion of annual disturbance versus annual rehabilitation?	Explained that recently (over the past few years) the progress of the rehabilitation has been approximately matching the area of disturbance. Also explained the one of the purposes of the PRCP is so mining companies ensured rehabilitation was planned and undertaken progressively to minimise the risk of rehabilitation not being completed.	-
				Query 3 – What is the expectation for level of grazing?	Explained that the final land use was light intensity grazing. Grazing trials are expected to be conducted to determine that the landform is stable and self-sustaining.	-
<b>Surrounding Landholders</b>						
Affected (Underlying and Adjoining) Landholders	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Email/Letter	Q1 2021	No issues raised to date.	-	-

**Table 11 (Continued)  
Community Consultation Register**

Stakeholder	Key Objectives and Information to be Provided	Consultation Activities and Engagement Method	Consultation Date	Issues Raised	How Issues Have Been Considered	Outcomes, Decisions and/or Commitments
<b>Local Community Groups</b>						
Community Reference Group	Update on CDM rehabilitation, methodology and final land use.	Meeting	20 February 2020	No issues raised during meeting.	-	-
	Update on CDM rehabilitation, methodology and final land use.	Meeting	27 November 2020	No issues raised during meeting.	-	-
	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Meeting	4 February 2021	Query 1 – Queried why the final voids (NUMA's) wouldn't be rehabilitated/backfilled.	Explanation on the mining process, including backfilling of mining voids progressively and explained that final voids occur due to lack of material in the final mining strip to backfill it. Also explained that the current EA has conditions regarding final void slope angles and safety requirements (e.g. bunding, geotechnical investigations).	-
				Query 2 – Regarding final land use of low intensity grazing queried if any areas would be native vegetation.	Explained that certain areas such as the flat areas of the in-pit spoil dumps would be most suitable for light intensity grazing and the sloped areas of the dumps would be more suitable for native vegetation. Used the map on slide 9 of the presentation as an example of where the native vegetation land use may be. Also briefly discussed the Revegetation Plan and how that would describe the revegetation plan for the site.	-
			Query 3 – Asked about the timing of the diversion drain of DL1.	Discussed the location of the proposed drain using the map on slide 9 to show the proposed location. Discussed the timing for the drain within the next 3-5 years.	-	
Local Community and Groups	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Letter/Website	Q1 2021	No issues raised to date.	-	-
Other Community Members	Place the community newsletter on the CDM website.	Website	Q1 2021	No issues raised to date.	-	-
<b>Traditional Owners</b>						
Aboriginal Community	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Website	Q1 2021	No issues raised to date.	-	-
Native Title Claimants (Iman People #4 (QC2017/008))	Overview of PRCP process and summary of key elements including overall timing, PMLU, NUMAs and assessments being undertaken.	Email/Letter	Q1 2021	No issues raised to date.	-	-

During the preparation of the PRCP, Syntech distributed a briefing to neighbouring (and other local) landholders (Section 3.1.2.11) in April 2021, to provide an overview of the PRCP process and a summary of key elements including overall timing, PMLU, NUMAs and the additional assessments being undertaken. No responses to the briefing newsletter have been received to date.

### ***Other Local Community Members***

A dedicated CDM community information line (1300 770 150) has been established for community members (including neighbouring landholders) to contact Syntech with any questions they may have, and relevant information has been, or will be, made publicly available on the CDM website.

#### ***3.2.1.2 Aboriginal Community***

Cultural Heritage Management Plans (CHMPs) have been formed with the Barunggam Endorsed Parties and the Western Wakka Wakka Aboriginal Parties. The CHMPs apply to the full extent of the ML areas and clearly define management measures to avoid or minimise harm to Aboriginal cultural heritage.

Syntech provided an overview of the Continued Operations Project to the Western Wakka Wakka Aboriginal Parties and Barunggam Endorsed Parties in August 2017 and November 2017, respectively.

In April 2021, during the preparation of the PRCP, Syntech distributed a briefing to the Western Wakka Wakka Aboriginal Parties and Barunggam Endorsed Parties, to provide an overview of the PRCP process and a summary of key elements including overall timing, PMLU, NUMAs and the additional assessments being undertaken. No responses to the letter have been received to date.

#### ***3.2.1.3 Queensland State Government Agencies***

Syntech consults with relevant Queensland State Government agencies on a regular basis in relation to the current operations at the CDM.

Consultation with Queensland State Government agencies regarding the PRCP is ongoing. Consultation initiatives to date are discussed below.

### ***Department of Environment and Science***

Syntech consulted with DES throughout the preparation of the Continued Operations Project. An overview of the Continued Operations Project and the proposed approval process were discussed.

The DES conducted a site visit in November 2016. The site visit included an inspection of the existing operations and an update briefing on the Continued Operations Project. The scope of environmental assessments and the rehabilitation strategy were discussed.

An EA amendment application for the Continued Operations Project was lodged with DES on 21 November 2016. An Assessment Level Decision was subsequently issued on 30 November 2016 that the proposed amendment is a Major EA Amendment application. DES issued an Information Request on 12 January 2017 to request additional information from Syntech to enable the DES to make a decision on the application.

Syntech presented an update to the DES in May 2017. The status of the environmental assessments was discussed during the meeting.

Syntech provided a detailed summary of the environmental assessment outcomes to DES in November 2017. DES subsequently provided feedback on the environmental assessment outcomes in January 2018. The feedback focused on the water resource assessments and the rehabilitation strategy.

A follow-up meeting was held with DES in May 2018 to provide an overview of how Syntech had considered their feedback. This meeting was followed by a DES site visit to the CDM.

In November 2020, Syntech organised a meeting with DES to discuss the preparation of the PRCP. Syntech provided a summary of the key elements including the overall timing, community consultation plan, PMLU, NUMAs and assessments being undertaken. The key objectives for the meeting were related to the final voids, public notification process (if required), PRCP scope and the proposed community consultation plan. A follow up email was sent to DES on 4 December 2020. Feedback from DES was used to inform the preparation of the PRCP.

In March 2021, Syntech provided a preliminary draft of the PRCP Schedule to DES for their review. High-level advice with regards to the draft PRCP Schedule was received from DES on 14 April 2021, and has been considered in this PRC Plan and the associated PRCP Schedule. Subsequently, a complete draft of the PRC Plan and PRCP Schedule was provided to DES on 6 May 2021. DES provided additional pre-lodgement advice to assist in finalising the PRCP application. This advice has been considered and incorporated into this iteration of the PRC Plan and PRCP Schedule.

### ***Department of Resources***

Syntech provided a briefing on the Continued Operations Project to the Department of Natural Resources and Mines and Energy (DNRME) (now Department of Resources [DoR]) in August 2016. An overview of the Continued Operations Project and the status of MLs 50258, 50259, 50260 and 50269 were discussed.

A pre-lodgement meeting was held with the DNRME in September 2018 to discuss the public notification of the EVA and MLs 50258, 50259, 50260 and 50269.

In April 2021, Syntech provided the DoR with a briefing letter on the PRCP process and a summary of the key elements including overall timing, PMLU, NUMAs and the additional assessments being undertaken. No response to the briefing letter has been received to date.

#### ***3.2.1.4 Western Downs Regional Council***

Syntech consults with the WDRC on a regular basis in relation to the current operations at the CDM (including representation as part of the CRG – Section 3.2.1.1). A briefing on the Continued Operations Project was provided to the WDRC Mayor and Deputy Mayor (Planning and Environment Councillor) in August 2016.

Key issues discussed during the August 2016 meeting included: the proposed approval process; environmental assessments; maximum employee numbers and accommodation requirements; proposed road closures; site rehabilitation and final land uses, and community consultation. Syntech has continued to provide regular updates on the Continued Operations Project to the WDRC.

In March 2021, Syntech organised a meeting with WDRC to provide an overview of the PRCP process and a summary of key elements including overall timing, PMLU, NUMAs and the additional assessments being undertaken. No issues were raised during this consultation.

### **3.2.2 Community Consultation Plan**

Future consultation to be undertaken with regards to the PRCP is outlined in Table 12.

**Table 12  
Community Consultation Plan**

Stakeholder	Key Objectives of Engagement	Proposed Engagement Method and Activities	Engagement Indicative Timing	Information to be Provided	Mechanism for Feedback Incorporation
<b>Government Agencies</b>					
DES	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> </ul>	Meetings or Email Rehabilitation Report Milestone Monitoring	Annually	Status of rehabilitation.	PRCP Amendments.
DoR	<ul style="list-style-type: none"> <li>To outline the status of MLs once rehabilitation is complete.</li> </ul>	Email/Letter Report	Post-mining	Status of ML relinquishment.	Post-surrender Management Report.
<b>Local Government</b>					
Western Downs Regional Council (WDRC)	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> <li>To ensure any desired changes to post-mining land uses are considered.</li> </ul>	Meetings or Email	Annually	Status of rehabilitation.	PRCP Amendments.
<b>Surrounding Landholders</b>					
Affected (Underlying and Adjoining) Landholders	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> <li>To discuss retaining infrastructure or water storages/management areas.</li> </ul>	Email/Letter	As required	Status of rehabilitation.	PRCP Amendments.
<b>Local Community Groups</b>					
Community Reference Group	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> </ul>	Meetings or Email	Annually	Status of rehabilitation.	PRCP Amendments.
Local Community and Groups	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> </ul>	Website	Annually	Status of rehabilitation.	PRCP Amendments.
Other Community Members	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> </ul>	Website	Annually	Status of rehabilitation.	PRCP Amendments.
<b>Traditional Owners</b>					
Aboriginal Community	<ul style="list-style-type: none"> <li>To provide updates on rehabilitation progress.</li> </ul>	Website	Annually	Status of rehabilitation.	PRCP Amendments.

### 3.3 POST-MINING LAND USE

The relevant land outcome documents for the CDM are EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020). The PMLU (light intensity grazing, with areas of native vegetation) is described in the land outcome documents (Figure 23). Consistent with the process outlined in the PRCP Guideline, Syntech has transitioned the approved PMLU for the CDM into the PRC Plan and PRCP Schedule and is not required to complete the information requirements under section 126C(1)(j) of the EP Act.

Native vegetation has been incorporated into the PMLU to provide wildlife corridors, shelter belts for stock (from sun and wind) and visual enhancement (Syntech, 2018). There have been no changes to the PMLU compared to the approved PMLU in EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020).

Light intensity grazing was originally selected as the PMLU for the CDM as it is located within a rural area that is predominantly used for low intensity cattle grazing on unimproved pasture. No horticulture or cropping occurs on the CDM site.

Notwithstanding the above, the legislative requirements under section 126C(1)(d) of the EP Act still apply to the CDM. In accordance with section 126C(1)(d) of the EP Act, the rehabilitation planning part of the PRC plan must state the extent to which each PMLU for land identified in the PRCP schedule is consistent with:

- a) the outcome of consultation with the community in developing the plan, and
- b) any strategies or plans for the land of a local government, the State or the Commonwealth.

This is addressed in the sub-sections below.

#### 3.3.1 Community Consultation

As described in Section 3.2.1, during preparation of the EVA, consultation was conducted with the neighbouring landholders, the local community, Aboriginal stakeholders, key State and Commonwealth government agencies, WDRC, QGC (Shell Australia) and relevant infrastructure owners.

Consultation has also been undertaken with the relevant groups during the preparation of this PRCP, and their feedback has been addressed or incorporated into the PRC Plan and PRCP Schedule.

The approved PMLU of light intensity grazing is considered to be consistent with the outcomes of the community consultation undertaken to date as:

- The queries raised by the CRG have been addressed and no further queries or issues have been forthcoming.
- No queries or issues with the PMLU have been raised by adjacent landholders or other members of the local community.

### 3.3.2 Relevant Legislation, Plans and Strategies

#### 3.3.2.1 Local Government

The *Western Downs 2050 Community Plan* (WDRC, 2011) (the Community Plan) provides a long-term vision and strategic direction to enable the Western Downs community to guide its future in the midst of anticipated growth and changes. It is the over-arching strategic document for the region and informs all other WDRC planning documents, operations and budgeting. In short, it sets out what is important to the Western Downs community.

The Community Plan is intended to facilitate strategic and planned development of the region and form the basis for more detailed strategic and operational plans. It will guide future plans at both the regional and local scale. The Community Plan will better inform the infrastructure requirements for both the current and future communities of the region. The Community Plan will provide the strategic direction needed to ensure that the Western Downs region grows in a sustainable way that meets the community's expectations.

The approved PMLU of light intensity grazing, with areas of native vegetation, is in keeping with the vision outcomes in the Community Plan as:

- The region's natural environment and native species habitats will be recognised, maintained and enhanced, and the extent of weeds and pests impacting on the region will be minimised.
- The rehabilitated landform will be consistent with the region's physical attractions (e.g. agricultural land and dramatic landscape features, including wide open spaces).
- The return to grazing will support the region's long-standing role as a vital food bowl, and will protect land used for rural production and other non-urban values from further fragmentation and excessive urban encroachment.

#### 3.3.2.2 State and Commonwealth Governments

The State and Commonwealth legislation considered during the preparation of the EVA (Syntech, 2018) includes:

- *Mineral Resources Act 1989.*
- *EP Act 1994.*
- *EPBC Act 1999.*
- *Environmental Offsets Act 2014.*
- *Nature Conservation Act 1992.*
- *Regional Planning Interests Act 2014.*
- *Planning Act 2016.*
- *Water Act 2000.*
- *Water Resource (Condamine and Balonne) Plan 2004.*
- *Native Title Act 1993.*
- *Aboriginal Cultural Heritage Act 2003.*
- *Land Act 1994.*
- *Electricity Act 1994.*
- *Local Government Act 2009.*

- *Sustainable Planning Act 2009 Murilla (Miles) Shire Planning Scheme.*
- *Chinchilla Shire Planning Scheme.*
- *Building Act 1975.*
- *Building Regulation 2006.*
- *Building Code of Australia 2008.*

The approved PMLU is not considered to be inconsistent with any of the legislation identified above.

### 3.4 NON-USE MANAGEMENT AREAS

The relevant land outcome documents for the CDM are EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020). The two final voids are described in the land outcome documents and have been transitioned into this PRC Plan and PRCP Schedule (Figures 21 and 23).

Consistent with the process outlined in the PRCP Guideline, Syntech is not required to comply with the requirements under section 126C(1)(g) or (h), or section 126D(2) or (3) of the EP Act and is not required to complete the information requirements under section 126C(1)(j) of the EP Act for the approved NUMAs.

There have been no changes to the final voids compared to the approved layout in EA EPML00900113 and the Rehabilitation Operational Management Plan (Syntech, 2020).

The final voids must be consistent with the description in EA EPML00900113, and in particular, *Table G1: Approved Final Residual Voids Design* and *Attachment 7: Approved Final Residual Voids Design*.

**Table G1 – Approved Final Residual Voids Design**

Void ID	High Wall Slope (deg)	High Wall Incompetent Rock Slope (deg)	Low Wall Slope (deg)	Low Wall Incompetent Slope (deg)	Void Maximum Depth (m)	Void Maximum Length (m)	Void Maximum Area (ha)	Volume (Mm <sup>3</sup> )
Central Final Void (Pit 1)	45	45	37	37	70	1,460	75	28
Western Final Void (Pit 3)	45	45	37	37	87	3,770	165	86

Mm<sup>3</sup> = million cubic metres.

Deg = Degrees.

Notwithstanding the above, the legislative requirements under section 126C(1)(d) of the EP Act still apply. In accordance with section 126C(1)(d) of the EP Act, the rehabilitation planning part of the PRC plan must state the extent to which each NUMA identified in the PRCP schedule is consistent with:

- a) the outcome of consultation with the community in developing the plan, and
- b) any strategies or plans for the land of a local government, the State or the Commonwealth.

This is addressed in the sub-sections below.

### 3.4.1 Community Consultation

As described in Section 3.2.1, during preparation of the EVA, consultation was conducted with the neighbouring landholders, the local community, Aboriginal stakeholders, key State and Commonwealth government agencies, WDRC, QGC (Shell Australia) and relevant infrastructure owners.

Consultation has also been undertaken with the relevant groups during the preparation of this PRCP, and their feedback has been addressed or incorporated into the PRC Plan and PRCP Schedule.

The approved NUMAs (i.e. the final voids) are considered to be consistent with the outcomes of the community consultation undertaken to date as:

- The queries raised by the CRG have been addressed and no further queries or issues have been forthcoming.
- No queries or issues with the NUMA have been raised by adjacent landholders or other members of the local community.

### 3.4.2 Relevant Legislation, Plans and Strategies

#### 3.4.2.1 Local Government

The approved NUMAs will be managed in such a way as to minimise any impacts on the vision outcomes in the Community Plan, in particular:

- The region's natural environment and native species habitats will be recognised, maintained and enhanced, and the extent of weeds and pests impacting on the region will be minimised.
- The rehabilitated landform will be consistent with the region's physical attractions (e.g. agricultural land and dramatic landscape features, including wide open spaces).
- The size of the NUMAs has been minimised to maximise the amount of rehabilitated grazing areas that will support the region's long-standing role as a vital food bowl, and will protect land used for rural production and other non-urban values from further fragmentation and excessive urban encroachment.

#### 3.4.2.2 State and Commonwealth Governments

The State and Commonwealth legislation that were considered during the preparation of the EVA (Syntech, 2018) are listed in Section 3.3.2.2.

The approved NUMAs are not considered to be inconsistent with any of the legislation identified above. It is noted that the NUMAs (i.e. the two final voids) will not be located within the floodplain.

### 3.5 REHABILITATION AND MANAGEMENT METHODOLOGY

In accordance with section 126C(1)(e) and (i), this section:

- States, for each proposed PMLU for land, the proposed methods or techniques for rehabilitating the land to a stable condition in a way that supports the rehabilitation milestones under the proposed PRCP Schedule.
- States, for each proposed NUMA, the proposed methodology for achieving best practice management of the area to support the management milestones under the proposed PRCP Schedule for the area.

#### 3.5.1 Rehabilitation and Management Milestones

Syntech has developed a comprehensive suite of milestones for the rehabilitation areas and improvement areas for the CDM. Tables 13 and 14 list these milestones and how they relate to the proposed revegetation scenarios for the CDM.

The sections below provide further detail on how Syntech will manage the rehabilitation activities to achieve the rehabilitation milestones. The management measures for the rehabilitation areas and improvement areas have been developed in consideration of guidelines and relevant information currently available, including the:

- PRCP Guideline.
- Department of Environment and Science (2014) *Guideline: Rehabilitation requirements for mining resource activities* (Historical).
- Australian Government (2016a) *Leading Practice Sustainable Development Program for the Mining Industry – Mine Rehabilitation*.
- Australian Government (2016b) *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure*.

The rehabilitation area and improvement area management measures are considered by Syntech to be consistent with “best practice” measures available as at the time of preparing this PRCP. If further information becomes available or these guidelines are revised, this PRCP would be reviewed and the proposed management measures updated as required to maintain “best practice” status.

In addition to the information presented in the EVA for the Continued Operations Project, Syntech also commissioned suitably qualified specialists to develop and refine a Revegetation Plan (AusEcology, 2021; Appendix K) and to review and evaluate potential risks related to rehabilitation (Risk Mentor Pty Ltd [Risk Mentor], 2021; Appendix L). The Revegetation Plan (AusEcology, 2021) and PRCP Risk Assessment (Risk Mentor, 2021) informed the rehabilitation management, maintenance and monitoring methodologies outlined in this PRC Plan and are discussed further throughout Sections 3.5 and 3.6.

**Table 13**  
**Rehabilitation Milestones and Criteria for Rehabilitation Areas**

Milestone Reference	Rehabilitation Milestone	Revegetation Scenario	Milestone Criteria	Approximate Timeframe
RM1	Infrastructure Decommissioning and Removal	1, 2 & 3	<ul style="list-style-type: none"> <li>All services decommissioned.</li> <li>All buildings and water storages demolished and removed, unless otherwise agreed in consultation with landholders and/or relevant agencies.</li> </ul>	3 months
RM2	Remediation of Contaminated Land	1, 2 & 3	<ul style="list-style-type: none"> <li>Carry out preliminary and intrusive contaminated land investigations, as required.</li> <li>Removal or onsite-treatment of contaminated water (e.g. affected by hydrocarbons, brine, metals, etc.).</li> <li>Removal and appropriate disposal of contaminated materials (PCBs, Dioxins, Mercury, hydrocarbon contaminated soils).</li> <li>On-site remediation of hydrocarbon contaminated soils.</li> <li>Removal and disposal of asbestos.</li> <li>Removal and disposal of plastic (geofabric) liners from dams, leach pads, etc.</li> <li>Conduct validation testing to confirm that contaminated soils have been removed/remediated.</li> </ul>	3 months
RM3	Installation of Cover System/Capping	1	<ul style="list-style-type: none"> <li>Finalise engineering and design plans.</li> <li>Source, cart, spread, and compact a suitable volume of material with appropriate chemical and physical properties.</li> <li>Install additional materials (capillary breaks, geofabric, etc.) as required.</li> <li>Prepare engineering report on completed cover, certifying capping system built/installed as per design.</li> </ul>	5 years
RM4	Landform Development and Reshaping/ Re-profiling	1, 2 & 3	<ul style="list-style-type: none"> <li>All major earthworks completed.</li> <li>Stable landform and angle achieved (1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used).</li> <li>Installation of contour or graded drains as per construction design which has been certified by an appropriately qualified person.</li> <li>Back-filled voids have been assessed as geotechnically stable by a suitably qualified geotechnical engineer.</li> </ul>	6 months

**Table 13 (Continued)**  
**Rehabilitation Milestones and Criteria for Rehabilitation Areas**

Milestone Reference	Rehabilitation Milestone	Revegetation Scenario	Milestone Criteria	Approximate Timeframe
RM5	Surface Preparation	1, 2 & 3	<ul style="list-style-type: none"> <li>• Topsoil amelioration and fertilisation process completed (target Total N: 1,500 mg/kg, Total P: 200 mg/kg).</li> <li>• Placement of topsoil to a minimum thickness of 100 mm and maximum thickness of 200 mm.</li> <li>• An assessment of soil health and suitability has been completed by an appropriately qualified person to confirm soil is suitable for target vegetation establishment.</li> <li>• Installation of fencing (if necessary) completed.</li> </ul>	3 months
RM6	Revegetation (grazing)	1	<ul style="list-style-type: none"> <li>• Direct seeding of cover crop and pasture species completed (rates as specified in Revegetation Plan).</li> <li>• Pasture grass species are comparable to designated reference sites.</li> <li>• Stock fencing to protect early stages of revegetation installed.</li> </ul>	12 months
RM7	Revegetation (grazing with native vegetation)	2 & 3	<ul style="list-style-type: none"> <li>• Direct seeding of cover crop and pasture species completed (rates as specified in Revegetation Plan).</li> <li>• Hiko or native tubestock planting completed (rates as specified in Revegetation Plan).</li> <li>• Survivorship of hiko or native tubestock greater than or equal to 70%, 12 months after planting.</li> <li>• Stock fencing to protect early stages of revegetation installed.</li> </ul>	12 months
RM8	Surface Conditions	1, 2 & 3	<ul style="list-style-type: none"> <li>• Site is stable when comparing photographs from successive monitoring events, for a period of five years post-mining.</li> <li>• No evidence of slumping and erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.</li> <li>• Hydrocarbon, heavy metal or other contamination levels are within relevant DES limits.</li> <li>• Salinity levels of less than 0.6 deci-siemens per metre (dS/m) in soil root zone or less than 130% of comparable reference sites.</li> <li>• Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 130% of comparable natural reference sites.</li> <li>• Persistent groundcover greater than or equal to 60% established at land suitability classes 3 to 4, and at least 40% at land suitability class 5.</li> </ul>	5 years

**Table 13 (Continued)**  
**Rehabilitation Milestones and Criteria for Rehabilitation Areas**

Milestone Reference	Rehabilitation Milestone	Revegetation Scenario	Milestone Criteria	Approximate Timeframe
RM9	Achievement of PMLU to Stable Condition (grazing)	1	<p>Safe:</p> <ul style="list-style-type: none"> <li>• Certification that slopes are safe, and predicted to remain safe.</li> <li>• Certification that specified cover thickness has been obtained.</li> <li>• Evidence that any site contamination has been resolved and relevant measures implemented, resulting in removal of the site from the Environmental Management Register (if required).</li> <li>• Receiving water system water quality monitoring results comply with EA EPML00900113 or are comparable with upstream values, for a period of at least two years.</li> <li>• Measures for fire reduction in place.</li> </ul> <hr/> <p>Stable:</p> <ul style="list-style-type: none"> <li>• Site has remained stable when comparing photographs from successive monitoring events, for a period of at least five years post-mining.</li> <li>• Limited active erosion, similar to the levels present in reference sites.</li> <li>• Erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.</li> <li>• Evidence of effective pest management with pest species abundance being comparable to vegetation reference sites.</li> <li>• Evidence of effective weed management with weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.</li> <li>• Persistent groundcover greater than or equal to 70% established at land suitability classes 3 to 4, and at least 50% at land suitability class 5.</li> </ul> <hr/> <p>Self-sustaining land use:</p> <ul style="list-style-type: none"> <li>• Stocking rates are comparable to designated reference sites and are managed to prevent overgrazing.</li> <li>• Salinity levels of less than 0.6 dS/m in soil root zone or less than 110% of comparable reference sites.</li> <li>• Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.</li> <li>• Pasture grass species are comparable to designated reference sites.</li> <li>• Pasture grass species show evidence of seed set, germination and emergence.</li> </ul>	5 years

**Table 13 (Continued)**  
**Rehabilitation Milestones and Criteria for Rehabilitation Areas**

Milestone Reference	Rehabilitation Milestone	Revegetation Scenario	Milestone Criteria	Approximate Timeframe
RM9 (continued)	Achievement of PMLU to Stable Condition (grazing)	1	<p>Non-polluting:</p> <ul style="list-style-type: none"> <li>Hydrocarbon, heavy metal or other contamination levels are within relevant DES limits.</li> <li>Receiving water system water quality monitoring results comply with EA EPML00900113 or are comparable with upstream values, for a period of at least two years.</li> </ul>	(as above)
RM10	Achievement of PMLU to Stable Condition (grazing with native vegetation)	2 & 3	<p>Safe:</p> <ul style="list-style-type: none"> <li>Certification that slopes are safe, and predicted to remain safe.</li> <li>Certification that specified cover thickness has been obtained.</li> <li>Evidence that any site contamination has been resolved and relevant measures implemented, resulting in removal of the site from the Environmental Management Register (if required).</li> <li>Receiving water system water quality monitoring results comply with EA EPML00900113 or are comparable with upstream values, for a period of at least two years.</li> <li>Measures for fire reduction in place.</li> </ul> <p>Stable:</p> <ul style="list-style-type: none"> <li>Site has remained stable when comparing photographs from successive monitoring events, for a period of at least five years post-mining.</li> <li>Limited active erosion, similar to the levels present in reference sites.</li> <li>Erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.</li> <li>Evidence of effective pest management with pest species abundance being comparable to vegetation reference sites.</li> <li>Evidence of effective weed management with weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.</li> <li>Persistent groundcover greater than or equal to 70% established at land suitability classes 3 to 4, and at least 50% at land suitability class 5.</li> </ul>	Up to 20 years

**Table 13 (Continued)**  
**Rehabilitation Milestones and Criteria for Rehabilitation Areas**

Milestone Reference	Rehabilitation Milestone	Revegetation Scenario	Milestone Criteria	Approximate Timeframe
RM10 (continued)	Achievement of PMLU to Stable Condition (grazing with native vegetation)	2 & 3	<p>Self-sustaining land use:</p> <ul style="list-style-type: none"> <li>Stocking rates in rehabilitated pasture areas are comparable to designated reference sites and are managed to prevent overgrazing.</li> <li>Salinity levels of less than 0.6 dS/m in soil root zone or less than 110% of comparable reference sites.</li> <li>Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.</li> <li>Litter density comparable to vegetation reference sites.</li> <li>Pasture grass species are comparable to designated reference sites.</li> <li>Pasture grass species show evidence of seed set, germination and emergence.</li> <li>Tree and shrub species comparable to designated reference sites.</li> <li>Tree and shrub species show evidence of flowering, viable seed setting, germination and emergence.</li> </ul>	(as above)
			<p>Non-polluting:</p> <ul style="list-style-type: none"> <li>Hydrocarbon, heavy metal or other contamination levels are within relevant DES limits.</li> <li>Receiving water system water quality monitoring results comply with EA EPML00900113 or are comparable with upstream values, for a period of at least two years.</li> </ul>	
RM11	Retained Water Structures	1, 2 & 3	<ul style="list-style-type: none"> <li>Water quality monitoring results indicate water quality suitable for intended PMLU (i.e. grazing).</li> <li>Certification of structural integrity.</li> </ul>	2 years

**Table 14**  
**Management Milestones and Criteria for Improvement Areas**

Milestone Reference	Management Milestone	Milestone Criteria	Approximate Timeframe
MM1	Highwall treatment	<ul style="list-style-type: none"> <li>Highwall treatment (e.g. benched or blasted) undertaken.</li> <li>Safety assessment conducted.</li> <li>Highwall design confirmed consistent with EA EPML00900113 requirements.</li> <li>Geotechnical stability of the final void walls has been achieved and geotechnical investigations demonstrating this have been undertaken and reported.</li> </ul>	2 years
MM2	Surface Conditions	<ul style="list-style-type: none"> <li>Access is prohibited to final voids by a bund wall with a minimum height of 2 m, a minimum base width of 4 m and be located at least 10 m beyond the area potentially affected by any instability of the pit edge or a fence.</li> <li>Appropriate signage placed.</li> </ul>	6 months
MM3	Achievement of Sufficient Improvement	<p>Safe:</p> <ul style="list-style-type: none"> <li>Bund wall remains in place.</li> <li>Appropriate signage remains in place.</li> </ul> <p>Stable:</p> <ul style="list-style-type: none"> <li>Final voids remain structurally stable, with no maintenance requirements and are predicted to remain stable.</li> </ul> <p>Non-polluting:</p> <ul style="list-style-type: none"> <li>Receiving water system water quality monitoring results comply with EA EPML00900113 or are comparable with upstream values, for a period of at least two years.</li> <li>Review of final void water recovery confirms the void is predicted to act as a long-term groundwater sink.</li> </ul>	2 years

### 3.5.2 Rehabilitation Area Commencement Dates

Syntech is committed to commencing rehabilitation in each of the Rehabilitation Areas progressively, as land becomes available. An overview of the anticipated commencement dates, and justification of these dates, is provided in Table 15. Rehabilitation areas are shown on Figure 22.

### 3.5.3 General Rehabilitation Practices

The following sub-sections outline the information that is necessary to underpin the development of the rehabilitation and management methodologies for the existing CDM.

#### 3.5.3.1 Hydrogeology

##### **Groundwater Occurrence**

As described in Section 3.1.2.3, the stratigraphic units occurring within the CDM area and immediate surrounds, from youngest to oldest, including corresponding hydrogeological systems are (Figure 3):

- Quaternary / Tertiary (unconsolidated alluvial sediments) – ephemeral groundwater where present.
- Late Jurassic (Springbok Sandstone [i.e. lowermost unit of the Kumbarilla Beds]) – unsaturated in the CDM area.
- Middle Jurassic (Walloon Coal Measures) – confined aquifer associated with coal seams between overburden/interburden aquitards.
- Early/Middle Jurassic (Hutton Sandstone and Precipice Sandstone) – confined aquifers at depth.

The main productive aquifers present include the Precipice Sandstone, Hutton Sandstone, and Springbok Sandstone. Regionally, these aquifers are used extensively for stock and domestic and stock intensive water supply due to being laterally continuous, permeable, and containing significant storage (OGIA, 2016). However, in some areas, their hydraulic properties may be closer to the character of aquitards than aquifers (OGIA, 2016). The permeable units are separated by thick sequences of low permeability aquitards, confining the aquifers. Within the Project area, the main aquitards are the Evergreen Formation, the lower sequence of the Walloon Coal Measures, and the overburden separating the Springbok Sandstone and the coal seams of the Walloon Coal Measures.

##### **Groundwater Recharge and Discharge Locations**

Groundwater recharge to the Walloon Coal Measures is very low due to the relatively low annual rainfall and high evaporation rates, and the low permeability of overlying strata (Appendix C). Recharge occurs via direct rainfall where the unit outcrops and via seepage from overlying strata, and is assessed to be low (0.0 mm/year to 0.2 mm/year) as reported in the OGIA 2012 UWIR report (GHD, 2012). Plate 2 displays the conceptual groundwater model schematic for the CDM.

Airlift data from drilling in the area indicates the groundwater yields are between 0.6 L/s and 2.4 L/s, with a median yield of 1.2 L/s.

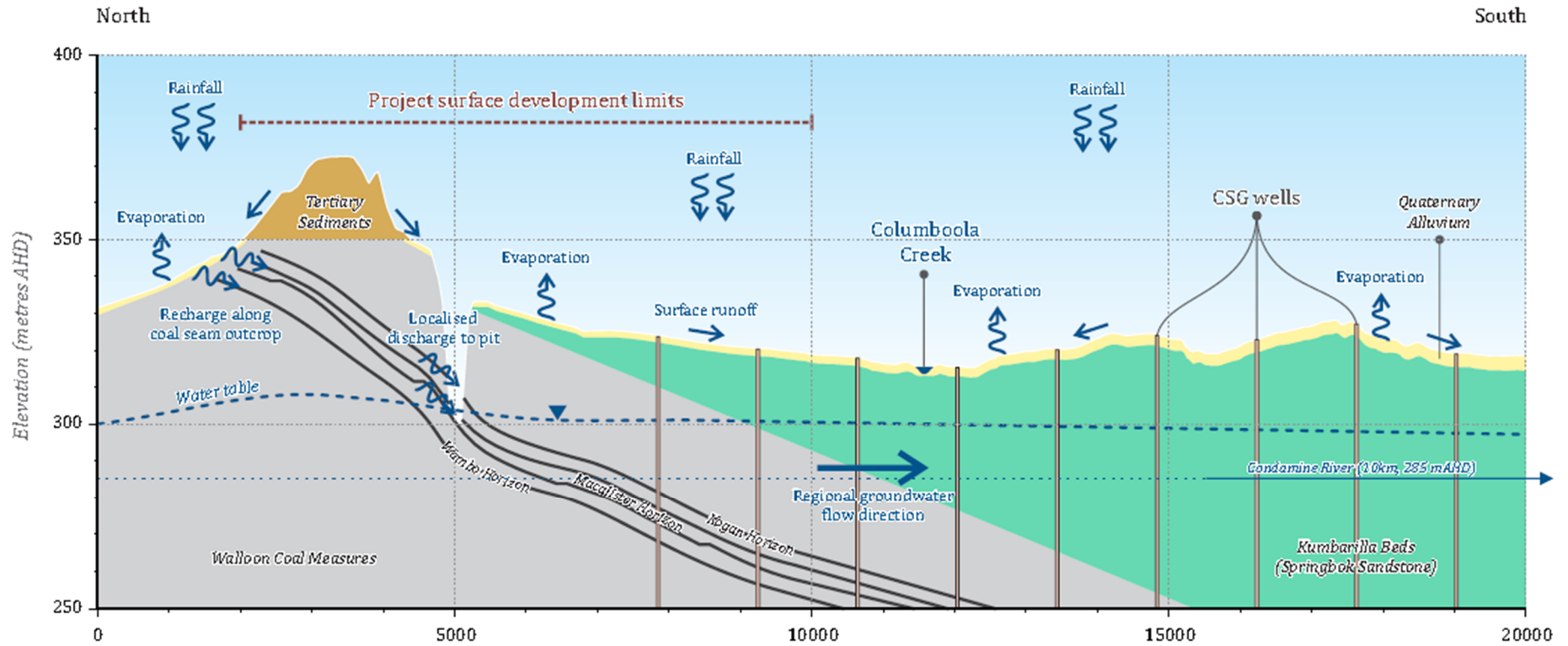
Recharge to the Great Artesian Basin (GAB) occurs via direct infiltration from rainfall along the outcrops and via seepage from streams or overlying strata. Groundwater in the GAB generally flows towards the south, southwest, and west at velocities of one to five millimetres per year (OGIA, 2016). Discharge occurs via springs, rivers, vertical leakage, subsurface flow into adjoining areas, and groundwater extraction across the basin.

**Table 15**  
**Rehabilitation Area Commencement Dates and Justification**

Rehabilitation Area	Relevant Activities	PMLU	Rehabilitation Commencement Date	Estimated Completion Date	Justification of Commencement Date
RA1	Pit 1, in-pit emplacement area	Grazing	Already commenced	2108	Initial rehabilitation activities have already commenced in Pit 1. As development of Pit 1 progresses, additional areas (including RA2) will become available for rehabilitation.
RA2		Grazing with Native Vegetation	Already commenced	2123	
RA3	Pit 2, in-pit emplacement area	Grazing	2053	2108	Disturbance in Pit 2 is anticipated to commence in approximately 2046, with development of the secondary boxcut. Once the boxcut is completed, rehabilitation can be progressed. This rehabilitation area will become available as the active mining face progresses through Pit 2.
RA4		Grazing with Native Vegetation	2055	2123	
RA5	Pit 3, in-pit emplacement area	Grazing	2067	2113	Disturbance in Pit 3 is anticipated to commence in approximately 2066, with development of the secondary boxcut. Once the boxcut is completed, rehabilitation can be progressed.
RA6		Grazing with Native Vegetation	2067	2123	
RA7	Out-of-pit waste rock emplacement areas	Grazing	2023	2086	Out-of-pit waste rock emplacement areas will become available progressively over the life of the mine. The out-of-pit waste rock emplacement areas will be active during the excavation of the boxcut for each pit and two additional out-of-pit emplacement areas will be utilised at the end of mining.
RA8		Grazing with Native Vegetation	2023	2123	
RA9	Pit 1, in-pit rejects emplacement areas	Grazing	2040	2118	In-pit rejects emplacement areas will be constructed and operated throughout the life of the mine. Rehabilitation activities will be undertaken progressively as operations in these areas are completed.
RA10	Out-of-pit rejects emplacement areas	Grazing	2033	2066	The out-of-pit rejects emplacement areas are intended to be used while the in-pit rejects emplacement areas are developed. Once the in-pit rejects emplacement areas have been developed, rehabilitation of the out-of-pit rejects emplacement areas can be progressed.

**Table 15 (Continued)**  
**Rehabilitation Area Commencement Dates and Justification**

Rehabilitation Area	Relevant Activities	PMLU	Commencement Date	Estimated Completion Date	Justification of Commencement Date
RA11	Infrastructure areas	Grazing	Already commenced	2123	Infrastructure areas are typically anticipated to be required for the life of the mine. Some small areas of infrastructure adjacent to Pit 1 have already had rehabilitation commenced.
RA12		Grazing with Native Vegetation	2094	2123	
RA13	Water management infrastructure	Retained Water Management Infrastructure	2093	2123	Water management infrastructure will be required for the life of mining. As mining nears completion, Syntech will engage in further consultation with relevant stakeholders (e.g. landholders and DES) to confirm whether water management infrastructure is to be retained or should be rehabilitated.
RA14	Water diversions	Grazing with Riparian Suited Vegetation	Already commenced	2053	A small diversion around the rail loop has already been constructed and rehabilitation commenced. Construction of the diversion for Drainage Line 1 is scheduled to commence in 2022, with completion scheduled for 2023. Rehabilitation will be progressed subsequently.



Source: Figure 7.1 of AGE (2018).

Plate 2 – Conceptual Groundwater Model Schematic

The CDM is partially located in the mapped extent of the GAB groundwater recharge area of the Kumbarilla Beds. This unit outcrops in the north-western part of the CDM and subcrops below the Quaternary sediments. The Springbok Sandstone is generally unsaturated and does not form a significant aquifer in the vicinity of the CDM. The Hutton Sandstone is more than 500 mbGL in the vicinity of the CDM and is separated from the target coal seams by a thick sequence of sandstone, siltstone, mudstone, and coal.

### ***Groundwater Quality***

Groundwater quality is described in Section 3.1.2.5.

### ***Current and Potential Future Groundwater Uses***

The bore census conducted in 2017 (refer Section 3.1.2.5) identified there is no significant use of groundwater by landholders surrounding the CDM with the nearest water supply bore located approximately 6.5 km south of the ML boundary.

Other users in the area surrounding the CDM include CSG operations and other mining operations.

Given the availability and quality of groundwater in the area, it is expected that future groundwater uses would remain the same.

### ***Groundwater Flow Direction and Potentiometric Profile***

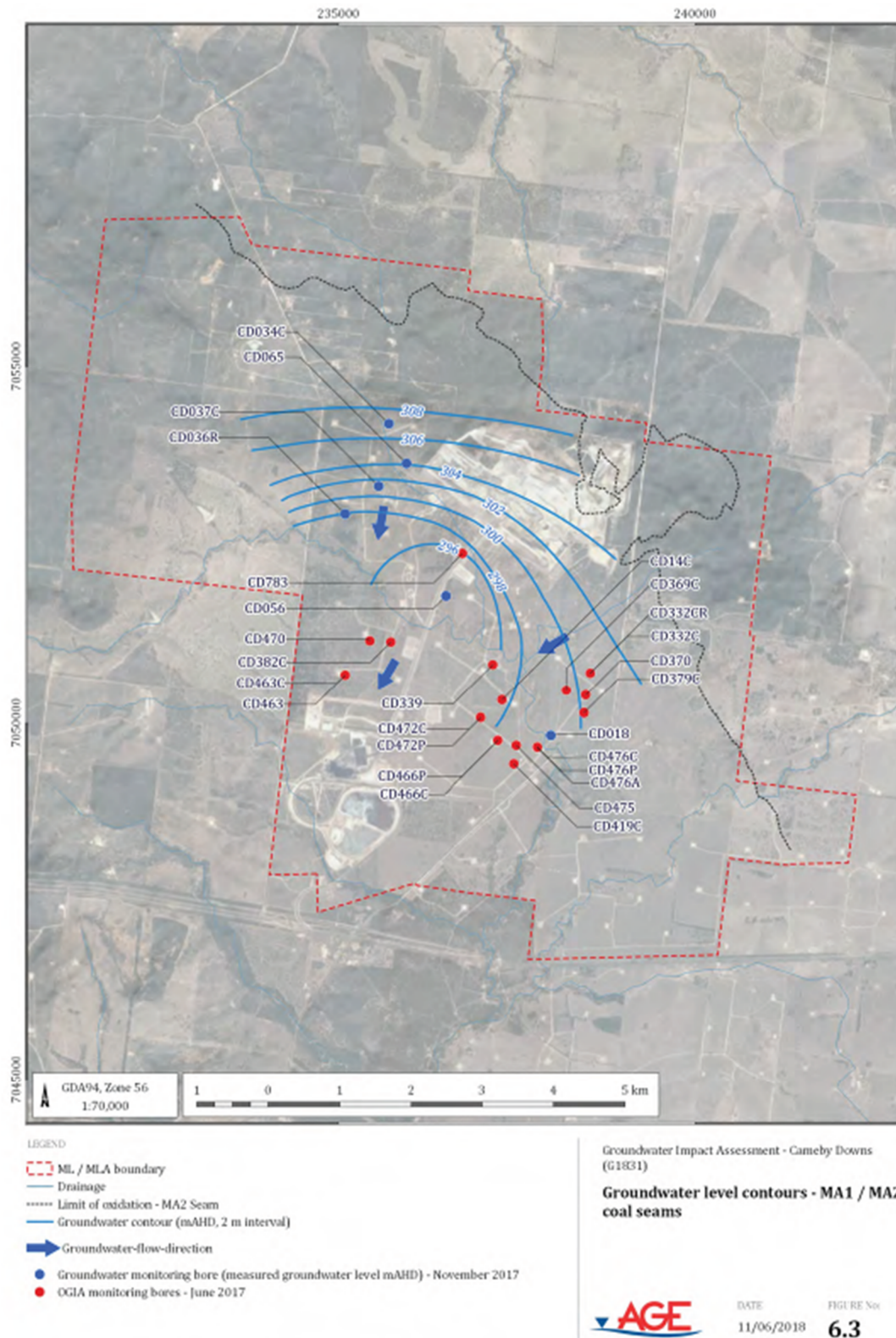
Plate 3 presents the potentiometric surface for the MA1 / MA2 coal seams. The regional groundwater flow direction in the coal seams is from north to south-southwest. The removal of associated water during CSG extraction is expected to have impacted the groundwater level and flow direction in the Walloon Coal Measures.

Groundwater flow in the vicinity of the CDM is towards the southwest, which is down dip within the Walloon Coal Measures and most likely a function of CSG extraction.

The main water bearing units of the Walloon Coal Measures are the coal seams which comprise approximately 10% of the total thickness of the unit (OGIA, 2016). Hydraulic conductivity within the Walloon Coal Measures is generally associated with secondary porosity through fractures, and cleats within the coal seams.

AGE (2006) completed in-situ permeability tests on six monitoring bores at the CDM. The median hydraulic conductivity for the MA1 / MA2 coal seams is 0.16 m/day which is representative of shallow coal seams in the region. The coal seams will have a higher hydraulic conductivity compared to the interburden due to flow via fracturing and cleats within the coal. The hydraulic conductivity data observed at the CDM is comparable to that published by OGIA (2016).

Hydraulic testing at other mines in the area indicate the hydraulic conductivity of the interburden is approximately 0.009 m/day, several orders of magnitude lower compared to the coal seams (AGE, 2013).



Source: Figure 6.3 of AGE (2018).

**Plate 3 – Groundwater Level Contours**

### **Groundwater Modelling**

As described in Section 3.1.2, a comprehensive Groundwater Assessment (Appendix C) was completed for the Continued Operations Project EVA (Syntech, 2018). As part of this Groundwater Assessment, a 3D numerical groundwater flow model was developed for the Project based on historic models developed for the approved operations at the Cameby Downs Mine. The peer review of the Groundwater Assessment (Dundon Consulting Pty Limited, 2018) concluded the model had an appropriate level of complexity, was generally in accordance with the Australian Groundwater Modelling Guidelines (Barnett et al., 2012) and the groundwater impact assessment was ‘fit-for-purpose’.

It is noted that there have been no significant changes to the approved operation since the Groundwater Assessment (Appendix C) was prepared for the Continued Operations Project.

In relation to contaminant transport and potential changes to groundwater levels from dewatering or waste storage, the key conclusions from the Groundwater Assessment (Appendix C), were:

- The depressurised zone in the Walloon Coal Measures is predicted to extend up to approximately 5 km towards the south-west of the CDM.
- Cumulative impacts in the region extend across much of the model domain, and are solely due to impacts from CSG development, which partially overlaps with the CDM. Logically, the drawdown that is attributable to the CDM is adjacent to the open cut pits, with the influence reducing with distance. As such, the groundwater modelling indicates the CDM will only add a small to moderate ‘water take’ that is predicted to be comparatively low compared to the already approved impacts from CSG operations.
- The groundwater modelling predicts the final pit voids would act as long-term groundwater sinks post-mining, with pit void water levels expected to recover to a quasi-equilibrium level that is between approximately 20 m to 25 m below the pre-mining groundwater levels.
- Evaporation from the void lake surfaces will maintain a water level below the surrounding aquifer water levels, forming a groundwater sink in the local environment. Evaporation from the lake surfaces will also slowly concentrate salts in the pit lake over time. The increasing salinity will not pose a risk to other aquifers and surface water features as the final void will remain a permanent sink.
- Although the majority of overburden would be non-acid forming material, some carbonaceous units in the overburden may have a capacity to generate acid. Overburden will continue to be placed within the open cut pits and progressively rehabilitated during mining. Groundwater will be drawn in from the surrounding geological units (and backfilled mine areas) towards the voids.
- Coal rejects will be managed to control formation and release of acid drainage. Additionally, it is anticipated that placement of coarse and fine reject materials hydraulically up-gradient of the final void will result in any seepage from the emplaced rejects reporting to the final voids. As the final voids are predicted to become sinks, any resultant seepage from the emplaced rejects will be captured and contained within the final voids.
- The fine rejects within the Central Pit (Pit 1) void will reach a relative level (RL) of approximately 301 m. The void will then be infilled and rehabilitated to a final surface level of approximately 330 mAHD. As the fine rejects level of 301 mAHD is less than the pre-mining groundwater level of 305 mAHD, any infiltration of water that comes into contact with the buried rejects is expected to remain within the void and is not expected to impact on the groundwater quality of the regional groundwater system.
- There is limited potential for groundwater contamination to occur as a result of hydrocarbon and chemical contamination.

Based on the above, contaminant transport modelling is not considered necessary as the potential for significant groundwater contamination is low.

### 3.5.3.2 Flooding

WRM (Appendix B) completed hydrologic and hydraulic modelling of local catchments to:

- assess the existing and proposed flood behaviour at the Cameby Downs Mine and surrounds at the completion of the Project;
- assist in the development of conceptual designs for clean water drains and drainage features diversions; and
- assess the conceptual design of flood protection measures for the open cut pits and mine infrastructure, including final landforms.

The XP-RAFTS runoff-routing model was used to estimate design flood discharges for the drainage features across the CDM and surrounds. A two-dimensional hydraulic model (TUFLOW) was also used to investigate the flood behaviour for the mine stages as follows:

- Existing Conditions (Stage 0);
- Year 29 (Stage 1);
- Year 48 (Stage 2);
- Year 75 (Stage 3); and
- End of Mine.

A range of average recurrence interval (ARI) flood events were modelled including:

- 2-year ARI – to assess the behaviour of the proposed diversion of Drainage Line 1;
- 50-year ARI – to assess the behaviour of the proposed diversion of Drainage Line 1;
- 100-year ARI – to assess the mine infrastructure flood immunity and potential flood impacts of the Project; and
- 1,000-year ARI – to assess the open cut pit flood immunity.

A PMF event was also modelled to assess the final void flood immunity at the end of mine.

The flood modelling results indicate that with the proposed flood management measures (i.e. operational flood levees and drainage line diversion), the open cut pits, and the mine infrastructure area would be protected and would not be inundated for all mine stages for the 100-year ARI and 1,000-year ARI flood events, respectively.

Other key conclusions made from the results of the flood modelling on nearby infrastructure (i.e. Warrego Highway and Western Railway) are as follows:

- comparisons with the existing condition modelling show there would be no impact to the flood immunity at the drainage features crossings of the Warrego Highway and Western Railway;
- the Western Railway will continue to have a 100-year ARI flood immunity at both Drainage Line 1 and Drainage Line 3 crossings;
- flood velocities for the 100-year ARI event along the Western Railway embankment are generally less than 1 metres per second (m/s) outside of drainage feature crossings (i.e. no impact); and
- the peak 100-year ARI flood velocities are generally similar along Drainage Line 1 and Drainage Line 3 (i.e. negligible change).

Based on the final landform designs, with the operational flood levees removed, the flood modelling demonstrates that the two final voids are beyond the predicted 1,000-year ARI flood and PMF event extents for the local drainages (Appendix B).

For comparison purposes, the remaining two final voids are also located beyond the Queensland Floodplain Assessment Overlay extents (Appendix B).

The toe of the out-of-pit waste rock emplacements adjacent Drainage Line 1 would be treated with an erosion resistant material to maintain its stability in the event of 1,000-year ARI and PMF floodwater interaction.

Based on the above, the final landform design has a low flood risk profile.

### 3.5.3.3 Soil and Capping Material Assessment

#### **Quantity of Available Resources**

LRS Environmental (Appendix G) has completed a preliminary material inventory to determine the quantity of topsoil available for rehabilitation at the CDM. The results of these calculations are summarised in Table 16 and indicate that there would be sufficient topsoil available on-site to meet the requirements of the rehabilitation concepts.

**Table 16  
Estimated Soil Resources Available and Required**

Soil Type	Stripping Depth (mm)	Volume Available (m <sup>3</sup> )	Volume Required (m <sup>3</sup> )
Soil Stockpiled as at May 2018	-	549,500	-
Binkey and Braemar Soil Units	200	8,713,820	8,500,000
Tara Soil Unit	400	2,015,280	1,800,000

Source: Appendix G.

Other materials required for rehabilitation (e.g. competent rock) are also available on-site.

#### **Ameliorants and Fertilisers**

Prior to commencement of topsoiling works, adequate sampling is to be undertaken to ensure the soil pH is within the specified range. Dependent upon soil results, additional nutrients may need to be added to the fertilising process.

Existing data indicates that available topsoil materials are suitable for use in rehabilitation, but are deficient in key plant nutrients. If nutrient deficiencies are not corrected, the rehabilitation would – over the long term – be constrained to a very low level of plant growth and productivity, and to greatly increased erosion risk.

For rehabilitation works to achieve a high level of surface cover, and for that cover to be sustainable, the topsoil needs to be amended to:

- alleviate sodicity;
- increase total nutrient contents;

- establish an organic pool of nutrients; and
- improve soil structure.

In terms of nutrient shortfalls in the topsoil, target levels (concentrations) for the topsoil for N and P (the elements of greatest concern and likely cost) are:

- Total N: 1,500 mg/kg.
- Total P: 200 mg/kg.

Based on average Total N and Total P in the topsoils of 913 mg/kg and 71 mg/kg respectively, increases of 600 mg/kg in Total N and 130 mg/kg in Total P in the 0-100 mm layer would be required to bring soil levels to the boundary between "low" and "medium" as specified in Bruce and Rayment (1982). It is not possible to achieve these increases using a single application of soluble fertilisers without significant impacts on plant growth. Therefore, nitrogen and phosphorus additions will be achieved through a staged fertiliser application program and/or with a combination of soluble fertilisers and manure applications (e.g. piggery or feedlot compost).

There are a range of other advantages from the compost addition, including addition of trace elements, increased soil organic carbon, improved soil structure, and more sustainable soil fertility.

### **Surface Preparation Process**

Rehabilitation will be undertaken progressively as the CDM expands. The sequence of works is generally:

1. Rip waste rock material to a minimum of 300 mm using grader tyres or equivalent.
2. Spread topsoil to a minimum depth of 100 mm and maximum of 200 mm (based on topsoil availability).
3. Spread gypsum, chemical fertiliser, and compost (as required).
4. Use a two-way disc plough, or similar, to till to 100 mm depth to mix and incorporate soil ameliorants (but not deep enough to bring waste rock material to the surface).
5. Apply seed and till on the contour with a tyned implement with tyne spacing no greater than 0.5 m.

Prior to commencement of topsoiling works, adequate sampling will be undertaken to check the soil pH is within the specified range. Dependent upon soil results, additional nutrients (e.g. chemical fertiliser or compost) may need to be added to the fertilising process.

Topsoiling shall occur immediately after re-contouring to enable sufficient bonding between the topsoil and waste rock emplacements and no more than three months prior to ripping/seeding. This optimises plant growth before organic matter and nutrients in the topsoil begins to decay. The topsoil will be re-spread to a minimum thickness of 100 mm and maximum of 200 mm (based on topsoil availability), with emplacement area top and batters to be contour ripped to approximately 0.5 m spacing.

### **General Soil Management Measures**

Specific measures that would be implemented to manage soil resources include:

- Areas of disturbance would be stripped progressively, as required, to reduce potential erosion and sediment generation, and to minimise the extent of topsoil stockpiles and the period of soil storage.
- Areas of disturbance to be stripped would be clearly defined so the dozer operator clearly understands the boundaries of the area to be stripped.

- During the topsoil stripping:
  - visual inspections would be conducted to confirm that appropriate soil stripping depth is being recovered; and
  - small areas (e.g. 1 m by 1 m) would be left unstripped at approximate 100 m intervals to allow to confirm stripping depth, record soil profile observations and collect soil sample for analysis.
- Topsoil would be placed directly on completed sections of the final landform or placed in topsoil stockpiles.
- The perimeter of topsoil stockpiles would be marked and appropriately signed.
- The topsoil stockpile locations and volume would be surveyed for inclusion in the topsoil inventory.

Any long-term soil stockpiles would be managed to maintain long-term soil viability through the implementation of the following management practices as listed below:

- Topsoil stockpiles would be retained at a maximum height of 3 m and would not be double stacked to avoid compaction and damage to the topsoil.
- Topsoil stockpiles would be constructed to minimise erosion (e.g. roughened surface maintained), encourage drainage, and promote revegetation.
- Wherever practicable, soil stockpiles would not be trafficked, deep ripped or removed in wet conditions to avoid breakdown in soil structure.
- All topsoil stockpiles would be protected with a non-persistent cover crop to reduce erosion potential as soon as practicable after completion of stockpiling.
- Soil stockpiles would be located in positions to avoid surface water flows. Silt stop fencing would be placed immediately down-slope of stockpiles until stable vegetation cover is established.
- An inventory of soil resources (available and stripped) would be maintained and regularly reconciled with rehabilitation requirements.

#### 3.5.3.4 Waste Characterisation

Detailed geochemical investigations (including static and kinetic net acid generation [NAG] testing) have been undertaken on drill-hole interval samples representing the different material types and lithologies present at the CDM in 2007, 2010 and 2012. Additional to these investigations, a number of deposited and discharge tailings samples, collected from 2019 and 2020, have been assessed for their geochemical characteristics (including static and kinetic NAG testing). These assessments have been undertaken to determine the salinity, sodicity, acid forming characteristics, and metal enrichment and solubility risks associated with the different mining waste materials, including the overburden and interburden waste rock, coarse rejects and tailings (fine rejects) at the CDM.

These are summarised below and further detail on the waste characterisation undertaken to date for the CDM is provided in Appendix J.

Syntech will continue to test and characterise waste samples from the CDM.

### **Overburden and Interburden Characterisation**

The geochemical characteristics of the overburden and interburden waste rock have been assessed according to the following lithological groupings (GEM, 2021):

- general sedimentary rocks (including the sandstone, siltstone, and claystone);
- carbonaceous material and mudstone; and
- alluvials and soils (including clays, sands, laterites and soils).

These test results indicate that (GEM, 2021):

- The overburden and interburden are typically expected to have low salinity and sodicity, although some of these materials are expected to have moderate to high salinity and/or moderate to high sodicity.
- The general sedimentary rocks, including the sandstone, siltstone and claystone, and the alluvials and soils, including the clays, sands, laterites and soils, are typically expected to be non-acid forming (NAF) and the majority of these materials are expected to be relatively barren in terms of acid generation and neutralisation.
- A proportion of the carbonaceous materials and mudstone is expected to be potentially acid forming (PAF) due to an increase in the reactive sulfide content. However, any PAF materials are expected to have a low capacity to generate acid (PAF-LC) with an expected acid generation capacity of less than or equal to 5 kg H<sub>2</sub>SO<sub>4</sub>/t.
- The overburden and interburden is expected to be slightly enriched with arsenic and significantly enriched with selenium, and due to this, relatively high concentrations of dissolved selenium can be expected to flush from the waste rock when it is initially exposed to atmospheric weathering processes.

The overburden and interburden excavated as waste rock, is either dozer pushed into the in-pit waste rock emplacements or loaded into trucks for hauling to dedicated out-of-pit waste rock emplacements. The weathered material is typically removed without blasting, but the more competent material requires drilling and blasting (GEM, 2021).

GEM (Appendix J) provided the following recommendations for management of the overburden and interburden waste rock:

- The bulk of the overburden and interburden, comprising all of the materials apart from the carbonaceous materials and mudstone, does not require selective handling for placement within the in-pit waste rock emplacements. However, due to the risk of acid generation within the carbonaceous material and mudstone, this material will be treated as the coarse reject material and encapsulated within the waste rock emplacements in order to isolate it from atmospheric oxidation.
- It is expected that blending of any minor amount of PAF or PAF-LC material that may occur within the general sedimentary overburden and interburden (i.e. sandstone, siltstone, claystone) during active disposal will produce an overall NAF material and therefore the waste rock will not require any specific handling during excavation and disposal.
- Due to the risk that some of the waste rock may be saline or sodic, this material will be assessed for its salinity and sodicity prior to being used for any on-site earthworks or construction, or prior to undertaking rehabilitation to ensure appropriate ameliorants are applied.

Syntech will implement these recommended measures at the CDM.

### ***Coarse Rejects Characterisation***

Coarse reject materials are expected to be moderately saline and to contain PAF materials. Similar to the waste rock material, the coarse rejects are expected to contain enriched arsenic and selenium and of these, selenium is likely to be readily flushed from this material if it is left exposed to surface processes (GEM, 2021).

The coarse rejects were initially co-disposed with the fine rejects (tailings) in the out-of-pit coal rejects emplacement known as Tailings Storage Facility 1 (TSF1) (Figure 2). However, this ceased early in 2017, when in-pit disposal of the coarse rejects commenced, encapsulating the dry rejects within the waste rock (GEM, 2021).

The disposal of the coarse rejects is conducted as outlined in the Rejects Management Concept Study (Engeny, 2018) (Appendix I). Progressive rehabilitation, surface drainage and mining dump methods are used to minimise exposure of the coarse rejects to atmospheric oxygen in order to reduce the risk of developing acid conditions. As the in-pit waste rock emplacement progresses, the benches are graded such that any surface water overflow is directed toward the pit until either rehabilitation has been progressed or the reject material has been over-dumped with waste rock (Appendix I).

GEM (Appendix J) provided the following additional recommendation for management of the coarse rejects:

- For optimum geochemical security the coarse rejects will be encapsulated, as soon as practical, in order to reduce the exposure to atmospheric oxidation, with a minimum of 5 m of NAF waste rock. If an insufficient quantity of NAF capping material or space (height) is available for a minimum 5 m cap, compaction of the capping material may be required to ensure that oxygen diffusion is adequately reduced to minimise the risk of sulfide oxidation and acid generation.
- NAF waste rock or other identified capping materials (e.g. clay) will be compacted with suitable oxygen diffusion control properties in order to reduce the minimum encapsulation thickness required.

These recommendations will be implemented by Syntech for the CDM.

### ***Tailings Characterisation***

The tailings are likely to be moderately to highly saline and either NAF or PAF-LC. The PAF-LC tailings are expected to have a geochemical lag period exceeding six months of exposure prior to developing acid conditions. The tailings are also expected to be enriched with arsenic and selenium and the selenium is expected to be readily flushed from the deposited tailing under the quasi-neutral pH conditions. A number of environmentally significant metals are likely to become soluble if low or acidic pH values are allowed to develop in the deposited tailings (GEM, 2021).

As the tailings have been identified as having a risk of being PAF, they have been managed to minimise their exposure to atmospheric oxidation during active disposal and post-closure, as documented in the Rejects Management Concept Study (Engeny, 2018).

Tailings storage facility design and management are described further in Section 3.5.4.

### 3.5.3.5 Landform Design

As described in Section 3.1.3, the final landform at the CDM is already approved. Key features of the approved CDM final landform include:

- eight out-of-pit waste rock emplacements;
- in-pit waste rock emplacements (backfilled voids) including in-pit disposal of coal rejects;
- two out-of-pit coal rejects emplacement;
- two final voids; and
- rehabilitated infrastructure areas (including water management areas, unless retained).

The final landform (including surface elevation contours [i.e. three dimensional designs]) is presented on Figure 21.

Syntech engaged Landloch Pty Ltd (Landloch) to assess the designs for out-of-pit landforms at the CDM, including modelling of the landforms for runoff erosion stability.

In considering landform design, Landloch (2016; Appendix M) applied the following strategy:

- Use the Water Erosion Prediction Program (WEPP) (Flanagan and Livingston, 1995) model to consider runoff and erosion from a range of landform and rehabilitation options.
- Generate time series data from WEPP to then derive parameters for the SIBERIA landform evolution model.
- Run SIBERIA for 3-dimensional landforms to consider impacts of potential flow concentrations and of changes in landform profile through time.

A 100-year climate file for the Miles area was prepared, and WEPP was used to assess runoff and erosion from landform batter profiles with varying levels of surface vegetative cover.

Landloch (Appendix M) concluded that, based on the data obtained and the results of the erosion simulations, the current landforms can be expected to deliver suitable rehabilitation outcomes. The runoff/erosion simulations showed that establishment of a sufficient and sustainable vegetation cover is critical for landform stability.

Further detail on each of the key features of the approved CDM final landform is provided below.

#### ***Out-of-pit Waste Rock Emplacements***

During the excavation of the boxcuts, waste rock is loaded into haul trucks for hauling to out-of-pit waste rock emplacements. Once sufficient space is available behind the active face, waste rock material is placed in-pit behind the active workings to minimise surface disturbance associated with the out-of-pit waste rock emplacements. When the out-of-pit waste rock emplacements are no longer required (i.e. once in-pit emplacement resumes), progressive rehabilitation will be commenced to minimise the time and disturbance associated with the out-of-pit waste rock emplacements.

Waste rock will also be placed in out-of-pit waste rock emplacements in selected areas around the final voids so that the rehabilitated final landform provides flood immunity for the final voids up to the PMF. The final landform design is shown on Figure 21.

The final elevations of the out-of-pit waste rock emplacements will range from approximately 35 m to 45 m above natural ground level. The out-of-pit waste rock emplacements will be contoured to form an extension of the in-pit waste rock emplacements and be free-draining away from the backfilled open cut, where practicable.

The outer slope of the out-of-pit waste rock emplacement will be re-contoured to a slope of approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used. The toe of the out-of-pit waste rock emplacements adjacent Drainage Line 1 will be treated with an erosion resistant material to maintain its stability in the event of 1,000-year ARI and PMF floodwater interaction (Figure 21).

The landform will then be topsoiled and seeded with grass and shrub species. Revegetation management is discussed further in Section 3.5.3.8.

### ***In-pit Waste Rock Emplacements (Backfilled Voids)***

Once sufficient space is available behind the active face, waste rock material is placed in-pit behind the active workings to minimise surface disturbance associated with out-of-pit waste rock emplacements and to also minimise the size of the final voids. Rehabilitation of the in-pit waste rock emplacements will progressively follow the active mining face, thereby minimising the area of active disturbance at any given time.

Coal rejects will also be disposed of in the in-pit waste rock emplacements (i.e. the IWL). The in-pit coal rejects emplacements will be located a minimum of 10 m below the final landform surface elevation to allow for sufficient depth for capping and rehabilitation, however may be located at deeper elevations within the overburden material (Appendix I). Once the in-pit coal rejects emplacements have reached capacity, they will be allowed to settle and will then be rehabilitated once stable.

In addition, the Central Void (once available) will contain the majority of the fine rejects produced. The fine rejects within the void will reach approximately 301 mAHD. The void will then be infilled and rehabilitated to a final surface level of approximately 330 mAHD. Rehabilitation of the surface will then be undertaken consistent with other in-pit waste rock emplacements.

Additional detail on the design, operation and rehabilitation of the IWL cells is provided in the Reject Management Concept Study (Appendix I).

The final elevations of the in-pit emplacements will range from approximately 320 mAHD in the south-east to approximately 365 mAHD in the north-west.

The approach to rehabilitation described above minimises the active disturbance associated with in-pit waste rock emplacements across the site. Once capped, the landform will then be topsoiled and seeded with grass and shrub species. Revegetation management is discussed further in Section 3.5.3.8.

### ***Out-of-pit Coal Rejects Emplacements***

Fine rejects are either pumped to out-of-pit coal rejects emplacements (TSF 1 and 2) or placed in the in-pit coal rejects emplacements (including the Central Void, once available). Rehabilitation of the out-of-pit coal rejects emplacements will commence when the IWL cells in the pit are available for use and the rejects material has settled.

The rehabilitated outer slope of the out-of-pit coal rejects emplacements will have a slope of approximately 1V:10H. Once ready for rehabilitation, the out-of-pit coal rejects emplacements will be covered with a 0.5 m layer of competent material followed by a 0.5 m layer of compacted non-sodic clay creating a stable landform ready for final profiling, topsoiling (0.1 to 0.2 m layer) and revegetation (seeded with grass and shrub species). Revegetation management is discussed further in Section 3.5.3.8.

Additional detail on the design and rehabilitation of the out-of-pit coal reject emplacements is provided in the Rejects Management Concept Study (Appendix I).

### ***Final Voids***

The approved CDM final landform includes two final voids (Figure 21). Further detail on the final voids is provided in Section 3.5.5.

The approved final landform design plans and sections for the two final voids post-mining which provide flood immunity for the post-mining final voids are shown on Figure 21.

The conceptual designs for the approved final landforms (including erosion protection) are shown on Figure 21.

The flood modelling demonstrates that the final voids are beyond the predicted 1,000-year ARI flood and PMF event extents for the local drainages (Appendix B).

### ***Infrastructure***

This domain is dominated by the infrastructure associated with the existing mine infrastructure area. The infrastructure domain includes, but is not limited to:

- CHPP;
- ROM coal and product stockpiles;
- train loadout and rail loop;
- workshops, stores, administration buildings, toilet complexes, vehicle wash bays, control room and coal testing laboratory, diesel fuel storage area;
- access roads and haul roads;
- electrical supply infrastructure; and
- water management features including water storages, sediment control structures, diversions and operational flood levees.

Due to the nature of the infrastructure, rehabilitation of significant areas is unlikely to be able to be undertaken progressively as the majority of the disturbance associated with this domain will be required for the life of the Project. Notwithstanding, disturbance associated with infrastructure is minimised and will be progressively rehabilitated where possible.

### ***Water Management Features***

Water storages and sediment control structures will either be retained as water sources for future land uses or decommissioned and rehabilitated. As with the infrastructure areas, water management features are required for the life of the Project and rehabilitation of significant areas is unlikely to be able to be undertaken progressively due to ongoing need. Notwithstanding, where water storages and sediment control structures are no longer required (for mining or future land uses) they will be decommissioned and rehabilitated at the earliest opportunity.

Temporary and permanent up-catchment diversion structures will be constructed over the life of the CDM to divert runoff from undisturbed areas around the open cut pits and waste rock emplacements.

The proposed drainage feature diversion for Drainage Line 1 has been designed and assessed using the Australian Coal Association Research Program (ACARP) stream diversion design criteria (Project C8030 – Maintenance of Geomorphic Processes in Bowen Basin River Diversions).

An objective of the proposed diversion of Drainage Line 1 is to provide a self-sustaining landform at the end of the mine life so that the diversion channel functions like a natural drainage similar to the hydraulic and geomorphic characteristics of the existing Drainage Line 1 channel.

Additional details on the conceptual design of the Drainage Line 1 diversion are provided in Appendix A.

At the completion of mining, the operational flood levees in the south and south-east will be removed or integrated with the approved final landforms where required to provide flood immunity up to the PMF.

### ***Quality Assurance/Quality Control Requirements***

Quality assurance measures and Environmental Quality Inspection Forms (EQIF) are used to ensure that works are completed to the specifications identified in this plan. At all stages of the rehabilitation program, EQIFs need to be completed and signed off by the relevant personnel prior to commencing the next stage of works.

Included in the EQIF process are 'Hold Points'. Hold points represent key steps in the rehabilitation process where signoff must be obtained from the nominated entities; this may include the Contractor Representative, CDM Project Managers, Environment Team and Field Supervisors. The EQIF documentation detailing the required hold points is attached for reference in the appendices at the back of this document.

EQIF hold points requiring sign-off are:

- Landform design approval.
- Landform and drainage construction approval.
- Seed selection.
- Ripping, seeding, and fertilising.

### ***Methodology to Verify the Success of the Final Landform Design***

Successful rehabilitation of the final landform will be assessed through the completion criteria and monitored following the program outlined in Section 3.7.

The certification process undertaken by DES will verify that the rehabilitation and final landform are successful prior to surrender of the EA.

### ***Limitations and Assumptions of the Landform Design***

The final landform design has the following limitations and assumptions:

- Simulations of landform evolution considered surfaces that were either bare, or had 50% or 70% vegetation cover.
- Simulations were run for a 200-year period.
- Simulations were developed using a 100-year climate sequence.

- Soil availability and quality are based on soil test sites located at an appropriate density.
- Waste characterisation is based on appropriately selected representative samples.
- Climate change projections (CSIRO, 2015) for the central slopes were adopted.

### 3.5.3.6 Cover Design

As described in Section 3.5.3.4, the waste characterisation test results indicate that appropriate cover design for each of the waste outputs is as follows (Appendix J):

- Overburden and interburden:
  - The bulk of the overburden and interburden, comprising all of the materials apart from the carbonaceous materials and mudstone, does not require selective handling for placement within the in-pit waste rock emplacements. However, due to the risk of acid generation within the carbonaceous material and mudstone, this material will be treated as the coarse reject material and encapsulated within the waste rock emplacements in order to isolate it from atmospheric oxidation.
  - It is expected that blending of any minor amount of PAF or PAF-LC material that may occur within the general sedimentary overburden and interburden (i.e. sandstone, siltstone, claystone) during active disposal will produce an overall NAF material and therefore the waste rock will not require any specific handling during excavation and disposal.
- Coarse rejects:
  - For optimum geochemical security the coarse rejects will be encapsulated, as soon as practical, in order to reduce the exposure to atmospheric oxidation, with a minimum of 5 m of NAF waste rock. If an insufficient quantity of NAF capping material or space (height) is available for a minimum 5 m cap, compaction of the capping material may be required to ensure that oxygen diffusion is adequately reduced to minimise the risk of sulfide oxidation and acid generation.
  - NAF waste rock or other identified capping materials (e.g. clay) will be compacted with suitable oxygen diffusion control properties in order to reduce the minimum encapsulation thickness required.
- Tailings (out-of-pit):
  - The out-of-pit coal rejects emplacements will be covered with a 0.5 m layer of competent material followed by a 0.5 m layer of compacted non-sodic clay.
- Tailings (in-pit IWL):
  - Prior to tailings disposal within the Central (Pit) Void, the tailings will be disposed within the IWL. The IWL will involve the construction of centrally located deposition cells within the Central Pit waste rock emplacement to hold the tailings. A minimum 100 m buffer will be maintained between each cell as the dump and the cells progress. Sub-aerial tailings deposition in thin layers incorporating secondary flocculation will be used to promote segregation, desiccation, drying and consolidation of the tailings, and the final surface of the filled cells below the final landform surface to allow a sufficient depth for capping and rehabilitation.
  - The IWL cells will include an engineered compacted surface which will consist of clay and geosynthetic liner, and as such there is minimal potential for seepage from cells. Sufficient freeboard will be provided to minimise the risk of uncontrolled discharge during high rainfall events, and diversion bunds constructed around the perimeter of the cells to prevent runoff from entering the cells during deposition.

- Tailings (in-pit Central Void):
  - At completion, the tailings within the Central (Pit) Void are expected to have a RL of 301 mAHD. The remaining void will then be infilled with waste rock material and rehabilitated to a final RL of approximately 330 mAHD in line with the post-mining land use rehabilitation objectives (Syntech, 2020).
  - Due to the expected salinity and occurrence of PAF material, the tailings in the Central Void will need to be covered with non-saline and NAF material as soon as practical once tailings deposition ceases within each cell in order to reduce the risk of developing saline and/or acid conditions, leading to potential saline and/or acid and metalliferous drainage.

### 3.5.3.7 Water Management

#### **Site Water Management System**

Site water management at the CDM is conducted in accordance with the CDM Water Management Plan (WMP) and EA EPML00900113. Water management at the CDM is based on the containment and re-use of water as well as the control of sediment that may be potentially carried with runoff from disturbed areas (e.g. runoff from waste rock emplacements and cleared areas). Runoff from undisturbed areas is separated from disturbed areas by up-catchment diversions and channels.

The objectives of the CDM water management system specifically seek to:

- protect the integrity of local and regional water sources;
- maintain separation between runoff from areas undisturbed by mining and water generated within active mining areas;
- design and manage the system to operate reliably throughout the life of the CDM in all seasonal conditions, including both extended wet and dry weather periods;
- provide sufficient storage capacity to store, treat and discharge runoff as required, including in extended wet weather periods;
- operate in accordance with EA EPML00900113; and
- provide a reliable source of water to meet the CDM requirements (e.g. dust suppression).

To meet these objectives, the site water management system will continue to be progressively developed over the life of the CDM. The existing/approved CDM water management system includes:

- water storages;
- in-pit water storage;
- out-of-pit rejects emplacement;
- site surface water drains and sediment dams;
- erosion and sediment control structures;
- five discharge points (EA EPML00900113) including automated upstream and downstream monitoring sites;
- up-catchment diversions and channels;
- seven operational flood levees;
- diversion of Drainage Line 1;
- supply of external water from CSG operators; and
- operation of a sewage treatment plant and associated irrigation system.

WRM (2018a) concluded that the CDM surface water management system was robust and had adequate storage capacity to manage surface water runoff contained on-site for a wide range of possible climatic conditions, including extended wet and dry periods. WRM (2018a) also concluded that the potential for an uncontrolled release to receiving waters from the sites water management system was very low (i.e. <1% annual exceedance probability).

### **Water Demand and Supply**

The CDM sources water subject to the following priority order:

- water supplied from pit dewatering (including any groundwater inflows);
- recycled process water recovered from the CHPP and reject streams;
- surface water runoff captured from disturbed areas and stored within the water management system; and
- external water supplied from CSG operators or other licensed external sources.

Syntech currently holds a specific Beneficial Use Approval (BUA) (under the *Waste Reduction and Recycling Act, 2011*) to source water from CSG operators to the CDM for use in the CHPP or for dust suppression. In November 2016, the BUA framework was replaced by an End of Waste (EOW) framework under the *Waste Reduction and Recycling Act, 2011*.

It is anticipated that this water supply will remain available to the CDM while CSG operations are conducted in the area (subject to obtaining a new EOW approval). If the supply becomes unavailable during the life of the CDM, an alternative external water supply from other CSG operations in the region, or potentially from licensed groundwater extraction, would be secured to provide a reliable make-up water source, where required.

WRM (2018a) concluded that the site is predicted to be a net consumer of water during the initial years and, over the long-term, a net producer of water. All water demands for the CDM will be met through a combination of on-site water sources, water recycled and re-used from the rejects dams and in-pit disposal areas, and water imported from the QGC Glen Eden Pond.

### **Contaminants That Pose a Risk to Environmental Values**

The following potential contaminants have been identified as posing a potential risk to environmental values of the receiving environment:

- sediments.
- selenium and arsenic;
- total dissolved solids; and
- hydrocarbons.

### **Source, Pathway and Fate of Contaminants**

Key potential sources of contaminants (post-rehabilitation) are:

- in-pit waste rock emplacements (including IWL cells and Central Void);
- out-of-pit rejects emplacements; and
- final voids.

Pathways for the potential contaminants to reach the receiving environment (e.g. water courses or the groundwater table) include overland flow (e.g. overtopping of the final voids) or infiltration/seepage (e.g. from out-of-pit rejects emplacements).

With regards to overland flow, once rehabilitation is completed, all runoff will be clean water as it will be from rehabilitated surfaces. Runoff within the final void catchments will be directed into the final voids by the safety bund, and will not flow to the receiving environment.

### ***Infiltration and Seepage Intervention and Collection Controls***

With regards to infiltration/seepage (Appendix I):

- The IWLs will be clay lined and as such there is minimal potential for seepage from each cell. Despite this, any potential seepage from the IWL cells would remain within the water management system as the IWL cells are located hydraulically up-gradient of the Central Void. Long term water balance modelling also concluded that the equilibrium volumes for the south-eastern final void will remain well below (by at least 20 metres) the pre-mining groundwater level and therefore the void will remain a localised sink and not impact on the groundwater quality of the regional groundwater system.
- As the fine rejects level of 301 mAHD (in the Central Void) is less than the pre-mining groundwater level of 305 mAHD, any infiltration of water that comes into contact with the buried rejects is expected to remain within the void and is not expected to impact on the groundwater quality of the regional groundwater system.
- RD1 and RD2 (if constructed) are classified as regulated structures and, as such, are required to be designed, constructed and operated in accordance with the CDM Environmental Authority. Regulated structures are inspected annually by a suitably qualified and experienced person at which time the condition, operation and water quality (including pH) of the structure is reviewed.
- Groundwater modelling predicts the final pit voids would act as long-term groundwater sinks post-mining, with pit void water levels expected to recover to a quasi-equilibrium level that is between approximately 20 m to 25 m below the pre-mining groundwater levels.
- Evaporation from the void lake surfaces will maintain a water level below the surrounding aquifer water levels, forming a groundwater sink in the local environment. Evaporation from the lake surfaces will also slowly concentrate salts in the pit lake over time. The increasing salinity will not pose a risk to other aquifers and surface water features as the final void will remain a permanent sink.

As described above, the final landform has been designed to minimise contamination potential as the storages have been designed to prevent seepage. Notwithstanding, if seepage were to occur, it would be drawn to the final voids which act as groundwater sinks for the area, thereby preventing any potential exposure to the receiving environment.

### ***Surface Water Diversions***

Temporary and permanent up-catchment diversion structures would be constructed over the life of the CDM to divert runoff from undisturbed areas around the open cut pits and waste rock emplacements.

The diversion for Drainage Line 1 has been designed and assessed using the ACARP stream diversion design criteria (Project C8030 – Maintenance of Geomorphic Processes in Bowen Basin River Diversions). An objective of the diversion of Drainage Line 1 is to provide a self-sustaining landform at the end of the mine life so that the diversion channel functions like a natural drainage similar to the hydraulic and geomorphic characteristics of the existing Drainage Line 1 channel.

At the completion of mining the operational flood levees in the south and south-east would be removed or be integrated with the final landforms where required to provide flood immunity up to the PMF.

### ***Ongoing Water Management and Reduction Requirements***

As mining approaches completion, Syntech will consult with landholders and/or relevant agencies regarding the potential for retaining water management structures. As grazing is the approved PMLU, it is assumed that most water management structures would be retained post-mining (i.e. due to their direct benefit to the PMLU).

If specific water structures are not suitable to be retained, they would be decommissioned or remediated in consultation with relevant stakeholders and with the approval of DES. Relevant remediation measures would be determined on a case-by-case basis.

Once remediation is completed, no ongoing water management would be required for the site.

#### ***3.5.3.8 Revegetation***

AusEcology (2021; Appendix K) has reviewed the existing rehabilitation management methodologies on site and have prepared a detailed Revegetation Plan with three revegetation scenarios consistent with the PMLU of light-intensity grazing, with areas of native vegetation:

- Scenario 1 – Pasture on flat / slightly sloping land.
- Scenario 2 – Pasture with native vegetation on slopes.
- Scenario 3 – Pasture with native vegetation along riparian corridors.

The revegetation strategy for CDM is based on the re-construction approach to ecological restoration. This approach is most suitable for disturbed areas or construction areas that show modified or disturbed soils, depleted or absent soil seed bank and high potential for domination by weed species that prevent natural regeneration and succession of the pre-disturbance ecological community. This approach is employed when removal of ongoing threatening processes alone is insufficient to allow natural establishment of ecological processes and communities (Appendix K).

The revegetation strategy does not aim to recreate the conditions of the target regional ecosystems in their remnant or undisturbed state. Rather, the strategy is aimed at establishing a safe, stable and non-polluting landform, with a self-sustaining vegetation cover consistent with the proposed PMLU of light intensity grazing and specific vegetation scenario (Appendix K).

Initial revegetation activities will focus on the establishment of ground layer vegetation to facilitate stability and topsoil retention. The establishment of ground cover using a fast-germinating cover crop will be critical to the attainment of site stability in the short term. An additional mixture of pasture and native grasses and legumes will be introduced at the same time by direct seeding to establish a self-sustaining vegetation cover suitable for scenario 1 areas and native trees and shrubs will be introduced by planting to establish a self-sustaining vegetation cover suitable for scenario 2 and 3 areas (Appendix K).

Cover crop species selection will be based on time of year and may vary depending on the topsoil spreading program. Cover crops suitable for use in revegetation scenario 1, 2 & 3 are specified based on seasonality in Table 17. Most cover crop species are typically sown at depths of 1 - 4 cm below the soil surface for optimum germination and growth.

**Table 17**  
**Seasonal Preferences and Application Rates for Cover Crops**

Cover Crop	Optimal Sowing Time	Application Rate (kg/ha)
Quick Oats	March – July	25 – 80
Barley	May – August	25 – 50
Annual Ryegrass	April – September	15
Japanese Millet	October – March	6 – 10

For revegetation scenarios 2 and 3, tree plantings will be incorporated to provide wildlife corridors, shelter belts for stock (from sun and wind) and visual enhancement to the site. Species recommended for the revegetation project are presented in Table 18. Not all species listed in Table 18 (especially grasses and forbs) are required to be used in the revegetation program. Rather, a combination of species will be chosen from the list based on the availability of seed and tubestock prior to revegetation works. However, native groundcover species will be preferentially sourced for vegetation scenario 2 and 3. In addition, if live topsoiling is used, there will likely be natural recruitment of groundcover species.

### **Seed Procurement and Collection**

Non-native pasture and legume species are readily commercially available and, where required, will generally be purchased up to six months in advance in quantities sufficient to undertake direct seeding operations. Where native seed is preferred, where possible it will be collected from populations of identified species within the CDM site (or within close proximity) or from within the same rainfall isohyet at a minimum, with preference given to seed collected as close as possible to the CDM.

Generally, seed collection will be programmed at least 18 months prior to the proposed propagation commencement date, and preferably earlier in order to maximise opportunities to collect as many of the target species as possible in the quantities required. Seed collection will be undertaken in accordance with the Florabank guidelines and the *Model Code of Practice for community-based collectors and suppliers of native plant seed* (Florabank, 1998). Permissions to collect seed from private and public land will be obtained prior to collection, as appropriate.

All seed will be bagged and labelled with genus and species, collection location (coordinates), collection date and collector identification and stored under appropriate environmental conditions in order to prevent degradation and infection with mould, fungus or other pathogens. Maintenance of temperatures less than 15 degrees and low moisture levels in collection bags are considered critical to maintaining viability of collected seed.

Collected seed will be processed as soon as possible after collection. Processing may involve drying, cooling, threshing or spreading seed-containing plant parts on drop sheets to allow seed to drop over time. Processed seed will be bagged and labelled with all required information and stored in a seed fridge until required for propagation.

**Table 18  
Revegetation Species**

Scientific Name	Common Name	Form	Revegetation Methodology	Scenario 1	Scenario 2	Scenario 3
* <i>Cenchrus ciliaris</i>	Buffel grass	Grass	Direct seed	✓	✓	✓
* <i>Bothriochloa pertusa</i>	Indian bluegrass	Grass	Direct seed	✓	✓	✓
* <i>Digitaria milanjana cv. Strickland</i>	Strickland digitaria	Grass	Direct seed	✓	✓	✓
* <i>Digitaria eriantha ssp. eriantha cv. Premier</i>	premier digitaria	Grass	Direct seed	✓	✓	✓
* <i>Bothriochloa bladhii ssp. glabra cv Swan</i>	forest bluegrass	Grass	Direct seed	✓	✓	✓
* <i>Urochloa mosambicensis cv. Saraji</i>	sabi grass	Grass	Direct seed	✓	✓	✓
* <i>Chloris gayana cv. Reclaimer</i>	reclaimer rhodes grass	Grass	Direct seed	✓	✓	✓
<i>Eragrostis brownii</i>	Brown's lovegrass	Grass	Direct seed	✓	✓	✓
<i>Cymbopogon refractus</i>	barbed-wire grass	Grass	Direct seed	✓	✓	✓
<i>Enteropogon ramosus</i>	windmill grass	Grass	Direct seed	✓	✓	✓
<i>Paspalidium caespitosum</i>	Brigalow grass	Grass	Direct seed	✓	✓	✓
<i>Dichanthium sericeum</i>	Queensland bluegrass	Grass	Direct seed	✓	✓	✓
<i>Bothriochloa decipiens</i>	Pitted bluegrass	Grass	Direct seed	✓	✓	✓
<i>Chloris divaricata</i>	-	Grass	Direct seed	✓	✓	✓
<i>Panicum coloratum</i>	Gatton panic	Grass	Direct seed	✓	✓	✓
<i>Bothriochloa insculpta</i>	creeping bluegrass	Grass	Direct seed	✓	✓	✓
* <i>Medicago truncatula</i>	barrel medic (varieties Parabinga, Caliph)	Forb	Direct seed	✓	✓	✓
* <i>Medicago polymorpha</i>	spineless burr medic (varieties Cavalier or Scimitar)	Forb	Direct seed	✓	✓	✓
* <i>Medicago spp.</i>	other medics (variety Toreador)	Forb	Direct seed	✓	✓	✓
<i>Geijera parviflora</i>	wilga	Shrub	Plant	X	✓	✓
<i>Dodonaea biloba</i>	-	Shrub	Plant	X	✓	X
<i>Dodonaea viscosa</i>	sticky hopbush	Shrub	Plant	X	✓	X
<i>Dodonaea peduncularis</i>	hop bush	Shrub	Plant	X	✓	X
<i>Acacia shirleyi</i>	lancewood	Tree	Plant	X	✓	X

**Table 18 (Continued)  
Revegetation Species**

Scientific Name	Common Name	Form	Revegetation Methodology	Scenario 1	Scenario 2	Scenario 3
<i>Acacia leiocalyx</i>	black wattle	Tree	Plant	X	✓	X
<i>Allocasuarina luehmannii</i>	bulloak	Tree	Plant	X	✓	X
<i>Casuarina cunninghamiana</i>	river sheoak	Tree	Plant	X	X	✓
<i>Callitris glaucophylla</i>	white cypress pine	Tree	Plant	X	✓	X
<i>Eucalyptus crebra</i>	narrow-leaved ironbark	Tree	Plant	X	✓	X
<i>Eucalyptus populnea</i>	poplar box	Tree	Plant	X	X	✓
<i>Eucalyptus fibrosa</i> subsp. <i>nubila</i>	blue-leaved ironbark	Tree	Plant	X	✓	X
<i>Eucalyptus tereticornis</i>	forest red gum	Tree	Plant	X	X	✓

\* Exotic species.

### ***Planting Stock***

Propagation of planting stock from seed will be commissioned at least six months ahead of planting date to allow sufficient time to produce plants that are sturdy and well-established at time of planting.

Propagated stock will preferably be delivered in 40-cell “hiko” trays or 20-cell native tubestock trays. Hiko planting stock has a well-established history of planting success in the commercial forestry industry and has the advantages of being cheaper to produce, more efficient to transport and quicker to plant. Success rates for hiko plant stock are also on par with larger native tubestock pots.

Throughout the term of the propagation phase, the nursery will be requested to provide regular updates and plant propagation reports in order for planting operations to proceed as planned. Plants will only be accepted where adherence to the following quality characteristics is achieved:

- Healthy and displaying signs of active growth; and
- Healthy foliage and stem growth, characteristic of the species and the growth stage; and
- Sturdy stems and being free-standing; and
- Fresh actively growing roots; and
- Well-developed fine root system that is coherent when removed from pot, but is not tightly pot bound; and
- No signs of nutritional deficiencies; and
- Sun hardened.

All plants will need to be saturated prior to dispatch from the nursery.

An appropriate temporary field storage facility (field nursery) will be set up in advance of receiving the plants on site. This will typically consist of plastic sheeting or some other barrier layer set out in an open and level area, where plants can be placed without risk of them growing roots into the ground. Watering will be undertaken for the duration of time the plants are held in the temporary field storage facility to preserve the viability of the plant stock.

### ***Establishment Methods***

Direct seeding will be preferred to achieve a dense or continuous cover of green cover crops and grass species. Seeding may be undertaken using conventional broadacre seeding equipment (e.g. combine seeder, spreader with harrows or spinner).

Grass seed rates for pasture establishment typically range from 1 kg per hectare for uncoated (bare) seed to 3 kg per ha for coated seed. However, application rates of 5 kg for uncoated seed and 10 kg per ha of coated seed will be used where practicable for exposed topsoil areas to maximise germination success rate and coverage.

Timing of seeding can be important for successful revegetation. Where practicable, seed will be sown immediately before the expected onset of reliable rains or after the break of the season.

Hiko or native tubestock will be planted to establish canopy and shrub species with relatively low densities or clumped distributions compared to the more continuous cover required for revegetation of the ground layer (predominantly grasses).

General planting specifications include:

- plants will be spade planted;
- plant growth media will be saturated with water and diluted Seasol (or similar product) as per manufacturer's specifications immediately prior to dispatch from the plant nursery;
- plants will be placed in a vertical hole that is deeper than its root ball;
- depending on growth form of tubestock, planted to a depth so that the top of the plug is between 2 cm and 10 cm below the soil surface (no visible potting media at soil surface);
- plants will be planted with a slow-release fertiliser and a soil conditioner with use of water crystals (such as Terracottem), where practicable;
- firmed so that plant may not be pulled out of ground by pulling top leaves; and
- not damaged during planting.

Timing of planting will typically be targeted for late summer or early autumn when soil moisture is high and temperatures are becoming milder (March-May). The combination of decreasing daytime temperatures and intermittent showers when the soil moisture profile is good will minimise evaporative losses and maximise plant available soil moisture during the three-month establishment period.

Planting will generally be carried out once all cover crop and grass species have germinated and established. Pre-plant spot spraying will be carried out (1 m diameter sprayed spots) to minimise grass competition within the immediate vicinity of the planted tree, as required.

Table 19 sets out the anticipated stock densities and estimated quantities for plant stock per ha for vegetation scenario 2 and 3. Table 20 sets out the anticipated seed quantities for grasses and legumes per hectare across vegetation scenario 1, 2 and 3.

Seed quantity includes cover crop species, although it should be noted that cover crops will be chosen in consideration of season of application. Note that not all species listed in Tables 19 and 20 will be used in the revegetation. Rather, a combination of species will be chosen from the list based on the availability of seed and tubestock prior to revegetation works. A contingency amount of 20% will typically be utilised to account for mortality.

Planted stock will be watered in where soil moisture is less than optimal at time of planting. Pre-saturation of plant stock prior to planting is critical to early-stage survival. Where practicable, hydrated water crystals (Terracottem, Terraform or similar) will be incorporated into planting holes at time of planting to maximise water retention in the plant root zone.

The brigalow woodland snail, grey snake and short-beaked echidna require on ground timber cover, rocks, leaf litter and debris. Where practicable, a selection of trees and coarse woody debris will be retained (i.e. not mulched) stockpiled for later reinstatement in revegetation scenario 2 & 3 areas where trees are being planted. Where available, large hollow logs will be strategically placed in the rehabilitated landform and smaller logs will be placed in piles to provide habitat for the abovementioned fauna species.

Further detail on the revegetation strategy is provided in the Revegetation Plan (Appendix K).

**Table 19**  
**Planting Densities and Quantities for Shrub and Tree Species**

Scientific Name	Common Name	Form	Density Required	Average Coverage per individual plant at 10 years (m <sup>2</sup> )	Approximate quantity required per ha
<i>Geijera parviflora</i>	wilga	Shrub	10%	5.0	200
<i>Dodonaea biloba</i>	-	Shrub			
<i>Dodonaea viscosa</i>	sticky hopbush	Shrub			
<i>Dodonaea peduncularis</i>	hop bush	Shrub	20%	10.0	200
<i>Acacia shirleyi</i>	lancewood	Tree			
<i>Acacia leiocalyx</i>	black wattle	Tree			
<i>Allocasuarina luehmannii</i>	bulloak	Tree			
<i>Callitris glaucophylla</i>	white cypress pine	Tree			
<i>Eucalyptus crebra</i>	narrow-leaved ironbark	Tree			
+ <i>Eucalyptus populnea</i>	poplar box	Tree			
<i>Eucalyptus fibrosa ssp. nubila</i>	blue-leaved ironbark	Tree			
<i>Casuarina cunninghamii</i>	river sheoak	Tree			
<i>Eucalyptus tereticornis</i>	forest red gum	Tree			

+ *Eucalyptus populnea* to be planted predominantly on flats, as the species may not be as successful when planted on slopes.

**Table 20**  
**Seed Quantities Required for Grasses and Cover Crops**

Scientific Name	Common Name	Form	Suitability	Rate (kg/ha) <sup>1</sup>
* <i>Avena spp.</i>	Quick oats	Cover crop	Autumn-Winter	25 - 80
* <i>Hordeum vulgare</i>	Barley		Winter-Spring	25 - 50
* <i>Lolium rigidum</i>	Annual ryegrass		Autumn	15
* <i>Echinochloa esculenta</i>	Japanese millet		Spring-Summer	6 - 10
* <i>Cenchrus ciliaris</i>	Buffel grass	Grass		0.5 - 2
* <i>Bothriochloa pertusa</i>	Indian bluegrass			3
* <i>Digitaria milanjiana cv. Strickland</i>	Strickland digitaria			1 - 2
* <i>Digitaria eriantha ssp. eriantha cv. Premier</i>	premier digitaria			3
* <i>Bothriochloa bladhii ssp. glabra cv Swan</i>	forest bluegrass			1 - 2
* <i>Urochloa mosambicensis cv. Saraji</i>	sabi grass			1 - 2
* <i>Chloris guyana cv. Reclaimer</i>	reclaimer rhodes grass			13
<i>Eragrostis brownii</i>	Brown's lovegrass			4 (combined)
<i>Cymbopogon refractus</i>	barbed-wire grass			
<i>Enteropogon ramosus</i>	windmill grass			
<i>Paspalidium caespitosum</i>	Brigalow grass			
<i>Dichanthium sericeum</i>	Queensland bluegrass			
<i>Bothriochloa decipiens</i>	Pitted bluegrass			
<i>Chloris divaricata</i>	-			
* <i>Panicum coloratum</i>	Gatton panic			
* <i>Bothriochloa insculpta</i>	creeping bluegrass		3	
* <i>Medicago truncatula</i>	barrel medic (varieties Parabinga, Caliph)	Forb	-	2 - 3
* <i>Medicago polymorpha</i>	spineless burr medic (varieties Cavalier or Scimitar)			2 - 3
* <i>Medicago spp.</i>	other medics (variety Toreador)			2 - 3

<sup>1</sup> Assumes coated seed, halve rate for bare seed.

\* Denotes exotic species.

### 3.5.4 Tailings Storage Facilities

The tailings are currently pumped as a slurry into the out-of-pit coal rejects emplacements, known as Reject Dams, and in the future will be pumped to engineered in-pit emplacements, including the integrated waste landform (IWL) and Central (Pit) Void, shown in Figure 20. Due to the increased geochemical security provided by below ground disposal (i.e. limited oxygen diffusion), tailings will be preferentially disposed below final surface level (i.e. in-pit IWL and Central Void) (GEM, 2021).

The detailed design of the coal rejects emplacements has been undertaken in accordance with *Structures which are dams or levees constructed as part of environmentally relevant activities* (DES, 2019) based on the Consequence Category assessed under the *Manual for assessing consequence categories and hydraulic performance of structures* (DEHP, 2016). The detailed design processes for the out-of-pit coal reject emplacements and IWL will be conducted consistent with the design principles outlined in Engeny (2018). The detailed design process for all of these structures will consider the geotechnical characteristics of the tailings (including, but not limited to, particle size distribution, specific gravity, Atterberg limits, moisture content and dry density profiles, settling, shear strength, soil water characterisation, self-weight consolidation and desiccation).

The out-of-pit Reject Dams include RD1, comprising three deposition cells, and RD2, comprising two deposition cells, of which Cell 1 (southern cell) was commissioned in 2019. The tailings are slurry pumped into the tailings cell from spigots located around the perimeter of the cell embankments in such a manner that a fine rejects beach profile is created that slopes away from the perimeter embankments to ultimately form a decant pond to the designed water recovery point. Sub-aerial deposition in thin layers, incorporating secondary flocculation, is used to promote desiccation, drying and consolidation of the tailings and to improve water recovery. Active dewatering of the decant pond is returned to the site water management system for re-use. Once sufficiently consolidated, the tailings will be capped with a layer of competent rock, followed by a layer of compacted non-sodic clay, top soiled and rehabilitated according to the rehabilitation objectives.

Prior to tailings disposal within the Central (Pit) Void, the tailings will be disposed within the IWL. The IWL will involve the construction of centrally located deposition cells within the Central Pit waste rock emplacement to hold the tailings. A minimum 100 m buffer will be maintained between each cell as the dump and the cells progress. Sub-aerial tailings deposition in thin layers incorporating secondary flocculation will be used to promote segregation, desiccation, drying and consolidation of the tailings, and the final surface of the filled cells below the final landform surface to allow a sufficient depth for capping and rehabilitation (Engeny, 2018).

The IWL cells will include an engineered compacted surface which will consist of clay and geosynthetic liner, and as such there is minimal potential for seepage from cells. Sufficient freeboard will be provided to minimise the risk of uncontrolled discharge during high rainfall events, and diversion bunds constructed around the perimeter of the cells to prevent runoff from entering the cells during deposition (Engeny, 2018).

Once the Central (Pit) Void is available for tailings disposal, it will become the primary tailings receptacle for the mine. The north-western section of the Central Void will be utilised for tailings disposal and the south-eastern section, separated by a land-bridge, will remain a void. The Central Void will be dewatered prior to tailings deposition in order to maximise consolidation of the solids, and the size of the decant pond during disposal will be minimised to increase consolidation and beaching (Engeny, 2018).

At completion, the tailings within the Central (Pit) Void are expected to have a Relative Level (RL) of 301 mAHD. The remaining void will then be infilled with waste material and rehabilitated to a final RL of approximately 330 mAHD in line with the post-mining land use rehabilitation objectives (Syntech, 2020). Because the final tailings surface is expected to be below the pre-mining groundwater level of 305 mAHD, any infiltration of water that comes into contact with the tailings is expected to remain within the void and is not expected to impact on the groundwater quality of the regional groundwater system (Engeny, 2018).

GEM (Appendix J) recommended that, due to the expected salinity and occurrence of PAF material, the tailings be covered with non-saline and NAF material as soon as practical once tailings deposition ceases within each cell in order to reduce the risk of developing saline and/or acid conditions, leading to potential saline and/or acid and metalliferous drainage.

Further detail on the tailings design is available in Appendix I.

### 3.5.5 Voids

#### 3.5.5.1 Minimisation of Final Voids

The approved CDM final landform includes two final voids (Figure 21).

The size of the final voids will be minimised by disposing waste rock and coal rejects in-pit. In addition, waste rock removed during the mining of the western side of the Eastern Pit (Pit 2) will be used to backfill the void on the eastern side of the Eastern Pit (Pit 2) reducing the number of final voids required for the CDM (Figure 21).

#### 3.5.5.2 Final Void Dimensions and Slope Angles

As described in Section 3.4, the final voids must be consistent with the description in EA EPML00900113, and in particular, *Table G1: Approved Final Residual Voids Design* and *Attachment 7: Approved Final Residual Voids Design*.

**Table G1 – Approved Final Residual Voids Design**

Void ID	High Wall Slope (deg)	High Wall Incompetent Rock Slope (deg)	Low Wall Slope (deg)	Low Wall Incompetent Slope (deg)	Void Maximum Depth (m)	Void Maximum Length (m)	Void Maximum Area (ha)	Volume (Mm <sup>3</sup> )
Central Final Void (Pit 1)	45	45	37	37	70	1,460	75	28
Western Final Void (Pit 3)	45	45	37	37	87	3,770	165	86

Mm<sup>3</sup> = million cubic metres.

Deg = Degrees.

### 3.5.5.3 *Final Void Stability*

Final void highwalls will be treated (e.g. benched or blasted) so that they are geotechnically stable to an appropriate factor of safety. Once completed, a safety assessment and geotechnical investigation will be undertaken to confirm the safety and stability of the highwall for the long term. An as-built design report will be completed to confirm that the final voids are consistent with the requirements of EA EPML00900113.

A safety bund wall consisting of competent material and/or fencing would be constructed to limit human and livestock/animal access. The bund wall will have a minimum height of 2 m, with a minimum base width of 4 m and be located at least 10 m beyond the area potentially affected by any instability of the open cut pit edge.

Appropriate signage alerting people to the presence of the voids will be placed around the bund.

### 3.5.5.4 *Final Void Hydrology*

#### ***Inflows***

Once mining operations cease, groundwater inflows to the final voids will no longer be collected and pumped out, and as a result, the final voids will gradually begin to fill with water. Water in other on-site operational storages may also be transferred to the final voids to facilitate decommissioning and rehabilitation.

Inflows into the final voids will comprise incident rainfall, runoff within the final void catchment area and groundwater. The catchment area of the final voids is defined by the surrounding landform including safety bunds.

#### ***Water Level Recovery Analysis***

Final void water recovery analyses have been conducted as part of the Surface Water Assessment (Appendix A). The assessment is based on predicted groundwater inflows developed as part of the Groundwater Assessment (Appendix C).

The OPSIM model was run for a 500-year period from the end of mine to assess the long-term storage inventory and TDS concentrations in the final voids during post closure. The 128 years of SILO Data Drill rainfall and evaporation data was cycled four times to generate the 500-year climate sequence. Variable groundwater inflow and outflow rates were provided by AGE (2018). Several iterations of the OPSIM model were run to converge with the stage groundwater inflow curve.

Final voids and open pits are assumed to have reduced evaporation due to the shading from the highwall. Two scenarios were modelled to assess the sensitivity of water inventory and TDS concentrations due to evaporation. The base case used an evaporation factor of 0.7 applied to the lake evaporation rate, which is the same factor used for open pits during operations. The alternate case reduced the evaporation factor to a conservative value of 0.5.

The stored volumes in the final voids will increase until a balance is established between rainfall/groundwater inflows and evaporation outflows. The model results show that the final void water inventory in both pits is predicted to stabilise below half of the final void FSL volume within the first 200 to 300 years after mine closure for both the base case and the alternate case.

With respect to the predicted results, the following is of note:

- Final Void (Pit 3) [West] stabilises around 15% of its storage capacity in the base case which is the lowest inventory (as a percentage) of the final voids;
- The final void storage inventories follow a similar pattern albeit with different amplitudes. The amplitudes in final void behaviour are different because:
  - they have different stage-surface area-storage curves. Final Void (Pit 1) [Centre] is significantly smaller in surface area compared with Final Void (Pit 3) [West];
  - the final voids have different catchment areas; and
  - the final voids stage-groundwater inflow relationship curves vary significantly for each void. For example, at 275 mAHD Final Void (Pit 1) [Centre] groundwater inflow is 105 m<sup>3</sup>/d and the equivalent Final Void groundwater inflow is 113.5 m<sup>3</sup>/d.

There is very little recovery in Final Void (Pit 1) [Centre] and Final Void (Pit 3) [West] because the evaporation loss rates and rainfall runoff rates are significantly greater than the groundwater inflow rates. Therefore, the behaviour of these voids is dominated by surface hydrology rather than groundwater inflows and will continue to operate as groundwater sinks.

The alternate case increased the total storage inventory of both final voids. However, the storage inventory of the final voids is not predicted to exceed 50% of capacity over a 500-year period. Changing the evaporation factor had the following impacts on inventory:

- Final Void (Pit 1) [Centre] maximum storage inventory increased from approximately 7,370 ML to 11,340 ML; and
- Final Void (Pit 3) [West] maximum storage inventory increased from approximately 11,660 ML to 30,670 ML.

As outlined above, the modelling predicts that evaporation from the void lake surfaces will maintain a water level below the surrounding aquifer water levels, forming a groundwater sink in the local environment, with pit void water levels expected to recover to a quasi-equilibrium level that is between approximately 20 m to 25 m below the pre-mining groundwater levels (Appendix A).

The final void waterbodies are not predicted to spill under any of the simulated climatic sequences (Appendix A).

Based on the *Climate Change Projections for the central slopes* (CSIRO, 2015) the following changes are predicted at the CDCOP from 2090 onwards based on the RCP8.5 results:

- 80% of climate change models predicted that annual rainfall would change by between -23% (reduce by 145 mm) and 18% (increase by 113 mm); and
- 80% of climate change models predicted that annual evapotranspiration would change by between 9.8% (increase by 185 mm) and 18.1% (increase by 341 mm).

Based on the above CSIRO (2015) predictions, annual evaporation losses from the mine pit lake and its catchment will continue to be significantly higher than annual rainfall and groundwater inputs. Therefore, the potential effects of climate change on the behaviour of the final void lake are unlikely to be significant and the mine pit lakes are not expected to fill based on the CSIRO (2015) climate change predictions.

### 3.5.5.5 Final Void Water Quality

The final void water recovery analyses include simulations of the long-term salinity of the final void waterbodies. Evaporation from the lake surfaces will also slowly concentrate salts in the pit lake over time. The increasing salinity will not pose a risk to other aquifers and surface water features as the final void will remain a permanent sink (Appendix A).

TDS concentrations are predicted to increase past the end of the 500-year assessment period. Comparison of the maximum predicted TDS concentrations at the end of the simulation period between the base case and the alternate case show:

- Final Void (Pit 1) [Centre] maximum TDS decreased from approximately 23,000 mg/l (base case) to 6,700 mg/L.
- Final Void (Pit 3) [West] maximum TDS decreased from approximately 21,000 mg/l (base case) to 5,500 mg/L.

The results indicate that a lower evaporation rate in the alternate case has a significant impact on the concentration of salts in the final voids (Appendix A).

### 3.5.6 Underground Mining

This section of the PRCP Guideline is not relevant to the CDM as it is an open cut mining operation.

### 3.5.7 Built Infrastructure

#### 3.5.7.1 Infrastructure Decommissioning and Removal

The majority of the infrastructure domain will be rehabilitated at the end of the CDM life as the infrastructure areas are required to support mining operations. Syntech will decommission and remove all infrastructure from the site unless otherwise agreed with post-mining landholder(s) and DES.

Hydrocarbons (petrol, diesel, oils, greases, degreasers and kerosene), explosives, chemicals and liquid and non-liquid wastes unused at the completion of mining will be returned to the supplier in accordance with relevant safety and handling procedures.

Sites will be added to the Environmental Management Register (EMR) if required. The EMR is a public register which contains information about contaminated land in Queensland. The EMR also contains information of land which is, or could potentially be, contaminated because it is being used for an activity which may cause contamination.

#### 3.5.7.2 Remediation of Contaminated Land

The CDM involves several Notifiable Activities and will potentially disturb areas where evidence of contamination or historical contaminating activities has occurred. Management of contaminated land during the operation of the CDM is described in Section 3.1.2.6.

Investigations will be undertaken at mine closure and prior to rehabilitation to identify and remediate any contaminated soil materials that may exist in accordance with the requirements under Part 8 of Chapter 7 of the EP Act or equivalent statutory provision in force at the time.

Where areas of potential land contamination are identified during rehabilitation activities, the CDM will undertake:

- Preliminary and intrusive contaminated land investigations, as required.
- Removal or onsite-treatment of contaminated water (e.g. affected by hydrocarbons, brine, metals, etc.).
- Removal and appropriate disposal of contaminated materials (PCBs, Dioxins, Mercury, hydrocarbon contaminated soils).
- On-site remediation of hydrocarbon contaminated soils.
- Removal and disposal of asbestos.
- Removal and disposal of plastic (geofabric) liners from dams, leach pads, etc.
- Validation testing to confirm that contaminated soils have been removed/remediated.

#### 3.5.7.3 *Environmental Management Register*

When land is listed on the EMR for a notifiable activity, it is an indication that the land is likely to be contaminated but it does not mean it needs to be cleaned up or is not suitable for its current land use. This will depend on the nature, extent and risks of any contamination on the land, which can be determined by engaging a suitably qualified person to carry out a site investigation.

Where land is listed on the EMR because it is contaminated, details about the hazardous contaminant affecting the land will be included on the EMR as well as information about what land uses the land is suitable for. Where there is a site management plan in place to manage the contamination so it is suitable for a particular land use, the plan will also be attached to the EMR.

Once the site management plan has been successfully executed and the contamination has been resolved, Syntech will apply for the land to be removed from the EMR.

## **3.6 RISK ASSESSMENT**

### **3.6.1 Risk Identification**

Syntech has undertaken a risk assessment (Risk Mentor, 2021; Appendix L) to identify the risks of a stable condition for land described as a post-mining land use not being achieved, and how the risks will be managed or minimised. Syntech has identified the sources of risk, areas of impacts, events and their causes and potential consequences (Table 21).

The risks identified by the assessment team generally fell into the following categories:

- Market or other conditions leading to a move to care and maintenance or premature closure of the operation, which could compromise the ability to rehabilitate the CDM in line with community expectations.
- Problems with achieving a stable final landform arising from poor physical performance of rehabilitated dumps, dams, or slopes.
- Impacts on the receiving environment (water) due to excursions of contaminated or sediment laden water flows.
- Decommissioning challenges leaving either contaminated or dangerous materials on the site after the conclusion of rehabilitation works.
- Impacts on ecology (flora or fauna) arising from failing to achieve the target landform and species mix on the site.
- Rehabilitation management issues related to insufficient resourcing or inadequate experience/execution of rehabilitation works.

Risks that were considered to be a result of controls failing could not be ranked (on the basis that a failed control has an indeterminant outcome) and are recorded in Appendix L.

### **3.6.2 Risk Evaluation and Treatment**

The identified risks were ranked (considering the effect of the applied controls) using the Yancoal Risk Assessment and Control Criteria (Table 22). The risks identified were considered to be able to be effectively controlled through the implementation of the controls, management and mitigation measures as outlined in Tables 21 and 23.

A detailed breakdown of all risks identified, the residual risk rankings and their associated controls is provided in Appendix L.

**Table 21  
Identified Rehabilitation Risks**

PRCP ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Ranking Comments	Loss Type	Existing / Proposed Risk Treatment / Control	Ranking with Controls		
PRCP-01	General	Insufficient resourcing (including skills and experience of rehabilitation personnel; funding for, or prioritisation of, rehabilitation activities; ongoing maintenance of rehabilitation requirements).	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(E) Environmental Impact	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-02	General	Insufficient resourcing (including skills and experience of rehabilitation personnel; funding for, or prioritisation of, rehabilitation activities; ongoing maintenance of rehabilitation requirements).	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(R) Impact on Reputation	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-03	General	Lack of clearly defined responsibilities.	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(O) Asset Damage and Other	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-04	General	Lack of clearly defined responsibilities.	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(R) Impact on Reputation	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-05	General	Care and maintenance/premature closure.	Delayed rehabilitation.	Non-compliance with the process of rehabilitation, leaving an unwanted site condition for subsequent land-holders and not being able to relinquish mining leases.  This could possibly occur if there is a global failure of coal mining companies or a drop in demand for the product.	(E) Environmental Impact	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-06	General	Poor records management, unable to demonstrate compliance with completion criteria.	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(E) Environmental Impact	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-07	General	Inadequate consultation with key stakeholders.	Rehabilitation inadequate, requiring further works.	As for PRCP-05.	(E) Environmental Impact	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)

**Table 21 (Continued)  
Identified Rehabilitation Risks**

PRCP ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Ranking Comments	Loss Type	Existing / Proposed Risk Treatment / Control	Ranking with Controls		
PRCP-08	General	Change in Western Downs Regional Council Planning Scheme.	Final land use no longer aligns with local planning scheme.	As for PRCP-05.	(E) Environmental Impact	01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation. 02PV.04 - Rehabilitation protocols. 02PV.07 - Timing for access to rehabilitated areas. 03SV.04 - PRCP Amendment process. 04TV.03 - Government rehabilitation bonds in place.	2	C	8(M)
PRCP-09	Decommissioning	Generation of waste products from demolition process (e.g., conveyors, electrical substations, compressors, services [pipes/cables], stores, laydown areas, etc.).	Inappropriate disposal of waste products (e.g., at licensed disposal facility).	Residual sources of ongoing contamination remain - addressed by rigorous identification of all areas to decommission and subsequent planning, execution, and quality/performance monitoring.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SY.05 - Contractor management and protocols.	2	D	5(L)
PRCP-10	Decommissioning	Failure to remove all infrastructure that is not to be retained post-closure (e.g., services, infrastructure, roads, carparks, hardstand areas, concrete footings).	Rehabilitation inadequate, requiring further works.	As for PRCP-09.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SY.05 - Contractor management and protocols.	2	D	5(L)
PRCP-11	Decommissioning	Failure to remove all hazardous materials (e.g., carbonaceous material on the surface, hazardous wastes, other wastes).	Rehabilitation inadequate, requiring further works.	As for PRCP-09.	(E) Environmental Impact	01DY.01 - Planning for decommissioning works. 01DV.01 - Surveyed plans of all mine features. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 02PY.02 - Specific guidelines for hazardous chemicals. 03SY.05 - Contractor management and protocols.	2	D	5(L)
PRCP-12	Decommissioning	Land contamination sites not successfully identified or remediated resulting in impacts to the environment.	Rehabilitation inadequate, requiring further works.	As for PRCP-09.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SY.05 - Contractor management and protocols.	2	D	5(L)
PRCP-13	Decommissioning	Failure of borehole or gas well seals.	Resealing of boreholes or gas wells required.	As for PRCP-09.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SY.05 - Contractor management and protocols. 04TV.01 - Guidance on gas borehole decommissioning.	2	D	5(L)
PRCP-14	Decommissioning	Lack of structural integrity of buildings and infrastructure to be retained in final land use.	Collapse/failure of infrastructure to be retained (e.g., dams).	As for PRCP-09.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SY.05 - Contractor management and protocols.	2	D	5(L)
PRCP-15	Decommissioning	Impacts on European/historic heritage items.	Damage to heritage items. Prosecution.	No heritage items of significance identified.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PV.01 - Planning process to identify all heritage items. 02PV.02 - Site land disturbance permits. 02PV.03 - Utilising already disturbed footprints. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 03SV.01 - Database which tracks all known heritage items. 03SY.05 - Contractor management and protocols.	1	E	1(L)

**Table 21 (Continued)  
Identified Rehabilitation Risks**

PRCP ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Ranking Comments	Loss Type	Existing / Proposed Risk Treatment / Control	Ranking with Controls		
PRCP-16	Decommissioning	Impacts on Aboriginal heritage items.	Damage to heritage items. Prosecution.	As for PRCP-15.	(E) Environmental Impact	01DV.01 - Surveyed plans of all mine features. 01DY.01 - Planning for decommissioning works. 02PY.01 - Works conducted by suitably qualified and experienced contractors. 02PV.01 - Planning process to identify all heritage items. 02PV.02 - Site land disturbance permits. 02PV.03 - Utilising already disturbed footprints. 03SY.01 - Database which tracks all known heritage items. 03SY.05 - Contractor management and protocols.	1	E	1(L)
PRCP-17	Ecology - flora and fauna	Landform aspect not suitable for intended target plant species - not meeting required habitats for woodland fauna.	Inability to meet post-mining land use criteria.	Appropriate species are being identified that consider habitat requirements of local fauna and the works will be subject to a monitoring process to confirm success.  Reference sites are used to confirm the success/failure of the process.	(E) Environmental Impact	01DY.02 - Target revegetation species identified. 01DV.10 - Selection of appropriate analogue and reference sites. 02PV.04 - Rehabilitation protocols. 02PV.05 - Long mine life (~75 years). 03SY.01 - Monitoring and adaptive management programs. 03SY.02 - Regular review of milestones and completion criteria. 03SY.03 - Annual reporting of PRCP progress. 03SV.02 - Two yearly internal independent environmental audits. 04TV.02 - Internal reporting of any non-compliances.	1	C	4(L)
PRCP-18	Ecology - flora and fauna	Tree species established along diversion are not suited to riparian environment.	Rehabilitation inadequate, requiring further works.	As for PRCP-17.	(E) Environmental Impact	01DY.02 - Target revegetation species identified. 01DV.10 - Selection of appropriate analogue and reference sites. 02PV.04 - Rehabilitation protocols. 02PV.05 - Long mine life (~75 years). 03SY.01 - Monitoring and adaptive management programs. 03SY.02 - Regular review of milestones and completion criteria. 03SY.03 - Annual reporting of PRCP progress. 03SV.02 - Two yearly internal independent environmental audits. 04TV.02 - Internal reporting of any non-compliances.	1	C	4(L)
PRCP-19	Ecology - flora and fauna	Inappropriate revegetation species mix for targeted final land use.	Rehabilitation inadequate, requiring further works.	As for PRCP-17.	(E) Environmental Impact	01DY.02 - Target revegetation species identified. 01DV.10 - Selection of appropriate analogue and reference sites. 02PV.04 - Rehabilitation protocols. 02PV.05 - Long mine life (~75 years). 03SY.01 - Monitoring and adaptive management programs. 03SY.02 - Regular review of milestones and completion criteria. 03SY.03 - Annual reporting of PRCP progress. 03SV.02 - Two yearly internal independent environmental audits. 04TV.02 - Internal reporting of any non-compliances.	1	C	4(L)
PRCP-20	Final Landform	Final landform instability (e.g. in and out of pit dumps, steep slopes, erosion, highwalls, low walls etc.) affecting post-mining land use.	Landform failure (public safety risk).	Stability of the landform leading to not meeting rehabilitation criteria, release of sediments, potential for public to encounter an unstable landform. Mitigated by rehabilitation, monitoring, relinquishment requirements and ability to remediate any identified areas of instability.	(P) Harm to People (E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)

**Table 21 (Continued)  
Identified Rehabilitation Risks**

PRCP ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Ranking Comments	Loss Type	Existing / Proposed Risk Treatment / Control	Ranking with Controls		
PRCP-21	Final Landform	Final landform instability (e.g. NUMAs, final voids, etc.) affecting post-mining land use.	Landform failure (public safety risk) and NUMAs causing environmental harm.	Slumping of material into the void - with potential to impact safety barriers - and subsequently causing harm to any persons, stock or fauna present.  This is mitigated by geotechnical designs, monitoring and meeting relinquishment requirements.  Considered to be slightly more significant than a failure of other landforms - but less likely to occur.	(P) Harm to People (E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-22	Final Landform	Final landform instability (e.g. steep slopes, erosion, highwalls, low walls etc.) affecting post-mining land use.	Rehabilitation inadequate, requiring further works.	As for PRCP-21.	(E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-23	Final Landform	Final landform unsuitable for final land use (e.g. large rocks present affecting cultivation, settlement and surface subsidence leading to extended ponding etc.).	Rehabilitation inadequate, requiring further works.	As for PRCP-21.	(E) Environmental Impact	01DV.02 – Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-24	Final Landform	Final landforms are not consistent with and do not complement the topography of the surrounding region.	Rehabilitation inadequate, requiring further works.	As for PRCP-21.	(E) Environmental Impact	01DV.02 – Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-25	Final Landform	Erosion and failure of drainage and water management/storage structures.	Impacts on water quality and potential discharge.	Drainage line 1 is the most significant.  As for PRCP-21.	(E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.05 - Long mine life (~75 years). 02PV.06 - Erosion and sediment control. 03SV.08 - Water quality monitoring.	2	D	5(L)
PRCP-26	Final Landform	Failure of the tailings storage facility over time.	Impact on surrounding landform and movement of tailings off site.	Similar to PRCP-21.  Dams have been assessed as a low risk.  Environmentally is minor to moderate consequence - but expected to be a rare/unlikely likelihood.	(E) Environmental Impact	01DE.01 - Tailings and dam designs and management systems. 01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.09 - Mine planning includes allowance for rehabilitation of the TSF. 02PE.01 - Flocculant use achieving a stiff tailings deposition. 02PE.06 - Capping of TSF. 03SV.03 - RPQ involvement in TSF design.	3	D	9(M)

**Table 21 (Continued)  
Identified Rehabilitation Risks**

PRCP ID	Mine Closure / Rehabilitation Aspect	Risk Source	Potential Events / Consequences	Ranking Comments	Loss Type	Existing / Proposed Risk Treatment / Control	Ranking with Controls		
PRCP-27	Final Landform	Lack of infrastructure to support intended final land use (e.g. dams, fences, watering facilities, etc.). Note: Intended final land use is light intensity grazing with some native vegetation, minimal infrastructure required.	Farm dams retained insufficient to support grazing and additional dams required.	As for PRCP-21.	(E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-28	Final Landform	Landform (excluding final void domains) not free draining.	Rehabilitation inadequate, requiring further works.	As for PRCP-21.	(E) Environmental Impact	01DV.02 - Geotechnical analysis and design. 01DV.03 - Geomorphic design protocols. 01DV.04 - Factor of safety applied to designs. 01DV.05 - Prior studies of erosion performance. 02PV.06 - Erosion and sediment control.	2	D	5(L)
PRCP-56	Final Landform	Gazetted roads (Boort-Koi and Ryalls) if re-established would allow access to potentially hazardous locations in the rehabilitation area and final landform.	Risk to public safety.	As for PRCP-21.	(P) Harm to People	01DV.06 - Road closures. 02PE.03 - Site security, fencing, etc. 02PV.07 - Timing for access to rehabilitated areas. 03SY.04 - Third party grazing agreements.	2	D	5(L)
PRCP-50	Water	Contamination resulting from associated activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluids, spillage of dirty or produced saline water, brine, sewage, tailings emplacement etc.).	Contamination of waterways or land resulting in infringement notice.	As for PRCP-52.	(E) Environmental Impact	02PE.08 - Design minimises water reporting to voids. 02PE.09 - Over-topping buffer in site voids. 03SY.06 - Water management plan. 03SV.08 - Water quality monitoring. 03SV.09 - Mine voids are groundwater sinks.	2	D	5(L)
PRCP-51	Water	Diversion of surface water runoff away from catchment areas.	Loss of water flow downstream due to capture of water in voids.	As for PRCP-52.	(E) Environmental Impact	02PE.08 - Design minimises water reporting to voids. 03SY.06 - Water management plan.	2	D	5(L)
PRCP-52	Water	Water accumulation in voids.	Overtopping/ discharge to receiving environment.	Release to the environment could lead to a minor level of harm and unlikely to occur.	(E) Environmental Impact	02PE.08 - Design minimises water reporting to voids. 02PE.09 - Over-topping buffer in site voids. 03SV.08 - Water quality monitoring. 03SV.09 - Mine voids are groundwater sinks.	2	D	5(L)
PRCP-53	Water	Groundwater seepage from voids.	Impact to receiving environment.	As for PRCP-52.	(E) Environmental Impact	02PE.08 - Design minimises water reporting to voids. 03SV.08 - Water quality monitoring. 03SV.09 - Mine voids are groundwater sinks.	2	D	5(L)
PRCP-54	Water	Poor water quality/excessive discharges (e.g. acid-drainage, high salinity, etc.).	Impact to receiving environment.	As for PRCP-52.	(E) Environmental Impact	02PE.04 - Gypsum remediation to improve run-off. 02PE.09 - Over-topping buffer in site voids. 02PV.09 - Waste rock handling procedures. 03SY.06 - Water management plan. 03SV.08 - Water quality monitoring. 03SV.09 - Mine voids are groundwater sinks.	2	D	5(L)

**Table 22  
Yancoal Risk and Control Assessment Criteria**

Loss Type	Consequence					
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic	
(P) Harm to People	Slight injury or health effects – report only (RO) or first aid injury (FAI)	Minor injury or health effects – medical treatment injury (MTI) or restricted work injury (RWI)	Serious bodily injury or health effects –lost time injury (LTI)	Single fatality	Multiple fatalities	
(E) Environmental Impact	Environmental nuisance – trivial or negligible, short term impact to area of low significance, minimal or no physical remediation required No regulation. Cost < \$1K	Minor environmental harm – short term impact to area of limited local significance, limited physical remediation Reportable Breach /Minor Non Compliance, potential warning notice, other notices (infringement / prosecution) unlikely. Costs \$1k - \$10k	Serious environmental harm – impact to Environment, physical remediation, potential or actual community health impacts or pollution or contamination. Infringement Notice but Prosecution unlikely. Costs \$10K - \$100K	Major environmental harm – long term reversible impact, health statistics in community may alter as a result of this incident or pollution or contamination Prosecution Costs \$100K – \$1M	Extreme environmental harm – irreversible impacts on environmental values of extreme & widespread areas, or those of national conservation significance, community fatalities or pollution or contamination Prosecution, license revoked Costs > \$1M	
(O) Asset Damage and Other Consequential Losses	Slight damage < \$1M or < 1 day disruption to operation	Minor damage \$1M - \$5M or < 1 week disruption to operation	Local damage \$5M - \$20M or < 1 month disruption to operation	Major damage \$20M - \$100M or < 6 months partial loss of operation	Extreme damage > \$100M or 6 months Substantial or total loss of operation	
(R) Impact on Reputation	Slight impact – Public awareness may exist but no public concern Isolated compliance failure – no brand damage	Limited impact – Some local public concern Intervention of regulating authority – minimal brand damage	Considerable impact - Regional public concern Major compliance failure involving fines – medium brand damage	National impact – National public concern Temporary withdrawal of license to operate – significant brand damage	International impact - International public attention Loss of shareholder confidence – irreparable brand damage	
Likelihood	Likelihood Guide	Level of Risk				
A (Almost Certain)	Likely that the unwanted event could occur several times per year at this location	11 (M)	16 (H)	20 (H)	23 (E)	25 (E)
B (Likely)	Likely that the unwanted event could occur several times per year in the Australian mining industry; or could happen annually	7 (M)	12 (M)	17 (H)	21 (E)	24 (E)
C (Possible)	The unwanted event could well have occurred in the Australian mining industry at some time in the past 10 years	4 (L)	8 (M)	13 (H)	18 (H)	22 (E)
D (Unlikely)	The unwanted event has happened in the Australian mining industry at some time; or could happen in 50 years	2 (L)	5 (L)	9 (M)	14 (H)	19 (H)
E (Rare)	The unwanted event has never been known to occur in the Australian mining industry; or is highly unlikely that it could ever occur	1 (L)	3 (L)	6 (M)	10 (M)	15 (H)

**Table 23  
Controls, Management and Mitigation Measures**

Control Name	Expectation	Selection Reason	Responsible
01DE.01 - Tailings and dam designs and management systems	Tailings and other dams appropriately designed to contain material and any affected water.	Addressing potential for collapse or uncontrolled release of site fluids.	CDM Operations Manager
01DV.01 - Surveyed plans of all mine features	Surveyed plans to confirm that all locations, structures and features of substance are identified.	Preventing key items or built features not being addressed during rehabilitation as their physical locations are known and mapped.	CDM Mine Planning Superintendent
01DV.02 - Geotechnical analysis and design	Geotechnical analyses and implementation of designs to achieve long term stable landforms. As new materials are identified this leads to review and updating (as required) of designs.	Protection against changes in geotechnical conditions leading to final landform instability.	CDM Mine Planning Superintendent
01DV.03 - Geomorphic design protocols	Current designs are aligned with relevant QLD design principles. Planned to implement geomorphic design principles being applied to the design of the final landform.	Protection against longer term instability of the final landform.	CDM Operations Manager
01DV.04 - Factor of safety applied to designs	Factor of safety applied to the void design to address the weathering expected.	Protection against longer term instability of the final landform.	CDM Operations Manager
01DV.05 - Prior studies of erosion performance	Prior studies of erosion potential of dumps have been considered when the rehabilitation methodology has been developed.	Addressing potential for using incorrect inputs in final landform designs.	CDM Environment and Community Superintendent
01DV.06 - Road closures	Intention is to keep the roads closed, with relocated roads providing access for private landholders.	Addresses potential for unwanted post mining access to steep slopes or water bodies.	CDM Operations Manager
01DV.07 - Progressive rehabilitation resulting in reduced area for final rehabilitation	Progressive rehabilitation (in conformance with the PRCP) minimising the amount of land to rehabilitate at closure.	Addressing potential for extensive works being required at the end of mine life.	CDM Environment and Community Superintendent
01DV.08 - Mine design considers carbonaceous material in dumps	Mine design/mine planning identifies carbonaceous material and manages this appropriately.	Addressing potential for spontaneous combustion in dumps or stockpiles.	CDM Mine Planning Superintendent
01DV.09 - Mine planning includes allowance for rehabilitation of the TSF	Mine plan has significant time-frame for rehabilitating TSF whilst ongoing mining of the pit is occurring.	Addressing potential for incomplete capping of the tailings storage facility.	CDM Operations Manager
01DV.10 - Selection of appropriate analogue and reference sites	Selection of appropriate analogue and reference sites. AusEcology have reviewed the reference sites to confirm suitability and present a monitoring strategy.	Addresses potential to not achieve desired rehabilitation performance due to a lack of understanding of species mix and micro-climate impacts	CDM Environment and Community Superintendent
01DY.01 - Planning for decommissioning works	Appropriate planning for decommissioning works.	Specifically identifies waste products to allow for their safe disposal on or off site.	CDM Environment and Community Superintendent
01DY.02 - Target revegetation species identified	Revegetation plan to identify appropriate species for purchase and outline process to meet requirements.	Achieve a species mix which will allow the completion criteria to be met.	CDM Environment and Community Superintendent
02PE.01 - Flocculant use achieving a stiff tailings deposition	Operational strategy is the use of flocculant, leading to a very stiff material which would constrain any release.	Addresses long term escape of stored tailings.	CDM Operations Manager
02PE.02 - External supplier of seeds	External supplier of seeds to address quality and availability of appropriate seed mix.	Addresses potential for poor germination rates and inappropriate seed mix.	CDM Environment and Community Superintendent
02PE.03 - Site security, fencing, etc.	Prevention of unwanted access through site security, including fencing of lease, demarcation and signage, and exclusion of stock.	Addressing potential for overgrazing, access by unwanted third parties or feral animal access to the site.	CDM Operations Manager
02PE.04 - Gypsum remediation to improve run-off	Gypsum remediation assists in improving run-off quality.	Addressing poor quality run-off from the site.	CDM Environment and Community Superintendent
02PE.05 - Stockpiling rock for hydraulic breaks	Rock material for hydraulic breaks over tailings is stockpiled in sufficient amounts.	Addressing hydraulic erosion of the TSF dam wall (and other dam walls, drains, etc.).	CDM Operations Manager
02PE.06 - Capping of TSF	PRCP includes procedures for, and description of, capping requirements for the TSF.	Addressing potential for incomplete capping of the tailings storage facility.	CDM Mine Planning Superintendent
02PE.07 - Bunding and barricading of voids and steep slopes	Construct a safety bund wall of suitable material and/or fencing to limit human and livestock/animal access.	Addressing potential for injury to members of the public or livestock at the site.	CDM Mine Planning Superintendent
02PE.08 - Design minimises water reporting to voids	Executed designs minimise the catchment reporting to the void.	Addressing the unwanted build-up of water in site voids.	CDM Operations Manager
02PE.09 - Over-topping buffer in site voids	Significant buffer before over-topping and final void water balance indicates a very low risk of spill (<1% annual exceedance probability).	Addressing potential for over-topping of site voids post-mining.	CDM Environment and Community Superintendent
02PV.01 - Planning process to identify all heritage items	Planning and survey process to identify all heritage items so that they can be avoided.	Addressing potential to damage a heritage site, thereby degrading environmental values in an area.	CDM Environment and Community Superintendent
02PV.02 - Site land disturbance permits	Site land disturbance permits will be completed to manage localised disturbance and prevent impacts to specific features.	Preventing damage to heritage sites, natural features or other sensitive locations.	CDM Environment and Community Superintendent
02PV.03 - Utilising already disturbed footprints	Where possible, work will occur within already disturbed footprints to prevent excess disturbance.	Preventing disturbance to less affected items of environmental value.	CDM Operations Manager
02PV.04 - Rehabilitation protocols	Rehabilitation protocols in place to regulate planting, monitoring and selecting appropriate species of vegetation.	Minimise the potential that planted species will not lead to meeting required environmental values at closure.	CDM Environment and Community Superintendent

**Table 23 (Continued)  
Controls, Management and Mitigation Measures**

Control Name	Expectation	Selection Reason	Responsible
02PV.05 - Long mine life (~75 years)	The long mine life (~75 years) means there is sufficient time to adjust the vegetation strategy based on results.	Having a long mine life addresses the potential for seasonal variations to misrepresent the effectiveness of rehabilitation efforts.	CDM Operations Manager
02PV.06 - Erosion and sediment control	Existing erosion and sediment control methodologies are informed by geochemical assessments and site operating knowledge.	Protecting against releases to the wider environment during construction and for the longer-term landform.	CDM Environment and Community Superintendent
02PV.07 - Timing for access to rehabilitated areas	Subsequent land holders could not access the land until the mining leases are relinquished and CDM sells the land to a subsequent party.	Prevents damage to the rehabilitated areas by third parties.	CDM Operations Manager
02PV.08 - Cleared vegetation is mulched or burnt unless retained	Vegetation is mulched or burnt unless retained for rehabilitation.	Addresses potential for unwanted species in the rehabilitated areas.	CDM Operations Manager
02PV.09 – Waste rock handling procedures	Waste rock handling procedures lead to adequate capping (to prevent any spontaneous combustion threats).	Addressing potential for spontaneous combustion in dumps or stockpiles.	CDM Mine Planning Superintendent
02PY.01 - Works conducted by suitably qualified and experienced contractors	Works conducted by suitably qualified contractors including permits for disposing of any contaminated materials, to ensure professional outcomes.	This business input/control is intended to minimise the potential for poor execution of required works. It is supported by appropriate supervision, inspection and test plans, and formal contractual arrangements to optimise the outcomes from any works.	CDM Operations Manager
02PY.02 - Specific guidelines for hazardous chemicals	Specific guidelines in place that address any hazardous materials on site.	To minimise the outcome from any hazardous materials brought to, used or created by the operating site.	CDM Health Safety and Training Superintendent
03SV.01 - Database which tracks all known heritage items	Database which tracks all known heritage items is maintained.	To identify, geo-locate and characterise all items within proximity of the site and workings.	CDM Environment and Community Superintendent
03SV.02 - Two yearly internal independent environmental audits	Two yearly internal (to the company) independent (to the site) environmental audits undertaken and any recommendations are reviewed and actions tracked.	Challenge any slippage of standards and identify emerging conditions that may require additional resources to be allocated.	CDM Operations Manager
03SV.03 - RPQ involvement in TSF design	RPQ involvement with the TSF design as a regulated structure and subject to annual inspections.	Addressing potential instability in the TSF.	CDM Operations Manager
03SV.04 – PRCP amendment process	Processes available for amending PRCP in the event of a requirement to close the mine early (meeting requirements of a stable landform).	Reducing the potential for delivered rehabilitation not meeting community expectations.	CDM Operations Manager
03SV.05 - Topsoil management	Topsoil management described in PRCP (includes identifying the resource, addressing/treating any sodic soils, stockpiling to preserve soil quality, site wide topsoil study, monitoring of topsoil pre-rehab to confirm nutrient and soil chemistry levels/requirements and topsoil balance reporting).	Addressing potential for topsoil to not meet rehabilitation growing requirements.	CDM Operations Manager
03SV.06 - Rehabilitation design, monitoring and maintenance	Quantity of required species and monitoring of germination rates is defined in the PRCP. The plan also covers monitoring of general rehabilitation performance and required maintenance works.	Addressing failure to execute rehabilitation works in line with PRCP requirements.	CDM Operations Manager
03SV.07 - Weed and pest control management	Weed and pest control management described in the PRCP.	Addressing potential for rehabilitation failure due to weeds or invasive pests.	CDM Operations Manager
03SV.08 - Water quality monitoring	Water quality monitoring is undertaken for site dams and the receiving environment.	Addressing potential for cumulative impacts from poor quality water presence or release.	CDM Environment and Community Superintendent
03SV.09 – Mine voids are groundwater sinks	Groundwater modelling of long-term performance indicates that voids will continue to act as ground water sinks.	Addressing unintended releases to, or draw from, groundwater/aquifers.	CDM Environment and Community Superintendent
03SY.01 - Monitoring and adaptive management programs	Monitoring and adaptive management programs which determine relevant conditions and provide modification (within design parameters) of activities to achieve design goals.	To prevent changes in performance from becoming more significant by reducing the impact of an emerging condition/threat.	CDM Environment and Community Superintendent
03SY.02 – Regular review of milestones and completion criteria	Milestone and completion criteria to confirm outcomes are being achieved.	Prevent any long-term slippage of progressive rehabilitation.	CDM Environment and Community Superintendent
03SY.03 - Annual reporting of PRCP progress	Annual reporting of PRCP progress to the relevant regulators.	Minimise the potential for executed rehabilitation drifting from the PRCP Schedule.	CDM Operations Manager
03SY.04 - Third party grazing agreements	Any third party grazing would be in accordance with appropriate license terms (Rural licence agreements).	Addressing unmanaged access to rehabilitated areas by third parties conducting rural businesses.	CDM Operations Manager
03SY.05 - Contractor management and protocols	Contractor management to confirm site requirements/expectations are met.	Addressing poorly executed works being performed by contractors.	CDM Operations Manager
03SY.06 - Water management plan	Water management plan with clean and dirty water diversions around the pit.	Addressing potential for unwanted collection, storage or release of waters on the site during operations and post closure.	CDM Environment and Community Superintendent
04TV.01 - Guidance on gas borehole decommissioning	Gas borehole guidance on decommissioning - that leads to a removal of any threats.	To minimise potential for unexpected legacy drill holes and associated features.	CDM Operations Manager
04TV.02 - Internal reporting of any non-compliances	Internal reporting of any non-compliances in order to alert management to any emerging threats and required allocation of resources.	Minimise the extent to which rehabilitation works fail to meet requirements of the PRCP.	CDM Environment and Community Superintendent
04TV.03 - Government rehabilitation bonds in place	Government holds rehabilitation security/bonds which are sufficient to return the site to a stable, suitable landform in the event of the company failing.	Addresses failure of the company.	CDM Operations Manager

### 3.6.3 Rehabilitation Trials

Rehabilitation activities at the CDM will continue as an iterative process, progressively building on the results and outcomes from previous years, with each previous round of rehabilitation informing future work.

As the CDM is in the early stages of operation and associated progressive rehabilitation, all rehabilitation activities are currently considered to be rehabilitation trials. As rehabilitation progresses, Syntech will review the outcomes and adopt methodologies from the rehabilitation areas considered to be the most successful.

Syntech has also planned to undertake future rehabilitation trials, including stocking rate trials and species trials for diversion areas.

The stocking rate trials will be designed and undertaken to validate the carrying capacity of the rehabilitation areas. The stocking rate trials will be based on the stocking rates used for surrounding properties with the same light intensity grazing PMLU.

Species trials for diversion areas will be undertaken to confirm the viability of the proposed revegetation species for these areas. The trial will be commenced once the diversion of Drainage Line 1 has been constructed (anticipated to be completed in 2023) and will monitor and analyse the success rates of various revegetation species along the diversion.

### 3.7 MONITORING AND MAINTENANCE

#### 3.7.1 Milestone Monitoring

Successful revegetation outcomes rely on an integrated and adaptive approach to risk identification and control. Monitoring plays an integral part within the overall management strategy, as it will enable early detection of any risks to revegetation areas as well as the effectiveness of risk management actions undertaken. Effective monitoring will enable significant processes or trends to be detected and, where required, appropriate management actions to be implemented.

The monitoring program is split into two phases, an establishment phase and a maintenance phase (Table 24). Areas of native vegetation (i.e. Scenarios 2 and 3) have longer establishment and maintenance phases because tree and shrub species will be planted in addition to direct seeding of grasses and forbs.

**Table 24  
Revegetation Phases**

Phase	Definition	Anticipated Timeframe (Years)	
		Scenario 1	Scenarios 2 & 3
Establishment	The period required for revegetated areas to become self-reliant without watering in normal seasonal conditions.	2	5
Maintenance	The period of growth post-establishment until the time that the revegetated plants become dominant and self-sustaining on the site.	3-5	6-20

A summary of the proposed monitoring methods for each vegetation scenario is provided in Table 25 and discussed in further detail in the Revegetation Plan (Appendix K).

Rehabilitation monitoring sites will be established following the completion of each rehabilitation area. Monitoring at these sites will include:

- one fixed 50 m transect;
- one 50 m x 10 m plot (centred on the 50 m transect); and
- five 1 m x 1 m quadrats (at 10 m intervals along the transect, alternating sides).

Sites will be placed at random within newly established rehabilitation polygons, at a density of approximately one site per 10 hectares. The data to be collected in each plot/subplot is summarised in Table 25 and discussed further below. Photographic records and GPS locations for all monitoring sites and observed issues will be kept up to date in an appropriate database. To monitor revegetation progress, the data for each vegetation scenario will be averaged across monitoring sites established in similar timeframes and compared to the corresponding reference sites.

Newly revegetated areas will be monitored at one and two years after seeding/planting, with early survivorship assessments also undertaken at zero, three, six and 12 months after completion. Revegetated areas more than two years old will then be monitored at five and ten years of age. Mature revegetation areas older than ten years of age will be monitored every five years with the aim of compiling sufficient evidence of success to achieve completion criteria.

**Table 25**  
**Monitoring Methods for Rehabilitation Milestones**

Performance Indicator	Completion Criteria	Monitoring Method	Monitoring Measurement/ Analysis	Scenario 1	Scenario 2	Scenario 3	Establishment	Maintenance
Landform Stability and Erosion	Site is stable when comparing photographs from successive monitoring events, for a period of five years post-mining.	Vegetation monitoring	Photo monitoring (at centre of 50 m transect)	✓	✓	✓	✓	✓
	Limited active erosion, similar to the levels present in reference sites. No maintenance required to cease active erosion.		Line intercept (50 m transect)	✓	✓	✓	✓	✓
	Limited erosion (presence of sheets, rills and gullies) similar to vegetation reference sites, for a period of five years post-mining.		Line intercept (50 m transect)	✓	✓	✓	✓	✓
	Erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.	Documentation review	N/A	✓	✓	✓	✓	✓
Topsoil Characterisation	Hydrocarbon, heavy metal or other contamination levels are within relevant DES limits.	Soil sampling	Heavy metals scan, Hydrocarbons	✓	✓	✓	✓	
	Salinity levels of less than 0.6 dS/m in soil root zone or less than 110% of comparable reference sites.		Salinity (dS/m)	✓	✓	✓	✓	
	Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.		Cation Exchange Capacity (CEC)	✓	✓	✓	✓	

**Table 25 (Continued)**  
**Monitoring Methods for Rehabilitation Milestones**

Performance Indicator	Completion Criteria	Monitoring Method	Monitoring Measurement/ Analysis	Scenario 1	Scenario 2	Scenario 3	Establishment	Maintenance
Ecosystem Functionality and Sustainability	Litter density comparable to vegetation reference sites.	Vegetation monitoring	Groundcover quadrats (1 m x 1 m quadrats)	✓	✓	✓		✓
	Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.		Species list and recruitment (50 m x 10 m plot)	✓	✓	✓		✓
	Evidence of generational succession of trees and shrubs is apparent in rehabilitation areas.		Recruitment (50 m x 10 m plot)		✓	✓		✓
	Native vegetation comparable to designated reference sites.		Tree Height (50 m x 10 m plot)		✓	✓		✓
			Species list (50 m x 10 m plot)		✓	✓		✓
			Shrub cover using Line intercept (50 m transect)		✓	✓		✓
			Tree cover using line intercept (50 m transect)		✓	✓		✓
Light-intensity Grazing Suitability	70% established and persistent groundcover at land suitability classes 3 to 4, and at least 50% at land suitability class 5	Vegetation monitoring	Groundcover quadrats (1 m x 1 m quadrats)	✓	✓	✓		✓
	Vegetation consistent with pasture grass species suitable for grazing		Species list (50 m x 10 m plot)	✓	✓	✓	✓	✓
	Stocking rates in rehabilitated pasture areas are comparable to designated reference sites.		Carrying capacity (head per 100 ha)	✓	✓	✓	✓	✓

**Table 25 (Continued)**  
**Monitoring Methods for Rehabilitation Milestones**

Performance Indicator	Completion Criteria	Monitoring Method	Monitoring Measurement/ Analysis	Scenario 1	Scenario 2	Scenario 3	Establishment	Maintenance
Pest Flora and Fauna	Evidence of weed management being successful by weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.	Vegetation monitoring	Species list (50 m x 10 m plot)	✓	✓	✓	✓	✓
	Evidence of weed management being successful by weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.		Groundcover quadrats (1 m x 1 m quadrat)	✓	✓	✓	✓	✓
	Evidence of weed management being successful by weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.		Density (stems/ha) per species (50 m x 10 m plot)	✓	✓	✓	✓	✓
	Pest species do not occur in substantial numbers or visibly affect the development of native plant species.		Observations and analysis of vegetation monitoring (50 m x 10 m plot)	✓	✓	✓	✓	✓

### 3.7.1.1 Reference Sites

Twelve reference sites were established at the commencement of operations in 2010 to provide a comparable benchmark for rehabilitation monitoring sites to determine rehabilitative success (Figure 24).

Table 26 lists the reference sites and links each to a certain revegetation scenario, for which it will be used to provide comparable benchmarks to determine revegetation success.

**Table 26**  
**Rehabilitation Reference Sites**

Site	Easting	Northing	Applicable ecosystem/ rehab domain
Reference Site 1	234290	7048088	Scenario 1 - Light Intensity Grazing
Reference Site 2	236135	7047974	Scenario 1 - Light Intensity Grazing
Reference Site 3	235563	7054118	Scenario 2 - Light Intensity Grazing (with native veg regrowth)
Reference Site 4	234521	7054554	Scenario 2 - Light Intensity Grazing (with native veg regrowth)
Reference Site 5	233167	7054747	Scenario 2 - Light Intensity Grazing (with native veg regrowth)
Reference Site 6	234671	7053268	Scenario 1 - Light Intensity Grazing
Reference Site 7	239275	7054092	Scenario 2 - Light Intensity Grazing (with native veg)
Reference Site 8	240205	7049527	Scenario 2 - Light Intensity Grazing (with native veg)
Reference Site 9	240752	7050979	Scenario 1 - Light Intensity Grazing
Reference Site 10	238848	7047878	Scenario 1 - Light Intensity Grazing
Reference Site 11	237805	7046951	Scenario 1 - Light Intensity Grazing
Reference Site 12	236287	7047724	Scenario 2 - Light Intensity Grazing (with native veg)

### 3.7.1.2 Survivorship Assessment

Monitoring the survivorship of newly planted stock will commence immediately after planting (i.e. month zero) to obtain baseline data and then at three, six- and 12-month intervals thereafter.

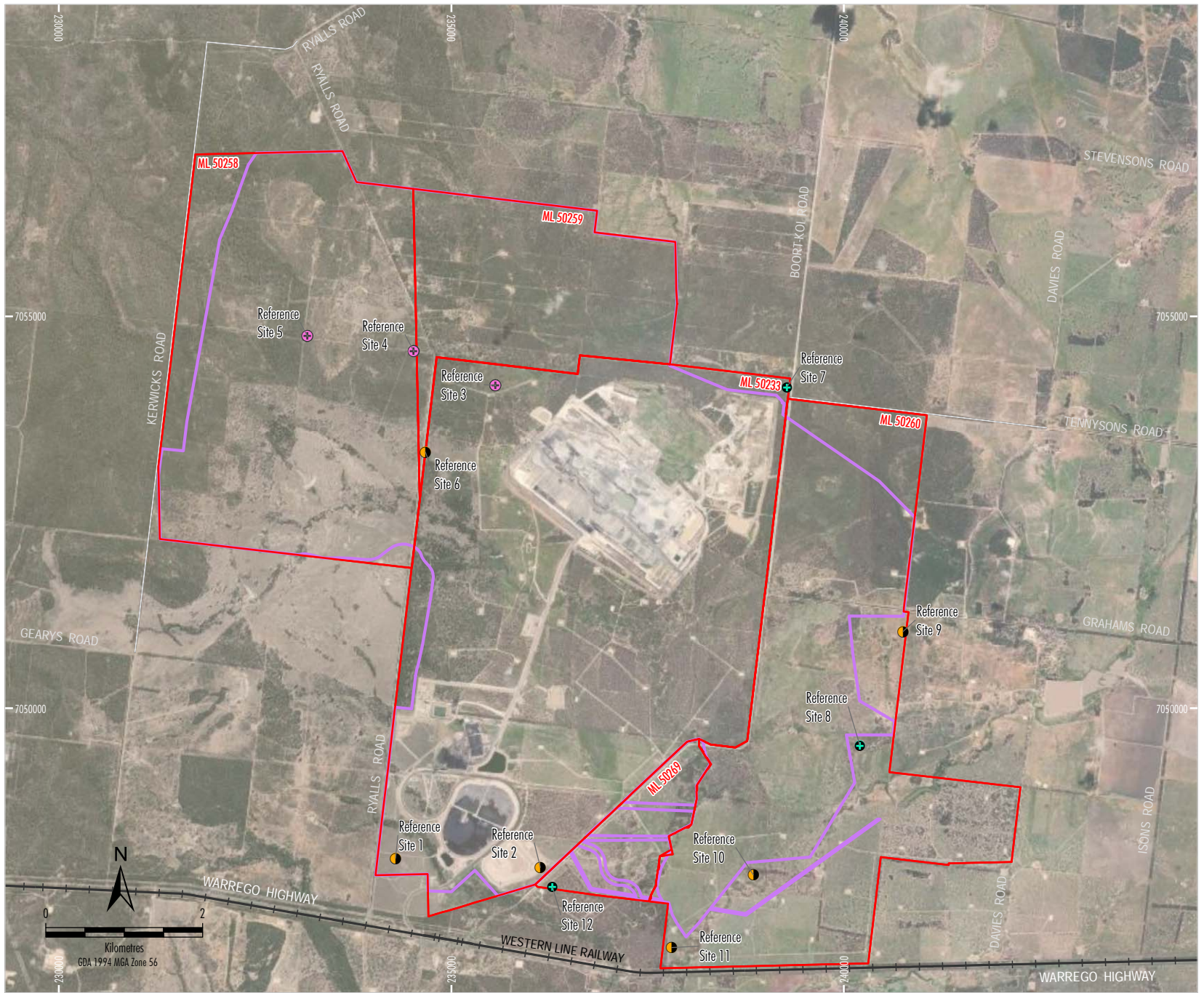
All surviving stock along the transect will be counted. If survivorship is less than 70%, supplementary planting will be undertaken.

Note that monitoring the survivorship of stock does not need to be undertaken by an Ecologist.

### 3.7.1.3 Landform Stability and Erosion

At the centre point of the transect (25 m), four (4) landscape photos (north, south, east and west) will be taken to record and assess site stability.

An estimation of the prevalence of erosion features, including sheets, rills and gullies along the 50 m transect will be made using the line intercept method. The start and end points of erosion features as they intersect the 50 m transect will be recorded, allowing total length of erosion features to be compared with reference site values.



- LEGEND**
- Mining Lease Boundary
  - Maximum Approved Disturbance Footprint
- Existing Rehabilitation Reference Site
- Scenario 1 - Light Intensity Grazing
  - ⊕ Scenario 2 - Light Intensity Grazing (with native veg regrowth)
  - ⊕ Scenario 2 - Light Intensity Grazing (with native veg)

Source: The State of Queensland (2020); Syntech Resources (2021)  
 Orthophoto: 2016; Esri, DigitalGlobe (2017)

  
**CAMEBY DOWNS MINE**  
 Existing Rehabilitation Reference Sites

**Figure 24**

#### 3.7.1.4 *Topsoil Characterisation*

Soil sampling will be undertaken at all monitoring sites during the establishment phase and subsequently if further investigation is required based on other monitoring data (e.g. persistent poor performance in relation to ground cover, erosion etc.).

Soil sampling will generally be undertaken according to the following methodology:

- At the 20 m mark and 40 m mark of each transect, a small area (25 cm by 25 cm) will be cleared of loose surface vegetation, litter and debris to avoid inclusion in the soil sample. Where grass and/or other growing vegetation is present, the vegetation will be cut off at ground level and discarded.
- A clean spade will be used to collect two 0.25 L soil samples to a depth of 10 cm below the surface of the soil.
- The two samples will be combined in a clean plastic clip seal bag (total soil sample approximately 0.5 L) and labelled with site name, monitoring point identifier, collection date and collector's name using a permanent marker.
- Labelled soil samples will be sent for analysis as soon as possible following collection.

#### 3.7.1.5 *Ecosystem Functionality and Sustainability*

##### ***Groundcover and Organic Litter***

For the 1 x 1 m quadrats, groundcover will be split into the following components: native perennial grass cover, native forb cover, pasture grass cover, non-native grass cover (that are not pasture species), non-native forb cover and leaf litter, rock and bare ground. Groundcover will be measured by a vertical projection downwards of the living and attached plant material.

##### ***Plant Species List / Richness***

All pasture and native flora species within the 50 m by 10 m plot (i.e. 5 m either side of the central transect) will be recorded. The presence or absence of reproductive structures (flowers and /or fruit) per species will be noted.

##### ***Evidence of Generational Succession***

The recruitment attribute assesses the presence of regeneration of the dominant tree and shrub species in the 50 m x 10 m plot. Recruitment is assessed as the proportion of dominant species present at a site that are regenerating.

##### ***Tree Canopy Height***

Tree canopy height (measured to the top of the highest leaves) refers to the median canopy height in metres, estimated for the trees in the ecologically dominant layer (EDL) or canopy layer within the 50 m x 10 m plot. The median canopy height is the height that has 50% of canopy trees higher and lower than it.

### ***Tree and Shrub Cover***

An estimation of the percentage canopy cover of the living, native tree layer along the 50 m transect will be made, using the line intercept method (Greig-Smith 1964). Canopy cover equates to crown cover as defined by Walker and Hopkins (1990). The vertical projection of the tree canopy over the 50 m transect will be recorded. The total length of the projected canopy of each layer is then divided by the total length of the tape to give an estimate of percentage canopy cover on the site, which then can be compared with the reference site value.

Shrub canopy cover refers to the estimate of the percentage cover of native shrubs recorded along the 50 m transect (similar to the estimation of tree canopy cover using a vertical projection of shrub crowns downwards over the centre line transect).

#### ***3.7.1.6 Light-intensity Grazing Suitability***

### ***Groundcover and Organic Litter***

For the 1 x 1 m quadrats, groundcover will be split into the following components: native perennial grass cover, native forb cover, pasture grass cover, non-native grass cover (that are not pasture species), non-native forb cover and leaf litter, rock and bare ground. Groundcover will be measured by a vertical projection downwards of the living and attached plant material.

### ***Plant Species List / Richness***

All pasture and native flora species within the 50 m by 10 m plot (i.e. 5 m either side of the central transect) will be recorded.

### ***Carrying Capacity***

Carrying capacity is measured as the number of head of cattle per 100 hectares. This is calculated by dividing the dry biomass required per head of cattle by the measured mean pasture biomass (kg/ha) of each monitoring plot and converting to head/100 ha.

To estimate pasture biomass, a 1 m height pole will be placed at the 26 m mark along the 50 m transect. A photo will then be taken at the 23 m mark facing the pole. The field of view for each photo will be aligned by tilting the camera down until the top of frame meets the horizon. The photos will then be compared to the Brigalow Belt Pasture Photo Standards to estimate biomass in tonnes per hectare (Future Beef, 2012).

#### ***3.7.1.7 Pest Flora and Fauna***

### ***Weed Density***

The number of stems or estimated foliage projective cover within the 50 m x 10 m plot of each non-pasture weed species will be recorded. The data will then be extrapolated to obtain the number of stems per ha.

For the 1 x 1 m quadrats, groundcover will be split into the following components: native perennial grass cover, native forb cover, pasture grass cover, non-native grass cover (that are not pasture species), non-native forb cover and leaf litter, rock and bare ground. Groundcover will be measured by a vertical projection downwards of the living and attached plant material.

### ***Pest Animal Browsing Damage***

Pest animal browsing damage is defined as any evidence of damage to planted grasses, shrubs and trees by wallabies, hares, rabbits etc. Where possible, the number of plants damaged within the 50 x 10 m plot will be counted. A score of 0 to 3 will then be assigned to the plot, with 0 being no damage, 1 being light damage, 2 being moderate damage and 3 being severe damage.

### **3.7.2 Rehabilitation Maintenance/Contingency**

#### **3.7.2.1 *Supplementary Planting***

If the survivorship assessment identifies a success rate of less than 70%, supplementary planting will be undertaken.

Details of the supplementary planting will be determined on a case-by-case basis.

#### **3.7.2.2 *Weed Control***

Weed control will be managed carefully to promote seedling growth and prevent ground cover from being reduced to a level where erosion risk is increased.

Weed control operations will typically be based on local spot spraying around native seedlings or tubestock. Broad scale herbicide application will generally be avoided due to the likelihood of damaging or killing grass cover and reducing site stability.

Three restricted species (two of which are Weeds of National Significance) are known to occur on the site. AusEcology (Appendix K) identifies these species and the best practice methods to control their spread. The frequency and intensity of control will depend on the size of infestations. Weed infestations will be recorded as part of the monitoring program and the data collected used to determine adequate control measures.

The following controls will be implemented to reduce the risks to safety and environment where appropriate:

- Herbicide applications will be primarily carried out by professional commercial operators, licenced under the *Agricultural Chemicals Distribution Control Act 1966*.
- Weed hygiene declarations for all equipment and vehicles brought onto the site will be up to date prior to arrival. An onsite inspection protocol for equipment and vehicles including personnel and contractor training will be developed and implemented.
- Work orders issued to contractors will stipulate constraints on spray operations, including weather constraints relating to wind, rainfall and temperatures.
- Work orders issued to contractors will include clear operations maps showing delineated work areas, boundaries of different treatment zones and locations of sensitive areas and weed hygiene boundaries.

#### **3.7.2.3 *Irrigation/Watering***

Irrigation/watering of seedlings and plantings will be undertaken as required during the establishment phase to maintain soil moisture at field capacity and to significantly increase plant survivorship. Hand watering or spraying from a water truck will be utilised where establishment of irrigation is not feasible or practicable.

#### 3.7.2.4 Erosion and Sediment Control

Erosion presents a key risk to the overall rehabilitation and revegetation outcomes. All aspects of the revegetation program will be managed with erosion risks as a key priority. Application of water to planting sites, soil disturbance around planted trees, weed control methods and general access to the planting sites are all aspects of the revegetation program that have high potential to cause erosion. Detailed instructions and appropriate supervision will be provided to personnel undertaking these activities to ensure erosion risk is managed.

For newly revegetated areas, the short-term priority will be to establish a suitable level of cover in the spring/early summer months so that there is significant erosion protection by December, which has been identified as the month of greatest erosion hazard on the site.

To reduce erosion risk, revegetation works will be scheduled to work upwards from the toe of slopes, with each windrowed line of topsoil being spread and rehabilitated progressively. Where practicable, a temporary bund will be formed at the upslope edge of the spread topsoil to divert flows originating upslope and prevent them from damaging newly revegetated areas.

#### 3.7.2.5 Pest Fauna and Livestock Control

The cane toad, feral pig, feral cat, brown hare, house mouse and European fox have been recorded on the site (Ecosure, 2018b). The presence and relative abundance of these pest species will be monitored at regular intervals.

Other animals likely to be encountered that represent a risk to revegetated areas include:

- Cattle and other livestock; and
- Wallabies.

Regular monitoring will be undertaken to detect any pest activity that may impact the revegetation. Where damage to planted trees (e.g. by browsing from wallabies, hares, and rabbits) is observed at significant levels, guards will be installed around trees in affected areas. Some level of replanting may also be required in these areas.

Feral pig control (trapping and shooting) will be instigated where damage to planted stock is observed during monitoring.

Damage from cattle and other livestock represents a key risk to the success of revegetated areas. Newly seeded / revegetated areas will be fenced sufficiently to exclude cattle and other livestock for the duration of the revegetation establishment and maintenance phases. Light intensity grazing will only be commenced when revegetated areas are sufficiently stable with appropriate levels of ground cover.

### 3.7.3 Reporting Requirements

#### 3.7.3.1 Annual Return

In accordance with section 316J of the EP Act, Syntech's Annual Return must include an evaluation of the effectiveness of:

- the actions taken in relation to each rehabilitation milestone or management milestone under the PRCP Schedule; and
- the environmental management carried out under the PRCP Schedule.

The evaluation must state whether any rehabilitation milestones or management milestones to be completed under the PRCP Schedule during the year have been met and whether Syntech has complied with the conditions imposed on the PRCP Schedule.

### 3.7.3.2 *Progressive Certification*

Under section 318Z of the EP Act, the administering authority may certify that a particular area within a relevant tenure for a resource project has been rehabilitated under all relevant requirements of the EP Act, EA EPML00900113, a PRCP Schedule and any relevant guidelines or documents made under the EP Act.

As required by section 318ZF of the EP Act, the progressive certification report must:

- contain the following information:
  - information showing how the rehabilitation milestones and management milestones under the PRCP Schedule have been achieved; and
  - information about the extent to which the relevant conditions stated in the PRCP Schedule have been complied with;
- include:
  - a map of an appropriate scale that shows the proposed certified area; and
  - relevant information to locate the proposed certified area, including, for example, GPS information or a survey; and
- if progressive certification has previously been given for a relevant tenure for the environmental authority:
  - state when the certification was given; and
  - identify the certified area.

### 3.7.3.3 *Surrender Application*

Under section 257 of the EP Act, Syntech may apply to the administering authority to surrender the EA (EPML00900113) if, under the *Mineral Resources Act 1989*, Syntech has sought a conditional surrender for all, or part of, a relevant mining tenure.

The surrender application must be accompanied by a compliance statement for the EA, the PRCP Schedule and the conditions imposed on the schedule. The compliance statement must state:

- the extent to which relevant activities carried out under the environmental authority have complied with the conditions of the authority;
- whether the rehabilitation milestones and management milestones under the PRCP Schedule have been met; and
- the extent to which conditions imposed on the schedule have been complied with.

### 3.7.4 Auditing

In accordance with section 285 of the EP Act, Syntech must commission an audit of the PRCP Schedule by a rehabilitation auditor for the following periods:

- the three-year period starting on the day the schedule takes effect; and
- each three-year period starting on the day after the previous audit period ended.

Syntech must, within four months after the end of each audit period, give the administering authority the rehabilitation auditor's report and a declaration for the audit report stating that Syntech has not knowingly given false or misleading information to the rehabilitation auditor and has given all relevant information to the rehabilitation auditor.

In accordance with section 286 of the EP Act, an audit report for a PRCP Schedule must be in the approved form, and include the following:

- a statement about whether the holder has complied with the schedule during the audit period, including:
  - details of actions Syntech has taken, or failed to take, in relation to the rehabilitation milestones and management milestones under the schedule; and
  - whether Syntech has complied, or failed to comply, with conditions imposed on the schedule; and
  - whether information given to the administering authority about rehabilitation carried out under the PRCP schedule is accurate;
- an assessment of whether the PMLU for land the subject of the PRCP Schedule is likely to be achieved, having regard to the rehabilitation that has been and is to be carried out under the schedule; and
- recommendations about actions Syntech should take to ensure rehabilitation milestones and management milestones are achieved or conditions of the PRCP Schedule are complied with.

In addition to the mandatory three-yearly audits, the administering authority has the power (under section 322 of the EP Act) to issue an audit notice, which requires the holder of a PRC Plan schedule to commission an audit.

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ATTACHMENT 1

ENVIRONMENTAL AUTHORITY EPML00900113

# Permit

*Environmental Protection Act 1994*

## Environmental Authority EPML00900113

*This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.*

**Environmental authority number: EPML00900113**

**Environmental authority takes effect on 18 June 2020**

**Environmental authority holder(s)**

Name(s)	Registered address
SYNTECH RESOURCES PTY LTD	Darling Park - Tower 2, Level 18, 201 Sussex Street Sydney NSW 2000

**Environmentally relevant activity and location details**

Environmentally relevant activity/activities	Location(s)
Schedule 3 13: Mining black coal	ML50233; ML50258; ML50259; ML50260; ML50269
Ancillary 31 - Mineral processing 2: Processing, in a year, the following quantities of mineral products, other than coke (b) more than 100,000t	ML50233; ML50258; ML50259; ML50260; ML50269
Ancillary 60 - Waste disposal 1: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a) (a) less than 50,000t	ML50233; ML50258; ML50259; ML50260; ML50269
Ancillary 63 - Sewage Treatment 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	ML50233; ML50258; ML50259; ML50260; ML50269

**Additional information for applicants**

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any

inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

#### Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days);

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website [www.qld.gov.au](http://www.qld.gov.au), using the search term 'duty to notify'.

#### Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Sustainable Planning Act 2009* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Juliana McCosker  
Department of Environment and Science  
Delegate of the administering authority  
*Environmental Protection Act 1994*

**Enquiries:**  
Business Centre (Coal)  
Department of Environment and Science  
PO Box 3028  
EMERALD QLD 4720  
Phone: (07) 4987 9320  
Email: CRMining@des.qld.gov.au

**Date issued: 18 June 2020**

### Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

### Conditions of Environmental Authority

The environmentally relevant activity(ies) conducted at the location as described above must be conducted in accordance with the following site-specific conditions of approval.

This environmental authority consists of the following Schedules and Appendices:

Schedule A	General
Schedule B	Air
Schedule C	Waste
Schedule D	Noise
Schedule E	Water
Schedule F	Sewerage Treatment
Schedule G	Land
Schedule H	Regulated Structures
Attachment 1:	Approved disturbance footprint – Cameby Downs Coal Mine
Attachment 2:	Mine affected water release points and receiving water monitoring locations
Attachment 3:	Approved levees and water diversions during life of mine, and other final landforms
Attachment 4:	Current and proposed groundwater bore locations
Attachment 5:	Sewage treatment plant and effluent disposal
Attachment 6:	Rehabilitation Requirements
Attachment 7:	Final Residual Voids Design

Schedule A: General	
Condition number	Condition
A1	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
Authorised activities	
A2	The environmental authority holder must only conduct mining activities in the area defined in <b>Table A1: Mining Domains</b> and <b>Attachment 1: Approved disturbance footprint – Cameby Downs Coal Mine</b> .

Table A1 – Mining Domains

Mine Domain	Maximum Disturbance Area (Ha)+	Location
Open-cut voids and walls (includes ramps, high, low and end walls)	3,536	See Attachment 1
Mine infrastructure (includes CHPP, ROM stockpiles, workshops, administration areas, and other associated minor infrastructure, plant and activities)	1,027	
Out-of-pit spoil dumps (including out of pit rejects)	745	
Water management areas (including mine affected water dams, raw water dams and water management infrastructure)*	293	
<b>Total</b>	<b>5,601</b>	

+ Total disturbance area not including progressive rehabilitation of the mine site.

\* Excluding levees and clean water diversions (progressively developed) that are already accounted in other domains.

Condition number	Condition
A3	<p><b>Estimated Rehabilitation Cost (ERC)</b></p> <p>The environment authority holder must not carry out, or allow the carrying out of, a resource activity under this environment authority unless:</p> <ul style="list-style-type: none"> <li>a) An ERC decision is in effect for the resource activity being carried out;</li> <li>b) The environmental authority holder has paid a contribution to the scheme fund or given a surety for the environmental authority under the <i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i>; and</li> <li>c) The environmental authority holder has complied with the requirements under the <i>Mineral and Energy Resources (Financial Provisioning) Act 2018</i> for paying a contribution to the scheme fund, or giving a surety for the authority, as required from time to time.</li> </ul>
A4	<p><b>New Estimated Rehabilitation Cost (ERC) decision before expiry</b></p> <p>When an ERC decision is in force for this environment authority, the environmental authority holder must apply, under section 298 of the <i>Environmental Protection Act 1994</i>, for a new ERC decision, at least three (3) months before the ERC period to which the decision relates ends.</p>
A5	<p><b>When holder must re-apply for Estimated Rehabilitation Cost (ERC) decision</b></p> <p>When ERC decision is in force for this environmental authority, the environmental authority holder must re-apply within ten (10) business days under section 298 of the <i>Environmental Protection Act 1994</i> for an ERC decision when:</p> <ul style="list-style-type: none"> <li>a) there is an increase in the likely maximum amount of disturbance to the environment as a result of the holder carrying out the resource activity; or</li> <li>b) there is a change relating to the carrying out of the resource activity that may result in an increase in the ERC for the resource activity.</li> </ul>
A6	<p><b>Maintenance of measures, plant and equipment</b></p> <p>The environmental authority holder must:</p> <ul style="list-style-type: none"> <li>a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;</li> <li>b) maintain such measures, plant and equipment in a proper and efficient condition;</li> <li>c) operate such measures, plant and equipment in a proper and efficient manner; and</li> <li>d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.</li> </ul>
A7	<p><b>Monitoring records</b></p> <p>All monitoring records or reports required by this environmental authority must be kept for a period of not less than <b>five (5) years</b>.</p>

<b>A8</b>	Upon request from the administering authority, copies of monitoring records and reports will be made available and provided to the administering authority within <b>ten (10) business days</b> , or an alternative timeframe agreed between the administering authority and the environmental authority holder.
<b>A9</b>	Where monitoring is a requirement of this environmental authority, the environmental authority holder must ensure that all monitoring required under a condition of this environmental authority is performed by a suitably qualified person(s).
<b>A10</b>	<p><b>Notification of emergencies, incidents and exceptions</b></p> <p>The environmental authority holder must notify the administering authority via the Pollution Hotline, (or WaTERS where applicable) or its successor, within <b>twenty-four (24) hours</b>, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.</p>
<b>A11</b>	<p>In the event the environmental authority holder is required to give notification to the administering authority of an event or release under <b>Condition A9</b>, the notification must include the following:</p> <ul style="list-style-type: none"> <li>a) the environmental authority number;</li> <li>b) the holder of the environmental authority;</li> <li>c) the name and telephone number of a designated contact person who is able to provide information to the administering authority on behalf of the environmental authority holder in relation to the event or release;</li> <li>d) the location of the event or release, including a physical address and lot on plan description (if available) and any other information necessary to identify the specific location of the event of release;</li> <li>e) the time of the event or release (if known);</li> <li>f) the time the environmental authority holder became aware of the event or release;</li> <li>g) if the event or release has impacted, or may impact on, a person's land – whether the person whose land has been, or may be, impacted by the event or release has been notified;</li> <li>h) the suspected cause of the event or release;</li> <li>i) the environmental harm caused, threatened, or suspected to be caused by the event or release; and</li> <li>j) actions taken to prevent any further incident and mitigate any environmental harm caused by the incident.</li> </ul>

<b>A12</b>	<p>Within <b>ten (10) business days</b> following the notification as per <b>Condition A10</b> of any event or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following:</p> <ul style="list-style-type: none"> <li>a) results and interpretation of any samples taken and analysed;</li> <li>b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and,</li> <li>c) proposed actions to prevent a recurrence of the event or incident.</li> </ul>
<b>A13</b>	<p><b>Complaints</b></p> <p>The environmental authority holder must record all environmental complaints received about the mining activities including:</p> <ul style="list-style-type: none"> <li>a) name, address and contact number of the complainant;</li> <li>b) time and date of the complaint;</li> <li>c) reasons for the complaint;</li> <li>d) investigations undertaken;</li> <li>e) conclusions formed;</li> <li>f) actions taken to resolve the complaint;</li> <li>g) any abatement measures implemented; and</li> <li>h) person responsible for resolving the complaint.</li> </ul>
<b>A14</b>	<p>The person undertaking the authorised mining activity must investigate any complaints of nuisance or environmental harm (which is neither frivolous nor vexatious, nor based on mistaken belief, in the opinion of the administering authority).</p>
<b>A15</b>	<p>The environmental authority holder must, when requested by the administering authority, undertake relevant specified monitoring to investigate any complaint of environmental harm. The environmental authority holder must:</p> <ul style="list-style-type: none"> <li>a) within a timeframe agreed to by the administering authority, commence monitoring;</li> <li>b) undertake the monitoring for a duration agreed to by the administering authority; and</li> <li>c) provide a report to the administering authority within <b>ten (10) business days</b> of completion of the investigation, or no later than <b>ten (10) business days</b> after the end of the timeframe nominated by the administering authority to undertake the investigation.</li> </ul>

<b>A16</b>	<p>Where monitoring undertaken in accordance with <b>Condition A14</b> indicates the occurrence of environmental harm or nuisance, the environmental holder must:</p> <p>a) address any complaint including the use of appropriate dispute resolution, if required; and,</p> <p>b) immediately implement abatement measures so that the environmental harm or nuisance to which the complaint relates ceases or no longer negatively impacts the sensitive receptor or commercial place.</p>
<b>A17</b>	<p><b>Risk Management</b></p> <p>The environmental authority holder must develop, implement and review annually a risk management system for all stages of mining activities, which mirrors the content requirement of the <i>Standard for Risk Management (ISO31000:2009)</i>, or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management.</p>
<b>A18</b>	<p><b>Third-party reporting</b></p> <p>The environmental authority holder must nominate an appropriately qualified independent, third party auditor to audit compliance with the conditions of this environmental authority. The third-party audit must be completed by <b>31 January 2020</b>, and then at regular intervals not exceeding <b>thirty-six (36) months</b>.</p>
<b>A19</b>	<p>Within <b>3 months</b> of completing the audit required by <b>Condition A18</b>, provide a written report to the administering authority that has been certified by the appropriately qualified independent third party auditor, detailing any non-compliance issues that were found (if no non-compliance issues were found this should be stated in the report). If non-compliance issues were found the report must also address:</p> <p>a) actions taken by the environmental authority holder to ensure compliance with this environmental authority; and</p> <p>b) actions taken to prevent a recurrence of non-compliance.</p>
<b>A20</b>	<p>Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the environmental authority holder must:</p> <p>a) comply with the amended or changed standard, policy or guideline within <b>two (2) years</b> of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, and,</p> <p>b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.</p>

<b>A21</b>	<b>Scope of activity</b>  This environmental authority authorises the mining of no more than <b>3.5 million tonnes</b> of run of mine (ROM) ore per annum.
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Schedule B: Air	
Condition number	Condition
B1	<p>The environmental authority holder must ensure that avoidance and mitigation measures outlined in the Air Quality Management Plan required by <b>Condition B4</b> are employed so that the dust and particulate matter emissions generated by the mining activities do not cause exceedances of the following levels when measured at any sensitive or commercial place:</p> <ul style="list-style-type: none"> <li>a) Dust deposition of 120 milligrams per square metre per day, averaged over 1 month, when monitored in accordance with the most recent version of Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter – Gravimetric method, 2003 (or more recent editions).</li> <li>b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time (excluding natural events such as bushfires and dust storm), when monitored in accordance with the most recent version of either: <ul style="list-style-type: none"> <li>a) Australian Standard AS3580.9.6 of 2003: Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM<sub>10</sub> high volume sampler with size-selective inlet – Gravimetric method; or</li> <li>b) Australian Standard AS 3580.9.8 of 2008: Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM<sub>10</sub> continuous direct mass method using a tapered element oscillating microbalance (TEOM) analyser, or</li> <li>c) Australian Standard AS 3580.9.11 of 2008: Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM<sub>10</sub> beta attenuation monitors.</li> </ul> </li> <li>c) A concentration of particulate matter suspended in the atmosphere of 90 micrograms per cubic metre over a 1 year averaging time, when monitored in accordance with the most recent version of AS/NZS3580.9.3 of 2003: Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—Total suspended particulate matter (TSP)—High volume sampler gravimetric method.</li> <li>d) Any alternative methods of monitoring, which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority, are also acceptable</li> </ul>

<b>B2</b>	<p>The environmental authority holder must monitor air quality for the activity, which must include, but not be limited to:</p> <ul style="list-style-type: none"> <li>a) continuous monitoring of PM10 at one location and dust deposition at five locations (representative of the worst affected receptors) during the current operation of the activity;</li> <li>b) an additional real-time PM10 monitor must be installed near the sensitive receptors to the north-west of ML50258 when mining operations commence in ML50258;</li> <li>c) meteorological monitoring (including at least temperature, wind speed and direction) at a single location representative of the approved place;</li> <li>d) the monitoring locations must comply with the Australian Standard AS/NZS 3580.1.1:2016 "Methods for siting and analysis of ambient air. Part 1.1: Guide to siting air monitoring equipment";</li> <li>e) quarterly reporting of the measured dust deposition rates and PM10 concentrations to a publicly available web site;</li> <li>f) investigation of all measured exceedances to determine the influence of emissions from the mining site; and,</li> <li>g) should an alternative sampling method (other than as discussed in <b>Condition B1</b>) be required, the environmental authority holder must seek approval from the administering authority to exclude this requirement. In seeking such exclusion, the reasons for the exclusion must be provided and be fully justified.</li> </ul>
<b>B3</b>	<p>If an exceedance in accordance with <b>Condition B1</b> is identified, the environmental authority holder must notify the administering authority within <b>seven (7) days</b> of receiving the result.</p>
<b>B4</b>	<p>An Air Quality Management Plan must be developed and implemented by suitably qualified person(s) for all stages of mining activities and provided to the administering authority for review and comment by <b>30 June 2019</b>, and at intervals not exceeding <b>three (3) years</b> thereafter.</p>
<b>B5</b>	<p>The Air Quality Management Plan must include:</p> <ul style="list-style-type: none"> <li>a) a release source study;</li> <li>b) a description of the air quality monitoring program;</li> <li>c) a description of relevant avoidance and mitigation measures;</li> <li>d) Trigger Action Response Program; and,</li> <li>e) maintenance of air quality management infrastructure.</li> </ul>
<b>B6</b>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority as per <b>Condition B4</b>, the Air Quality Management Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.</p>

<b>B7</b>	<p>To ensure that the air quality monitoring program remains effective and well-targeted through the life of the project, the monitoring locations must be reviewed by a suitably qualified person(s) and a report provided to the administering authority by <b>31 January 2021</b>, and at intervals not exceeding <b>two (2) years thereafter</b>. The review must consider:</p> <ul style="list-style-type: none"> <li>a) the frequency and cause of any exceedances of air quality objectives measured by the monitoring program over a period of at least <b>two (2) years</b>;</li> <li>b) dust complaints;</li> <li>c) future progression of the mining activities;</li> <li>d) locations of sensitive receptors relative to the mining activities; and</li> <li>e) all stages of mining.</li> </ul>
<b>B8</b>	<p><b>Odour Nuisance</b></p> <p>The release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the mining activity must not cause an environmental nuisance at any sensitive or commercial place.</p>
<b>B9</b>	<p>When requested by the administering authority, odour monitoring must be undertaken within a timeframe agreed to by the administering authority to investigate any complaint (which is neither frivolous nor vexatious, nor based on mistaken belief, in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within <b>fourteen (14) days</b> to the administering authority following completion of monitoring.</p>
<b>B10</b>	<p>If the administering authority determines the odour released to constitute an environmental nuisance, then the environmental authority holder must:</p> <ul style="list-style-type: none"> <li>a) address the complaint including the use of appropriate dispute resolution if required; and</li> <li>b) immediately implement odour abatement measures so that emissions of odour from the activity do not result in further environmental nuisance.</li> </ul>

Schedule C: Waste	
Condition number	Condition
<b>C1</b>	A Waste Management Plan must be developed, implemented and reviewed, by a suitably qualified person(s), for all stages of mining activities and provided to the administering authority for review and comment by <b>30 June 2019</b> , and at intervals not exceeding <b>three (3) years</b> thereafter.
<b>C2</b>	<p>The Waste Management Plan required by <b>Condition C1</b> must include:</p> <ul style="list-style-type: none"> <li>a) a description of the mining activities that may generate waste;</li> <li>b) waste management control strategies such as: <ul style="list-style-type: none"> <li>i. the types and amounts of wastes generated by the mining activities;</li> <li>ii. segregation of the wastes;</li> <li>iii. storage of the wastes;</li> <li>iv. disposal of the wastes;</li> <li>v. transport of the wastes; and</li> <li>vi. monitoring and reporting matters concerning the wastes;</li> </ul> </li> <li>c) the hazardous characteristics of the wastes generated including disposal for hazardous wastes;</li> <li>d) a program for reusing, recycling or disposing of all wastes;</li> <li>e) how the waste will be dealt with in accordance with the waste management hierarchy, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices in the waste management hierarchy (that is, avoidance, reuse, recycling, energy recovery and disposal);</li> <li>f) procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources and improve the waste management practices employed;</li> <li>g) procedures for dealing with accidents, spills and other incidents;</li> <li>h) details of any accredited management system employed, or planned to be employed, to deal with waste;</li> <li>i) how often the performance of the waste management plan will be assessed;</li> <li>j) the indicators or other criteria on which the performance of the waste management plan will be assessed; and</li> <li>k) staff training and induction to the waste management plan.</li> </ul>

<b>C3</b>	Within <b>twenty (20) business</b> days of receiving comments from the administering authority as per <b>Condition C1</b> , the Waste Management Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.
<b>C4</b>	Disposal of bulky non-putrescible wastes resulting from the mining activities in spoil emplacements and backfilled voids is acceptable.
<b>C5</b>	Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.
<b>C6</b>	The environmental authority holder may burn vegetation cleared in the course of carrying out extraction activities provided the activity does not cause environmental harm at any sensitive place or commercial place.
<b>C7</b>	<p><b>Tailings disposal</b></p> <p>A Tailings Management Plan must be developed, implemented, and reviewed by a suitably qualified person(s) for all stages of the authorised mining activities and must be submitted to the administering authority for review and comment by <b>31 July 2019</b>.</p>
<b>C8</b>	<p>The Tailings Management Plan required by <b>Condition C8</b> must include the following:</p> <ul style="list-style-type: none"> <li>a) containment of tailings;</li> <li>b) the management of seepage and leachates both during operation and the foreseeable future;</li> <li>c) the control of fugitive emissions to air;</li> <li>d) a program of progressive sampling and characterisation to identify acid producing potential and metal concentrations of tailings;</li> <li>e) maintaining records of the relative locations of any other waste stored within the tailings;</li> <li>f) rehabilitation strategy; and</li> <li>g) monitoring of rehabilitation, research and/or trials to verify the requirements and methods for decommissioning and final rehabilitation of tailings, including the prevention and management of acid mine drainage, erosion minimisation and establishment of vegetation cover.</li> </ul>
<b>C9</b>	Within <b>twenty (20) business days</b> of receiving comments from the administering authority as per Condition C8, the Tailings Management Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.
<b>C10</b>	<p><b>Waste rock</b></p> <p>A Waste Rock and Spoil Disposal Plan must be developed, implemented, and reviewed by a suitably qualified person(s) for all stages of the authorised mining activities and must be submitted to the administering authority for review and comment by <b>31 July 2019</b>.</p>

<b>C11</b>	<p>The Waste Rock and Spoil Disposal Plan required by <b>Condition C11</b> plan must include:</p> <ul style="list-style-type: none"> <li>a) effective characterisation of the waste rock and spoil to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances;</li> <li>b) a program of progressive sampling and characterisation to identify dispersive and non-dispersive spoil and the salinity, acid and alkali producing potential and metal concentrations of waste rock;</li> <li>c) a materials balance and disposal plan demonstrating how potentially acid forming and acid forming waste rock will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage;</li> <li>d) where relevant, a sampling program to verify encapsulation and/or placement of potentially acid-forming and acid-forming waste rock;</li> <li>e) how often the performance of the plan will be assessed;</li> <li>f) the indicators or other criteria on which the performance of the plan will be assessed;</li> <li>g) a rehabilitation strategy; and,</li> <li>h) periodic review of environmental performance against the plan and continual improvement.</li> </ul>
<b>C12</b>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority as per <b>Condition C11</b>, the Waste Rock and Spoil Disposal Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.</p>
<b>C13</b>	<p><b>Storage of tyres</b></p> <p>Scrap tyres waiting to be transported off site for disposal, recycling, take-back or waste-to-energy options must be stockpiled in volumes less than <b>3m</b> in height and <b>200m<sup>2</sup></b> in area and at least <b>10m</b> from any other tyre storage area or combustible or flammable material, including vegetation.</p>
<b>C14</b>	<p><b>Disposal of tyres</b></p> <p>Disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable.</p>
<b>C15</b>	<p>Scrap tyres resulting from the mining activities disposed within the operational land must not impede saturated aquifers or compromise the stability of the consolidated landform.</p>

Schedule D: Noise	
Condition number	Condition
D1	<p><b>Noise limits</b></p> <p>The environmental authority holder must ensure that the noise generated by the mining activities does not cause exceedances of the levels in <b>Table D1: Noise Limits</b> when measured at any sensitive or commercial place, other than where an alternative arrangement is in place for noise.</p>

**Table D1: Noise Limits**

Sensitive place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	7am to 6pm	6pm to 10pm	10pm to 7am
L <sub>Aeq</sub> , adj 15 mins	45	40	35	40	40	35
L <sub>Amax</sub> adj, 15mins'	-	-	47	-	-	47
Commercial place						
Noise level dB(A) measured as:	Monday to Saturday			Sundays and public holidays		
	7am to 6pm	6pm to 10pm	10pm to 7am	7am to 6pm	6pm to 10pm	10pm to 7am
L <sub>Aeq</sub> , adj 15 mins	50	45	40	50	45	40

<b>D2</b>	<p>The environmental authority holder must conduct noise monitoring to determine compliance with <b>Table D1: Noise Limits</b>, which must include, but not be limited to:</p> <ul style="list-style-type: none"> <li>a) Continuous noise monitoring, in accordance with Australian Standards and the administering authority's most current version of the administering authority's Noise Monitoring Manual, to inform the on-site noise management strategy;</li> <li>b) Quarterly attended monitoring of noise near the sensitive receptors in accordance with the administering authority's most current version of the administering authority's Noise Monitoring Manual to confirm the efficacy of the noise management system;</li> <li>c) Meteorological monitoring (including at least temperature, wind speed and direction) at a single location representative of the approved place;</li> <li>d) The monitoring locations must comply with the administering authority's most current version of the Noise Monitoring Manual; and</li> <li>e) Investigation of all measured exceedances to determine the influence of mining activities at Cameby Downs Coal Mine.</li> </ul>
<b>D3</b>	<p>If an exceedance in accordance with <b>Condition D1</b> and <b>Table D1: Noise Limits</b> is identified, the environmental authority holder must notify the administering authority within <b>seven (7) days</b> of receiving the result.</p>
<b>D4</b>	<p>A Noise Management Plan must be developed, implemented and reviewed by a suitably qualified person(s) for all stages of the mining activity, and provided to the administering authority for review and comment by <b>31 July 2019</b>. The Noise Management Plan must include:</p> <ul style="list-style-type: none"> <li>a) a description of noise monitoring procedures to identify potential noise exceedances;</li> <li>b) noise trigger values to prevent exceedances at sensitive receptors;</li> <li>c) management and mitigation strategies to reduce noise levels at sensitive receptors;</li> </ul> <p>and,</p> <p>an annual review of the acquired monitoring data and the suitability of the noise management plan.</p>
<b>D5</b>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority as per <b>Condition D4</b>, the Noise Management Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.</p>

<b>D6</b>	<p>When requested by the administering authority, the environmental authority holder must provide noise monitoring to determine compliance with noise limits specific in <b>Table D1: Noise Limits</b>. This noise monitoring must be undertaken to measure the following descriptor characteristics and matters:</p> <ul style="list-style-type: none"> <li>a) LAN, T (where N equals the statistical levels of 1, 10 and 90 and T = 15 to 60 minutes;</li> <li>b) background noise LA90;</li> <li>c) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistic levels;</li> <li>d) atmospheric conditions including temperature, relative humidity and wind speed and directions;</li> <li>e) effects due to any extraneous factors such as traffic noise;</li> <li>f) location, date and time of monitoring; and,</li> <li>g) if the complaint concerns low frequency noise, Max LpLIN,T and on third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.</li> </ul>
<b>D7</b>	<p><b>Vibration and Air blast overpressure nuisance</b></p> <p>The environmental authority holder must ensure that blasting does not cause the limits for peak particle velocity and air blast overpressure in <b>Table D2: Blasting Limits</b> to be exceeded at a sensitive place or commercial place, other than when an alternative arrangement is in place for blasting.</p>
<b>D8</b>	<p>The environmental authority holder must develop and implement a blast monitoring program to monitor compliance with <b>Table D2: Blasting Limits</b> for:</p> <ul style="list-style-type: none"> <li>a) 100% of all blasts undertaken at Cameby Downs Coal Mine in each year at the nearest sensitive place(s) or commercial place(s), other than where an alternative arrangement is in place for blasting, to the centroid of the blast; and,</li> <li>b) include an annual review of the acquired monitoring data and the suitability of the blast monitoring program.</li> </ul>
<b>D9</b>	<p>If an exceedance in accordance with <b>Condition D7</b> and <b>Table D2: Blasting Limits</b> is identified, the environmental authority holder must notify the administering authority within <b>seven (7) days</b> of receiving the result.</p>

**Table D2 – Blasting Limits**

Blasting limits	Sensitive or commercial place limits	
	Monday to Saturday 7 am - 6 pm	Monday to Saturday 6pm to 7am Sundays and Public Holidays
Air blast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time	No blasting will occur.
Ground vibration peak particle velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	No blasting will occur.

Schedule E: Water	
Condition number	Condition
<b>E1</b>	<p><b>Contaminant release</b></p> <p>Contaminants must not be released to any waters, except as permitted under the conditions of this environmental authority.</p>
<b>E2</b>	<p><b>Monitoring of water storage quality</b></p> <p>Water storages stated in <b>Table E1: Water Storage Monitoring</b> must be monitored for:</p> <ul style="list-style-type: none"> <li>a) the water quality characteristics specified in <b>Table E2: Onsite Water Storage Contaminant Limits</b> at the monitoring locations and at the monitoring frequency specified in <b>Table E1: Water Storage Monitoring</b>; and</li> <li>b) the volume of water held in the each of the water storages listed in <b>Table E1: Water Storage Monitoring</b>.</li> </ul>

Table E1: Water Storage Monitoring

Water Storage Description	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Monitoring Location	Frequency of Monitoring
Sediment Dam 1 (SD1)	238 759	7 052 398	Pump intake (via bleed-off valve)	Quarterly
Raw Water Dam	234 865	7 050 052	Pump intake (via bleed-off valve)	Quarterly
Admin Dam	234 350	7 049 800	Pump intake (via bleed-off valve)	Quarterly
Return Water Dam (RWD1)	234 999	7 047 979	Pump intake (via bleed-off valve)	Quarterly
MIA Dam	235 709	7 049 294	Pump intake (via bleed-off valve)	Quarterly
Mine Water Dam 1 (MWD1)	236 449	7 053 166	Pump intake (via bleed-off valve)	Quarterly
Water Management Dam 1 (WMD1)*	235 880	7 048 110	Pump intake (via bleed-off valve)	Quarterly
Rejects Dam 1	235 250	7 051 200	Decant	Quarterly
Pit 1	As per advancing mining operation (when as required for surplus water storage as outlined in the site water balance in the Water Management Plan required under <b>Condition E24</b> ).		Sump	Quarterly

\* Once constructed.

Table E2: Onsite Water Storage Contaminant Limits

Quality Characteristic	Test Value	Contaminant Limit
pH (pH unit)	Range	Greater than 4, less than 9 <sup>2</sup>
EC (µS/cm)	Maximum	5970 <sup>1</sup>
Sulfate (mg/L)	Maximum	1000 <sup>1</sup>
Fluoride (mg/L)	Maximum	2.0 <sup>1</sup>
Aluminium (mg/L) <sup>3</sup>	Maximum	5.0 <sup>1</sup>
Arsenic (mg/L) <sup>3</sup>	Maximum	0.5 <sup>1</sup>
Cadmium (mg/L) <sup>3</sup>	Maximum	0.01 <sup>1</sup>
Cobalt (mg/L) <sup>3</sup>	Maximum	1.0 <sup>1</sup>
Copper (mg/L) <sup>3</sup>	Maximum	1.0 <sup>1</sup>
Lead (mg/L) <sup>3</sup>	Maximum	0.1 <sup>1</sup>
Nickel (mg/L) <sup>3</sup>	Maximum	1.0 <sup>1</sup>
Zinc (mg/L) <sup>3</sup>	Maximum	20 <sup>1</sup>

<sup>1</sup> Contaminant limit based on ANZECC & ARMCANZ (2000) stock water quality guidelines.

<sup>2</sup> Page 4.2-15 of ANZECC & ARMCANZ (2000) "Soil and animal health will not generally be affected by water with pH in the range of 4–9".

<sup>3</sup> Total measurements (unfiltered) must be taken and analysed

<b>E3</b>	In the event that water storages defined in <b>Table E1: Water Storage Monitoring</b> exceed the contaminant limits defined in <b>Table E2: Onsite Water Storage Contaminant Limits</b> , the environmental authority holder must implement measures, where practicable, to prevent access to waters by all livestock.
<b>E4</b>	<b>Release to waters</b> The release of mine affected water to waters must only occur directly to receiving waters and from the release points specified in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b> and depicted in <b>Attachment 2: Mine affected water release points and receiving water monitoring locations</b> attached to this environmental authority.
<b>E5</b>	The release of mine affected water to waters in accordance with <b>Condition E4</b> must not exceed the release limits stated in <b>Table E4: Mine Affected Water Release Limits</b> when measured at the monitoring points specified in <b>Table E3: Mine Affected Water Release Points, sources and receiving waters</b> for each quality characteristic.

**Table E3: Mine Affected Water Release Points, Sources and Receiving Waters**

Release Point (RP)	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Mine affected water source and location	Monitoring Point	Receiving waters description
RP1	238 759	7 052 398	Sediment Dam 1 (SD1)	End of pipe	Tributary of Drainage Line 1 (Headwaters of Columboola Creek)
RP2	234 865	7 050 052	Raw Water Dam	End of pipe	Tributary of Drainage Line 1 (Headwaters of Columboola Creek)
RP3	234 999	7 047 979	Return Water Dam 1 (RWD1)	End of pipe	Drainage Line 2 (Headwaters of Columboola Creek)
RP4	235 709	7 049 294	MIA Dam	End of pipe	Tributary of Drainage Line 1 (Headwaters of Columboola Creek)
RP5	236 164	7 053 664	Mine Water Dam 1 (MWD1)	End of pipe	Tributary of Drainage Line 1 (Headwaters of Columboola Creek)

**Table E4: Mine Affected Water Release Limits**

Quality Characteristic	Release Limits	Monitoring Frequency
Electrical conductivity ( $\mu\text{S}/\text{cm}$ )	Release limits specified in <b>Table E7: Mine Affected Water Release during Flow Events</b> for variable flow criteria.	Upon commencement (the first sample must be taken within 2 hours of commencement of release), daily and on cessation of release from release points listed in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters.</b>
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	
Suspended Solids (mg/L)	216	
Sulfate ( $\text{SO}_4^{2-}$ ) (mg/L)	Release limits specified in <b>Table E7: Mine Affected Water Release during Flow Events</b> for variable flow criteria.	

**Table E5: Receiving Water Monitoring Locations and Frequency**

Monitoring point	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Monitoring frequency
WS1	238 038	7 049 604	Upon commencement (the first sample must be taken within 2 hours of commencement of release), daily and on cessation of release of waters from the release points listed in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b>
WS2	234 602	7 052 504	
WS3	235 392	7 047 573	
WS4	234 145	7 048 566	
WS5	234 244	7 049 234	
Drainage Line 1 (upstream) – DL1 US	233 027	7 051 920	
Drainage Line 1 (downstream) – DL1 DS	237 199	7 046 785	
Drainage Line 3 (upstream) – DL3 US	242 291	7 050 083	
Drainage Line 3 (downstream) – DL3 DS	237 803	7 046 754	
Punchbowl Creek (downstream) – PB DS	226 569	7 060 299	

E6	<p>If quality characteristics of the release waters exceed any of the trigger levels specified in <b>Table E6: Release Contaminant Trigger Investigation Levels during a Release Event</b> at the locations listed in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b>, the environmental authority holder must compare the downstream results at the monitoring points specified in <b>Table E5: Receiving Water Monitoring Locations and Frequency</b> to the trigger values specified in <b>Table E6: Release Contaminant Trigger Investigation Levels</b> and:</p> <ul style="list-style-type: none"> <li>a) where the trigger values are not exceeded then no action is to be taken; or</li> <li>b) where the downstream results exceed the trigger values specified in <b>Table E6: Release Contaminant Trigger Investigation Levels</b> for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and: <ul style="list-style-type: none"> <li>i) if the result is less than the background monitoring site data, then no action is to be taken; or</li> <li>ii) if the result is greater than the background monitoring site data, complete an investigation into the potential for environmental harm and provide a written report to the administering authority within 90 days of receiving the result, outlining: <ul style="list-style-type: none"> <li>1) details of the investigations carried out; and</li> <li>2) actions taken to prevent environmental harm.</li> </ul> </li> </ul> </li> </ul> <p>Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with <b>Condition E6(b)(ii)</b> of this condition, no further reporting is required for subsequent trigger events for that quality characteristic.</p>
E7	<p>If an exceedance in accordance with <b>Condition E6(b)(ii)</b> is identified, the environmental authority holder must notify the administering authority within <b>seven (7) days</b> of receiving the result.</p>
E8	<p><b>Mine Affected Water Release Event</b></p> <p>The environmental authority holder must ensure an automatic stream flow gauging station(s) is installed, operated and maintained to determine and record stream flows at the location(s) and flow recording frequency specified in <b>Table E7: Mine Affected Water Release during Flow Events</b>.</p>
E9	<p>The release of mine affected water to waters in accordance with <b>Condition E4</b> must only take place during periods of natural flow events in accordance with the receiving water flow criteria for discharge specified in <b>Table E7: Mine Affected Water Release during Flow Events</b> for the release point(s) specified in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b>.</p>

Table E6: Release Contaminant Trigger Investigation Levels

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Level	Monitoring Frequency
Aluminium	55	For aquatic ecosystem protection, based on SMD guideline	Upon commencement (the first sample must be taken within 2 hours of commencement of release), daily and on cessation of release.
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	8.1	80 percentile of locally derived value	
Copper	5.5	80 percentile of locally derived value	
Iron	300	For aquatic ecosystem protection, based on low reliability guideline	
Lead	4.5	80 percentile of locally derived value	
Mercury (inorganic)	0.6	For aquatic ecosystem protection, based on LOR for CV FIMS	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	15	80 percentile of locally derived value	
Boron	370	For aquatic ecosystem protection, based on SMD guideline	
Cobalt	90	For ANZECC & ARM CANZ 2000, based on low reliability value for cobalt	
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline	
Selenium	10	For aquatic ecosystem protection, based on LOR for ICPMS	
Silver	1	For aquatic ecosystem protection, based on LOR for ICPMS	
Ammonia	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		

Note: 1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

2. The quality characteristics required to be monitored as per **Table E6: Release Contaminant Trigger Investigation Levels** can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from **Table E6: Release Contaminant Trigger Investigation Levels** by amendment.

3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARM CANZ (2000).

4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

<b>E10</b>	The release of mine affected water to waters in accordance with <b>Condition E4</b> must not exceed the maximum release rate (for all combined release point flows) for each receiving water flow criteria for discharge specified in <b>Table E7: Mine Affected Water Release during Flow Events</b> when measured at the monitoring points specified in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b> .
<b>E11</b>	The daily quantity of mine affected water released from each release point must be measured and recorded at the monitoring points in <b>Table E3: Mine Affected Water Release Points, Sources and Receiving Waters</b> , and provided to the administering authority on request.
<b>E12</b>	Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters or cause a material build-up of sediment in such waters.
<b>E13</b>	<p><b>Notification of release event</b></p> <p>The environmental authority holder must notify the administering authority via WaTERS <b>within twenty-four (24) hours</b> after commencing to release mine affected water to the receiving environment. Notification must include the submission of written advice to the administering authority of the following information:</p> <ul style="list-style-type: none"> <li>a) release commencement date and time;</li> <li>b) details regarding the compliance of the release with the conditions of this environmental authority (that is, contaminant limits, natural flow, discharge volume etc.);</li> <li>c) release point(s);</li> <li>d) release rate;</li> <li>e) release salinity; and</li> <li>f) receiving water(s) including the natural flow rate.</li> </ul>
<b>E14</b>	<p><b>Notification of release event exceedance</b></p> <p>If the release limits defined in <b>Table E4: Mine Affected Water Release Limits</b> are exceeded, the environmental authority holder must notify the administering authority via WaTERS within <b>twenty-four (24) hours</b> of receiving the results.</p>

Table E7: Mine Affected Water Release during Flow Events

Receiving waters /stream	Release Point (RP)	Gauging Station	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m <sup>3</sup> /s) [Total]	Maximum release rate (for all combined RP flows)	Electrical conductivity and sulfate release limits
Drainage Line 1 and Drainage Line 2 (headwaters of Columboola Creek)	RP1, RP2, RP3, RP4, RP5.	WS1 and WS3	(WS1) 238 058  (WS3) 235 712	(WS1) 7 049 622  (WS3) 7 047 317	Daily during release (within 2 hours of commencement and cessation of flow)	<b>Low Flow</b>		
						< 0.20 m <sup>3</sup> /s	< 0.20 m <sup>3</sup> /s	Electrical conductivity: 350 µS/cm;  Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 250 mg/L
						<b>Medium Flow</b>		
						> 0.20 m <sup>3</sup> /s	<0.20 m <sup>3</sup> /s	Electrical conductivity: 1500 µS/cm;  Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 500 mg/L
						>0.5 m <sup>3</sup> /s	<0.10 m <sup>3</sup> /s	Electrical conductivity: 3500 µS/cm;  Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 1200 mg/L

Receiving waters /stream	Release Point (RP)	Gauging Station	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m <sup>3</sup> /s) [Total]	Maximum release rate (for all combined RP flows)	Electrical conductivity and sulfate release limits
						>0.5 m <sup>3</sup> /s	<0.40 m <sup>3</sup> /s	Electrical conductivity: 1500 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 500 mg/L
						>0.9 m <sup>3</sup> /s	<0.8 m <sup>3</sup> /s	Electrical conductivity: 1500 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 500 mg/L
						<b>High Flow</b>		
						>1.0 m <sup>3</sup> /s	<0.2 m <sup>3</sup> /s	Electrical conductivity: 3500 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 1200mg/L
						>1.7 m <sup>3</sup> /s	<1.5 m <sup>3</sup> /s	Electrical conductivity: 1500 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 500 mg/L

Receiving waters /stream	Release Point (RP)	Gauging Station	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Receiving water flow recording frequency	Receiving water flow criteria for discharge (m <sup>3</sup> /s) [Total]	Maximum release rate (for all combined RP flows)	Electrical conductivity and sulfate release limits
						>2.5 m <sup>3</sup> /s	<0.60 m <sup>3</sup> /s	Electrical conductivity: 3500 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 1200 mg/L
						>4 m <sup>3</sup> /s	<0.20m <sup>3</sup> /s	Electrical conductivity: 10000 µS/cm; Sulfate (SO <sub>4</sub> <sup>2-</sup> ): 3400 mg/L

<p><b>E15</b></p>	<p>The environmental authority holder must, within <b>twenty-eight (28) days</b> of a release that is not compliant with the conditions of this environmental authority, provide a report to the administering authority via WaTERS detailing:</p> <ul style="list-style-type: none"> <li>a) the reason for the release;</li> <li>b) the location of the release;</li> <li>c) the total volume of the release and which (if any) part of this volume was non-compliant;</li> <li>d) the total duration of the release and which (if any) part of this period was non-compliant;</li> <li>e) all water quality monitoring results (including all laboratory analyses);</li> <li>f) identification of any environmental harm as a result of the non-compliance; and</li> <li>g) any other matters pertinent to the water release event.</li> </ul>
<p><b>E16</b></p>	<p><b>Receiving environment monitoring and contaminant trigger levels</b></p> <p>The quality of the receiving waters must be monitored at the locations specified in <b>Table E8: Receiving Water Upstream Background Sites and Downstream Monitoring Points</b> for each quality characteristic and at the monitoring frequency stated in <b>Table E6: Receiving Waters Contaminant Trigger Levels</b>.</p>
<p><b>E17</b></p>	<p>If quality characteristics of the receiving waters at the downstream monitoring points exceed any of the trigger levels specified in <b>Table E6: Receiving Waters Contaminant Trigger Levels during a Release Event</b> the environmental authority holder must compare the downstream results to the upstream results in the receiving waters and:</p> <ul style="list-style-type: none"> <li>a) where the downstream result is the same or a lower value than the upstream value for the quality characteristic then no action is to be taken; or</li> <li>b) where the downstream results exceed the upstream results, complete an investigation into the potential for environmental harm and provide a written report to the administering authority in the next annual water monitoring report <b>as required by Condition E23</b>, outlining: <ul style="list-style-type: none"> <li>i) details of the investigations carried out; and</li> <li>ii) actions taken to prevent environmental harm.</li> </ul> </li> </ul> <p>Note: Where an exceedance of a trigger level has occurred and is being investigated, in accordance with <b>Condition E17(b)</b> of this environmental authority, no further reporting is required for subsequent trigger events for that quality characteristic.</p>

Table E8: Receiving Water Upstream Background Sites and Downstream Monitoring Points

Receiving Waters Location Description	Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)	Receiving waters description
Upstream Background Monitoring Points			
Upstream of RP1, RP2, RP4 and RP5 – DL1 US	233 027	7 051 920	Drainage Line 1 (Headwaters of Columboola Creek)
Upstream of RP1, RP2, RP4 and RP5 – WS2	234 571	7 052 378	Drainage Line 1 (Headwaters of Columboola Creek)
Upstream of RP3 – WS4	234 087	7 048 329	Tributary of Drainage Line 2 (Headwaters of Columboola Creek)
Upstream of RP3 and RP4 – WS5	234 243	7 049 229	Drainage Line 2 (Headwaters of Columboola Creek)
Drainage Line 3 – DL3 US	242 291	7 050 083	Drainage Line 3 (Headwaters of Columboola Creek)
Downstream Monitoring Points			
Downstream of RP1 and RP5 - WS1	238 058	7 049 622	Drainage Line 1 (Headwaters of Columboola Creek)
Downstream of RP3– WS3	235 712	7 047 317	Drainage Line 2 (Headwaters of Columboola Creek)
Downstream of Drainage Line 1 and 2 Confluence (RP1 – RP5) – DL1 DS	237 199	7 046 785	Drainage Line 1 (Headwaters of Columboola Creek)
Drainage Line 3 – DL3 DS	237 729	7 050 045	Drainage Line 3 (Headwaters of Columboola Creek)
Punchbowl Creek – PB DS	226 569	7 060 299	Punchbowl Creek

<b>E18</b>	<p><b>Receiving Environment Monitoring Program (REMP)</b></p> <p>A Receiving Environment Monitoring Program must be developed, implemented and reviewed, by a suitably qualified person(s) for all stages of the authorised mining activity and provided to the administering authority for review and comment by <b>30 June 2019</b>, and every <b>two (2) years</b> thereafter.</p>
<b>E19</b>	<p>The REMP, required by <b>Condition E18</b>, must:</p> <ul style="list-style-type: none"> <li>a) identify and describe any potential adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity;</li> <li>b) described methods utilised to monitor the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site;</li> <li>c) describe any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be affected by an authorised release of mine affected water;</li> <li>d) describe the background reference water quality;</li> <li>e) describe the condition of downstream water quality compared against water quality objectives; and,</li> <li>f) describe the suitability of current discharge limits to protect downstream environmental values.</li> </ul> <p>For the purposes of the REMP, the receiving environment is the waters listed in <b>Table E8: Receiving Water Upstream Background Sites and Downstream Monitoring Points</b>.</p>
<b>E20</b>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority, as required by <b>Condition E18</b>, the REMP must be updated to address the comments and submitted to the administering authority.</p>
<b>E21</b>	<p>A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with <b>Conditions E18 and E19</b> must be prepared annually and submitted to the administering authority with each annual return.</p>
<b>E22</b>	<p><b>Water general</b></p> <p>All determinations of water quality and biological monitoring must be performed in accordance with the latest version of the administering authority's Water Monitoring and Sampling Manual.</p>

<p><b>E23</b></p>	<p><b>Annual Water Monitoring Reporting</b></p> <p>The following information must be recorded in relation to all water monitoring required under the conditions of this environmental authority and submitted to the administering authority in the specified format with each annual return:</p> <ul style="list-style-type: none"> <li>a) the date on which the sample was taken;</li> <li>b) the time at which the sample was taken;</li> <li>c) the monitoring point at which the sample was taken;</li> <li>d) the measured or estimated daily quantity of mine affected water released from all release points;</li> <li>e) the release flow rate at the time of sampling for each release point;</li> <li>f) the results of all monitoring and details of any exceedances of the conditions of this environmental authority; and</li> <li>g) water quality monitoring data must be provided to the administering authority in the specified electronic format upon request.</li> </ul>
<p><b>E24</b></p>	<p><b>Water Management Plan</b></p> <p>A Water Management Plan must be developed by a suitably qualified person(s) and implemented by a person(s) who has relevant professional qualifications, training, skills or experience for all stages of the authorised activity on site. The Water Management Plan must be submitted to the administering authority for review and comment by <b>30 June 2019</b>.</p>
<p><b>E25</b></p>	<p>The Water Management Plan must include:</p> <ul style="list-style-type: none"> <li>a) a contaminant source study;</li> <li>b) site water balance and model;</li> <li>c) onsite water quality sampling, including stratification sampling of pits used for water storages;</li> <li>d) water management system;</li> <li>e) saline drainage prevention and management measures;</li> <li>f) acid rock drainage prevention and management measures (if applicable);</li> <li>g) erosion and sediment control measures;</li> <li>h) maintenance of water management and erosion and sediment control infrastructure;</li> <li>i) emergency and contingency planning; and</li> <li>j) monitoring and review.</li> </ul>
<p><b>E26</b></p>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority, as required by <b>Condition E24</b>, the Water Management Plan must be updated to address the comments and submitted to the administering authority.</p>

E27	<p><b>Levees and Diversions</b></p> <p>The environmental authority holder is authorised to construct and maintain levees and water diversions as shown in <b>Attachment 3: Approved levees and water diversions</b> during life of mine.</p>
E28	<p><b>Diversion Monitoring Program for the Drainage Feature (Drainage Line 1) at the Headwaters of Columboola Creek Catchment</b></p> <p>The environmental authority holder must develop a program to monitor the diversion of the drainage feature at the headwaters of the Columboola Creek catchment. The monitoring program must be submitted to the administering authority for comment <b>at least 6 weeks</b> prior to commencement of the monitoring program. The environmental authority holder must have due regard for the comments of the administering authority in finalising the details of the monitoring program. The Diversion Monitoring Program must satisfy the following:</p> <ul style="list-style-type: none"> <li>a) developed and carried out by a person possessing appropriate qualifications and experience in aquatic ecology and water quality monitoring, and to be able to competently make recommendations about these matters;</li> <li>b) establish and document monitoring points at locations that are suitable for the monitoring program reviewed by the administering authority;</li> <li>c) monitoring in accordance with the accepted Diversion Monitoring Program must be undertaken for whichever of the following periods is met first: three (3) years in which a flow event occurred in each year; or (5) five years;</li> <li>d) in addition to regular condition and trend surveillance monitoring, the Diversion Monitoring Program results must also enable assessment of the establishment of the aquatic and riparian zones in the diverted section of the drainage feature at the headwaters of the Columboola Creek catchment; and</li> <li>e) after the drainage feature has been diverted and in the event that monitoring results indicate a significant decline in the pre-determined values or ecological condition of the diverted drainage feature at the headwaters of the Columboola Creek catchment, or indicates any other significant ecological impact, the monitoring program must include provisions for action to address the actual or potential harm to the diverted drainage feature and downstream reaches.</li> </ul>
E29	<p><b>Acid and Metalliferous Drainage</b></p> <p>The environmental authority holder must avoid or otherwise minimise the generation and/or release of acid and metalliferous drainage.</p>
E30	<p><b>Associated Water: Dust Suppression</b></p> <p>The environmental authority holder is authorised to use associated water in accordance with an approval of resource for beneficial use issued under the provisions of the <i>Waste Reduction and Recycling Act, 2011</i>.</p>

E31	<p>Use of the resource for dust suppression purposes must comply with the following:</p> <p>a) the amount of dust suppressant applied must not exceed what is required to effectively suppress dust; and</p> <p>b) the application of dust suppressant must:</p> <ul style="list-style-type: none"> <li>i) not cause on-site ponding or runoff;</li> <li>ii) be directed to the area being dust suppressed;</li> <li>iii) not harm vegetation surrounding the area being dust suppressed; and</li> <li>iv) not cause visible salting.</li> </ul>
E32	<p>If there is any indication that ponding or runoff or vegetation die-off or visible salting is occurring beyond the approved disturbance footprint as detailed in <b>Attachment 1: Approved disturbance footprint – Cameby Downs Coal Mine</b>, the application of dust suppressant must cease immediately, and the administering authority must be notified as soon as possible, but within forty-eight (48) hours of becoming aware, and the affected area must be remediated without delay.</p>
E33	<p><b>Associated Water: Coal Washing</b></p> <p>Associated water used for coal washing in the Coal Handling and Processing Plant must be carried out in such a manner that there is no release to land or waters, except where authorised under <b>Condition E4</b> of this authority.</p>
E34	<p><b>Sediment and erosion control</b></p> <p>Releases to waters must be undertaken so as not to cause erosion or release of sediments, beyond the limits prescribed in <b>Table E4: Mine Affected Water Release Limits</b>.</p>
E35	<p><b>Void water quality monitoring</b></p> <p>Water quality in all mining voids and final voids must be monitored quarterly and for the parameters defined in <b>Table E2: Onsite Water Storage Contaminant Limits</b>.</p>
E36	<p><b>Groundwater</b></p> <p>The environmental authority holder must not release contaminants to groundwater.</p>
E37	<p>Groundwater must be monitored at the locations and frequencies defined in <b>Table E9: Groundwater Monitoring Locations and Frequency and Attachment 4: Current and proposed groundwater bore locations</b> for the standing water levels and the parameters identified in <b>Table E10: Groundwater Reference Bore Contaminant Triggers</b>.</p>
E38	<p>Groundwater monitoring bores listed in <b>Table E9: Groundwater Monitoring Locations and Frequency</b> must be constructed and commissioned in accordance with <b>Conditions E48 and E49 by 20 September 2020</b>, or an alternative timeframe agreed between the administering authority and the environmental authority holder.</p>

<p><b>E39</b></p>	<p><b>Monitoring and reporting</b></p> <p>A Groundwater Management and Monitoring Program for all stages of the authorised mining activity on site must:</p> <ul style="list-style-type: none"> <li>a) be developed by a suitably qualified person(s) in accordance with <b>Table E9: Groundwater Monitoring Locations and Frequency</b> and submitted to the administering authority for review and comment by <b>30 June 2019</b>;</li> <li>b) specify the timing for the construction and commissioning of the groundwater monitoring bores listed in <b>Table E9: Groundwater Monitoring Locations and Frequency</b>, including any staging of the groundwater monitoring bores; and</li> <li>c) be implemented to detect any change in groundwater quality values and levels due to activities that are part of the authorised mining activities.</li> </ul>
<p><b>E40</b></p>	<p>A suitably qualified person(s) must review the Groundwater Management and Monitoring Program, required by <b>Condition E39</b>, and the data collected on an annual basis. The review must:</p> <ul style="list-style-type: none"> <li>a) include the assessment of groundwater levels and groundwater quality data;</li> <li>b) assess the suitability of the groundwater monitoring network, including an assessment of whether groundwater parameter trigger values or compliance bores are required for all groundwater aquifers potentially impacted by the authorised mining activities;</li> <li>c) include a description of any groundwater monitoring bores constructed and commissioned during the review period; and</li> <li>d) be in a report submitted to the administering authority with each annual return</li> </ul>

Table E9: Groundwater Monitoring Locations and Frequency

Monitoring Point	Aquifer Type	Bore type (reference or compliance)	Location		Surface elevation (mAHD)	Screening interval (mbgl)	Groundwater drawdown trigger level (m)	Monitoring frequency
			Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)				
CD034C	MA1 / MA2 coal seams	Reference	235 706	7 054 194	350.6	34.9 – 46.9	5	SWL: Monthly  Water Quality: Quarterly
CD036R		Reference	235 094	7 052 931	338.6	39.4 – 47.4	32	
CD037C		Reference	235 563	7 053 320	346.1	39.5 – 47.5	18	
CD056		Reference	236 505	7 051 782	328.2	53.2 – 59.2	50	
CD065		Reference	235 953	7 053 638	343.6	27.0 – 33.0	6	
MB1	MA1-WM3 Coal Seams	Compliance	As per Condition E42	As per Condition E42	As per Condition E42	As per Condition E42	As per Condition E42	
MB2								
MB3								
MB4								
MB5								
MB6								
MB7								
MB8A								
MB8B	Base of weathering							
MB9	MA1-WM3							

Monitoring Point	Aquifer Type	Bore type (reference or compliance)	Location		Surface elevation (mAHD)	Screening interval (mbgl)	Groundwater drawdown trigger level (m)	Monitoring frequency
			Easting (GDA94 MGA Zone 56)	Northing (GDA94 MGA Zone 56)				
	Coal Seams							
MB10A	Base of weathering							
MB10B	Base of regolith							
MB11A	Base of weathering							
MB11B	Base of regolith							
MB12A	Base of weathering							
MB12B	Base of regolith							

<b>E41</b>	Within <b>twenty (20) business days</b> of receiving comments from the administering authority, as required by <b>Condition E39</b> , the Groundwater Management and Monitoring Program must be updated to address the comments and submitted to the administering authority.
<b>E42</b>	<p>The environmental authority holder must determine the following for groundwater bores listed in <b>Table E9: Groundwater Monitoring Locations and Frequency</b> and submit to the administering authority, via an amendment to the environmental authority, by <b>30 June 2021</b>, or an alternative timeframe agreed between the administering authority and the environmental authority holder:</p> <p>a) location details, including GPS co-ordinates in the format specified in <b>Table E9: Groundwater Monitoring Locations and Frequency</b>;</p> <p>b) surface RL and screening interval; and</p> <p>c) groundwater trigger limits.</p>
<b>E43</b>	<p>The following information must be recorded in relation to all groundwater sampling:</p> <p>a) the date on which the sample was taken;</p> <p>b) the time at which the sample was taken;</p> <p>c) the monitoring point at which the sample was taken; and</p> <p>d) the results of all monitoring.</p>
<b>E44</b>	<p><b>Exceedance investigation</b></p> <p>If groundwater quality characteristics exceed any of the trigger levels identified in <b>Table E10: Groundwater Contaminant Triggers</b> the environmental authority holder must:</p> <p>a) notify the administering authority via WaTERS within <b>seven (7) days</b> of receiving the analysis results; and</p> <p>b) complete an investigation into the potential for environmental harm.</p>
<b>E45</b>	<p>If groundwater levels for the compliance monitoring bores identified in <b>Table E9: Groundwater Monitoring Locations and Frequency</b> exceed any of the groundwater drawdown trigger level thresholds for the compliance monitoring bores identified in <b>Table E9: Groundwater Monitoring Locations and Frequency</b> the environmental authority holder must:</p> <p>a) notify the administering authority via WaTERS within <b>seven (7) days</b> of receiving the analysis results; and,</p> <p>b) complete an investigation into the potential for environmental harm.</p>
<b>E46</b>	An exceedance investigation under <b>Condition E44</b> or <b>Condition E45</b> must be completed and submitted to the administering authority via WaTERS within <b>ninety (90) days</b> of the notification made under <b>Condition E44(a)</b> or <b>Condition E45(a)</b> .
<b>E47</b>	If the exceedance investigation in <b>Condition E44</b> or <b>Condition E45</b> identifies environmental harm is occurring, the environmental authority holder must immediately implement appropriate abatement measures to prevent the continuation or re-occurrence of environmental harm to groundwater.

<b>E48</b>	<b>Bore construction and maintenance and decommissioning</b> All groundwater bores (including groundwater monitoring bores) must be constructed in accordance with the Minimum Construction Requirements for Water Bores in Australia (National Uniform Drillers Licensing Committee, 2011).
<b>E49</b>	The construction, maintenance and management of groundwater bores (including groundwater monitoring bores) must be undertaken in a manner that prevents or minimises impacts to the environment and ensures the integrity of the bores to obtain accurate monitoring.

**Table E10: Groundwater Reference Bore Contaminant Triggers**

Parameter	Unit	Trigger Values – CD034C	Trigger Values – All other reference bores listed in Table E9	Limit type
Aluminium	mg/L		5 <sup>2</sup>	Maximum
Arsenic (III)	mg/L		0.024	Maximum
Cadmium	mg/L		0.0009	Maximum
Chromium	mg/L		0.016	Maximum
Copper	mg/L		0.042	Maximum
Iron	mg/L		0.3	Maximum
Lead	mg/L		0.018	Maximum
Mercury	mg/L		0.002	Maximum
Molybdenum	mg/L		0.15 <sup>2</sup>	Maximum
Nickel	mg/L		0.026 <sup>2</sup>	Maximum
Selenium	mg/L		0.034 <sup>2</sup>	Maximum
Sulfate	mg/L	1000	250	Maximum
Zinc	mg/L		0.703	Maximum
Electrical Conductivity	µS/cm		27,880	Maximum
pH	pH Units		5.7 – 7.5	Minimum/maximum
Total Petroleum Hydrocarbons C6-C9	µg/L		100 <sup>1</sup>	Maximum
Total Petroleum Hydrocarbons C10-C36	µg/L		1000 <sup>1</sup>	Maximum

1. Based on Draft Water Quality Objectives for Queensland Murray-Darling Basin – Fractured Rock Aquifer Zone. Upper Condamine Basalts.
2. Based on Assessing Petroleum Hydrocarbon Contamination, released by the National Environment Protection Council Assessment of Site Contamination (NEPM Variation)
3. Based on Stock Drinking Water Guideline for beef cattle
4. Based on ANZECC Aquatic Ecosystem Protection

Schedule F: Sewage treatment	
Condition number	Condition
<b>F1</b>	<p><b>Sewage Treatment</b></p> <p>Treated sewage effluent is authorised to be released to land in accordance with the release limits stated in <b>Table F1: Contaminant Release Limits to Land</b> at the following locations:</p> <p>a) within the nominated area(s) identified in <b>Attachment 5: Sewage treatment plant and effluent disposal</b>; and</p> <p>b) other land for the purpose of dust suppression and/or firefighting.</p>
<b>F2</b>	All sewage effluent from the treatment plant must be monitored at the frequency and for the parameters specified in <b>Table F1: Contaminant Release Limits to Land</b> .

**Table F1: Contaminant Release Limits to Land**

Contaminant	Unit	Release limit	Limit type	Frequency
5-day Biochemical oxygen demand (BOD)	mg/L	20	Maximum	Monthly
Total suspended solids	mg/L	30	Maximum	Monthly
Nitrogen	mg/L	30	Maximum	Monthly
Phosphorus	mg/L	15	Maximum	Monthly
E-coli	Organisms/100mL	1000	Maximum	Monthly
pH	pH units	6.0 – 9.0	Range	Monthly

<b>F3</b>	The monthly volume of treated sewage effluent released to land must be measured and records kept of the volumes of effluent released.
<b>F4</b>	Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in <b>Table F1: Contaminant Release Limits to Land</b> .
<b>F5</b>	Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any sensitive or commercial place.
<b>F6</b>	The release of treated effluent to land must be carried out in a manner such that: <ul style="list-style-type: none"> <li>a) vegetation is not damaged;</li> <li>b) there is no surface ponding of treated sewage effluent; and</li> <li>c) there is no run-off of treated sewage effluent.</li> </ul>
<b>F7</b>	Subject to <b>Conditions F2 to F3</b> inclusive, sewage effluent from sewage treatment facilities must be reused or evaporated and must not be directly released from the sewage treatment plant to any water way or drainage line.
<b>F8</b>	If areas irrigated with treated sewage effluent are accessible to employees or the general public, prominent signage must be provided advising that effluent is present, and care should be taken to avoid consuming or otherwise coming into unprotected contact with the effluent.

Schedule G: Land	
Condition number	Condition
<b>G1</b>	<p><b>Contaminant release</b></p> <p>Contaminants must not be released to land, except as permitted under the conditions of this environmental authority.</p>
<b>G2</b>	<p><b>Topsoil</b></p> <p>Topsoil must be strategically stripped ahead of mining in accordance with a Topsoil Management Plan.</p>
<b>G3</b>	<p>A topsoil inventory which identifies the topsoil requirements for the authorised mining activities and availability of suitable topsoil on site must be:</p> <ul style="list-style-type: none"> <li>a) provided with any Estimated Rehabilitation Cost application; and</li> <li>b) detailed in the Topsoil Management Plan.</li> </ul>
<b>G4</b>	<p>Land disturbed by the authorised mining activities must be rehabilitated to a safe, stable and non-polluting landform, with a self-sustaining vegetation cover in accordance with:</p> <ul style="list-style-type: none"> <li>a) <b>Attachment 6: Rehabilitation Requirements;</b></li> <li>b) <b>Table G1: Approved Final Residual Voids Design;</b></li> <li>c) <b>Attachment 7: Approved Final Residual Voids Design;</b> and</li> <li>d) the rehabilitation management plan required by <b>Condition G7</b>.</li> </ul>
<b>G5</b>	<p>The environmental authority holder may only retain items of infrastructure which are beneficial to the post-mining land use, when there is written agreement between the environmental authority holder and the post-mining landowner/holder.</p> <p>Where the post-mining landowner/holder, is also the environmental authority holder, infrastructure cannot remain without the administering authority's agreement.</p>

<b>G6</b>	<p><b>Approved final residual voids outcome</b></p> <p>Approved final residual voids must comply with the following outcomes:</p> <p>a) Approved final residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority;</p> <p>b) approved final residual voids must comply with the basic criteria in <b>Table G1: Approved Final Residual Voids Design and Attachment 7: Approved Final Residual Voids Design</b>;</p> <p>c) a void hydrology study, addressing the long-term water balance in the approved final residual voids, connections to groundwater resources and water quality parameters in the long term;</p> <p>d) a certified design plan must be submitted for each of the approved final residual voids in advance of operations, that shows the maximum distance between berms and the width of berms, that are required at various levels to provide for safe operations and a final void that is stable for the foreseeable future; and,</p> <p>e) An approved final residual voids management plan, detailing the following:</p> <p style="padding-left: 40px;">i. description of any environmental impacts and how these will be managed; and</p> <p>description of any environmental monitoring requirements to demonstrate successful implementation of management strategies.</p>
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**Table G1 – Approved Final Residual Voids Design**

Void Identification	Void high wall competent rock slope (deg)	Void high wall incompetent rock slope (deg)	Void low wall (deg)	Void low wall incompetent rock slope (deg)	Void Maximum Depth (m)	Void Maximum Length (m)	Void Maximum Area (ha)	Volume (Mm <sup>3</sup> )
<b>Central Final Void (Pit 1)</b>	45	45	37	37	70	1,460	75	28
<b>Western Final Void (Pit 3)</b>	45	45	37	37	87	3,770	165	86

Mm<sup>3</sup> = million cubic metres

Deg = Degrees

<p><b>G7</b></p>	<p>A Rehabilitation Management Plan for all mining areas must be developed by a suitably qualified person(s) and implemented for all stages of the mine life and submitted to the administering authority for review and comment by <b>31 October 2019</b>. The Rehabilitation Management Plan must, at a minimum, include:</p> <ul style="list-style-type: none"> <li>a) a map of existing areas of rehabilitation including classification and status of rehabilitation;</li> <li>b) a strategy and schedule for the progressive rehabilitation of all disturbance during the life of mine;</li> <li>c) a strategy for successfully achieving rehabilitation requirements of this environmental authority;</li> <li>d) details of grazing or rehabilitation trials that are to be undertaken on overburden emplacement areas;</li> <li>e) details of the objectives and success criteria for rehabilitation of each mining domain to achieve rehabilitation outcomes listed in <b>Attachment 6: Rehabilitation Requirements, Table G1: Approved Final Residual Voids Design</b> and <b>Attachment 7: Approved Final Residual Voids Design</b>;</li> <li>f) details of landform design to achieve rehabilitation outcomes listed <b>Attachment 6: Rehabilitation Requirements</b> including end of mine design and schematic representation of final landform inclusive of: <ul style="list-style-type: none"> <li>i) drainage design and features;</li> <li>ii) slope designs;</li> <li>iii) cover design;</li> <li>iv) erosion controls proposed on reformed land;</li> </ul> </li> <li>g) details of how landform design will be consistent with surrounding topography;</li> <li>h) details of how the final land uses will align with local planning scheme requirements;</li> <li>i) specify the spoil characteristics, soil analysis and soil separation for use on rehabilitation;</li> <li>j) specify the topsoil requirements for the site and how topsoil will be managed for use in rehabilitation;</li> <li>k) details of any topsoil deficit and how any deficit will be managed for successful rehabilitation;</li> <li>l) details of rehabilitation methods to be applied to each domain;</li> <li>m) a description of the monitoring of at least <b>three (3)</b> reference sites for each mine domain for use in rehabilitation monitoring, including: <ul style="list-style-type: none"> <li>i) specific identifier of each reference site;</li> <li>ii) the location of each reference site;</li> <li>iii) a description of each reference site; and</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>iv) a description of the relevant rehabilitation domain.</li> <li>n) a description of rehabilitation indicators and how these will be monitored;</li> <li>o) a description of management actions to address unsuccessful rehabilitation or redesign;</li> <li>p) a description of wastewater collection and reticulation and treatment systems;</li> <li>q) a description of any risks to groundwater and how these will be managed; and</li> <li>r) a description of seepage and leachate management considerations, including the prevention and management of acid mine drainage.</li> </ul>
<b>G8</b>	<p>The environmental authority holder must review the Rehabilitation Management Plan required by <b>Condition G7</b> at intervals no greater than <b>thirty-six (36) months</b> from <b>31 October 2019</b>. If the environmental authority holder needs to make changes to the Rehabilitation Management Plan they must submit to the administering authority:</p> <ul style="list-style-type: none"> <li>a) the revised Rehabilitation Management Plan for review and comment; and</li> </ul> <p>a report of the findings of the Rehabilitation Management Plan (the Rehabilitation Monitoring Review).</p>
<b>G9</b>	<p>The Rehabilitation Monitoring Review required by <b>Condition G8</b> must contain the following:</p> <ul style="list-style-type: none"> <li>a) how the rehabilitation objectives in the Rehabilitation Management Plan required by <b>Condition G7</b> are being met;</li> <li>b) if the rehabilitation objectives are not being met, the corrective actions to be taken;</li> <li>c) a statistical analysis of how areas of rehabilitation compare to analogue sites listed in the Rehabilitation Management Plan;</li> <li>d) a statistical analysis of how areas of rehabilitation are meeting the requirements of <b>Condition G4</b>;</li> <li>e) the sampling and monitoring intensity used in the Rehabilitation Management Plan required by <b>Condition G7</b>; and</li> </ul> <p>justification of the sampling and monitoring intensity used in the Rehabilitation Management Plan required by <b>Condition G7</b>.</p>
<b>G10</b>	<p>Within <b>twenty (20) business days</b> of receiving comments from the administering authority as per <b>Condition G7</b>, the Rehabilitation Management Plan must be updated to address the comments, amended to adopt any recommendations and submitted to the administering authority.</p>
<b>G11</b>	<p>Where there is an inconsistency between the Rehabilitation Management Plan and this environmental authority, the requirements of this environmental authority prevail.</p>

<b>G12</b>	<p><b>Vegetation management</b></p> <p>Cleared vegetation from the site must be managed in accordance with the following hierarchy:</p> <p>a) recycle, e.g. mulching of vegetation and use in rehabilitation on the site; or,</p> <p>other alternative management options implemented in a way that causes the least amount of environmental harm.</p>
<b>G13</b>	<p><b>Flood protection levees</b></p> <p>The environmental authority holder is authorised to construct and maintain a flood protection levee as shown in <b>Attachment 3: Approved levees and water diversions</b> during the life of mine.</p>
<b>G14</b>	<p>The flood protection levee must be designed and inspected annually by a suitably qualified and experienced person(s) in accordance with <b>Agency Interest: Regulated structures</b> section of this environmental authority.</p>
<b>G15</b>	<p>Any section of the outside face of the levee must be treated with cover material and grass seed (unless rock armoured) within three months of completion of earthworks for that section of the levee.</p>
<b>G16</b>	<p><b>Chemicals and flammable or combustible liquids</b></p> <p>Chemicals and fuels stored, must be managed in accordance with Australian Standards, where such a standard is applicable.</p>
<b>G17</b>	<p>Where no relevant Australian standard exists store such materials within an effective on-site containment system.</p>
<b>G18</b>	<p><b>Acid sulfate soils</b></p> <p>Treat and manage acid sulfate soils in accordance with the latest edition of the 'Queensland Acid Sulfate Soil Technical Manual'.</p>
<b>G19</b>	<p><b>Impacts of Prescribed Environmental Matters</b></p> <p>Significant residual impacts to prescribed environmental matters outside of the approved disturbance footprint shown in <b>Attachment 1: Approved disturbance footprint – Cameby Downs Coal Mine</b> are not authorised under this environmental authority or the <i>Environmental Offsets Act 2014</i> unless the impact(s) is specified in <b>Table G2: Significant Residual Impacts to Prescribed Environmental Matters</b>.</p>
<b>G20</b>	<p>An environmental offset made in accordance with the <i>Environmental Offsets Act 2014</i> and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in <b>Table G2: Significant Residual Impacts to Prescribed Environmental Matters</b>, for which an offset is required.</p>

<b>G21</b>	The significant residual impacts to a prescribed environmental matter authorised in <b>Condition G19</b> for which an environmental offset is required by <b>Condition G20</b> may be carried out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.
<b>G22</b>	Prior to the commencement of impacts to prescribed environmental matters in each stage, a report completed by a suitably qualified person(s), that includes an analysis of the following must be provided to the administering authority:  a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and  for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.
<b>G23</b>	The report required by <b>Condition G22</b> must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
<b>G24</b>	A notice of election for the staged environmental offset referred to in <b>Condition G23</b> , if applicable, must be provided to the administering authority no less than <b>three (3) months</b> before the proposed commencement of impacts to prescribed environmental matters in that stage, unless a lesser timeframe has been agreed to by the administering authority.
<b>G25</b>	Within <b>six (6) months</b> from the completion of the final stage of the project, a report completed by a suitably qualified person(s), that includes the following matters must be provided to the administering authority:  a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and  b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.

Table G2 - Significant Residual Impacts to Prescribed Environmental Matters

Prescribed environmental matter	Maximum extent of impact (Ha)	Environmental offset required
<b>Regulated Vegetation</b>		
Endangered Regional Ecosystem – 11.4.3 <sup>1</sup>	2.9	Yes
Endangered Regional Ecosystem – 11.4.10	5.8	Yes
Of Concern Regional Ecosystem – 11.3.2	17.5	Yes
Of Concern Regional Ecosystem – 11.3.4	0.2	No
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map – Regional Ecosystems 11.3.2, 11.3.25, 11.5.1/11.5.1a, 11.7.4 and 11.7.7	2.5	Yes
Connectivity Areas	893.5	Yes
<b>Protected wildlife habitat</b>		
Essential habitat (not in an urban area) for endangered wildlife – Brigalow Woodland Snail ( <i>Adclarkia cameroni</i> )	7.6	No
Essential habitat (not in an urban area) for endangered wildlife - Yakka Skink ( <i>Egernia rugosa</i> ) <sup>2</sup>	899.4	Yes
Essential habitat (not in an urban area) for endangered wildlife - Grey Snake ( <i>Hemiaspis damelii</i> )	67.7	Yes
Essential habitat (not in an urban area) for endangered wildlife – Glossy Black-cockatoo ( <i>Calyptorhynchus lathami</i> )	713.3	No
Essential habitat (not in an urban area) for endangered wildlife – Short-beaked Echidna ( <i>Tachyglossus aculeatus</i> )	2,478.2	No
Essential habitat (not in an urban area) for endangered wildlife – Koala ( <i>Phascolarctos cinereus</i> ) <sup>2</sup>	894.2	Yes

1. RE 11.4.3 equated to the Brigalow TEC listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
2. Brigalow Woodland Snail, Yakka Skink and Koala are also listed under the EPBC Act.

Schedule H: Regulated Structures	
Condition number	Condition
H1	<p><b>Assessment of consequence category</b></p> <p>The consequence category of any structure must be assessed by a suitably qualified and experienced person(s) in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> at the following times:</p> <ul style="list-style-type: none"> <li>a) prior to the design and construction of the structure, if it is not an existing structure;</li> <li>b) if it is an existing structure, prior to the adoption of this schedule; or</li> <li>c) prior to any change in its purpose or the nature of its stored contents.</li> </ul>
H2	A consequence assessment report and certification must be prepared for any structure assessed and the report may include a consequence assessment for more than one structure.
H3	Certification must be provided by the suitably qualified and experienced person(s) who undertook the assessment, in the form set out in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
H4	<p><b>Design and construction<sup>1</sup> of a regulated structure</b></p> <p><b>Conditions H5 to H9</b> inclusive do not apply to existing structures.</p> <p><i>Note:</i>  <sup>1</sup>Construction of a dam includes modification of an existing dam — refer to definitions.</p>
H5	<p>All regulated structures must be designed by, and constructed<sup>2</sup> under the supervision of, a suitably qualified and experienced person(s) in accordance with the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i>.</p> <p><i>Note:</i>  <sup>2</sup>Certification of design and construction may be undertaken by different persons.</p>
H6	Construction of a regulated structure is prohibited unless the environmental authority holder has submitted a consequence category assessment report and certification to the administering authority has been certified by a suitably qualified and experienced person(s) for the design and design plan and the associated operating procedures in compliance with the relevant condition of this authority.
H7	Certification must be provided by the suitably qualified and experienced person(s) who oversees the preparation of the design plan, in the form set out in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams (EM635)</i> , and must be recorded in the Regulated Dams/Levees Register.

<b>H8</b>	<p>Regulated structures must:</p> <ul style="list-style-type: none"> <li>a) be designed and constructed in accordance with and conform to the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i>; and</li> <li>b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: <ul style="list-style-type: none"> <li>i. floodwaters from entering the regulated dam from any watercourse or drainage line; and</li> <li>ii. wall failure due to erosion by floodwaters arising from any watercourse or drainage line.</li> </ul> </li> </ul>
<b>H9</b>	<p>Certification by the suitably qualified and experienced person(s) who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:</p> <ul style="list-style-type: none"> <li>a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and</li> <li>b) construction of the regulated structure is in accordance with the design plan.</li> </ul>
<b>H10</b>	<p><b>Operation of a regulated structure</b></p> <p>Operation of a regulated structure, except for an existing structure, is prohibited unless the environmental authority holder has submitted to the administering authority:</p> <ul style="list-style-type: none"> <li>a) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with <b>Condition H7</b>;</li> <li>b) a set of 'as constructed' drawings and specifications;</li> <li>c) certification of those 'as constructed drawings and specifications' in accordance with <b>Condition H9</b>;</li> <li>d) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the Design Storage Allowance (DSA) volume across the system, a copy of the certified system design plan;</li> <li>e) the requirements of this environmental authority relating to the construction of the regulated structure have been met;</li> <li>f) the holder has entered the details required under this authority, into a Register of Regulated Dams; and</li> <li>g) there is a current operational plan for the regulated structures.</li> </ul>

<b>H11</b>	<p>For existing structures that are regulated structures:</p> <p>a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within <b>twelve (12) months</b> of the commencement of this condition a copy of the certified system design plan including that structure; and</p> <p>b) there must be a current operational plan for the existing structures.</p>
<b>H12</b>	<p>Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.</p>
<b>H13</b>	<p><b>Mandatory reporting level</b></p> <p><b>Conditions H14 to H17</b> inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.</p>
<b>H14</b>	<p>The Mandatory Reporting Level (MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.</p>
<b>H15</b>	<p>The environmental authority holder must, as soon as practical and within <b>forty-eight (48) hours</b> of becoming aware, notify the administering authority when the level of contents of a regulated dam reaches the MRL.</p>
<b>H16</b>	<p>The environmental authority holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.</p>
<b>H17</b>	<p>The environmental authority holder must record any changes to the MRL in the Register of Regulated Structures.</p>
<b>H18</b>	<p><b>Design storage allowance</b></p> <p>The environmental authority holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to <b>1 July</b> of each year.</p>
<b>H19</b>	<p>By <b>1 November</b> of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the DSA volume for the dam (or network of linked containment systems).</p>
<b>H20</b>	<p>The environmental authority holder must, as soon as possible and within <b>forty-eight (48) hours</b> of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on <b>1 November</b> of any year, notify the administering authority.</p>

H21	The environmental authority holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on <b>1 November</b> of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
H22	<p><b>Annual inspection report</b></p> <p>Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person(s).</p>
H23	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person(s) must prepare an annual inspection report containing details of the assessment and include recommended actions to ensure the integrity of the regulated structure.
H24	The suitably qualified and experienced person(s) who prepared the annual inspection report must certify the report in accordance with the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)</i> .
H25	<p>The environmental authority holder must:</p> <p>a) within <b>twenty (20) business days</b> of receipt of the annual inspection report, provide to the administering authority:</p> <ul style="list-style-type: none"> <li>i. the recommendations section of the annual inspection report;</li> <li>ii. if applicable, any actions being taken in response to those recommendations; and</li> </ul> <p>b) if, following receipt of the recommendations and (if applicable) actions, the administering authority requests a full copy of the annual inspection report from the environmental authority holder, provide this to the administering authority within <b>ten (10) business days</b> of receipt of the request.</p>
H26	<p><b>Transfer arrangements</b></p> <p>The environmental authority holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.</p>

<b>H27</b>	<p><b>Decommissioning and rehabilitation</b></p> <p>Structures must not be abandoned but be either:</p> <ul style="list-style-type: none"> <li>a) decommissioned and rehabilitated to achieve compliance with <b>Condition H28</b>; or</li> <li>b) be left in-situ for a beneficial use(s) provided that: <ul style="list-style-type: none"> <li>i) it no longer contains contaminants that will migrate into the environment;</li> <li>ii) it contains water of a quality that is demonstrated to be suitable for its intended beneficial use(s); and</li> <li>iii) the administering authority, the environmental authority holder and the landholder agree in writing that the dam will be used by the landholder following the cessation of the environmentally relevant activity(ies).</li> </ul> </li> </ul>
<b>H28</b>	<p>After decommissioning, all significantly disturbed land caused by the carrying out of the environmentally relevant activity(ies) must be rehabilitated to meet the following final acceptance criteria:</p> <ul style="list-style-type: none"> <li>a) the landform is safe for humans and fauna;</li> <li>b) the landform is stable with no subsidence or erosion gullies for at least three (3) years;</li> <li>c) any contaminated land (e.g. contaminated soils) is remediated and rehabilitated;</li> <li>d) not allowing for acid mine drainage;</li> <li>e) there is no ongoing contamination to waters (including groundwater);</li> <li>f) rehabilitation is undertaken in a manner such that any actual or potential acid sulfate soils on the area of significant disturbance are treated to prevent or minimise environmental harm in accordance with the Instructions for the treatment and management of acid sulfate soils;</li> <li>g) all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;</li> <li>h) for land that is not being cultivated by the landholder: <ul style="list-style-type: none"> <li>i. groundcover, that is not a declared pest species is established and self-sustaining;</li> <li>ii. vegetation of similar species richness and species diversity to pre-selected analogue sites is established and self-sustaining; and</li> <li>iii. the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the mining activity(ies); and</li> </ul> </li> <li>i) for land that is to be cultivated by the landholder, revegetation with a cover crop, unless the landholder will be preparing the site for cropping within <b>three (3) months</b> of mining activities being completed.</li> </ul>
<b>H29</b>	<p><b>Register of regulated dams</b></p> <p>A register of regulated dams must be established and maintained by the environmental authority holder for each regulated dam.</p>

<b>H30</b>	The environmental authority holder must provisionally enter the required information in the Register of Regulated Dams when a design plan for a regulated dam is submitted to the administering authority.
<b>H31</b>	The environmental authority holder must make a final entry of the required information in the Register of Regulated Dams once compliance with <b>Condition H10 and H11</b> has been achieved.
<b>H32</b>	The environmental authority holder must ensure that the information contained in the Register of Regulated Dams is current and complete on any given day.
<b>H33</b>	All entries in the Register of Regulated Dams must be approved by the Site Senior Executive for the environmental authority holder, or their delegate, as being accurate and correct.
<b>H34</b>	The environmental authority holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Dams, in the electronic format required by the administering authority.
<b>H35</b>	<p><b>Transitional arrangements</b></p> <p>All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within <b>six (6) months</b> of amendment of the authority adopting this schedule.</p>
<b>H36</b>	All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in <b>Table H1 – Transitional Requirements for Existing Structures</b> , depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.
<b>H37</b>	<p><b>Table H1</b> ceases to apply for a structure once any of the following events has occurred:</p> <ul style="list-style-type: none"> <li>a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual;</li> <li>b) it has been decommissioned; or</li> <li>c) it has been certified as no longer being assessed as a regulated structure.</li> </ul>

Table H1 – Transitional Requirements for Existing Structures

<b>Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i></b>			
<b>Compliance with criteria</b>	<b>High</b>	<b>Significant</b>	<b>Low</b>
>90% and a history of good compliance performance in last 5 years	No transition required	No transition required	No transitional conditions apply. Review consequence assessment every 7 years.
>70%-≤90%	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 10 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	No transitional conditions apply. Review consequence assessment every 7 years.
>50-≤70%	Within 5 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing)	Within 5 years or as per compliance requirements (e.g. TEP timing)	Review consequence assessment every 5 years.

**END OF PERMIT CONDITIONS****Definitions**

Key terms and/or phrases used in this document are defined in this section. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

**‘acid rock drainage’** means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.

**‘aggregation dam’** means a regulated dam that receives and contains coal seam gas water or coal seam gas concentrate. The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.

**‘air blast overpressure’** means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak air blast overpressure measured in decibels linear (dBL).

**‘alternative arrangement’** means a written agreement between the environmental authority holder and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangement may include, but not necessarily be limited to, a range of noise abatement measures to be installed at a sensitive receptor and / or provision of alternative accommodation for the duration of the defined noise nuisance impact.

**‘annual exceedance probability or AEP’** the probability that at least one event in excess of a particular magnitude will occur in any given year.

**‘annual inspection report’** means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

- a) against recommendations contained in previous annual inspections reports;
- b) against recognised dam safety deficiency indicators;
- c) for changes in circumstances potentially leading to a change in consequence category;
- d) for conformance with the conditions of this authority;
- e) for conformance with the ‘as constructed’ drawings;
- f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems);
- g) for evidence of conformance with the current operational plan.

**‘assessed and assessment’** by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow and independent audit of the assessment:

- a) exactly what has been assessed and the precise nature of that determination;
- b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;

- c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

**'associated works'** in relation to a dam, means:

- a) operations of any kind and all things constructed, erected or installed for that dam; and
- b) any land used for those operations.

**'authority'** means an environmental authority.

**'background'**, with reference to the water schedule means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.

**'blasting'** means the use of explosive materials to fracture:

- a) rock, coal and other minerals for later recovery; or
- b) structural components or other items to facilitate removal from a site or for reuse.

**'Building and demolition waste'** means unsegregated material (other than material containing asbestos waste or liquid waste) that results from:

- the demolition, erection, construction, refurbishment or alteration of buildings other than:
  - chemical works;
  - mineral processing works;
  - container reconditioning works;
  - waste treatment facilities;
- the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports;

and includes materials such as:

- bricks, concrete, paper, plastics, glass and metal; and,
- timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).

**'Bulky non-putrescible wastes'** means timber pallets, air filters, conveyor belts, and building and demolition waste resulting from mining activities.

**'calendar month'** means the period from a day of one month to the corresponding day of the next month if such exists or if not to the last day of the next month (e.g. as from January 3 to February 3 or from January 31 to February 29).

**'certification'** means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed', drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs.

**‘commercial place’** means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees’ accommodation or public roads.

**‘consequence’** in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.

**‘consequence category’** means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

**‘construction’** or **‘constructed’** in relation to a dam includes building a new dam and modifying or lifting an existing dam but does not include investigations and testing necessary for the purpose of preparing a design plan.

**‘dam’** means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.

**‘dam crest volume’** means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (e.g. via spillway).

**‘design plan’** is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

**‘design storage allowance or DSA’** means an available volume, estimated in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.

**‘disturbance’** of land includes:

- a) compacting, removing, covering, exposing or stockpiling of earth;
- b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion;
- c) carrying out mining within a watercourse, waterway, wetland or lake;
- d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls;
- e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or
- f) releasing of contaminants into the soil or underlying geological strata.

However, the following areas are not included when calculating areas of ‘disturbance’:

- a) areas off lease (e.g. roads or tracks which provide access to the mining lease);
- b) areas previously disturbed which have achieved the rehabilitation outcomes;
- c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions);
- d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner.
- e) disturbance that pre-existed the grant of the tenure.

**'EC'** means electrical conductivity.

**'effluent'** treated wastewater released from sewage treatment plants.

**'estimated rehabilitation cost'** for a resource activity, see section 300(2) of the *Environmental Protection Act 1994*.

**'ERC decision'** means a decision of the administering authority under section 300 of the *Environmental Protection Act 1994* about the estimated rehabilitation cost for a resource activity.

**'ERC Period'** for the estimated rehabilitation cost for a resource activity, means—

(a) if a PRCP schedule applies for the activity—the period of between 1 and 5 years stated in the application for an ERC decision under section 298(2)(b); or

(b) if the activity is a petroleum activity that is an ineligible ERA, other than a petroleum activity to which a plan of operations applies, or the activity relates to a 1923 Act petroleum tenure granted under the Petroleum Act 1923—the period of between 1 and 5 years stated in the ERC decision about the estimated rehabilitation cost; or

(c) if a plan of operations applies for the activities—the plan period for the plan of operations; or

(d) otherwise—the total period during which the resource activity is likely to be carried out under the environmental authority for the activity.

**'Ha'** means hectares

**'holder'** means any person who is the holder of, or is acting under, that environmental authority.

**'hydraulic performance'** means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

**'infrastructure'** means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.

**'LAeq, adj 15 mins'** means the average equivalent A-weighted sound pressure level, adjusted for noise character and measured over a time period of not less than 15 minutes.

**'LAmx adj,T'** means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over a time period of not less than 15 minutes.

**'land'** in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the *Environmental Protection Act 1994*. For the purposes of the *Acts Interpretation Act 1954*, it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.

**'land use'** –means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

**'leachate'** means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

**'levee'** means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

**'licensed place'** means the mining activities carried out at the mining tenements detailed in this environmental authority.

**‘low consequence dam’** means any dam that is not a high or significant hazard category as assessed using the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)*.

**‘m’** means metres.

**‘Mm<sup>3</sup>’** means million cubic metres.

**‘mandatory reporting level or MRL’** means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

**‘manual’** means the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635)* published by the administering authority.

**‘measures’** includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.

**‘mine affected water’:**

- a) means the following types of water:
- i. pit water, tailings dam water, processing plant water;
  - ii. water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity;
  - iii. rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water;
  - iv. groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated;
  - v. groundwater from the mine’s dewatering activities;
  - vi. a mix of mine affected water (under any of paragraphs i)-v) and other water.
- b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with:
- i. land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or
  - ii. land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example:
    - a. areas that are been capped and have monitoring data demonstrating hazardous material adequately contained within the site;
    - b. evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or
  - iii. both.

**‘Mining activity’** is—

- a) an activity that is an authorised activity for a mining tenement under the *Mineral Resources Act 1989*; or

b) another activity that is authorised under an approval under the *Mineral Resources Act 1989* that grants rights over land.

**'modification or modifying'** see definition of 'construction'.

**'month'** see definition of 'calendar month'.

**'NATA'** means National Association of Testing Authorities, Australia.

**'natural flow'** means the flow of water through waters caused by nature.

**'non-polluting'** means having no adverse impacts upon the receiving environment.

**'operational plan'** includes:

- a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA allowance);
- b) contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

**'peak particle velocity (ppv)'** means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mm/s).

**'protected area'** means – a protected area under the *Nature Conservation Act 1992*; or

- a) a marine park under the *Marine Parks Act 1992*; or
- b) a World Heritage Area.

**'receiving environment'** in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The receiving environment includes (but is not limited to):

- a) a watercourse;
- b) groundwater; and
- c) an area of land that is not specified in this environmental authority.

The term does not include land that is specified in this environmental authority.

**'receiving waters'** means the waters into which this environmental authority authorises releases of mine affected water.

**'register of regulated dams'** includes:

- a) date of entry in the register;
- b) name of the dam, its purpose and intended/actual contents;
- c) the consequence category of the dam as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (EM635)*;
- d) dates, names and reference for the design plan plus dates, names and reference numbers of all document(s) lodged as part of a design plan for the dam;
- e) name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;
- f) for the regulated dam, other than in relation to any levees –
  - i. the dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
  - ii. coordinates (latitude and longitude in GDA94) within 5 metres at any point from the outside of the dam including its storage area;

- iii. dam crest volume (megalitres);
- iv. spillway crest level (metres AHD);
- v. maximum operating level (metres AHD);
- vi. storage rating table of stored volume versus level (metres AHD);
- vii. design storage allowance (megalitres) and associated level of the dam (metres AHD);
- viii. mandatory reporting level (metres AHD);
- ix. the design plan title and reference relevant to the dam;
- x. the date construction was certified as compliant with the design plan;
- xi. the name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
- xii. details of the composition and construction of any liner;
- xiii. the system for the detection of any leakage through the floor and sides of the dam;
- xiv. dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
- xv. dates when recommendations and actions arising from the annual inspection were provided to the administering authority;
- xvi. dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

**‘regulated dam’** means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Consequence and Hydraulic Performance of Structures (EM635)* published by the administering authority.

**‘regulated structure’** includes land-based containment structures, levees, bunds and voids, but not a tank or container designed and constructed to an Australian Standard that deals with strength and structural integrity.

**‘rehabilitation’** the process of reshaping and revegetating land to restore it to a stable landform

**‘release event’** means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.

**‘RL’** means reduced level, relative to mean sea level as distinct from depths to water.

**‘representative’** means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

**‘residual drilling material’** means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

**‘resource activity’** is an activity that involves—

- (a) a geothermal activity; or
- (b) a GHG storage activity; or
- (c) a mining activity; or
- (d) a petroleum activity.

**‘saline drainage’** The movement of waters, contaminated with salts, as a result of the mining activity.

**‘scheme fund’** means the scheme fund established under the *Mineral and Energy Resources (Financial Provisioning) Act 2018*, section 24.

**‘sensitive place’** means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or

- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- f) a public park or gardens.

*Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under Nature Conservation Act 1992 as a critical habitat or an area of major interest, marine park under Marine Parks Act 2004, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity.*

*A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company.*

*For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or the entire township is constructed on land owned by one or more of the companies.*

**'structure'** means dam or levee.

**'spillway'** means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

**'suitably qualified person'** means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

**'suitably qualified and experienced person'** in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience:

- for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design.
- for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

*Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.*

**'system design plan'** means a plan that manages an integrated containment system that shares the required DSA volume across the integrated containment system.

**'the Act'** means the *Environmental Protection Act 1994*.

“**undisturbed land**” means land which has not been cleared for mining activities.

‘**µS/cm**’ means micro Siemens per centimetre.

‘**void**’ means any constructed, open excavation in the ground.

‘**watercourse**’ has the same meaning given in the *Water Act 2000*.

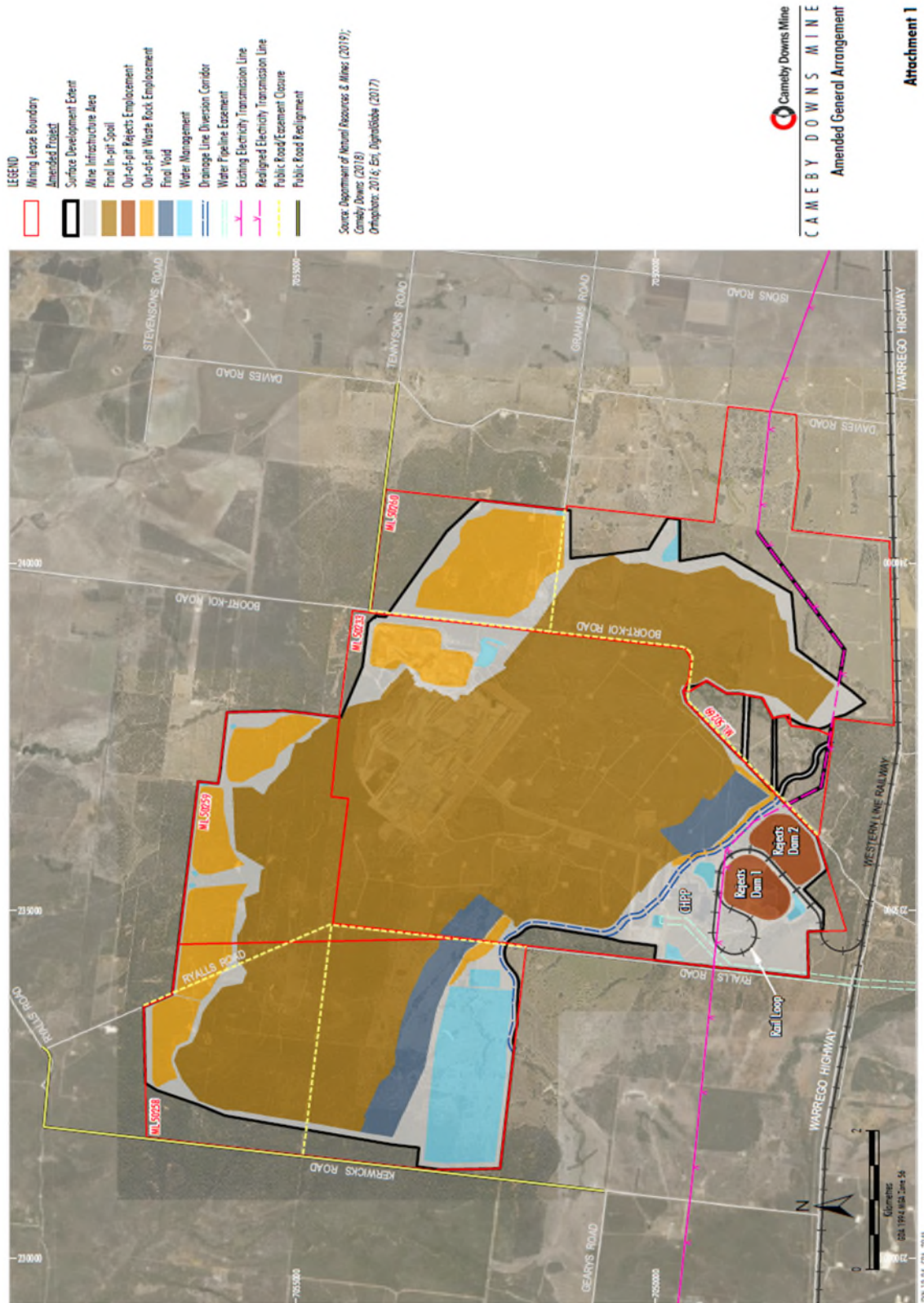
‘**water quality**’ means the chemical, physical and biological condition of water.

‘**waters**’ includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater runoff and groundwater.

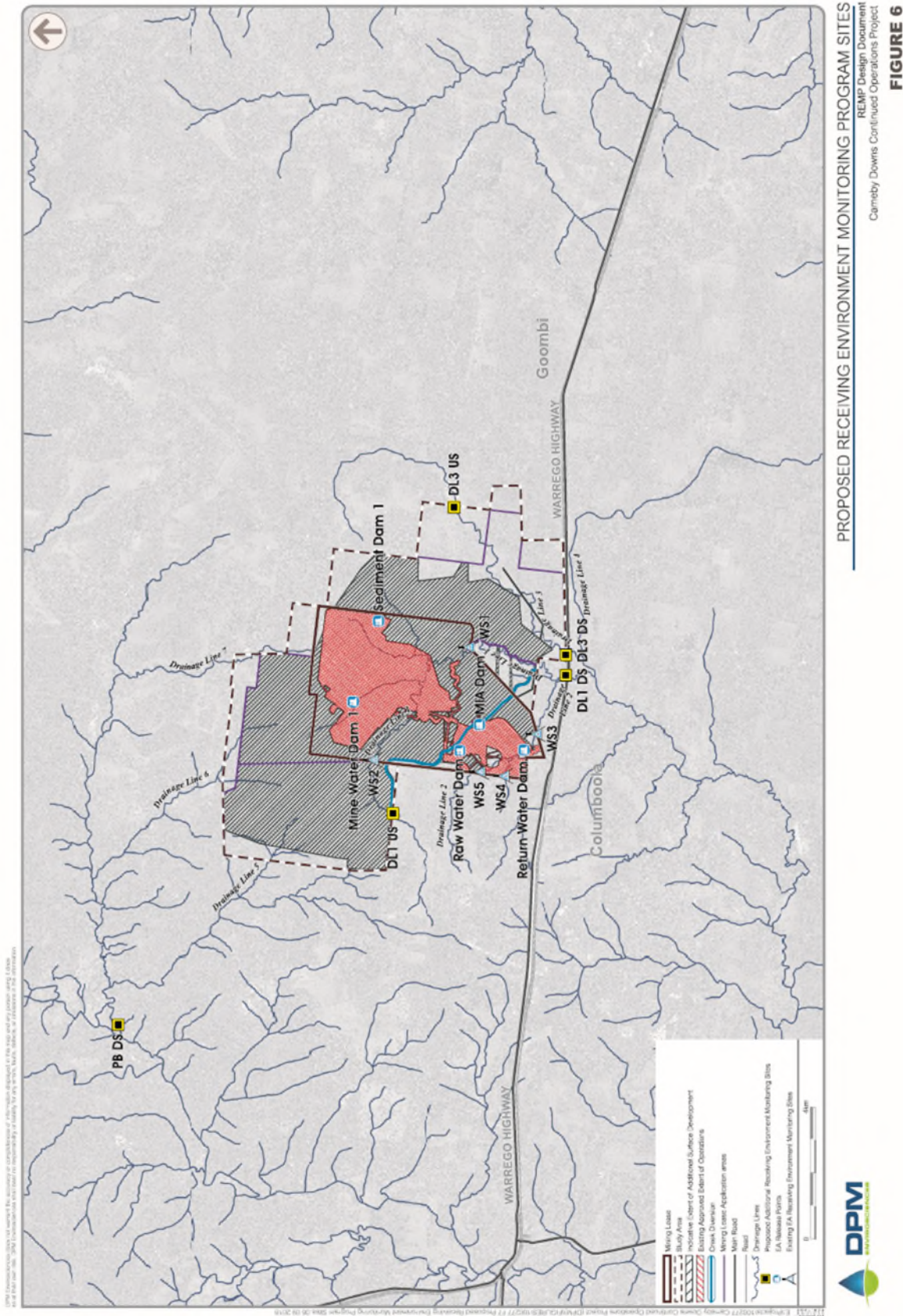
‘**water year**’ means the 12-month period from 1 July to 30 June.

‘**wet season**’ means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

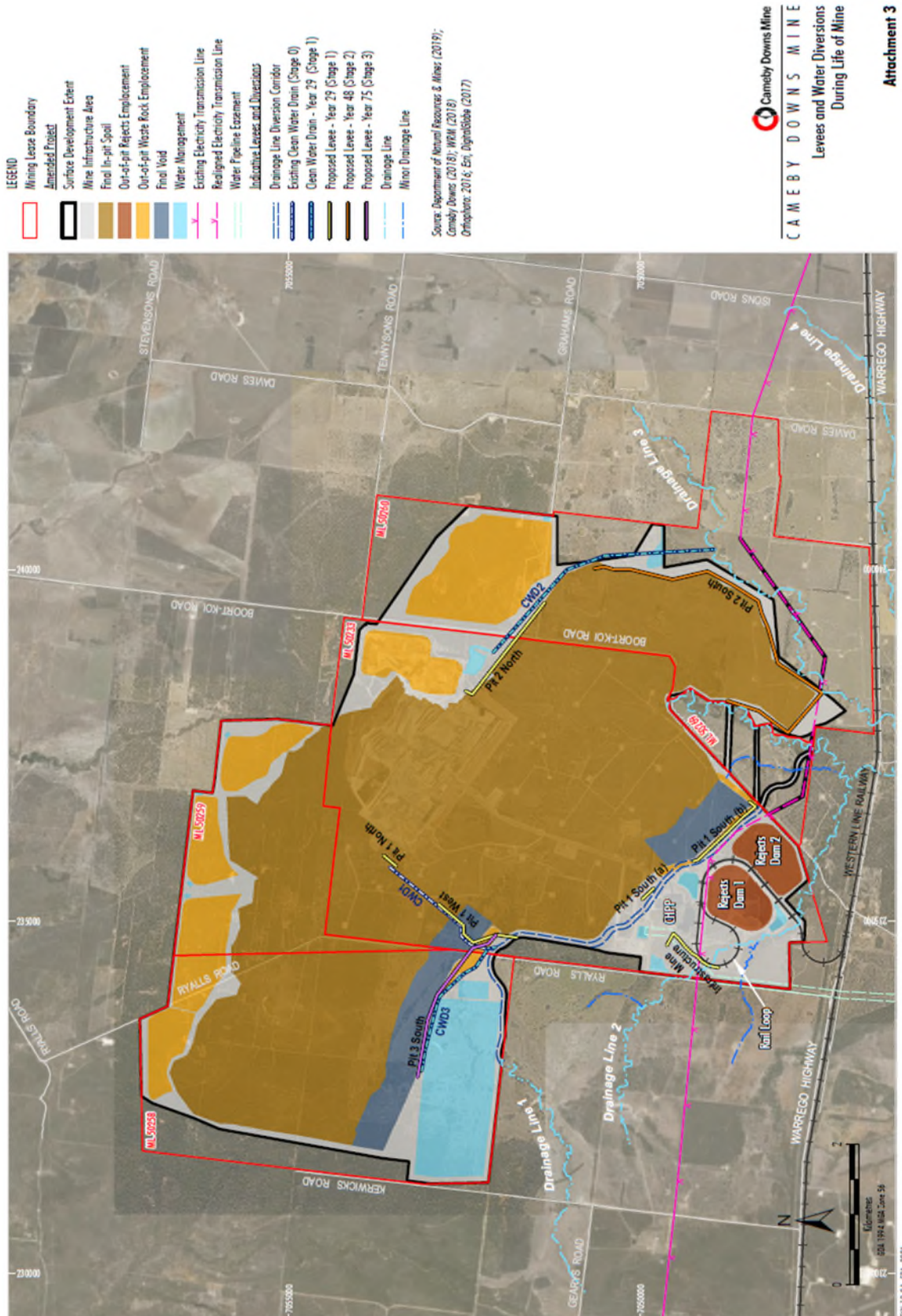
**Attachment 1: Approved disturbance footprint – Cameby Downs Coal Mine**

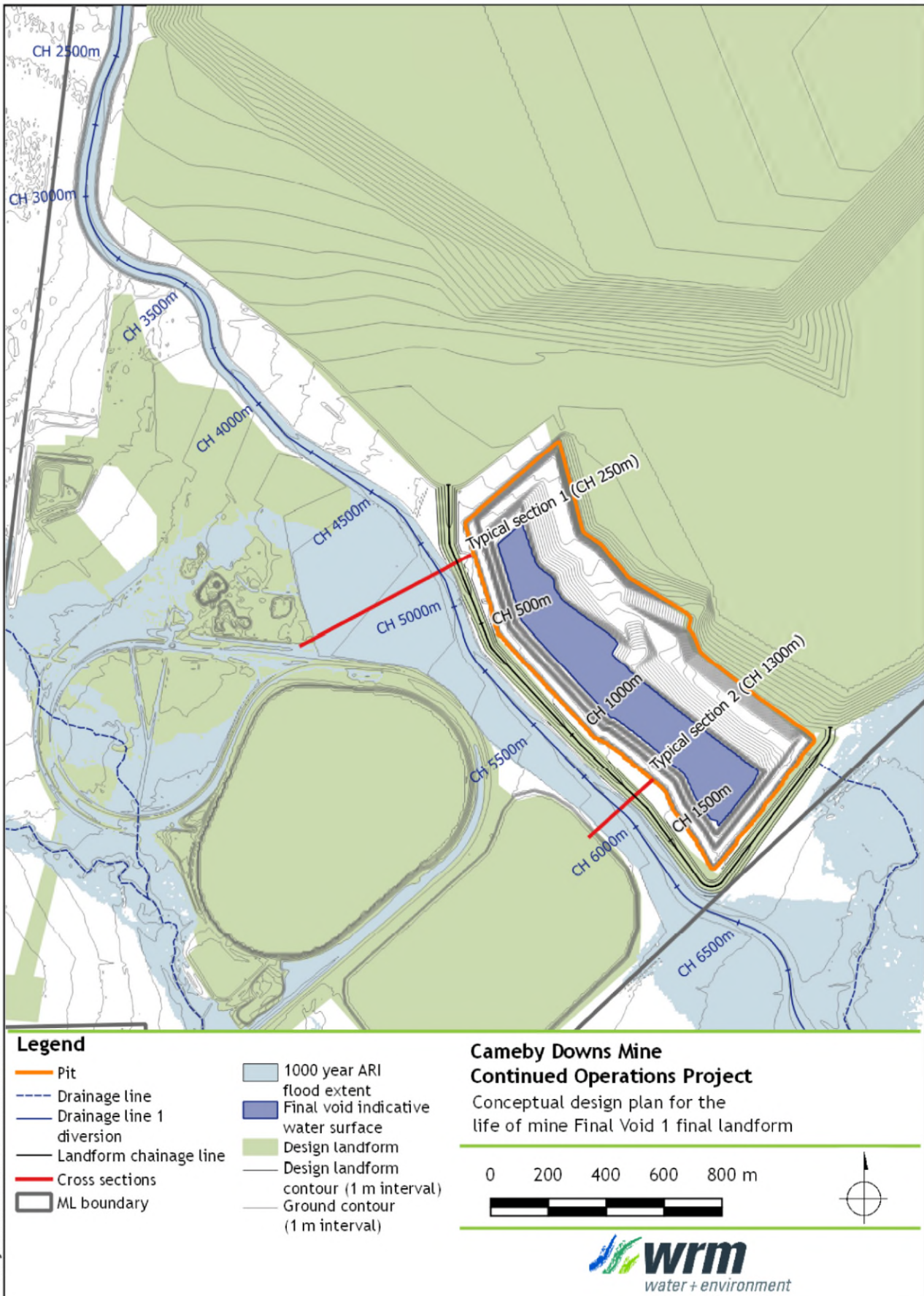


Attachment 2: Mine affected water release points and receiving water monitoring locations



**Attachment 3: Approved levees and water diversions during life of mine, and other final landforms**





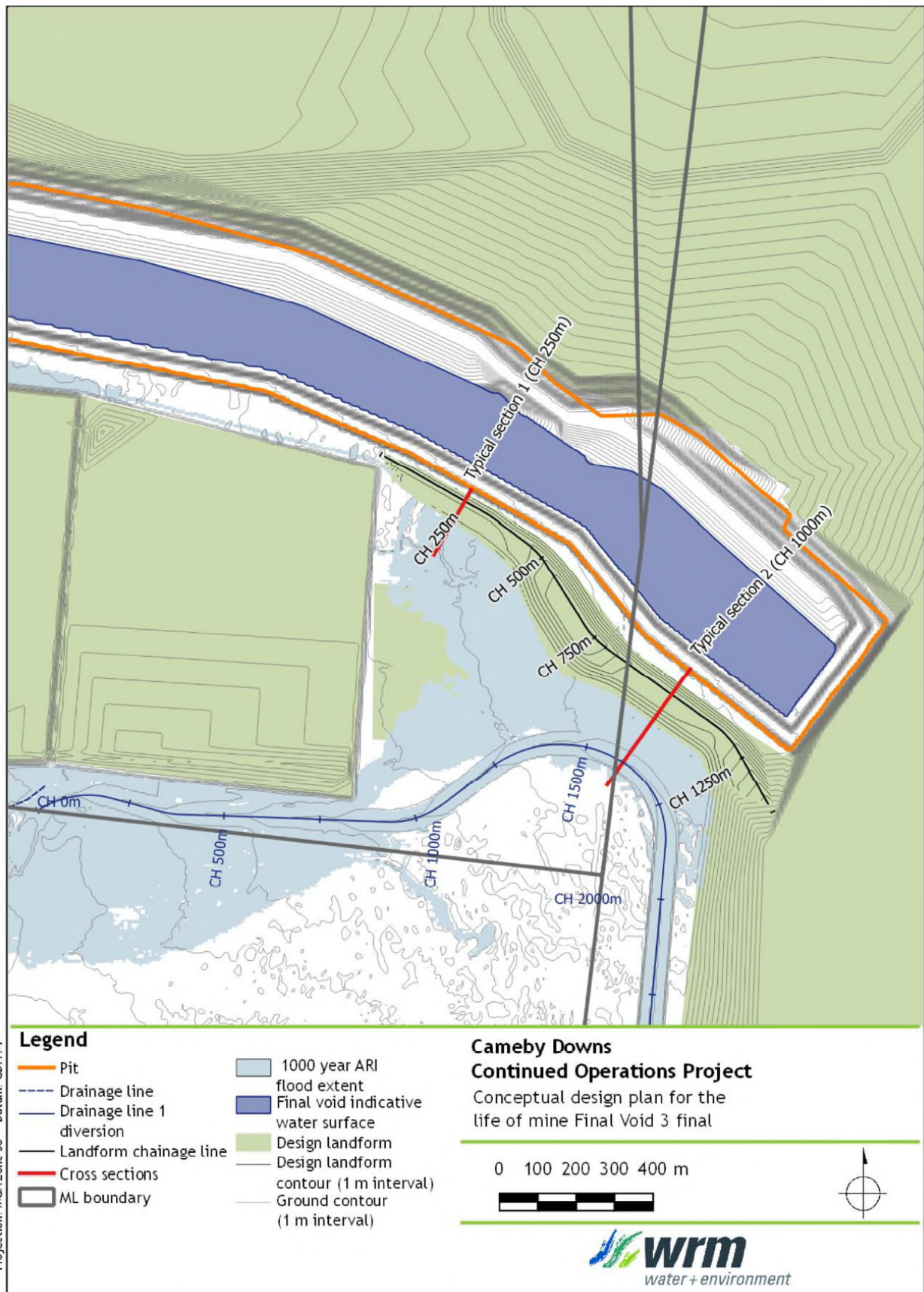


Figure 3 - Final Void 3 (Pit 3) final landform plan view

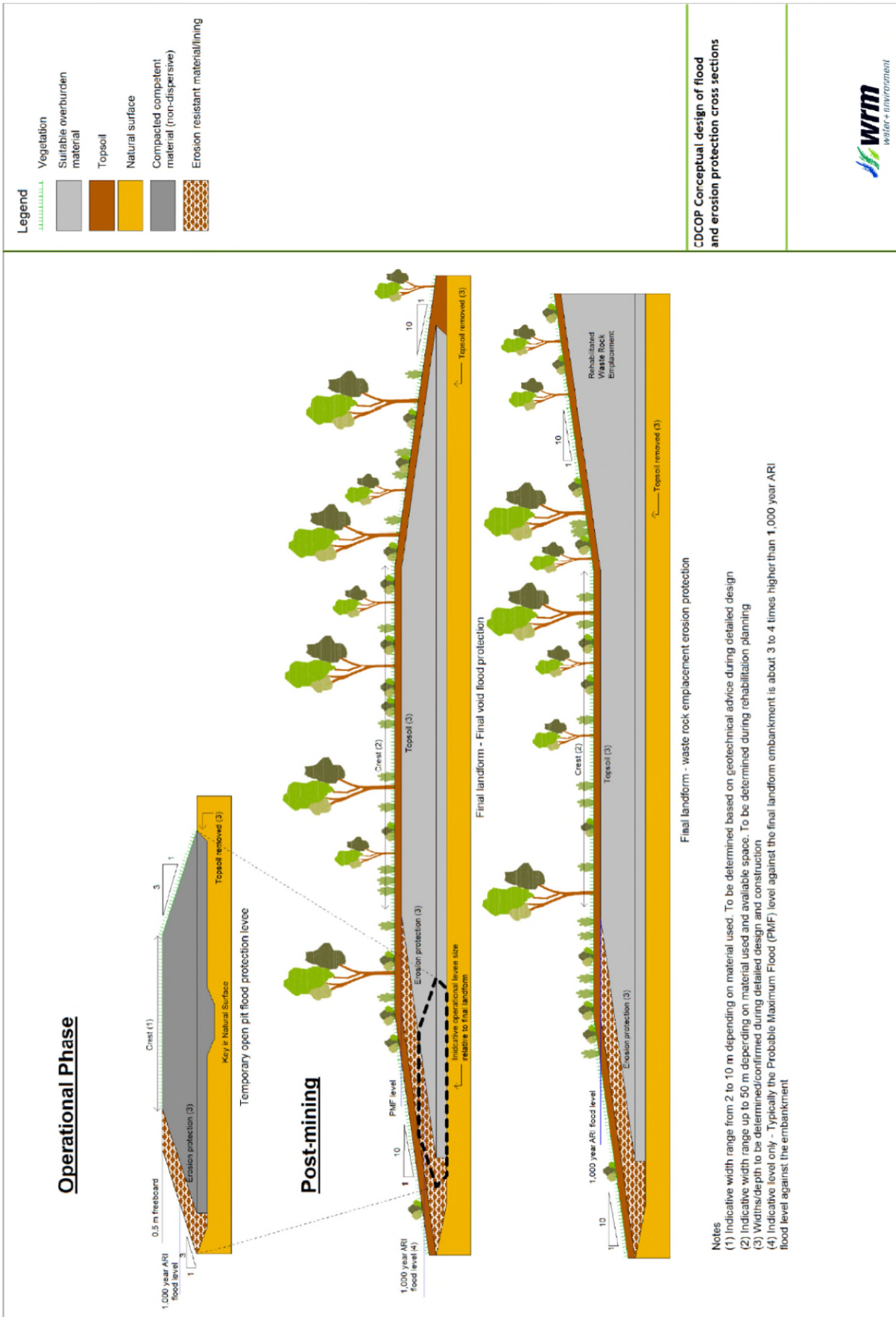


Figure 1 - Conceptual geometric templates for temporary levees and final landforms

**Attachment 4: Current and proposed groundwater bore locations**



- LEGEND**
- - - ML / MLA boundary
  - - - Indicative extent of additional surface development
  - Out of pit rejects disposal area
  - Central void in pit rejects disposal area
  - Road
  - Trail
  - Drainage
  - Existing mine monitoring bores
  - Proposed Final Void monitoring bores
  - Proposed mine monitoring bores
  - Proposed out of pit rejects disposal monitoring bores

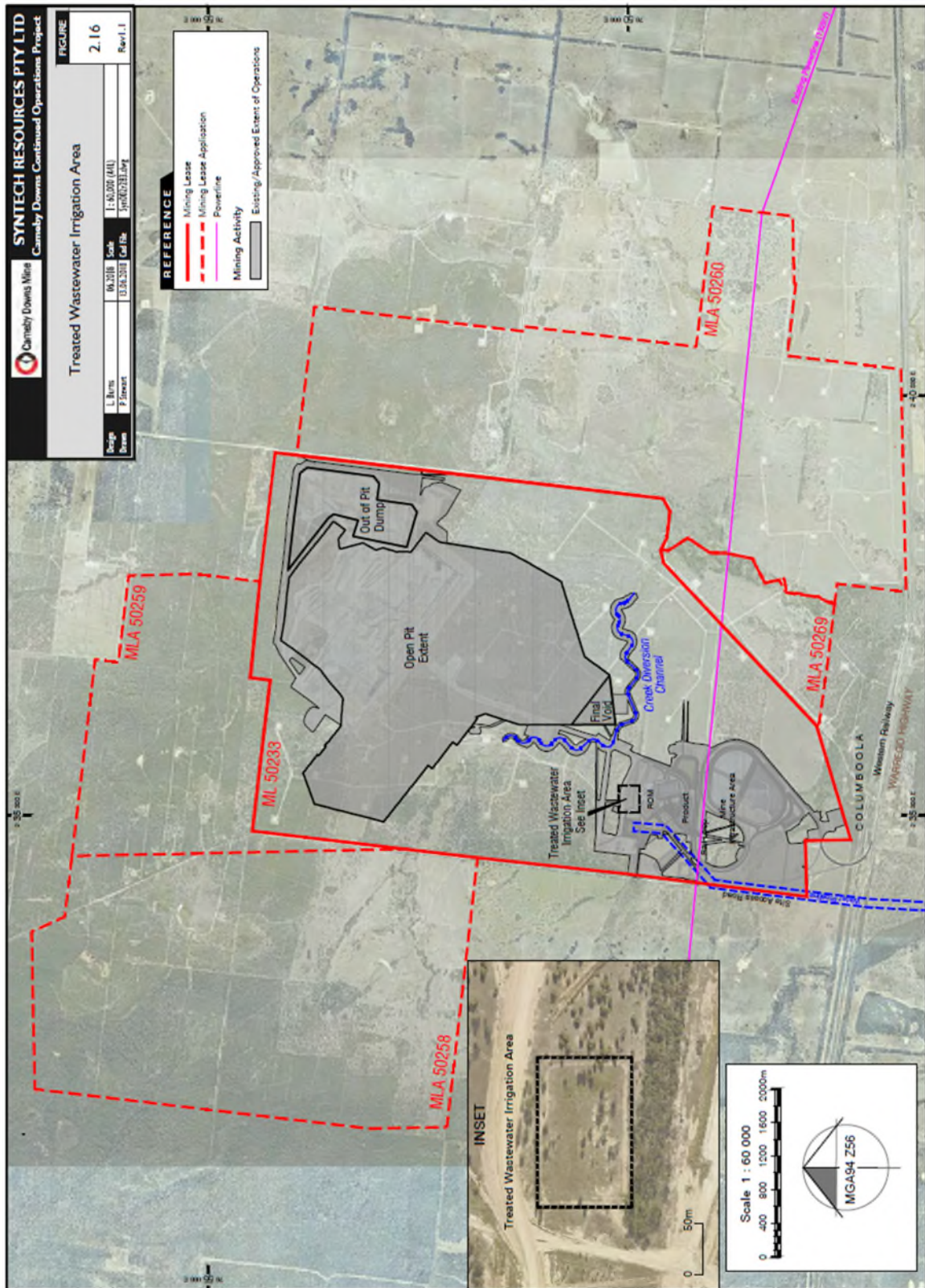
Groundwater Impact Assessment - Cameby Downs  
(G00011)

**Proposed Cameby Downs groundwater monitoring network**

**AGE** 15/06/2018 **11.1**

© 2018 Geoscience Queensland and Environmental Queensland Pty Ltd (EQE) - www.geoscience.qld.gov.au  
A North Queensland Project (NQP) Cameby Downs Mine (EPML00900113) - Proposed Mine Development and Infrastructure plus the NQP (NQP) Proposed Cameby Downs groundwater monitoring network

**Attachment 5: Sewage treatment plant and effluent disposal**



## Attachment 6: Rehabilitation Requirements

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
Infrastructure	<ul style="list-style-type: none"> <li>Site safe for humans and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>Site is determined to be geotechnically stable</li> <li>Contaminated lands treated to a standard acceptable by the administering authority.</li> </ul>	<ul style="list-style-type: none"> <li>Safety assessment conducted by a suitably qualified person.</li> <li>Geotechnical stability of the final void walls undertaken by a RPEQ.</li> <li>Contaminated land assessment, and treatment where required.</li> </ul>	<ul style="list-style-type: none"> <li>0 (zero) significant difference as defined in AS/NZS ISO 13000 Risk Management.</li> <li>Geotechnical investigations demonstrating that the final void walls are stable.</li> <li>Hydrocarbon, heavy metal or other contamination levels are acceptable to the administering authority.</li> </ul>
	<ul style="list-style-type: none"> <li>Non-polluting site</li> </ul>	<ul style="list-style-type: none"> <li>Residual water bodies pose low risk of environmental harm.</li> </ul>	<ul style="list-style-type: none"> <li>Surface and groundwater (e.g. sediment load, pH, heavy metal content) meet conditions of EA EPML00900113.</li> </ul>	<ul style="list-style-type: none"> <li>Receiving water and water bodies water quality compliant with EA EPML00900113.</li> <li>Groundwater quality compliant with EA EPML00900113.</li> </ul>
	<ul style="list-style-type: none"> <li>Stable</li> </ul>	<ul style="list-style-type: none"> <li>Site is determined to be geotechnically stable</li> <li>Contaminated lands treated to a standard acceptable by the administering authority.</li> </ul>	<ul style="list-style-type: none"> <li>Safety assessment conducted by a suitably qualified person.</li> <li>Geotechnical stability of the final void walls undertaken by a RPEQ.</li> <li>Contaminated land assessment, and treatment where required.</li> <li>Established and persistent vegetation.</li> <li>Achievement of sustainable agreed final land use.</li> </ul>	<ul style="list-style-type: none"> <li>0 (zero) significant difference as defined in AS/NZS ISO 13000 Risk Management.</li> <li>Geotechnical investigations demonstrating that the final void walls are stable.</li> <li>Limited active erosion, similar to the levels present in reference sites. No maintenance required to cease active erosion.</li> <li>Hydrocarbon, heavy metal or other contamination levels are</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>acceptable to the administering authority.</p> <ul style="list-style-type: none"> <li>• ≥70% established and persistent groundcover at land suitability classes 3 to 4, and at least 50% at land suitability class 5</li> <li>• Evidence of generational succession of trees and shrubs is apparent in rehabilitation areas.</li> <li>• Evidence of weed management being successful by weed diversity and density being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.</li> <li>• Pest species do not occur in substantial numbers or visibly affect the development of native plant species.</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
Infrastructure (cont.)	<ul style="list-style-type: none"> <li>Suitable site</li> </ul>	<ul style="list-style-type: none"> <li>Soil properties that support and will continue to support the desired final land use.</li> <li>Establish self-sustaining pasture and natural vegetation areas.</li> <li>Establish land use with comparable management requirements to similarly used non-mining land.</li> </ul>	<ul style="list-style-type: none"> <li>Ecosystem functionality, such as vegetation dynamics, habitat complexity and habitat quality.</li> <li>Landscape function, such as rate of soil loss, erosion features, soil physical parameters, organic matter and nutrient content and cycling.</li> <li>Rehabilitation progress and success rate.</li> <li>Achievement of sustainable agreed final land use.</li> </ul>	<ul style="list-style-type: none"> <li>Stocking rates in rehabilitated pasture areas are comparable to designated reference sites.</li> <li>Vegetation consistent with pasture grass species suitable for grazing and native vegetation comparable to designated reference sites.</li> <li>Groundcover density achieves and maintains at least 70% of vegetation reference sites at land suitability classes 3 to 4 and at least 50% at land suitability class 5.</li> <li>Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.</li> <li>Evidence of generational succession of trees and shrubs is apparent in rehabilitated areas.</li> <li>Litter density comparable to vegetation reference sites.</li> <li>Salinity levels of less than 0.6</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>deci-Siemens per metre (dS/m) in soil root zone or less than 110% of comparable natural reference sites.</p> <ul style="list-style-type: none"> <li>• Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.</li> <li>• Evidence of weed management being successful by weed diversity being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.</li> <li>• Pests do not occur in substantial numbers or visibly affect the development of native plant species.</li> </ul>
Final Voids	<ul style="list-style-type: none"> <li>• Site safe for humans and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• Very low probability of rock fails with serious consequences.</li> <li>• Hazardous materials adequately managed.</li> </ul>	<ul style="list-style-type: none"> <li>• Safety assessment of final voids.</li> <li>• Slope angle, length and profile.</li> <li>• Installation of safety barriers and human/wildlife exclusion fencing of final void if required following safety assessment.</li> <li>• Contaminated land assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Safety assessment conducted.</li> <li>• Geotechnical stability of the final void walls has been achieved and geotechnical investigations demonstrating this have been undertaken and reported.</li> <li>• Access is prohibited to final voids by</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>bund wall with a minimum height of 2 m, a minimum base width of 4 m and be located at least 10 m beyond the area potentially affected by any instability of the pit edge or a fence.</p> <ul style="list-style-type: none"> <li>Hydrocarbon, heavy metal or other contamination levels are within allowable departmental limits.</li> </ul>
	<ul style="list-style-type: none"> <li>Non-polluting site</li> </ul>	<ul style="list-style-type: none"> <li>Polluted water contained on site or treated.</li> <li>Residual water bodies have a low risk of environmental harm.</li> </ul>	<ul style="list-style-type: none"> <li>Surface and ground water quality (e.g. sediment load, pH, heavy metal content, etc) meet EA EPML00900113 conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Final void walls drain internally to the final void.</li> <li>Receiving water and end of pipe water quality monitoring results comply with EA EPML00900113, for a period of at least two years post-mining.</li> </ul>
	<ul style="list-style-type: none"> <li>Stable site</li> </ul>	<ul style="list-style-type: none"> <li>Very low probability of rock fails with serious consequences.</li> <li>Very low probability of slope slippage with serious consequences.</li> <li>Landform design achieves appropriate erosion rates.</li> </ul>	<ul style="list-style-type: none"> <li>Safety assessment of final voids.</li> <li>Slope angle, length and profile.</li> <li>Erosion rates and gully formation.</li> </ul>	<ul style="list-style-type: none"> <li>As for “safe to human and wildlife” and “non-polluting” rehabilitation goals.</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
In-pit Waste Rock Emplacements (Backfilled Voids) and Out-of-pit Emplacements	<ul style="list-style-type: none"> <li>Site safe for humans and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>Hazardous materials adequately managed.</li> <li>Very low probability of rock fails with serious consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Slope angle, length and profile.</li> <li>Contaminated land assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Landform recontoured to be sympathetic to the adjacent landforms.</li> <li>Out-of-pit waste rock emplacements – approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used.</li> <li>Other slopes – less than 1V:10H.</li> <li>Hydrocarbon, heavy metal or other contamination levels are within relevant DES limits.</li> <li>Site added to the Environmental Management Register if required.</li> </ul>
	<ul style="list-style-type: none"> <li>Non-polluting site</li> </ul>	<ul style="list-style-type: none"> <li>Polluted water contained on site or treated.</li> <li>Residual water bodies have a low risk of environmental harm.</li> </ul>	<ul style="list-style-type: none"> <li>Surface and ground water quality (e.g. sediment load, pH, heavy metal content, etc.) meet EA EPML00900113 conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Receiving water and end of pipe water quality monitoring results comply with EA EPML00900113, for a period of at least two years post-mining.</li> </ul>
	<ul style="list-style-type: none"> <li>Stable site</li> </ul>	<ul style="list-style-type: none"> <li>Very low probability of subsidence or rock fails with serious consequences.</li> <li>Very low probability of slope slippage with serious consequences.</li> </ul>	<ul style="list-style-type: none"> <li>Slope angle, length and profile.</li> <li>Erosion rates and gully formation.</li> <li>Vegetation type, density and cover.</li> </ul>	<ul style="list-style-type: none"> <li>Landform recontoured to be sympathetic to the adjacent landforms.</li> <li>Out-of-pit waste rock emplacements – approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used.</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
		<ul style="list-style-type: none"> <li>• Landform design achieves appropriate erosion rates.</li> <li>• Adequate vegetation cover established to minimise erosion.</li> </ul>		<ul style="list-style-type: none"> <li>• Other slopes – less than 1V:10H.</li> <li>• Limited erosion (presence of sheets, rills and gullies) similar to vegetation reference sites, for a period of five years post-mining.</li> <li>• Site is stable when comparing photographs from successive monitoring events, for a period of five years post-mining.</li> <li>• Erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.</li> <li>• Groundcover density achieves and maintains at least 70% of vegetation reference sites at land suitability classes 3 to 4 and at least 50% at land suitability class 5.</li> <li>• Litter density comparable to vegetation reference sites.</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
In-pit Waste Rock Emplacements (Backfilled Voids) and Out-of-pit Emplacements (cont.)	<ul style="list-style-type: none"> <li>Suitable site</li> </ul>	<ul style="list-style-type: none"> <li>Soil properties that support and will continue to support the desired final land use.</li> <li>Establish self-sustaining pasture and natural vegetation areas.</li> <li>Establish land use with comparable management requirements to similarly used non-mining land.</li> </ul>	<ul style="list-style-type: none"> <li>Ecosystem functionality, such as vegetation dynamics, habitat complexity and habitat quality.</li> <li>Landscape function, such as rate of soil loss, erosion features, soil physical parameters, organic matter and nutrient content and cycling.</li> <li>Rehabilitation progress and success rate.</li> <li>Achievement of sustainable agreed final land use.</li> </ul>	<ul style="list-style-type: none"> <li>Stocking rates in rehabilitated pasture areas are comparable to designated reference sites.</li> <li>Vegetation consistent with pasture grass species suitable for grazing and native vegetation comparable to designated reference sites.</li> <li>Groundcover density achieves and maintains at least 70% of vegetation reference sites at land suitability classes 3 to 4 and at least 50% at land suitability class 5.</li> <li>Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.</li> <li>Evidence of generational succession of trees and shrubs is apparent in rehabilitated areas.</li> <li>Litter density comparable to vegetation reference sites.</li> <li>Salinity levels of less than 0.6 dS/m</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>in soil root zone or less than 110% of comparable natural reference sites.</p> <ul style="list-style-type: none"> <li>• Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.</li> <li>• Evidence of weed management being successful by weed diversity being less than 110% of baseline survey results and abundance being comparable to vegetation reference sites.</li> <li>• Pests do not occur in substantial numbers or visibly affect the development of native plant species.</li> </ul>
<p>Out-of-pit Coal Reject Emplacements</p>	<ul style="list-style-type: none"> <li>• Site safe for humans and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• Hazardous materials adequately managed.</li> <li>• Very low probability of rock fails with serious consequences.</li> </ul>	<ul style="list-style-type: none"> <li>• Slope angle, length and profile.</li> <li>• Contaminated land assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• Landform recontoured to be sympathetic to the adjacent landforms.</li> <li>• Approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used.</li> <li>• Other slopes – less than 1V:10H.</li> <li>• Hydrocarbon, heavy metal or other contamination levels</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>are within relevant DES limits.</p> <ul style="list-style-type: none"> <li>Site added to the Environmental Management Register if required.</li> </ul>
	<ul style="list-style-type: none"> <li>Non-polluting site</li> </ul>	<ul style="list-style-type: none"> <li>Polluted water contained on site or treated.</li> <li>Residual water bodies have a low risk of environmental harm.</li> </ul>	<ul style="list-style-type: none"> <li>Surface and ground water quality (e.g. sediment load, pH, heavy metal content, etc.) meet EA EPML00900113 conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Receiving water and end of pipe water quality monitoring results comply with EA EPML00900113, for a period of at least two years post-mining.</li> </ul>
	<ul style="list-style-type: none"> <li>Stable site</li> </ul>	<ul style="list-style-type: none"> <li>Very low probability of subsidence or rock fails with serious consequences.</li> <li>Very low probability of slope slippage with serious consequences.</li> <li>Landform design achieves appropriate erosion rates.</li> <li>Adequate vegetation cover established to minimise erosion.</li> </ul>	<ul style="list-style-type: none"> <li>Slope angle, length and profile.</li> <li>Erosion rates and gully formation.</li> <li>Vegetation type, density and cover.</li> </ul>	<ul style="list-style-type: none"> <li>Landform recontoured to be sympathetic to the adjacent landforms.</li> <li>Out-of-pit coal reject emplacements – approximately 1V:10H or up to 1V:3.5H where rock mulch or other stabilisation controls are used.</li> <li>Other slopes – less than 1V:10H.</li> <li>Limited erosion (presence of sheets, rills and gullies) similar to vegetation reference sites, for a period of five years post-mining.</li> <li>Site is stable when comparing photographs from successive monitoring events, for a period of five years post-mining.</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<ul style="list-style-type: none"> <li>• Erosion maintenance requirements are comparable to designated reference sites, for a period of at least five years post-mining.</li> <li>• Groundcover density achieves and maintains at least 70% of vegetation reference sites at land suitability classes 3 to 4 and at least 50% at land suitability class 5.</li> <li>• Litter density comparable to vegetation reference sites.</li> </ul>
<p>Out-of-pit Coal Reject Emplacements (cont.)</p>	<ul style="list-style-type: none"> <li>• Suitable site</li> </ul>	<ul style="list-style-type: none"> <li>• Soil properties that support and will continue to support the desired final land use.</li> <li>• Establish self-sustaining pasture and natural vegetation areas.</li> <li>• Establish land use with comparable management requirements to similarly used non-mining land.</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystem functionality, such as vegetation dynamics, habitat complexity and habitat quality.</li> <li>• Landscape function, such as rate of soil loss, erosion features, soil physical parameters, organic matter and nutrient content and cycling.</li> <li>• Rehabilitation progress and success rate.</li> <li>• Achievement of sustainable agreed final land use.</li> </ul>	<ul style="list-style-type: none"> <li>• Stocking rates in rehabilitated pasture areas are comparable to designated reference sites.</li> <li>• Vegetation consistent with pasture grass species suitable for grazing and native vegetation comparable to designated reference sites.</li> <li>• Groundcover density achieves and maintains at least 70% of vegetation reference sites at</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				<p>land suitability classes 3 to 4 and at least 50% at land suitability class 5.</p> <ul style="list-style-type: none"> <li>• Species in rehabilitated areas show evidence of flowering, viable seed setting, germination and emergence.</li> <li>• Evidence of generational succession of trees and shrubs is apparent in rehabilitated areas.</li> <li>• Litter density comparable to vegetation reference sites.</li> <li>• Salinity levels of less than 0.6 dS/m in soil root zone or less than 110% of comparable natural reference sites.</li> <li>• Cation exchange capacity levels are greater than 8 to 10 in soil root zone or less than 110% of comparable natural reference sites.</li> <li>• Evidence of weed management being successful by weed diversity being less than 110% of baseline survey results and abundance being comparable to</li> </ul>

Rehabilitation Domain	Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Completion Criteria
				vegetation reference sites. <ul style="list-style-type: none"> <li>• Pests do not occur in substantial numbers or visibly affect the development of native plant species.</li> </ul>





ATTACHMENT 2

PROGRESSIVE REHABILITATION AND CLOSURE PLAN SCHEDULE

Refer to separate excel spreadsheet