PINE DALE MINE

CARE AND MAINTENANCE MINING OPERATIONS PLAN

Prepared by

Enhance Place Pty Limited

February 2019

TITLE BLOCK

Name of Mine:	Pine Dale Mine
MOP Commencement Date:	15 April 2014
MOP Completion Date:	15 April 2021
Mining Authorisations:	ML 1578, part ML 1569, ML 1664, ML 1637
Name of Authorisation/ Authorisation holder(s):	Enhance Place Pty Limited
Name of Mine Operator:	Enhance Place Pty Limited
Mining Engineering Manager:	Graham Goodwin Pine Dale Mine, Castlereagh Highway, Blackmans Flat, NSW 2790 Ph. (02) 63 551 761
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Title of Representatives(s) of the Authorisation Holder(s):	Director
Signature of Representatives(s) of the Authorisation Holder(s):	
Date:	4/3/2019

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CARE AND MAINTENANCE
MINING OPERATIONS PLAN

Revision History			
Version	**Date**	**Author**	**Authorised by:**
1	March 2014	Ben Eastwood	Graham Goodwin
2	November 2014	Ben Eastwood	Graham Goodwin
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1. INTRODUCTION

Energy Australia (EA) owns Enhance Place Pty Ltd (Enhance Place) which operates the Pine Dale Mine near Lithgow in the Western Coalfields of New South Wales. EA acquired the Gentrader rights to the Mt. Piper and Wallerawang Power Stations effective from 1 March 2011 and took on the ownership and responsibility of the Pine Dale Mine on the 1 June 2012. Pine Dale Mine is located at Blackmans Flat, 16km north of Lithgow on the Castlereagh Highway. The site is approximately 3km by road from the Mt. Piper Power Station (MPPS) and immediately across the Highway from the Springvale Joint Venture Coal Preparation & Handling Facility.

The available coal within the approved mining area at the Pine Dale Mine has been exhausted and as such mining operations will be temporarily suspended. This Care and Maintenance Mining Operations Plan (C&M MOP) describes the arrangements and proposed management of the Pine Dale Mine during this period. Enhance Place has applied to NSW for the suspension of its mining operations at the Pine Dale Mine under Section 70(1)(a) of the *Mining Act 1992* NSW (Mining Act).

The Pine Dale Mine will be managed under a care and maintenance arrangement until the recommencement of mining activities, under a new planning approval. The suspension of mining activities at Pine Dale Mine is attributed to the delay in assessing and granting of a new project approval for the continuation of mining activities. It is anticipated that any potential impacts to residences would be minimal during the C&M MOP Term.

This C&M MOP has been prepared in accordance with *ESG3: Mining Operations Plan (MOP) Guidelines* prepared by the NSW Department of Mineral Resources, dated September 2013.

1.1 HISTORY OF OPERATIONS

The southern and western parts of the Pine Dale Mine were originally associated with historical coal mining operations, particularly the former Wallerawang and Commonwealth Collieries. The following subsections provide a summary of these operations and those associated with the existing Pine Dale Mine.

1.1.1 Wallerawang Colliery

The Wallerawang Colliery commenced underground mining operations in 1910 as an extension to the first mine in the district. The colliery closed in 1987 due to a depletion of underground coal reserves.

A small open cut mine was operated on the Wallerawang Colliery site for approximately 2 years up until 1954, with a second smaller open cut operation undertaken for a similar period up until 1969. Both open cut operations fall within an area referred to as the Wallerawang Colliery Pit Top which is partly located in the western part of the Pine Dale Mine and Yarraboldy Extension area.

Between 1987 and 1991, the majority of the surface infrastructure including the washery and conveyors were removed. The shafts and adits are reported to have been sealed during this period. Approximately 20ha of the surface area disturbed by the operation was rehabilitated in 1991 although the rehabilitation work proved largely unsuccessful as coarse reject from the washing operations was left on the surface and capped with only 0.1m of clay prior to

seeding. Over time, the surface acidified and much of the vegetation died, resulting in bare areas susceptible to erosion.

Further rehabilitation work continued in 1994 with the removal of the bathhouse and office blocks. A program to remove approximately 150 000t of coal fines, generally located within the northern part of the former Wallerawang Open Cut (now referred to as the former Yarraboldy Open Cut Mine), was commenced. During this time, discharge water quality controls, fertilisation and noxious weed control programs were maintained. The coal fines recovery program was expanded in 1999 with the commencement of a briquette operation which was subcontracted to Yarraboldy Briquette Company Pty Ltd. This operation ceased in 2006.

1.1.2 Commonwealth Colliery

The Commonwealth Colliery operations incorporated two open cut mines including the Commonwealth Open Cut, located directly east of Pine Dale Mine Area B, and the Commonwealth Extended Open Cut, located between Pine Dale Mine Areas A and B.

Following cessation of mining operations at the Commonwealth Open Cut, the void filled with water to form a lake which is now known as Blue Lake. Blue Lake is located at the confluence of the Coxs River and Neubecks Creek, with overflow from the lake continuing down the Coxs River.

Further mining operations were later conducted in the late 1940s and early 1950s at a site known as the Commonwealth Extended Open Cut covering an area of approximately 16ha to the west of Blue Lake.

The void from the Commonwealth Extended Open Cut operations was approximately 15m deep along its southern boundary. However, from about 1975 onwards, the void became the principal site for the disposal of washery reject ("chitter") from the Wallerawang Colliery washery. It is estimated that over 1Mt of reject was placed in the old Commonwealth Extended Open Cut. In the 1990s, the surface of the backfilled reject was re-profiled to its present configuration and mostly covered with a layer of clay and vegetated with pasture grasses.

1.1.3 Original Pine Dale Mine

Pine Dale Mine has been operating since early 2006. The coal resource within the Pine Dale Mine was exhausted in December 2010. The majority of the area has already been rehabilitated under the previous MOP, however, there are still some rehabilitation activities to be undertaken in the original Pine Dale Mine footprint which are covered under this C&M MOP.

1.1.4 Pine Dale Mine - Yarraboldy Extension

The Yarraboldy Open Cut Mine, forms part of the former Wallerawang Colliery. The Yarraboldy Open Cut Mine is within the area approved to be mined under Project Approval 10_0041 as part of the Pine Dale Mine – Yarraboldy Extension.

1.2 CURRENT CONSENTS, AUTHORISATIONS AND LICENCES

Pine Dale Mine is a State Significant Development as described under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the Minister for the Department of Planning and Environment (DP&E) is the consent authority. As such Pine Dale Mine is a Level 1 Mine by definition under the EP&A Act and this MOP has been prepared on this basis in accordance with the above mentioned guideline.

At this stage no additional consents, leases or licences are required to manage the Pine Dale Mine under a care and maintenance arrangement as described in this C&M MOP. Enhance Place notes that the new planning approval, EPL and other relevant licences and approvals will be required prior to the recommencement of any future mining activities. A list of the current consents, leases and licences that will be maintained during the period is shown **Table 1**.

Table 1: Status of Leases, Licences and Approvals

Document	Depth	Date Granted	Expiry Date	Comment
Project Approval PA 10_0041	n/a	20 Feb 2012	31 Dec 2014	Granted by Minister of DP&E, Section 75J of the EP&A Act. A modification to PA 10_0041 was granted in March 2012.
Referral Decision 2011/6016	n/a	20 Oct 2011	n/a	Referral Decision under section 75 and 77A of the EPBC Act.
Environmental Protection Licence 4911	n/a	Anniversary Date 24 Nov	n/a	EPL held by Enhance Place Pty Ltd
ML 1578	Surface to unlimited depth	5 Nov 2013	11 Dec 2024	ML 1578 incorporates 69.4ha of land within the boundary of the Pine Dale Mine site.
ML 1569	Varying depths	5 Nov 2013	11 Dec 2024	ML1569 incorporates 161 ha
ML 1664	Part surface to 15.24m, part surface to unlimited	5 Nov 2013	11 Dec 2024	ML 1664 incorporates 4.1 Hectares of land within the boundary of the Pine Dale Mine site.
ML 1637	Surface only	5 Nov 2013	11 Dec 2024	ML 1637 covers an area to the south of Pine Dale Mine for the purpose of proposed rail infrastructure
EL7621	n/a	1 Oct 2010	1 Oct 2018	EL 7621 incorporates 312 Hectares of land within the north western and central parts of the Wallerawang Colliery.
Bore Licence 10BL165933	n/a	22 Dec 2005	n/a	Issued by the Department of Natural Resources (DNR) under Part 5 of the Water Act 1912 for the use of six piezometers for monitoring groundwater levels and quality.
Bore Licence 10BL604181	n/a	23 Nov 2010	n/a	This licence was issued by DECCW – NOW under Part 5 of the *Water Act 1912* for interception and use of up to 200ML of groundwater per year.
Water Access Licence WAL36480 (approval no 10WA118780)	n/a	1 July 2013	30 June 2026	This licence was issued by DECCW – NOW under Part 5 of the *Water Act 1912* for interception and use of up to 200ML of groundwater per year from The Bong.
Flood Control Works Licence 10CW801601	n/a	23 Dec 2005	n/a	Issued by the DNR under Part 8 of the *Water Act 1912* for the construction of noise/flood bunding along the boundaries of Mining Areas A, B and C.

It is proposed Pine Dale Mine will be maintained under the care and maintenance arrangements described in this C&M MOP while the Pine Dale Mine Stage 2 Extension Project (Stage 2 Project) is being assessed by the NSW DP&E. It is anticipated that Pine

Dale Mine may be in care and maintenance for up to two years until the Stage 2 Project is determined. It is understood that Enhance Place would prepare a further MOP consistent with the grant of any new Project Approval for the Stage 2 Project.

1.3 LAND OWNERSHIP AND LAND USE

Land covered by the term of this MOP is either owned by Enhance Place, is Crown Land included in the Ben Bullen State Forest or is privately owned. The Ben Bullen State Forest is managed by the Forestry Corporation NSW. **Plan 1C** (**Appendix A**) shows the status of land ownership surrounding the Pine Dale Mine. Land use including vegetation communities, cleared land, other infrastructure and sensitive habitat areas are shown in **Plan 1B** (**Appendix A**).

1.4 STAKEHOLDER CONSULTATION

Enhance Place forwarded copies of the draft C&M MOP to The Resource Regulator, Environmental Protection Authority, Lithgow City Council, WaterNSW, Department of Industry – Land and water Division, and Forestry Corporation of NSW, as part of its consultation and preparation of this document. Any comments received and matters raised by these key stakeholders have been incorporated in the revised document. It should be noted that Lithgow City Council and the Forestry corporation of NSW were the only agencies that responded to and made comment on the draft C&M MOP, it is assumed that other agencies did not have any immediate concerns with the proposed rehabilitation strategy.

Enhance Place will continue to consult with all relevant stakeholders including regulators, landowners and the Pine Dale Mine Community Consultative Committee (CCC) and update the C&M MOP as and when required. As of July 2018 the Pinedale Mine CCC has been combined into a broader EnergyAustraliaNSW CCC as approved by the Department of Planning. Matters relating to Pinedale Mine and associated exploration leases are tabled to CCC members in this forum.

All stakeholders will be kept informed in regards to the modification and changes to any management plans in accordance with Project Approval 10_001 for Pine Dale Mine. It is anticipated that inspections by regulators will continue as part of the Annual Review process. This inspection typically involves DPE, EPA, LCC Forest Corporation NSW and NSW Office of Water. Ongoing reporting of environmental monitoring data will continue as required and is discussed in more detail in **Section 10**.

Any matters raised by relevant stakeholders will continue to be considered in the day to day management of the site during the term of the C&M MOP. Correspondence in this regard is provided in **Appendix B**.

2. PROPOSED MINING ACTIVITIES

Section 2 describes the Pine Dale Mine, associated assets and proposed activities that will be undertaken over the C&M MOP term.

2.1 PROJECT DESCRIPTION

There are no planned mining activities to be undertaken at Pine Dale Mine during the care and maintenance period. As noted in **Section 1** Pine Dale Mine will be managed under care and maintenance arrangements until the Stage 2 Project has been determined. Activities relating to existing licences and approvals such as water management and sediment control, rehabilitation maintenance works and general housekeeping will be undertaken and are described in more detail in **Section 3**. The maintenance of existing site infrastructure such as haul roads, maintenance workshop, office buildings and water management structures is proposed during the care and maintenance period.

2.2 ASSET REGISTER

A detailed asset register has been developed and costed in accordance with *ESUF02 Rehabilitation Cost Estimation Tool V1.12* guideline issued by Department of Planning and Environment – Resources and Geoscience (DPE-RG). The Rehabilitation Cost Estimate has been provided separately to DPE-RG. The identified site domains including their major assets are summarised in **Table 2** and shown in **Plan 2** (**Appendix A**).

Table 2: Pine Dale Mine Domains

Domain	Area (ha)	Major Asset
Infrastructure (1)	19.9	Demountable office building, maintenance workshop, shipping container, earth bunding, part of private haul road, coal crusher, heavy vehicle park up area, fencing.
Overburden Emplacement (2)	14.0	Unshaped spoil, highwall, low wall.
Water Management Area (3)	0.4	Sediment dams, pumps, pipe, drainage lines.
Infrastructure (A)	4.0	Includes infrastructure to remain post mining as agreed by stakeholders and approved in a Closure Management Plan.
Water Management Area (B)	0.8	Contour drains, sediment ponds, dams and sediment control structures including rock channels.
Rehabilitation Area – Pasture (C)	25.4	Fence lines, pasture land and water management structures.
Rehabilitation Area – Native Forest (D)	16.0	Native forest species

2.3 ACTIVITIES OVER THE MOP TERM

2.3.1 Exploration

It should be noted that some exploration works may be undertaken in ML1569 related to the Stage 2 Project for the purpose of further defining the coal resource, related environmental assessments and monitoring. These works will be undertaken in accordance with relevant exploration guidelines and site procedures as required.

2.3.2 Construction

There is no planned construction activities proposed to be undertaken during the care and maintenance period relating to buildings, mining equipment or other mining related infrastructure.

2.3.3 Mining Operations

There is no planned mining activity proposed to be undertaken during the care and maintenance period. However, mining machinery, infrastructure and ancillary equipment will remain in place at Pine Dale Mine, this will include:

- Loader(s), excavator(s), dozer(s), grader(s) and water cart;
- Coal crusher;
- Generators and other electrical equipment; and
- Pumps, tools and other related mechanical equipment.

2.3.4 Rock/overburden emplacement

There is no planned rock or overburden emplacement works proposed to be undertaken during the care and maintenance period.

2.3.5 Processing residues and tailings

There is no planned coal processing activities proposed to be undertaken during the care and maintenance period.

2.3.6 Waste Management

2.3.6.1 *Putrescible waste*

There will be minimal number of employees and contractors based at Pine Dale Mine on a permanent basis, as such there will be minimal putrescible waste generated. General waste bins will be kept at the site office for the collection of putrescible waste. These bins will be inspected and emptied as part of the regular inspection and maintenance program for the site.

2.3.6.2 *Hydrocarbons*

There will be some machinery and other ancillary equipment located at Pine Dale Mine during the C&M MOP term. As such some hydrocarbon based materials will be stored or kept at the site in accordance with the currently approved Environmental Management Strategy and Waste Management Plan. Any waste hydrocarbon materials will transported from the site by a licenced contractor.

2.3.6.3 *Contaminated Soils*

There are no contaminated soils known to occur at Pine Dale Mine. In the unlikely event that contaminated soil is identified then the material would be either treated on site or disposed off-site by a licenced contractor.

2.3.6.4 *Sewage*

Sewage management facilities will be maintained during the C&M MOP term and regular inspections and pump out undertaken as required.

2.3.7 Decommissioning and Demolition Activities

There is no planned decommissioning or demolition activities proposed to be undertaken during the C&M MOP term. Mining equipment and machinery will be maintained at the site and inspected on a regular basis and ongoing maintenance performed.

2.3.8 Temporary Stabilisation

Maintenance of vegetation on the temporary amenity bund will continue during the care and maintenance period to manage dust and improve visual amenity of the southern batter facing the Castlereagh Highway.

Maintenance of water management infrastructure including contour drains, rock structures, sediment ponds and dams will be undertaken in accordance with the approved Water Management Plan (see **Section 3.2.1.5** and **Section 3.2.1.12**). It should be noted that some areas including part of the overburden stockpile, mining void and infrastructure areas will be retained as disturbed areas to facilitate the continuation of mining in the future. These disturbed areas will be minimised where practical during the care and maintenance period and are shown in **Plan 2** and **Plan 3**.

2.3.9 Progressive Rehabilitation and Completion

Planned rehabilitation works proposed to be undertaken during the C&M MOP term areas are described in detail in **Section 7.2**. Proposed work includes progressive rehabilitation associated with Neubecks Creek and improvement works associated with pasture and treed rehabilitation areas to improve soil characteristics and growth (**Section 7.2**).

Ongoing maintenance works of existing rehabilitated areas will continue to be undertaken during the C&M MOP term as described in **Section 7.2**. The status of rehabilitated land is shown on **Plan 2**.

2.3.10 Material Production Schedule during MOP Term

As noted in **Section 2.3.3** there is no planned mining activity proposed to be undertaken during the care and maintenance period. As such there is no material production schedule required or available during the care and maintenance period.

3. ENVIRONMENTAL ISSUES MANAGEMENT

3.1 ENVIRONMENTAL RISK ASSESSMENT

A formal risk assessment for the Pine Dale Mine has been undertaken and is included in the supporting Environmental Assessment for PA 10_0041. An additional risk assessment has been undertaken for Pine Dale Mine for the care and maintenance period. The risk assessment was undertaken by relevant Enhance Place staff and contractors in November 2013 at the site office. A site tour was undertaken to ensure all areas of the Pine Dale Mine and adjacent lands held within mining leases were considered in the scope of the risk assessment. The risk assessment was conducted in accordance with the Enhance Place Risk Management Plan and includes the associated management and mitigation strategies for identified risks. A copy of the risk assessment is provided in full in **Appendix D**.

Undertaking a formal risk assessment allowed for a review of existing management controls and procedures in order to minimise potential environmental impacts during the C&M MOP term. Management controls are required for all items which have been identified as either high or medium risk. In addition to the formal risk assessment the DPE-RG *Guidelines to the Mining, Rehabilitation and Environmental Management Process* Risk Identification Matrix was used to identify any potential further environmental hazards which is summarised in **Table 3**. The key environmental risks associated with Pine Dale Mine and their associated management and mitigation strategies are discussed below in **Section 3.2**.

3.2 ENVIRONMENTAL RISK MANAGEMENT

The management of environmental risks at Pine Dale Mine is achieved through the implementation of relevant management and mitigation measures described in the Environmental Assessment and approved Environmental Management Plans. The currently approved Environmental Management Plans for Pine Dale Mine include:

- Environmental Management Strategy;
- Water Management Plan;
- Baseline Water Monitoring Plan;
- Air Quality and Greenhouse Gas Management Plan;
- Noise Management Plan;
- Blast Management Plan;
- Waste Management Plan;
- Aboriginal Heritage Management Plan;
- Bushfire Management Plan;
- Purple Copper Butterfly Monitoring & Management Plan;
- Pollution Incident Response Management Plan.

3.2.1 Specific Risks relating to Rehabilitation Management

Specific risks relating to mine rehabilitation areas are discussed in more detail over.

Table 3: Environmental Risk Identification Matrix

Issue	Mining Activity, Process or Facility														
	Exploration	Land preparation, vegetation, topsoil stripping	All construction activities including earth moving	Mine development and mining, surface and underground	Maintenance of roads, tracks and equipment	Waste rock emplacement management	Mineral processing facilities and infrastructure	Ore/product stockpiling and handling	Tailings impoundment management	Water management including storm event contingencies	Hazardous materials and fuel, handling/spills management	Sewerage	Rubbish disposal	Rehabilitation activities	Rehabilitated land and remaining features
Air pollution, dust/other	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Erosion/sediment minimisation	n/a	n/a	M	n/a	L	M	n/a	n/a	L	H	L	L	L	M	L
Surface water pollution	n/a	n/a	L	n/a	L	M	n/a	n/a	M	L	L	L	L	L	L
Ground water pollution	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Contaminate or polluted land	n/a	n/a	L	n/a	L	L	n/a	n/a	M	L	L	L	L	L	L
Threatened flora protection	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Threatened fauna protection	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Weed control and management	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	M	M
Operational noise	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Vibration and air blast	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Visual amenity, stray light	n/a	n/a	L	n/a	L	M	n/a	n/a	L	L	L	L	L	L	L
Aboriginal heritage	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Natural heritage conservation	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Spontaneous combustion	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Bushfire	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Mine subsidence	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Hydrocarbon contamination	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	M	L	L	L	L
Methane drainage/venting	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L
Public safety	n/a	n/a	L	n/a	L	L	n/a	n/a	L	L	L	L	L	L	L

3.2.1.1 *Geology and Geochemistry*

Pine Dale Mine is located near the western edge of the Permo-Triassic Sydney Basin, in a province referred to as the 'Western Coalfield'. The Western Coalfield mainly occupies an extensive plateau of erosion-resistant Triassic sandstone which is deeply dissected by numerous canyons and deep sided valleys. The underlying Illawarra Coal Measures of the Permian age are exposed in places along the western edge of the coalfield and at deeper levels in the valleys of the Wolgan and Capertee Rivers. The Illawarra Coal Measures within the Western Coalfield are divided stratigraphically into the Wallerawang, Charbon, Cullen Bullen and Nile Sub-Groups.

Of these four sub-groups, coal within parts of the Wallerawang, Cullen Bullen and Charbon Sub-Groups are suitable for the development of commercially viable coal mines. Specifically, the six coal seams recognised to have commercial potential in the Wallerawang area in descending stratigraphic order are as follows:

- Katoomba Coal Seam
- Middle River Coal Seam;
- Moolarben Coal Seam;
- Irondale Coal Seam;
- Lidsdale Coal Seam; and
- Lithgow Coal Seam.

When operating, Pine Dale Mine targeted the Lithgow Seam, Lidsdale Seam and Irondale Seam.

3.2.1.2 *Material prone to spontaneous combustion*

Pine Dale Mine does not have a history of spontaneous combustion and there have been no incidents recorded during active mining operations. It is unlikely that spontaneous combustion will occur at Pine Dale Mine during the care and maintenance period based on the history of the site and nature of carbonaceous materials. As such the potential for spontaneous combustion is considered to be very low. Statutory inspections of the site will be undertaken during the care and maintenance period, this will identify any potential matters relating to spontaneous combustion. Statutory inspections and reporting requirements are summarised in **Section 10**.

3.2.1.3 *Material prone to generating acid rock drainage*

Material prone to acid rock drainage (ARD) has been identified at the historic Wallerawang Colliery, Commonwealth colliery and Pine Dale Mine. Additional assessments including geochemical testing, soil testing and water monitoring have been undertaken to further clarify and determine the extent of potential ARD impacts in the area. A number of works have been undertaken to address known and potential ARD impacts which include:

- The removal of coal-bearing material near the concrete drain adjacent Neubecks Creek;
- Development and implementation of a channel health and stability monitoring program;
- Construction of rock lined drop structures to stabilise water channels at three locations;
- Continuation of progressive rehabilitation works;
- Covering of the coal bearing material identified on the south bank of Neubecks Creek in the vicinity of sampling point S3; and
- Spreading of lime over rehabilitated areas as required.

A comprehensive *Environmental Audit Report of the Pine Dale Mine Mining Leases 1569 and 1578* (ML Audit Report) has been conducted in February 2012. The ML Audit Report found that the approved MOP and subsequent documentation has adequately addressed the requirements of Condition 2(9) of ML 1569 and ML 1578. The ML Audit Report recommended some further

works which included those noted above. These works have been completed and additional treatments applied to further mitigate any potential adverse impacts from ARD.

Ongoing monitoring will assist in identifying any potential adverse trends in water quality at the site. The status of rehabilitation is shown in **Plan 2** and the rehabilitation performance criterion is described in detail in **Appendix C**. Any additional works required will be undertaken in consultation with DPE, EPA and other relevant stakeholders.

3.2.1.4 *Mine subsidence*

Pine Dale Mine does not have a history of mine subsidence and there have been no incidents recorded during active mining operations. It is unlikely that mine subsidence will occur at Pine Dale Mine during the C&M MOP term based on the history of the site. As such the potential for mine subsidence is considered to be very low. Statutory inspections of the site will be undertaken during the care and maintenance period, this will identify any potential matters relating to mine subsidence. Statutory inspections and reporting requirements are summarised in **Section 10**.

3.2.1.5 *Erosion and Sediment Controls*

Soil resources at Pine Dale Mine require careful management so that they are not wasted or lost through wind or water erosion and are available for rehabilitation of the disturbed areas. Existing topsoil stockpiles were used to rehabilitate proposed areas prior to the commencement of the C&M MOP term (See **Plan 3**). Any remaining topsoil stock piles will be vegetated with pasture species as required.

Permanent measures such as the diversion of "clean" water from above the disturbed areas and containment of runoff from disturbed areas by sediment basins and temporary measures including contour banks, drains and silt-stop fences will continue to be maintained during the C&M MOP term.

3.2.1.6 *Soil types(s) and suitability*

There is no planned soil handling, transport or stockpiling activities proposed to be undertaken during the care and maintenance period. Soil resources utilised for rehabilitation at Pine Dale Mine are typically acidic and nutrient deficient. During this MOP term, Enhance Place propose to ameliorate soils in pasture and treed rehabilitation areas with poor vegetation growth to enhance the chemical properties required to sustain growth.

3.2.1.7 *Flora and Fauna*

Flora and Fauna environmental management controls are included as part of the Statement of Commitments for Project Approval 10_0041. A summary of the principal management controls are summarised as follows.

A pre-clearance vegetation survey has been undertaken by Eco Logical Australia in April and July 2012 in accordance with Sections 75 and 77A of the EPBC Act. The pre-clearance survey report and associated procedure ensures potential impacts to fauna in the approved mining area are minimised. There are no clearing activities proposed to be undertaken

during the C&M MOP term.

Ongoing monitoring of the Purple Copper Butterfly population will continue during the C&M MOP term in accordance with the particular manner decision granted under the EPBC Act to ensure any potential impacts are mitigated and regulatory compliance is achieved.

3.2.1.8 *Weeds*

Weed control is undertaken in accordance with the Weed Management Plan developed to meet the requirements for noxious weed control (FirstField Environmental, 2016) and to minimise the occurrence and migration of weed species at Pine Dale Mine. Three noxious weeds commonly occur and have been identified at Pine Dale Mine, being Blackberry, Briar Rose and St John's Wort. African Lovegrass, a declared noxious weed in many NSW local government areas, has also been identified in pasture rehabilitation areas.

Weeds are monitored in the Annual Rehabilitation Monitoring Report, and visual inspections are undertaken on a regular basis. Weed infestations are treated seasonally with application of herbicides as per the integrated weed management schedule (refer **Table 4**). Weed control will continue during the C&M MOP term as part of vegetation improvement works in relevant pasture and treed rehabilitation areas (see **Section 7.2**).

3.2.1.9 *Overburden Characterisation*

Overburden characterisation assessments have been undertaken for PA 10_0041 and the supporting Environmental Assessment. There is no intention to undertake any further assessments during the C&M MOP term. It is unlikely that there will be any potential adverse environmental impacts from overburden waste material during the C&M MOP term, see **Section 3.2.1.3**. Pine Dale Mine will continue to be managed in accordance with the current planning approval and any modifications will be sought as required.

3.2.1.10 *Slopes and Slope Management*

Slopes will be battered to less than or equal to 10 degrees or less where practical. It should be noted that a portion of the highwall will be exposed during the C&M MOP term to facilitate the continuation of future mining activities. Potential risks associated with slope stability during the C&M MOP term is considered to be very low. Statutory inspections of the site will be undertaken during the C&M MOP term, this will identify any potential matters relating to slope stability. Statutory inspections and reporting requirements are summarised in **Section 10**.

3.2.1.11 *Air Quality*

Due to the cessation of mining activities at Pine Dale Mine during the C&M MOP term it is not anticipated that adverse impacts to air quality will occur. As such the risk of air quality impacts from Pine Dale Mine is considered to be very low. Despite this Pine Dale Mine will continue to monitor air quality in accordance with the Air Quality and Greenhouse Gas Management Plan at eleven locations, including ten depositional dust gauges (DDG) and two high volume air samplers (HVAS) which monitor Total Suspended Particulates (TSP) and particulate matter less than 10μm (PM_{10}). Air quality sampling and analysis will continue to

be carried out by an independent certified consultant in accordance with EPL 4911 during the C&M MOP term. In the unlikely event that adverse air quality is experienced from the site Enhance Place will have access to a water cart to assist in the suppression of dust from exposed areas.

3.2.1.12 *Surface Water*

The strategy behind the surface water management plan is to keep the clean and dirty water systems separate by interception and diversion of stormwater runoff from infrastructure areas and other areas disturbed by mining activities.

The Water Management Plan at Pine Dale Mine has been designed (as far as possible) as a closed loop system, with all water which enters the site via rainfall or through the water table being diverted to a series of settlement dams within the site. The existing water management system will remain in place during the care and maintenance period and will be managed in accordance with the approved Water Management Plan.

The water management plan consists of an in-pit sump, retention dam sediment trap, Old underground workings and a series of drainage lines, contour drains and sediment ponds. It is proposed to maintain all existing water management structures at the site during the C&M MOP term to ensure any potential impacts to surface water runoff is minimised.

Due to the permeable nature of the waste rock that is back-filled into the completed open cut excavation, and the proximity of the open cut to the abandoned underground workings, the majority of surface water runoff collected in pit sumps, coal stockpile areas, active mining areas and waste dumps seep down dip into the abandoned underground workings. Water from the abandoned underground workings is used for dust suppression as required. Runoff from the crushing and stockpiling area will be captured through the sediment trap with overflows directed to the in-pit sump via a temporary water diversion channel. Any excess water, that meets the required water quality criteria, will be released from the Main Dam into Neubeck's Creek via a licenced discharge point under EPL 4911.

If discharge is required following significant rainfall events, water will be piped to the existing Sediment Dams within the Pine Dale Mine footprint before being discharged to Neubecks Creek via the licenced discharge point LDP13.

Controlled discharges will only occur if EPA water quality parameters are met and if the water demands of the operation are not put at risk. The water quality discharge criteria as described under EPL 4911 include <30mg/L suspended solid, <10mg/L of oil and grease and have a pH reading within 6.5 - 8.5. The water management system and associated pumps and pipe work will be inspected during the regular statutory inspections.

Periodic maintenance and repair works to the water management system will be undertaken during the C&M MOP term, these will likely include:

- The de-silting and maintenance of sediment dams and drainage lines;
- The installation of silt fences and hay bales to minimise soil erosion during rainfall events;
- The construction of additional drainage lines as required; and
- The continuation of the water quality monitoring program.

The above measures will ensure environmental impacts are minimised and regulatory compliance is achieved in regards to water management during the C&M MOP term.

In the event that heavy vehicles are required for planned activities or maintenance works and the haul road is used, a water cart will be made available to ensure air quality impacts are minimised.

The water cart will draw water from designated water fill points as per the approved water management plan. The potable water supply will continue to be sourced from an existing connection to the Fish River Water Supply pipeline.

3.2.1.13 *Groundwater*

It is not anticipated that any additional disturbance to groundwater aquifers will occur during the C&M MOP term beyond that already experienced from previous mining activities. Enhance Place monitors groundwater in accordance with the Groundwater Monitoring Program in the approved Water Management Plan. Results are reported annually. Any trends that indicate mining activities are having a potentially adverse impact to groundwater aquifers would be identified by this monitoring program. It should be noted that no adverse impacts have been identified to groundwater aquifers at Pine Dale Mine to date.

3.2.1.14 *Contaminated land*

There is no contaminated land known to occur at Pine Dale Mine. In the unlikely event that contaminated land is identified then the material would be either treated on site or disposed off-site by a licenced contractor.

3.2.1.15 *Hazardous materials*

Hazardous material storage tanks containing oils, grease and degreasers have been emptied, isolated and secured. Any additional storage tanks have been removed from the site. Storage tanks remaining onsite that contain these materials will be kept emptied during the C&M MOP term.

3.2.1.16 *Greenhouse gasses, methane drainage / venting*

Due to the cessation of mining activities at Pine Dale Mine during the C&M MOP term greenhouse gas emissions will be minimal. There are no methane drainage issues or venting at Pine Dale Mine.

3.2.1.17 *Blasting*

There are no planned blasting activities proposed to be undertaken during the C&M MOP term.

3.2.1.18 *Noise*

Due to the cessation of mining activities at Pine Dale Mine during the C&M MOP term it is not anticipated that any potential adverse noise impacts will occur. Any noise generated from Pine Dale Mine would be related to maintenance activities. As such the risk of any noise impacts to nearby neighbours is considered to be very low. Despite the above noise

monitoring will continue to be carried out by an independent certified consultant in accordance with EPL 4911 during the C&M MOP term.

3.2.1.19 *Visual and lighting*

Potential visual impacts will be minimised through rehabilitation to the final landform where practical. Lighting at night will be minimal and will be used for security purposes only during the C&M MOP term. There will be no additional visual and lighting impacts beyond those already experienced from Pine Dale Mine.

3.2.1.20 *Heritage (Aboriginal & European)*

There have been no Aboriginal artefacts of cultural or scientific value identified at Pine Dale Mine and therefore no special design or operational safeguards have previously been put in place. There will be no additional disturbance of land that has not been previously impacted by mining activities during the C&M MOP term, as such it is unlikely that any Aboriginal cultural items will be identified. In the unlikely event that some artefacts are identified the EPA will be notified and appropriate management measures implemented in consultation with relevant stakeholders.

There are no items of natural or European heritage at Pine Dale Mine as such no additional management measures are required during the C&M MOP term.

3.2.1.21 *Spontaneous Combustion*

As discussed in **Section 3.2.1.2**.

3.2.1.22 *Bushfire*

Bushfire management and control will continue to be undertaken in accordance with the approved Bushfire Management Plan. The approved Bushfire Management Plan has been prepared in consultation with Forestry Corporation of NSW and other relevant stakeholders. Enhance Place will assist local firefighting services where possible in the event of a bushfire.

4. POST MINING LAND USE

4.1 REGULATORY REQUIREMENTS

Rehabilitation of the Pine Dale Mine will be undertaken in accordance with Project Approval (PA) 10_0041 granted by the Minister for DP&E on 20 February 2011 and modified in March 2012 and the supporting The *Environmental Assessment* dated August 2012. The rehabilitation strategy described in this C&M MOP builds on and replaces the previously approved MOP dated December 2014. Rehabilitation works will be required to be undertaken in the event that a decision is made to close the Pine Dale Mine. A summary of the regulatory requirements is included in **Table 4**.

Table 4: Rehabilitation Regulatory Requirements

Reference	Condition	Section
Project Approval (PA) 10_0041		
Schedule 3 (53)	*The proponent shall rehabilitate the site to the satisfaction of the Executive Director, Mineral Resources in DPE-RG. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA, however the area to be returned to native woodland and forests vegetation (i.e. Class VII land which is consistent with surrounding State Forest lands) must be increased to cover the area marked with cross-hatching on the figure in Appendix 3, to the satisfaction of the Executive Director, Mineral Resources in DPE-RG.*	Section 6, Appendix A, Appendix B, Appendix C
Schedule 3 (54)	*The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.*	Section 2.3.9, Appendix A
Schedule 3 (54)	*The Proponent shall prepare and implement a Rehabilitation Management Plan for the Project to the satisfaction of the Executive Director, Mineral Resources in DPE-RG. This plan must:*	This C&M MOP
(a)	*Be prepared in consultation with the Department, OEH, NOW and the CCC*	Section 1.3
(b)	*Be prepared in accordance with any relevant DPE-RG guideline*	Section 1
(c)	*Build, to the maximum extent possible, on the other management plans required under this approval; and*	Section 3.2
Project Approval (PA) 10_0041 – Statement of Commitments		
1.Groundwater		
1.1	*Design the mine plan so that the interception of groundwater within the old Wallerawang Colliery underground workings is minimised.*	Section 2
1.2	*Manage the small amount of groundwater intercepted on site for use in dust suppression or other internal uses e.g. wash down.*	Section 3.2.1.13
1.3	*Install sumps in strategic locations in the open cut pit as the pit develops.*	Section 3.2.1.5 Section 3.2.1.12
1.4	*Continue the existing groundwater monitoring regime but also include monitoring of the bore that has been installed within the Yarraboldy footprint and the old ventilation shaft next to the haul road.*	Section 3.2.1.13
1.5	*Manage chemicals and hydrocarbons appropriately.*	Section 3.2.1.15
1.6	*Manage any potentially acid-generating material by the selective placement of cover material.*	Section 3.2.1.3
1.7	*If a non-conformance with a nominated trigger value is determined to be the result of activities associated with the Project, then the impacted landholder and DECCW-NOW will be notified and a remediation strategy will be proposed for discussion and implementation.*	Section 3.2.1.11 Section 3.2.1.12 Section 3.2.1.13
2.Surface Water		
2.1	*Retain, for as long as practicable, selected surface water structures such as the existing dams, sediment retention points and clean water diversion banks.*	Section 3.2.1.5, Section 3.2.1.12, Appendix C
2.2	*Install temporary erosion and sediment control structures.*	
2.3	*Construct diversion and sediment retention structures for the capture of sediment-laden water for treatment.*	
2.4	*Prepare and implement a general Erosion and Sediment Control Plan (in accordance with the requirements of Landcom (2004)) to manage surface water flows within the Project Site.*	

Reference	Condition	Section
2.5	*Establish and maintain groundcover at 70% or better over areas disturbed and no longer required by the Project and as site conditions provide for practicability.*	Section 3.2.1.5, Section 3.2.1.12, Appendix C
2.6	*Progressively rehabilitate disturbed areas no longer required by the Project soon after the cessation of mining activities.*	
2.7	*Construct diversion bunds or utilise existing infrastructure to keep dirty water separate from clean water diversions bunds.*	
2.8	*Divert dirty water into sediment basin and Retention Dam A.*	
2.9	*Divert clean water along clean water diversion bunds for flow into Neubecks Creek.*	
2.10	*Divert dirty water into sediment controls or suitable structures for treatment.*	
2.11	*Pump water from sediment basin into Retention Basin A for storage and use in dust-suppression activities on Project Site.*	
2.12	*Pump groundwater from in-pit sump into Retention Dam A for storage and use in mining operations and dust suppression.*	
2.13	*Install a sediment trap in the coal crushing/stockpiling and maintenance area to remove coal fines from surface flows.*	
2.14	*Install an oil/water separating unit to receive potentially contaminated water from the maintenance and wash-down bay for further treatment in the sediment basin.*	
2.15	*Monitor surface water quality for pH, EC, TSS, turbidity, oil and grease, filterable iron and sulphate ion concentrations.*	
2.16	*Record the approximate volume and quality of water extracted from the in-pit sump for discharge off site.*	
3.Flora		
3.3	*Utilise local native plant species and shrubs for rehabilitation and landscaping.*	Section 5.2
3.4	*Undertake replacement planting of some of the same tree species and shrubs within the Project Site upon cessation of mining activities.*	
3.5	*Retain suitable bush rock with the topsoil and respread during the rehabilitation phase to return groundcover to near-original state.*	
4.Fauna		
4.4	*Provide habitat for important target species such as the Purple copper butterfly through planting of appropriate flora species (e.g. Bursaria spinosa spp lasiophylla).*	Section 3.2.1.7
4.5	*Progressively increase forest and woodland communities within the already disturbed areas, the coaly residue areas and the rehabilitated land, to provide foraging and sheltering habitat.*	Appendix A Section 5.2 Section 7.2.2
4.6	*Use nesting boxes if required and salvage hollows to assist in maintaining the short and long term habitat value for hollow dependent species.*	Section 7.2.7
10. Visibility		
10.1	*Construct the amenity bund on the southern side of the mine area.*	Section 7.1
11. Soils, Land Capability and Agricultural Suitability		
11.1	*Retain soils stripped from undisturbed areas of the Project Site for rehabilitation works.*	Section 3.2.1.6
11.2	*Develop appropriate soil management procedures for handling and stockpiling oils of the types found at the Project Site.*	Section 3.2.1.6
11.3	*Develop appropriate soil and erosion management procedures to minimise soil erosion from stockpiles and stripped areas.*	Section 3.2.1.5
11.4	*Excavate and remove soils contaminated with hydrocarbons.*	Section 2.3.6

Reference	Condition	Section
11.5	*Remove contaminated soil (if the contamination is limited in area) to a designated location at the site (away from natural drainage) for the bioremediation of the contaminated material.*	Section 2.3.6
11.6	*Remove contaminated soil (if the contamination is widespread) and transport to a facility licenses to accept the specific type of contaminated material.*	

Table 5: Mining Lease 1569

Reference	Condition	Section
Mining Lease *1569*		
S(2)_C(1)	*Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (the Plan) satisfactory to the Director-General. The plan together with environmental conditions of development consent and other approvals will form the basis for : -* *a) Ongoing mining operations and environmental management;* *b) Ongoing Monitoring of the project.*	Section 1 Section 4.1
S(2)_C(2)	*The plan must be prepared in accordance with the Director General's guidelines current at the time of lodgement*	Section 1
S(2)_C(3)	*A Plan must be lodged with the Director General: -* *a) (i) Prior to the commencement of rehabilitation or other works, with the exception of the continuing Yarraboldy Briquette Company Pty Ltd operations, or* *(ii) Within sixty (60) days from the 'effective date' of the renewal of this authority.* *Whichever date is the sooner.* *b) Subsequently as appropriate prior to the expiry of any current Plan; and* *c) In accordance with any direction issued by the Director-General.*	Section 1.4
S(2)_C(4)	*The Plan must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify: -* *a) Area(s) proposed to be disturbed under the Plan;* *b) Mining and rehabilitation method(s) to be used and their sequence;* *c) Areas to be used for disposal of tailings/waste;* *d) Existing and proposed surface infrastructure;* *e) Progressive rehabilitation schedules;* *f) Areas of particular environmental sensitivity;* *g) Water management systems (including erosion and sediment controls);* *h) Proposed resource recovery; and* *i) Where the mine cease extraction during the term of the Plan, a closure plan including final rehabilitation objectives/methods and post mining landuse/vegetation.*	Appendix A
S(2)_C(5)	*The plan when lodged will be reviewed by the Department of Mineral Resources.*	Section 1.4
S(2)_C(6)	*The Director General may within two(2) months of the lodgement of a Plan, require modification and re-lodgement.*	Section 1.4
S(2)_C(7)	*If a requirement in accordance with clause (6) is not issued within two months of the lodgement of a Plan, lease holder may proceed with implementation of the Plan submitted subject to the lodgement*	Section 1.4

Reference	Condition	Section
	of the required security deposit within the specified time.	
S(2)_C(8)	*During the life of the Mining Operations Plan, proposed modifications to the Plan must be lodged with the Director-General and will be subject to the review process outlined in clauses (5) – (7) above.*	Section 1.4
S(2)_C(9)	*In addition to the content required by clauses (1) to (8) above, the Mining Operation Plan must also include the following information: -* *i) Details and timeframes for any impacts on the amenity of residents in the vicinity of the site.*	Section 1
	ii) A Rehabilitation Plan for this authority must be included as part of the Mining Operation Plan. This Rehabilitation Plan must detail rehabilitation measures for all areas of this authority which have been degraded by mining activities.	Section 6 Section 7 Appendix C
	iii) The Rehabilitation Plan must fully address the issue of acid rock drainage (ARD) and provide means to ameliorate its impact on this authority and Neubecks Creek. This includes a detailed assessment of the site materials and the efficacy of any proposed encapsulation strategies. Appropriate monitoring and control mechanisms should be implemented to ensure surficial caps are installed to a thickness of not less than 250 mm and compacted to maximise runoff and limit erosion.	Section 3.2.1.3
	iv) The Rehabilitation Plan shall include a detailed surface and groundwater management plan incorporating erosion and sediment control measures for the entire site. This Rehabilitation Plan shall contain details on all surface drainage controls and structures, their design, installation and maintenance to effectively manage and minimise erosion. The Rehabilitation Plan shall also include details on water monitoring for key locations on the site.	Section 3.2
	v) The rehabilitation Plan shall include a specific plan identifying detailed rehabilitation measures for the entire length of Neubecks Creek where it passes through this authority, excluding areas intended to be disturbed as part of the Pine Dale operation. This Plan must include a detailed description of the methods and materials to be used to enable the rehabilitation and maintenance of the Creek (based on the site-specific consideration of soil types, landform, vegetation etc..) The Planning and design of the watercourse should be, in both concept and design detail, consistent with the River and Estuaries Policy; NSW Wetlands Management Policy; Australian Stream Management Manual [LWRRDC]; and NSW Biodiversity Strategy.	Section 7.2.3
	vi) The Rehabilitation Plan should clearly identify the intended final land use(s) for the rehabilitated areas of this authority	Table 7
	vii) The Rehabilitation Plan shall include a detailed revegetation plan consistent with the final land use. The Rehabilitation Plan should identify the type and location of grasses, ground covers, shrubs and trees to be planted. Where possible, preference should be given to local endemic species grown from seed. The Rehabilitation Plan should provide for progressive revegetation and for revegetation to occur promptly after completion of earthworks. This Rehabilitation Plan shall also include proposed measures to control weeds and grazing.	Section 7 Appendix A
	viii) The Rehabilitation Plan shall include a detailed costing and	7.2

Reference	Condition	Section
	timetable for all works.	
S(2)_C(10)	*Development of the site Post Rehabilitation Management and Maintenance Plan is required that details management strategies which ensure the site is managed and maintained in an appropriate condition consistent with rehabilitation aims. This plan shall provide information on actions proposed to control weeds, ensure survival of vegetation, maintain drainage and sediment control structures and minimise grazing impacts. This Plan must be provided to the Department within twelve (12) months from the 'effective date' of the renewal of this authority and will be considered to form an addendum to the Mining Operation Plan.*	Section 7 Table 14 Appendix C
S(2)_C(11)	*Approval must be sought from the Director-General and other relevant government agencies prior to the importation of significant quantities of rehabilitation materials (such as 'green product', 'wood based soil conditioner', 'compost' or 'power station ash'). Materials sourced from within the site should be used wherever possible .*	Section 1.4
S(2)_C(12)	*Community consultation in respect of the proposed rehabilitation works should be undertaken with landowners in the Blackmans Flat area prior to the commencement of rehabilitation works.*	Section 1.4
Annual Environmental Management Report (AEMR)		
S(3)_C(1)	*Within 12 months of the commencement of mining operations and thereafter annually or, at such times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General*	Section 4.4
S(3)_C(2)	*The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:-* *a) The accepted Mining Operations Plan;* *b) Development consent requirement and conditions;* *c) Department of Environment and Conservation and Department of Infrastructure, Planning and Natural Resources licence and approvals;* *d) Any other statutory environmental requirements;* *e) Details of any variations to environmental approvals applicable to the lease area; and* *f) Where relevant, progress towards final rehabilitation objectives.*	Section 4.4
S(3)_C(3)	*After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.*	Section 4.4
S(3)_C(4)	*The lease holder shall, as and when directed by the Minister, co-operate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies.*	Section 4.4

4.2 **POST MINING LAND USE GOAL**

The final land use goal is described in the EA for Pine Dale Mine which notes that the Yarraboldy extension is located predominantly within the Ben Bullen State Forest and the principle aim of the final land use of the rehabilitated area is to return it to native vegetation.

Ongoing consultation with Forestry Corporation NSW would be undertaken as required. The portion of privately owned land has been returned to pasture for agricultural purposes including grazing. The final rehabilitation landform and post mining land use is shown on **Plan 4.**

4.3 **REHABILITATION OBJECTIVES**

The rehabilitation objectives for the area covered by the C&M MOP are as follows.

- The rehabilitated landform is safe, stable, non-polluting and suitable for its intended long term land use;
- The rehabilitated land is self-sustaining or maintenance requirements are consistent with the agreed post mining land use(s);
- Achievement of an acceptable post disturbance land use capability/suitability with downstream water quality preserved;
- Rehabilitation maintains or improves the species diversity and habitat value of the Yarraboldy Extension area, particularly the former Yarraboldy Open Cut Mine;
- The agreed post mining land use is compatible with the surrounding land fabric and land use requirements;
- The area rehabilitated is as close as practical to the waste rock dumps and mining area during the C&M MOP term.

Rehabilitation objectives for the Pine Dale Mine will be achieved by:

- Implementing the mitigation measures outlined in **Section 3** relating to operational risks to rehabilitation;
- Demonstrating that the completion criteria / indicators for each domain and rehabilitation phase are met by monitoring rehabilitation performance against the nominated completion criteria / indicators (refer to **Sections 6** and **8**); and
- Mitigating any rehabilitation shortfalls identified in monitoring in a timely manner via a rehabilitation maintenance program (refer to **Section 9**).

4.4 **REHABILITATION PROGRESS**

A summary of the current status of the rehabilitation domains at the Pine Dale Mine site is reported on an annual basis through the *Annual Review* (formerly the AEMR) to satisfy the requirements of Mining Lease 1569. The Annual Review also reports on environmental compliance in accordance with the Pine Dale Mine Project Approval, Environmental Protection Licence and Water Access Licence. The Annual Review has been prepared in accordance with the NSW Department of Planning and Environment's *Annual Review Guideline* dated October 2015.

5. REHABILITATION PLANNING AND MANAGEMENT

5.1 **DOMAIN SELECTION**

Primary and secondary domains have been defined in accordance with the methodology prescribed in ESG3 (DMR 2013). Primary Domains have been defined as the set of discrete

areas that have a particular operational or functional purpose, and will, by virtue of their specific physical features, require specific rehabilitation activities to achieve the intended post mining land use. All areas previously disturbed by mining at Pine Dale Mine have been assigned to an appropriate primary domain.

Secondary Domains are land management units with similar post mining land use objectives, such as native vegetation or pasture. Primary and Secondary domains at the commencement of the MOP term are depicted on **Plan 2** and are defined in **Table 6** below.

Table 6: Site Domains

Code	Domain	Description
Primary Domains (Operational)		
1	Infrastructure	Footprint of infrastructure areas including, haul roads, administration buildings the workshop and crushing facility and hardstands.
2	Overburden Emplacement	Footprint of in-pit and out of pit waste rock emplacements including the temporary amenity bund.
3	Operational Water Management Area	Footprint of the major water management structures (including sediment dams, diversion channels and banks).
4	Open Cut Pit	This domain comprises the footprint of the extraction area not yet backfilled with overburden. Includes the highwall, low walls and ramps.
Secondary Domains (Final Land use)		
A	Infrastructure	May include access tracks, creek crossings, highway entrances, fences and gates etc.
B	Water Management Area	The network of water management structures retained in the final landform including clean water dams, banks and channels
C	Rehabilitation - Pasture	Areas disturbed by mining rehabilitated with exotic and native pasture species.
D	Rehabilitation - Native Forest	Areas disturbed by mining rehabilitated with native vegetation including species representative of Stringybark – Scribbly Gum Forest.
E	Pine Plantation	Existing Pine Plantation

5.2 **DOMAIN REHABILITATION OBJECTIVES**

Rehabilitation Domains require specific management objectives to realise the desired final land use outcome due to the distinct geophysical features associated with the current land function. The rehabilitation objectives for each domain are provided in **Table 7**.

Table 7: Domain Rehabilitation Objectives

Code	Domain	Rehabilitation Objectives
Primary Domains		
1	Infrastructure	• All surface infrastructure and services will be removed prior to closure. • All hazardous and/or contaminated materials will be identified and removed or appropriately remediated. • Disturbed areas will be re-graded (where required) to produce free draining landforms. • Drainage structures will be designed and constructed where required in accordance with Blue Book requirements. • Infrastructure areas will be rehabilitated with a combination of pasture areas and native forest areas compatible with analogue vegetation communities.
2	Overburden Emplacement Area	• Post mining landforms will be geotechnically stable and non-polluting. • Overburden emplacements will be shaped to generally reconstruct the pre-mining landform where possible. • Slopes are generally up to 10 degrees and steeper in areas commensurate with the surrounding landscape. • Potentially acid forming material (including shaley interburden) will be emplaced in-pit and capped with inert overburden material. • Where required, surface layers will be treated with alkaline boiler ash to ameliorate potentially acid forming materials. • Overburden emplacement areas will be adequately drained to avoid ponding. • The temporary amenity bunds will be re-graded to blend into the adjacent landform. • Overburden emplacement areas will be rehabilitated with a combination of pasture areas and native forest areas compatible with adjacent vegetation communities.
3	Operational Water Management Area	• Clean water will be diverted around operational areas, where practical. • Mine water and sediment laden (dirty) water runoff from disturbance areas will be captured and diverted to mine water and dirty water dams. • Mine water and dirty water will be preferentially used for operational requirements such as dust suppression and earthworks. • Water management structures will be designed and constructed prior to disturbance, in accordance with Best Practice and “the Blue Book”. • Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is similar to comparable undisturbed landforms.
4	Open Cut Pit	• Topsoil and vegetation (hollows and mulched vegetation) stripped ahead of mining will be retained for re-use in rehabilitation. • The open cut excavation will be backfilled with waste rock to largely recreate the pre-mining landform. • The footprint of the open cut excavation will be rehabilitated with native forest vegetation compatible with the adjacent undisturbed vegetation communities.

Code	Domain	Rehabilitation Objectives
Secondary Domains		
A	Retained Infrastructure	• The crushing, stockpiling and maintenance facility will be retained for future use in accordance with relevant approvals.
B	Water Management Area	• The final landform drainage will integrate with the surrounding catchments. • Drainage lines will be reconstructed generally in the locations of pre-mining drainage where practical. • Sediment dams retained in the final landform will be decontaminated and preserved as clean water dams. • Drainage structures will be designed and constructed in accordance with “the Blue Book” to minimise erosion and enhance long term geomorphic stability. • Rehabilitation of Neubecks Creek including the establishment of native vegetation species, bank stabilization, removal of exotic weed species and ongoing monitoring.
C	Rehabilitation – Pasture	• Approximately 21 ha of sustainable pasture have been established on areas disturbed by mining. • Pasture rehabilitation areas will be compatible with surrounding undisturbed land. • Appropriate topsoil (or topsoil substitutes) will be spread and ameliorated (as required) to produce a growth media capable of sustaining pasture growth. • Pasture areas are vegetated with a mix of native and exotic perennial pasture species. • Maintenance needs / management inputs will be no greater than those of surrounding land.
D	Rehabilitation – Native Forest	• Native forest vegetation will be established on areas disturbed by mining in accordance with PA10_0041. • Native forest rehabilitation areas will be compatible with surrounding native vegetation. • Native forest rehabilitation areas will include fauna habitat features. • Native forest rehabilitation areas will be top-dressed with appropriate topsoil (or topsoil substitutes) and ameliorated (as required) to produce a growth media capable of sustaining the desired vegetation communities. • Slopes will be vegetated with species that represent Stringybark – Scribbly Gum community. • Flats and drainage lines will be vegetated with appropriate riparian species compatible with adjacent analogue sites. • Maintenance needs / management inputs will be no greater than those of surrounding land.
E	Pine Plantation	• Maintenance needs / management inputs will be no greater than those of surrounding land.

5.3 **REHABILITATION PHASES**

The current rehabilitation domains and status of the rehabilitation phase are summarised in **Table 8**. A description of the rehabilitation phases are summarised in **Table 9**.

Table 8: Rehabilitation Phases

Rehabilitation Phase / Domain	Domain Code	Active Mining Area	Decommissioning	Landform Establishment	Growth Medium Development	Ecosystem & Land use Establishment	Ecosystem & Land use Sustainability
Infrastructure – Infrastructure	1A	✔	✘	✘	✘	✘	✘
Infrastructure – Water Mgt Structure	1B	✔	✘	✘	✘	✘	✘
Infrastructure – Rehabilitation Pasture	1C	✔	✘	✘	✘	✘	✘
Infrastructure – Rehabilitation Native Forest	1D	✔	✘	✘	✘	✘	✘
Overburden Emplacement – Infrastructure	2A	✔	✘	✘	✘	✘	✘
Overburden Emplacement – Water Mgt Structure	2B	✔	✘	✔	-	✔	✔
Overburden Emplacement – Rehabilitation Pasture	2C	✘	✔	✔	✔	✔	✔
Overburden Emplacement – Rehabilitation Native Forest	2D	✔	✘	✔	✔	✔	✘
Overburden Emplacement – Pine Plantation	2E	-	-	-	-	-	✔
Water Mgt Structure – Infrastructure	3A	-	-	-	-	-	-
Water Mgt Structure – Water Mgt Structure	3B	✔	✘	✘	✘	✘	✘
Water Mgt Structure – Rehabilitation Pasture	3C	-	-	-	-	-	-
Water Mgt Structure – Rehabilitation Native Forest	3D	✔	✘	✘	✘	✘	✘

Table 9: Description of Rehabilitation Phases

Phase No.	Rehabilitation Phase	Description
1	Decommissioning	Infrastructure removed, contamination remediated, and electricity decommissioned
2	Landform Establishment	Slope, drainage, substrate material (clay & topsoil), depth, sediment control structures
3	Growth Medium Development	Physical, chemical and biological characteristics
4	Ecosystem & Land Use Establishment	Species selection, presence and germination rates
5	Ecosystem & Land Use Sustainability	Floristic and structure, recruitment and recovery, fauna presence, growth, ecosystem resilience

6. PERFORMANCE INDICATORS AND COMPLETION / RELINQUISHMENT CRITERIA

A detailed rehabilitation performance criteria table has been developed for Pine Dale Mine. The rehabilitation completion criteria defines the objectives, performance indicators, measuring criteria, justification reference, current status, TARP (if relevant) and the progress at the start of the MOP term. The rehabilitation completion criteria have been developed in accordance with the DPE-RG *ESG3: Mining Operations Plan (MOP) Guidelines dated September 2013* and is included in full in **Appendix C**.

7. REHABILITATION IMPLEMENTATION

7.1 STATUS AT MOP COMMENCEMENT

Pine Dale Mine is currently in care and maintenance in accordance with this C&M MOP pending future mining approvals. As such existing infrastructure areas, overburden waste areas, water management structures, high walls and the amenity bund constructed on the southern side of the mine area will remain in place until future mining applications have been determined. A summary of the status of each domain is included in **Table 10** and **Table 11**.

Table 10: Primary Domain Status

Code	Primary Domains (Operational)	Status
1	Infrastructure	Active
2	Overburden Emplacement	Active
3	Water Management Structure	Active
4	Open Cut Pit	Active

Table 11: Secondary Domain Status

Code	Secondary Domains (Post Mining Land Use)	Status
A	Infrastructure	Active
B	Water Management Structure	Contour drains established and sediment ponds installed. Rock lined drainage structures have been constructed in some areas. Neubecks Creek planted with native species, bank stabilisation works undertaken as required and weed species removed.
C	Rehabilitation - Pasture	25.4 ha of pasture grasses have been sown; area fertilized and compost applied. .
D	Rehabilitation - Native Forest	16.0 ha have been seeded with native tree species with mixed results; fertilizer and compost also applied.
E	Rehabilitation – Pine Plantation	Existing areas of established pine trees such as radiada pine on historic mine working areas.

7.2 PROPOSED REHABILITATION ACTIVITIES DURING THE MOP TERM

Maintenance of existing rehabilitated areas is proposed to be undertaken during the C&M MOP term. Maintenance activities such as fencing, fertilizing, weed spraying, feral animal control and minor drainage works will continue to be undertaken as required to ensure the existing rehabilitated areas progress towards achieving the agreed rehabilitation criteria. Additional works in accordance with the recommendations of the Annual Rehabilitation Monitoring Reports will be implemented over the C&M MOP Term. The rehabilitation completion criteria for each domain are detailed in **Appendix C**.

Detailed costings associated with proposed rehabilitation are provided to DPE-RG separately as per the Rehabilitation Cost Estimate possess for calculating the rehabilitation bond. Costings are calculated in accordance with the Rehabilitation Calculator Tool provided by DPE-RG.

7.2.1 Domain C – Rehabilitation Pasture (Pasture Improvement)

During the MOP term Enhance Place will undertake works to improve pasture rehabilitation outcomes in Domain C. The assessment of the status of rehabilitated pasture areas was undertaken with the objective of identifying appropriate management actions to improve the productivity of pasture areas and progress toward the desired objective of establishing sustainable grazing pasture that will require ongoing management inputs that are consistent with comparable pasture and grazing practices.

The assessment identified opportunities to improve soil characteristics and pasture composition.

Proposed works to be undertaken in this MOP term are:

- Treat infestations of prominant weed species in Summer and Spring as per the Weed Management Schedule;
- Re-sow poorly established areas with the recommended pasture species mix;
- Application of appropriate compost material/lime/gypsum at the recommended rate to poorly established pasture areas following seeding.

7.2.2 Domain D – Rehabilitation Native Forest (Treed Area Improvement)

Enhance Place will undertake works during the C&M MOP term to improve the treed area rehabilitation outcomes in Domain D. The *Annual Rehabilitation Monitoring Reports* shall also be used to determine the ongoing status of rehabilitation within Domain D and provide recommendations and/or improvement strategies.

The assessment of the status of rehabilitated native forest (treed areas) is undertaken with the objective of identifying appropriate management actions to progress toward the agreed objectives nominated in the rehabilitation completion criteria.

Proposed works to be undertaken in the C&M MOP term are:

- Treat any infestations of prominent weed species in Summer and Spring as per the Weed Management Schedule;

- Re-sow exposed surfaces with fast growing groundcover, herbs and grasses;
- Continue application of appropriate fertiliser and compost at the recommended rate per hectare to improve native plant growth as required;
- Installation of nesting boxes when native tree species have established are are of medium height.

7.2.3 Neubecks Creek

Progressive rehabilitation of Neubecks Creek within mining authorities held by Enhance Place will continue to be undertaken in accordance with the rehabilitation objectives. Works proposed to be undertaken will include:

- Bank stabilisation works as required;
- Removal of exotic weed species noting the need to balance the removal of pine trees and bank stabilisation requirements;
- Soil analysis (if required);
- Undertake Annual Biodiversity and Rehabilitation monitoring surveys; and
- Ongoing surface water monitoring.
- Undertake Channel Stability and Stream Health surveys on a bi-annual basis.

The rehabilitation of Neubecks Creek will be undertaken progressively overtime to ensure the highest chance of success. It should be noted that it is not proposed to change the alignment of Neubecks Creek, as such the existing channel and alignment will be used and stabilised accordingly.

Enhance Place will seek specialist advice to ensure rehabilitation of Neubecks Creek is undertaken generally in accordance with the following guiding documents, these include:

- River and Estuaries Policy;
- NSW Wetlands Management Policy;
- Australian Stream Management manual; and
- NSW Biodiversity Strategy

The rehabilitation performance criteria of Neubecks Creek are described in detail in **Appendix C**.

7.3 SUMMARY OF REHABILITATION AREAS DURING THE MOP TERM

Table 12: Rehabilitation Areas during C&M MOP

Primary Domain	Secondary Domains	Code	Rehabilitation Phase	Start of MOP (ha)	End of MOP (ha)
Infrastructure (1)	Infrastructure (A)	1A	Active	19.9	19.9
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
			TOTAL	**19.9**	**19.9**
Overburden Emplacement (2)	Infrastructure (A)	2A	Active	22.9	22.9
			Decommissioning	0	0
			Landform Establishment	4	4
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
			TOTAL	**26.9**	**26.9**
	Water Management Area (B)	2B	Active	0	0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0.8	0.8
			Ecosystem Development	0	0
			Relinquished Lands	0	0
			TOTAL	**0.8**	**0.8**
	Pasture (C)	2C	Active	0	0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	25.4	25.4
			Relinquished Lands	0	0
			TOTAL	**25.4**	**25.4**
	Native Forest (D)	2D	Active	0	0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	7.1	7.1
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
			TOTAL	**7.1**	**7.1**
	Pine Plantation (E)	2E	Active	0	0
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	7.0	7.0
			Relinquished Lands	0.	0
			TOTAL	**7.0**	**7.0**
Water Management Areas (3)	Infrastructure (B)	2B	Active	0.4	0.4
			Decommissioning	0	0
			Landform Establishment	0	0
			Growth Medium Development	0	0
			Ecosystem Establishment	0	0
			Ecosystem Development	0	0
			Relinquished Lands	0	0
			TOTAL	**0.4**	**0.4**
TOTAL				**87.5**	**87.5**

7.4 **RELINQUISHMENT PHASE ACHIEVED DURING MOP TERM**

Enhance Place is seeking to move towards relinquishment of the old Pine Dale Mine (Areas B and C) which is privately owned. As such every effort is being made to ensure that the rehabilitation objectives proposed in this C&M MOP are suitable and that the completion criteria are achieved in the MOP term. It is anticipated that these areas may be considered for lease relinquishment by Enhance Place during the C&M MOP term.

8. REHABILITATION MONITORING AND RESEARCH

8.1 **REHABILITATION MONITORING**

Pine Dale Mine has undertaken flora surveys on previously rehabilitated areas. It is proposed to undertake annual flora surveys to provide qualitative data so that rehabilitated lands can be measured against the agreed completion criteria. The annual flora surveys will monitor and include as a minimum:

- Species richness;
- Species density;
- Soil analysis (every 2 years);

Additional parameters for native forest domains will be monitored including:

- Forest structure;
- Habitat features;
- Flora surveys; and
- Ecosystem function analysis.

Results of the rehabilitation monitoring program will be used to identify successes and failures in the applied rehabilitation techniques. This will enable rehabilitation methods that have worked well to be identified and applied in future mining rehabilitation areas. Any areas identified through the monitoring program as not progressing towards achieving the agreed completion criteria will be treated accordingly. Rehabilitation methods will be developed in accordance with current best practice methods based on recent mine rehabilitation research and successes achieved at other mine sites in the local area.

8.2 **RESEARCH AND REHABILITATION TRIALS AND USE OF ANALOGUE SITES**

There is no additional research in rehabilitation proposed to be undertaken during the C&M MOP term. Existing rehabilitation areas will be monitored in accordance with the rehabilitation monitoring program described above in **Section 8.1**. Reference sites relating to pasture and native forest areas will be described in detail in the ongoing rehabilitation monitoring program. The monitoring of the PCB will continue as required by relevant licences and approvals.

9. INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 THREATS TO REHABILITATION

Significants threats to rehabilitation areas at Pine Dale Mine and the proposed mitigation and management measures are summaries in **Table 13**.

Table 13: Threats to Rehabilitation

Secondary Domains (Post Mining Land Use)	Potential Threat(s)	Mitigation & Management Measures
Infrastructure (A) Water Management Structure (B)	Engineering design failure	Any infrastructure remaining in place post mining would be inspected and approved by a suitably qualified person (if required) and agreed by relevant stakeholders.
	Water damage (erosion, flooding etc.)	Infrastructure and water management structures would be constructed in accordance with relevant guidelines and to ensure erosion and damage from floods is minimised.
Rehabilitation - Pasture (C) Rehabilitation - Native Forest (D) Rehabilitation – Pine Plantation (E)	Adverse soil chemistry	Soil testing and amelioration
	Erosion	Design to relevant guidelines, regular maintenance as required
	Seed germination failure	Seed treatment, soil amelioration, annual monitoring
	Species diversity and density	Annual monitoring and supplementary tree planting and seeding as required
	Weed presence	Inspections and weed control (herbicide application).
	Drought	Drought tolerant species selection, timing seeding to coincide with appropriate soil moisture.
	Grazing	Restrict grazing particularly in early years to rehabilitated areas
	Bushfire	Maintain low fuel loads, emergency preparedness and response

9.2 TRIGGER ACTION RESPONSE PLAN

Table 14 presents a Trigger Action Response Plan (TARP). The TARP summarises the mitigation measures that will be implemented if rehabilitation monitoring meets any of the triggers associated with the rehabilitation risks identified in **Table 14** and / or does not meet applicable rehabilitation criteria.

Table 14: Rehabilitation Trigger Action Response Plan

Rehabilitation Risk	Monitoring Trigger	Mitigation Measure
Soil is stockpiled too high.	Soil stockpile greater than 2m high for topsoil and 3m high for subsoil.	Reduce height of soil stockpile.
Erosion of soil stockpiles.	Evidence of active erosion on the soil stockpile (to be retained for greater than 3 months).	Install appropriate upslope water diversions (bunding or drain) and see non-persistent cover crop.
Inadequate soil resources available for rehabilitation.	Soil inventory shows a deficit of soil.	Review rehabilitation plan to ensure there is enough soil available for rehabilitation and/or conduct rehabilitation trials using alternative growth mediums other than soil.

Rehabilitation Risk	Monitoring Trigger	Mitigation Measure
The proliferation of weeds in soil stockpiles, amenity bund or rehabilitation area.	- Greater than 30% groundcover or projected foliage cover is weeds. - Presence of noxious weeds.	Control weeds in accordance with the sites weed management protocols and undertake quarterly follow up inspection of treated area.
Soil has not been spread at appropriate depths on the rehabilitated landform in the Yarraboldy Extension area.	Subsoil depth on the rehabilitated landform is less than 250mm in thickness and / or topsoil less than 50mm.	Spread additional soil over the area and/or apply appropriate treatment to improve soil quality.
Soil infertility	Soil chemical properties assessed as toxic or inhospitable for plant growth.	Ameliorate soils in accordance with soil assessment recommendations (SLR 2014).
Water management infrastructure is not constructed appropriately.	- Water management infrastructure constructed in inappropriate location. - Diversion bunds do not meet design standards of blue book (e.g. longitudinal grade greater than 2%). - Water retention dams do not meet sizing requirements.	Monitor the performance of the water management infrastructure and upgrade if required (e.g. regrade sections of diversion bunds, installation of additional erosion controls, and enlargement of dam).
Services not disconnected prior to rehabilitation.	Services are not disconnected prior to rehabilitation.	Engage appropriate trade person to disconnect services prior to proceeding to the landform establishment phase.
Contaminated sites are present.	Contaminated sites are present.	Remediate contaminated sites in accordance with recommendation of qualified contamination consultant.
Acid bearing material is placed too close to the surface of overburden/interburden emplacement areas.	Acid bearing material is found less than 5m from the proposed surface of the final landform.	Rehandle acid bearing material to an area that will be at least 5m beneath the surface of the final landform where practicable. If appropriate, add acid amelioration material to rehabilitated areas.
Overburden / interburden is not placed in the appropriate area to be commensurate with the final landform.	Overburden / interburden has not been placed in accordance with the mine plan.	Review final landform plan and make adjustments or rehandle the material to an area to be commensurate with the existing final landform plan.
Overburden / interburden is not placed in a manner that will provide geotechnical stability.	Evidence of slumping in overburden / interburden emplacement areas.	Remediate based on the advice of a geotechnical engineer.
Excess residue is left on the coal stockpile footprints at the time of decommissioning.	Greater than a nominal 20% of the coal stockpile footprints contain coal residue at a depth greater than 20mm at the time of decommissioning.	Remove excess residue from coal stockpile footprints prior to spreading soil material.
Ponding of water is evident on rehabilitated slopes.	Evidence of ponded water over greater than 15% of the rehabilitated area.	Monitor for geotechnical stability and erosion of the landform and remediate if required.
Rehabilitated slopes are not in accordance with the final landform plan.	Rehabilitated slopes within the existing Pine Dale Mine exceed 18° and 30° within the Yarraboldy Extension area.	Regrade slopes prior to contour ripping and drainage works being installed.
Reshaped landform has not been contour ripped.	Reshaped landform has not been contour ripped.	Contour ripped reshaped landform prior to the placement of topsoil.

Rehabilitation Risk	Monitoring Trigger	Mitigation Measure
Rehabilitated landform is not seeded / planted with appropriate seed mix / tube stock.	Seed / tube stock supplied is not commensurate with what was ordered.	Send seed / tube stock back to supplier. Do not sow seed or plant tube stock.
Spontaneous combustion outbreak.	Smoke/heat/odour present.	Mitigate in accordance with the site's spontaneous combustion management procedures (see Section 3.2.1.2).
Inadequate groundcover is present for the phase of rehabilitation.	Less than 70% groundcover or 90% total projected foliage cover is present in the ecosystem establishment phase after 3 years of monitoring.	Test soil pH and EC and conduct soil amelioration if required. If soil amelioration not required, re-sow seed / plant tube stock and monitor performance.
Inadequate species diversity present for the phase of rehabilitation.	- Less than 70% of the species originally sown are present in areas returned to pasture. - Less than 10 native species are present within monitoring quadrat in areas returned to native forest.	Test soil pH and EC and conduct soil amelioration if required. If soil amelioration not required, re-sow additional seed / plant additional tube stock and monitor performance.
Weed presence / density	Noxious weed presence is greater than analogue sites. African Lovegrass represents <10% of pasture sward in pasture rehabilitation areas.	Implement weed control program in accordance with legislation.
The rehabilitated area does not meet its intended sustainable end land use.	The rehabilitated area does not meet its intended sustainable end land use after 5 years of being in this phase.	Review rehabilitation records. Seek specialist advice and liaise with government agencies to determine a solution to move forward and implement the solution.

10. REPORTING

Pine Dale Mine reports against key environmental parameters to ensure regulatory compliance with associated licences and approvals is achieved. Reporting mechanisms implemented at Pine Dale Mine to ensure compliance with the C&M MOP include:

- Weekly statutory inspections by Open Cut Examiner;
- Monthly MEM mine site report;
- Environmental monitoring including air quality, surface water, groundwater and noise
- Annual rehabilitation monitoring surveys;
- Annual Environmental Management Report / Annual Review report;
- Rehabilitation Cost Estimate;
- Annual site inspection by regulators;
- Environmental Management Plan updates;
- Environmental complaints and incidents register;
- Community Consultative Committee meetings; and

In the event of any environmental concerns identified regarding Pine Dale Mine additional monitoring and reporting maybe undertaken to ensure compliance with relevant licences and approvals.

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Appendix A

MOP Plans

228000
230000
6308000
6306000
6304000
6302000
B55
Castlereagh Highway
Wolgan Road
Angus Place
Angus Place Colliery
Western Main Colliery
Walkerawang Colliery
Newcom Colliery
Lidsdale
Coxs River
Maddox Lane
Groves Road
Noon Street
View Street
Karawatha Drive
Ian Holt Drive
Skelly Road
Duncan Street
Kangaroo Creek
Beecroft Fire Trail
1664
1569
1578

Date: 17/12/2018
Mining Engineering Manager
For and behalf of operator

LEGEND

Pine Dale Mine

Mining Leases

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 180 360 720 1,080 1,440
metres

N

EnergyAustralia
LIGHT THE WAY

PINE DALE MINE
REGIONAL LOCALITY PLAN

PLAN: 1A

DRAWN BY : C. Rocher

SCALE: 1:23,856 (A3)

DATE: 17/12/2018

DRAWING : 23.4.11.6.1

REV: C

PD4-0S
PD1-0S
PD2-0S
PD3-ISO
226500
227000
227500
228000
228500
6305500
6305000
6304500
Castlereagh Highway
Neubecks Creek
Coxs River
Blue Lake

Date: 17/12/2018
Mining Engineering Manager
For and behalf of operator

LEGEND

- Project Boundary
- Flood Prone Land
- Grassland
- Natural Forest
- Bursaria Habitat
- Ecotone Habitat

Vegetation Communities

- 1a.Red Stringybark-Brittle Gum-Inland Scribbly Gum dry open forest (dominated by E.rossll and E.sparsifolia) (HN570)
- 1b.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (E. rubida, E. dives, E. macroyncha) (HN570)
- 2.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (Sandstone woodland) (HN570)
- 3.Ribbon Gum - Snow Gum grassy forest (HN572)
- 4.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (Derived grassland) (HN570)
- 5.Snow Gum - Candle Bark woodland (HN589)
- Eucalyptus Aggregata
- Derwentia Blakelyi
- Aboriginal Heritage Site

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 50 100 200 300 400
metres

N

EnergyAustralia LIGHT THE WAY

PINE DALE MINE
CARE AND MAINTENANCE MOP
PRE MINING -
NATURAL ENVIRONMENTAL

PLAN: 1B

DRAWN BY : C. Rocher

SCALE: 1:6,500 (A3)

DATE: 17/12/2018

DRAWING : 23.4.11.6.1B

REV: E

6305500
6305000
6304500
6304000
226500
227000
227500
228000
228500

1664
1578
1569

Castlereagh Highway
Neubecks Creek
Coxs River
Blue Lake

Date: 17/12/2018
Mining Engineering Manager
For and behalf of operator

LEGEND

- Project Boundary
- Major and Minor Roads
- Mine Authority
- Drainage
- Water Management Areas
- Enhance Place Owned Land
- Crown Land
- Other Owned Land
- Infrastructure
- Other Owned Residence
- Other Mined Own Residence

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 50 100 200 300 400
metres

N

EnergyAustralia LIGHT THE WAY

PINE DALE MINE
CARE AND MAINTENANCE MOP
PRE MINING -
BUILT ENVIRONMENTAL

PLAN: 1C

DRAWN BY : C. Rocher

SCALE: 1:6,500 (A3)

DATE: 17/12/2018

DRAWING : 23.4.11.6.1C

REV: C

Date: 17/12/2018
Mining Engineering Manager
For and behalf of operator

LEGEND

- Project Boundary
- Area of Disturbance
- Major and Minor Roads
- Section Locations
- Drainage

Primary Domains

- 1 Infrastructure Area - 19.9Ha
- 2 Overburden Emplacement - 22.9Ha
- Water Management Areas - 0.4Ha

Secondary Domains

- B Water Management Area - 0.8Ha
- C Rehabilitation Area - Pasture 25.4Ha
- D Rehabilitation Area -Native Forest 7.1Ha
- Pine Plantation

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 50 100 200 300 400
metres

N

EnergyAustralia LIGHT THE WAY

PINE DALE MINE
MINE DOMAINS AT COMMENCEMENT OF MOP

PLAN: 2

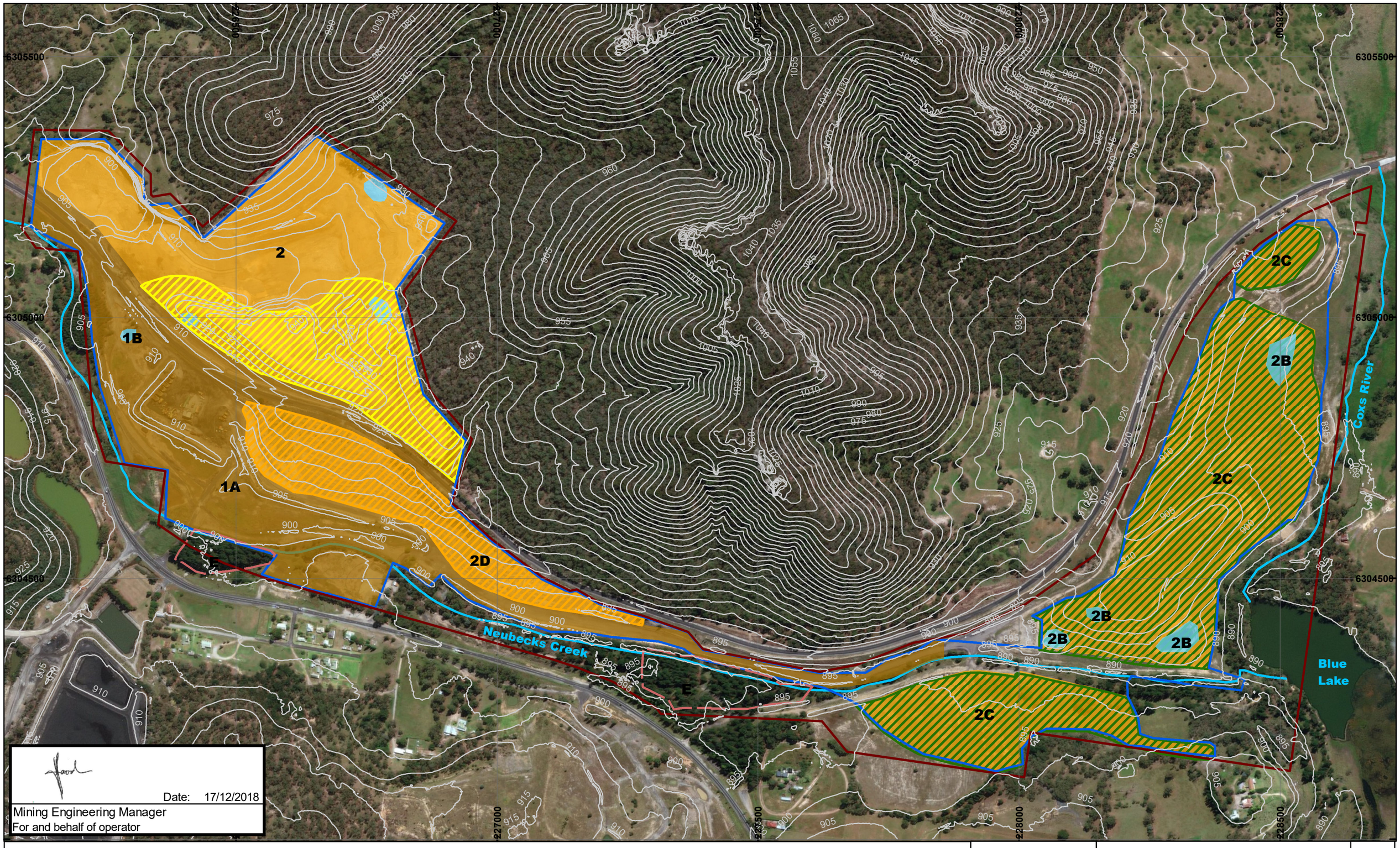
DRAWN BY : C. Rocher

SCALE: 1:6,500 (A3)

DATE: 17/12/2018

DRAWING : 23.4.11.6.2

REV: G



Date: 17/12/2018

Mining Engineering Manager
For and behalf of operator

LEGEND

- Project Boundary
- Area of Disturbance
- Section Locations
- Landform Establishment
- Growth Media Development
- Ecosystem and Land Use Development
- Pine Plantation

Primary Domains

1	Infrastructure Area - 19.9Ha
2	Overburden Emplacement - 22.9Ha
	Water Management Areas - 0.4Ha

Secondary Domains

A	Infrastructure
B	Water Management Area
C	Rehabilitation Area - Pasture
D	Rehabilitation Area - Pasture
E	Pine Plantation

N

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 50 100 200 300 400
metres

EnergyAustralia LIGHT THE WAY

PINE DALE MINE
MINING AND REHABILITION
DURING CARE AND MAINTENANCE
MOP TERM

PLAN: 3

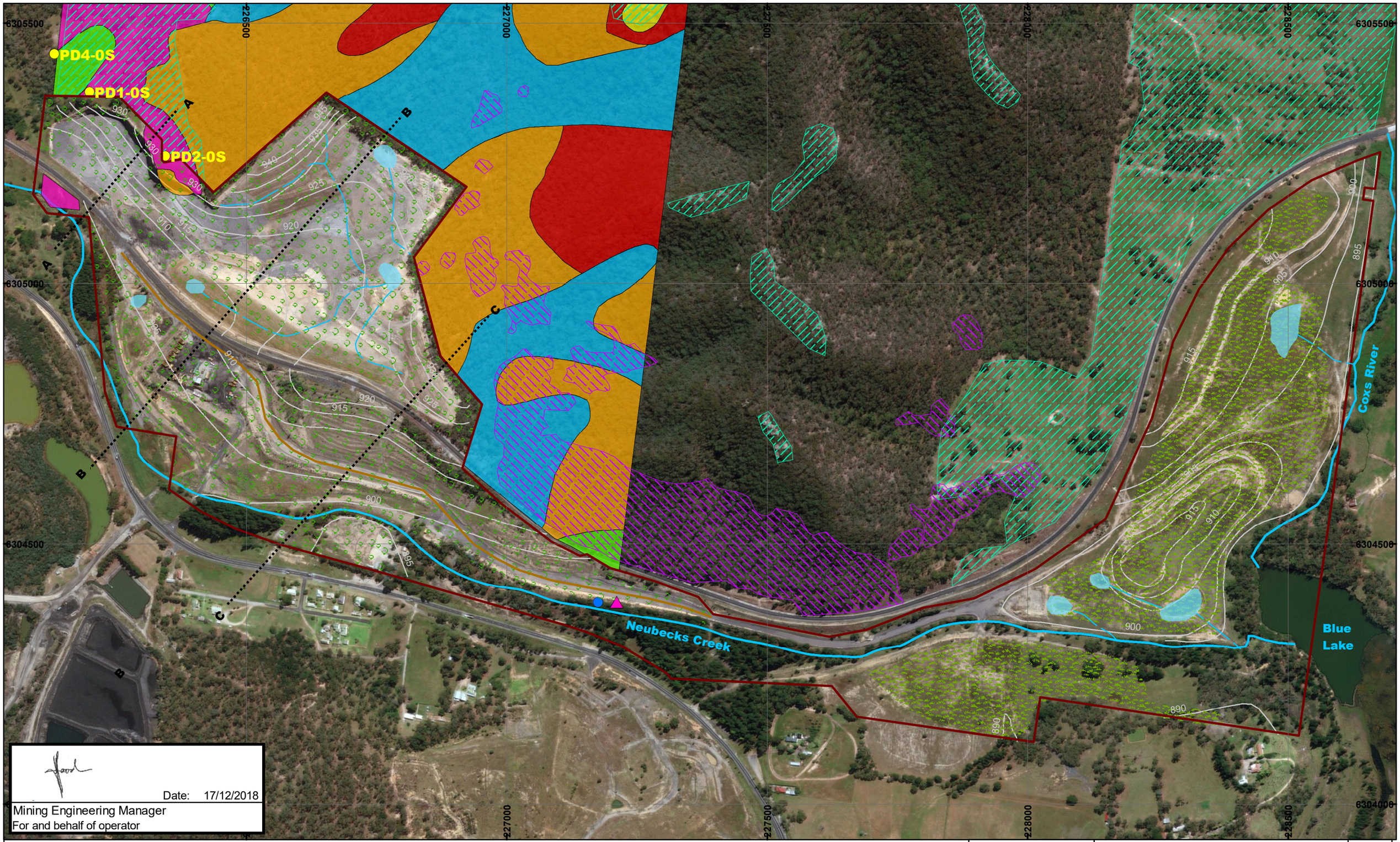
DRAWN BY : C. Rocher

SCALE: 1:6,500 (A3)

DATE: 17/12/2018

DRAWING : 23.4.11.6.3

REV: G



Date: 17/12/2018
Mining Engineering Manager
For and behalf of operator

LEGEND

- Project Boundary
- Section Locations
- Drainage
- Grassland
- Natural Forest
- Bursaria Habitat
- Ecotone Habitat

Vegetation Communties

- 1a.Red Stringybark-Brittle Gum-Inland Scribbly Gum dry open forest (dominated by E.rossll and E.sparsifolia) (HN570)
- 1b.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (E. rubida, E. dives, E. macroyncha) (HN570)
- 2.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (Sandstone woodland) (HN570)
- 3.Ribbon Gum - Snow Gum grassy forest (HN572)
- 4.Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest (Derived grassland) (HN570)
- 5.Snow Gum - Candle Bark woodland (HN589)
- Eucalyptus Aggregata
- Derwentia Blakelyi
- Aboriginal Heritage Site
- Infrastructure Area
- Water Management Areas

Aerial Image Dated 3/10/2015
Coordinate System MGA Zone 56

0 50 100 200 300 400
metres

N

EnergyAustralia LIGHT THE WAY

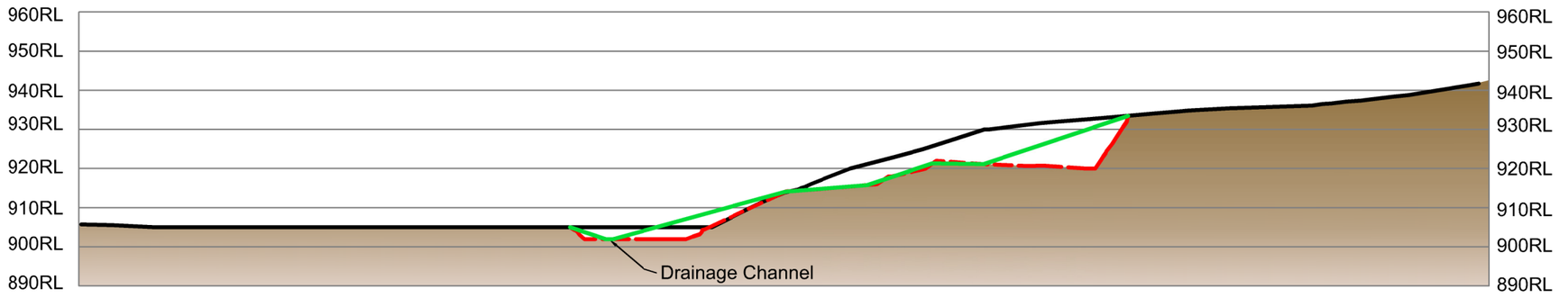
PINE DALE MINE
CARE AND MAINTENANCE MOP
FINAL REHABILITATION AND
POST MINING LAND USE

PLAN: 4

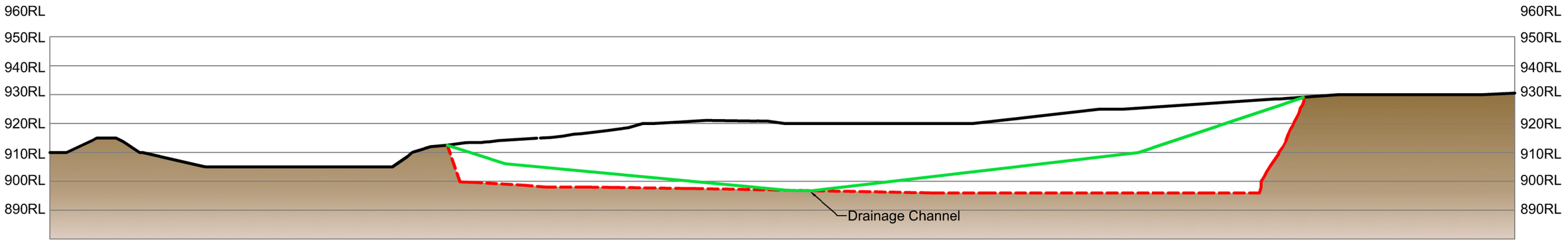
DRAWN BY : C. Rocher
SCALE: 1:6,500 (A3)
DATE: 17/12/2018
DRAWING : 23.4.11.6.4
REV: D

Date: 17/12/2018

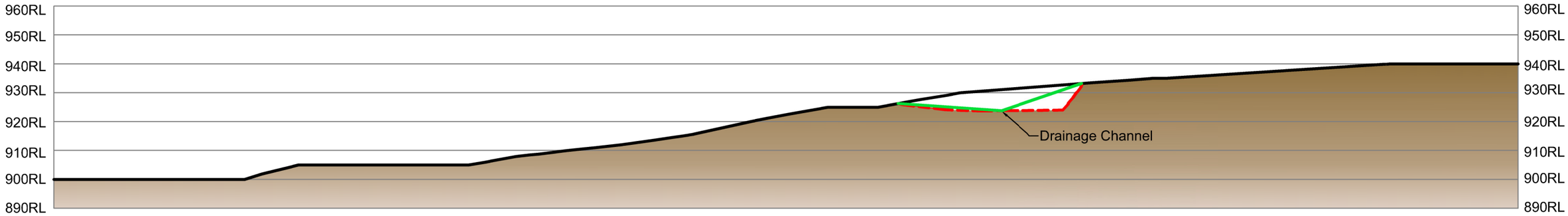
Mining Engineering Manager
For and behalf of operator



Section A-A



Section B-B



Section C-C

LEGEND

- Final Landform
- Natural Surface
- Pit Surface

EnergyAustralia
LIGHT THE WAY

Pinedale Mine
Care & Maintenance MOP
Cross Sections

Plan **5**

Drawn By:	Date:	Drawing No.:	Revision:	MGA Zone 56
Dave Eustace	06/11/13	23.4.11.6.1B	A	

Appendix B

Regulatory Correspondence

1659420:LGS
Economic Development and Environment

Lithgow CITY COUNCIL
Surrounded by Nature · Steeped in History

29 January 2019

James Teare
James.Teare@energyaustraliansw.com.au

Dear James

PINE DALE MINE – MINE OPERATIONS PLAN

I refer to your email received 23 January 2018 and your request for review of the Pine Dale Mine Operations Plan.

Council considers that the Mine Operations Plan adequately highlights the relevant issues and therefore has no objection to the plan.

Please do not hesitate to contact me who is available between 8.15 am and 10.30 am on (02) 6354 9999, Monday to Friday; in Council's Economic Development and Environment should you require any additional information in relation to this matter.

Yours Sincerely

L. A. Stevens

Lauren Stevens
DEVELOPMENT PLANNER

PO Box 19, LITHGOW NSW 2790
Tel: (02) 6354 9999 Fax: (02) 63514259
Web: www.lithgow.nsw.gov.au Email: council@lithgow.nsw.gov.au

On 14 Feb 2019, at 1:33 pm, Melanie Klootwijk <Melanie.Klootwijk@fcnsw.com.au> wrote:

Hi Ben,
I don't have any concerns with the MOP, I do have one query though. On page 27, Section 7.2.2 Rehabilitation Native Forest – these is no mention of re-sowing or planting tube stock with native trees, only "fast growing groundcover, herbs and grasses". I am not greatly familiar with the area, however I would be surprised if previous planting of native trees has been so successful that no more would be required to achieve rehabilitation outcomes. I am happy to be corrected on this but it did stand out to me that there was no further tree planting planned.
Also, we haven't regularly been sent the annual reports or the rehab monitoring reports, which would be of interest to me.
Thanks for your time and sorry again for the lateness of reply.
Regards,
Melanie

From: Melanie Klootwijk
Sent: Thursday, 14 February 2019 11:42 AM
To: ben.eastwood@energyaustraliansw.com.au
Subject: Pine Dale Mine, Mine Operations Plan

Hi Ben,
I apologise for not making contact earlier. I received the MOP several weeks ago however have not had the chance to review it, which I am doing today. I note comments were requested by 9th Feb and I am asking if during my review I find something to comment on, is too late?
Kind Regards,

Melanie Klootwijk | Stewardship Coordinator (NOTE: I work Mon - Thurs)
Forestry Corporation of NSW | Northern Softwoods Region

Cnr Panorama Ave and Browning Street | Bathurst NSW 2795
PO Box 143 | Bathurst NSW 2795
M: 0427 259 503
E: melanie.klootwijk@fcnsw.com.au | W: www.forestrycorporation.com.au

From: Ravi Sundaram <ravi.sundaram@waternsw.com.au>
Sent: Tuesday, 5 March 2019 3:05 PM
To: Eastwood, Ben <Ben.Eastwood@energyaustraliansw.com.au>
Cc: Peter Dupen <Peter.Dupen@waternsw.com.au>
Subject: RE: Pine Dale Mine, Mine Operations Plan

Hi Ben

WaterNSW appreciates being consulted on the proposal and regrets the delay in responding. The updated draft MOP is for the Care & Maintenance period until further approvals are obtained to commence mining at Pine Dale Mine. There are no proposed mining activities including exploration works during this period. However, mine rehabilitation works required under existing approvals will continue and are discussed in detail in the MOP. WaterNSW supports the continuation of progressive rehabilitation discussed in Section 7.2 and Appendix C of the MOP associated with Neubecks Creek and improvement works associated with pasture freed rehabilitation areas to improve soil characteristics and growth. WaterNSW also supports the continued maintenance of all erosion and sediment controls in place during the care and maintenance period and management of water at the site in accordance with the Water Management Plan.

Please contact me in case you wish to discuss any matter described above. WaterNSW would appreciate receiving a final copy of the MOP and a copy of the 2018 AEMR when available.

Regards

Ravi

Ravi Sundaram
Mining Catchment Specialist

WaterNSW
Level 14, 169 Macquarie Street
Parramatta NSW 2150
P: 9865 2507 **M:** 0428 226 152
Ravi.Sundaram@waternsw.com.au
www.waternsw.com.au

Appendix C

Rehabilitation Completion Criteria

Pine Dale Mine - Rehabilitation Completion Criteria

Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
PHASE - DECOMMISSIONING						
Domain 1 – Infrastructure Areas						
All non-heritage infrastructure will be removed prior to closure.	Services removed	Complete removal of services.	Closure Management Plan	No	N/A	Not Commenced
	Buildings removed	Complete removal of buildings.	Closure Management Plan	No	N/A	Not Commenced
	Footings, pads and pavements	All concrete footings and foundation pads, bituminous and concrete pavements have been removed.	EA Section 2.12.10	No	N/A	Not Commenced
All hazardous and contaminated materials are identified and removed or appropriately remediated.	Contamination assessment	A contamination assessment has been completed for the workshop, fuel and chemical stores, crushing and stockpiling facility.	PA10_0041 NEPM 1999	Yes	N/A	Not Commenced
	Contamination	Identified contamination has been removed or appropriately remediated in-situ.	EA Statement of Commitments 11.4 – 11.6	Yes	N/A	Not Commenced
	Hazardous materials	Hazardous materials are identified and removed to appropriate standards.	Closure Management Plan	No	N/A	Not Commenced
	Coaliferous materials	All coaliferous material has been removed from the crushing and stockpiling facility and private haul road.	Closure Management Plan	Yes	N/A	Not Commenced
Domain 2 – Overburden Emplacement						
Post mining landforms will be geotechnically stable, free draining and non-polluting.	Presence of spon com	No areas of spon com detected.	Spon Com Management Procedures (MOP Section 3.2.1.2)	Yes	Yes	Ongoing
	Discharge water quality	Discharge water quality meets EPL standard.	Approved Water Management Plan	No	Yes	Ongoing
	Potentially acid forming materials	Suspected Potentially acid forming (PAF) materials are capped with at least 5 m of inert overburden.	EA Section 2.5.5	Yes	Yes	Ongoing
		Shaley interburden is capped with at least 2m of inert overburden.	EA Section 2.12.11	No	Yes	Ongoing
Domain 3 - Water Management Structure						
Water Management infrastructure not required in the final landform is removed from site.	Operational water infrastructure	Removal of dirty water management infrastructure including pipes, pumps, sediment dams and ancillary equipment.	Closure Management Plan	No	N/A	Not Commenced
	Dirt water dams	Dirty water dams not retained for future land use are drained and the water disposed of in accordance with the EPL.	EA Section 2.12.10	No	N/A	Not Commenced

Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
PHASE - LANDFORM ESTABLISHMENT						
All Domains						
Post mining landforms will be geotechnically stable, free draining and non-polluting.	Slope angle	Slopes are generally up to 10 degrees and steeper in areas commensurate with the surrounding landscape.	Slope Management Procedures (MOP Section 3.2.1.10)	No	No	In progress
	Ponding	Landforms are free draining with an absence of ponding (excluding retained water storage dams).	EA Section 2.12.11 Landscape Management Plan	No	Yes	In progress
	Discharge water quality	Dirty water is captured and discharged in accordance with the EPL.	EPL & Approved Water Management Plan	No	Yes	Ongoing
Domain 2 – Overburden Emplacement						
Overburden emplacements will be shaped to generally reconstruct the pre-mining landform where possible.	Landform integration	Post mining landforms are considered to be compatible with adjacent undisturbed landforms.	EA Section 2.12.11	No	No	Ongoing
	Pre-mining drainage	Overburden emplacements are shaped to be free draining and generally reinstate the pre-mining drainage regime where possible.	EA Section 2.12.11	No	No	Ongoing
Temporary amenity bunds will be re-graded to blend with the adjacent landform.	Landform integration	The bund material is pushed to the north and the final profile considered to be sufficiently blended with the adjacent landform.	EA Section 2.12.10 PA 10_0041 Schedule 3 Condition 37 and 53	No	No	Ongoing
Domain 3 – Water Management Structures						
Post mining landforms will be geotechnically stable, free draining and non-polluting.	Final landform drainage plan	Final landform water management system is designed and constructed in accordance with an approved Final Landform Drainage Plan.	From Managing Urban Stormwater: Soils & Construction	No	Yes	In progress
	Longitudinal grade of contour banks	Contour grade ≤2%	From Managing Urban Stormwater: Soils & Construction	No	Yes	In progress
	Landform stability	Drainage structures are assessed to be stable with no significant active erosion or bank failure.	From Managing Urban Stormwater: Soils & Construction	No	Yes	In progress
PHASE – GROWING MEDIA DEVELOPMENT						
Domain – Rehabilitation Area (Native Forest & Pasture)						
Growth media is suitable for establishing the desired vegetation community.	Soil characterisation	Topsoil and subsoil has been tested to assess suitability for intended post mining landuse.	Soil Assessment Results and Rehabilitation Monitoring Report	No	Yes	In progress
	Topsoil and subsoil depth	≥250mm of subsoil material e.g. clay ≥50mm of topsoil	Soil Assessment Results and Rehabilitation Monitoring Reports	No	Yes	In progress
	Amelioration	Topsoils and subsoils are ameliorated in accordance with the recommendations of the soil characterisation (including application of boiler ash, fertilisers and organics as required).	Soil Assessment Results and Rehabilitation Monitoring Reports	No	Yes	In progress

Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
	Deep ripping	Rehabilitation area deep ripped on contour.	Rehabilitation Monitoring Reports	No	No	In progress
Erosion hazards are minimised	Temporary ESC	Erosion and sediment controls are installed prior to topsoil respreading.	From Managing Urban Stormwater: Soils & Construction	No	Yes	In Progress
PHASE – ECOSYSTEM AND LAND USE ESTABLISHMENT						
All Domains						
Weed species and feral animals are controlled and do not significantly impact the desired final land use.	Feral animal and noxious weed presence	Feral animal and weed species presence and abundance is not considered to adversely impact the intended final land use	Rehabilitation Monitoring Reports	No	Yes	In Progress
	Feral animal and noxious weed control	Feral animals and noxious weeds are controlled in accordance with legislation	Rehabilitation Monitoring Reports	No	Yes	In Progress
Bushfire risk is managed on rehabilitation areas.	Fuel Loads	Fuel loads and fire breaks in and surrounding rehabilitation areas are assessed and maintained in accordance with the Bushfire Management Plan.	Bushfire Management Plan	No	Yes	In Progress
	Access	Adequate access for firefighting is maintained on rehabilitation areas.	Bushfire Management Plan	No	Yes	In Progress
Erosion does not compromise public safety or the post mining land capability	Erosion	No evidence of significant erosion.	Rehabilitation Monitoring Reports	No	Yes	In Progress
Soil profile is developing appropriate for the intended post mining land use.	Soil Quality	Soil chemical characteristics including: pH, EC, major cations (K, Na, Al, Ca, Zn), Sulfur and nitrate are comparable with analogue site (PD3).	Soil Assessment Results (MOP Appendix D)	No	Yes	In Progress
	Ground Cover	Ground cover (vegetation, leaf litter, mulch) greater than 70% at Year 5.	*Ecosystem Function Analysis.* (CSIRO 2008)	No	No	In Progress
Domain – Rehabilitated Area (Native Forest including Neubeck's Creek)						
Native forest rehabilitation areas will include fauna habitat features	Habitat features	Habitat features are installed on rehabilitation areas including: - Nesting boxes and salvaged hollows - Crushed timber spread over native forest rehab areas (excluding Neubeck's Creek area) - rock pile clusters.	Rehabilitation Monitoring Reports	No	No	In Progress
Native forest rehabilitation areas will be compatible with surrounding native vegetation	Species Composition	Native forest vegetation is established in accordance with the approved species mix	Rehabilitation Monitoring Reports	No	Yes	In Progress
	Vegetation Health	More than 75% of indicator species are assessed to be healthy and growing at Year 5.	*Ecosystem Function Analysis.* (CSIRO 2008)	No	Yes	In Progress

Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
Domain – Rehabilitated Area (Pasture)						
Pasture rehabilitation areas will be established comparable to surrounding undisturbed pasture lands.	Pasture species	Approved pasture species mix is sown at the specified rate per hectare.	Rehabilitation Monitoring Reports / MOP Appendix D	No	No	In Progress
	Species Composition	Established pasture mix comprises approximately 70% perennial grasses and 20% annual legumes, representative of species at analogue sites.	Rehabilitation Monitoring Reports / MOP Appendix D	No	No	In Progress
	Weed Presence	Weeds including African Lovegrass comprise less than 10% of the total pasture sward.	Rehabilitation Monitoring Reports / MOP Appendix D	No	Yes	In Progress
PHASE – ECOSYSTEM AND LAND USE SUSTAINABILITY						
All Domains						
Erosion does not present a safety hazard or compromise the post mining land capability.	Soil loss	Net annual soil loss is comparable to analogue sites at Year 10.	*Ecosystem Function Analysis.* (CSIRO 2008)	No	No	In Progress
	Erosion Features	There are no significant erosion features that compromise landform stability or public safety (including gullying or tunnelling)	From Managing Urban Stormwater: Soils & Construction	No	Yes	In Progress
Soil profile is developing appropriate for the intended post mining land use.	Soil Quality	Soil chemical characteristics including: pH, EC, major cations (K, Na, Al, Ca, Zn), Sulfur and nitrate are comparable with analogue site (PD3).	Soil Assessment Results / MOP Appendix D	No	Yes	In Progress
	Ground Cover	Ground cover (vegetation, leaf litter, mulch) greater than 70% at Year 5.	*Ecosystem Function Analysis.* (CSIRO 2008)	No	Yes	In Progress
Domain – Rehabilitated Area (Native Forest including Neubecks Creek)						
Native fauna utilising the rehabilitated area.	Woodland birds present	Evidence of woodland birds utilising rehab areas.	Rehabilitation Monitoring Reports	No	No	In Progress
	Evidence of mammals	Evidence of target mammal species presence in rehab areas.	Rehabilitation Monitoring Reports	No	No	In Progress
Native Forest rehabilitation areas are self-sustaining.	Natural Regeneration	Evidence of second generation of indicator species from desired vegetation community.	Rehabilitation Monitoring Reports	No	Yes	In Progress
	Structure	Structural layers (canopy, mid storey, understorey and ground cover) are comparable to analogue sites.	Rehabilitation Monitoring Reports	No	Yes	In Progress
	Vegetation Health	Indicator species tree height and girth is within the range of analogue sites.	Rehabilitation Monitoring Reports	No	Yes	In Progress
Domain – Rehabilitated Area (Pasture)						
Pasture rehabilitation areas are self-sustaining.	Natural regeneration.	Evidence of natural regeneration of at least four pasture species at Year 5.	*Ecosystem Function Analysis.* (CSIRO 2008)	No	Yes	In Progress
	Rural Land Capability.	Pasture Rehabilitation Areas are assessed to have a Rural Land Capability Class VI or better (suitable for grazing).	*Ecosystem Function Analysis.* (CSIRO 2008)	No	Yes	In Progress
	Management Inputs	Management inputs (ameliorants, fertilisers, weed treatments) are within the range of analogue sites.	Rehabilitation Monitoring Reports & MOP Appendix D	No	Yes	In Progress

Objective	Performance Indicator	Completion Criteria	Justification/Source	Complete (Yes/No)	Link to TARP	Progress at start of MOP
Domain – Water Management Structures						
Discharge water quality is non-polluting	Water turbidity (TSS)	≤50 mg/L	Environment Protection Licence	No	Yes	Ongoing – Component of the EPL monitoring requirements
	Water pH	6.5 – 8.5	Environment Protection Licence	No	Yes	Ongoing – Component of the EPL monitoring requirements
	Oil & Grease	≤10 mg/L	Environment Protection Licence	No	Yes	Ongoing – Component of the EPL monitoring requirements

Appendix D

Care and Maintenance Risk Assessment

Enhance Place Pty Ltd
Pine Dale Mine,
Blackmans Flat NSW



Pine Dale Mine
Care and Maintenance Risk Assessment
December 2016

PREAMBLE TO RESULTS

GENERAL BACKGROUND

It is anticipated that Pine Dale Mine will cease mining operations in quarter 1, 2014. As such, the Pine Dale Mine will go into care and maintenance and be managed in accordance with the arrangements described in the Care and Maintenance Mining Operations Plan (C&M MOP). This Risk Assessment has been prepared to assess the equipment, safety and environmental risks associated with managing Pine Dale Mine during the care and maintenance period.

Pine Dale Mine was placed in care and maintenance in 2014 following the cessation of mining operations. The C&M Risk Assessment has been revised following the introduction of the Work Health and Safety (Mines) Act 2013 and associated Regulations 2014.

Note: text in blue is associated with the updated C&M Risk Assessment completed in December 2016.

DATE AND LOCATION

Wednesday 27 November 2013 at the Pine Dale Mine site office.

SCOPE

This risk assessment relates to the currently approved Pine Dale Mine and associated Mining Authorities.

THE REVIEW TEAM

Name	Position / Title	Company	2014	2016
Graham Goodwin	Mining Engineering Manager	EnergyAustralia.	Y	Y
Kelly A Muir	Administration	Energy Australia Pty Ltd.	Y	N
Ben Eastwood	Environmental Manager	EnergyAustralia.	Y	Y
Neil Harris	OCE	RN Harris Maintenance Pty Ltd.	Y	N
Chris Schofield	OCE	Dukes Mining Pty Ltd.	Y	Y
Kerry Martin	GD Officer	Energy Australia Pty Ltd.	Y	N
John Curran	Qualified Electrical Engineer	Curran and Curran Pty Ltd.	Y	Y
Howard Domsalla	Qualified Mechanical Engineer	Karinyacrest Holdings.	Y	Y

RISK MATRIX

All risks are based on a **FREQUENCY x SEVERITY** scale.

Frequency -likelihood of occurrence:

Descriptor	Description	Frequency
Rare	May occur under exceptional circumstances	Once or twice every 100 years
Unlikely	May occur at some time	Once or twice every 10 years
Personal	Should occur at some time	Once or twice a year
Probable	Will occur in most circumstances	Once a month
Almost Certain	Expect to occur in most circumstance	All the time

Severity

	Health and Safety	Equipment Damage	Operational	Environmental
Insignificant	No medical treatment required	No equipment damage	No impact on operations. Operations as normal	No environmental impact
Minor	Injury requiring medical treatment, short term health affects	Minor equipment – less than $5000.	Minor impact – 1-2 deliveries late, but freight delivered. No impact on 3rd party operations	Low level environmental. Confined to the local environment.
Moderate	Serious injury – employee likely to lose time., short or long term health affects	Equipment Damage – Damage value between $5000 and $20,000	Greater than 2 deliveries are late. But freight delivered. Some impact on 3rd party operation	Moderate environmental impacts. Impact on surrounding environment
Major	Permanent disability, long term health effects, fatality	Substantial Damage Value between $20,000 - $100,000	Missed deliveries for a day/shift. Major impact on 3rd party operation	Serious environmental impact, affecting immediate and surrounding environments. Long term affects
Extreme	Multiple fatality	Extreme damage Damage Value greater than $100,000.	No freight transport. Complete impact on 3rd party operations	Major environmental impact. Affecting wide spread area and ecosystem.

Table of Risk Assessment

SEVERITY	FREQUENCY				
	Rare	**Unlikely**	**Personal**	**Probable**	**Almost Certain**
Insignificant	LOW	LOW	LOW	LOW	MODERATE
Minor	LOW	LOW	MODERATE	MODERATE	HIGH
Moderate	LOW	MODERATE	MODERATE	HIGH	EXTREME
Major	LOW	MODERATE	HIGH	EXTREME	EXTREME
Extreme	MODERATE	HIGH	HIGH	EXTREME	EXTREME

Assessment Rating

LOW RISK	Risk does not require further action but must be monitored and measured to ensure risk levels do not increase
MODERATE	Risk to be continually monitored with a view to reduce risk further.
HIGH	Immediate action to be taken to reduce risk.
EXTREME	Unacceptable condition. Activity to cease. Immediate action taken BEFORE activity can be resumed.

HIERARCHY OF CONTROLS

Risk should be controlled in the following order. One or more options may be applied:

1	**Elimination**	If Personal completely remove the hazard or risk from the operations
2	**Substitution**	If Personal substitutes the hazard for an operation/substance that has less or no risk associated with it.
3	**Isolation**	Isolate the hazard away from the workforce population, limiting its exposure
4	**Engineering Controls**	Carry out some engineering modification, or redesign the process to control the risk
5	**Administration**	Implement procedures, training and supervision
6	**PPE**	To be used as a last resort. Administer and enforce the use of PPE.

Summary of Action items from Risk Assessment

Item	Description of Action Required	Who	When
1	Confirm adequacy of the security inspection program for Pine Dale during the C&M period.	GG	31/01/2014
2	Ensure current work procedures are implemented during the C&M period. i.e. plumbing, statutory inspections.	GG	ongoing
3	Check suitability of signage at all access and highwalls. Include sign at main entrance e.g. under video surveillance and contact details of company representatives.	NH/CS	31/01/2014
4	Install security fence around office complex area to prevent public access	GG	30/11/2014
5	Retrieve all padlock keys from employees and contractors as required	KM	31/01/2014
6	Close and lock gate along rail access road near water pump out line	KM	31/01/2014
7	Review Management Structure and report to DRE as required	GG	28/02/2014
8	Undertake bi-monthly environmental inspections	BE	28/02/2014
9	Review and identify equipment and first aid facilities that will remain on-sight during the care and maintenance period	GG	28/02/2014
10	Take waste bins off hire as required	GG	28/02/2014
11	Complete a full back up of OCE, Mine Manager and office computers	HD	28/02/2014
12	Return hired office equipment and demountable building	GG/KAM	28/02/2014
13	Finalise any outstanding accounts and check mail box weekly	GG	28/02/2014
14	Liaise with DRE - Mines inspectorate during care and maintenance period as required	GG	31/01/2014
15	Prepare and implement a C&M MOP in consultation with DRE	GG	31/01/2014

			Initial Risk		Residual Risks	
Task	**Hazard/s**	- **Current Control Measures**	**Risk Descriptor**	**Proposed Control Measures**	**Risk Descriptor**	**Action By**
Statutory Inspections	High Wall Strata Failure Unauthorised Access Haul roads, dumps, windrows, Bund Walls	Inspection Program – HSMS, security surveillance in line with EA program, daily mine inspections	**L**	No further measures required	**L**	
Statutory Compliance Electrical and Mechanical	Non-compliance with specified maintenance / inspection intervals Poor maintenance etc.	EEMP and MEMP	**M**	Dependant of equipment being used i.e. pumps or power trip, which will dictate mechanical or electrical inspection required Monthly inspection by a qualified engineer if warranted.	**L**	
Access	Unauthorised access Personal Injury Limited security Unlocked gate Limited supervision	Security inspections. Gate must always remain locked. Bunding surrounding exposed high walls. Boundary fences to be sign posted. Signage – indicating mine.	**L**	Signage – under video surveillance and Access by prior arrangement.	**L**	
Supervision of staff or contractors	Limited supervision Emergency – could be only person on-site Working alone Limited UHF and mobile coverage Non-Compliance with CMHSA & CMHSR	MME Communication Emergency Management System Authority to work permit. Sign in book at entry to site. All work authorised and approved by MME	**L**	No further measures required	**L**	

			Initial Risk		Residual Risks	
Task	**Hazard/s**	- **Current Control Measures**	**Risk Descriptor**	**Proposed Control Measures**	**Risk Descriptor**	**Action By**
Environmental	Dust Water Discharge Fire Stormwater runoff Pollution	Monthly Environmental monitoring and reporting, daily site inspections by MME or delegate, Housekeeping and maintenance	**L**	Bi-monthly environmental audit inspections by Environmental Officer and MME	**L**	
Rehabilitation	Acid rock drainage	Spreading lime, soil tests as required, vegetation monitoring, removal of identified ARD material	**M**	Development of rehabilitation completion criteria and monitoring regime	**M**	
	Topsoil stockpiles	Topsoil stockpiles seeded if left longer than 3 months	**M**	No further measures required	**M**	
	Erosion	Sediment control e.g. silt fencing, hay bales etc., rainfall monitoring, daily inspections, annual rehabilitation monitoring review	**M**	No further measures required	**M**	
	Weed infestation and feral animal proliferation	Targeted weed spraying and feral animal control as required	**M**	No further measures required	**M**	
	Landform stability	Approved Rehabilitation management plan and performance criteria as described in the C&M MOP	**M**	No further measures required	**M**	
Equipment (fixed assets)	Theft Vandalism	Locked and secure. Security inspections. Added security fence around office complex area. Signage indicating video surveillance.	**L**	No further measures required	**L**	

			Initial Risk		Residual Risks	
Task	**Hazard/s**	**- Current Control Measures**	**Risk Descriptor**	**Proposed Control Measures**	**Risk Descriptor**	**Action By**
Principle Hazard Management Plans						
Rehabilitated areas and existing high-wall.	Slope Stability, Ground or strata failure.	Slope Stability management plan in place. Site in care and maintenance, no mining activity being conducted. No existing problems with slope stability, ground or strata failure identified.	**L**	In the event that an issue of slope stability, ground or strata failure is identified appropriate third party specialists will be engaged, as required, to advise on appropriate management control measures.	**L**	Mining Engineering Manager
	Withdrawal	Site in care & maintenance, No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**L**	No further measures required.		
Established rehabilitated areas and overburden stockpiles.	Spontaneous combustion.	No historic evidence of spontaneous combustion from coal stockpiles or overburden dumps at Pine Dale Mine. Assessments to date indicate coals in the lease have a low propensity to spontaneously combust. Statutory inspections.	**L**	No further measures required.		

			Initial Risk		Residual Risks	
Task	**Hazard/s**	**- Current Control Measures**	**Risk Descriptor**	**Proposed Control Measures**	**Risk Descriptor**	**Action By**
Working in mining lease area.	Subsidence, sink holes forming damage to equipment.	Statutory inspections, no underground mining activity taking place. Site in care & maintenance, No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**M**	No further measures required.		
Driving and operating vehicles and constructing roads.	Roads or other vehicle operating areas, collision equipment damage.	Mobile Plant Management Plan in place. Site in care & maintenance, No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**L**	No further measures required.		
Working in the mining lease area.	Air quality or dust or other airborne contaminants	Health Control Plan in place. Site in care & maintenance, No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**L**	No further measures required.		
Working in the mining lease area.	Fire or explosion	Fire Control and Emergency System in place. Site in care and maintenance. No explosives or hazardous materials stored on site. Statutory inspections.	**L**	No further measures required.		

			Initial Risk		Residual Risks	
Task	**Hazard/s**	**- Current Control Measures**	**Risk Descriptor**	**Proposed Control Measures**	**Risk Descriptor**	**Action By**
Principle Control Plans						
Operating plant and equipment including vehicles, pumps and other auxiliary equipment.	Equipment damage or injury to persons.	Mechanical Engineering Control Plan in place. Site in care & maintenance. No heavy equipment operating on site on regular basis. No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**L**	No further measures required.		
	Health impacts to personnel	Health Control Plan.	**L**	No further measures required.		
Working with and in close proximity to electrical devises and power supply units.	Electrical fault, black outs and electric shock.	Electrical Engineering Control Plan in place. Site in care & maintenance. No heavy equipment operating on site on regular basis. No permanent employees based on site full time. Contract staff with intermittent site visits to undertake statutory inspections.	**L**	No further measures required.		
WHS Documentation	Non-compliance with Work Health and Safety Act and associated Regulations.	Implement Care and Maintenance Safety Management System.	**L**	Ongoing	**L**	Mining Engineering Manager