



SECTION 2

Description of the Approved Operations

TABLE OF CONTENTS

2	DESCRIPTION OF THE APPROVED OPERATIONS	2-1	Figure 2-7	General Arrangement of Dendrobium Coal Preparation Plant
2.1	HISTORY OF MINING IN THE VICINITY OF THE PROJECT	2-1	Figure 2-8	Overview of the Dendrobium Mine Environmental Management Strategy
2.2	DENDROBIUM MINE	2-4		General Arrangement of West Cliff Coal Wash Emplacement
2.2.1	Underground Mining Operations	2-4	Figure 2-9a	Environmental Monitoring Sites Dendrobium Pit Top and Kemira Valley Coal Loading Facility
2.2.2	Surface Facilities	2-4	Figure 2-9b	Environmental Monitoring Sites West Cliff Coal Wash Emplacement
2.2.3	ROM Coal Transport, Stockpiling and Processing	2-10	Figure 2-9c	Environmental Monitoring Sites Underground Mining Area
2.2.4	Product Coal Handling and Transportation	2-10	Figure 2-10	Surface Facilities at the Cordeaux Colliery
2.2.5	Coal Wash Management	2-10	Figure 2-11	General Arrangement of Cordeaux Pit Top
2.2.6	Approval History	2-10	Figure 2-12	General Arrangement of the West Cliff Coal Wash Emplacement
2.2.7	Environmental Monitoring and Management	2-12		
2.2.8	ROM Coal Production in the Absence of the Project	2-12		
2.3	CORDEAUX COLLIERY	2-19		
2.3.1	Cordeaux Pit Top	2-19		
2.3.2	Approval History	2-19		
2.3.3	Environmental Monitoring and Management	2-19		
2.4	BULLI SEAM OPERATIONS	2-19		

LIST OF PLATES

Plate 2-1	Dendrobium Nos 2 and 3 Shafts
Plate 2-2	Train Loading at the Kemira Valley Coal Loading Facility

LIST OF TABLES

Table 2-1	Historical Start and Finish Dates for Dendrobium Mine Longwalls to Date
Table 2-2	Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

LIST OF FIGURES

Figure 2-1	Previous Mine Workings
Figure 2-2	Longwall Mining Method – Conceptual Cross Section and Plan
Figure 2-3	Approved Dendrobium Mine Underground Mining Layout
Figure 2-4	General Arrangement of Dendrobium Pit Top
Figure 2-5	General Arrangement of Dendrobium Shafts
Figure 2-6	General Arrangement of Kemira Valley Coal Loading Facility

2 DESCRIPTION OF THE APPROVED OPERATIONS

This Section presents a description of the previous and existing approved operations, including a history of statutory approvals. Section 2.1 provides a brief overview of the long history of mining in the vicinity of the Project. The approved Dendrobium Mine and the Cordeaux Colliery are described in Sections 2.2 and 2.3, respectively.

2.1 HISTORY OF MINING IN THE VICINITY OF THE PROJECT

Underground mining in the vicinity of the Project has included:

- Kemira Colliery;
- Wongawilli Colliery;
- Nebo Colliery;
- Elouera Colliery;
- Cordeaux Colliery;
- Corrimal Colliery; and
- Dendrobium Mine.

The approximate extent of previous underground mining works is shown on Figure 2-1. Further details on the history of this mining activity are provided below.

There has been no previous mining in the proposed Project underground mining areas. Figure 2-1 illustrates that underground coal mining in the Metropolitan Special Area has been extensive, and the Project is a logical extension to this previous development.

Initially, mining was generally carried out using bord and pillar methods; however, more recently, coal has been extracted using longwall mining methods at Corrimal, Cordeaux, Kemira and Elouera Collieries, and at the Dendrobium Mine (Figure 2-2).

Kemira Colliery

Mining operations began in 1848 at the Albert Coal Mine at Mt Keira, but it was only in 1857 that the first commercial quantities of coal were produced from nearby Mt Keira at what later became known as the Kemira Colliery (NSW Government, 2008).

The first successful fully mechanised longwall retreat mining operation in Australia commenced at the Kemira Colliery in 1965 (Illawarra Heritage Trail, 2018). Mining at the Kemira Colliery continued until approximately 2004, when facilities were decommissioned and rehabilitated.

The Kemira Colliery Pit Top has since been sold and Illawarra Coal maintains no further liability for that facility. The other Kemira Colliery facilities remain the responsibility of Illawarra Coal.

Wongawilli, Nebo and Elouera Collieries

The Wongawilli Colliery first opened in around 1916 to feed the demand for suitable coking coal for steelmaking (NSW Government, 2008).

The Nebo Colliery commenced production in 1946 and coal was last extracted from that mine in 1993.

At this time, the Nebo Colliery was formally combined with the Wongawilli Colliery to form the Elouera Colliery. Nebo's surface facilities remained in use to provide access and ventilation for the Elouera Colliery.

The Nebo Portal site (now the Dendrobium Pit Top) was relinquished from the ownership and responsibility of Elouera Colliery in December 2001, to enable the Dendrobium Mine to acquire formal responsibility and ownership of the site.

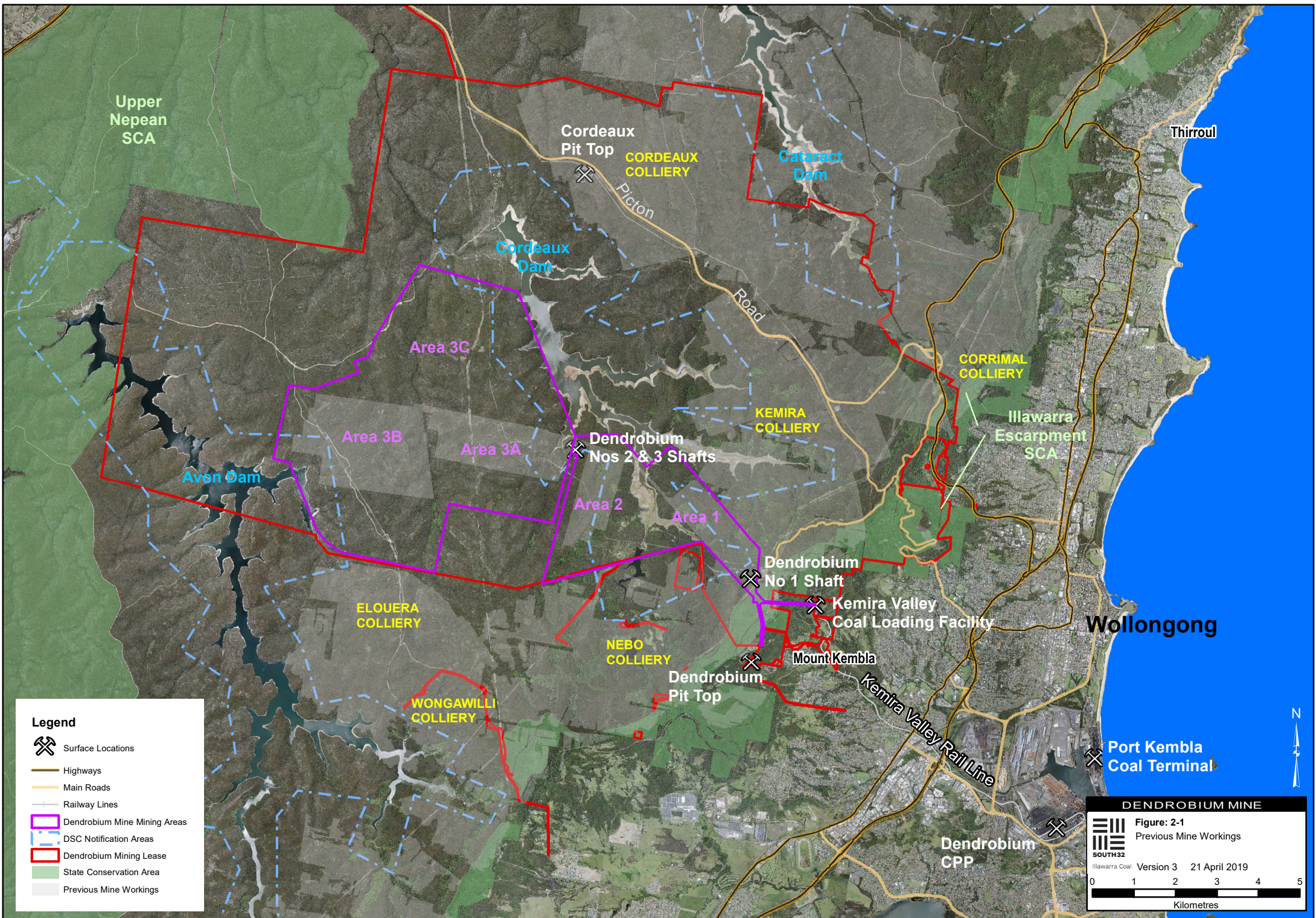
The Elouera Colliery was purchased by Gujarat NRE Coking Coal Ltd (now Wollongong Coal Limited) in December 2007 and now operates under the name of Wongawilli Colliery. The Wongawilli Colliery has since been combined with the Avondale Colliery and Huntley Colliery, located further south (Department of Planning and Infrastructure [DP&I], 2011a).

Corrimal and Cordeaux Collieries

The Corrimal Colliery commenced production in approximately 1870.

The Cordeaux Colliery was approved in 1974 and construction commenced in 1976. The first coal from the Cordeaux Colliery was produced in 1980.

In 1985, the Cordeaux operation holed into Corrimal Colliery workings to officially merge the two collieries in January 1986. Mining was then undertaken using longwall mining methods.



Legend

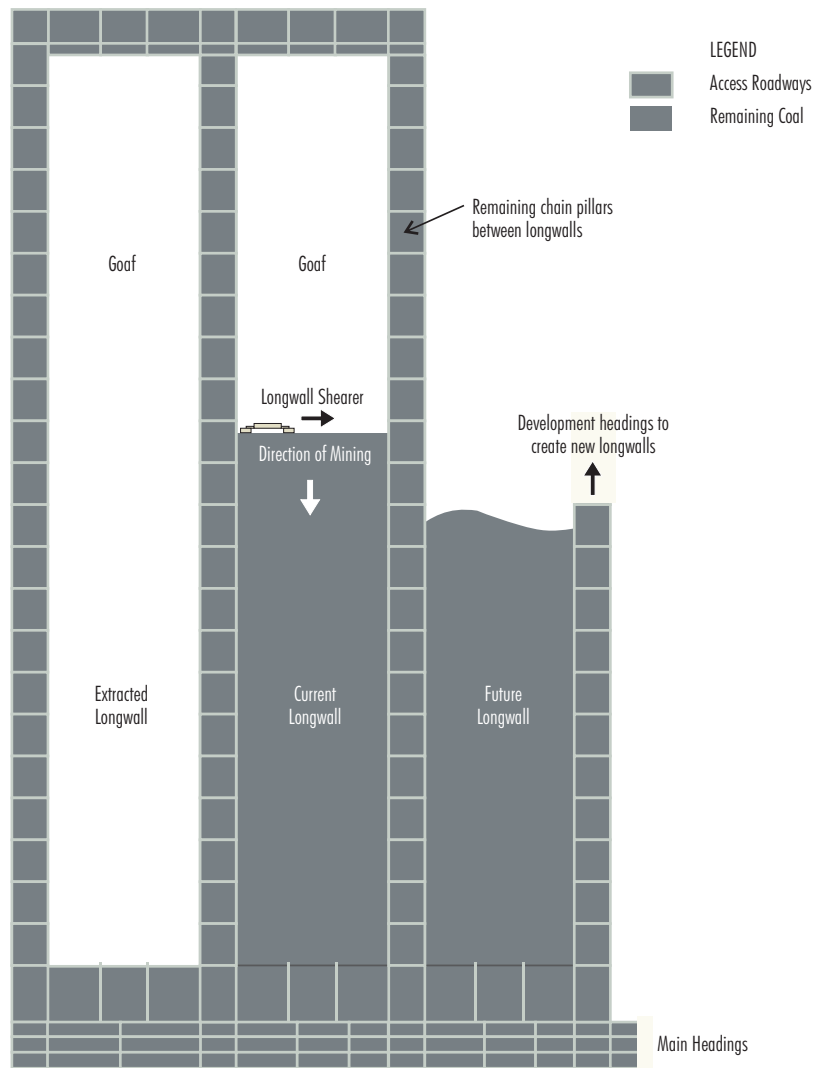
- Surface Locations
- Highways
- Main Roads
- Railway Lines
- Dendrobium Mine Mining Areas
- DSC Notification Areas
- Dendrobium Mining Lease
- State Conservation Area
- Previous Mine Workings

DENDROBIUM MINE

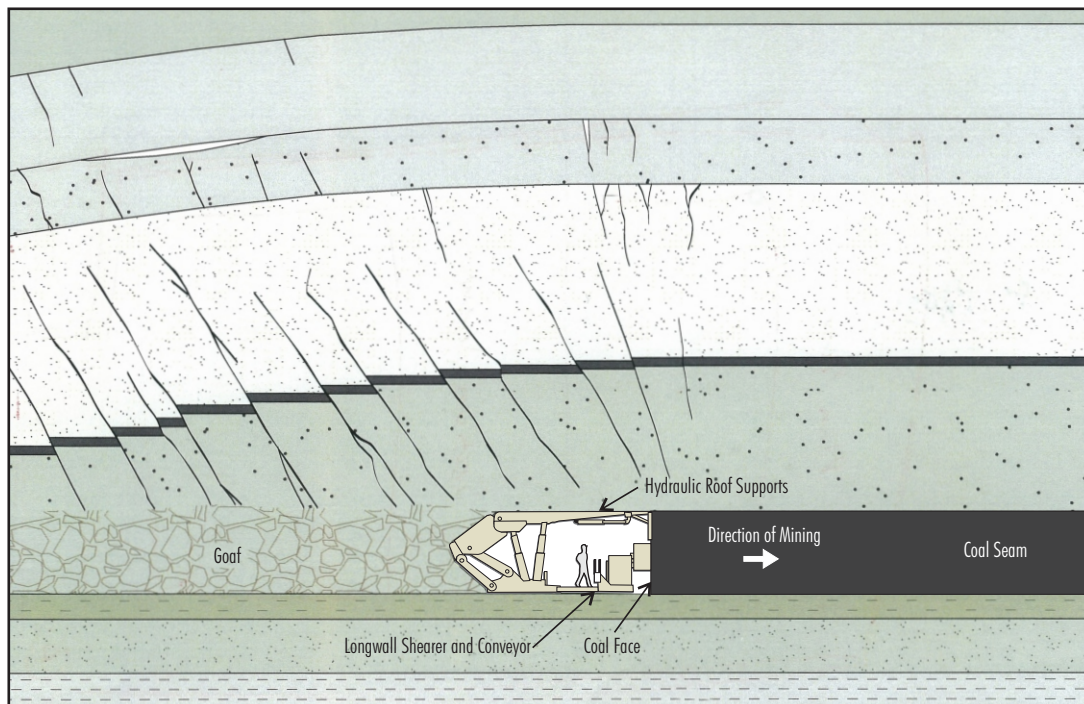
Figure: 2-1
Previous Mine Workings

Version 3 21 April 2019

0 1 2 3 4 5
Kilometres



Plan View



Section View

Source: After Hansen Consulting (2008)

Coal production ceased towards the end of March 2001 and recovery of longwall mining equipment was completed on 12 April 2001. Following cessation of mining, the Cordeaux Colliery was placed on care and maintenance and has since retained this status. The Cordeaux Colliery surface facilities are maintained by Illawarra Coal.

Dendrobium Mine

Construction for the Dendrobium Mine commenced in January 2002, with longwall mining commencing in April 2005.

The Dendrobium Mine uses the sites of the former pit top associated with the Nebo Colliery (now the Dendrobium Pit Top) and the Kemira Valley Coal Loading Facility, which was previously used for coal receipt and distribution for the Cordeaux and Tower Collieries.

Kemira Valley Rail Line

Although the Dendrobium Mine has been in operation since 2005, the Kemira Valley Rail Line has been in operation since 1980 and therefore precedes the Dendrobium Mine.

The Kemira Valley Rail Line passes through the residential areas of Mount Kembla, Cordeaux Heights and Cringila, and is used to transport ROM coal from the Dendrobium Mine to the Dendrobium CPP.

2.2 DENDROBIUM MINE

2.2.1 Underground Mining Operations

The Dendrobium Mine extracts coal from the Wongawilli Seam (also known as the No 3 Seam) within CCL 768 using underground longwall mining methods.

The Dendrobium Mine includes five approved underground mining domains, named Areas 1, 2, 3A, 3B and 3C (Figure 2-3). Longwall mining is currently being undertaken in Area 3B, with extraction largely complete in Areas 1, 2 and 3A.

The Dendrobium Mine has an approved operational capacity of up to 5.2 Mtpa of ROM coal until 31 December 2030.

The approved Dendrobium Mine underground mining layout is presented on Figure 2-3. Start and finish dates for longwalls extracted to date at the Dendrobium Mine are provided in Table 2-1.

Table 2-1
Historical Start and Finish Dates for Dendrobium Mine Longwalls to Date

Area	Longwall	Start Date	Finish Date
1	1	03/04/2005	11/12/2005
1	2	08/02/2006	22/01/2007
2	3	29/03/2007	15/11/2007
2	4	19/12/2007	02/10/2008
2	5	03/12/2008	18/12/2009
3A	6	09/02/2010	28/03/2011
3A	7	04/05/2011	23/01/2012
3A	8	24/02/2012	29/12/2012
3B	9	09/02/2013	02/06/2014
3B	10	20/01/2014	20/01/2015
3B	11	18/02/2015	26/01/2016
3B	12	22/02/2016	31/01/2017
3B	13	04/03/2017	19/04/2018
3B	14	22/05/2018	26/02/2019
3B	15	09/04/2019	-

2.2.2 Surface Facilities

Key surface facilities at the Dendrobium Mine (Figure 1-2) include the:

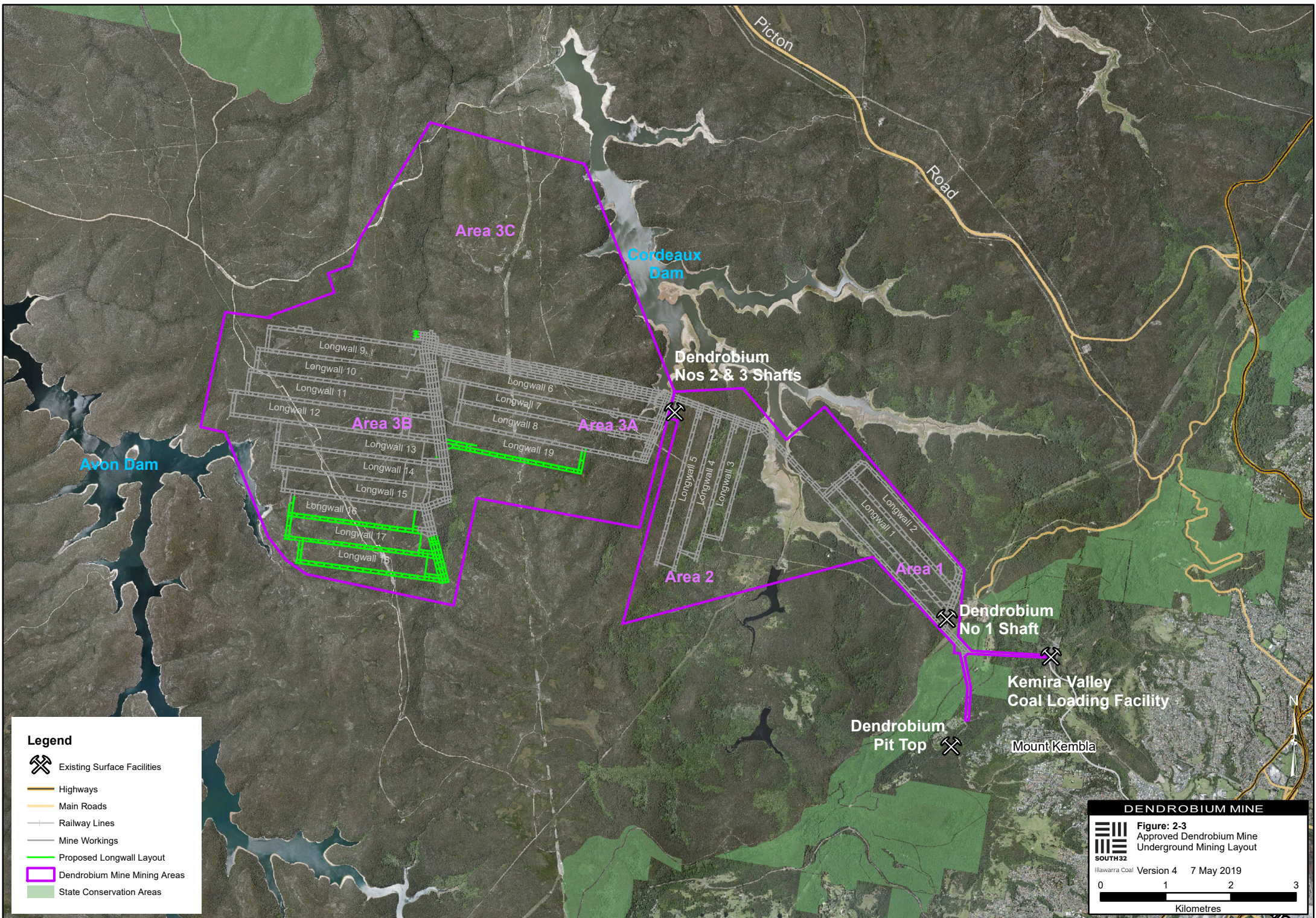
- Dendrobium Pit Top;
- Dendrobium Nos 1, 2 and 3 Shafts;
- Kemira Valley Coal Loading Facility;
- Kemira Valley Rail Line; and
- Dendrobium CPP located in Port Kembla.

Dendrobium Pit Top









The Dendrobium Pit Top is located adjacent to Mount Kembla village near the top of Cordeaux Road (Figure 2-4). Access to the Dendrobium Pit Top is off Cordeaux Road, approximately 8 km west of Wollongong.

Existing surface infrastructure at the Dendrobium Pit Top includes the following (Figure 2-4):

- administration buildings;
- workshop, machinery and equipment storage areas;
- personnel and materials access to the underground workings via the Dendrobium Tunnel;




Legend

-  Existing Surface Facilities
-  Highways
-  Main Roads
-  Railway Lines
-  Mine Workings
-  Proposed Longwall Layout
-  Dendrobium Mine Mining Areas
-  State Conservation Areas

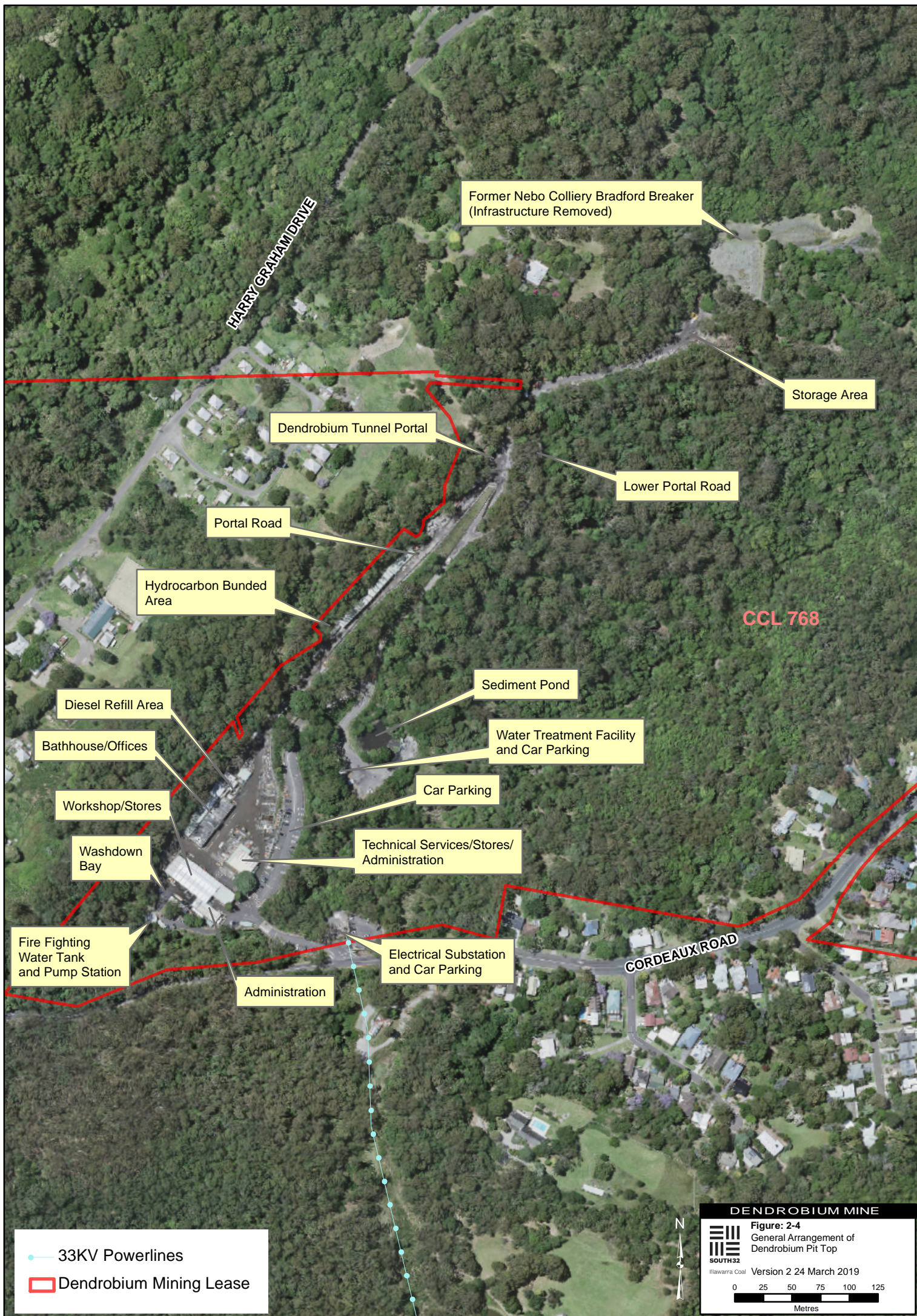
DENDROBIUM MINE

Figure: 2-3
Approved Dendrobium Mine
Underground Mining Layout

 SOUTH32

Illawarra Coal Version 4 7 May 2019

0 1 2 3
Kilometres



DENDROBIUM MINE
Figure: 2-4
General Arrangement of
Dendrobium Pit Top
Version 2 24 March 2019
0 25 50 75 100 125
Metres

- water management infrastructure (including sediment pond and a grey water treatment and oily water separation facility); and
- other ancillary infrastructure.

Dendrobium Nos 1, 2 and 3 Shafts

Dendrobium Shaft No 1 is located south-east of Area 1 (Figure 2-3).

Dendrobium Nos 2 and 3 Shafts are located in the Metropolitan Special Area between Areas 2 and 3A (Figure 2-3).

Dendrobium Nos 1 and 2 Shafts are downcast (or intake) ventilation shafts that draw fresh air into the underground workings. Dendrobium Shaft No 3 is an upcast (or exhaust) ventilation shaft that uses fans to draw air out of the underground workings (Plate 2-1).



Plate 2-1 - Dendrobium Nos 2 and 3 Shafts

The general arrangements of the Dendrobium ventilation shaft sites are shown on Figure 2-5.

Kemira Valley Coal Loading Facility

The Kemira Valley Coal Loading Facility is located approximately 2 km north-east of the Dendrobium Pit Top (Figure 1-2). Access to the Kemira Valley Coal Loading Facility is northwards from Stones Road near Mount Kembla village.

ROM coal is transported from the underground operations to the Kemira Valley Coal Loading Facility via an underground conveyor network, reaching the surface via the Kemira Valley Tunnel. The ROM coal is sized, fed through a rill tower and deposited onto a stockpile with a 150,000 tonne capacity. An enclosed rail-loading chute is used to load the coal onto rail wagons beneath the stockpile (Plate 2-2).



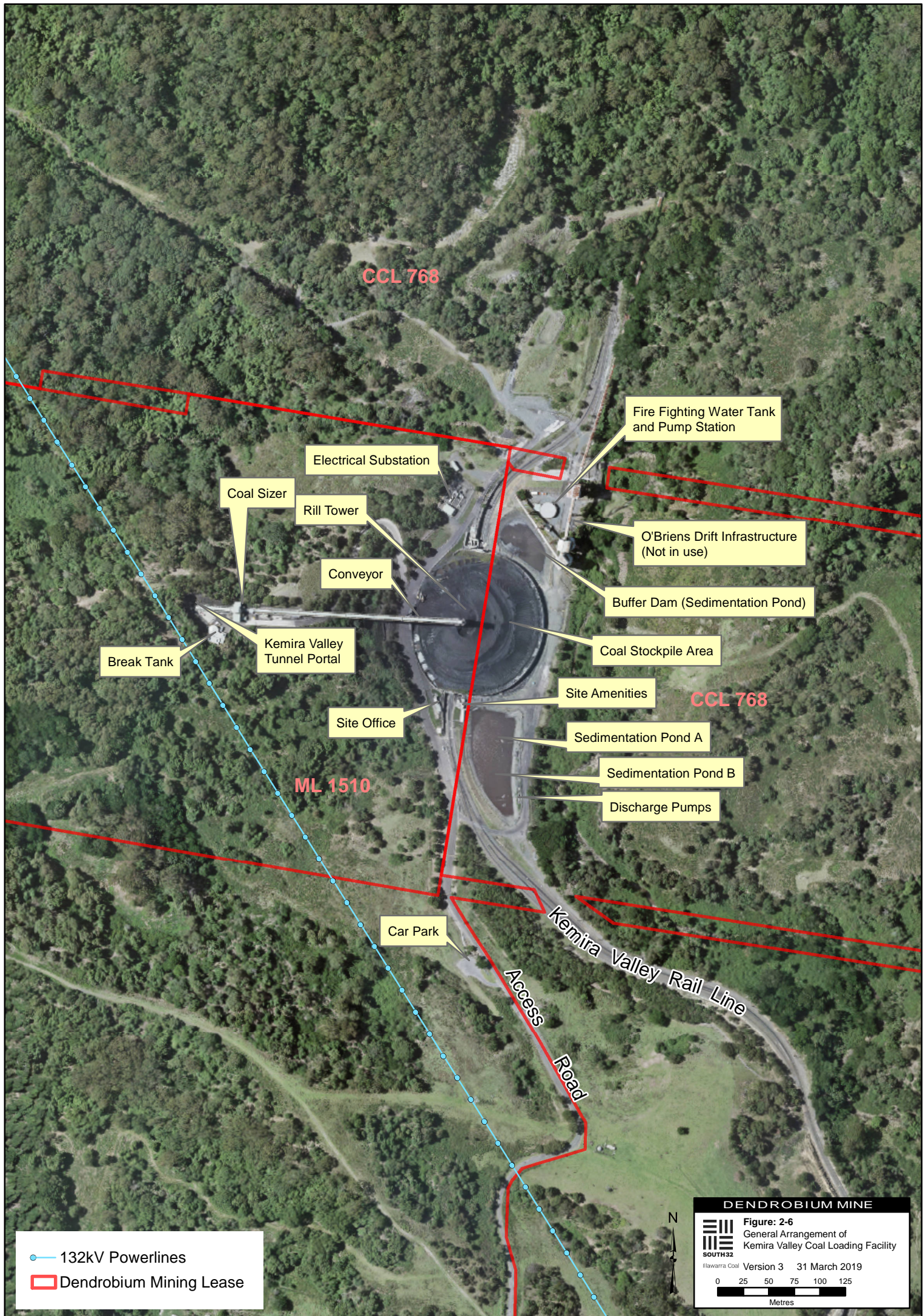
Plate 2-2 - Train Loading at the Kemira Valley Coal Loading Facility

A general arrangement of the coal loading facility is shown in Figure 2-6.

Existing infrastructure at the Kemira Valley Coal Loading Facility includes the following (Figure 2-6):

- site office;
- site amenities;
- Kemira Valley Tunnel portal;
- coal sizer;
- coal conveyor;
- rill tower;
- coal stockpile;
- sedimentation ponds;
- buffer dam;
- other ancillary infrastructure;
- Kemira Valley Rail Line; and
- rail loading infrastructure (beneath the coal stockpile).





Kemira Valley Rail Line

The Kemira Valley Rail Line is a private rail line, approximately 9 km long. ROM coal is transported from the Kemira Valley Coal Loading Facility to the Dendrobium CPP at Port Kembla via the Kemira Valley Rail Line (Figure 1-2).

Train movements are not permitted on the Kemira Valley Rail Line between 11.00 pm and 6.00 am, unless written approval is obtained from the EPA.

Dendrobium Coal Preparation Plant

The existing Dendrobium CPP is located on Flinders Street within the Port Kembla Steelworks industrial precinct (Figure 1-2).

The Dendrobium CPP is also known as the Dendrobium Washery, or Port Kembla Coal Processing Plant.

The Dendrobium CPP consists of the following infrastructure (Figure 2-7):

- administration building;
- CPP;
- ROM and product coal stockpiles;
- storage areas;
- parking and access roads;
- Kemira Valley Rail Line;
- maintenance workshop;
- rail unloading facility; and
- other ancillary infrastructure.

2.2.3 ROM Coal Transport, Stockpiling and Processing

Sized ROM coal is stockpiled at the Kemira Valley Coal Loading Facility prior to transport to the Dendrobium CPP via the Kemira Valley Rail Line.

ROM coal from the Dendrobium Mine is processed at the Dendrobium CPP to primarily produce coking coal products for use in steelmaking.

The Dendrobium CPP has the capacity to process up to 5.2 Mtpa of sized ROM coal.

2.2.4 Product Coal Handling and Transportation

Product coal is temporarily stockpiled at the Dendrobium CPP prior to being delivered to the Port Kembla Steelworks for domestic steelmaking, or to the Port Kembla Coal Terminal for transport to Liberty Primary Steel Whyalla Steelworks or export.

Product coal transportation occurs on a continuous basis (24 hours per day, seven days per week) on internal haul roads within the Port Kembla industrial precinct.

2.2.5 Coal Wash Management

The Dendrobium CPP currently produces up to approximately 1.1 Mtpa of coal wash. Coal wash is approved for transport by road from the Dendrobium CPP to the West Cliff Coal Wash Emplacement (Figures 1-1a and 1-1b) (Section 2.4).

Coal wash is also supplied to third parties for use as an engineering fill material or for other beneficial uses.

2.2.6 Approval History

Development Consent

The potential environmental impacts associated with the development of the Dendrobium Mine were assessed in the *Environmental Impact Statement for the Dendrobium Underground Coal Mine* (Olsen Environmental Consulting, 2001).

Following a Commission of Inquiry, the Dendrobium Mine was approved on 20 November 2001 by the NSW Minister for Urban Affairs and Planning (the Minister) under the EP&A Act.

Among other conditions and requirements, Development Consent DA 60-03-2001 issued in November 2001 required further approval from the Minister for:

- emplacement of coal wash at the West Cliff Stage 3 Coal Wash Emplacement; and
- longwall extraction in parts of Area 3 (described as Area C in the original consent).

The West Cliff Stage 3 Coal Wash Emplacement was approved on 20 December 2007 by the Minister for Planning under Condition 1.1(c) of Development Consent DA 60-03-2001.



Product Coal Stockpile

ROM Coal Stockpile

Train Unloading

Administration Building

Hydrocarbon Storage

Coal Preparation Plant

Maintenance Workshop

Store

Car Park

Railway Lines

DENDROBIUM MINE

Figure: 2-7
General Arrangement of
Dendrobium Coal Preparation Plant

SOUTH32
Illawarra Coal

Version 2 24 March 2019

0 50 100 150 200
Metres

An application to modify the originally approved Area 3 mining footprint was lodged in November 2007 under section 75W of the EP&A Act. Approval was granted on 8 December 2008, subject to modified conditions, including the requirement to prepare Subsidence Management Plans (SMPs).

In addition to the two applications described above, other approved modifications to the Development Consent DA 60-03-2001 include:

- a modification application made in February 2002 to permit the access of construction traffic to the Bradford Breaker Emplacement Area via Cordeaux Road and Benjamin Road, Mount Kembla;
- a modification application made in May 2002 to allow vehicles to access Benjamin Road, Mount Kembla;
- a modification application made in March 2005 for the construction and operation of an above-ground coal sizing plant at the Kemira Valley Coal Loading Facility;
- a modification application made in December 2008 for amendment of the approved layout for underground mining Area 3 (to split into Areas 3A, 3B and 3C);
- a modification application made in March 2015 to modify the conditions relating to biodiversity offsets; and
- a modification application made in July 2018 to switch electricity supplier and upgrade electricity supply infrastructure.

EPBC Act Approval

Approval Decision EPBC 2001/214 under the EPBC Act, relating to the Dendrobium Mine, was issued on 20 December 2001. The approval was subject to six conditions relating to the management of potential impacts on threatened species.

Subsidence Management Plan Approvals

The conditions of Development Consent DA-60-03-2001 and CCL 768 require the preparation of SMPs prior to longwall extraction.

The following SMP approvals have been issued for the Dendrobium Mine to date:

- Subsidence Environmental Management Plan approval for Longwalls 1 and 2 in Area 1, issued in March 2005.

- SMP approval for Longwalls 3 to 5 in Area 2, issued in March 2007.
- SMP approval for Longwall 6, issued in December 2009.
- SMP approval for Longwalls 6 to 8 and 19, issued in June 2010.
- SMP approval for Longwalls 9 to 18, issued in February 2013.
- Further approval of the Secretary for Longwalls 14 and 15, issued in December 2016.
- Further approval of the Secretary for Longwall 16, issued in May 2018.
- Further approval of the Secretary for Longwall 17, issued in July 2019.

2.2.7 Environmental Monitoring and Management

The Dendrobium Mine has an Environmental Management Strategy (EMS) that provides a framework to allow the operation to be conducted in an environmentally responsible manner and in accordance with relevant statutory requirements.

A list of key strategies, plans and programmes in place at the Dendrobium Mine is shown on Figure 2-8.

Further discussion of the existing content of these strategies, plans and programmes and how they would continue to be relevant to the majority of the Project is provided under the relevant sub-sections in Section 6.

A summary of the existing environmental monitoring regime at the Dendrobium Mine is provided in Table 2-2, and the locations of relevant environmental monitoring sites are shown on Figures 2-9a to 2-9c.

2.2.8 ROM Coal Production in the Absence of the Project

At 1 July 2019, it is estimated that approximately 33 Mt of ROM coal will remain in the approved underground mining areas.

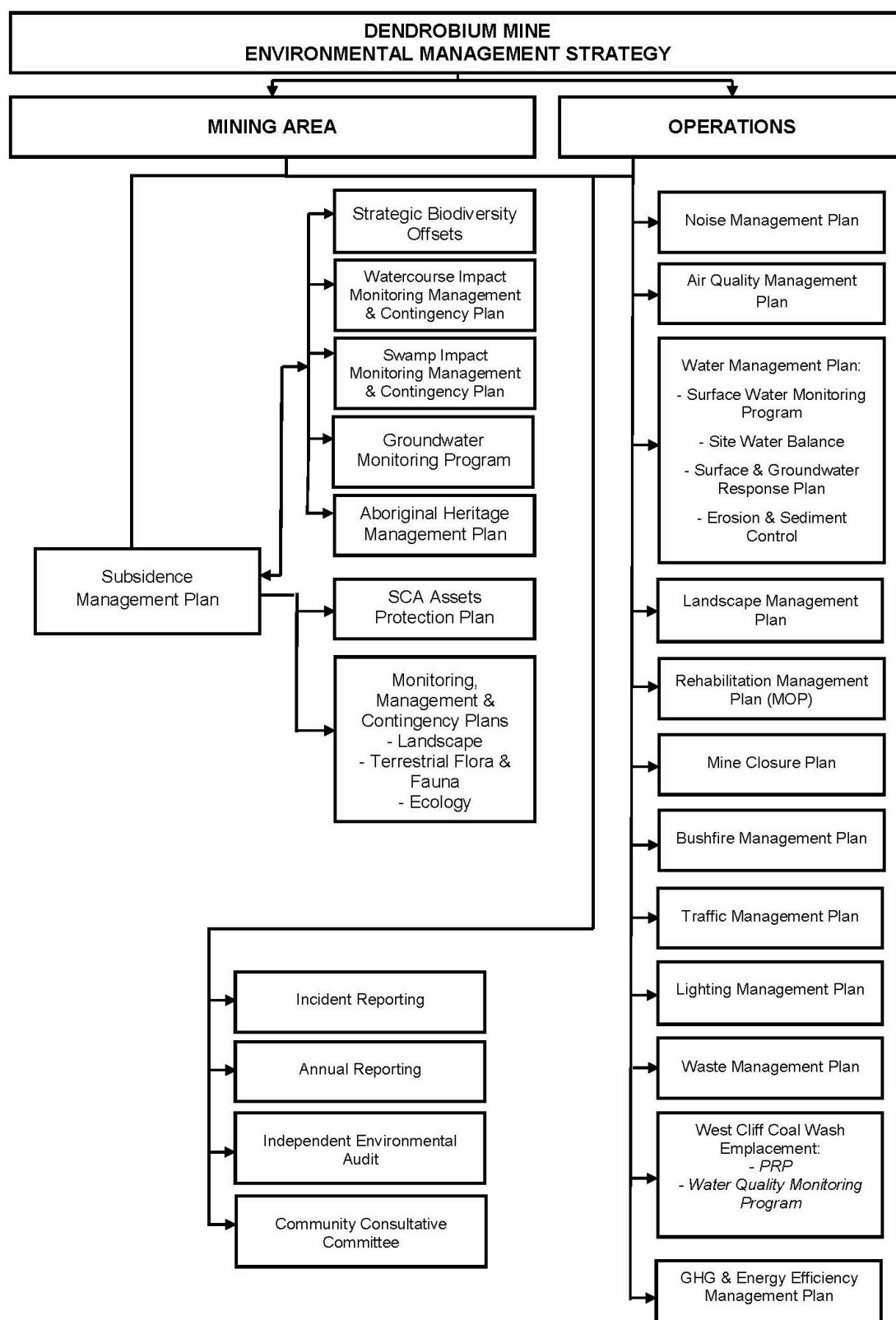


Figure 2-8 - Overview of the Dendrobium Mine Environmental Management Strategy

Note: The requirement for a Rehabilitation Management Plan is satisfied by the Mining Operations Plan (MOP).

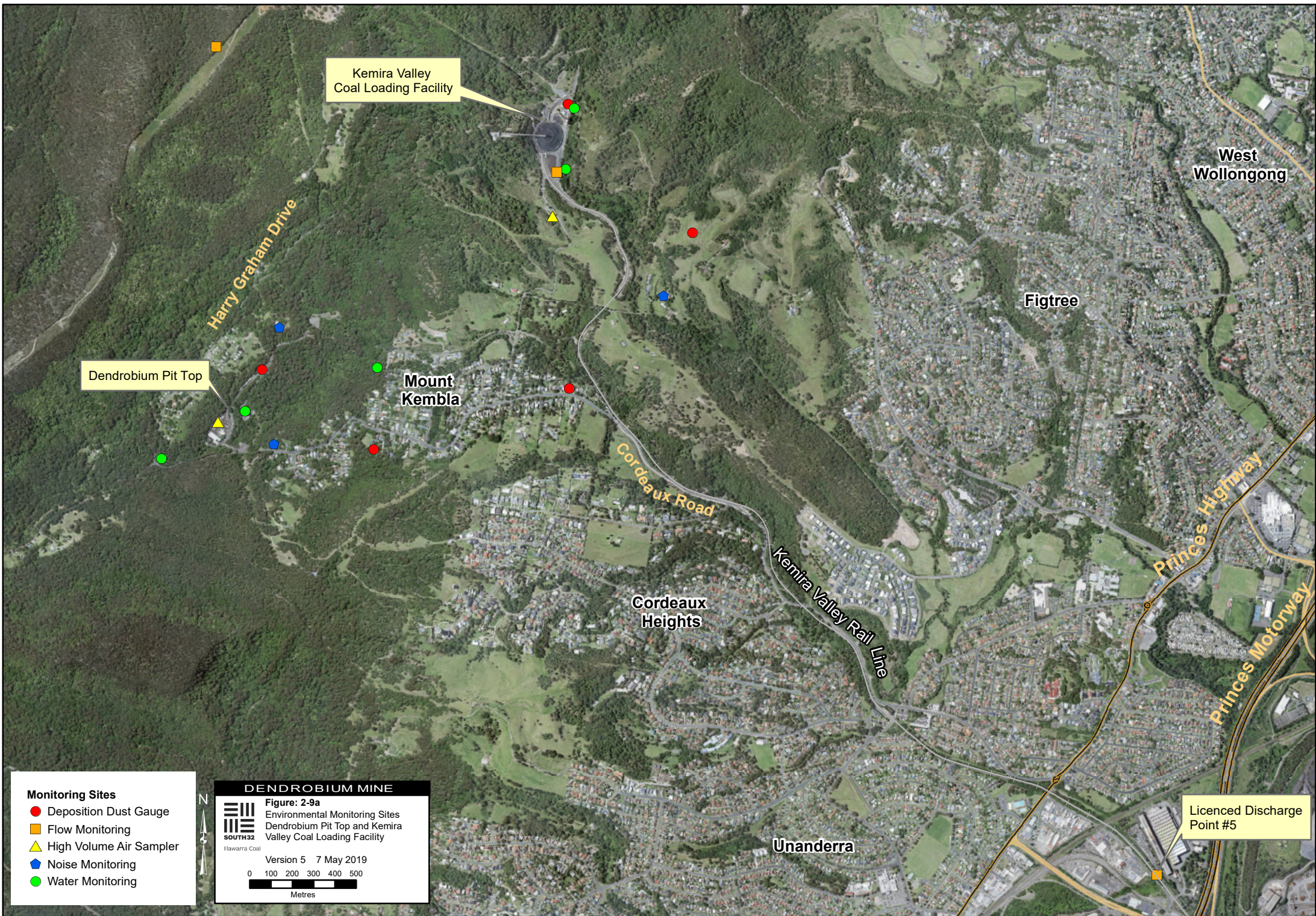
Table 2-2
Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

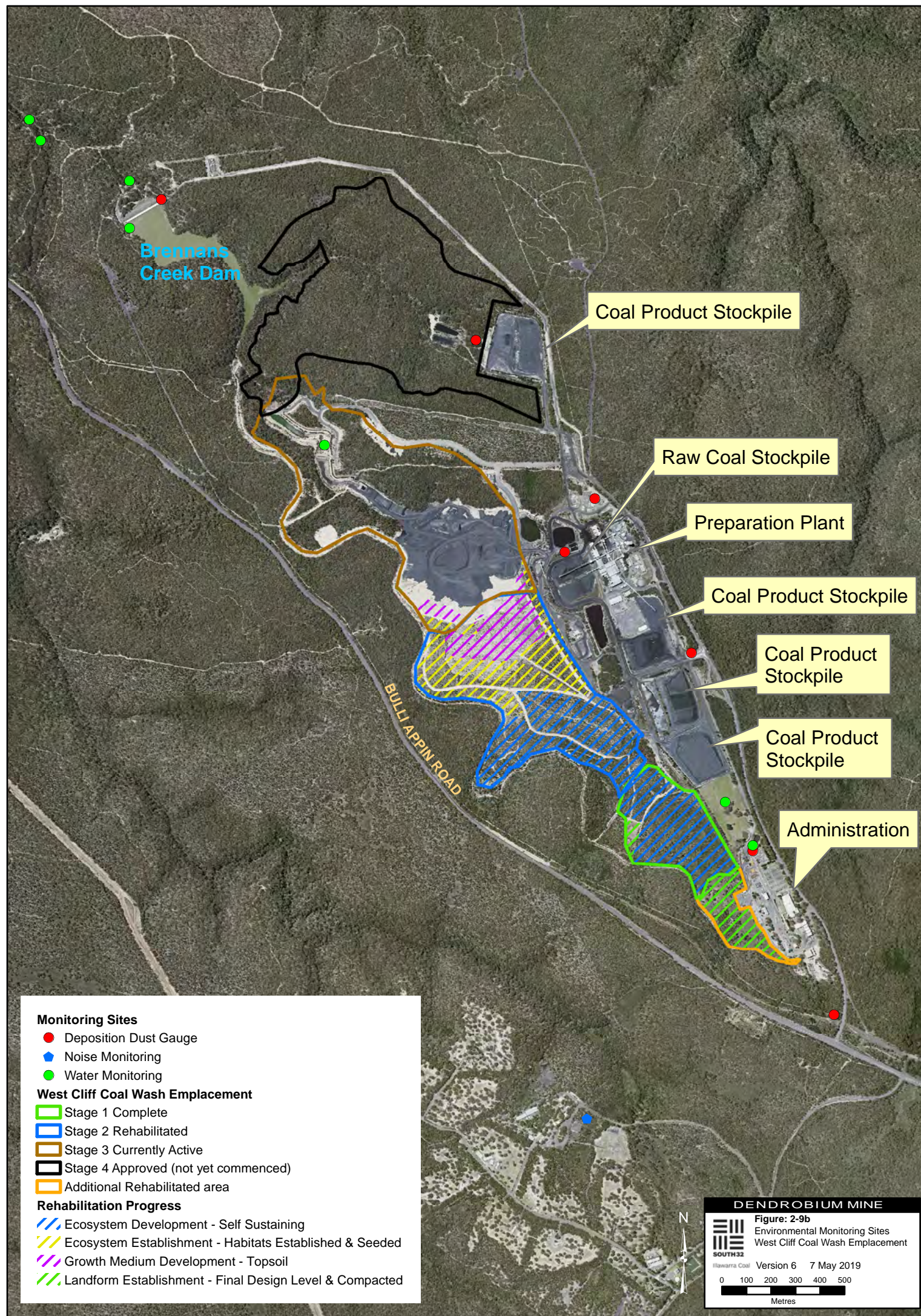
Environmental Aspect	Environmental Management Documentation	Environmental Monitoring ¹
Surface Facilities		
Noise	Noise Management Plan	<ul style="list-style-type: none"> Operational attended noise monitoring – R1, R6a, R39a. Operational real-time noise monitoring – as-needed basis. Locomotive noise monitoring – annual testing. Unattended rail noise monitoring. Community complaints.
Air Quality	Air Quality Management Plan	<ul style="list-style-type: none"> Meteorology – wind speed, wind direction, temperature and rainfall at Dendrobium Pit Top and Kemira Valley Coal Loading Facility. High Volume Air Samplers (HVAS) – Points 20 and 21. Dust deposition – Points 6, 9, 13, 17 and 18. Community complaints.
Surface Water	Water Management Plan	<ul style="list-style-type: none"> Surface water quality and volume – LDP 5, LDP 24, LDP 25. Surface water quality – Dend 7, Dend 10, Dend 12, Dend 13, PTSP. Erosion and sediment control structures.
Road Transport	Traffic Management Plan	<ul style="list-style-type: none"> Compliance with Drivers' Code of Conduct; community complaints.
Lighting	Lighting Management Plan	<ul style="list-style-type: none"> Inspections; lighting surveys and assessment; community complaints.
Waste	Waste Management Plan	<ul style="list-style-type: none"> Records of waste movements; waste contractor audits; site inspections.
Greenhouse Gas	Greenhouse Gas & Energy Efficiency Plan	<ul style="list-style-type: none"> Monitoring and recording of energy use and greenhouse gas emissions on a monthly basis.
West Cliff Stage 3 Coal Wash Emplacement		
Geotechnical Stability	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> Surveyed emplacement height. Compaction testing.
Surface Water	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> Water quality – emplacement subsurface drainage; as required by EPL 2504. Erosion and sediment control structures.
Noise	Bulli Seam Operations Noise Management Plan.	<ul style="list-style-type: none"> Attended noise monitoring – W-NS1.
Air Quality	Bulli Seam Operations Air Quality and Greenhouse Gas Management Plan	<ul style="list-style-type: none"> Dust deposition – W-DD1, W-DD3, W-DD8, W-DD10. Real-time PM₁₀ monitoring – W-PF1, W-PS1, W-PS2, W-PS3. Quarterly PM₁₀ monitoring – W-PS4.
Rehabilitation	West Cliff Coal Wash Emplacement Area Management Plan	<ul style="list-style-type: none"> Quarterly visual inspection of fixed photo points. Annual BioMetric vegetation assessment. Random meander transects. Fauna monitoring.
Underground Mining Areas		
Subsidence Movements	Area 3B SMP	<ul style="list-style-type: none"> Airborne Laser Scanning (ALS). 2D monitoring lines. 3D monitoring points and survey control.
Land Resources	Area 3B SMP	<ul style="list-style-type: none"> Inspection of mapped cliffs within 400 m of longwall face. Inspection of mapped steep slopes within 400 m of longwall face. Inspection of fire trails within 400 m of longwall face.

Table 2-2 (Continued)
Summary of the Current Environmental Monitoring Regime at the Dendrobium Mine

Environmental Aspect	Environmental Management Documentation	Environmental Monitoring ¹
Underground Mining Areas (Continued)		
Upland Swamps	Area 3B SMP	<ul style="list-style-type: none"> • <i>Observational, photo point, pool water level and erosion monitoring (impact sites)</i> – Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A and 35B. • <i>Observational, photo point, pool water level and erosion monitoring (reference sites)</i> – Swamps 2, 7, 15a, 22, 24, 25, 33, 84, 85, 86, 87 and 88. • <i>Shallow groundwater level monitoring (impact)</i> – Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 12, 13, 14, 23, 35A and 35B. • <i>Shallow groundwater level monitoring (reference)</i> – Swamps 2, 7, 15A, 22, 24, 25, 33, 84, 85, 86, 87 and 88. • <i>Soil moisture monitoring (impact)</i> – Swamps 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A and 35B. • <i>Soil moisture monitoring (reference)</i> – Swamps 2, 7, 15A, 22, 24, 25, 33, 84, 85, 86, 87 and 88. • <i>Monitoring of composition and distribution of species, swamp size and ecosystem function.</i>
Surface Water	Area 3B SMP	<ul style="list-style-type: none"> • <i>Flow monitoring</i> – WWU, WWL, WC21S1, WC15S1, DCU, DC13S1, DCS2, LA4S1. • <i>Water quality monitoring</i> – WWU1, WWU4, WC Pool 49, WWM1, WWM2, WWM3, WWL2, WC21_S1, WC21 Pools 30 and 53, WC15_S1 LA4_S1, LA4_S2, LA5_S1, LA5_S2, LA3 Pool 4, LA2 Pool 5, LA1, NDC4, NDC1, DCU3, DCL3, DC_S2, DC13_S1, SCU1, SCL. • <i>Observational and photo point monitoring</i> – Native Dog Creek, Wongawilli Creek, Donalds Castle Creek, WC21, WC15, LA4, DC13, LA6, ND1, WC6, WC7, WC8, WC9, WC12, WC16, WC18.
Biodiversity	Area 3B SMP	<ul style="list-style-type: none"> • <i>Upland swamp monitoring</i> – see above. • <i>Threatened frog species surveys.</i> • <i>Macroinvertebrate sampling (AUSRIVAS) protocol.</i>
Aboriginal Heritage	Area 3B SMP	<ul style="list-style-type: none"> • <i>Observational monitoring of known Aboriginal sites, including sandstone shelter sites.</i>
Groundwater	Groundwater Monitoring Program	<ul style="list-style-type: none"> • <i>Deep groundwater pressure monitoring</i> – network of vibrating wire piezometers that extend vertically from near the surface to within the coal measures. • <i>Deep groundwater chemistry monitoring</i> – S1870, S1885, S1888, S1889, S1890, S1907, S1934, S1911, S1929, S1932, S2001a, S2197, S2313, S2314. • <i>Shallow groundwater monitoring</i> – see upland swamps above. • <i>Underground mine water balance</i> – mine water pumping in and out of the mine, water in ventilation air, water in extracted coal and underground water storage and use. • <i>Mine water quality</i> – underground workings, inter-seam boreholes, flooded adjacent mine workings.
Built Features	Built Features Management Plans	<ul style="list-style-type: none"> • <i>As agreed with asset owners.</i>

¹ As required by management plans required under the Development Consent DA 60-03-2001, CCL 768 and Environment Protection Licence (EPL) 3241.





In the absence of approval of the Project, Illawarra Coal would undertake further analysis regarding the feasibility of extraction of some portions of Area 3C. There would be significant time and costs associated with pre-drainage of gas from the coal measures (including the target Wongawilli Seam) in Area 3C to allow for the safe removal of the coal. There may also need to be a period of care and maintenance for the other parts of the Dendrobium Mine to provide sufficient time to safely conduct pre-drainage of gas from Area 3C.

2.3 CORDEAUX COLLIERY

The Cordeaux Colliery is owned and operated by Endeavour Coal Pty Ltd, a wholly owned subsidiary of South32. The Cordeaux Colliery is located within CCL 768.

Coal production ceased at the Cordeaux Colliery towards the end of March 2001, and recovery of longwall mining equipment was completed in April 2001. Following the cessation of mining, the Cordeaux Colliery was placed on care and maintenance.

A number of surface facilities associated with the Cordeaux Colliery (Figure 2-10) have been progressively decommissioned and rehabilitated (Section 7). However, the Cordeaux Pit Top and the Corrimall No 3 shaft site were retained, as they have strategic value for access to potential future underground mining areas.

2.3.1 Cordeaux Pit Top

The Cordeaux Pit Top was used for personnel and materials access and coal clearance while the Cordeaux Colliery was operating. Access to the Cordeaux Pit Top is off Picton Road, approximately 16 km south-east from its intersection with the Hume Motorway.

Infrastructure used during the operation of the Cordeaux Colliery remains at the Cordeaux Pit Top (Figure 2-11).

The Cordeaux Pit Top currently functions as a storage facility and office space for Illawarra Coal staff undertaking environmental, survey and exploration activities within Illawarra Coal tenements.

2.3.2 Approval History

The Cordeaux Colliery, including the Cordeaux Pit Top, was approved by Development Consent D74/134, issued by the Wollongong City Council on 20 December 1974. Construction subsequently commenced in 1976.

CCL 768 was issued under the NSW *Coal Mining Act, 1973* in October 1991. It consolidated a number of mineral leases, coal leases, private land leases and mining purposes leases held for the Cordeaux Colliery as well as various future mining areas, including the Dendrobium Mine and the Project Area.

2.3.3 Environmental Monitoring and Management

Care and maintenance activities and other activities at the Cordeaux Colliery are primarily managed through:

- EPL 611 issued by the EPA under the NSW *Protection of the Environment Operations Act, 1997* (PoEO Act); and
- the MOP approved under the conditions of CCL 768.

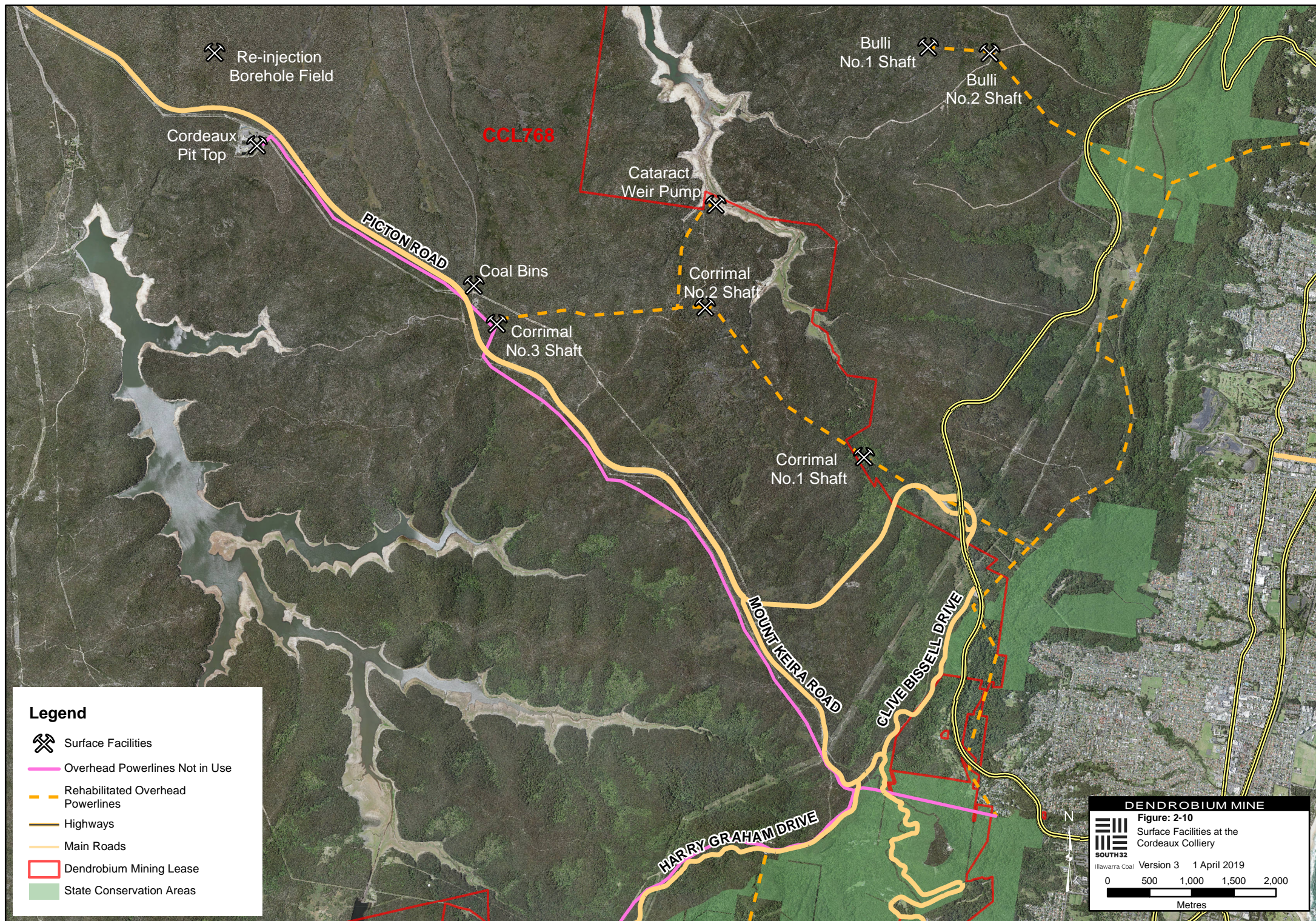
2.4 BULLI SEAM OPERATIONS

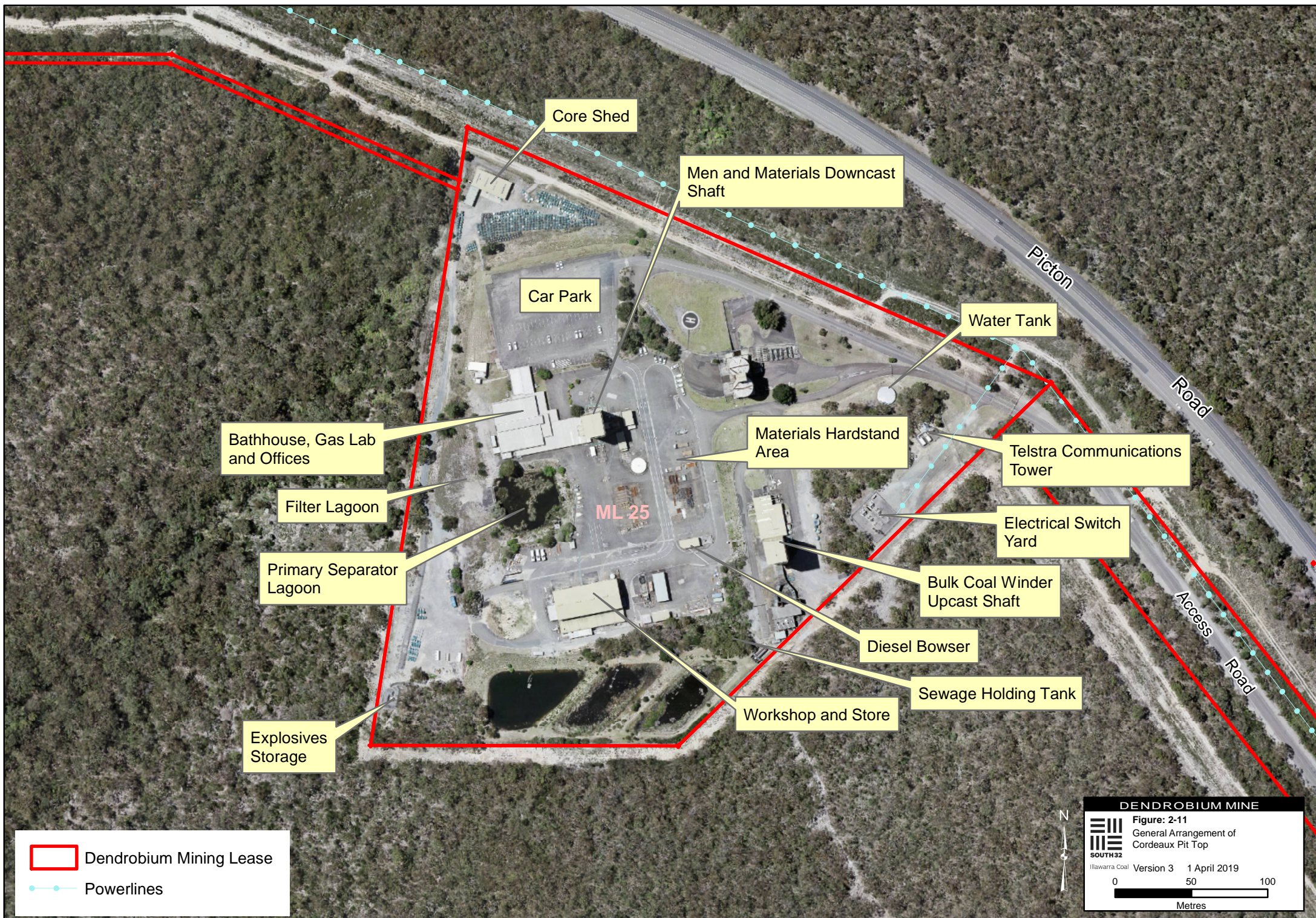
The Bulli Seam Operations (Project Approval 08_0150) was approved in December 2011.

The Bulli Seam Operations interacts with the Dendrobium Mine via the following:

- a portion of the ROM coal from the Bulli Seam Operations is processed at the Dendrobium CPP; and
- coal wash from the Dendrobium CPP is backloaded into empty Bulli Seam Operations product coal trucks and is transported to the West Cliff Coal Wash Emplacement.

A general arrangement of the West Cliff Coal Wash Emplacement is shown in Figure 2-12.





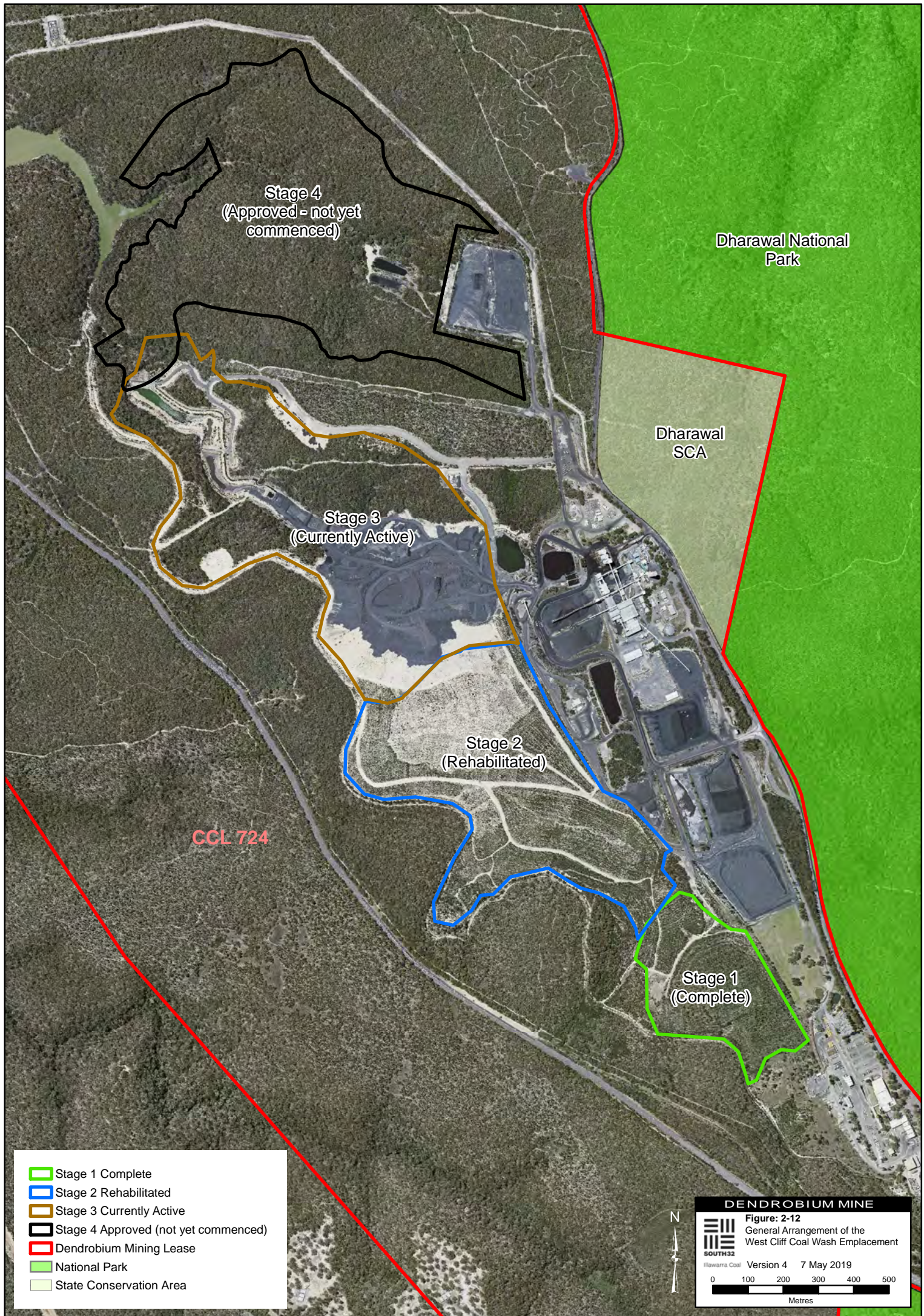
DENDROBIUM MINE

Figure: 2-11
General Arrangement of
Cordeaux Pit Top

SOUTH32
Illawarra Coal

Version 3 1 April 2019

0 50 100
Metres



The West Cliff Coal Wash Emplacement will comprise four stages. Stage 1 and Stage 2 of the Coal Wash Emplacement were completed in 2001 and 2010, respectively. Coal wash is approved for emplacement at:

- the West Cliff Stage 3 Coal Wash Emplacement under Development Consent DA 60-03-2001 for the Dendrobium Mine; and
- the West Cliff Stage 4 Coal Wash Emplacement under Project Approval 08_0150 for the Bulli Seam Operations.

Emplacement in Stage 3 is underway and Stage 4 has not yet commenced.