Delta coal	Doc Owner: Environment and Community Coordinator Doc No:

CHAIN VALLEY COLLIERY

Biodiversity Management Plan

ENVIRONMENTAL MANAGEMENT PLAN

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Date:	1 December 2019

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1 Introduction

1.1 Purpose

This management plan addresses the requirements for Development Consent SSD-5465, Schedule 3, Condition 20 which specifies that a Biodiversity Management Plan (BMP) be prepared.

The BMP applies to the surface operations at Chain Valley Colliery (CVC), including pit top facilities and lands where additional infrastructure may be constructed.

The purpose of this management plan is to:

- provide an overall framework for consultation related to biodiversity;
- set out the rehabilitation objectives for CVC;
- meet the requirements of the development consent in respect of the BMP;
- detail monitoring requirements (if required);
- minimise and appropriately control potential impacts to biodiversity from operations;
- minimise potential impacts on biodiversity surrounding the operational areas;
- define specific responsibilities of all stakeholders and function as a management tool for all relevant operational personnel; and
- identify the requirements for review of the document and a procedure for continual improvement.

The BMP includes a Biodiversity Enhancement Strategy, which will implement measures to enhance and restore the endangered ecological communities (EECs) in the Biodiversity Enhancement Area, including:

- weed and rubbish removal;
- return of the natural hydrological regime; and
- regeneration with native endemic species.

The overall aim of this management plan is to promote a high level of environmental performance through the minimisation of impacts.

1.2 Background

CVC is an underground coal mine located on the southern side of Lake Macquarie approximately 60 km south of Newcastle and 80 km north of Sydney (see **Figure 1**). The pit-top is located approximately 1 km south-east of the township of Mannering Park at the southern extent of Lake Macquarie.

In August 1960, J&A Brown and Abermain Seaham Collieries Ltd commenced clearing the present site with drift and shaft sinking starting a few months later. Production of coal from the Wallarah Seam, commenced with the first delivery to the adjacent Delta Electricity's Vales Point Power Station (VPPS) in April 1963.

LakeCoal was formed in 2001 to acquire BHP Billiton's 80% share in the Wallarah Coal Joint Venture (WCJV), the remaining 20% share was owned by Sojitz. In October 2006, Peabody Energy, a US listed company acquired LakeCoal Pty Limited.

In November 2009 LDO Coal Pty Limited purchased LakeCoal Pty Limited. LDO Coal is a consortium consisting of LD Operations, AMCI and private investors. In March 2011 the 20% share in the WCJV which Sojitz held was acquired by LDO Coal shareholders through the entity Fassi Coal Pty Ltd. The WCJV had operated the Wallarah, Moonee and Chain Valley underground coal mines and the Catherine Hill Bay Coal

Preparation Plant, all located at the southern end of Lake Macquarie. At the time of LakeCoal's acquisition by LDO Coal, both the Wallarah and Moonee mines were closed.

In 2013 the owners of Mannering Colliery (MC) and CVC entered into an agreement which enabled LakeCoal to operate the MC until 2022. LakeCoal became the operator of MC effective 17 October 2013, with the underground link between CVC and MC completed in October 2017.

LakeCoal was placed into Voluntary Administration on 3 October 2018. The receivers continued operation of the mines in the period 3 October 2018 to 1 April 2019. As of 1 April 2019, Great Southern Energy Pty Ltd (trading as Delta Coal, DC) own and operate the two underground coal mines, CVC and MC. Mining is currently undertaken at CVC, with the coal being transported underground to MC where the coal is crushed and screened and sent directly to VPPS.

1.3 Operation

With changes to the *Mining Act 1992* and amendments to the Environmental Planning and Assessment Regulation 2000, LakeCoal was required to obtain approval under the *Environmental Planning and Assessment Act 1979* (EP&A Act) to permit continued operation. Approval of the mine was granted on 23 January 2012 (MP10_0161) following submission of an environmental assessment (EA) (AECOM, 2011). Development consent (SSD-5465) was subsequently approved on 23 December 2013, granting approval for underground mining over an additional area of Lake Macquarie and a consolidation of approved activities granted by virtue of MP10_0161. Mining operations are approved to occur until 31 December 2027.

1.4 Construction

No above-ground construction works are planned that would result in significant vegetation changes or removal. As a result of construction, the following biodiversity issues have been identified:

- clearing of vegetation and fauna habitat for water management and maintenance (dams and embankments) works;
- clearing of vegetation and fauna habitat for bushfire management and maintenance (asset protection zone) works; and
- potential for invasion and spread of weeds and soil pathogens into areas of remnant vegetation.

Commitments related to the clearing of fauna habitat and weed management during the ventilation fan augmentation project which was approved under MP10_0161 have already been undertaken during construction under a specific management plan and are therefore not included within this BMP. However, follow-up measures to monitor the effectiveness of these measures and potential impacts post-construction activities have been included within this plan.

1.5 Consultation

The BMP was originally developed in 2012 and, following some minor changes to the original document as a result of comments from the then Department of Planning and Infrastructure (DPI), the final plan was subsequently approved on 6 November 2012.

This BMP has been subsequently updated to be consistent with the requirements of the most recent development consent (SSD-5465 dated 16 December 2015) and the commitments made within Chain Valley Colliery's Mod 2 Statement of Environmental Effects (SEE). Extensive consultation was undertaken with the then Office of Environment and Heritage (OEH) by LakeCoal during the approvals process.

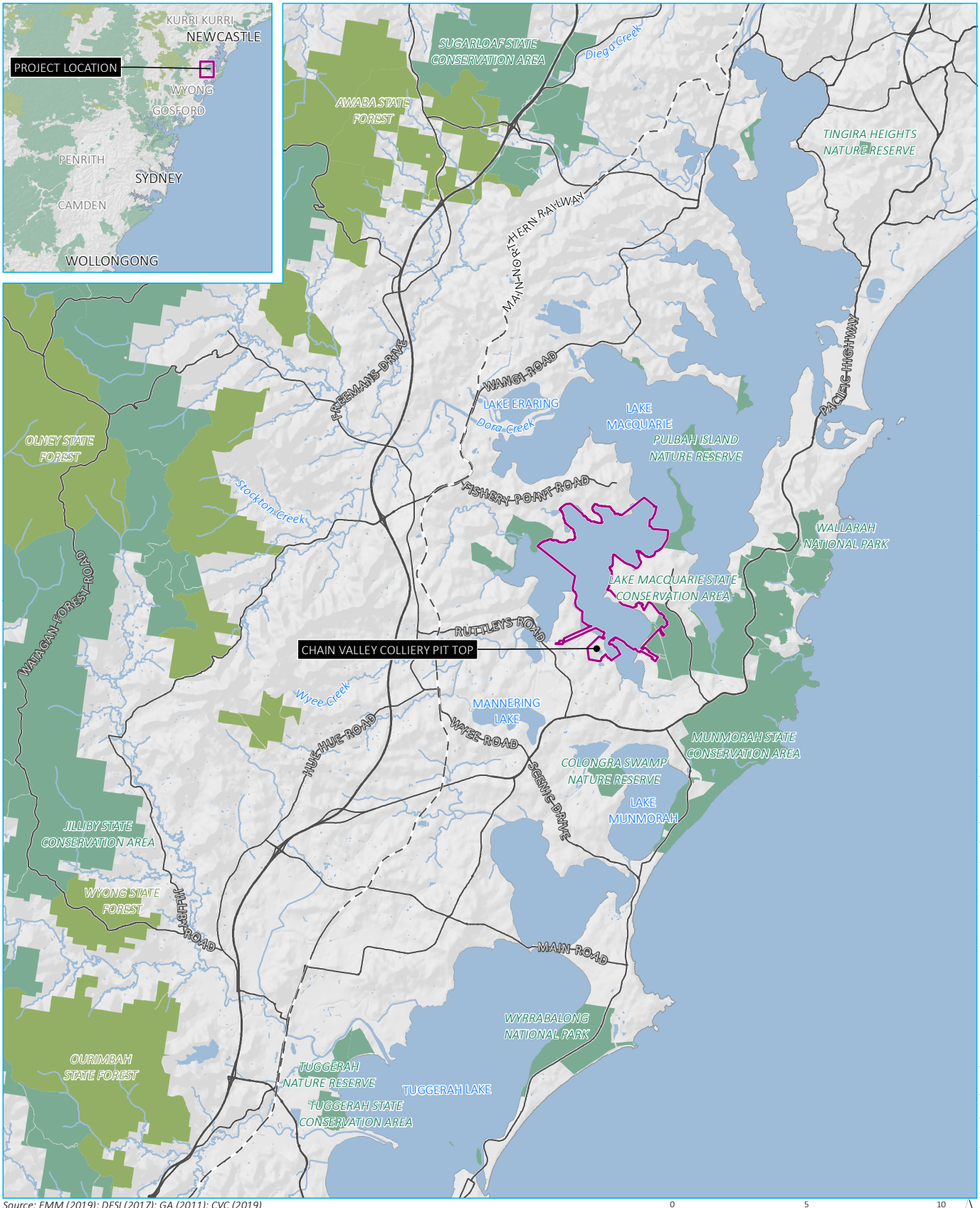
This BMP, while based substantially on the previously approved LakeCoal BMP (V3), has been updated to reflect the recommendations of the Independent Environmental Audit (IEA) conducted by SLR in June 2019. These updates are administrative only and there are no changes to activities, impacts, the mine footprint or development consent requirements associated with CVC.

Endorsement of individuals undertaking the review of this management plan was received from DPIE on the14 August 2019.

This BMP was provided to the Environment Protection Authority (EPA), Biodiversity Conservation Division (BCD) and Department of Planning, Industry and Environment (DPIE) on 1 December 2019 for their review and comment. A summary of the comments received, and amendments subsequently made to the document prior to finalisation are detailed in **Table 1**. Evidence of consultation is provided in **Appendix 1**.

Table 1: Consultation Summary

Stakeholder	Comments	Response/Action
NSW EPA	•	•
NSW DPIE	•	•
NSW BCD	•	•



Source: EMM (2019); DFSI (2017); GA (2011); CVC (2019)

0 5 10 km

GDA 1994 MGA Zone 56

N

KEY

- Chain Valley Colliery development consent boundary
- Rail line
- Main road
- Watercourse/drainage line
- Waterbody
- NPWS reserve
- State forest

CVC regional context

Chain Valley Colliery
Figure 1

EMM
creating opportunities

\\emmsvr1\EMMJobs\2019\H190358 - Mannering Colliery Mgt Plan Updates\GIS\02_Maps\MCMP001_RegionalLocation_20191021_02.mxd 21/10/2019

2 Statutory Requirements

2.1 Key Legislation, Policy and Guidelines

Both State and Commonwealth environmental legislation applies to DC's operation and activities. Compliance with State regulations requires the implementation of activities ranging from the control of priority weeds (*Biosecurity Act 2015*), monitoring for threatened species (*Biodiversity Conservation Act 2016)* and management of forest fuels to prevent fire spread (*Rural Fire Services Act 1997).*

A number of legislative requirements, government policies and guidelines relating to biodiversity are applicable, key items relevant to this BMP are:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Protection of the Environment Operations Act 1997* (POEO Act);
- *Environmental Planning and Assessment Act 1979* (EP&A Act);
- *Mining Act 1992*;
- *Biosecurity Act 2015* and Biosecurity Regulation 2017;
- *Local Land Services Act 2013*,
- *National Parks and Wildlife Act 1974*;
- *Biodiversity Conservation Act 2016*;
- *Rural Fires Act 1997;*
- Central Coast Council Tree Works Permit (former Wyong Local Government Area); and
- Auld, B. (2009). Guidelines for monitoring weed control and recovery of native vegetation, NSW Department of Primary Industries (DPI).

Delta lands are within the Lake Macquarie City Council (LMCC) and Central Coast Council (CCC) local government areas (LGAs).

2.2 Development Consent (SSD-5465) Requirements

Biodiversity related requirements of the development consent (SSD-5465) include specific conditions that are to be addressed. **Appendix 1** details where in the BMP they are addressed.

DC will also carry out works generally in accordance with the Environmental Assessment (EA), EA (Mod 1), EA (Mod 2), Project Layout Plans, and Statement of Commitments.

3 Existing Environment

3.1 Previous Assessments

Several biodiversity assessments have been undertaken in the Wyong Local Government Area (LGA), for the nearby VPPS, and for CVC. This section provides a summary of previous assessments in relation to management of biodiversity values within and surrounding the CVC.

Ecotone Ecological Consultants undertook detailed biodiversity surveys within and surrounding the study area in June 1997 and April 2010. Their study area included the CVC pit top area with the following biodiversity values identified:

- Narrow-leaved Scribbly Gum Open Forest in vegetated areas;
- potential habitat for threatened flora listed under the *Threatened Species Conservation Act 1995* (TSC Act): Black-eyed Susan (*Tetratheca juncea*); Leafless Tongue Orchid (*Cryptostylis hunteriana*) and *Angophora inopina*; and
- a record of the threatened Grey-headed Flying-fox (*Pteropus poliocephalus*), listed under the TSC Act and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The CVC EA for continued operations (MP10_0161) identified the following biodiversity values at the pit top and ventilation shaft site at Summerland Point.

- pit top area:
  - Contains remnant and regenerating vegetation including Coastal Plains Smooth-barked Apple Woodland, Riparian Melaleuca Swamp Woodland, and Swamp Mahogany Paperbark Forest. The latter two communities are part of the Swamp sclerophyll forest which is listed as an EEC under the TSC Act.
- ventilation shaft site at Summerland Point:
  - Contains remnant vegetation including Coastal Plains Smooth-barked Apple Woodland, Coastal Wet Sand Cyperoid Heath and some areas of Riparian Melaleuca Swamp Woodland, and Swamp Mahogany Paperbark Forest, which are part of the Swamp Sclerophyll Forest EEC.
- Both sites:
  - contain potential habitat for threatened species: Regent Honeyeater (*Anthochaera phrygia*), Swift Parrot (*Lathamus discolor*), Osprey (*Pandion haliaeetus*), Squirrel Glider (*Petaurus norfolcensis*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). An additional ten threatened fauna species may utilise the habitats in the pit top area on occasion.

Under the Wyong Local Environmental Plan 2013 the pit top area and sediment dams are zoned as SP2 Infrastructure, with the vegetation east of the sediment dams zoned as E2 Environmental Conservation.

The infrastructure area and surrounds of the ventilation shaft site at Summerland Point are zoned E1 National Parks and Nature Reserves under the Wyong Local Environmental Plan 2013.

3.2 Baseline Monitoring

3.2.1 Native Vegetation

Baseline data on vegetation condition in the area of Swamp oak forest enhancement areas was collected in 2013 in accordance with the monitoring program outlined in this BMP (see **Table 2**).

Table 2 provides baseline data for site attributes for Swamp Oak Forest in the Biodiversity Enhancement Area. It provides the site attribute score (plot score) and calculates the weighted score of each site attribute to give an overall weighted score.

Table 2: Baseline (2013) Swamp Oak Forest Data

Site attribute	Benchmark	Plot 1 score	Plot 2 score	Average	Weighting %	Calculation	Weighted score %
Native plant species richness	>6	4	3	3.5	25	21.875	21.9
Native over-storey cover	5 to 18	3	3	3	10	7.5	7.5
Native mid-storey cover	36 to 48	3	3	3	10	7.5	7.5
Native ground-cover (grasses)	3 to 21	4	4	4	2.5	2.5	2.5
Native groundcover (shrubs)	0 to 0	4	4	4	2.5	2.5	2.5
Native groundcover (other)	1 to 13	4	4	4	2.5	2.5	2.5
Exotic plant cover (all strata)	>66%	3	4	3.5	5	4.375	4.4
Number of trees with hollows	> 0	4	4	4	20	20	20.0
Proportion of over-storey species occurring as regeneration	0	1	2	1.5	12.5	4.6875	4.7
Total length of fallen logs	> 20	3	4	3.5	10	8.75	8.8
Total		34	37	35.5	100		**82.2**

Native vegetation in this area is in good to moderate condition, with an overall weighted score of 82.2%. The trigger value for remedial works is when the weighted score is less than 60%. Subsequent monitoring events will be compared against these baseline results for Swamp oak forest in the biodiversity enhancement area to monitor the overall weighted score against this trigger value.

3.2.2 Terrestrial Ecology

Vegetation mapping undertaken during 2012 in areas surrounding the CVC pit top identified the nearby vegetation communities as Coastal Open Woodland, Swamp Oak Forest and Swamp Sclerophyll Forest. Mapping was also undertaken at the ventilation shaft site and identified Coastal Open Woodland, Grassy Open Woodland and Swamp Sclerophyll Forest.

From the above, both the Swamp Oak Forest and Swamp Sclerophyll Forest are listed as Endangered Ecological Communities (EEC s) under the *Biodiversity Conservation Act 2016*.

These vegetation communities are also known to provide habitat for threatened fauna species such as the Squirrel Glider (*Petaurus norfolcensis*), Regent Honeyeater (*Anthochaera phrygia*), Swift Parrot (*Lathamus discolor*), Grey-headed Flying-fox (*Pteropus poliocephalus*) and microbats.

In addition to the natural habitat within the site, built structures are also known to provide potential habitat for a number of fauna species. It is known that threatened microbat populations have inhabited mine portals elsewhere in NSW (Olsen Consulting Group, 2009). In addition, the CVC sediment dams have become used by a number of native fauna species.

3.2.3 Wallum Froglet

A baseline monitoring event was completed to identify the presence of the Wallum Froglet in the pit top area. The survey was completed in accordance with guidelines for the species, described in *Threatened species survey and assessment guidelines: field survey methods for fauna (Amphibians)* (DECCW 2009). The survey was conducted on two separate nights in April 2014, during the breeding and calling season when the species is readily detectable. The surveys were also completed during rain. The survey guidelines note that wet weather conditions are more important for detection of the species than the time of year the survey is completed (DECCW 2009).

The survey was completed by a qualified and experienced ecologist during 2014. Wallum Froglet calls were broadcast at the start of the survey with a five-minute listening period to check for responses. Active searches were then completed with a spotlight and head torch in potential habitat including the Swamp Oak Forest, Swamp Sclerophyll Forest and around the edges of dams.

No Wallum Froglet individuals were identified despite the survey being completed at the correct time of year and in suitable weather conditions. Additionally, the site is not considered to contain optimal habitat for the species which is usually found in acid paperbark swamps. It is not associated with Swamp Oak Forest and only occasionally found in Swamp Sclerophyll Forests (DECCW 2009; OEH 2014). Based on failure to detect the species and sub-optimal nature of the habitat identified, no further monitoring has been conducted.

4 Remnant Native Vegetation

Remnant native vegetation is located within both the CVC pit top area and ventilation shaft site (see **Figure** 2 and **Figure 3**). Vegetation in these areas has been subject to a number of influences from the surrounding areas and uses, including clearing for powerline easements, mine activities and associated infrastructure, and encroachment from adjacent residential areas. However, in general, the native vegetation within the study area is in reasonable condition and is known to contain EECs and threatened fauna species including Squirrel Gliders and microbats. A description of these vegetation communities is provided in the following sections.

4.1 Coastal Open Forests

Coastal open forests (Coastal Open Woodland and Grassy Open Woodland) occur in both the pit top and ventilation shaft areas. These areas contain a mixture of vegetation types dominated by either Narrow-leaved Scribbly Gum (*Eucalyptus haemastoma*), Red Bloodwood (*Corymbia gumifera*) or Smooth-barked Apple (*Angophora costata*). These communities generally occur above 5 metres AHD in the study area, i.e. above the high-water mark, and are not influenced by tidal movements or inundation by floodwaters.

The vegetation within the coastal open forest areas is not considered to meet the description of any EECs, although it provides important habitat for threatened fauna and contains important habitat features such as large hollow-bearing trees.

4.2 Coastal Swamp Forests

Swamp forests occur generally below 5 m AHD within the study area. Several types occur within the study area, including:

- Mangroves;
- Swamp Sclerophyll Forest; and
- Swamp Oak Forest.

4.2.1 Mangroves

Patches of mangroves occur along Swindles Creek, an unnamed creek and Lake Macquarie foreshore. The creek is subject to tidal flows from the lake, which has influenced the occurrence of the mangroves in this area. Mangrove areas are within the intertidal zone, inundated more frequently than other communities such as saltmarsh and Swamp Oak Forest.

4.2.2 Swamp Sclerophyll Forest

Swamp Sclerophyll Forest occurs on the deeper alluvial soils where drainage is impeded and standing water occurs after rain. These areas are not influenced by saline tidal waters or discharge waters associated with the sediment dams. The community is dominated by Swamp Mahogany (*Eucalyptus robusta*), Broad-leaved Paperbarks (*Melaleuca quinquenervia*), *Melaleuca sieberi*, and Forest Red Gum (*Eucalyptus teriticornis*).

This community is listed as an EEC in NSW under the TSC Act. In the study area, it surrounds some of the ventilation fan site (**Figure 3**). Microclimatic changes to this vegetation could occur from the outputs of the shaft, which could influence the health of the community. Therefore, the health of vegetation in this area will be monitored during operations.

4.2.3 Swamp Oak Forest

Swamp Oak Forest typically occurs in estuaries where tidal influence has created saline groundwater. These areas are not always inundated by saline or freshwater, with the understory within the community determined by the amount of tidal influence and salinity within floodwaters. Within the Lake Macquarie area, this community typically fringes the lake foreshore.

The area to the east of the sediment dams has been mapped as containing Swamp Sclerophyll Forest, a listed EEC. The vegetation in this area is considered to more accurately represent a Swamp Oak Forest community as it is dominated by Swamp Oak (*Casuarina glauca*). Some dead trees do occur in this area and it is likely that it previously contained species such as Swamp Mahogany (*Eucalyptus robusta*) and Broad-leaved Paperbark. These species, when dominant are indicative of Swamp Sclerophyll Forest, though have the potential to also occur in Swamp Oak forest in low quantities or in transitional areas. Regardless, the decline of these species and the lack of subsequent recruitment is a potential indicator that the area has become too saline and/or too waterlogged to provide suitable habitat.

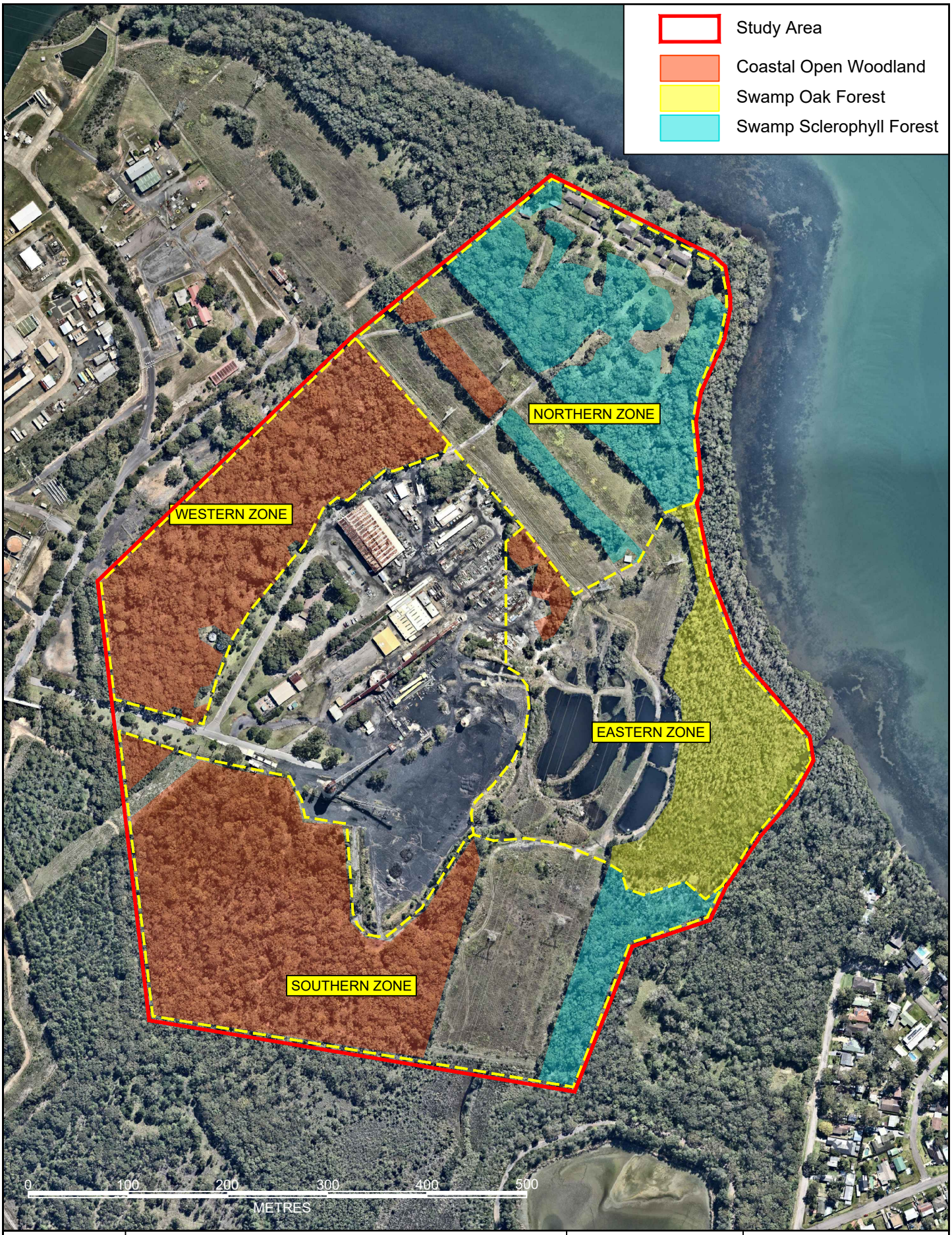
The Swamp Oak Forest is listed as a EEC under the TSC Act and is differentiated from the Swamp Sclerophyll Forest by Swamp Oak being dominant canopy species, the low abundance of eucalypt species and the position of the landscape (where flooding is periodic and soils show some influence of saline groundwater).

The area to the east of the sediment dams is unlikely to be subject to tidal influence. However, saline groundwater from the underground workings is continually discharged (via the sediment dams). This in conjunction with consequential ponding due to the relatively flat nature of the area, is likely to have influenced the vegetation present, increasing the presence of species which are adapted to higher levels of saline inundation (halophytes). Several Saltmarsh species, which tolerate inundation with saline water, occur throughout the Swamp Oak area, including *Selliera radicans*, *Suaeda australis* and *Samolus repens.* Other understory species include sedges and rushes such as *Juncus spp., Schoenus brevifolius*, *Chorizandra cymbaria* and Water Couch (*Paspalum distichum*).

Without the sediment dam discharge water, this area is likely to only be inundated after large flood events, by freshwater from Swindles Creek and runoff from other areas associated with the mine. The community present in 2014 therefore appears to be in transition and generally in poor health as is evident from the presence of weed species, dominance of sedges and rushes, and the density and health of Swamp Oaks.

Any changes to the current hydrological cycle (even though it is not natural), may impact on this community. Too much or not enough water could have effects on future species composition in this area. Changes in the quality and quantity of water discharges from the sediment dams and through seepage from the dam walls could also affect the health of the vegetation in this area.

While Swamp Oak can tolerate saline groundwater, too much saline water may lead to dieback, as is evident from the baseline monitoring in 2013, where the sediment dams have permanently inundated areas of the community. Conversely, too little inundation may cause changes to the composition of the community allowing further invasion of weeds. Changes in the condition and composition of the community present will be monitored during operations to ensure that the vegetation in this area is not negatively impacted by the operation of CVC.



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DELTA COAL
CHAIN VALLEY COLLIERY

SURFACE FACILITIES
BROAD VEGETATION TYPES

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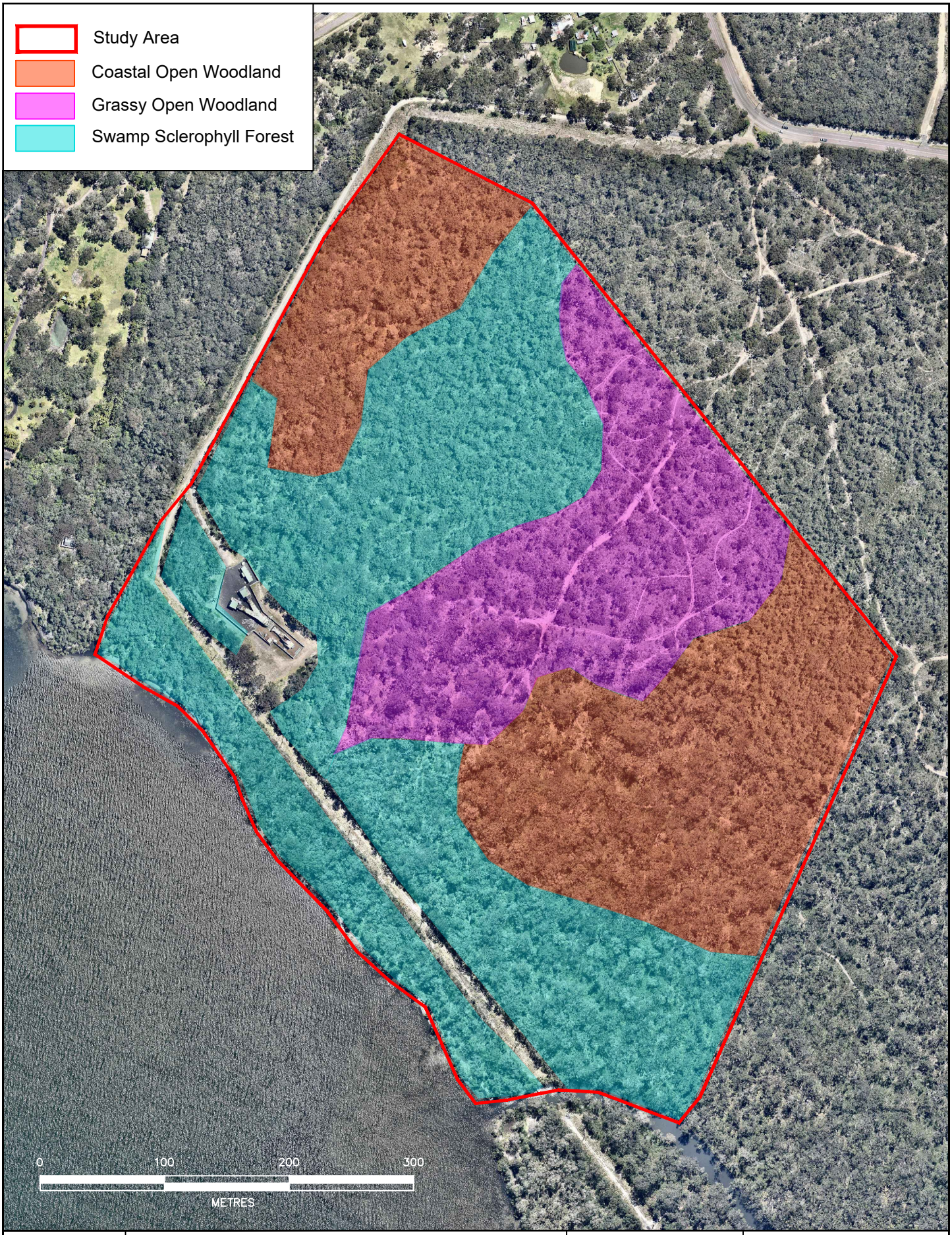
DRAWN:	R Tubridy	DRG NO:	C1S0270
CHECKED:	K Weekes	REV NO:	1
SIGNED:	-	SIZE:	A4

Delta coal



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DELTA COAL
CHAIN VALLEY COLLIERY

VENTILATION FAN COMPOUND
BROAD VEGETATION TYPES

SCALE:	1:4000	DATE:	29 Nov 2019
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Delta coal

5 Design and Construction Environmental Management

5.1 Ecological Inputs to Design

CVC designed the dam embankment and spillway in consultation with an ecologist to minimise potential impacts on the Swamp Oak Forest.

5.2 Pre-clearance Ecological Surveys

Pre-clearance ecological surveys will be undertaken by a qualified ecologist prior to any future construction works. They will clearly identify sensitive fauna habitats and significant vegetation and be undertaken during the appropriate flowering time for the particular flora species. Identification of sensitive features will potential impacts during construction to be minimised.

The following activities will be completed during the pre-clearance ecological survey:

- clear delineation of the clearing footprint;
- classification of the surrounding vegetation as a 'no go zone' during construction activities;
- installation of protective fencing/markers; and
- designating sites in previously cleared areas for material stockpiles and machinery parking.

5.3 Environmental Management Prior to and Following Construction Activities

The following measures will be implemented prior to and during any construction activities, particularly the maintenance of Asset Protection Zones (APZs) to minimise impacts to native vegetation and fauna habitats:

- installing erosion and sediment controls around any proposed earthworks;
- installation of delineation fencing around threatened flora populations (if found) to ensure their protection during development and maintenance of APZs;
- condition monitoring for threatened flora populations (if found) in APZ areas;
- retention of hollow-bearing trees in the APZs, where possible, with details to be included in a hollow tree register;
- installation of nest boxes (or salvaged hollows) under the supervision of a suitably qualified ecologist or wildlife carer to replace hollows where hollow-bearing trees cannot be retained;
- measures for APZ maintenance that include weed control;
- clearing of hollow-bearing trees (if required) under the supervision of a suitably qualified ecologist;
- any injured fauna would be taken to the nearest veterinary hospital for treatment before release;
- felled trees to augment nearby habitat, i.e. woody debris to be placed on the ground to create additional habitat;
- avoiding disturbance to dead standing timber and fallen timber during clearing works, or if required to be removed, timber will be relocated into suitable habitat areas nearby; and
- clearing all earthworks equipment of excess soil, potentially containing pathogens and weed seeds, prior to entering the site.

6 Native Vegetation Enhancement Strategy

The development consent and commitments for the CVC related to the enhancement of native vegetation comprise:

- the improvement and enhancement of the Swamp Oak Forest and Swamp Sclerophyll Forest to compensate for potential impacts on EECs;
- development of rehabilitation methods in accordance with the Saltwater Wetlands Rehabilitation Manual (DECC 2008), with the methods potentially including:
    - restoration of natural flow regimes;
    - rubbish and litter removal;
    - control and removal of competitive introduced species to allow for regeneration of native species;
    - revegetation where natural regeneration processes are interrupted; and
    - condition monitoring.

The native vegetation enhancement strategy aims to compensate for the potential impacts on the Swamp Oak Forest and Swamp Sclerophyll Forest and covers all the areas identified as these EECs within the pit top area, including those adjacent to the sediment dams and in areas to their north and south.

The strategy builds on existing actions and monitoring programs identified in the previous versions of the BMP to ensure that the Swamp Oak Forest and Swamp Sclerophyll Forest are enhanced and improved. The extent of the Enhancement Area is shown on **Figure 4**.

The main issues in the area adjacent to the sediment dams are:

- continuous presence of standing saline mine discharge water;
- limited canopy regeneration and canopy senescence;
- lack of understory diversity; and
- presence of weeds and rubbish.

In accordance with the SSD-5465 Statement of Commitments for Terrestrial Ecology, upgrade works to the sediment dam (D10) wall, which is located adjacent to the Swamp Oak Forest area, was completed in February 2015 in order to prevent future leakage through the wall. At the same time a new discharge monitoring system and spillway were installed.

Any changes to the hydrological cycle (even though it is not natural), also has the potential to impact on this community.

Table 5 outlines the goals, objectives and actions for native vegetation enhancement.

Figure 4 Native Vegetation Enhancement Area

Table 3: Native Vegetation Enhancement Strategy

Issue	Goal	Objective	Action
EASTERN ZONE			
Continuous presence of standing saline water from mine discharge	Restoration of natural flow regimes to the EEC areas	Water quality values in the EEC areas are within or better than the trigger values identified in Table 10 of this BMP.	1. Spillway and improvements to dam wall embankment to direct saline water away from EECs completed; 2. Water quality monitoring undertaken in accordance with the CVC Water Management Plan.
Weed invasion	Weeds are controlled in EEC area	Weeds of national environmental significance are controlled in EEC areas to a level where low maintenance is required.	1. Weed management is completed in line with **Section 7** of this BMP; 2. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.
Presence of rubbish and litter	EEC area is rubbish and litter free	EEC areas are rubbish and litter free and continues to be litter free for the life of the mine.	1. Collection and disposal of rubbish and litter; 2. Type and location of rubbish/litter recorded during compliance monitoring.
Limited canopy regeneration and canopy senescence	Native species regeneration is evident in the EEC areas	Native species regeneration is at least 20% in plots by 2022	1. Annual monitoring of EEC areas downstream of D10 in accordance with **Section 11**, with regeneration values investigated and rehabilitation actions undertaken as required to ensure that the objectives are achieved; 2. Native vegetation monitoring in accordance with **Table 6** to determine if active rehabilitation is required; 3. Weed management is completed in line with **Section 7** of this BMP; 4. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.
Lack of understorey diversity	Ecologically functional and diverse EECs	Final weighted condition criteria from plots in the swamp oak forest are above the trigger value (60%). Condition criteria should increase over time and meet benchmark conditions for the EECs present.	1. Monitoring EEC areas downstream of D10 in accordance with **Section 11**, to assess condition values against the trigger value and to ensure that the condition of the EEC areas is improving over time; 2. Native vegetation monitoring in accordance with **Table 6** to determine if active rehabilitation is required; 3. Weed management is completed in line with **Section 7** of this BMP; 4. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.

Issue	Goal	Objective	Action
SOUTHERN ZONE			
Weed invasion	Weeds are controlled in EEC area	Weeds of national environmental significance are controlled in EEC areas to a level where low maintenance is required.	1. Weed management is completed in line with **Section 7** of this BMP; 2. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.
Presence of rubbish and litter	EEC area is rubbish and litter free	EEC areas are rubbish and litter free and continues to be litter free for the life of the mine.	1. Collection and disposal of rubbish and litter; 2. Type and location of rubbish/litter recorded during compliance monitoring.
NORTHERN ZONE			
Weed invasion	Weeds are controlled in EEC area	Weeds of national environmental significance are controlled in EEC areas to a level where low maintenance is required.	1. Weed management is completed in line with **Section 7** of this BMP; 2. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.
Presence of rubbish and litter	EEC area is rubbish and litter free	EEC areas are rubbish and litter free and continues to be litter free for the life of the mine.	1. Collection and disposal of rubbish and litter; 2. Type and location of rubbish/litter recorded during compliance monitoring.
WESTERN ZONE			
Weed invasion	Weeds are controlled in native vegetation area	Noxious weeds and weeds of national environmental significance are controlled in native vegetation to a level where low maintenance is required.	1. Weed management is completed in line with **Section 7** of this BMP; 2. Weed monitoring is undertaken in accordance with **Section 11** of this BMP.

Active rehabilitation will be undertaken in the EEC areas if condition criteria fall below the trigger values, or if natural regeneration is not occurring sufficiently to meet the objectives nominated in Table 5, as determined by the monitoring program. Supplementary planting with suitable species for each of the communities present, where required, would assist to meet the rehabilitation objectives. Suitable species would include:

- Swamp Oak Forest:
    - canopy species: Swamp Oak (*Casuarina glauca*); and
    - understorey and groundcover species: Water Couch (*Paspalum distichum*), *Baumea juncea* and *Selliera radicans*,
- Swamp Sclerophyll Forest:
    - canopy species: Swamp Mahogany (*Eucalyptus robusta*), paperbarks (*Melaleuca sieberi*, *Melaleuca quinquenervia*) and Forest Red Gum (*Eucalyptus tereticornis*); and
    - understory and groundcover species: *Gahnia clarkei*, Bracken (*Pteridium esculentum*), Large-leaf Hopbush (*Dodonaea triquetra*) and Whiteroot (*Pratia purpurascens*).

7 Weed Management

7.1 Background

Weed invasion impacts on species biodiversity and may alter habitats through processes such as competition and erosion. They also have the potential to impact on DC's commercial operations and reputation as a responsible land manager. Biosecurity at the land management level is the protection of environmental, economic and community values from the impacts of invasive weed species.

Some of the most common disturbance triggers are land clearing, soil disturbance, fires or change in fire regimes, and drought.

The greatest threat to the ecological integrity of the threatened ecological communities at CVC is the invasion by weeds, particularly associated with disturbance/construction activities.

This had the potential to occur with the planned embankment and spillway works on dam D10 and, subsequently, when inundation and salinity regimes are changed as a result of those works In order to facilitate weed management.

7.2 Weed Species

Total Earth Care undertook a weed survey in October 2019 which identified 36 weed species listed under the *Biosecurity Act 2015* and Biosecurity Regulation 2017 (Total Earth Care Weed Action Plan, 2019). Of these, there are various weed species which have been identified as priority species on site. The weeds detailed fall under some of the following categories:

- a declared weed under the *Biosecurity Act 2015* / Biosecurity Regulation 2017;
- listed as a Weed of National Significance (WoNS);
- listed in the Greater Sydney Regional Strategic Weed Management Plan; and
- considered a significant environmental weed which has the ability to spread rapidly and substantially reduce biodiversity.

Table 4 details the priority weed species. The ranking of 1 indicates the highest priority of control required for a weed that is recognised on a national level (WoNS) and is regionally declared weed. A ranking of 2 indicates that significant management would be required before the next monitoring survey to reduce presence, abundance and spread. Controls should be undertaken with ongoing monitoring to ensure significant reduction in distribution.

Table 4: Priority Weed species

Priority Ranking Category	Weed common name (*scientific name*)	WoNS	State Priority	Regional Priority	Duties for Priority Weeds of Greater Sydney
1	Bitou Bush (*Chrysanthemoides monilifera* subspecies *rotundata*)	Yes	Containment		Prohibition on dealings, B Zone; The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south.

Priority Ranking Category	Weed common name (*scientific name*)	WoNS	State Priority	Regional Priority	Duties for Priority Weeds of Greater Sydney
1	Blackberry (*Rubus fruticosis* aggregate species)	Yes			Prohibition on dealings.
2	Crofton Weed (*Ageratina adenophora*)	-			Potential risk to environment and agriculture.
2	Asparagus Fern (*Asparagus aethiopicus*)	Yes			Prohibition on dealings.
2	Lantana (*Lantana camara)*	Yes	Asset protection		Prohibition on dealings.
1	Pampas Grass (*Cortaderia jubata*)			Asset protection	Regional recommended measure. Land managers mitigate the risk of the plant being introduced to their land or spread from their land where feasible. It should not be bought, sold, grown, carried or released.
1	Fireweed (*Senecio madagascariensis)*	Yes	Asset protection		Prohibition on dealings.
1	Giant Reed (*Arundo donax)*			Asset protection	Regional recommended measure. Land managers mitigate the risk of the plant being introduced to their land. It should not be bought, sold, grown, carried or released.

7.3 Weed Management

For ease of management, monitoring and reporting, areas infested with weeds have been divided into the following zones shown on Figure 5 and Figure 6:

- Northern zone;
- Southern zone;
- Eastern zone;
- Western zone; and
- Ventilation shaft.

Several parties have management interests within the study area. Delta Electricity owns the land while DC manages CVC. TransGrid also has rights over the land in the transmission line easements. Though ultimate legal responsibility for weeds rests with Delta Electricity, as land managers, DC will undertake weed management as part of its operations on Delta Electricity owned land.

The principal objectives of weed management are guided by national, state and local legislation. The guidelines and the legislation used to determine the prioritisation of weed species for targeted control are:

- preventing the introduction of weeds into new and highly desirable areas such as rehabilitation areas, APZs and high biodiversity value areas;
- eradicating high risk infestations that are new and/or have the potential to spread quickly or significantly impact biodiversity is left unmanaged;
- containment and management of WoNs that are widespread; and
- containment and control of environmental weeds that pose a high risk to biodiversity in riparian, bushland and grassland habitats. This includes areas where control measures have already been undertaken.

For areas such as exploration sites and rehabilitation areas, the revegetation programs limit initial weed infestations, however the early control of naturally introduced weeds will minimise competition and maximise early growth and survival of desired species. This can and will be achieved by physical removal, mulching and/or chemical control as required.

When any activity results in vegetation disturbance, DC has committed to undertaking:

- seasonal monitoring and weed control as necessary to minimise the spread of weeds into nearby remnant vegetation;
- delineate the clearance footprint for works and to cordon off all surrounding vegetation as a 'no go' zone; and
- minimising disturbance areas where possible; and
- stockpiling materials, parking machinery etc. in previously cleared areas.

7.4 Weed Control

Table 5 provides recommendations for the control of the priority weed species within the site, i.e. the weeds identified within the study area during site visits, those listed in the Greater Sydney Regional Strategic Weed Management Plan and listed WoNS.

Weed control should minimise the requirements for herbicide usage, particularly given the sensitive location of the infestations and the potential for the spread of herbicides into surrounding water bodies and wetland communities.

Other environmental weeds recorded in the study area include Whisky Grass (*Andropogon virginicus*), Scotch Thistle (*Onopordum acanthium*), Large-leaved Privet (*Ligustrum lucidum*), Cassia (*Senna pendula*), Asparagus Fern (*Asparagus virgatus*), Fishbone Fern (*Nephrolepis cordifolia*), Coral Tree (*Erythrina x sykesii*) and Radiata Pine (*Pinus radiata*).

There is no legal obligation to control these weeds, but in most cases it is good practice to remove them as well as any other weeds of significance to protect the health of native vegetation communities. These infestations will be visually inspected during the weed monitoring program. If infestations increase significantly, appropriate control methods will be implemented in consultation with an approved ecologist and/or Central Coast Council.

Table 5: Recommended Weed Control

Weed	Photo	Control technique	Control priority
Bitou Bush		Hand-weeding and/or cut and paint with Glyphosate in winter. Do not undertake weeding when plants are seeding or bear fruit due to the risk of spread.	High – WoNS
Blackberry		Brush cut. Scrape and paint stem with Glyphosate in spring/summer. N.B. Gloves should be worn during application due to thorns.	High – WoNS
Croton Weed		Hand-weed individual plants.	Moderate – Weed of concern.
Ground Asparagus		Cut underground tubers with secateurs out of ground around root base and remove from site. This is most easily done by cutting a small square of ground around the above ground stems.	Moderate – WoNS which occurs in sensitive EEC areas
Lantana		Cut and paint stem with Glyphosate.	Moderate – WoNS which occurs in sensitive EEC areas

Weed	Photo	Control technique	Control priority
Pampas Grass		Remove seed heads, place in plastic bags and remove from site. Slash/brush cut plant down to bottom of stem and remove from site. Dig out roots with a mattock and remove from site. N.B. Eye protection should be worn during all stages of removal as Pampas Grass contains fine hairs that can irritate the eye.	Moderate
Fireweed		Foliar spraying with Glyphosate, hand pulled and brush cut.	High – WoNS
Giant reed		Cut and paint with neat Glyphosate.	Moderate

Sources: NSW, Australian and QLD Government 2009; DLWBC 2006; NSW Primary Industries Weed Management Unit 2009; Primary Industries (Agriculture) 2012; NSW; Sydney Weeds Committee 2012; Winkler, Cherry and Downey (eds) 2008; Total Earth Care Weed Management Plan 2019.

Weed control is undertaken by a suitably qualified contractor who will undertake mechanical removal, spraying of weeds or other treatment measures in the correct periods to maintain effective control. The contractor will use approved herbicides at the required volumes according to manufacturer's instructions.

Areas that are targeted include predominantly disturbed grassland, fragmented forested and woodland zones in the vicinity of the pit top prior to rehabilitation. These areas exhibit signs of previous agricultural use and mining-related activities. All other areas remain largely undisturbed by DC mining activities.

N
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DELTA COAL
CHAIN VALLEY COLLIERY

SURFACE FACILITIES
VEGETATION MAPPING ZONES

SCALE:	1:5000	DATE:	21 Nov 2019
DRAWN:	T Chisholm	DRG NO:	C1S0272
CHECKED:	K Weekes	REV NO:	0
SIGNED:	-	SIZE:	A4

Delta coal

Figure 6: Ventilation Shaft Weed Management Zone and Distribution

8 Feral Animal Management

Although there are no specific conditional requirements in SSD-5465 relating to feral animal management, the Statement of Commitments requires the abundance and distribution of feral animals to be identified.

Feral animals and/or evidence of their presence (i.e. tracks and scats) have been observed within the Pit Top and Ventilation Shaft areas at CVC. Feral animals recorded within the area include:

- European Red Fox (*Vulpes vulpes*);
- Feral Rabbit (*Oryctolagus cuniculus*);
- Feral Pig (*Sus scrofa*);
- Feral Cat (*Felis catus);*
- Dog (*Canis lupus familiaris); and*
- Feral Pigeons (*Columba livia*).

The species listed above are of concern through the potential environmental impacts they generate and their capacity to establish quickly from neighbouring areas. The European fox, dogs and feral cats have been identified as the most ecologically damaging species present due to their predation of native species. The most likely prey onsite is frogs, small mammals, birds and small reptiles. A proportion of cats and dogs preying on native species are likely to be domestic pets from adjoining properties.

Feral animals currently (and historically) do not appear to be abundant or causing adverse impacts at CVC. Monitoring is undertaken during monthly inspections and biodiversity monitoring. Only in the event that these species become an issue, or a clear trend if increasing observations become apparent, would control measures be implemented by an appropriated licenced contractor.

Other common pests identified and controlled on site include spiders, rodents (rats and mice), cockroaches, and other invertebrates.

9 Fire Management

9.1 Background

As CVC is not a residential development and there are no strict requirements for fire management, with the exception of preventing fires within the project area and their spread to surrounding land. However, Condition 24 within Schedule 3 of SSD-5465 identifies a requirement that DC be sufficiently equipped to respond to fires on site and to assist the NSW Rural Fire Service (RFS) in the event of a fire in the vicinity of the surface facilities.

There is also a statutory responsibility under the *Rural Fires Act 1997* that requires the owners of land to prevent the ignition and spread of bushfires on their land. This act provides for the prevention, mitigation and suppression of bush and other fires in NSW. Section 63(2).

9.1.1 Existing Environment

Topography can have a great impact on bushfire behaviour. For every increase in slope gradient, there is a similar increase in fire intensity and rate of fire spread. The topography of CVC is relatively flat. According to classifications in the PBP guideline, the vegetation surrounding CVC comprises forests and forested wetlands. Forests are particularly vulnerable to bushfire.

9.1.2 Key Stakeholder and Emergency Response Details

The key stakeholder and emergency response details and contacts are contained within the Pollution Incident Response Management Plan (PIRMP) which is retained in the CVC operations room, Control Room and on the DC website.

9.1.3 Bushfire Risk

Bushfire risks have been assessed in accordance with the NSW Rural Fire Service's (RFS) Planning for Bush Fire Protection Guideline (the PBP guideline). The majority of CVC is on land mapped as being in the Vegetation Category 1 on the Wyong Bushfire Prone Land Map, which is considered high risk. Category 1 vegetation comprises areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations and requires a 100 m buffer.

As with all rural settings where vegetation is present, there is a risk that bushfires could occur in or near CVC. There is therefore a risk that a bushfire could damage buildings and present a hazard to human life. This was demonstrated in October 2013 when CVC's pit top area was threatened by a bushfire.

9.2 Land Management Zones

Fire management is addressed in this BMP as fire can present a threat to biodiversity at both the pit top and ventilation facility as these areas contain vegetation which is considered to be bushfire prone land (Category 1).

Bushfire prone land surrounding the CVC pit top and ventilation facility are shown in **Figure 7** and **Figure 8** respectively.

Figure 7: Bushfire Prone Land Map for the Pit Top Area (Source: Central Coast Council, 2015)

Figure 8: Bushfire Prone Land Map for the Ventilation Shaft Area (Source: Central Coast Council, 2015).

9.3 Defendable Space

Fire protection zones or defendable space around assets which assist in fire prevention comprise three zones:

1st Zone -APZ (Asset Protection Zone);

2nd Zone -SFAZ (Strategic Fire Advantage Zone); and

3rd Zone - LMZ (Land Management Zone).

The fire protection zones are positioned between a bush fire hazard and the asset and minimise fuel loads via hazard reduction; inhibit a fire path, and reduce the effects of heat, flame, ember and smoke attack.

Following the bushfires which occurred in 2013, DC undertook a risk assessment of bushfire controls across the operation. This review concluded that improvements to the sites APZ's around the pit top area and ventilation fan site were required. The proposed improvements to the existing APZ's were approved as part of the most recent approval modification to SSD-5465 in December 2015. The APZ's as they were approved in December 2015 are shown in **Figure 9**.

9.3.1 Asset Protection Zones

APZs provide fire vehicle access, reduce radiant heat, reduce convection winds, reduce ember attack and allow smoke to disperse. APZs are divided into an inner protection area (IPA) and an outer protection area (OPA) for forest vegetation.

APZs were determined using the PBP guideline which compares the bushfire hazard vegetation classification, bushfire weather and slope classes on bushfire prone land to derive their minimum extent. The vegetation communities and slope classes were characterised in accordance with Appendix 4 of the PBP. CVC is located in the Greater Hunter Fire Weather Area (Fire Danger Index 100).

As the topography around the CVC pit top area is relatively flat, with the primary slope class identified in the PBP guideline as class (ii) (any vegetation greater than 0° and up to 5° downslope vegetation).

The APZs for the pit top infrastructure are 25 m, comprising a 15 m inner protection area (IPA) and a 10 m outer protection areas (OPA), while the APZ for the ventilation fan site is 20 m with no requirement for an OPA. Where unimpeded access is not already available, the IPAs will also include the establishment of a 4 m wide fire trail around certain assets (ie structures, buildings and the ventilation fan site) to enable access for fire fighting vehicles.

A buffer or Asset Protection Zone (APZ) is provided between areas of vegetation and the main offices, workshops and infrastructure at the pit top and, currently, in limited areas around the perimeter of ventilation facility. Within the pit top, the APZ is landscaped to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack to the buildings.

Figure 9: Asset Protection Zones

An example of the pit top APZ can be seen in **Figure 10**.

Figure 10: Firebreak between CVC Pit Top Area and Surrounding Bush

9.4 Access and Egress

Fire trails and access roads provide an important line of defence for fighting bushfires. An extensive array of fire trails and tracks are located around the pit top area to provide access for emergency services in case of a bush fire. These also provide access to easements throughout the study area which are maintained by TransGrid to provide vertical clearance and buffers for high-voltage transmission lines.

Though there is an existing road access to the ventilation facility and some fire trails, the November 2013 risk assessment and review of the October fires incident identified a risk due to access and an inadequate turnaround for fire tankers at the facility. APZs were approved and established to account for this risk and a clear area maintained around the Ventilation shaft site.

Fire trails will be inspected annually prior to the start of the Bushfire Danger Period.

9.5 Water Supply

Existing fire management infrastructure surrounds the pit top area, with water tanks and a distribution system (100 millimetre diameter water reticulation line). Fire hydrants, fire reels and depots are also placed in strategic positions to enable rapid response to fires on site. Though no reticulated water is available at the ventilation facility, its proximity to Lake Macquarie provides an emergency source of water if required.

CVC has 10 dams which can also be used if required.

Following the cessation of mining and surface operations, DC will consider maintenance of applicable controls during rehabilitation establishment (e.g. maintain APZs or other controls until rehabilitation vegetation is adequately established).

9.6 Prohibition on Hot Work Activities During Extreme and Catastrophic Fire Periods

Welding, cutting, grinding and other within vegetated area activities should not be undertaken on Extreme and Catastrophic fire danger rating days. All site vehicles should carry portable fire extinguishers and be able to communicate with the CVC Control Room in case of an emergency.

9.7 Water Access Points and Fire Fighting Equipment Locations

Existing fire management infrastructure surrounds the MC surface infrastructure areas, with water tanks and a distribution system (100-millimetre diameter water reticulation line). Fire hydrants, fire reels and depots are also placed in strategic positions to enable rapid response to fires on site. An example is shown in **Figure 11**. CVC also has 13 dams, however, due to their saline nature, they would not be an ideal source of water.

Following the cessation of mining and surface operations, DC will consider maintenance of applicable controls during rehabilitation establishment (e.g. maintain APZs or other controls until rehabilitation vegetation is adequately established).

9.8 Controls

The APZs will be managed in accordance with the PBP guideline. Maintenance will be undertaken in a manner that prevents accumulation of fine flammable debris on the ground so that fuel quantities are reduced, thus lessening flame heights and potential crowning. General maintenance guidelines are described in Appendix 2 of the PBP guideline.

The PBP guideline nominates that APZs should be maintained as follows:

- Inner protection areas (IPAs):
  - canopy cover kept at less than 15% of total surface area and at least 2 m from the roof line of a building;
  - garden beds and shrubs not to be located under trees and sited at least 10 m from any exposed windows or doors; and
  - lower limbs of trees up to 2 m above the ground are removed.
- Outer protection areas (OPAs):
  - canopy cover kept at less than 30% of total surface area; and
  - understorey mowed annually before the fire season (usually September) to remove shrubs and long grasses.

Figure 11: CVC Water Access Points

DC has, and will continue to, implement appropriate controls to assist in the management of bushfires that may impact the mining operations, including:

- Defendable Space - A buffer or APZ is provided between areas of vegetation and the main offices, workshops and infrastructure at the pit top and, currently, in areas around the perimeter of ventilation facility. Within the pit top, the APZ is landscaped to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack to the buildings. The size of the protection zones will take into consideration matters such as the type of vegetation, slope of the land, fuel load source and criticality of the asset to the operation. The APZ areas will be maintained and inspected prior to the start of the fire season (1st October to 31st March unless advised otherwise). In the event additional bush fire hazard reductions works are proposed, they will be undertaken only after obtaining the requisite Bushfire Hazard Reduction Certificate from the NSW Rural Fire Service. Regular training of mine firefighting crews is also undertaken.

The APZ areas will be inspected prior to the start of the fire season (1st October to 31st March). In the event additional bush fire hazard reductions works are proposed, they will be undertaken only after obtaining the requisite Bushfire Hazard Reduction Certificate from the NSW Rural Fire Service. Regular training of mine firefighting crews is also undertaken.

10 Public Access Management

10.1 Background

While public access management is not specified in SSD-5465 as a matter to be addressed within the BMP, it has been identified as an issue within the larger surrounding Delta Electricity land (Connell Wagner 2008). Though primarily a concern from a safety management perspective, uncontrolled access to bush land areas, particularly by motor-bikes, has the potential to introduce and/or spread weeds and be a cause of erosion, both of which have the potential to affect biodiversity in remnant areas, rehabilitation or biodiversity enhancement activities.

Uncontrolled public access does not appear to be an issue within the pit top area even though some small access tracks occur throughout the areas of remnant vegetation and function as fire trails and access routes to the power line easements. These do not however appear to be commonly used and rubbish dumping does not appear to be a significant problem in this area. Motorbike tracks have been observed on the fire trails of the Ventilation Facility area and, given its location relative to local rural residential properties, it is possible that it is accessed by locals on occasion.

10.2 Management and Control

A security firm is engaged to undertake scheduled site security checks and remote alarm monitoring and reporting with these security checks e generally undertaken at times of higher unauthorised access risk such as nights and weekends.

As uncontrolled public access or potential associated problems does not appear to be a major issue at either the pit top area or the ventilation facility, it is not considered that any further management actions are required to control public access. Public access will be monitored and managed during operation of the mine through the standard incident reporting process which would include reporting of unauthorised access. Similarly, the monitoring programs such as for weeds and erosion, are considered appropriate for the management of any potential uncontrolled access issues.

Any reported incidents concerning public safety or access will be detailed in the Annual Review.

11 Biodiversity Monitoring

11.1 Overview

Table 6 provides an overview of the biodiversity monitoring programs which are identified in this BMP. Further details are provided for each of the monitoring program methodologies within the following sections. As required by the project approval conditions, this includes ecological monitoring of the:

- weed occurrence and control effectiveness;
- feral animals;
- fire risk (including asset protection zones);
- uncontrolled public access; and
- Ecological aspects including:
    - receiving waters;
    - the EEC downstream of the discharge point;
    - remnant vegetation around ventilation facilities at Summerland Point; and
    - habitat within the Biodiversity Enhancement Area as detailed in **Figure 4**.

Table 6: Biodiversity Monitoring Details

Monitoring Regime	Site	Monitoring Frequency	Methodology
Weeds	Pit Top area Ventilation Shaft	Bi-annual (seasonal)	Target existing locations and significant new occurrences of weed species (**Figure 5** and **Figure 6**) in each management zone. Record: - the number of individuals, the estimated size of infestation (i.e. m² for large infestations); - the estimated distance to native vegetation; and - recommended control measures.
Feral animals	Pit Top area and Ventilation Shaft	Annually	Monitor activity of feral species by searching for tracks, diggings, scats, burrows and sightings of individuals. Monitoring to be undertaken in conjunction with weed monitoring.
Bushfire risk /uncontrolled public access	Pit Top area Ventilation shaft	Annually prior to the fire season	APZ and fire trails (access to ventilation shaft area, access to houses to the north of the pit top area and tracks south of the pit top area to the transmission lines) to be visually inspected annually prior to the fire season (1st October – 31st March). Security firm to continue site security patrols and remote monitoring of security systems/alarms. Public access issues to be reported via standard incident form or in conjunction with weed/feral animal monitoring programs.
Receiving waters	Pit Top area	n/a	Monitoring requirements related to receiving waters are documented in the Water Management Plan.Results will be considered in conjunction with the outcomes of biodiversity

Monitoring Regime	Site	Monitoring Frequency	Methodology
			monitoring.
EEC areas downstream of the D10 discharge	Pit Top area	Annually	Continuation of surveys in the identified swamp oak forest areas. Two BioBanking plots have been established within the Swamp Oak forest which will be monitored annually. Refer to **Section 11.1** for further information.
Native vegetation	Ventilation Shaft	Annually	Monitoring of the health and condition of vegetation surrounding the ventilation shaft area. Two large Rough-barked Apple (*Angophora floribunda*) occurring directly adjacent to the Ventilation Shaft will be monitored for condition and health.

11.2 Monitoring of the Biodiversity Enhancement Area

The Biobanking methodology provides a means of determining the baseline condition, structure and composition of vegetation communities. Repeating this method over time allows changes in these variables to be identified.

A baseline event was completed in 2013 where vegetation data was collected from two plots and transects across the swamp oak forest at the site, in accordance with the Biobanking methodology (**Table 7**). The baseline monitoring identified that the generic benchmark values for the swamp oak forest (HU635) were much higher than the condition identified onsite, and would not provide a useful value to compare changes over time. Accordingly, local benchmarks (

Table 8) were assigned for Swamp Oak Forest using the baseline surveys results. These local benchmarks will provide an accurate point of comparison with site attribute scores collected in the future to determine any changes in condition resulting from management and the proposed discharge works.

Using the local benchmarks, the weighted site attribute score for these plots has varied between 65.0 – 80.3% during monitoring conducted 2016 and 2018. A value of 60% has been assigned which will trigger management in addition to the proposed enhancement strategy, if the weighted site attribute score drops below this value. A high degree of flexibility has been applied in assigning this trigger value.As this trigger is based on local benchmark data of a system already in low condition, any significant changes are likely to result in a noticeable decrease in scores. Trigger values will be reviewed and updated to reflect these changes if they occur as part of the review of the BMP.

Coupled with the water quality data, the monitoring will be able to detect changes in the composition and health of the community. **Table 7** describes the attributes to be measured during the ecological monitoring of the EEC area.

Trigger values will be determined using the final weighted site score out of 100, based on the benchmark conditions.

Table 7: Condition Criteria for Monitoring as per the Biobanking Methodology

Site attribute		Site attribute score				Weighting for site score attribute
		1	2	3	4	
A	Native plant species richness	0	0-<50% of benchmark	50-<100% of benchmark	≥ benchmark	25%
B	Native over-storey cover	0-10% or >200% of benchmark	0-<50% or >150-200% of benchmark	50-<100% or >100-150% of benchmark	Within benchmark	10%
C	Native mid-storey cover	0-10% or >200% of benchmark	0-<50% or >150-200% of benchmark	50-<100% or >100-150% of benchmark	Within benchmark	10%
D	Native ground-cover (grasses)	0-10% or >200% of benchmark	0-<50% or >150-200% of benchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.5%
E	Native groundcover (shrubs)	0-10% or >200% of benchmark	0-<50% or >150-200% of benchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.5%
F	Native groundcover (other)	0-10% or >200% of benchmark	0-<50% or >150-200% of benchmark	50-<100% or >100-150% of benchmark	Within benchmark	2.5%
G	Exotic plant cover (all strata)	>66%	>33-66%	>5-33%	0-5%	5%
H	Number of trees with hollows	0 (unless benchmark includes 0)	0-<50% of benchmark	50-<100% of benchmark	≥ benchmark	20%
I	Proportion of over-storey species occurring as regeneration	0	>0-<50%	50-<100%	100%	12.5%
J	Total length of fallen logs	0-10% of benchmark	>10-<50% of benchmark	50-<100% of benchmark	≥ benchmark	10%
Total weighted score						100%

Table 8 provides the local benchmarks that have been developed as a baseline for the Swamp Oak Forest. This information will form the basis against which changes will be assessed using the above criteria (**Table** 7).

Table 8: Benchmarks to measure changes within the Swamp Oak Forest Community

Criteria	Benchmarks	
	Biobanking Benchmark (HU635)	Local Benchmark
Native plant species	15	≥ 6
Native overstorey cover	15 to 65	5 to 18
Native midstorey cover	0 to 50	36 to 48
Native ground cover (grasses)	0 to 90	3 to 21
Native ground cover (shrubs)	1 to 15	0 to 0

Criteria	Benchmarks	
	Biobanking Benchmark (HU635)	**Local Benchmark**
Native ground cover (other)	2 to 90	1 to 13
Number of trees with hollows	0.8	≥ 0
Total length of fallen logs (m)	10	≥ 20

11.3 Weed Control

Monitoring is vital to assessing the effectiveness of the treatment methods carried out. Assessing the site response to any treatments is also essential in providing any follow-up actions. This will be conducted by collecting information about the site and the treatment methods used in the following ways:

- using photographic monitoring points;
- mapping of weed species, their location and densities;
- noting if the weeds have been previously treated; and
- recording significant native species and their density within the treatment area.

Information on the best practice for weed monitoring and detail on the monitoring techniques to be applied will be utilised from guidelines for monitoring weed control and recovery of native vegetation.

The results and recommendations from any monitoring will be detailed in a report or Weed Action Plan and supplied to the Environment and Community Coordinator.

Baseline information and data should be collected and assessed when measuring the effectiveness of presence and/or densities of weed species over time. The weed contractors must maintain daily activity reports detailing the following information:

- number of contractors and total number of person/people hours worked;
- weed control methods used;
- herbicide application (if any) and the type of chemical and quantity/volume used;
- weather conditions, morning, midday and afternoon, including Delta T measurements;
- location of work performed;
- the approximate area (m^2) or % of weeds treated within each management area;
- consider establishing photo points at significant infestation areas;
- other information or observations that may be relevant;
- provide this information in a report to DC, summarising weed management activities undertaken; and

record threatened or endangered flora or fauna identified within the study area.

12 Compliance Management

12.1 Introduction

The biodiversity monitoring results will be reviewed on an annual basis to confirm compliance with the conditions specified in SSD-5465.

The results will also be presented in the Annual Review and include a summary of monitoring results during the past year; a comparison against the impact assessment criteria; a summary of previous years' monitoring results; a comparison of the impacts with those predicted in the EIS and present an analysis of the potential cause(s) of significant discrepancies, if any. The Annual Review will also identify any relevant trends and any non-conformance over the year as well as describing any actions currently implemented or planned to ensure compliance with the impact assessment criteria. The Annual Review will be forwarded to the relevant authorities including the DPIE and the EPA. The Annual Review will also be forwarded to members of the Community Consultative Committee and local Councils (Central Coast and Lake Macquarie) and will also be placed on the company's website along with a summary of environmental monitoring results.

12.2 Compliance Monitoring

Trigger values have been identified for each of the biodiversity monitoring regimes implemented within this BMP based on the compliance criteria specified in Section 1. These are outlined in **Table 9** with recommended actions if trigger values are exceeded.

Table 9: Biodiversity Monitoring Triggers and Actions

Management Issue	Compliance Criteria	Triggers	Action
Weeds	Control and suppress the spread of weeds into remnant vegetation around the ventilation facility and pit top areas.	Spread of weed infestations into remnant vegetation as determined by monitoring.	Include findings in the Annual Review and undertake targeted weed control as per **Table 5** in identified areas.
Feral animals	Control feral animals.	Feral animal monitoring will identify if the number of individuals and activity levels increase. As current levels are low, the trigger value is an increase in activity levels of 2 points from the previous monitoring period for any given species.	Include findings in Annual Review and employ a suitably qualified person to undertake feral animal control for the identified species in accordance with local control programs.
Bushfire risk	Asset Protection Zones (APZs) are well maintained.	Growth of vegetation in asset protection areas surrounding the pit top and ventilation shaft areas.	Include findings in the Annual Review and undertake firetrail and APZ maintenance.
Uncontrolled public access	Control public access	Public accesses prohibited areas.	Restrict public access as required.
Receiving waters	Ecological monitoring of the receiving waters of the mine water discharge.	Use results of the Water Management Plan (EMP-D-16368) monitoring to compare to the trigger values in **Table 10**.	Monitoring requirements related to receiving waters are documented in the Water Management Plan. Results will be considered with the outcomes of biodiversity monitoring and will be included in the Annual Review. If ecological triggers are exceeded (based on annual averages), amelioration measures to improve water quality will be determined in accordance with the Water Management Plan.
EEC areas downstream of the discharge from D10 (Pit top area)	Any harm to EEC vegetation due to mine water discharge would be offset in accordance with the Office of Environment and Heritage (OEH) policy.	A decrease in the total weighted score to less than 60% for any Biobanking plots (decrease in condition and health of the EECs) within the swamp oak forest and below trigger values identified by baseline monitoring for the Swamp Sclerophyll Forest.	If the trigger is exceeded, amelioration and compensatory measures will be adopted. See Section 12.4 for details.
Native vegetation (Ventilation shaft)	Condition of remnant native vegetation around the ventilation shaft to be monitored.	Observable decrease in health of the two Rough-barked Apple in close proximity to the ventilation shaft. Observable dieback in vegetation surrounding the ventilation shaft from monitoring photos.	Amelioration measures to be discussed with the Project Ecologist to minimise impacts. This could include additions to fencing, restrictions for access and rehabilitation of disturbed vegetation.

12.3 Water Quality Triggers

The water quality triggers detailed in **Table 10** have been devised to maintain the ecological health of the receiving waters and EEC area downstream of dam D10. Trigger values will be determined by averaging the annual water quality parameters over the sampling events to ensure that stochastic environmental events are not influencing the results.

Table 10: Water Quality Triggers for Compliance Monitoring

Water quality parameter (units)	Estuary health (DECC, 2010)			Trigger (averaged annual results)
	Healthy	Fair	Poor	
pH	7 - 9	-	<7 or >9	Poor health
Suspended Solids (mg/L)	<10	10 - 20	>20 (may be influenced by tides)	Poor health
EC (µS/cm)	No trigger value. Area affected by tides			No trigger value – Area affected by tides. Monitoring in association with vegetation condition
Total Phosphorus (mg/L)	<0.02	0.02 - 0.3	>0.3	Poor health

Notes:

- *Suspended solids measurements are used instead of turbidity (as per DECC, 2010) but utilises the same health criteria. Turbidity data will also be collected in the event that the suspended solids trigger is reached.*
- *Total phosphorus used instead of Phosphates (PO_4), with the same estuary health guidelines applied from DECC, 2010.*

Water quality triggers will be investigated when EEC condition appears to be declining, that is when it has a total weighted score of less than 60%. If the threshold is exceeded, annual average water quality values will be investigated to determine if trigger values are being exceeded, to establish whether or not water quality is negatively influencing EEC condition. Results will be included within the annual monitoring report with appropriate recommendations in line with the water quality management plan reporting.

Water quantity (volumetric) triggers have not been proposed as flows may vary significantly on any day as a result of mine dewatering changes and the daily discharge volume is restricted to a maximum of 12,161 kL under EPL 1770. The need for a volumetric trigger will be reassessed in the future if EPL 1770 is varied to include a higher daily discharge volume.

12.4 Swamp Oak Forest Actions

The significance of any degradation in condition of the Swamp Oak Forest community will be determined based on the final weighting of the data from two Biobanking plots undertaken annually. Plot data will be compared to the local benchmark (baseline) data (Table 10) to calculate a final weighting.

A trigger value has been developed for the project of 60% for the total weighted score. If the weighted score for a plot falls below this threshold as a result of impacts from the Colliery, ameliorative measures and compensation will be required. Using the baseline data as a 'before impact condition', the Biobanking calculator (under the Biobanking Assessment Methodology) will be used to determine the compensatory measures required for the decrease in vegetation condition identified. The calculator will generate ecosystem credits required to be retired.

Potential offset sites will then be identified, with a preference for CVC land within the locality, using existing vegetation mapping and ground-truthing by the Project Ecologist. Offset requirements will be determined in consultation with the BCD and in the manner approved at the time.

13 Reporting

13.1 Annual Review

The results of any monitoring will be summarised in the relevant Annual Review. The Annual Review will also include a description of any actions being implemented or planned with respect to biodiversity.

Annual Review will be forwarded to members of the Community Consultative Committee, local Councils (Central Coast and Lake Macquarie), DPIE and other relevant authorities and be placed on the company's website.

13.2 Incident or Non-compliance Reporting

If monitoring reveals that actions by CVC have resulted in an environmental issue or that there has been non-compliance in relation to rehabilitation, then DC will conduct an investigation into the cause of the non-compliance.

The report will:

- describe the date, time and nature of the observation;
- identify the cause (or likely cause) of the damage/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the incident and prevent further such occurrences.

14 Stakeholder Management and Response

14.1 Complaints Handling

DC has a 24-hour telephone hotline (1800 115 277) through which members of the public can lodge complaints, concerns, or to raise issues associated with the operation. This service aims to promptly and effectively address community concerns and environmental matters.

All complaints are recorded and responded to and if, for some reason, no action is taken then the reason why is recorded. The information recorded in the complaint register includes:

- date and time the complaint was lodged;
- personal details provided by the complainant;
- nature of the complaint;
- action taken or, if no action was taken, the reason why; and
- follow up contact with the complainant.

14.2 Independent Review

As detailed in Condition 2, Schedule 5 of SSD-5465, an Independent Review can be requested by a landowner who "*considers the development to be exceeding the relevant criteria in Schedule 3".*

If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Applicant shall:

(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
- *consult with the landowner to determine his/her concerns;*
- *conduct monitoring to determine whether the development is complying with the relevant criteria in Schedule 3; and*
- *if the development is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and*

(b) give the Secretary and landowner a copy of the independent review

14.3 Dispute Resolution

If any disputes are not adequately addressed by the complaints handling process then they will be handled by the Environment and Community Coordinator. If the response of CVC is not considered to satisfactorily address the concern of the complainant, a meeting may be convened with the complainant, Mine Manager together with the Environment and Community Coordinator to determine any further options to reduce potential impacts.

Any actions agreed from the meeting will be implemented by CVC. After implementation of the proposed actions the complainant will be contacted and advice sought as to the satisfaction or otherwise with the measures taken.

If no agreed outcome is determined or the complainant is still not satisfied by the action taken, then an Independent Review may be requested by the complainant. If determined to be warranted by the Secretary, an independent review will be undertaken in accordance with the process identified in Schedule 5 of SSD-5465.

15 Audit and Review

The BMP will be kept up to date through DC's standard audit and review process, however it is noted that significant planning for the detailed mine closure plan is not expected until around 2026. Current site audit and review arrangements are set out below.

15.1 Review

This document will be reviewed, and if necessary revised, within three months of the following;

- The submission of an Annual Review;
- The submission of an incident report;
- The submission of an independent environmental audit; and
- Following any modification to the project approval.

Internal and external audits of this document will be carried out as described below. If possible, internal and external audits will be objective and be conducted by a person or organisation independent of the document being audited.

Audits will be carried out by personnel who have the necessary qualifications and experience to make an objective assessment of the issues. The extent of the audit, although pre-determined, may be extended if a potentially serious deviation from this document is detected.

Any audit non-conformances and/or improvement opportunities will have corrective and preventative actions implemented to avoid recurrence, these actions will be loaded into the Colliery Incident Database to ensure the actions are assigned to the relevant people and completed.

15.2 Auditing

The objectives of an audit are to maintain compliance with the BMP. Audits shall be carried out by personnel who have the necessary qualifications and experience to make an objective assessment of the issues. The extent of the audit, although pre-determined, may be extended if a potentially serious deviation from this document is detected.

Any audit non-conformances and/or improvement opportunities will have corrective and preventative actions implemented to avoid recurrence, these actions will be loaded into the site Incident Database to ensure the actions are assigned to the relevant people and completed.

External audits will be conducted utilising external specialists and will consider this document and related documents. External auditors shall be determined based on skills and experience and upon what is to be accomplished.

An Independent Environmental Audit (IEA) was undertaken during June 2019. In accordance with SSD-5465 Schedule 6, Condition 9, IEA's will be scheduled for every three years thereafter (unless the Secretary directs otherwise) by an audit team whose appointment has been endorsed by the Secretary.

16 Records and Document Control

16.1 Records

Generally, the Environment and Community Coordinator will maintain all Environmental Management System records which are not of a confidential nature. Records that will be maintained include:

- monitoring data;
- environmental inspections and auditing results;
- environmental incident reports;
- the complaints register; and
- licences and permits.

All records will be stored so that they are legible, readily retrievable and protected against damage, deterioration and loss. Records will be maintained for a minimum of 4 years or as otherwise required under any legislation, licence, lease, permit or approval.

16.2 Document Control

This document and all others associated with the Environmental Management System shall be maintained in a document control system which is in compliance with the site Document Control Standard which is available to all site personnel. Any proposed change to this document will be via the Environment and Community Coordinator.

A copy of this document is available on the DC website. Details on document revisions are provided in **Table 11**.

Table 11: Document Revision Details

Version	Date	Details of Revision	Company	Reviewed by/ Authorised by
1	06/03/2013	Original BMP	LakeCoal	P. Stewart C. Ellis B. Johnston
2	07/01/2014	Review	LakeCoal	C. Ellis
3	05/12/2014	Review	LakeCoal	C. Ellis
4	01/03/2019	Review	LakeCoal	C. Armit W. Covey
5	1/12/2019	Updated to Delta Coal format	Delta Coal	K. Weekes E. Dodd C. Armit

17 Roles and Responsibilities

Roles and responsibilities specific to completing the requirements of the BMP are identified in **Table 12**.

Table 12: Roles and Responsibilities for Biodiversity Management

Role	Responsibilities
General Manager	• Ensure that adequate financial and personnel resources are made available for the implementation of the BMP, including rehabilitation activities.
Environment and Community Coordinator	• Document owner managing the implementation of the plan. • Coordinate the biodiversity monitoring. • Engage contractors to undertake weed management and feral animal management activities and review plan updates. • Coordinate the required native vegetation enhancement strategy. • Provide results of other environmental monitoring for the project to the Project Ecologist to assist in determining any change and cause of changes to monitored vegetation. • Inspect and report on bushfire risk and management and uncontrolled public access management. • Inspect APZs prior to the start of the fire season. • Arrange for access to site for all personnel involved in implementing this BMP. • Compile data for the Annual Review. • Follow up complaints or disputes. • Respond to any potential or actual non-compliances and report these as required to regulatory bodies and other stakeholders. • Undertake reviews of this document. • Undertake or coordinate the required audits of this document. • Complete notification process for any noncompliance or incident.
Project Ecologist	• Undertake ecological monitoring specified within this BMP. • Determine compliance with approval conditions based on monitoring results and in accordance with the criteria. • Incorporate results of other environmental monitoring into the biodiversity monitoring program. • Provide feedback to the Environment and Community Coordinator for updates to the plan based on monitoring results.
All employees and contractors	• Comply with the requirements of this BMP.

18 References

Documents used in the preparation of this management plan are detailed in Error! Reference source not found..

Table 13: References

Reference	Title
Standards	AS/NZS ISO 14001:2004 Environmental management systems – Requirements with guidance for use AS/NZS ISO 14004:2004 Environmental management systems – General guidelines on principles, systems and support techniques AS2601-2001: The demolition of structures
Legislation and Regulations	*Biodiversity Conservation Act 2016* *Biosecurity Act 2015* Biosecurity Regulation 2017 Environment Protection Licence (EPL) 1770 *Environmental Planning and Assessment Act 1979 (EP&A Act)* *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* *Fisheries Management Act 1994* *Game and Feral Animal Control Act 2002* *Game and Feral Animal Control Regulation 2012* *Local Land Services Act 2013* *Mining Act 1992* *National Parks and Wildlife Act 1974* *Pesticides Act 1999* Development consent SSD-5465 (as modified) *Protection of the Environment Operations Act 1997 (POEO Act)* *Rural Fires Act 1997*
Delta Coal documents	EMS 001 Environmental Management Strategy. Chain Valley Colliery Benthic Communities Management Plan, May 2018. Chain Valley Colliery Biodiversity Management Plan, July 2014. Chain Valley Colliery Heritage Management Plan, June 2014. Chain Valley Colliery Seagrass Management Plan, June 2019. Chain Valley Colliery Water Management Plan, July 2012. LakeCoal 2018, MC and CVC Mine Operations Plan 2018 - 2020. Delta Coal Permit to Clear or Disturb land.
External	AECOM, 2011, Environmental Assessment Chain Valley Colliery Domains 1 &2 Continuation Project, prepared for LakeCoal.

Reference	Title
	Australian Government Weeds of National Significance, www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html, viewed 5 August 2019. Bureau of Meteorology (BOM) 2019, Map of Climate Zones of Australia. Cardno Ecology Lab, 2011, Mannering Colliery Extension of Mining – Aquatic Ecology Assessment, prepared for Centennial Coal. Commonwealth of Australia, September 2016, Mine Closure: Leading Practice Sustainable Development Program for the Mining Industry. Department of Environment, Climate Change and Water (DECCW) 2009, Threatened species survey and assessment guidelines: field survey methods for fauna (Amphibians), NSW Government. Department of Environment, Climate Change and Water (DECCW) 2010, Waterwatch estuary field manual and guide. Ecotone Ecological Consultants 1997, Flora and Fauna Survey and Assessment Vales Point Power Station Perimeter lands Biodiversity. Waratah, NSW. Ecotone Ecological Consultants 2010, Flora and Fauna Investigations Vales Point Power Station Perimeter lands Biodiversity Update. Waratah, NSW. EMGA Mitchell McLennan, 2015 – Statement of Environmental Effects, Chain Valley Colliery – Modification 2, Prepared for LakeCoal Pty Ltd EMGA Mitchell McLennan, 2013 – Environmental Impact Statement, Chain Valley Colliery Mining Extension 1 Project, Prepared for LakeCoal Pty Ltd. Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022 Developed in partnership with the Greater Sydney Regional Weed Committee - Revised September 2019. Kelly, G.L., 2006, Recycled Organics in Mine Site Rehabilitation - A review of scientific literature, prepared for the Department of Environment and Conservation NSW. Kleinfelder 2016, Weed Action Plan - Mannering Colliery and Chain Valley Colliery. NSW Government Department of Land, Water and Biodiversity Conservation (DLWBC) 2006, Asparagus Weeds Best Practice Management Manual, Department of Water, Land and Biodiversity Conservation, South Australia. NSW Government, Australian Government and QLD Government 2009, Lantana Best Practice Manual and Decision Support Tool, Department of Employment, Economic Development and Innovation, Queensland. NSW Minerals Council Improving Mine Rehabilitation Discussion Paper, February 2018. NSW Office of Environment & Heritage (OEH) 2014, BioBanking Assessment Methodology 2014. Office of Environment and Heritage for the NSW Government, Sydney. NSW Primary Industries Weed Management Unit 2009, Blackberry control manual: Management and control options for Blackberry (Rubus spp.) in Australia, Department of primary Industries, Victoria. NSW Rural Fire Service (RFS) 2006, Planning for bush fire protection: a guide for councils, planners, fire authorities and developers. NSW

Reference	Title
	Government. Office of Environment and Heritage (OEH) 2014, *Wallum Froglet – profile,* www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10183, viewed 29 November 2019. Sydney Weeds Committee 2012, Groundcovers: Nasturtium (Tropaeolum majus), www.sydneyweeds.org.au/nasturtium, viewed 29 November 2019. Total Earth Care 2019, Weed Action Plan - Mannering Colliery and Chain Valley Colliery. Watterson, E.K., Burston, J.M., Stevens, H. and Messiter, D.J., 2011, The hydraulic and morphological response of a large coastal lake to rising sea levels. Worley Parsons. pp 1-14. Winkler MA, Cherry H and Downey PO (eds) 2008, *Bitou bush management manual. Current management and control options for bitou bush Chrysanthemoides monilifera* ssp. *rotundata) in Australia,* Department of Environment and Climate Change (NSW), Sydney.

19 Definitions

BMP Biodiversity Management Plan

CCC Central Coast Council

DC Delta Coal

DP&E Department of Planning & Environment

DPIE Department of Planning, Industry and Environment

DPI Department of Primary Industries

EA Environmental Assessment

EMS Environmental Management System

EPA NSW Environment Protection Authority

EPL Environmental Protection License

EP&A Act *Environmental Planning and Assessment Act 1979*

LMCC Lake Macquarie City Council

MC Mannering Colliery

MOP Mine Operations Plan

MP 10_161 Project Approval for CVC Domains 1 & 2 Continuation Project, referred to in Schedule 3, Condition 25 of SSD-5465

MSDS Material Safety Data Sheet

NSW New South Wales

OEH NSW Office of Environment and Heritage

POEO Act *Protection of the Environment Operations Act 1997*

RFS NSW Rural Fire Service

ROM Run of mine

Secretary Secretary of the Department, or nominee

VPPS Vales Point Power Station

WoNS Weed of National Significance

Appendix 1: Consultation

Appendix 2: Development Consent Summary

Chain Valley Colliery Development Consent SSD-5465 Summary

Relevant sections of Development Consent SSD-5465 detail the requirements of the BMP and are reproduced in Table A1 below along with identification of where the requirements are addressed in this document.

Table A1: Requirements from Chain Valley Colliery Development Consent (SSD-5465)

Condition No.	Requirements	Relevant section of this document
	Schedule 2 Administrative Conditions	
18	***Updating and Staging Strategies, Plans or Programs*** *The Applicant must regularly review the strategies, plans and programs required under this consent and ensure that these documents are updated to incorporate measures to improve the environmental performance of the development and reflect current best practice in the mining industry. To facilitate these updates, the Applicant may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Applicant may also submit any strategy, plan or program required by this consent on a staged basis.* *With the agreement of the Secretary, the Applicant must prepare a revision or stage of any strategy, plan or program required under this consent without undertaking consultation with all parties nominated under the applicable condition in this approval.* *Notes:* • *While any strategy, plan or program may be submitted on a staged basis, the Applicant must ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.* • *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*	**Section 10.1**
	Schedule 3 Specific Environmental Conditions	
	BIODIVERSITY ***Rehabilitation Objectives***	

<table>
<tr><th>Condition No.</th><th>Requirements</th><th>Relevant section of this document</th></tr>
<tr><td>19</td><td>The Applicant shall implement a Biodiversity Enhancement Strategy as described in the EIS and summarised in Table 6, in consultation with OEH, and to the satisfaction of the Secretary.
Table 6: Summary of the Biodiversity Enhancement Strategy
<table>
<tr><th>Area</th><th>Offset Type</th><th>Minimum Size/Amount</th></tr>
<tr><td>Biodiversity Enhancement Area</td><td>Enhancement and restoration measures, including weed and rubbish removal, return of natural hydrological regime and regeneration with native endemic species.</td><td>3 ha (in total) of Swamp Sclerophyll Floodplain Forest and Swamp Oak Floodplain Forest endangered ecological communities within the surface facilities sites</td></tr>
</table>
Note: To identify the Biodiversity Enhancement Area referred to in Table 6 see the applicable figures in Appendix 7.</td><td>Section 6</td></tr>
<tr><td></td><td>The Applicant shall implement its preferred option of the three options set out in new dot point 1 of the Terrestrial Ecology section of its Statement of Commitments by 1 December 2016, following consultation with OEH and to the satisfaction of the Secretary.</td><td>See below</td></tr>
<tr><td></td><td>Biodiversity Management Plan</td><td></td></tr>
<tr><td>20</td><td>The Applicant shall prepare a Biodiversity Management Plan for the surface facilities sites, for all areas that are not, or will not, be subject to condition 7 of schedule 4, to the satisfaction of the Secretary. This plan must:</td><td></td></tr>
<tr><td></td><td>(a) be prepared by a suitably qualified person approved by the Secretary; in consultation with OEH, and submitted to the Secretary within 6 months of the date of this consent;</td><td>Section 1.5</td></tr>
<tr><td></td><td>(b) establish baseline data for the existing habitat in the Biodiversity Enhancement Area and elsewhere on the site;</td><td>Section 6</td></tr>
<tr><td></td><td>(c) describe the short, medium, and long term measures that would be implemented to:</td><td></td></tr>
<tr><td></td><td>• manage the impacts of clearing vegetation;</td><td>Section 5</td></tr>
<tr><td></td><td>• manage the remnant vegetation and habitat in the Biodiversity Enhancement Area and elsewhere on the site; and</td><td>Section 6, 10</td></tr>
<tr><td></td><td>• implement the Biodiversity Enhancement Strategy, including detailed performance and completion criteria;</td><td>Section 6</td></tr>
<tr><td></td><td>(d) include a program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria;</td><td>Section 11</td></tr>
<tr><td></td><td>(e) identify the potential risks to the successful implementation of the Biodiversity Enhancement Strategy, and the contingency measures that would be implemented to mitigate these risks; and</td><td>Section 6</td></tr>
<tr><td></td><td>(f) include details of who would be responsible for monitoring, reviewing, and implementing the plan.</td><td>Section 17</td></tr>
<tr><td></td><td>The Applicant shall implement the approved management plan as approved from time to time by the Secretary.</td><td>Noted</td></tr>
<tr><td>20A</td><td>Within 3 months of the approval of MOD 2, the Applicant shall revise the Biodiversity Management Plan to incorporate the measures required to implement its commitments described in new dot point 2 of the Terrestrial Ecology section of its Statement of Commitments, and submit it to the Secretary for approval.</td><td>This document</td></tr>
<tr><td></td><td>BUSHFIRE MANAGEMENT</td><td></td></tr>
<tr><td>24</td><td>The Applicant shall:</td><td></td></tr>
</table>

Condition No.	Requirements	Relevant section of this document
	(a) ensure that the development is suitably equipped to respond to any fires on site; and	**Section 9**
	(b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the vicinity of the Surface facilities sites.	**Section 9**
	STATEMENT OF COMMITMENTS	
	Terrestrial Ecology	
	In addition to the management and mitigation measures undertaken at the Colliery for terrestrial ecology as described in the BMP, the following commitments specific to the Proposal will be undertaken. Some commitments are already undertaken under the BMP. LakeCoal will:	
	• *investigate one of the following options in consultation with OEH to offset the biodiversity impacts arising from the proposed modification:* ○ *provide $10,000 of funding, which is equivalent to the biodiversity being lost (i.e. 5 credits x $2,000 per credit) to existing environmental programs at the site which benefits the Swamp Sclerophyll EEC; or* ○ *consult with OEH to identify a suitable conservation program and provide $10,000 of funding; or* ○ *purchase and retire 5 credits on the Biobanking register.*	**Financial contribution by LakeCoal in 2016**
	• *update* the BMP to include the following: ○ *the completion of predisturbance surveys in the survey area for Blackeyed Susan, Leafless Tongue Orchid and Variable Midge Orchid during their flowering periods (July to December, November to February and September to October, respectively);* ○ *pre-disturbance surveys by an ecologist to determine the important components of vegetation communities and fauna habitats that should be preferentially retained in the APZs;* ○ *installation of delineation fencing around threatened flora populations (if found) to ensure their protection during development and maintenance of the APZs;* ○ *condition monitoring for threatened flora populations (if found);* ○ *retention of hollow-bearing trees in the APZs, where possible, with details to be included in a hollow tree register;* ○ *installation of nest boxes (or salvaged hollows) within the APZs under the supervision of a suitably qualified ecologist or wildlife carer to replace hollows where hollow-bearing trees cannot be retained;* ○ *measures for APZ maintenance that include weed control;* ○ *clearing of hollow-bearing trees (if required) under the supervision of a suitably qualified ecologist;* ○ *any injured fauna would be taken to the nearest veterinary hospital for treatment before release; and* ○ *relocation of suitable hollow-bearing felled trees adjacent to the APZs to create additional fauna habitat;*	**Section 5, 7 and 9**
	• *undertake the design of the dam embankment and spillway works in consultation with an ecologist to minimise potential impacts on the Swamp Oak Floodplain Forest EEC;*	**Dam works completed 2017**
	• *ensure pre-clearing surveys are undertaken by an ecologist to minimise the potential impact to fauna and significant vegetation prior to clearing works being undertaken within the embankment and spillway area;*	**As above and Section 5**

Condition No.	Requirements	Relevant section of this document
	• *clearly delineate the clearing footprint and cordon off surrounding vegetation as a 'no go' zone during works to the dam embankment and spillway;*	**As above and Section 5**
	• *minimise disturbance areas where possible by ensuring all stockpiling of materials, parking of machinery etc, is undertaken in previously cleared areas;*	**As above and Section 5**
	• *ensure that, wherever possible, dead standing timber and fallen timber will be avoided by any clearing works, or if required to be removed, be relocated into suitable habitat areas nearby;*	**As above and Section 5**
	• *ensure all equipment used for the earthworks associated with the dam embankment and spillway will be cleaned of excess soil potentially containing pathogens and weed seeds prior to entering the Site;*	**As above and Section 5**
	• *install sediment fencing surrounding the proposed earthwork areas, in accordance with a site- specific erosion and sediment control plan for the works;*	**As above and Section 5**
	• *ensure that in the event that sedimentation dam water is released from Dam 10 prior to the works being undertaken, it will be undertaken in a controlled manner over a number of days to ensure that the release does not result in significant erosion and sedimentation to the Swamp Oak Floodplain Forest;*	**As above and Section 5**
	• *continue the management and monitoring of flora and fauna in accordance with the BMP for the life of the mine, including:* - *the condition and composition of the Swamp Oak Floodplain Forest area;* - *the condition of vegetation adjacent to the ventilation shaft and fans;* - *the location and distribution of weed infestations; and* - *the abundance and distribution of feral animal use.*	**Section 7, 8, 11**
	• *noxious weeds will be removed and continually controlled from the pit top area, allowing for natural regeneration of vegetation;*	**Section 7**
	• *weed invasion will be monitored as part of the Colliery's BMP; and*	**Section 11**
	• *the condition of the EEC areas will be monitored through the Colliery's BMP.*	**Section 11**