



Illawarra Coal

**Annual Environmental Management Report
Dendrobium Mine and Cordeaux Colliery**

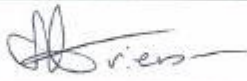



AEMR FY15

DENDROBIUM MINE AND CORDEAUX COLLIERY



1. Mine Details

Name of Mine		Dendrobium Mine and Cordeaux Colliery	
Titles/Mining Leases	ML1510, CCL768, ML1566, ML25, ML28, ML23, ML30, ML24, Lease No. 66 portion D1106, MPL205		
MOP Commencement Date Dendrobium	August 2010	MOP Completion Date	September 2015
MOP Commencement Date Cordeaux	October 2012	MOP Completion Date	October 2019
AEMR Commencement Date	01 July 2014	AEMR End Date	30 June 2015
Name of Leaseholder	Dendrobium Coal Pty Ltd (Dendrobium Mine), Endeavour Coal Pty Ltd (Cordeaux Colliery)		
Name of Mine Operator (if different)	Dendrobium Coal Pty Ltd		
Reporting Officer	Michelle Grierson		
Title	Environmental Officer		
Signature & Date	 27/8/15		
General Manager Dendrobium Coal	Wayne Price		
Signature & Date	 27/8/15		

¹MOP was resubmitted June 30th 2015 for the period of FY15-FY22. An extension was granted for the FY10-FY15 MOP until 30th September.

Table of Contents

1. Mine Details	2
2. Introduction	6
2.1. Overview of Operations	6
2.2. Consents, Leases and Licences	9
2.3. Mine Contacts	11
2.4. Actions Required at Previous AEMR Review	12
3. Operations during the Reporting Period	13
3.1. Exploration	13
3.2. Land Preparation	14
3.3. Construction	14
3.4. Mining	15
3.5. Mineral Processing	16
3.6. Ore and Product Stockpiles	17
3.7. Waste Management	17
3.8. Water Management	19
3.9. Hazardous Material Management	24
4. Environmental Management and Performance	25
4.1. Air Pollution	25
4.2. Erosion and Sediment	28
4.3. Surface Water Pollution	29
4.4. Groundwater	34
4.5. Contaminated Polluted Land	36
4.6. Threatened Flora	37
4.7. Threatened Fauna	37
4.8. Weeds	38
4.9. Blasting	39
4.10.Operational Noise	39
4.11.Visual, Stray Light	45
4.12.Aboriginal Heritage	46
4.13.Natural Heritage	46
4.14.Spontaneous Combustion	47
4.15.Bushfire	47
4.16.Mine Subsidence	48
4.17.Hydrocarbon Contamination	62

4.18.Methane Ventilation	62
4.19.Public Safety	63
4.20.Other Issues and Risks	65
5. Community Liaison	66
5.1. Rehabilitation for reporting period	71
5.2. Activities Proposed in the Next AEMR Period	78
6. References	80
7. Appendices	82

Figures

Figure 1: Bulk Storage Cover under Construction in August 2014.	15
Figure 2: ROM Production: FY07 to FY15	15
Figure 3: EPL Dust Deposition Gauge, Average Results Summary as at 30 June 2015	27
Figure 4: TSP Results	27
Figure 5: PM10 Results	28
Figure 6: Water Quality Data from the Mine Water Holding Lagoon (2001 to 2015).	33
Figure 7: pH and Conductivity at the Cordeaux Filter Lagoon Underflow	33
Figure 8: Principal Flowchart in “Cordeaux Reservoir DSC Notification Area Contingency Plan”.	34
Figure 9: Mine Water Balance July 2014 - June 2015	35
Figure 10: Weed Zones Surveyed During the Monthly Site Environmental Inspection.	38
Figure 11: Site R1 Noise Compliance (LAeq, 15 minute) during the Reporting Period	42
Figure 12: Site R6a Noise Compliance LAeq, 15min during the Reporting Period.	43
Figure 13: Site R39A Noise Compliance LAeq, 15min during the Reporting Period.	44
Figure 14: Dendrobium Community Complaints FY15	67
Figure 15: Photo locations monitoring rehabilitation	73
Figure 16: Landform established 12/8/2014	75
Figure 17: Landform Rehabilitated 10/03/2015	75

Tables

Table 2.2-1: Development Consent Approvals associated with the Dendrobium Mine.	9
Table 2.2-2: Mining Leases associated with the Dendrobium Mine.	10
Table 2.2-3: Licences associated with the Dendrobium Operations.	10
Table 2.2-4: Current Mining Approvals for the Dendrobium Operations.	11
Table 2.2-5: Consents Leases and Licenses Cordeaux Colliery	11
Table 2.3-1: Contacts	11

Table 2.4-1: Issues Arising from the Previous Dendrobium AEMR	12
Table 3.4-1: Area 3 Longwall Starts and Finish Dates.	16
Table 3.5-1: Cumulative Production and Waste Schedule	16
Table 3.7-1: Waste Streams and Total Volumes	17
Table 3.7-2: Recycled Volumes for Reporting Period	17
Table 3.7-3: Oil and Grease Volumes	18
Table 3.7-4: Volumes for Reporting Period	19
Table 3.8-1: Sydney Water Consumption for Dendrobium Mine	20
Table 3.8-2: Stored Water – Dendrobium	21
Table 3.8-3: Rainfall during the Reporting Period	22
Table 3.8-4: Stored Water – Cordeaux	23
Table 3.8-5: Rainfall at Cordeaux FY09 to FY15	23
Table 4.1-1: Relevant Standard for Air Quality	26
Table 4.3-1: Summary of Water Quality Results – Dend 7 (Upstream of KVCLF)	30
Table 4.3-2: Summary of Water Quality Results – Dend 10 (Downstream of KVCLF)	30
Table 4.3-3: Summary of Water Quality Results – Dend 12 Upstream of Pit top	31
Table 4.3-4: Summary of Water Quality results – Dend 13 Downstream of Pit top	31
Table 4.3-5: Monitoring Requirements and Prescribed Limits for LDP5	31
Table 4.3-6: EPL Annual Return Monitoring Summary	32
Table 4.4-1: TARP Conditions Throughout the Reporting Period	34
Table 4.4-2: Water Balance Statistics for the period 1st July 2014 – 30th June 2015.	35
Table 4.10-1: LAeq (15 minute) and Sleep Disturbance Criteria (1 minute)	41
Table 4.10-2: Rail Haulage Noise Criteria	45
Table 4.16-1: Monitoring program for Dendrobium Mine	50
Table 4.16-2: Impacts for Longwall 10.	60
Table 4.16-3: Summary of LW11 impacts.	61
Table 4.19-1: Site Safety Risks and Control Mechanisms	63
Table 4.19-2: Public Safety and Controls around Mining Areas	64
Table 4.20-1: Environmental Audits undertaken FY15	65
Table 5-1: Membership of the DCCC at 30 June 2015.	68
Table 5-2: Summary meeting information from of community consultation	68
Table 5.1-1: Dendrobium Rehabilitation Summary for the Reporting Period.	71
Table 5.1-2: Maintenance Activities on Rehabilitated Land	74
Table 5.1-3: Cordeaux Rehabilitation Summary for the Reporting Period	77
Table 5.1-4: Maintenance Activities on Rehabilitated Land	78

2. Introduction

Background

This Annual Environmental Management Report (AEMR) for Dendrobium Mine and Cordeaux Colliery is for the period 1 July 2014 to 30 June 2015. The report has been developed in accordance with the NSW Department of Trade, Investment, Regional Infrastructure and Services (DTIRIS) 'EDG03' Guidelines to the Mining, Rehabilitation and Environmental Management Process-MREMP Guideline. The AEMR is submitted to relevant agencies as per the requirements of Schedule 8, Condition 5 of the Dendrobium Development Consent. A copy of the report is publicly available via the South32 website under Dendrobium Mine: <http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document>

2.1. Overview of Operations

Dendrobium Mine

Dendrobium Mine is an underground mining operation approved in November 2001 by the Minister of Department of Urban Affairs and Planning. The mine is owned and operated by Dendrobium Coal Pty Ltd, a wholly owned subsidiary of South32. It is operated on a continuous basis, 24 hours a day and 7 days a week.

The mining operations are located immediately adjacent to Mt Kembla, approximately 8km west of Wollongong, NSW, on the Illawarra Escarpment. Mt Kembla village located within 500m of the Pit Top site and has close historical links with coal mining.

Dendrobium Mine extracts coal from the No. 3 Seam (Wongawilli Seam) of the Southern Coalfields. Four mining areas make up the approved mine plan for Dendrobium and are named Areas 1, 2, and 3A and 3B respectively. Longwall mining is currently being undertaken in Area 3B (refer to Plan 1). The mine primarily produces hard coking coal and is approved to produce up to 5.2 million tonnes per annum until 31 December 2030. Dendrobium Mine is comprised of a number of sites as detailed below.

Dendrobium Pit Top

The Pit Top consists of:

- Administration buildings;
- Workshop, machinery and equipment storage areas;
- People and materials access to the underground workings via the Dendrobium tunnel;
- A sediment pond;
- A grey water treatment and oily water separation facility.

The Pit Top layout is shown in Plan 2.

Kemira Valley Coal Loading facility (KVCLF)

Coal is transported from the underground workings to KVCLF via a conveyor network, reaching the surface via the Kemira Valley Tunnel. The coal is then fed through a coal sizer, into a rill tower and deposited onto a 150,000 tonne capacity stockpile. Coal is loaded onto trains via an enclosed rail-loading chute. The Kemira Valley Layout is shown in Plan 3.

Kemira Valley Rail Line

The private rail line is used to transport the coal from KVCLF to the Dendrobium Coal Preparation Plant (DCPP). The Processing and Logistics Department at Illawarra Coal manage the rail operations.

Ventilation Shaft 1

The fan housings associated with Ventilation Shaft 1 were decommissioned in October 2008 and relocated to Ventilation Shaft 3. This shaft now provides intake air to the underground workings.. The Ventilation Shaft 1 site layout is outlined in Plan 4.

Ventilation Shaft 2/3 Site (Mining Lease 1566)

Construction of Ventilation Shafts 2 and 3 commenced during 2006 and was completed in 2008. Ventilation Shaft 2 (downcast) and Shaft 3 (upcast) provide ventilation to the current and future underground workings in Area 3. The Ventilation Shaft 2/3 site layout is outlined in Plan 5.

Dendrobium Coal Preparation Plant (DCPP)

The DCPP is located within the Port Kembla Steelworks. The plant provides washing facilities for Dendrobium coal product prior to being blended with the No. 1 Seam coal in the coke making process at the Port Kembla Steelworks. The Processing and Logistics Department at Illawarra Coal manages the DCPP.

Cordeaux Colliery

Cordeaux Colliery is owned and operated by Endeavour Coal Pty Ltd, a wholly owned subsidiary of South32. 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 Colliery was placed on "Care and Maintenance". Throughout this reporting period, Cordeaux Colliery maintained this status.

The Cordeaux Colliery pit-top site functions as the central headquarters of Illawarra Coal's Energy and Engineering Department and the Environmental and Community Off-site Team. Dendrobium Mine's future underground mining operations consider Cordeaux Colliery pit-top site and Corrimal No. 3 shaft site to be of potentially significant strategic value. Non production sites that are of no strategic value are being progressively decommissioned and rehabilitated in line with planned arrangements.

The Cordeaux Colliery Pit Top is wholly contained within an area of approximately 10.7 Ha located within the Sydney Catchment Area (Plan 11&12). Cordeaux Colliery was serviced by four vertical shafts consisting of:

- Men and Materials (M&M) access shaft.
- Bulk Coal Winder (BCW) shaft. The BCW shaft was also the second means of egress and contained the mine's two main ventilation fans.
- Corrimal No.3 Shaft – mine ventilation fan shaft (Ex-Corrimal Mine). This fan was used to complement ventilation flow through Cordeaux mine.
- Corrimal No.2 Shaft - mine ventilation fan shaft (Ex-Corrimal Mine). This fan was used to complement ventilation flow through Cordeaux mine.

Cordeaux Colliery is considered a “zero discharge site”, prohibiting liquid discharge directly to the surface lands of the Sydney Catchment Area. Cordeaux Colliery Pit Top has approximately 40% of its area dedicated to surface water management (Plan 13).

As Cordeaux Colliery is currently deemed to be under ‘care and maintenance’, the following activities were not undertaken (or are not relevant) during the reporting period and therefore have been excluded from this report.

- Exploration
- Land Preparation
- Construction
- Mining
- Mineral Processing/Coal Wash
- Stockpiling of Ore and Product
- Blasting
- Spontaneous Combustion
- Mine Subsidence
- Air Pollution
- Operational Noise
- Community Relations

2.2. Consents, Leases and Licences

Lists of current development consent, leases and licences for Dendrobium Mine and Cordeaux Colliery are included in the following tables.

Dendrobium Mine

Table 2.2-1: Development Consent Approvals associated with the Dendrobium Mine.

Development Approvals	Purpose	Approval Date	Expiry Date
DA 60-03-2001	Dendrobium Underground Coal Mine and associated surface facilities and infrastructure	20/11/2002	21/12/2023
MOD-11-2-2002	Permitting the access of construction traffic to the Bradford Breaker Emplacement Area (Drift Spoil Emplacement Area 1) via Cordeaux Road and Benjamin Road, Mt Kembla.	28/02/2002	21/12/2023
MOD-36-5-2002-I	Application for commencement of vehicles accessing Benjamin Road.	15/08/2002	21/12/2023
60-03-2001 MOD3	Modification to Development Consent (Dept Planning)	28/08/2003	21/12/2023
60-03-2001 MOD4	Modification to Development Consent (Dept Planning)	05/4/2006	21/12/2023
60-03-2001 MOD5	Modification to Development Consent (Dept Planning)	30/11/2006	21/12/2023
60-03-2001 MOD6	Area 3 Consent Modification	08/12/2008	31/12/2030
60-03-2001 MOD7	Strategic Biodiversity Offset	02/04/2015	31/12/2030
D74/134	Cordeaux Colliery Development Consent	20/12/1974	n/a

Table 2.2-2: Mining Leases associated with the Dendrobium Mine.

Mining Lease/ Sub- Lease	Number	Issue Date	Expiry Date	Mine Site
Mining lease	1510	24/04/2002	24/04/2023	Dendrobium
Consolidated Coal Lease	768	05/12/2014	07/10/2029	Dendrobium
Mining Lease	1566	07/09/2005	07/09/2026	Dendrobium
Mining Lease	ML25	31/10/1975	As per CCL768	Cordeaux
Mining Lease	ML28	31/10/1975	As per CCL768	Cordeaux
Mining Lease	ML23	02/09/1981	As per CCL768	Cordeaux
Mining Lease	ML30	18/10/1976	As per CCL768	Cordeaux
Mining Lease	ML24	02/02/1976	As per CCL768	Cordeaux
Mining Lease	Lease No. 66 portion D1106	18/10/1976	As per CCL768	Cordeaux
Mining Purposes Lease	MPL205	29/09/1982	Relinquished (~2003)	Cordeaux

Table 2.2-3: Licences associated with the Dendrobium Operations.

Licences/Consents	Number	Issue Date	Expiry Date
Licence to Store – Explosives (WorkCover)	XSTR100152	14/01/2008	10/01/2018
Radiation Licence (EPA)	RL30137	27/07/2015	27/07/2016
Environment Protection Licence	3241	August 2000	n/a
Environment Protection Licence	611	December 1999	n/a
Water Access Licence (Office of Water)	10WA118772	1/07/2013	27/06/2018
Exploration Licence	A143	28/07/1979	7/11/2018
Exploration Licence	A374	24/10/1986	24/10/2017
SCA Access Consent	D2015/17013	13/03/2015	13/03/2020

Table 2.2-4: Current Mining Approvals for the Dendrobium Operations.

Current Mining Approvals	Number	Issue Date
SMP Approval - Longwalls 6-8 and 19	S03/01444	28/06/2010
SMP Approval-Longwalls 9 to 13	DGTO13/42	5/2/2013

Cordeaux Colliery

Cordeaux Colliery is held under CCL 768, which is administered by the Department of Trade & Investment. The relevant consents, leases, and licences for Cordeaux Colliery are presented in Table 2.2-5.

Table 2.2-5: Consents Leases and Licenses Cordeaux Colliery

Facility / Document	Document No	Issue Date	Expiry
Consolidated Coal Lease	768	29/10/91	07/10/2029
Environment Protection Licence	611	1/12/99	n/a
Development Consent (Wollongong City Council)	D74/134	20/12/74	n/a
Exploration Licence	A338	08/10/1984	08/10/2019
SCA Access Consent	D2015/17013	13/03/2015	13/03/2020

2.3. Mine Contacts

Table 2.3-1: Contacts

Position	Name	Number
General Manager- Dendrobium	Wayne Price	(02) 4255 4450
Surface Operations Manager- Cordeaux	Mick Loney	(02) 4286 3394
Environment and Community Supervisor	Peter McMillan	(02) 4255 4480
Environmental Officer	Michelle Grierson	(02) 4255 4463

2.4. Actions Required at Previous AEMR Review

Table 2.4-1: Issues Arising from the Previous Dendrobium AEMR

Action Required	Where dealt with in this AEMR
Detail should be included about the purpose of each of the Development Approvals.	
The expiry date of the Dendrobium Mining Operations Plan should be included.	Section 1 – Mine Details and Section 2.2 – Consents, Leases and Licences
The Cordeaux Mining Operations Plan also needs to be included.	
Land preparation associated with exploration activities should be covered in this section.	Section 3.2 – Land Preparation
The Waste management section needs to cover all relevant sites; Dendrobium, Cordeaux and possibly No. 2/3 shaft site.	Section 3.7 – Waste Management
The Water management sections needs to cover the No. 2/3 shaft site, and possibly other sites with water management issues (No. 1 Shaft, O'Briens Drift, Corrimal shaft sites).	Section 3.8 – Water Management
The Hazardous Material management section needs to cover diesel storage at Dendrobium.	Section 3.9 – Hazardous Material Management
Air pollution is potentially an issue at Cordeaux and the various shaft sites and should be covered, at least briefly.	Section 4.1 – Air Pollution
Erosion and Sediment needs to cover the No. 2/3 shaft site, and possibly other sites (No. 1 shaft, O'Briens Drift, Corrimal shaft sites)	Section 4.2 – Erosion and Sediment
Threatened Fauna, Threatened Flora, and Weeds should also cover the shaft sites.	Sections 4.6, 4.7, 4.8 and 5.1
Rehabilitation summary tables needs to include the areas associated with the Dendrobium Tunnel Sinkhole Rehabilitation Project.	Section 5.1
Maintenance activity tables – Areas need to be included for each of the relevant sections; for example, areas adversely affected by weeds.	Section 5.1

Action Required	Where dealt with in this AEMR
<p>Rehabilitation Plans – plans need to be included for each of the sites covered by the AEMR, including O’Briens Drift, the Corrimal No.2 and No.3 Shaft Sites and potentially Kemira (if it is still covered by the mining lease). Plans need to differentiate between disturbed areas, rehabilitation undertaken prior to the reporting period, rehabilitation undertaken in the reporting period and the rehabilitation to be undertaken in the next 12 months.</p>	<p>Plan 10 B</p>

3. Operations during the Reporting Period

3.1. Exploration

Dendrobium Mine

Drilling Program

A Review of Environmental Factors (REF) within CCL768 are prepared and submitted to the Sydney Catchment Authority (SCA) and the NSW Department of Trade and Investment for exploration activities as required basis. During FY15 the Wongawilli Seam Exploration Program included 12 coal quality exploration boreholes with two redrilled coal quality boreholes. The purpose of the coal quality boreholes was to assess coal thickness, depth of seam, quality, gas content, and to assist in determining possible future mining conditions by conducting geotechnical tests on the core samples. Plan 6 provides an overview of the locations of the exploration boreholes drilled during the reporting period.

Rehabilitation/Remediation

All of the exploration boreholes drilled during the reporting period (shown in Plan 6) have been rehabilitated. Most of these boreholes contain piezometers which are used for groundwater monitoring. The piezometers are embedded in the sealing cement, attached to surface head-works or an in-ground pit with a data logger. Once monitoring is not required monitoring sites are remediated and then rehabilitated. Remediation includes removal of any monitoring headwork/standpipes and cutting off the surface casing to below ground level. During rehabilitation erosion control works and re-vegetation is undertaken as required. In the Rehabilitation cost estimation model (CCL768) the following items are covered:

- All material associated with the drilling activities removed from the site.
- Removal of above ground tanks.
- Filling in of any sumps (only one borehole had a sump due to the difficult terrain) and re-contouring/stabilising the site (if required) to prevent erosion;
- Top soil, rocks and logs, set aside from the site during initial setup, returned to site to arrest water flow over disturbed ground and provide structure for emergent seedlings.

Cordeaux Colliery

No exploration works occurred at the Cordeaux site as it is under 'care and maintenance'.

3.2. Land Preparation

Dendrobium Mine

No land preparation works occurred at the Dendrobium Pit Top during the reporting period with the exception of activities which are detailed in the Dendrobium Tunnel Subsidence Rehabilitation Section.

Land preparation associated with exploration activities such as boreholes includes minimal land disturbance and the use of existing fire trails if possible. Where sensitive areas have been highlighted in a Review of Environmental Factors study the area should be suitably flagged with Caution/Do Not Enter tape. Lopping of vegetation is to be limited to what is required for safe access of drilling equipment. Lopped material is to be left on site and used in rehabilitation.

Cordeaux Colliery

No land preparation works occurred at the Cordeaux site as it is under 'care and maintenance'.

3.3. Construction

Dendrobium Mine

Construction Activities

During the reporting period Dendrobium Mine constructed a bulk storage cover on the portal road which was completed in August 2014. The works involved the erection of a counter-levered steel awning to assist in the weatherproofing storage of items prior to being transported underground.



Figure 1: Bulk Storage Cover under Construction in August 2014.

Emplacement Operations

Activities associated with the West Cliff Emplacement Area (where the coal wash from the Dendrobium operations is emplaced) are addressed in the Bulli Seam Operation Annual Environmental Management Report. Where possible Illawarra Coal diverts coal wash for beneficial uses such as engineered fill with the aim to minimise the volume emplaced at the West Cliff Emplacement Area.

3.4. Mining

Dendrobium Mine

The Run of Mine (ROM) product for the reporting period was 4,391,360 tonnes with a saleable product yield of 78%. A comparison showing the ROM production at Dendrobium Mine for the past eight reporting periods is provided in Figure 2.

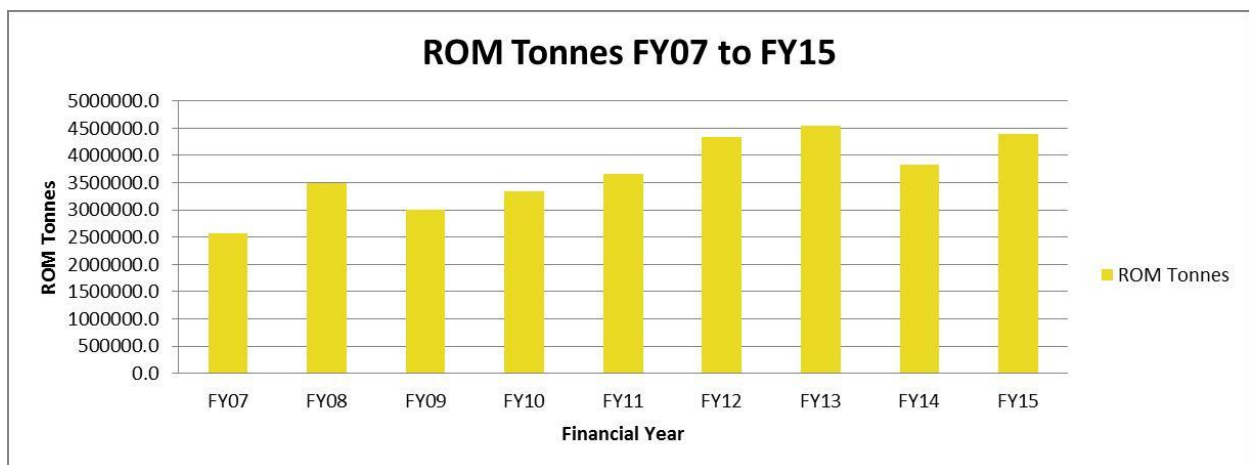


Figure 2: ROM Production: FY07 to FY15

The start and finish dates for the current Dendrobium mining domain is provided in Table 3.4-1.

Table 3.4-1: Area 3 Longwall Starts and Finish Dates.

Longwall Number	Start Date	Finish Date
7	4 th May 2011	23 rd January 2012
8	24 th February 2012	29 th of December 2012
9	9 th February 2013	2 nd June 2014
10	20 th January 2014	20 th January 2015
11	18 th February 2015	Currently Mining, predicted to be completed in December 2015.

3.5. Mineral Processing

Dendrobium Mine

Mineral processing of the ROM coal produced at Dendrobium Mine is undertaken at the DCP. Coal wash (or reject) is emplaced at the West Cliff Colliery Emplacement Area. Additional information on the emplacement operations is provided in the Bulli Seam Operation's Annual Environmental Management Report. The production and waste schedule for Dendrobium Mine is outlined in Table 3.5-1.

Table 3.5-1: Cumulative Production and Waste Schedule

	Start of Reporting Period	At End of Reporting Period	End of Next Reporting Period (Estimate)
Topsoil stripped (ha) #	0	0	0
Topsoil used/spread (ha) #	0	0	0
Waste Rock	0	0	0
Ore	0	0	0
Processing Waste (Coal Wash Tonnes)	N/A	1,127,780	1,000,000
Product (ROM tonnes)	N/A	4,391,360	5,100,000

#Refer to Bulli Seam Operation Annual Environmental Management Report for West Cliff emplacement operations

3.6. Ore and Product Stockpiles

Dendrobium Mine

A 150,000 tonne capacity stockpile, located at KVCLF, is used to store ROM coal prior to it being loaded into trains for transport to the DCP. Train movements are limited to between 6am and 11pm as required by the Dendrobium Development Consent.

During the reporting period, 2,603 trains were loaded at KVCLF and transported 4,329,219 tonnes of ROM coal to DCP. The difference between ROM production and coal transported tonnes occurs as ROM coal is measured at Dendrobium Mine prior to placement on the stockpile and coal transported is measured at the coal preparation plant (i.e. stockpile balance accounts for the difference).

3.7. Waste Management

Dendrobium Mine

General Waste

General waste bins are transported from Dendrobium pit top to Cleanaway's depot at Charcoal Place, Unanderra. The waste is then tipped onto a sorting pad and waste is directed into its correct waste stream for recycling or disposal. Dendrobium Mine's main solid waste streams and volumes are listed in Table 3.7-1. Recycled volumes for Dendrobium Pit top are listed in Table 3.7-2.

Table 3.7-1: Waste Streams and Total Volumes

Waste Stream	Treatment / Disposal	Volume (Tonnes)
Timber	Recycled off site	111.75
Cardboard and paper	Recycled off site	10.98
Steel and Scrap Metal	Recycled off site	159.77
Commingle	Recycled off site	6.705
Particulate (diesel) filters	Off-site treatment and disposal	52.55
General Waste	Landfill	290.952

Table 3.7-2: Recycled Volumes for Reporting Period

Year	Total recycled (tonnes)	Total disposed (tonnes)	% Recycled
FY15	536	748	72

Oil and Grease Containment and Disposal

Oil and Grease produced onsite is transported from the pit top for processing by a licenced contractor. Oil sumps and traps are in place and are periodically inspected by site personnel and emptied as required by a licensed contractor.

Table 3.7-3: Oil and Grease Volumes

Waste Stream	Volumes (Tonnes)
Oil	1,995.10
Oily water/Sludge	36,184.60
Hydraulic Oil	122,107.00

Coal wash management

During the reporting period, Illawarra Coal diverted 121,000 tonnes of coal wash for beneficial uses such as engineered fill with over 1 million tonnes diverted since 2009. Illawarra Coal continues to research, develop and implement alternative uses for coal wash and therefore minimise the volume emplaced at the West Cliff site. Illawarra Coal is a member of 'Sustainability Advantage', a business support service.

One of the projects from the 'Sustainability Advantage' is a road base mixture which utilises coal wash with other recycled materials such as fly ash to produce a material suitable for a variety of applications. In late 2014 the RMS published specification of this material, based on the success in trials of this product. Local councils have now been engaged to commence trials in order to gain approval for the product in their respective areas. In 2014 this project was awarded a Green Globe from the NSW Government in recognition of its success in sustainable Innovation. Other sustainable projects that look to incorporate coal wash which have yielded positive results also include cement making and brick making. These projects are expected to come online in 2015/16.

Cordeaux Colliery

General Waste

General waste produced at Cordeaux Colliery is negligible throughout the reporting period due to the inactivity of the mine and the small number of personnel utilising offices on site. Periodically, Trans-Pacific Cleanaway waste management services attend site to remove general waste from the bins. The amount of waste from Cordeaux Colliery is shown in Table 3.7-4. Waste such as cardboard, paper and batteries are set aside for recycling or reuse.

Table 3.7-4: Volumes for Reporting Period

Waste Stream	Treatment / Disposal	Volume
Commingle	Recycled off site	2.7 tonnes
General Waste	Landfill	27 tonnes

Sewage Treatment / Disposal

All bathhouse and sewerage effluent is contained on site and taken off site to the Port Kembla Sewerage Treatment Plant by Trans-Pacific (a licensed contractor) for treatment and disposal.

Oil and Grease Containment and Disposal

No bulk oils or greases are stored on site. Oil sumps and traps remain in place and are periodically inspected by site personnel and emptied as required by a licensed contractor. No maintenance activities are undertaken on site which would potentially generate industrial waste or remnant oils.

Security barricading and shielding were installed around and above the oil separator at the pit top workshop to prevent the entrapment of animals in the separator as noted in the previous reporting period. These arrangements have remained in place this reporting period.

Vent Shaft 2/3

During the reporting period, any waste brought to Vent Shaft 2/3 site was taken off site and disposed of through the Dendrobium Mine processes.

3.8. Water Management

Dendrobium Mine

Water Supply and Use

Underground and surface operations at Dendrobium utilise a combination of potable and recycled mine water. The 'Recycled Water Project' was implemented during the first quarter of 2008, which resulted in recycled water being used for general-purpose applications on the surface.

Potable Water use

Potable Sydney mains water, is currently used for the longwall hydraulic roof supports (emulsions used underground require high quality water for batching) and surface amenities such as the kitchen and bathhouse facilities. Potable water usage for the reporting period was 33.7ML, a 9.19% increase compared to the previous reporting period. Usage is tracked on a monthly basis and annual consumption is shown in Table 3.8-1 below.

Table 3.8-1: Sydney Water Consumption for Dendrobium Mine

Year	Volume (ML)	Water efficiency (L/tonne)
FY07	105.5	41.5
FY08	89.3	25.6
FY09	21.8	7.3
FY10	22.2	6.9
FY11	23.8	6.5
FY12	24.5	5.7
FY13	26.7	5.9
FY14	30.6	7.96
FY15	33.7	7.67

Recycled Water use

Recycled water is sourced from the Nebo Workings and used for various purposes on surface and underground operations:

- Surface Operations:
 - Portal Road dust suppression;
 - Wash down bay;
 - General hose down; and
 - Cleaning and firefighting.
- Underground Operations:
 - Secondary support;
 - Development and production units; and
 - Dust suppression and firefighting.

Surface Water Management

Surface water runoff is separated into three streams at the Pit Top site (as shown on Plan 2 B - Site drainage). The three runoff streams include:

- Clean water – This system collects runoff originating from the surrounding undisturbed land on the upstream (western) side of the site. This water is piped via sealed drains through the site into American Creek;
- Oily Water – This system captures potentially contaminated water runoff from the workshop area and diesel fuel dispensing area. This is diverted into the oily water separator and then into the grey water treatment plant. Treated water is then pumped into the old Nebo Mine workings; and
- Dirty Water – This system captures general site runoff from site roads and the car park. This runoff is directed into the Pit Top sediment pond via a series of drains and pits that are cleaned

out on a regular basis using an industrial vacuum truck. Settled water is pumped from the sediment pond into the grey water treatment plant based on pond level. The treated water is then pumped into the old Nebo Mine Workings.

At the Kemira Valley site, surface water is separated into two streams, which include:

- Clean Water – This system captures clean runoff originating from the upstream side of the site. The runoff is diverted around the western side of the site and through a culvert beneath the rail line and into Brandy and Water Creek.
- Dirty Water – This system captures all site runoff. The runoff is treated and reused in the site dust suppression system and/or the firefighting system. If there is excess water in the sediment ponds, water may be disposed via the mine water discharge pipeline into Allans Creek via Licensed Discharge Point 5.

The Pit Top Sediment pond and Kemira Valley Sediment Ponds are managed in accordance with the Water Management Plan. The stored water for the reporting period is provided in Table 3.8-2.

Runoff from the Corrimal shaft sites and O'Briens drift is classified as clean stormwater runoff therefore runoff is diverted into the natural drainage systems.

Table 3.8-2: Stored Water – Dendrobium

Year FY15	Start of Reporting Period	At End of Reporting Period	Storage Capacity
Clean Water (ML) – Pit Top Tank	0.35	0.35	0.35
Dirty Water (ML) - Kemira Valley Main Sedimentation Pond	6	6	14
Dirty Water (ML) - Pit Top Sedimentation Pond	0.4	0.4	1.1
Dirty Water (ML) - Kemira Valley Buffer Dam	1	1	3.9
Dirty Water (ML) - Kemira Valley Fire Tank	0.5	0.5	0.5
Controlled Discharge Water (salinity trading schemes)	NA		
Contaminated Water	NA		

* Levels are largely dependent on rainfall. Ponds are generally maintained at low levels for maximum storage potential for rainfall events.

Rainfall

Dendrobium rainfall has previously been recorded at the Kemira Valley weather station which is located on the coal clearance gantry structure. Due to repairs to the weather station during this reporting period; the rainfall measured at the Dendrobium Pit Top Site has been used. Total rainfall recorded during the reporting period was 1303mm, a decrease when compared to the previous reporting period in which 1,482 mm rainfall was recorded. Table 3.8-3 presents the rainfall at the Kemira Valley site for the past five reporting periods.

Table 3.8-3: Rainfall during the Reporting Period

Year	Total rainfall (mm)
FY10	1260
FY11	1299
FY12	1318
FY13	1532
FY14	1482
FY15	1303

Cordeaux Colliery

Water supply and use

Historically, most of the water used at the mine to support coal production was recycled mine water. The recycled water was primarily used for dust suppression and for charging of fire lines. With the cessation of mining and the subsequent reduction in personnel on site, the amount of water utilised by Cordeaux Colliery has reduced significantly. Water use is now limited to potable water use for personal consumption, showering and toilet facilities. Potable water is brought to site by road tanker as required basis. During this reporting period the average potable water use by site was 58 kL per month.

Surface Water Management

The surface facilities at Cordeaux Colliery have been designed to prevent dirty water run-off from the site entering the Sydney Catchment Authority land. The design ensured effective treatment of run-off from potentially dirty areas such as the coal bins, workshop area and machinery hard-stand areas. Drainage from these areas is still directed to a dirty water holding lagoon. The clean and dirty water surface drainage circuits of the site remain in place.

Due to the cessation of mining activities the amount of dirty water generated at the surface of the mine has significantly reduced. Water from hardstand areas is captured in the dirty water lagoon then transferred by pump to the upper level mine water holding lagoons for settlement. The water is then transferred to underground mine workings via a gravity fed pipeline. This arrangement negates any surface discharge. The water returned to the mine is essentially of good water quality containing no

contaminants. Details of the monitoring and pumping volumes are provided in Section 4.4 of this report. A summary of the stored water for the reporting period is provided in Table 3.8-4.

Table 3.8-4: Stored Water – Cordeaux

Year FY15	Start of Reporting Period	At End of Reporting Period	Storage Capacity
Clean Water (ML) – Surface Storage Tank	0.2	0.2	0.225
Dirty Water (ML) – Dirty Water Area Lagoon	0.85	0.85	1.0
Controlled Discharge Water (ML): Mine Water / Storm water Lagoon	2.0	2.0	5.5
Controlled Discharge Water (ML): Sand Filter Lagoon	0	0	0
Contaminated Water	NA		

* Levels are largely dependent on rainfall. Ponds are generally maintained at low levels for maximum storage potential for rainfall events.

Rainfall

Rainfall for the Cordeaux surface facilities is recorded on a daily basis from a rainfall gauge located at Cordeaux Mine. The Cordeaux site received a total of 1493.1 mm of rainfall during the reporting period, which was an increase from the previous reporting period (885.5mm). Table 3.8-5 shows the average cumulative rainfall volumes for the past five reporting period.

Table 3.8-5: Rainfall at Cordeaux FY09 to FY15

Period	Annual Rainfall (mm)
FY10	919
FY11	1203.1
FY12	1396.2
FY13	1277.6
FY14	885.5
FY15	1493.1

Vent Shaft 2/3

No water usage occurs on the Vent Shaft 2/3 site. Due to its location within the Sydney Catchment Area, the surface facilities at the vent shaft have been designed to control sediment entering the surrounding Sydney Catchment Authority land by:

- Capturing stormwater from disturbed areas and directing this water to sediment ponds ; and
- Rehabilitation of disturbed areas.

3.9. Hazardous Material Management

Dendrobium Mine

Explosives

A Licence to Store Explosives is in place for the Dendrobium premises. Limited quantities of explosives were stored at Dendrobium over the reporting period.

Dangerous Goods

The Dangerous Goods kept at Dendrobium Mine include compressed gases, flammable and combustible liquids, and corrosive substances but volumes stored are below the manifest quantities to require a Dangerous Goods Licence to be issued by Work Cover.

A Site Emergency Information Container is installed adjacent to the front gate in accordance with legislative requirements. This information box includes the site manifest along with Safety Data Sheets (SDS's) for each of the dangerous goods kept on site.

Combustible liquids

Dendrobium Pit Top has two bulk chemical storage containers, one for diesel storage and one for hydraulic oil storage (~16100L). These are stored in accordance with the requirements of AS 1940-2004 "The storage and handling of flammable and combustible liquid". Both are brought to site by tankers.

Other substances

Illawarra Coal assesses new substances before their use on site by completing a Substance Evaluation Form and a risk assessment. SDS's and substance evaluation are available electronically from ChemAlert, with a hard copy of all approved substances available in the Control Room. The Hazardous Materials Coordinator is responsible for the overall coordination of the hazardous materials system on site whilst the Materials Controller is responsible for the day-to-day management of hazardous materials. Regular inspections of the storage sites are undertaken to ensure compliance with relevant standards.

Cordeaux Colliery

Cordeaux has one bulk storage tank (underground diesel tank 42,000L holding capacity) and minor volumes of gas cylinders, and transient stores of oils/lubricants. The diesel fuel is brought to site by fuel tankers. A bulk diesel fuel system has been installed utilising underground tank storage with locked bowser delivery. The majority of fuel used is in relation to operating exploration equipment and other field vehicles. Environmental Protection Plan (EPP) has been developed for the below ground diesel fuel storage system (May 2011) in accordance with Underground Petroleum Storage Systems (UPSS) Regulations 2008 requirements. Tank integrity testing and an analysis of the surrounding groundwater has been completed, the results confirm the absence of any leaks/contamination.

4. Environmental Management and Performance

4.1. Air Pollution

Dendrobium Mine

Air quality management is an environment aspect within the Environmental Management System for the Dendrobium operation. At the Dendrobium Pit Top site, the following dust controls were utilised during the reporting period:

- The use of a vacuum sweeper truck which operates on a regular basis; and
- The use of an automatic dust suppression spray system along the portal road.

At the Kemira Valley site, the following dust controls were utilised during the reporting period:

- The automatic dust suppression system on the stockpile. Eight sprays are located around the base of the stockpile whilst a further two sprays are located at the top of the rill tower. The spray system is programmed to activate if wind velocities exceed 10 m/s and/or when the coal moisture level drops below the trigger level of 8%. The sprays can also be activated by site personnel via a dial up system when required;
- A dust suppression system in the train loading chamber. This system ensures that the moisture level of the coal is adequate to minimise the potential for fugitive dust emissions whilst being transported from the Kemira Valley site to the DCPD via the Kemira Valley rail line;
- An enclosed train loading facility that enables coal to be loaded into the train without any fugitive emissions; and
- A dust suppression system on the Kemira Valley conveyor (including sprays at the top and bottom of the Sizer, the jib pulley, and also around the Nebo Mains transfer point) that ensures that the coal moisture content is adequate to prevent dust emissions from the conveyor; and
- Wind protection on conveyor gantries.

The dust suppression systems at both the Pit Top and Kemira Valley use recycled water sourced from the Nebo workings.

Air Quality Monitoring System

During the reporting period, Dendrobium's air quality monitoring program consisted of five dust deposition gauge (DDG) sites and two high volume air samplers as required by the approved Air Quality Management Plan and Environmental Protection Licence (EPL).

The dust gauges (shown in Plan 7) are:

- Located around the site to monitor control effectiveness and throughout the community to determine amenity impacts;
- Measured on a monthly basis for ash content, combustible matter, total insoluble matter and total solids (analysis is performed at a NATA accredited laboratory);

- Compared to the EPA amenity goal of 4 g/m²/month for total insoluble matter as outlined in Table 4.1-1; and
- Visually analysed to determine the percentage contribution of dirt, coal, vegetation and insect matter.

Additional dust gauges can be deployed around the operations and throughout the community for investigative purposes.

Two High Volume Air Samplers (HVAS) measure total suspended particulates (TSP) and particulate matter less than 10 micrometres (PM10). The HVAS (shown on Plan 7) are:

- Located on site (Pit Top and Kemira Valley);
- Measure TSP and PM10 on a monthly basis over a 24-hour period in accordance with the approved Air Quality Management Plan and EPL requirements (samples are analysed by a NATA accredited laboratory); and
- Compared to the air quality standards (from the Dendrobium development consent) outlined in Table 4.1-1.

Results from the air quality monitoring program are reported:

- Internally to site management;
- Via the South32 website fortnightly and monthly; and
- Annually in the EPL Annual Return and AEMR.

Table 4.1-1: Relevant Standard for Air Quality

Pollutant	Goal	Averaging period
Particulate matter < 10 µm (PM10)	50 µg/m ³	24-hour maximum
	30 µg/m ³	Annual mean
Total Suspended Particulates(TSP)	90 µg/m ³	Annual mean
Deposited Dust (insoluble solids)	4g/m ² /month	Annual mean

Dust Deposition Results

Dust levels measured in the dust deposition gauges located within the community were below the amenity goal of 4 g/m²/month (Insoluble Solids). Figure 3 shows the 12 month averages for each of the licensed sites monitored during FY15.

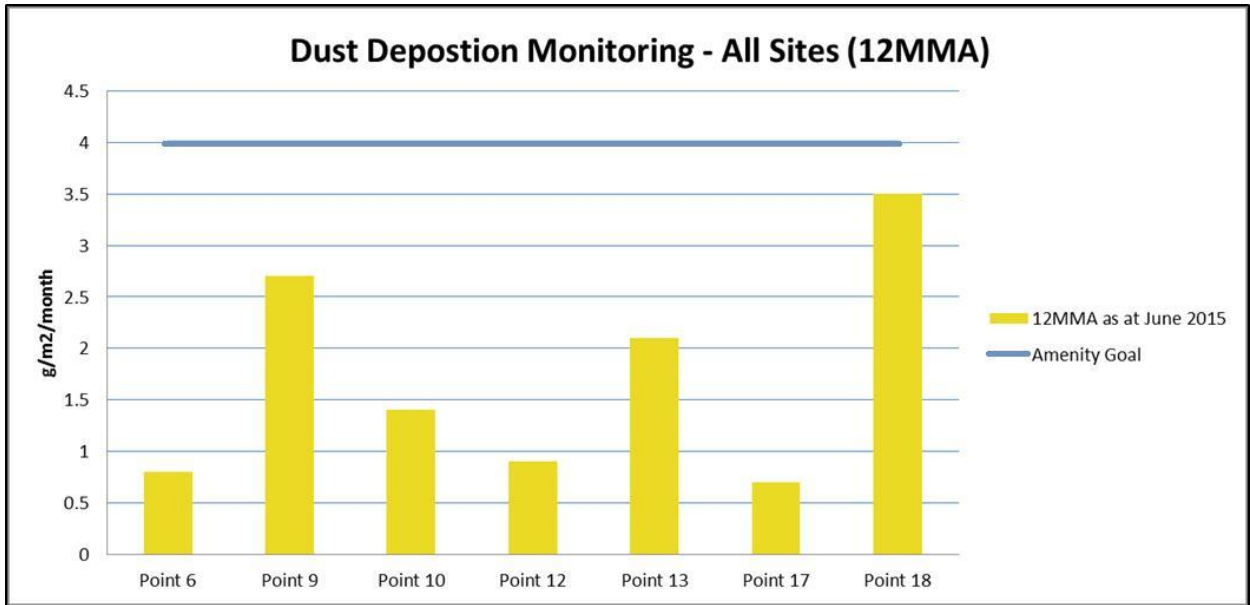


Figure 3: EPL Dust Deposition Gauge, Average Results Summary as at 30 June 2015

HVAS Results

Dust levels from the High Volume Air Sampler (HVAS) for FY15 complied with the relevant standards specified in Table 4.1-1. The monthly TSP results and PM10 results for the Kemira Valley (Point 20) and the Pit Top sites (Point 21) are shown in the following figures 4 and 5.

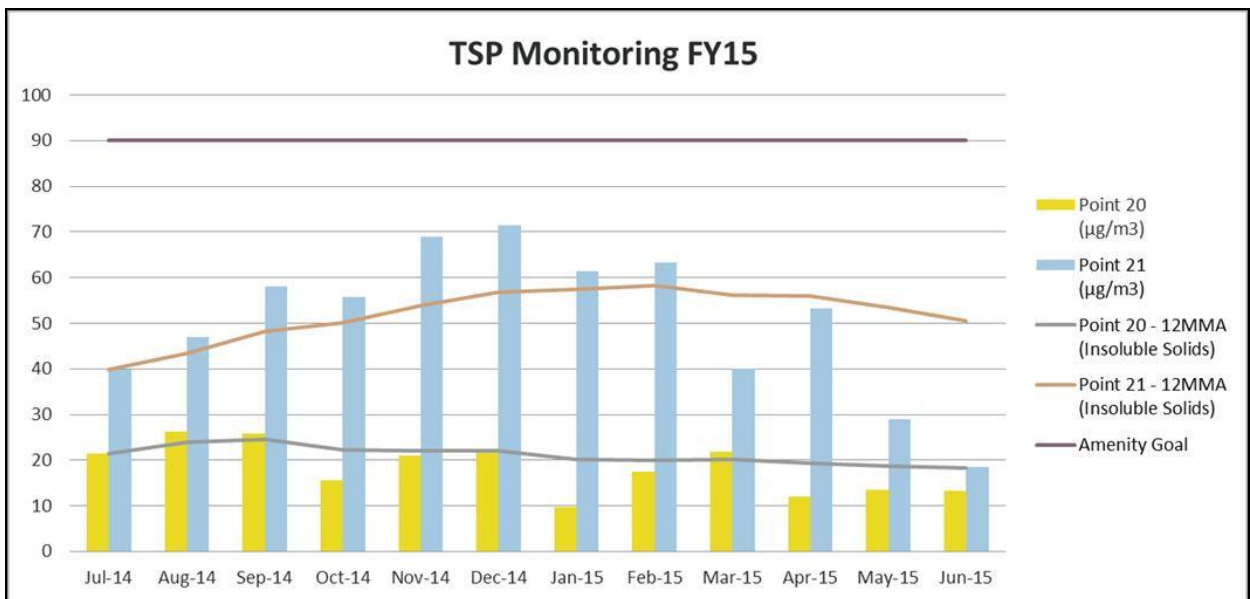


Figure 4: TSP Results

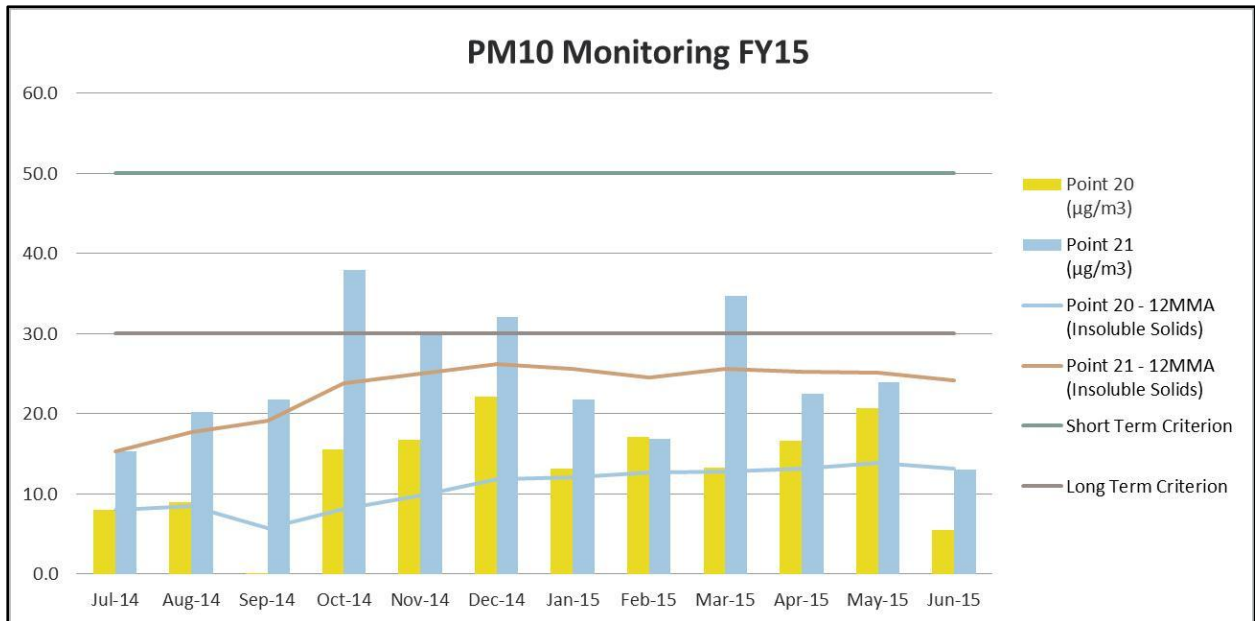


Figure 5: PM10 Results

Cordeaux Colliery

Air pollution is not considered an issue at this site as there is no coal handling or transport from the site and traffic and storage areas are sealed.

Vent Shaft 2/3

No air pollution issues are considered relevant for the Vent Shaft 2/3 fan site as the site has been rehabilitated. Possible shale oil aromatics from mine activities have been considered, but due to low odour levels and the remote location of the fans no controls are currently in place. No complaints have been received.

4.2. Erosion and Sediment

Dendrobium Mine

Erosion and sediment control at Dendrobium is managed in accordance with the approved Water Management Plan. This plan addresses erosion and sediment controls for the Dendrobium Pit Top, KVCLF, Ventilation Shaft 1 and 2/3 sites and the Kemira Valley Rail Line.

Erosion Control

Both the Dendrobium mine Pit Top and KVCLF predominantly consists of sealed surfaces and vegetated areas. As limited soil is exposed, the potential for erosion is low. Planting of tube stock occurred at the Dendrobium Tunnel Rehabilitation site to assist with the stabilisation of the topsoil.

Sediment Control

Sediment control structures are inspected and maintained via a work order system on a regular basis. Sediment is removed from drainage pits along the dirty water drainage system and the grey water treatment plant (GWTP) by an industrial vacuum tanker on an as required basis. The sediment pond assists in settling out suspended solids before surface water enters the GWTP.

Sediment control structures were installed at the Dendrobium Tunnel Rehabilitation site to prevent movement of sediment off site while the area was being stabilised with tube stock and natural recruitment of vegetation.

Cordeaux Colliery

Erosion is not a significant issue at the Cordeaux Colliery pit-top site as the majority of the mine surface is sealed with stormwater run-off directed to appropriate holding dams and filter systems. There are minimal exposed earthen areas.

Vent Shaft 2/3

Erosion is not a significant issue at the Vent Shaft 2/3 site. Sediment ponds have been installed for erosion control. Disturbance of land is minimised to reduce the risk of soil erosion and sediment contamination and areas around the fan site have been successfully re-planted using tube stock and direct seeding to reduce erosion.

Vent Shaft 1

Erosion is not a significant issue at the Vent Shaft 1 site as disturbed has been rehabilitated (with the exception of the 20 metre asset protection zone).

4.3. Surface Water Pollution

Dendrobium Mine

Mine Subsidence

The surface water monitoring program enables Dendrobium to maintain a database of regional water quality and to determine any changes to surrounding water quality. Potential water quality impacts as a result of mining are described in Section 4.16.

Mine Site Surface Facilities

The surface water monitoring network consisted of five regular sites (See Plans 8A and 8B) which includes sites upstream and downstream of both the Pit Top and Kemira Valley sites. Additional samples were taken during the reporting year in line with the approved Water Management Plan.

The monitoring program includes:

- Recording of field observations;

- In-situ monitoring for temperature, pH and conductivity; and
- Analysis of the water by a NATA accredited laboratory covering pH, conductivity, total suspended solids (TSS) and oil and grease.

Monitoring and Results

The majority of the monitoring sites are located in natural watercourses that surround the Dendrobium Pit Top and Kemira Valley sites, Brandy and Water Creek and American Creek. Variations in response to local geology and rainfall were within expectations during the reporting period. The results from the downstream sites are compared to the upstream results are as follows.

Kemira Valley Coal Loading Facility

During the reporting period, there has been no significant difference between the upstream and downstream results for points Dend 7 and Dend 10. The results indicate that the water management system in operation at the Kemira Valley site is effective with minimal influence on the surrounding Brandy and Water Creek. A summary of the results is provided in the following tables Table 4.3-1 and Table 4.3-2.

Table 4.3-1: Summary of Water Quality Results – Dend 7 (Upstream of KVCLF)

Parameter	Units	Min	Max	FY15 Average
pH	pH units	7.7	8.8	8.2
Total Suspended Solids	mg/L	<5	26	9.1
Oil and Grease	mg/L	<5	<5	<5
Conductivity	µS/cm	192	505	423

Table 4.3-2: Summary of Water Quality Results – Dend 10 (Downstream of KVCLF)

Parameter	Units	Min	Max	FY15 Average
pH	pH units	7.7	9.0	8.3
Total Suspended Solids	mg/L	<5	31	10
Oil and Grease	mg/L	<5	7	5
Conductivity	µS/cm	212	531	438

Dendrobium Pit Top

A comparison of the water quality results from Dend 12 (Table 4.3-3 upstream of pit top) and Dend 13 (Table 4.3-4 downstream of pit top) indicate that there is no significant variation in total suspended solids oil and grease levels or pH. Average water quality remained below the default trigger values from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 for slightly disturbed ecosystems in south-east Australia. The results are summarised in Table 4.3-3 and 4.3-4.

Table 4.3-3: Summary of Water Quality Results – Dend 12 Upstream of Pit top

Parameter	Units	Min	Max	FY15 Average
pH	pH units	7.3	7.7	7.5
Total Suspended Solids	mg/L	<5	15	8
Oil and Grease	mg/L	<5	<5	<5
Conductivity	µS/cm	109	271	224

Table 4.3-4: Summary of Water Quality results – Dend 13 Downstream of Pit top

Parameter	Units	Min	Max	FY15 Average
pH	pH units	7.6	8.0	7.9
Total Suspended Solids	mg/L	<5	24	8
Oil and Grease	mg/L	<5	<5	<5
Conductivity	µS/cm	150	578	332

Monitoring and Results – Licenced Discharge Point LDP5

Water from the old Kemira Mine workings and KVCLF sediment ponds (during and after rain events) is discharged through Licensed Discharge Point 5 (LDP5), located at Marley Place (refer to Plan 8B). Brine from Illawarra Coal's Appin West Desalination Plant is trucked down to Marley Place and discharged through LDP5. A total volume of 2,321 ML (includes 86.893 ML of Brine from Appin West Desalination Plant) was discharged in FY15. A summary of the monitoring requirements and limits for the reporting period for LDP5 are provided in Table 4.3-5.

Table 4.3-5: Monitoring Requirements and Prescribed Limits for LDP5

Parameter	Units	Frequency	Sampling method	Licence Limit
Arsenic	mg/L	Monthly	Grab sample	1.3
Conductivity	µS/cm	Monthly	Grab sample	----
Copper	mg/L	Monthly	Grab sample	0.08
Nickel	mg/L	Monthly	Grab sample	5
Oil and Grease	mg/L	Monthly	Grab sample	10
Total suspended solids	mg/L	Monthly	Grab sample	30
Zinc	mg/L	Monthly	Grab sample	0.4
pH	pH	Monthly	Grab sample	6.5-9.0

The monitoring results from the LDP5 sampling program are reviewed regularly and reported to site management. The results are also reported through to the relevant external stakeholders via the EPL Annual Return (see appendix) and this report. Monitoring results are also available via the South32 website which is updated fortnightly. A summary of monitoring results for the reporting period is provided in Table 4.3-6.

Table 4.3-6: EPL Annual Return Monitoring Summary

Parameter	Units	Min	Average	Max	EPL Limit
Arsenic	mg/L	0.014	0.046	0.143	1.3
Conductivity	µS/cm	1940	4458	14100*	NA
Copper	mg/L	<0.001	0.002	0.005	0.08
Nickel	mg/L	0.008	0.132	0.548	5
Oil and Grease	mg/L	<5	5	10	10
pH	pH	7.9	8.1	8.6	6.5 - 9.0
Total suspended solids	mg/L	<5	5	6	0.4
Zinc	mg/L	0.022	0.030	0.046	30

There were no non-compliances in relation to the Environmental Protection Licence during the reporting period. The Annual Return information is available online via the link: <http://www.epa.nsw.gov.au/prpoeoapp/> (EPA website). A copy of the 2014/15 EPA Annual Return has been provided as Appendix A.

Pollution Reduction Programs

No pollution reduction programs were required to be carried out during the reporting period.

Cordeaux Colliery

Due to the cessation of mining activities, the amount of dirty water generated at the surface of the mine has significantly reduced. Water from the catchment areas is captured in the dirty water lagoon then transferred using a pump to the upper level mine water holding lagoons for settlement. This water is then transferred to underground mine workings via a gravity fed pipeline, negating the need for surface discharge. The water returned to the mine is essentially of good quality containing no contaminants.

During the reporting period approximately 5 ML of water was discharged from the mine water holding lagoons to the underground workings.

Figure 6 shows the trends for water quality results for pH, Conductivity and Total Alkalinity of water within the mine holding lagoons from March 2000 to July 2015. Historical trends show that water quality in the lagoon has significantly improved since the cessation of underground pumping operations in September

2002. During the reporting period, monitoring results within the mine water holding lagoons continue to reflect good water quality (i.e.: nil contamination of rainwater). The pH typically ranged between 7 and 8, Conductivity ranged between 150 and 300 $\mu\text{S}/\text{cm}$. Figure 7 shows water quality data for the mine water holding lagoons.

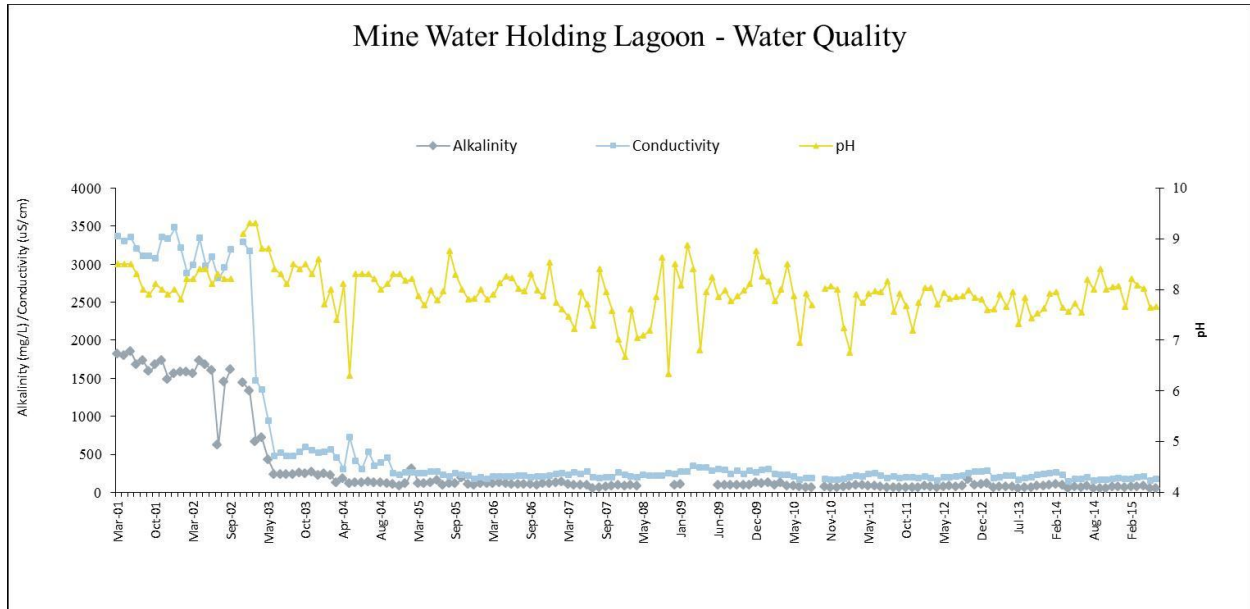


Figure 6: Water Quality Data from the Mine Water Holding Lagoon (2001 to 2015).

The clean area catchment run-off from the Cordeaux pit top site (including the sealed employee car parking area) reports to the sand filter lagoon and leaves site to the local environment via the sand filter underflow. Water quality from this point is analysed on a nominal monthly basis. Water quality analysis for this reporting period (and historical data) shows the discharge water quality consistently of pH 8, with conductivity ranging between 250 and 600 $\mu\text{S}/\text{cm}$, and Oil & Grease (O&G) resulting $<5 \text{ mg}/\text{L}$ (ie: below the Limit of Reporting of 5 mg/L). Due to O&G being below the limit of reporting, O&G results are not displayed in Figure 7.

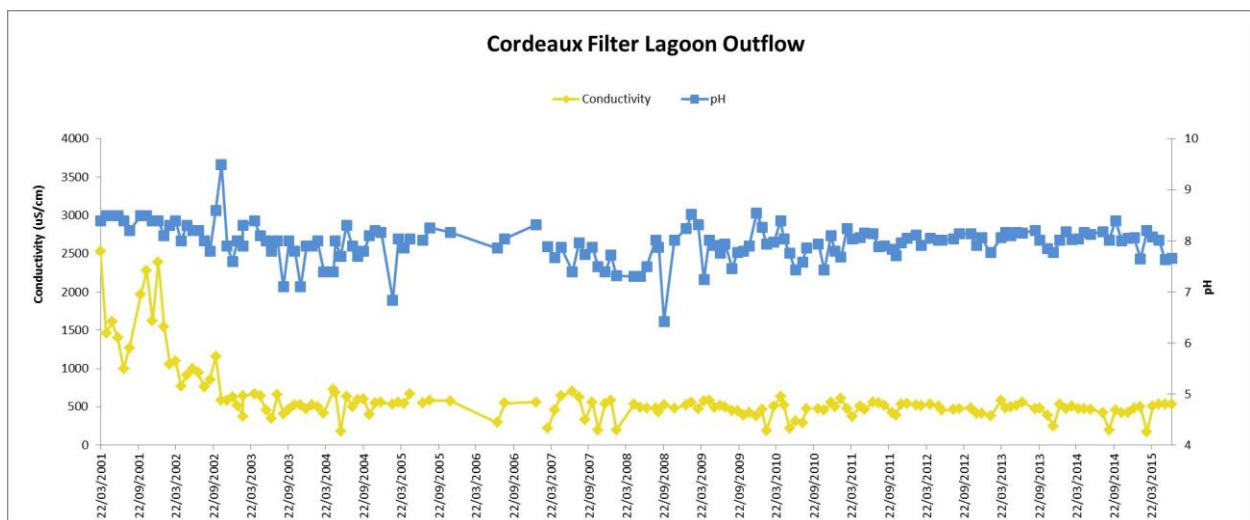


Figure 7: pH and Conductivity at the Cordeaux Filter Lagoon Underflow

The long term data suggests that the existing storage capacity and water management is adequate in managing the current activities and heavy rainfall events.

4.4. Groundwater

Dendrobium Mine

The Dendrobium groundwater monitoring program was undertaken during the reporting period as defined in the approved Groundwater Management Plan. The purpose of the program is to analyse the water quality and quantity within the mine and mining area to satisfy health, safety and environmental aspects of the Development Consent and South32 Policies and Standards. The Plan was developed in consultation with the DSC, SCA, DoPI, NOW and I&I NSW (now DTIRIS).

Monthly water sampling is performed underground with samples analysed onsite and at NATA accredited laboratories. Mine water usage, water flows and volumes within the mine are analysed and reported on regularly (i.e. on a daily to weekly basis). Surface and underground vibrating wire piezometers are utilised to monitor groundwater response to mining. Monthly reports are prepared and submitted to the DSC, SCA and DTIRIS summarising water quality and the water balance at Dendrobium.

During the reporting period, Dendrobium operated under a Principal Trigger Action Response Plan (TARP) as outlined in the “Avon and Cordeaux Reservoir DSC Notification Area Contingency Plan”. During this period the mine operated at ‘Normal’ in the Principal Response Flowchart (Figure 8).

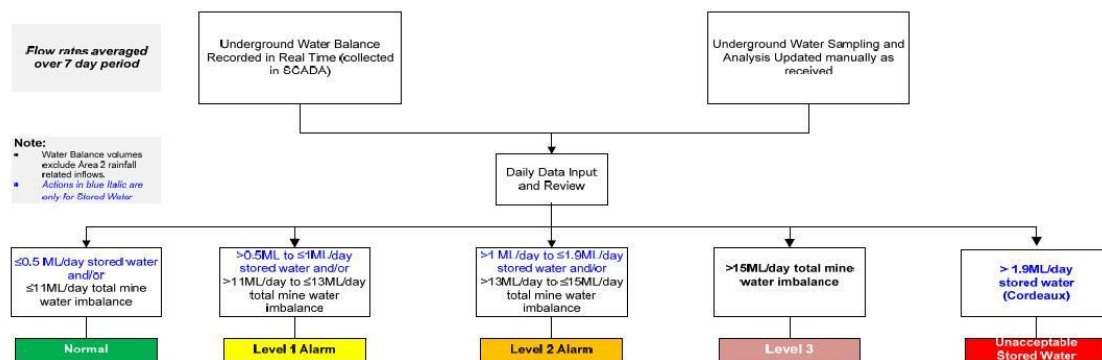


Figure 8: Principal Response Flowchart in “Cordeaux Reservoir DSC Notification Area Contingency Plan”.

Table 4.4-1: TARP Conditions Throughout the Reporting Period

Level	Commencement Date	Finish Date
Normal	1st July 2014	30th June 2015

A summary of the mine water balance for the reporting period is provided in Figure 9.

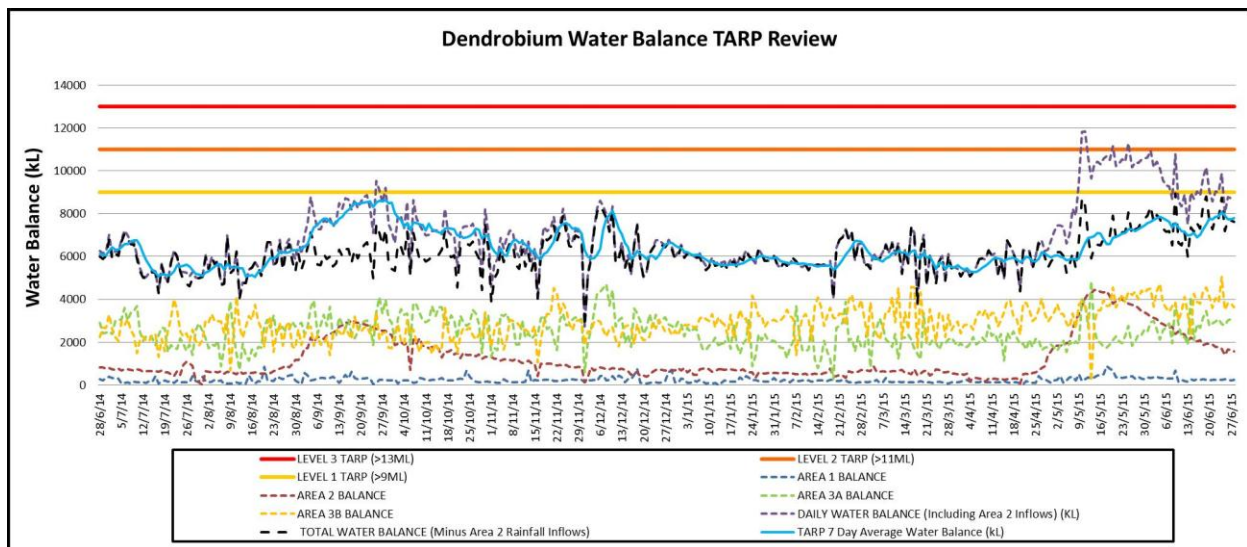


Figure 9: Mine Water Balance July 2014 - June 2015

The groundwater reporting to the mine workings during normal conditions is characteristic of coal measure water; this is determined to be relatively higher in salinity and age based on water chemistry and isotope analysis. Water samples from inflow events have been typical of near seam coal and shale water. Geochemistry, algal and isotope analysis is conducted monthly to determine probabilistic proportions of any modern rain or dam water entering the working.

Table 4.4-2: Water Balance Statistics for the period 1st July 2014 – 30th June 2015.

Statistic	Water Balance Less Area 2 Inflows (TARP related)		Units
	Total Water Balance		
Mean	6863.4	6157.11	kL/day
Maximum	11829.9	8952.95	kL/day
Minimum	2727.1	2727.1	kL/day
Total	2505124.4	2247343.72	kL

The piezometers located in Area 2 monitor groundwater levels from the near surface to the coal seams, between longwall extraction and Cordeaux Reservoir to the east of the longwalls. The piezometers in Area 3 monitor groundwater level throughout Area 3A, 3B and 3C and also from the near surface to the coal seams. Targeted monitoring is also undertaken, piezometers have been installed between the mining areas and the reservoirs, Lakes Cordeaux and Avon. There has been no response to inflow events in these piezometers; this is consistent with previous events indicating a localised source which is not linked to the stratigraphy monitored by the piezometer array.

Piezometers located in the Scarborough Sandstone and Lower Bulgo Sandstone have continued to show a pressure drop due to Longwall mining in Area 3A and 3B. Piezometers in the Upper Bulgo Sandstone adjacent to Longwall 10 have seen an effect from the Longwall passing the piezometer. An increase in

drawdown in the lower Hawkesbury Sandstone was observed in bores above and to the south of Longwall 10, with the maximum observed drawdown being 16 m. No significant additional drawdown was observed in the lower Hawkesbury Sandstone above Area 3A. The magnitude of observed drawdown is lower than predicted in the areas above Longwalls 9-13, and similar in other areas.

A Regional Groundwater Model for Dendrobium is maintained by Dr. Noel Merrick of Heritage Computing. This model is routinely revised and updated to incorporate new data and the conceptual understanding of the groundwater regime in the mining areas.

The below can be derived from the Dendrobium Regional Groundwater Model (2014) attributing to mining activities.

- a. No more than negligible reduction in the quantity of surface water inflows to the reservoir;
- b. No more than negligible reduction in the quantity of groundwater inflows to the reservoir;
- c. Negligible leakage from the reservoir to underground workings.

The Model also indicates that mining is not resulting in greater than a negligible reduction in the quality or quantity of surface water or groundwater inflows to Lake Cordeaux or Lake Avon or surface water inflow to the Cordeaux River at its confluence with Wongawilli Creek.

During the reporting period, Dendrobium Mine operated under the NSW Office of Water (NOW), Water Management Act 2000 (Approval Number 10WA118772). On the 12/05/2015 Dendrobium Mine exceeded the 1537 ML limit of the Water act licence for extraction of groundwater; this was reported to the NSW Office of Water. Discussions had been underway with NOW for some time prior to the exceedance to renew the approval for a higher allocation of groundwater based on the knowledge that we would exceed the allocation of 1537 ML.

Cordeaux Colliery

Refer to the Surface Water Management Section.

4.5. Contaminated Polluted Land

Dendrobium Mine

No significant land pollution events occurred during the reporting period for Dendrobium Mine. Basix Environmental Solutions (BES, 2010) undertook a preliminary contamination assessment of the Dendrobium Mine Pit Top and KVCLF in March 2010. The results of from subsequent soil sampling were provided in previous AEMRs and indicated the below;

- PAH levels were below the NEPM HIL criteria for parks, recreation open space and playing fields;
- TPH levels were below the Dutch Intervention Value of 5,000 mg/kg; and

- Minor oil staining of sealed surfaces occurred. For the majority of the Pit Top, it is likely that any potential contamination (existing under sealed surfaces or on unsealed road verges storage areas) is minor and not likely to export off site.

Cordeaux Colliery

Cordeaux Colliery has a small localised area which has been affected by leaching from the slag base at the surface switch yard. This was first noted in 2005 as vegetation in the localised area appears to have been adversely affected. No increases in impacts have been observed in this reporting period.

Rehabilitation planning for sites will include investigations to identify land contamination. If areas of contamination are identified that require remedial works, this will then be completed in an appropriate manner in accordance with the requirement/agreement of stakeholders and relevant Government agencies.

4.6. Threatened Flora

Dendrobium Mine

No threatened species were identified on the Dendrobium Pit Top site, KVCLF or Ventilation Shaft 1 or 2/3 sites during this reporting period. Results from the flora and fauna monitoring undertaken via the SMP process are detailed in section 4.16 of this report.

Cordeaux Colliery

No activities have occurred at Cordeaux Colliery that could potentially affect threatened flora species. Flora study from 2003 indicated that no threatened species were in danger of being disturbed by the rehabilitation works planned for the four Cordeaux Colliery sites (Biosis Research 2003).

Vent Shaft 2/3

No activities have occurred at Vent Shaft 2/3 that could potentially affect threatened flora species.

4.7. Threatened Fauna

Dendrobium Mine

Refer to section Mine Subsidence and section 4.16 of this report.

Cordeaux Colliery

No activities have occurred at the Cordeaux Colliery that would affect threatened fauna species.

Vent Shaft 2/3

Vent Shaft 2/3 has not taken part in any activities that could potentially affect threatened fauna species.

4.8. Weeds

Dendrobium Mine

Weeds are managed in accordance with Illawarra Coal's Weed Management Plan. Dendrobium carried out regular maintenance which included weed control during the reporting period.

Within the Dendrobium Pit Top area, some of the more accessible areas were targeted for weed species removal. This included the removal and / or treatment of Crofton Weed, Lantana, Privet, Ginger Lily and other woody and herbaceous weeds. Kemira Valley operations targeted accessible areas for Mysore Thorne removal and / or treatment.

Cordeaux Colliery

Weeds are controlled on a routine basis by the site contract gardener through targeted spray activities. Weed growth within the area of the boundary fire break zone is addressed on an as required basis.

Monthly site environmental inspections include weeds surveys across the site. The site has been mapped to identify weed zones for specific attention during these site inspections (Figure 10). Weed spraying and removal has been undertaken within identified zones during this reporting period.

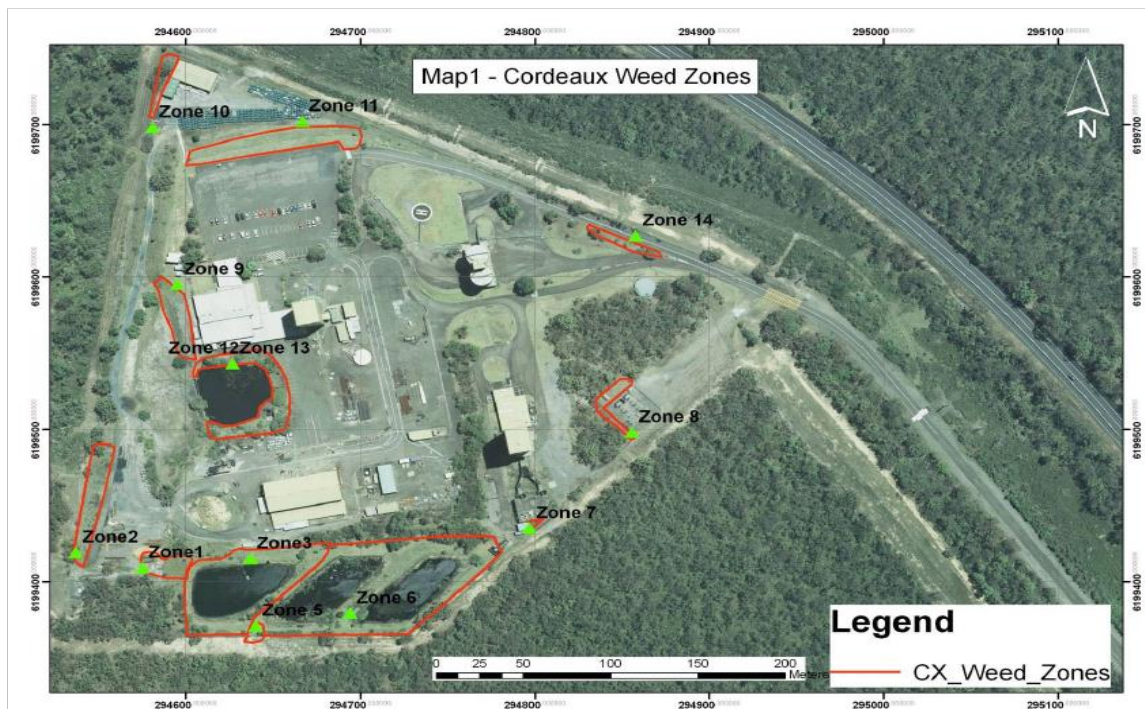


Figure 10: Weed Zones Surveyed During the Monthly Site Environmental Inspection.

Vent Shafts 1, 2&3

Weed management is conducted at Vent Shaft 1 and Vent Shaft 2/3 in accordance with Illawarra Coal's Weed Management Plan.

4.9. Blasting

Dendrobium Mine

No surface blasting activities have been undertaken during the reporting period. Minor blasting activities underground are undertaken using approved management plans.

Cordeaux Colliery

Blasting is not considered relevant as Cordeaux Colliery as the lease is under 'care and maintenance'.

4.10. Operational Noise

Dendrobium Mine

Noise Management Strategies

Noise management is an important aspect of the Dendrobium operations as the Pit Top and Kemira Valley sites are located adjacent to residences in Mt Kembla and Kembla Heights. Quarterly noise monitoring is conducted to satisfy requirements of the Dendrobium Development Consent and the approved Noise Management Plan.

Noise management strategies in place include:

- Low frequency reversing alarms installed on all underground and surface based vehicles;
- Rail track related noise management program;
- Replacement of steel rollers with polyurethane coated rollers on the Kemira Valley conveyor;
- Removal of steel belt clips at Kemira Valley Tunnel;
- Self-imposed night time noise curfew limiting mobile equipment and ballast movements around the Dendrobium Pit Top (from 10pm to 6.15am);
- Employee/contractor environment and community awareness training;
- Replacement of old compressor units with quieter noise attenuated units; and
- Load Haul Dump Vehicles have been upgraded to quieter coal tram machinery.

Noise from the rail operations on the Nebo Main (Rail) Line has been raised as a potential community concern since the Environmental Impact Statement was prepared for the Dendrobium mine operations.

The rail line is located within 200 metres of more than 500 receivers within the Mount Kembla, Cordeaux Heights and Unanderra communities. The track geometry consists of relatively tight curves which can increase the likelihood of squeal events caused by the wheel/track interface and/or brake related issues. To address the brake and/or wheel squeal or other noise issues the Rail Noise Working Group (RNWG) meets regularly with the below objectives:

- review noise results and identify rail noise mitigation options;

- improve targeted track maintenance; and
- develop strategy for positive proactive community engagement.

Illawarra Coal's RNWG consists of Illawarra Coal employees (operational, community and environmental personnel) and our rail contract partners (Fluor and Pacific National). During the reporting period, the RNWG has undertaken numerous rail trials and noise monitoring campaigns to identify noise sources and minimise the rail noise generated in the local area.

Below provides a summary of the trials and improvements that were undertaken during the reporting period:

- Continued use of the on board data loggers to increase consistency of driver behaviour;
- Review and trial of dynamic/duel braking (Engine and Brakes);
- Dynamic braking was incorporated into the best practice from Central road down to the bridge;
- Standardisation of chokes (brakes) to a 60 second release time;
- Trial of an alternate brake shoe showed promising signs, but did not eliminate wagon brake squeal. Testing of brake shoes on the manufacturer's dynamometer identified that increased brake force may nullify brake squeal, giving credence to consideration of alternative driving practices to those currently deployed on the Kemira Valley line;

During the reporting period temporary and hand held noise monitoring devices were deployed during trials and/or located in areas where complaints have been received for data evaluation.

Noise Monitoring Program

The program includes noise monitoring of the Pit Top site, the KVCLF and the rail operations. Attended noise monitoring is carried out on a quarterly basis at three locations as outlined Plan 9. Sites R5A and R15A have been removed from the monitoring program in accordance with EPL 3421.

The rail haulage noise measurements are undertaken on a six monthly basis. This monitoring has been undertaken as per the approved Noise Management Plan.

The results from the attended noise monitoring are compared to the noise criteria for Dendrobium Mine and KVCLF for daytime, evening, and night time periods as set out in the Dendrobium Development Consent. The LAeq noise criteria are shown in the table below.

Table 4.10-1: LAeq (15 minute) and Sleep Disturbance Criteria (1 minute)

Location	Noise Criteria LAeq,15min (dBA)			Noise Criteria for Dendrobium Operations, L _{A1} ,1min (dBA)
	Daytime (7am -6pm)	Evening (6pm-10pm)	Night time (10pm- 7am)	Night Time (10pm-7am)
R1	40	40	39	49
R6a	40	40	37	47
R39a	37	35	35	45

Attended noise monitoring was conducted on four occasions throughout the FY15 reporting period. Monitoring was undertaken in the following months:

- September 2014
- November 2014
- March 2015
- June 2015

During the reporting period Dendrobium achieved:

- 93% compliance against the LAeq, 15min criterion,
- Two of the three sites achieving 100% compliance for the reporting period.

A summary of the results is provided below.

Location R1 (17 High Street)

R1 is located to the north of the Pit Top. There were no exceedances of the noise criteria. The LAeq,15 minute results for R1 are provided in Figure 11.



Figure 11: Site R1 Noise Compliance (LAeq, 15 minute) during the Reporting Period

Location R6a (374 Cordeaux Road)

R6a is located to the east of the Dendrobium Pit Top. There were no exceedances of the LAeq, 15 minute noise criteria during the reporting. There were eleven occasions when the mine operations noise was inaudible. There were no exceedances of the LAm_{ax}, 1 minute noise criteria at Site R6a during the reporting period.



Figure 12: Site R6a Noise Compliance LAeq, 15min during the Reporting Period.

Location R39a

R39a is located to the south-east of KVCLF at Figtree Farm. There were four exceedances of the LAeq, 15 minute noise criteria during the reporting period, two during the day and two during the evening at Site R39a during the reporting period. The source of the exceedances were due to rail movements within KVCLF (train idling) and vehicles working on the stockpile. No exceedance of the LA1.

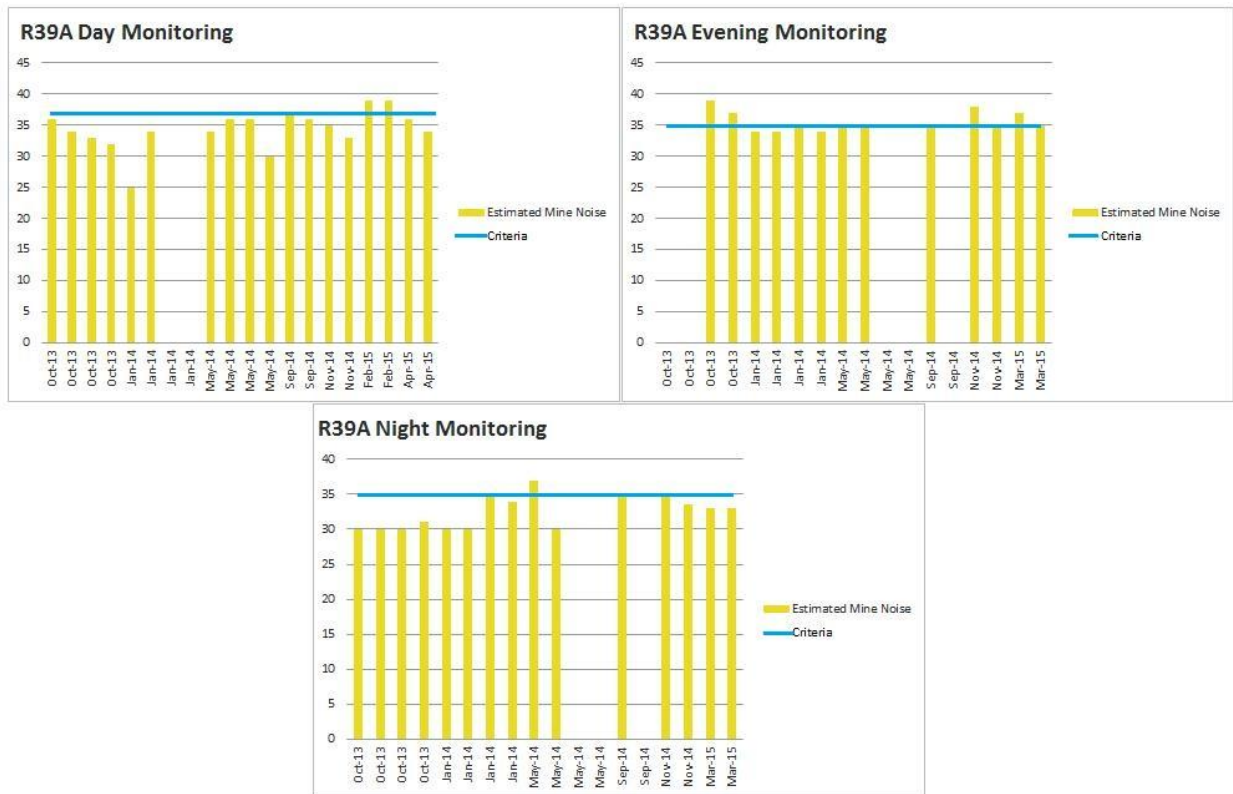


Figure 13: Site R39a Noise Compliance LAeq, 15min during the Reporting Period.

Rail Haulage

A summary of the rail haulage noise criteria is presented in Table 4.10-2. The noise levels from all locomotives in use on the Kemira Valley Rail line are governed by these specific noise limits.

Table 4.10-2: Rail Haulage Noise Criteria

Operating Condition	Speed & Location of Measurement	Noise Limits LA1 (1 min) (dBA)
Idle with compressor radiator fans and air conditioning operating at maximum load occurring at idle	Stationary 15m contour	70dBA
All other throttle settings under self-load with compressor radiator fans and air conditioning operating	Stationary 15m contour	87dBA 95dBLin
All service conditions	0-50 km/h 15m from centreline of track	87dBA 95dBLin

Attended rail haulage noise measurements for the 82 class locomotive was conducted during the reporting period. All rail haulage noise criteria were met expect for a small exceedance under the idle condition for tonality. This exceedance is considered minor as the major impact from train movement occurs under the pass-by and self-load criteria.

Cordeaux Colliery

This aspect is not considered relevant as Cordeaux Colliery as site is in 'care and maintenance'.

4.11. Visual, Stray Light

Dendrobium Mine

Lighting at Dendrobium is managed in accordance with the Lighting Management Plan. The Dendrobium Pit Top site is shielded by established vegetation with minimal stray light leaving the site.

The Kemira Valley site is shielded within the valley and the majority of the lighting is turned off during night-time operations unless work is being carried out on site.

Cordeaux Colliery

Cordeaux Colliery is located in bush land with no immediate residential receivers. No complaints regarding lighting were received during the reporting period.

4.12. Aboriginal Heritage

Dendrobium Mine

The Aboriginal Heritage Plan sets out the requirements to satisfy the Consent Conditions for Aboriginal Heritage management in Dendrobium Area 3. Aboriginal Heritage Impact Permit (AHIP) No: 1098243 was issued to Illawarra Coal on 27 March 2009. AHIP No: 1098243 allows for potential impacts (associated with subsidence movements from longwall mining) to Aboriginal archaeological sites within Dendrobium Area 3A. The management measures described in this Aboriginal Heritage Plan are the same as those to be implemented for AHIP No: 1098243.

Cordeaux Colliery

Sites of archaeological and natural significance were identified and assessed as part of previous longwall extraction approval processes. The assessments concluded that no significant effects would occur to the identified features as a result of longwall mining at Cordeaux Colliery.

Archaeological assessments and surveys were conducted in 2003 in relation to surface rehabilitation works planned for the Cordeaux sites. The assessments and surveys identified no items of aboriginal significance that will be disturbed by the potential rehabilitation activities.

4.13. Natural Heritage

Dendrobium Mine

Items of natural heritage are identified in the SMP process. Details regarding natural heritage and European heritage are reported in Section 4.16 of this report.

Cordeaux Colliery

Aspect not considered relevant as Cordeaux Colliery is in 'care and maintenance'.

4.14. Spontaneous Combustion

Dendrobium Mine

Spontaneous combustion has not been an issue at Dendrobium Mine. The coal and overburden characteristics at Dendrobium Mine are unlikely to lead to spontaneous combustion.

Cordeaux Colliery

Aspect not considered relevant as Cordeaux Colliery site is under 'care and maintenance'.

4.15. Bushfire

Dendrobium Mine

During the reporting period, bushfire mitigation works were carried out in accordance with the Bushfire Management Plan. Asset protection and fire trails were maintained or established in the following areas:

Asset Protection Zones maintained:

- 28-38 Harry Graham Drive – Kembla Heights; and
- Northern Side of Cordeaux Road – Mount Kembla
- Dendrobium 1, 2 and 3 shaft

Fire Trail Maintenance:

- Containment Line southern side of Dendrobium Mine Pit Top;
- Benjamin Road Fire Trail – Kembla Heights; and
- Stones Road Fire Trail – Kembla Heights.
- Access to Dendrobium 1, 2 and 3 shaft.

Cordeaux Colliery

Bushfire management at the Cordeaux pit top is achieved through the formation of a "fire break" around the site boundary, and the establishment of an extensive firefighting water pipeline (with booster pump facility) around the site. A tanker filling station for charging the fire line has been installed in proximity to the fire pump (Note: the fire line is not maintained in a charged state). Maintenance of fire line pressure was previously automated by a pressure controlled jockey pump.

Clearing of excessive vegetation from within the pit-top boundary fire break zone is undertaken on an as required basis, determined by annual inspections. To prevent the possibility of bush fires produced by contact with live power lines, line clearing is undertaken to selectively clear vegetation with the potential to encroach on power lines.

Prior to the onset of the summer months each year, Illawarra Coal undertakes inspections of its property boundaries to determine appropriate bush fire mitigation and hazard reduction works to be undertaken prior to the hotter drier summer months of the bushfire season.

The Rural Fire Service radio repeater is located in the M&M tower at the Cordeaux Pit top site.

4.16. Mine Subsidence

Dendrobium Mine

Mining using the longwall method results in subsidence (lowering) of the land surface. Dendrobium Mine has an approved Subsidence Management Plan (SMP) and/or Extraction Plan (EP) for each of its mining areas (1, 2, 3A and 3B) which describes the ongoing program of subsidence monitoring and management at the mine. These SMPs were developed in accordance with Condition 7, Schedule 3 of the Dendrobium Mine Development Consent (DA- 60-03-2001). The management of subsidence is undertaken in consultation with the Dendrobium Community Consultative Committee (DCCC), Sydney Catchment Authority (SCA), Industry and Investment (I&I NSW – Minerals and Fisheries), Department of Planning and Environment (DoPE), Dams Safety Committee (DSC), NSW Office of Water (NOW) and NSW Office of Environment and Heritage (OEH). The implementation of the plan relates to monitoring and management of:

- Natural features, including:
 - Surface and groundwater;
 - Landscapes, including steep slopes, cliffs, land suitability and areas prone to erosion or flooding;
 - Terrestrial and aquatic ecology;
- Aboriginal and European heritage; and
- Infrastructure (man-made features).

During the reporting period:

- Longwall 10 extraction was completed on the 20th January 2015, and
- Longwall 11 extraction commenced on the 18th of February 2015. As of the 30th of June 2014, Longwall 11 had extracted 1308.5 metres. Mine subsidence monitoring and reporting was carried out in accordance with the approved SMP/EP for Area 3B and supporting management plans.

The monitoring program for Longwalls 10 and 11 is defined by the Area 3B SMP/EP and supporting management plans which include:

- Dendrobium Area 3B Asset Protection Plan;
- Dendrobium Area 3B Groundwater Management Plan;
- Dendrobium Area 3B Swamp Impact, Monitoring, Management and Contingency Plan; and
- Dendrobium Area 3B Watercourse Impact, Monitoring, Management and Contingency Plan.

A summary of monitoring commitments for FY15 are provided in Table 4.16-1. Additional information can be found in the Longwall 10 End of Panel report, Area 3B SMP and EP and supporting management plans, which can be accessed from the South32 Website:

<http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document>

Table 4.16-1: Monitoring program for Dendrobium Mine

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
Subsidence Monitoring	<ul style="list-style-type: none"> Airborne Laser Scanning (ALS) over Areas 3A and 3B – including 3D Digital Terrain Model (DTM) 	<ul style="list-style-type: none"> ALS to be undertaken at conclusion of each longwall and 12 months after extraction is complete in each area 	<ul style="list-style-type: none"> As per SMP commitments
	<ul style="list-style-type: none"> Area 3A and 3B 2D monitoring lines 	<ul style="list-style-type: none"> Monthly for first 1000m of extraction then 6 monthly Monthly during mining for key features 	<ul style="list-style-type: none"> As per SMP commitments Two surveys were not undertaken as required in February and March 2014 - this was reported to Department of Trade and Investment May 2014
	<ul style="list-style-type: none"> 3D control survey 	<ul style="list-style-type: none"> Conclusion of each longwall and 12 months after the completion of each area 	<ul style="list-style-type: none"> As per SMP commitments
Observational, Photo Point and Water Monitoring			
Watercourses	<ul style="list-style-type: none"> Native Dog, Wongawilli and Donalds Castle Creeks, WC21, WC15, LA4, DC13, LA6, ND1, WC6, WC7, WC8, WC9, WC12, WC16 and WC18 Swamps 5, 10, 11, 13, 14, 23, 35a, 35b, 1a, 1b, 8, 3 and 4 	<ul style="list-style-type: none"> 6 monthly baseline and reference site monitoring Weekly monitoring when longwall is within 400m 6 monthly monitoring for 2 years post mining 	<ul style="list-style-type: none"> As per SMP commitments
	Water Quality		
	<ul style="list-style-type: none"> Wongawilli Creek <ul style="list-style-type: none"> WWU1, WWU4, WC Pool 49, WWM1, WWM2, WWM3, WWL2, WC21_S1, WC21 Pools 30 and 53, WC15_S1 Lake Avon <ul style="list-style-type: none"> LA4_S1, LA4_S2, LA5_S1, LA5_S2, LA3 Pool 4, LA2 Pool 5 and LA1 	<ul style="list-style-type: none"> Monthly monitoring during and post mining for two years or until required 	<ul style="list-style-type: none"> As per SMP commitments

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
	<ul style="list-style-type: none"> • Donalds Castle Creek <ul style="list-style-type: none"> – DCU3, DCL3, DC_S2, DC13_S1 • Sandy Creek <ul style="list-style-type: none"> – SCU1, SCL 		
	Flow		
	<ul style="list-style-type: none"> • Wongawilli Creek <ul style="list-style-type: none"> – WWU, WWL, WC21S1 and WC15S1 • Donalds Castle Creek <ul style="list-style-type: none"> – DCU, DC13S1 and DCS2 • Lake Avon <ul style="list-style-type: none"> – LA4S1 	<ul style="list-style-type: none"> • Continuous 1 hour logging intervals 	<ul style="list-style-type: none"> • As per SMP commitments
	Aquatic Ecology		
	<ul style="list-style-type: none"> • Macroinvertebrate sampling and assessment using the AUSRIVAS protocol and quantitative sampling using artificial collectors • Individuals of the genus Austrocorduliidae and Gomphomacromiidae are identified to species level if possible • Fish are sampled using back-pack electrofisher and baited traps 	<ul style="list-style-type: none"> • Two baseline monitoring campaigns prior to mining during autumn and spring • Monitoring during mining in autumn and spring • Monitoring post-mining for two years or as otherwise required • Monitoring target sites as mining progresses through the domain 	<ul style="list-style-type: none"> • As per SMP commitments
	Terrestrial Fauna – Threatened Frog Species		
	<ul style="list-style-type: none"> • Surveys are conducted along creeks with a focus on features susceptible to impacts • Potential breeding habitat for Littlejohn's Tree Frog and Giant 	<ul style="list-style-type: none"> • Surveys are undertaken in optimal periods over the season 	<ul style="list-style-type: none"> • As per SMP commitments

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
Swamps	Burrowing Frog will be targeted		
	<ul style="list-style-type: none"> Standardized transects to record numbers of individuals between surveys for each site 		
	Observational, Photo Point and Water Monitoring		
	Swamps 01A, 01B, 03, 04, 05, 08, 10, 11, 12, 13, 14, 15A, 15B, 23, 35A and 35B	<ul style="list-style-type: none"> SLMMP sites: pre and post mining, monthly when longwall is within 400m Other sites: monthly 2 years pre and post mining, weekly when longwall is within 400m of monitoring site 	<ul style="list-style-type: none"> As per SMP commitments
	Erosion Monitoring		
Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A, and 35B	<ul style="list-style-type: none"> Ground based surveys to be completed for each longwall after each longwall or to define any new erosions identified by ALS survey 	<ul style="list-style-type: none"> As per SMP commitments 	
Shallow Groundwater Level			
	Impact Sites:	For open hole sites:	
	<ul style="list-style-type: none"> Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 12, 13, 14, 15A, 15B, 16, 23, 35A & 35B 	<ul style="list-style-type: none"> Monthly baseline monitoring Weekly monitoring during active subsidence Monthly monitoring post mining for two years to be reviewed annually 	<ul style="list-style-type: none"> As per SMP commitments
		For instrumented sites:	
		<ul style="list-style-type: none"> Automatic groundwater level monitoring (4 	

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
		hour interval or similar) <ul style="list-style-type: none"> Monitoring post mining for five years to be reviewed annually 	
	Soil Moisture		
	Impact Sites: <ul style="list-style-type: none"> Swamps 1A, 1B, 3, 4, 5, 8, 10, 11, 13, 14, 23, 35A & 35B 	<ul style="list-style-type: none"> Monthly baseline for 2 years prior to mining Weekly monitoring when longwall is within 400m of swamp 6 monthly monitoring for 2 years post mining 	<ul style="list-style-type: none"> As per SMP commitments
	Terrestrial Flora – Composition and Distribution of Species		
	15m transects consisting of 30 0.5m X 0.5m quadrats. The monitoring records:		
	<ul style="list-style-type: none"> Presence of all species within each quadrat Percentage foliage cover and vegetation height Observations of dieback or changes in community structure Photo point monitoring at each transect 	<ul style="list-style-type: none"> Surveys are undertaken in spring and autumn each year 	<ul style="list-style-type: none"> As per SMP commitments
	Terrestrial Flora – Swamp Size and Ecosystem Function		
	Detailed mapping including use of LiDAR data to indicate the location and extent of upland swamp boundaries followed by ground-truthing of these boundaries and vegetation sub-communities	<ul style="list-style-type: none"> Baseline mapping prior to mining Repeat mapping at 5 year intervals or as determined by observational monitoring 	<ul style="list-style-type: none"> As per SMP commitments
	Terrestrial Fauna – Threatened Frog Species		
	<ul style="list-style-type: none"> Surveys are conducted along creeks with a focus on features susceptible to impacts 	<ul style="list-style-type: none"> Surveys are undertaken in optimal periods over the season 	<ul style="list-style-type: none"> As per SMP commitments

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
	<ul style="list-style-type: none"> Potential breeding habitat for Littlejohn's Tree Frog and Giant Burrowing Frog will be targeted Standardized transects to record numbers of individuals between surveys for each site Tadpole counts to be undertaken as part of the breeding habitat monitoring transects 		
	Targeted Sites		
Landscape	<ul style="list-style-type: none"> Cliffs <ul style="list-style-type: none"> A3-CL1, A3-CL2, A3-CL3, A3-CL4, A3-CL5, DA3-CF19, DA3-CF20, DA3-CF21, DA3-CF22, DA3-CF23, DA3-CF24, DA3-CF25, DA3-CF26, DA3-CF41, DA3-CF42, DA3-CF43 Steep Slopes <ul style="list-style-type: none"> A3-SL1, A3-SL2, A3-SL3, A3-SL4, A3-SL5, A3-SL6, A3-SL7, A3-SL8, A3-SL9 Watercourses / Swamps <ul style="list-style-type: none"> Refer to Dendrobium Area 3 Watercourse and Swamp Monitoring TARP's Fire Trails <ul style="list-style-type: none"> A3-FR1, A3-FR2, Fire Roads 6A, 6N and 6Q 	<ul style="list-style-type: none"> Baseline monitoring campaign prior to mining Monthly monitoring during subsidence Monitoring to continue 6 monthly for 2 years following the completion of mining 	<ul style="list-style-type: none"> As per SMP commitments
	Inspection of Active Mining Area – Landscape Features, Vegetation, Watercourses		
	<ul style="list-style-type: none"> All mapped cliff, steep slopes, and watercourse, swamp and fire trail sites in subsidence area. Refer to Dendrobium Area 3B SMP Figure 5.3, 15.1 and 18.1 for location of sites 	<ul style="list-style-type: none"> Weekly monitoring when longwall extraction is within 400m 	<ul style="list-style-type: none"> As per SMP commitments

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
	<ul style="list-style-type: none"> • General observation of active mining areas. • During mining recording includes impacts to: <ul style="list-style-type: none"> – Drainage – Disturbance of site erosion – Aggradations – Inundation – Rock fracturing – Changes in runoff – Changes in vegetation – Impacts to fauna / fish – Rockfalls – Soil cracking – Slumping 		
	Terrestrial Fauna		
	<ul style="list-style-type: none"> • A number of sites located across and around Areas 2, 3A and 3B. Refer to Dendrobium Area 3A SMP Figures 21.1, 21.2 and 21.3 and 3B Figure 20.1 • Monitoring parameters include: <ul style="list-style-type: none"> – Vegetation communities – Vegetation condition – Changes in vegetation – Tree health – Swamp vegetation – Threatened species – Control sites 	<ul style="list-style-type: none"> • Two baseline monitoring campaigns 1 year prior to mining during autumn and spring • 6 monthly monitoring during mining in autumn and spring • 6 monthly monitoring post mining for two years or as otherwise required 	<ul style="list-style-type: none"> • As per SMP commitments

Aspect	SMP Commitments for FY14	Monitoring Frequency	Monitoring Undertaken
	Terrestrial Fauna		
	<ul style="list-style-type: none"> A number of sites located across and around Areas 2, 3A and 3B. Refer to Dendrobium Area 3A SMP Figures 21.1, 21.2 and 21.3 and 3B Figure 20.1 Monitoring parameters include: <ul style="list-style-type: none"> Species and habitat characteristics Targeted surveys and monitoring of known populations of threatened frog species 	<ul style="list-style-type: none"> Two baseline monitoring campaigns 1 year prior to mining 6 monthly monitoring during mining 6 monthly monitoring post mining for two years or as otherwise required 	<ul style="list-style-type: none"> As per SMP commitments
	Aboriginal Archaeology		
	<ul style="list-style-type: none"> Re-recording of the principal components identified by Sefton (Sefton 2000) Macro and micro recording using digital photography (Navin Officer (2003) Detailed elevation plans of shelter walls recording structural and surface features including but not limited to the art, graffiti, joints, bedding planes, exfoliation scars, cracks, mineral and microorganism growth, drip line and water seepage locations 	<ul style="list-style-type: none"> Baseline archival recording: prior to longwall mining First impact assessment recording: following initial subsidence movement of the site Sandstone shelter aboriginal sites will be monitored during mining Further impact assessment recording: 12 months after undermining or final subsidence movement of the site 	<ul style="list-style-type: none"> As per SMP commitments

*Monitoring requirements were modified in June 2015 with the approval of the Swamp Impact Monitoring Management Contingency Plan and the Watercourse Impact Monitoring Management Contingency Plan. These modifications will be reported in the FY16 AEMR.

Subsidence Movements

Subsidence movements resulting from the extraction of Longwall 10 were measured at the following survey points and lines:

- Wongawilli Creek Closure Lines;
- Dendrobium Area 3B 3D monitoring points;
- Wongawilli Creek Tributary Cross Lines;
- Donalds Castle Creek Cross Lines;
- Swamp 1a, 1b and 5 Cross Lines; and
- Airborne Laser Scan of the area.

The subsidence parameters measured during the extraction and at the completion of Longwall 10 were generally similar to or less than what was predicted within the Area 3B SMP. For further detail on the subsidence movements measured for Longwall 10, refer to the Longwall 10 End of Panel Report. This report can be accessed via the South32 website:

<http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document>

The Subsidence Monitoring Program for Longwall 11 includes:

- Dendrobium Area 3B 3D GPS survey;
- Swamps 1a, 1b and 5 3D surveys;
- Donalds Castle Creek, WC21 and Wongawilli Creek Tributary Cross Lines; and
- Dendrobium Area 3B Airborne Laser Scan.

The subsidence parameters measured during extraction of Longwall 11 up to the 30th of June 2015 were generally similar or less than what was predicted within the Area 3B SMP. Further detail will be provided in the Longwall 11 End of Panel Report.

Landscape Features

The Illawarra Coal Environmental Field Team (ICEFT) have conducted detailed monitoring and inspections on landscape features including swamps, watercourses, rock outcrops and the general area within Dendrobium Area 3B. This monitoring was conducted in accordance with the Dendrobium Area 3B SMP, Dendrobium Area 3B Watercourse Impact, Monitoring, Management and Contingency Plan (WIMMCP) (versions dated December 2013 and June 2015) and the Dendrobium Area 3B Swamp Impact, Monitoring, Management and Contingency Plan (SIMMCP) (versions dated December 2013 and June 2015). During the period of extraction updated Trigger Action Response Plans, for the WIMMCP and SIMMCP, were developed in consultation with relevant government agencies.

Monitoring of water levels, water flow, water quality and key landscape features were also conducted by specialist consultants.

Twenty eight surface impacts were identified by the ICEFT. Fourteen of these impacts were observed in watercourses, and fourteen impacts were observed to landscape features such as access tracks, cliff lines

and steep slopes. Reductions in pool water levels were observed in WC21 (a tributary of Wongawilli Creek). TARP triggers in relation to shallow groundwater levels (reduction and recession rates) in Swamps 1a, 1b and Swamp 5 were also reported during Longwall 10 extraction. For more information please refer to the Longwall 10 End of Panel Report.

Surface Water and Shallow Groundwater

Ecoengineers assessed pre-mining monitoring data (from May 2001 to the commencement of Longwall 10 on 20th January 2014), during mining data, and post mining data after the completion of Longwall 10 on 20th January 2015. All observed water quality impacts from the mining of Longwall 10 were fully consistent with predicted impacts set out in the DA3B SMP (December 2012).

The hydrologic evidence indicates that the mining of Longwall 10 produced negligible hydrologic impact on the overall catchment recession and baseflow behaviour and associated water balances of Wongawilli Creek, Donalds Castle Creek and the non-mined under Lake Avon sub-catchment denoted LA4. It is concluded that observed hydrologic impacts on surface water hydrology of two local catchments which report to Cordeaux River and one catchment which reports to Lake Avon, which have been mined-under by Longwall 10, were consistent with the nature of predicted maximum impacts as set out in the DA3B SMP.

Shallow groundwater heads in piezometers in Swamps 1a and 5, lying within the Upper Donalds Castle Creek Catchment, were seen to reach levels lower than those which were observed during the pre-mining baseline period for piezometers which were directly undermined by Longwall 10. Rates of recession of groundwater levels in these piezometers were shown to increase significantly following being mined beneath. There was no piezometer mined under by Longwall 10 in Swamp 8.

Shallow groundwater level data are consistent with the Swamp TARP (December 2013) Level 2 for Swamps 1a, 1b and 5 as a result of both Longwall 9 and 10 extraction.

It was concluded that there was no evidence from the hydrologic performances of the Upper Donalds Castle Creek and the Greater Wongawilli catchments or the DC13 and WC21 sub-catchments that the observed impacts on shallow groundwater levels in the installed piezometers in swamps 1a, 1b, 5 and 8 had adversely affected the overall hydrology.

It was concluded that; the observed impacts on surface water quality, shallow groundwater levels, and catchment hydrologic performances due to the mining of Longwall 10 have been consistent with the nature of predicted impacts set out in the DA3B SMP. For more information please refer to the Longwall 10 End of Panel Report.

Aquatic Ecology

The aquatic ecology monitoring program is based on a Before, After, Control, Impact (BACI) design that provides a measure of variability at Potential Impact and Control Sites before, during and after extraction. This enables changes in the key indicators associated with mining-related impacts to be distinguished from natural variability.

Monitoring is undertaken in Wongawilli and Sandy Creeks in Dendrobium Area 3A and 3B and at comparable control sites established on Wongawilli, Sandy, Donalds Castle and Kentish Creeks.

Aquatic ecology monitoring for Dendrobium Area 3 commenced in spring 2008. To date, two years of pre, two years of during, and one year of post-extraction data have been collected for Dendrobium Area 3A and two years of pre and one year of during-extraction data have been collected for Dendrobium Area 3B.

There was no evidence in macro invertebrate and fish data of any impacts to the aquatic ecology at Site 6 on WC21 or Site 14 on Donalds Castle Creek. Both these sites are downstream of the physical mining impacts observed in WC21 and Donalds Castle Creek by the ICEFT. Thus, if any impacts to aquatic ecology did occur further upstream in these drainage lines (e.g., loss of aquatic habitat due to flow diversions) they appear to have been localised to these directly affected areas. As is with the case with impacts to the aquatic ecology of DA3A drainage lines, such impacts would be relatively minor in the context of the Sydney Catchment Area. For more information please refer to the Longwall 10 End of Panel Report.

Terrestrial Ecology and Swamps

Swamps 1, 15B, 15A, 1A and 1B have been monitored for terrestrial ecology before, during and after mining. Following mining of Longwalls 9 and 10, the landscape monitoring program and ecological monitoring program detected a drop in pool water levels at several locations along Donalds Castle Creek, DC13 and WC21 where Littlejohn's Tree Frog have been recorded and is monitored. A Level 1 Trigger was activated under the WIMMCP (December 2014) TARPs in DC13, specifically a reduction in habitat for one season.

Based on the information provided, the following Corrective Management Actions are recommended for the above site:

- Continue monitoring program.
- Submit an Impact Report to OEH, DoPI, DPI, SCA and other relevant resource managers.
- Report in the End of Panel Report (as reported herein).
- Summarise actions and monitoring in AEMR.

As of the end of the FY15 reporting period, these actions have been completed. For more information please refer to the Longwall 10 End of Panel Report.

Cultural Heritage

The assessment of cultural heritage and archaeological sites potentially impacted by Longwall 10 was conducted by Biosis. Two shelters with deposit were inspected as part of the assessment. These sites were inspected because they were within the zone of possible subsidence associated with Longwall 10. There were no European heritage sites identified as being potentially affected by the extraction of Longwall 10. For more information please refer to the Longwall 10 End of Panel Report.

Summary of Longwall 10 Impacts

The observed impacts to natural features and Aboriginal heritage above Longwall 10 were generally less than or consistent with those predicted in the assessments undertaken prior to mining. A summary of the observed and predicted impacts is provided in Table 4.16-2. For further detail on impacts associated with Longwall 10, refer to the Longwall 10 End of Panel Report in the appendices.

Table 4.16-2: Impacts for Longwall 10.

Impact Site	Identification Date	Type	TARP Level
LW10_001	8/10/2014	Soil Cracking	Level 1
LW10_002	8/10/2014	Soil Cracking	Level 1
LW10_003	27/10/2014	Soil Cracking	Level 1
LW10_004	5/11/2014	Rock Fracturing	Level 1
LW10_005	5/11/2014	Soil Cracking	Level 1
LW10_006	18/11/2014	Soil Cracking	Level 1
LW10_007	18/11/2014	Rock Fracturing	Level 2
LW10_008	18/11/2014	Rock Fracturing	Level 2
LW10_009	25/11/2014	Rock Fracturing	Level 2
LW10_010	25/11/2014	Rock Fracturing	Level 1
LW10_011	4/12/2014	Rock Fracturing	Level 2
LW10_012	4/12/2014	Soil Cracking	Level 1
LW10_013	4/12/2014	Rock Fracturing	Level 1
LW10_014	4/12/2014	Rock Fracturing	Level 2
LW10_015	4/12/2014	Rock Fracturing	Level 2
LW10_016	18/12/2014	Rock Fracturing	Level 2
LW10_018	18/12/2014	Rock Fracturing	Level 2
LW10_019	30/01/2015	Rock Fracturing	Level 2

Impact Site	Identification Date	Type	TARP Level
LW10_020	6/02/2015	Rock Fracturing	Level 1
LW10_021	6/02/2015	Rock Fracturing	Level 1
LW10_022	6/02/2015	Rock Fracturing	Level 1
LW10_023	18/02/2015	Rock Fracturing	Level 2
LW10_024	18/02/2015	Soil Cracking	Level 2
LW10_025	20/02/2015	Soil Cracking	Level 2
LW10_026	3/03/2015	Rock Fracturing	Level 2

Summary of Longwall 11 Impacts

As of the 30th of June 2015, three impacts associated with Longwall 11 have been observed. Two surface soil crack was observed that was consistent with a Level 2 TARP, and one surface soil crack observed that was consistent with a Level 1 TARP. Corrective Management Actions (CMA's) were implemented following TARP triggers and are summarised in Table 4.16-3 below.

Table 4.16-3: Summary of LW11 impacts.

Impact Site	Identification Date	Type	TARP level	CMA's
DA3B_LW11_001	1/06/2015	Soil Cracking	Level 2	<ul style="list-style-type: none"> • Continue monitoring program • Report impacts to key stakeholders • Summarise impacts and report in the End of Panel Report and AEMR
DA3B_LW11_002	1/06/2015	Soil Cracking	Level 2	<ul style="list-style-type: none"> • Continue monitoring program • Report impacts to key stakeholders • Summarise impacts and report in the End of Panel Report and AEMR

Reports on the impacts were provided to key stakeholders and will be covered in further detail in the Longwall 11 End of Panel report following completion of Longwall 11 extraction.

Cordeaux Colliery

Aspect not considered relevant as Cordeaux Colliery is in 'care and maintenance'.

4.17. Hydrocarbon Contamination

Dendrobium Mine

Specifically designed hydrocarbon bunded areas are located:

- along the Pit Top portal road;
- at the rear of the workshop; and
- at the diesel refuelling area were utilised during the reporting period.

Bunded areas are checked on a weekly basis and are pumped out when required to maintain sufficient capacity. In addition to the permanent bunded areas, portable bunds are used for transient storage or transportation of oils and fuels around the site. Various spill kits and/or bins containing oil absorbent material are located around the site in areas where there is a high potential for spillage. Surface personnel are made aware of the locations of these spill kits and absorbent material bins in their work area. The contents of the spill kits and the oil absorbent material bins are checked on a regular basis.

There has been no incident of hydrocarbon contamination in the reporting period.

Cordeaux Colliery

There have been no incidents of hydrocarbon contamination in the reporting period.

4.18. Methane Ventilation

Dendrobium Mine

During the reporting period, the underground mine workings were ventilated by drawing fresh air into the mine (intake air) via the Dendrobium Mine Portal Tunnel, Kemira Valley Portal Tunnel, and air intake Shafts No.1 and 2. The ventilation air drawn through the mine was extracted via the No.3 Shaft Main Mine Ventilation Fans. Three mine ventilation fans are installed at the No.3 Shaft site with two fans operating at any one time. Mine ventilation air was drawn through the mine at an average rate of 238.9 m³/s with the

discharge air (mine vent air) having an average concentration of methane (CH₄) of 0.258% and an average concentration of carbon dioxide (CO₂) of 0.401%.

Currently there are no mine methane abatement technologies or opportunities available which are viable due to the low methane concentration of the mine vent air.

Cordeaux Colliery

Cordeaux Colliery had no methane drainage extraction plant to support its underground gas management activities. Following cessation of mining, the emissions to the atmosphere via the main mine ventilation fans significantly decreased. The mine ventilation fans were shut down and the shafts temporarily sealed in December 2003.

4.19. Public Safety

Dendrobium Mine

Public and workplace safety is a major consideration in achieving the South32 corporate goal of zero harm. Site safety risks and control mechanisms associated with the Dendrobium operations are provided in Table 4.19-1.

Table 4.19-1: Site Safety Risks and Control Mechanisms

Safety Issue	Controls
Safety on site	<p>All personnel, including employees and contractors, are required to undertake a site induction prior to working on the site. This induction outlines a number of areas of importance, including their responsibilities in regards to safety. In addition to the site induction, awareness material is presented in a number of different ways, which include:</p> <ul style="list-style-type: none"> - safety scrums/training days that are attended by all persons working on site and which allow for two way communication between management and the workforce; - Toolbox talks; - Posters located around the site; and - Periodic business updates. <p>The Dendrobium facilities are fenced and the Pit Top site has 24 hour surveillance of the front car park and entry areas. Fencing of the sediment ponds at both the Pit Top and Kemira Valley sites minimises the potential for injury to the public. Prior to visitors entering the main Pit Top area they are required to sign in at reception in the administration building, located closest</p>

to the car park. From this point the visitor can make enquiries and collect equipment, such as PPE, if required.

Cordeaux Colliery pit top area is enclosed by a chain wire security fence around the perimeter of the site. The site access gates are locked at all times that Illawarra Coal personnel are not in attendance

Road Safety	<p>A Drivers' Code of Conduct is in place at Dendrobium to ensure appropriate driver behavior by all those who drive through the village to the mine including employees, contractors and truck transports, as required by the Dendrobium Development Consent and Traffic Management Plan. The Code of Conduct is communicated to all employees and contractors during the site induction and copies are periodically distributed to major suppliers and transport companies. Compliance with the Code of Conduct is strictly enforced.</p> <p>Lane alignment and roadway markings have been upgraded at the Cordeaux Colliery entrance on Picton Road to provide for safer traffic movements when entering and exiting the site.</p>
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Rail Safety	<p>Rail facilities are fenced, with the main sites patrolled on a regular basis by a contracted security firm.</p> <p>Signage and security cameras are in place.</p> <p>Critical Risk Observations and site inspections are undertaken to maintain safety systems</p> <p>Community announcements, newsletters and letter box drops are used to communicate relevant safety information to the public.</p>
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Public Safety around mining areas

The current Dendrobium Longwall mining is occurring within Sydney Catchment Authority lands. Illawarra Coal has developed procedures for working around and accessing potentially unstable ground. The controls are outlined in "Working around Rock falls, cliff lines and unstable areas" (IHP0145). The controls currently in place are listed in the table below.

Table 4.19-2: Public Safety and Controls around Mining Areas

Public Safety Risk	Control Mechanism/s
Rock falls	<ul style="list-style-type: none"> - Signs installed around potentially unstable areas that may be impacted by mining - Illawarra Coal employees and contractors working around potentially unstable areas (Site Induction, Emergency Response Training, 4WD training, active communications, sign-in and sign-out process).

Cordeaux Colliery

The Cordeaux Colliery pit top area is enclosed by a chain wire security fence around the perimeter of the site. The site access gates are locked at all times that Illawarra Coal personnel are not in attendance. The current condition of the site poses no threat to the general public. As various areas are decommissioned and rehabilitated, the sites will be left in a permanently safe condition to the satisfaction of relevant authorities. Remote sites have remained fenced and locked during this report period.

In consideration of the time elapsed since the last longwall panels were extracted, the continued effects of subsidence will be negligible to nil and pose no threat to the safety of infrastructure or the public.

4.20. Other Issues and Risks

Dendrobium Mine

Environmental Audits

During this reporting period the performance of Dendrobium's Environmental Management System (EMS) and overall HSEC Management System was assessed in a comprehensive series of audits (shown in Table 4.20-1). SAI Global has endorsed a "governance check" process as a part of the ISO14001 certification. This process involves reviewing relevant environmental management plans annually and incorporates both a desktop review and in-field verification.

Table 4.20-1: Environmental Audits undertaken FY15

Date	Type	Internal	External	Comments
December 2014	Triennial Audit		X	To determine the capability and effectiveness of your organisation's management system in: ensuring continual compliance with customer, statutory and regulatory requirements; meeting its specified objectives; and conformity of the management system to stated criteria.
Annually	Governance Check	X		Governance Checks are conducted internally as a part of ISO14001 certification.

No non-conformances were recorded during for the EMS or Triennial audit. If non-conformances are identified during audits, they are recorded and tracked via the event reporting system utilised by Illawarra Coal operations.

Environmental Risk Register

Environmental risks associated with the site operations are recorded in Environmental Aspects and Impacts Register. The Environmental Aspects and Impacts Register are reviewed on an annual basis and is the basis of the Environmental Improvement Plan.

Consent Condition Compliance

During the reporting period Dendrobium Mine complied with 98% of the required conditions. Dendrobium Mine Compliance report is attached in as Appendix C.

5. Community Liaison

Environmental Complaints

Dendrobium Mine

Illawarra Coal operates a 24hr Community Call Line (free call 1800 102 210) and a general email address IEnquiries@bhpbilliton.com. The call line and email address enables the community to request and provide feedback about operational activities and lodge complaints on any aspect of the Dendrobium operations. The call line number and email address has been advertised throughout the reporting period in all correspondence distributed to the community.

All complaints are investigated and the details, including any follow up actions required, are recorded in the internal event reporting system. Complaint information is provided to the DCCC, Dendrobium mine site and Illawarra Coal management, and government agencies on a regular basis.

A total of 78 community complaints were received during the reporting period. Of these, approximately 97% were related to rail noise (Figure 14). Complaints made against the operations and the resolutions of them are reported each month on the South32 website. A summary of the complaints recorded is provided in Appendix D.

As discussed in section “Noise Management Strategies”, the Rail Noise Working Group has undertaken numerous rail trials and noise monitoring campaigns to identify noise sources and minimise the rail noise generated in the local area.

Additional noise investigations have been undertaken during this reporting period to identify feasible initiatives to further reduce noise emissions from the rail line and site to minimise the likelihood of community complaints. An overview of the identified initiatives is provided in Noise Management Strategies.

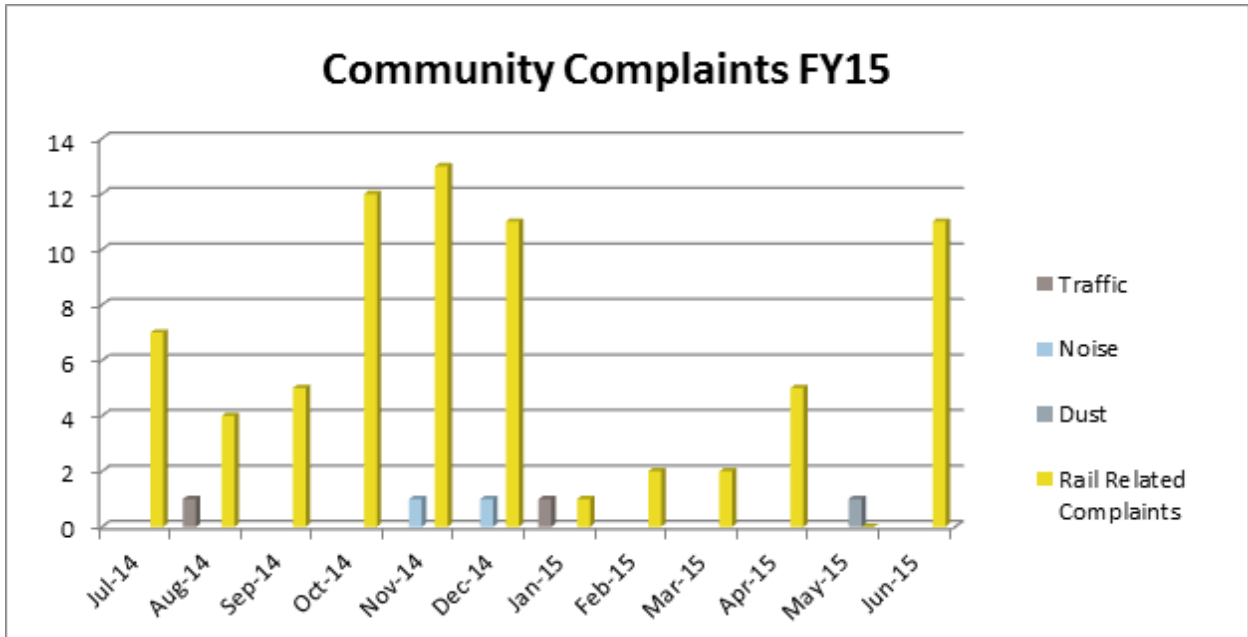


Figure 14: Dendrobium Community Complaints FY15

Cordeaux Colliery

There were no community complaints received during the reporting period.

Dendrobium Mine

Community Consultation

Due to the location of the Dendrobium Pit Top facilities and KVCLF, it is essential that frequent and effective communication occurs between the mine personnel and the residents of Mt Kembla and surrounding areas. Illawarra Coal takes a proactive approach to community consultation by advising residents of issues in advance, including scheduled construction activities or unusual traffic movements. The consultation occurs using a variety of methods including:

- Community newsletters (distributed quarterly) and other letterbox drops
- Dendrobium Community Consultative Committee meetings are held every two months
- Dendrobium Community Enhancement Committee meetings are held every two months
- Dendrobium section on the South32 'Regulatory Information' webpage
- Participation in community events and activities
- Community Perception Surveys
- Attendance at community meetings.

Dendrobium Community Consultative Committee

The DCCC was established in January 2002 in accordance with the Dendrobium Development Consent. The committee provides a mechanism to bring the community, environmental groups, local councils and South32 together:

- To establish good working relationships between the company, the community and other stakeholders in relation to Dendrobium Mine.
- For the ongoing communication of information and discussion of mining operations and the environmental performance of the mine.
- To discuss community concerns and review the resolution of community complaints.
- To discuss communication of relevant information on the mine and its environmental performance to the wider community, including results of environmental monitoring, environmental management reports and the results of audits.
- To work together towards outcomes of benefit to the mine, immediate neighbours and the local and regional community.

The committee is comprised of an independent Chairperson, up to five community members, two environmental group representatives, one representative from the Wollongong City Council and South32 representatives as outlined in Table 5-1.

Table 5-1: Membership of the DCCC at 30 June 2015.

Name	Member Category
Mike Archer	Independent Chairperson
Alex Beccari	Community Representative
Phil Diamond	Community Representative
Phil Grant	Community Representative
Vivien Twyford	Community Representative
Chris Haley	Community Representative
Julie Sheppard	Environmental Group Representative
Ann Young	Environmental Group Representative
Anthony Barnes	Wollongong City Council
Peter McMillan	Illawarra Coal (appointed Environmental Representative)
Wayne Price	Illawarra Coal – GM, Dendrobium Mine

The Independent Chairperson Mike Archer was appointed to the Chair in October 2013.

Table 5-2 below outlines a summary of the information presented to the Dendrobium Community Consultative Committee during the reporting period.

Table 5-2: Summary meeting information from of community consultation

Month	Presentation
21 August 2014	<p>MEETING – Items discussed:</p> <ul style="list-style-type: none"> - Operational update on Longwall 10 - Environment update, including site rehabilitation at subsidence impact site - Update on community initiatives and concerns- stakeholder survey results - Rail Noise Working Group update- high friction brake shoe trial - Swamp research project- looking at change sin swamp vegetation through remote sensing
16 October 2014	<p>MEETING – Items discussed:</p> <ul style="list-style-type: none"> - Operational update on Longwall 10, summary of End of Panel Report for Longwall 9 - Environment update, annual reporting and triennial independent audit, swamp piezometer data and subsidence impacts - Update on community initiatives and enhancement projects - Logistics update and rail noise issues
4 December 2014	<p>MEETING – Items discussed:</p> <ul style="list-style-type: none"> - Operational update on Longwall 10 and logistics issues. - Dendrobium CCC visited West Cliff Emplacement area on Tuesday 25 November- questions around emplacement management and coal wash addressed - Environment overview, including recent mining impacts. - Update on management plan actions required under the Development Consent. - Update on community initiatives.
19 February 2015	<p>MEETING – Items discussed:</p> <ul style="list-style-type: none"> - Operational update on Longwall 10 - Logistics update- standardisation of the fleet , brake chokes all 60 second release reduced from 90 sec - Environment overview, including recent mining impacts. - Update on actions required under the Development Consent. - Update on community initiatives. - Discussion relating to Height of Fracturing Report
16 April 2015	<p>MEETING – Items discussed:</p>

Month	Presentation
	<ul style="list-style-type: none"> - Operational update on Longwall 11- commenced 18th February - Environment overview, including recent mining impacts. - Update on actions required under the Development Consent. - Update on community initiatives.
18 June 2015	<p>MEETING – Items discussed:</p> <ul style="list-style-type: none"> - Operational update on Longwall 11 and logistics issues. - Environment overview, including recent mining impacts. - Update on community initiatives. - Height of fracturing report presented and questions addressed - South32 role changes

Newsletters and Information Sheets

During the reporting period, Dendrobium distributed community newsletters quarterly to the local community (Mt Kembla, Kembla Heights and communities located along the KVRL) covering a range of topics including:

- Operations updates, including longwall progress and development
- Environmental improvement works, including maintenance works - Stage 2 of the Mt Kembla Mine Memorial Pathway and Kembla Heights Wetland Rehabilitation weed removal conducted by Conservation Volunteers Australia;
- Events and organisations supported by Dendrobium Mine
- DCCC and DCEC activities, including information on inspections and projects supported.

Letterbox drops

Letterbox drops are used to raise awareness of work being undertaken during the reporting period, particularly where the activity carried out was not a part of regular operations.

Community Partnerships Program

The Dendrobium Community Enhancement Program (DCEP) was established in 2002 to facilitate funding for community projects with a vision to create a strong community and positive environment for the residents in the zone of influence of Dendrobium Mine. Since inception, Illawarra Coal has contributed over \$1.4 million to the fund, and continues to contribute three cents per saleable tonne of coal from the Dendrobium operations (adjusted for CPI).

The program is administered by the Dendrobium Community Enhancement Committee (DCEC) which comprises of an independent Chairperson, community representatives and Illawarra Coal representatives. The committee met regularly during the reporting period, with extraordinary meetings also convened to conduct business planning and review of operations.

Individuals and organisations in the local community are encouraged to apply for funding. Applications for funding under the DCEP are assessed against a range of selection criteria, which can be viewed at:

<http://www.south32.net/our-operations/australia/illawarra-coal/regulatory-document>

Some recent organisations the DCEP has supported include:

- Mt Kembla Mining Heritage (Yesterday Stories Web-site Initiative)
- Unanderra and Figtree Area Residents Association (Unanderra Homework Club)
- Life Education Illawarra (subsidised school visits)
- Mount Kembla Tennis Club (Tennis Court Upgrade)
- Figtree Public School P & C (Extension of specialised playground for “Banksia” support classes)

Community Land Rehabilitation

Conservation Volunteers Australia representatives and volunteers continued to weed the Kembla Heights Wetland area throughout the reporting period, with a number of secondary weeds starting to show signs of new growth.

Cordeaux Colliery

There were no targeted community liaison activities associated with the Cordeaux site during the reporting period.

5.1. Rehabilitation for reporting period

Dendrobium Mine

The rehabilitation security cost estimate for the Dendrobium operations was reviewed in 2014. No major changes to the existing security estimate were identified. A copy of the revised security cost estimate is provided as Appendix B. A rehabilitation summary associated with the Dendrobium operation is provided below.

Table 5.1-1: Dendrobium Rehabilitation Summary for the Reporting Period.

ITEM	Area affected /rehabilitated (hectares)		
	As at June 2014	As at June 2015	As at June 2016 (Estimated)
A1 Mine Lease area	18,816	18,816	18,816
<u>DISTURBED AREAS</u>			
B1: Infrastructure area	20.37	15.98**	15.98**
B2: Active mining area (surface)	0	0	0
B3: Waste emplacements	0	0	0

B4: Tailings emplacements	0	0	0
B5: Shaped waste emplacement	0	0	0
ALL DISTURBED AREAS	43	15.98**	15.98**
<u>REHABILITATION PROGRESS</u>			
C1: Total rehabilitated area	8.76	8.45**	8.45**
D: REHABILITATION ON SLOPES			
D1: 10 to 18 degrees	0	0	0
D2: Greater than 18 degrees	0	0	0
E: SURFACE OF REHABILITATED LAND			
E1: Pasture and grasses	0	0	0
E2: Native forest/ecosystems	8.035	7.73**	7.73**
E3: Plantations and crops	0	0	0
E4: Other (Bradford Breaker stg 3)	0.725	0.725	0.725

*0.1 hectare of land at the Dendrobium Tunnel Surface Feature was rehabilitated during the FY15 period.

** Updated in accordance with Rehabilitation Cost Estimate

Monitoring of the 2/3 Ventilation Shaft site was inspected on six monthly basis during the reporting period by Environmental representatives. Refer to the photo catalogue provided in Figure 17.

Figure 15: Photo locations monitoring rehabilitation



Weed species in the Ventilation Shaft 2/3 area remain at very low densities and are generally located in disturbed areas or highly trafficked such as road ways. Inspections will continue to monitor the presences of weed species.

The integrity of sediment and erosion control structures is regularly inspected. Adequate sediment control structures are in place to reduce the risk of off-site contamination. A clean water diversion bund has been constructed to divert clean water around the site, and drainage channels have been established within the site to divert seepage around infrastructure areas.

Table 5.1-2 outlines the maintenance activities undertaken on the rehabilitated land during the reporting period.

Table 5.1-2: Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area affected /rehabilitated (hectares)		Comment / Control Strategies / Treatment Detail
	Reporting period	Next Period	
Additional Erosion Control Works	0	0	Erosion and Sediment Control devices inspected as part of the rehabilitation program at No.2/3 Vent Shaft Site. Sediment control structures have been maintained throughout the reporting period
Recovering (topsoil, subsoil sealing)	0	0	Not applicable
Soil Treatment	0	0	Not applicable
Treatment Management (grazing, cropping, slashing)	0	0	Not applicable
Re-seeding / Planting	0.1	0	Planting occurred at the Dendrobium Tunnel Rehabilitation Site during FY15.
Adversely affected by Weeds	0	0	Exotic plant growth included in the inspection regime for the rehabilitation No.2/3 Vent Shaft Site.
Feral Animal Control	0	0	Not applicable.

The agreed post rehabilitation land use is native bushland. Further rehabilitation will be undertaken at mine closure following decommissioning of site infrastructure.

Dendrobium Tunnel Subsidence Rehabilitation

On 12th November 2013, a localised surface failure was observed on a South32 owned property above the Dendrobium Tunnel. This occurred in bushland east of Harry Graham Drive, adjacent to a decommissioned power line easement.

As soon as the feature was identified, temporary safety measures were put in place, these include:

- Chain mesh fencing around the perimeter.
- Warning signage around the perimeter.
- Continued inspections by IC to identify physical changes to the feature and determine the adequacy of safety measures in place.
- The relevant government agencies and the closest residents in Kembla Heights were informed of this feature and the management actions that were proposed to be undertaken.

Rehabilitation works commenced in June 2014 and involved the following activities:

- placing fill material in the subsidence feature.
- installation of topsoil over the disturbed area.
- establishment of a stable landform and permanent drainage with appropriate benches, sediment control devices.
- Planting of native tube stock.



Figure 16: Landform established 12/8/2014



Figure 17: Landform Rehabilitated 10/03/2015

Rehabilitation of the site will continue to be progressed and monitored during FY16 and results/outcomes will be reported in the next AEMR.

Mount Kembla Rehabilitation Project

The Mount Kembla Rehabilitation Project site was the original train haulage route from the historic Mount Kembla and Nebo Colliery sites to the Port Kembla steelworks. In addition to the rail line, coal bins were located in the corridor from which trains were loaded moved to Port Kembla Steelworks. The line and associated infrastructure was decommissioned in the early 1990s, however only minimal rehabilitation was undertaken at the time.

In 2002, with the development of Dendrobium Mine, a commitment was made by Illawarra Coal to provide an area of land for the establishment of the Mount Kembla Mine Memorial Pathway (the Pathway). The Pathway was planned to be completed in three stages; Stage 1 commencing at the start of Mount Kembla to Stones Road and was completed in 2008, Stage 2 incorporating an area of land between Stones Road and Benjamin Road and was completed in April 2013, and Stage 3 from Benjamin Road to the old Bradford Breaker station is progressing.

The stage 2 pathway area has been removed from the mining lease at the renewal of the mine lease. Southern Habitat, an environmental contracting firm have been hired to maintain and monitor the rehabilitation works conducted at the Stage 2 pathway project until June 2016. Ongoing maintenance activities will include erosion and sediment control, weed management and vegetation health.

During the reporting period, the following activities were undertaken as part of the Stage 3 rehabilitation:

- Weed removal and treatment targeting-Bidens, Fireweed, Fleabane, Thistles
- Installation of fencing and safety barriers (to keep out deers)
- Tubestock plantings
- Watering and application of fertiliser

Other Infrastructure

A project scope was developed for the removal of structures associated with O'Briens Drift (OBD) e.g. the removal of the tipping sheds at the top of the drift, the bins and conveyors at the bottom of OBD. Some of the old offices have also been removed. The project is currently on hold due to capital expenditure restrains.

Rehabilitation Trials and Research

No rehabilitation trial or research was conducted during the reporting period. Illawarra Coal continues to support a number of Australian Coal Association Research Programs such as the CSIRO study into coal wash strata injection and the Strata Control Technology study into the rehabilitation of mining impacts to rivers. BSO underground coal wash trial will continue to look at using coal wash as a road base.

Further Development of the Final Rehabilitation Plan

A Landscape Management Plan has been developed to meet the requirements of the Development Consent. This document outlines rehabilitation and closure requirements for the sites associated with Dendrobium Mine. As referenced in the Landscape Management Plan, the Dendrobium Mine Conceptual

Closure Plan has been developed in line with DITRIS NSW and internal South32 requirements. The Conceptual Closure Plan document outlines that are required to be rehabilitated after the closure of the mine.

Cordeaux Colliery

No rehabilitation activities occurred on the Cordeaux or Corrimal sites during the reporting period. Rehabilitation activities associated with exploration were detailed in Section 2 (Exploration) of this report. The rehabilitation summary associated with Cordeaux Colliery and the Corrimal shafts is provided in Table 5.1-3.

Table 5.1-3: Cordeaux Rehabilitation Summary for the Reporting Period

Area affected /rehabilitated (hectares)			
ITEM	As at June 2014	As at June 2015	As at June 2016 (Estimated)
A1 Mine Lease area	18,816	18,767**	18,767**
<u>DISTURBED AREAS</u>			
B1: Infrastructure area	26.31	131.56*	131.56*
B2: Active mining area (surface)	0	0	0
B3: Waste emplacements	0	0	0
B4: Tailings emplacements	0	0	0
B5: Shaped waste emplacement	0	0	0
ALL DISTURBED AREAS	26.31	131.56*	131.56*
<u>REHABILITATION PROGRESS</u>			
C1: Total rehabilitated area	21.32	0.76*	0.76*
D: REHABILITATION ON SLOPES			
D1: 10 to 18 degrees	0	0	0
D2: Greater than 18 degrees	0	0	0
E: SURFACE OF REHABILITATED LAND			
E1: Pasture and grasses	11.3	0	0
E2: Native forest/ecosystems	10.02	0.039*	0.039*
E3: Plantations and crops	0	0	0
E4: Other (Bradford Breaker stg 3)	0.725	0.725	0.725

* Updated in accordance with Rehabilitation Cost Estimate

A summary of the maintenance activities on rehabilitated land associated with the Cordeaux operations is provided in the table below.

Table 5.1-4: Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area affected /rehabilitated (hectares)		Comment / Control Strategies / Treatment Detail
	Reporting period	Next Period	
Additional Erosion Control Works	0	0	Existing measures appear to be adequate. No further actions undertaken during the period.
Recovering (topsoil, subsoil sealing)	0	0	None undertaken this period
Soil Treatment	0	0	None undertaken this period
Treatment Management (grazing, cropping, slashing)	0	0	Not applicable
Re-seeding / Planting	0	0	Not applicable
Adversely affected by Weeds	0	0	Weed control measures are addressed on a as required basis.
Feral Animal Control	0	0	Not applicable.

5.2. Activities Proposed in the Next AEMR Period

Dendrobium Mine

Mining Operations

During the next reporting period (FY16), Dendrobium will continue Longwall mining in Area 3B with Longwall 11 scheduled to be complete in December 2015 & Longwall 12 extraction to start in January 2016. Development will continue in Area 3B Main Gate 12, 13,14 and Wonga Mains.

Construction Activities

No major Construction activities are planned for FY16. No new land disturbance will be required.

Environmental Management

Erosion and Sediment Control

Erosion and sediment control improvements planned to be undertaken during the next reporting period at the Dendrobium Pit Top include:

- Improvements and ongoing maintenance to drainage and greywater treatment systems;
- Continued sealing of unsealed areas.
- Replacement of some bitumen areas with concrete

Noise Management

Additional monitoring is planned during the next reporting period using real-time and handheld noise monitoring units to identify feasible noise reduction initiatives.

Environmental Management System

Dendrobium Mine is planning to continue the environmental management in accordance with ISO14001.

Community Activities

A number of community-based activities are scheduled to be undertaken during the FY16 reporting period. These activities are detailed in the Stakeholder Engagement and Community Development Management Plan and include:

- Participation in Clean-up Australia Day;
- Continued sponsorship of the Mt Kembla Rugby League Football Club and Mt Kembla Mining Heritage.

There will be continued meetings of the DCEC and DCCC, with various inspections undertaken with DCCC members. Maintenance works associated with Stage 2 of the Mt Kembla Mine Memorial Pathway will continue during FY16. The Stage 3 of the path way project will progress during FY16 and will consist of caretaking of the existing fence and establishing tube-stock and building up of the biomass on the skeletal and flinty soils.

Cordeaux Colliery

No rehabilitation activities of significance are planned for the next report period. It is intended that the site activities and nature of the sites will be maintained throughout the next period.

6. References

Dendrobium Mine

- Air Quality Management Plan
- Bushfire Management Plan
- Landscape Management Plan
- Lighting Management Plan
- Noise Management Plan
- Waste Management Plan
- Water Management Plan
- Environmental Protection Licence 3241
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality- Volume 1, Chapter 3 (2000)
- Cardno, 2012. Dendrobium Area 3B Subsidence Management Plan. Prepared for BHPBIC.
- BHPBIC, 2012. Dendrobium Mine SCA Asset Protection Plan, Revision 5, Area 3B.
- BHPBIC, 2012. Dendrobium Colliery Area 3B SMP Groundwater Management Plan.
- Cardno, 2012. Swamp Impact, Monitoring, Management and Contingency Plan, Dendrobium Area 3B. Prepared for BHPBIC.
- Cardno, 2012. Watercourse Impact Monitoring, Management and Contingency Plan, Dendrobium Area 3B.
- South32 Illawarra Coal. (2014). Swamp Impact, Monitoring, Management and Contingency Plan.
- Biosis. (2015). Dendrobium 3B, Longwall 10 End of Panel Report (Cultural Heritage).
- Ecoengineers. (2013). Level 2 TARP Specialist Review and Recommendations Donalds Castle Creek and Swamp 5 (Dendrobium Area 3B).
- Ecoengineers. (2013). Level 2 TARP Specialist Review and Recommendations Donalds Castle Creek Catchment Tributary DC13 and Swamp 1 a and b (Dendrobium Area 3B).
- Ecoengineers. (2015). End of Panel Surface and Shallow Groundwater Impact Assessment - Dendrobium Area 3B Longwall 10.
- Ecoengineers. (2014). Level 2 TARP Specialist Review and Recommendations WC21 and Swamp 8 (Dendrobium Area 3B).
- Ecoengineers. (2014). Level 3 TARP Specialist Review and Recommendations SC10C and Swamp 15b (Dendrobium Area 3A).

Cordeaux Colliery

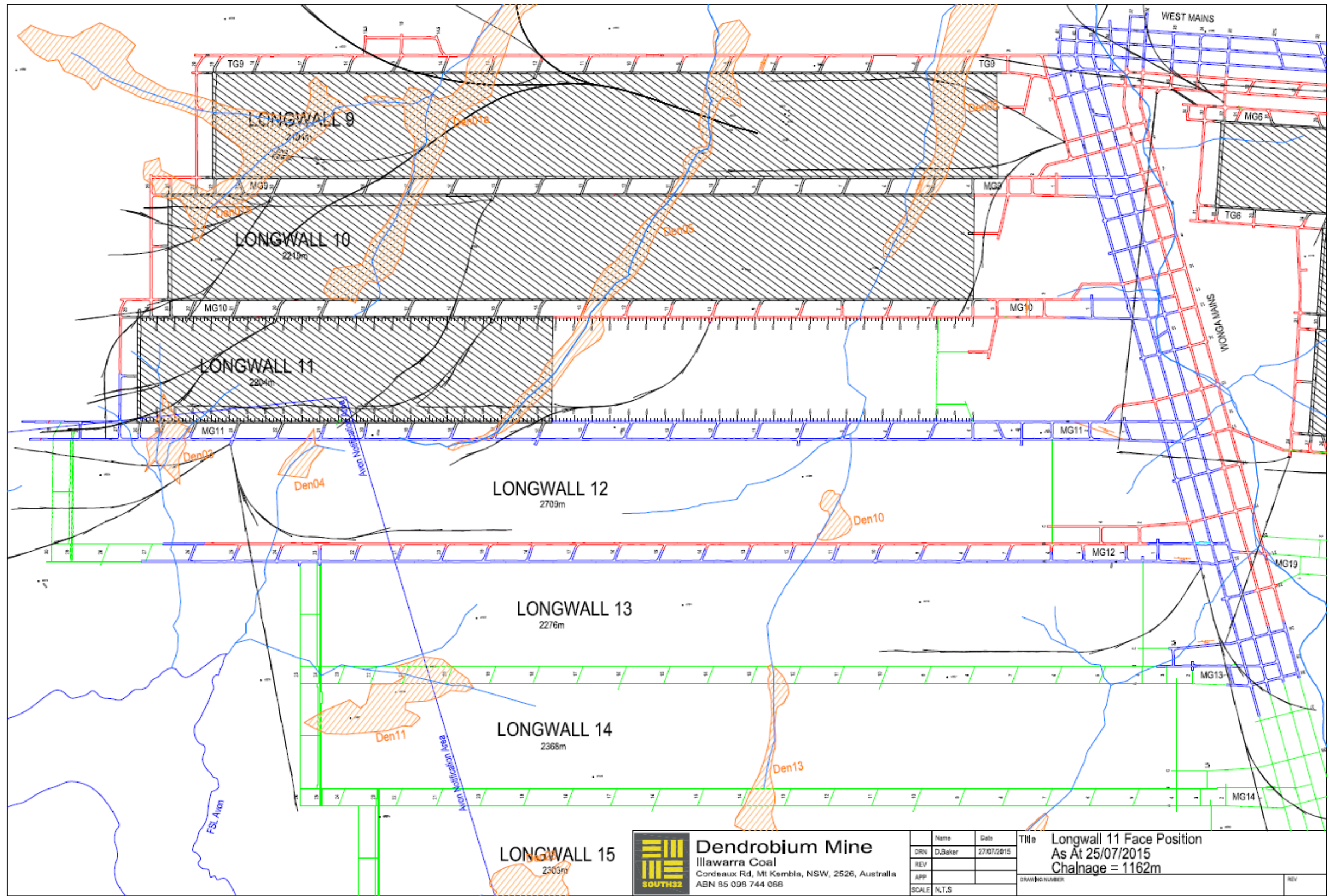
- Cordeaux Colliery - Locality Plan
- Cordeaux Colliery - Regional Context Plan
- Cordeaux Colliery – Leases, Colliery Holding and Location
- Cordeaux Colliery – Pit Top Infrastructure Plan

- Cordeaux Colliery – Extent of Underground Workings at Time of Closure – DP-3086
- Cordeaux Colliery Pit Top Surface Water Management
- Landcover Status – Cordeaux – Site 2012
- Landcover Status – Cordeaux – Corrimal No2 Shaft 2012
- Landcover Status – Cordeaux – Corrimal No3 Shaft 2012
- Landcover Status – Cordeaux – ML28 2012
- Cordeaux Colliery Rehabilitation Corrimal No. 2 Shaft – Work As Constructed Survey Plan
- Cordeaux Colliery – Corrimal No.3 Shaft Restoration Plan – Lower Level DP-3468
- Cordeaux Colliery - Corrimal No.3 Shaft Coal Bin Site Restoration Plan – Upper Level DP-3469
- Cordeaux Colliery – Corrimal No.3 Shaft Restoration Plan – Services Corridor DP-3470

7. Appendices

PLAN 1

Location of Mining Domain (and LW status as at end of FY15)



LONGWALL 12
2709m

LONGWALL 13
2276m

LONGWALL 14
2368m

LONGWALL 15
2303m


Dendrobium Mine
 Illawarra Coal
 Cordeaux Rd, Mt Kembla, NSW, 2526, Australia
 ABN 95 098 744 068

Name	Date	Title	REV
DRN	D.Baker	27/07/2015	
REV			
APP			
SCALE	N.T.S		

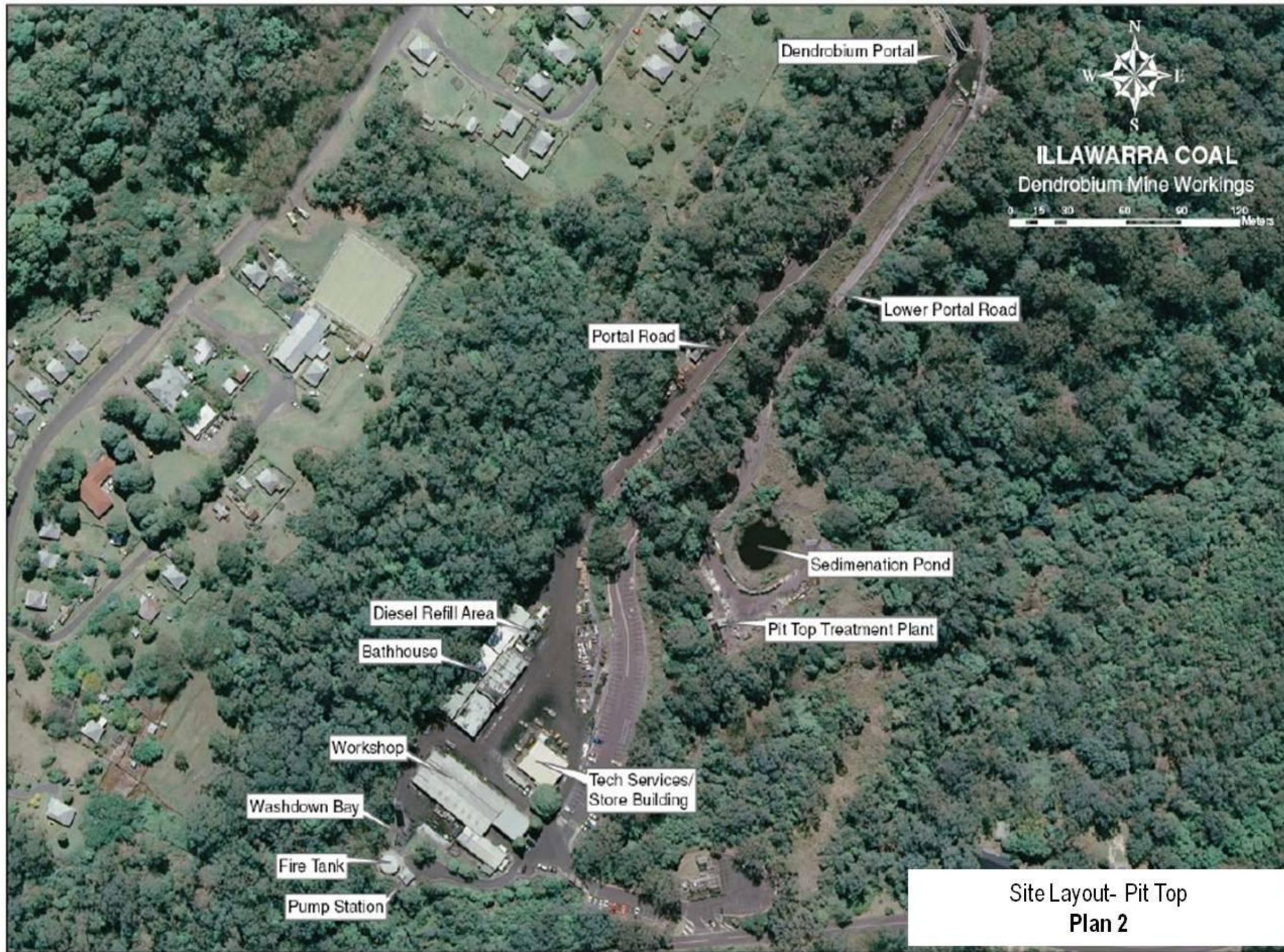
DRAWING NUMBER		REV

Title Longwall 11 Face Position
 As At 25/07/2015
 Chainage = 1162m

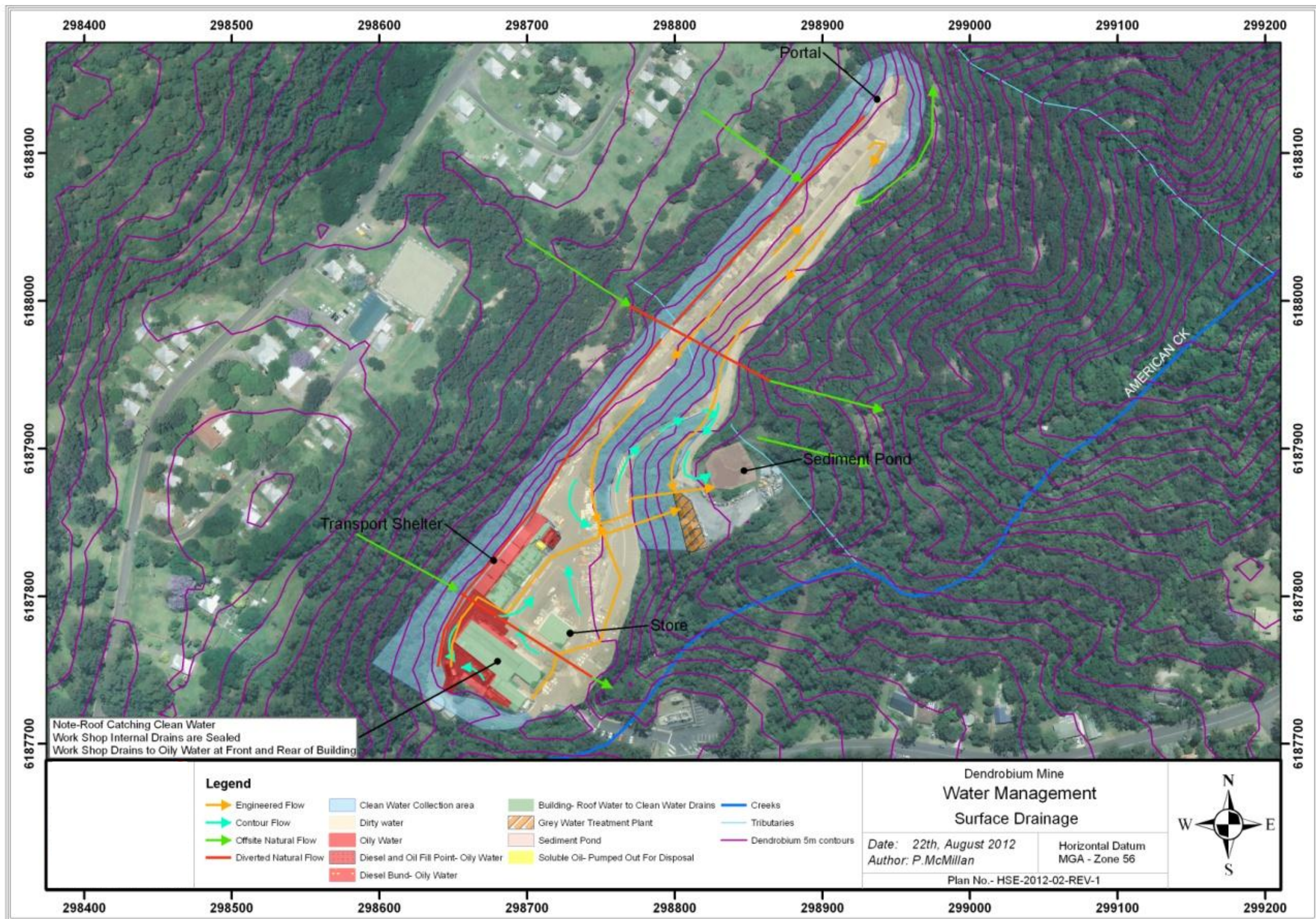
PLAN 2

A-Site Layout – Pit Top

B- Site Drainage



A)



B)

PLAN 3

Site Layout – Kemira Valley



PLAN 4

No. 1 Ventilation Shaft Site Layout



REV	DESCRIPTION	DATE	DRN	CKD	REV	DESCRIPTION	DATE	DRN	CKD
2	INFRASTRUCTURE REMOVED FROM No. 1 FAN SITE	10/9/09	MV						

Dendrobium Mine

PO Box 275 Unanderra NSW 2526 Australia
ABN 85 098 744 088

Name	Date
DRN CJM	1/6/04
CKD	
APP	
SCALE	

Title **No. 1 SHAFT AND FAN SITE LOCALITY PLAN**

DRAWING NUMBER **DEN-09-0956** REV **2**

PLAN 5

No. 2 and 3 Ventilation Shaft Site Layout



N 6193000

N 6192750

N 6192500

E 294000

E 294250

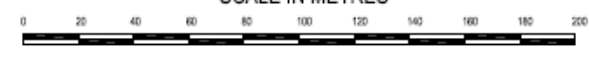
E 294500

E 294750

LEGEND

- LEASE
- WATER
- BUILDINGS
- CONTOURS

SCALE IN METRES



Dendrobium Mine

PO Box 275 Unanderra NSW 2526 Australia
 ABN 85 098 744 088

Name	Date
DRN Crisp Station	03/02/10
CKD	
APP	
SCALE	NTS

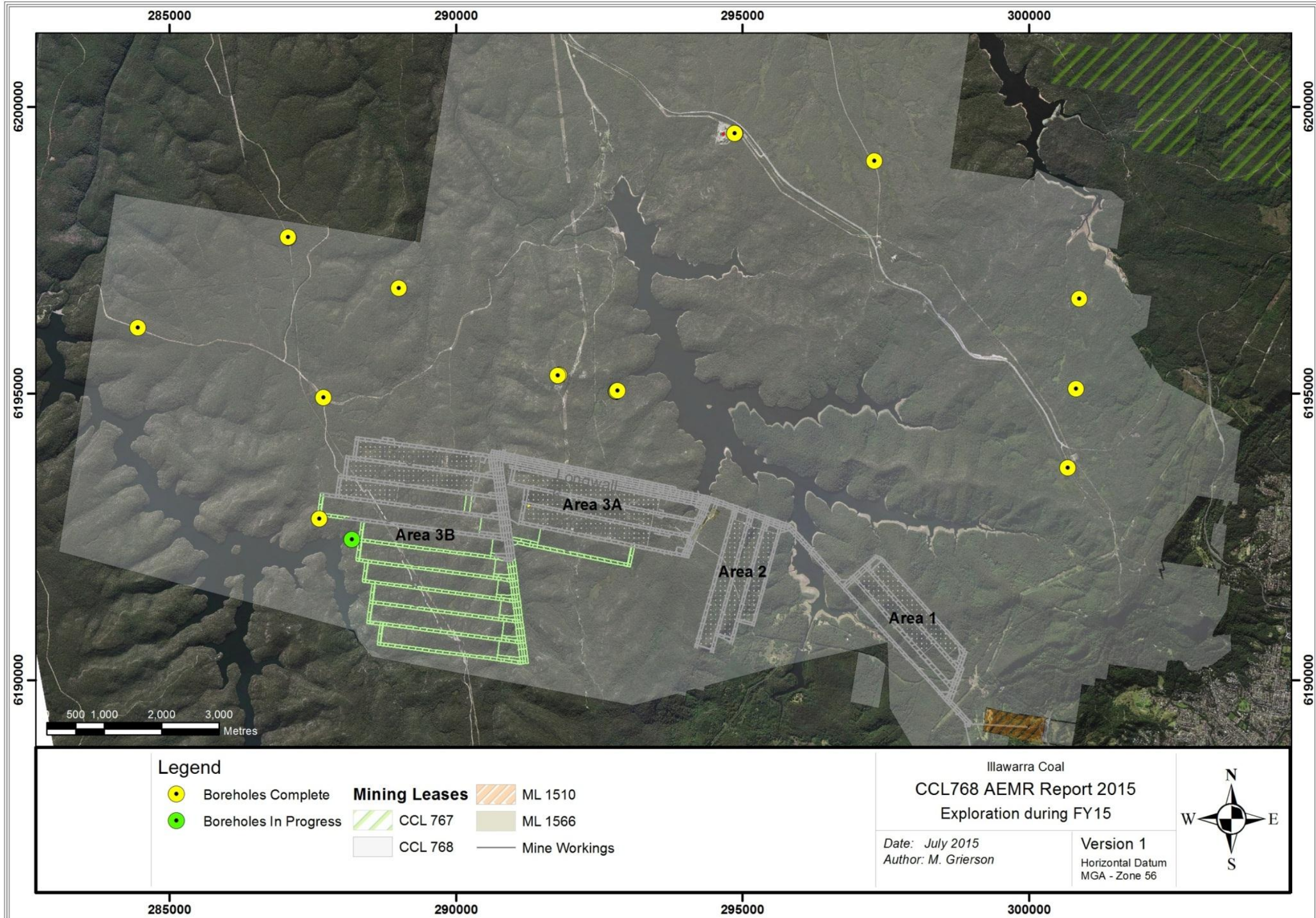
Title	Number 2 & 3 Shafts Detail Site Survey
DRAWING NUMBER	DEN-08-5701 Shaft Detail
REV	0

REV	DESCRIPTION	DATE	DRN	CKD	REV	DESCRIPTION	DATE	DRN	CKD
1									
2									
3									
4									
5									
6									

M:\Projects\08-Drawing\Register\Curren_Vest\08-5701-Dendrobium_Shaft_Detail.dwg - 3/2/2010 3:04:54 PM
 M:\Projects\08-Drawing\Register\Curren_Vest\08-5701-Dendrobium_Shaft_Detail.dwg - 3/2/2010 3:04:54 PM

PLAN 6

Exploration Activities – Dendrobium Mine



Legend

- | | | | | |
|--|-----------------------|----------------------|---------|-----------------|
| | Boreholes Complete | Mining Leases | | ML 1510 |
| | Boreholes In Progress | | CCL 767 | ML 1566 |
| | | | CCL 768 | — Mine Workings |

Illawarra Coal
CCL768 AEMR Report 2015
 Exploration during FY15

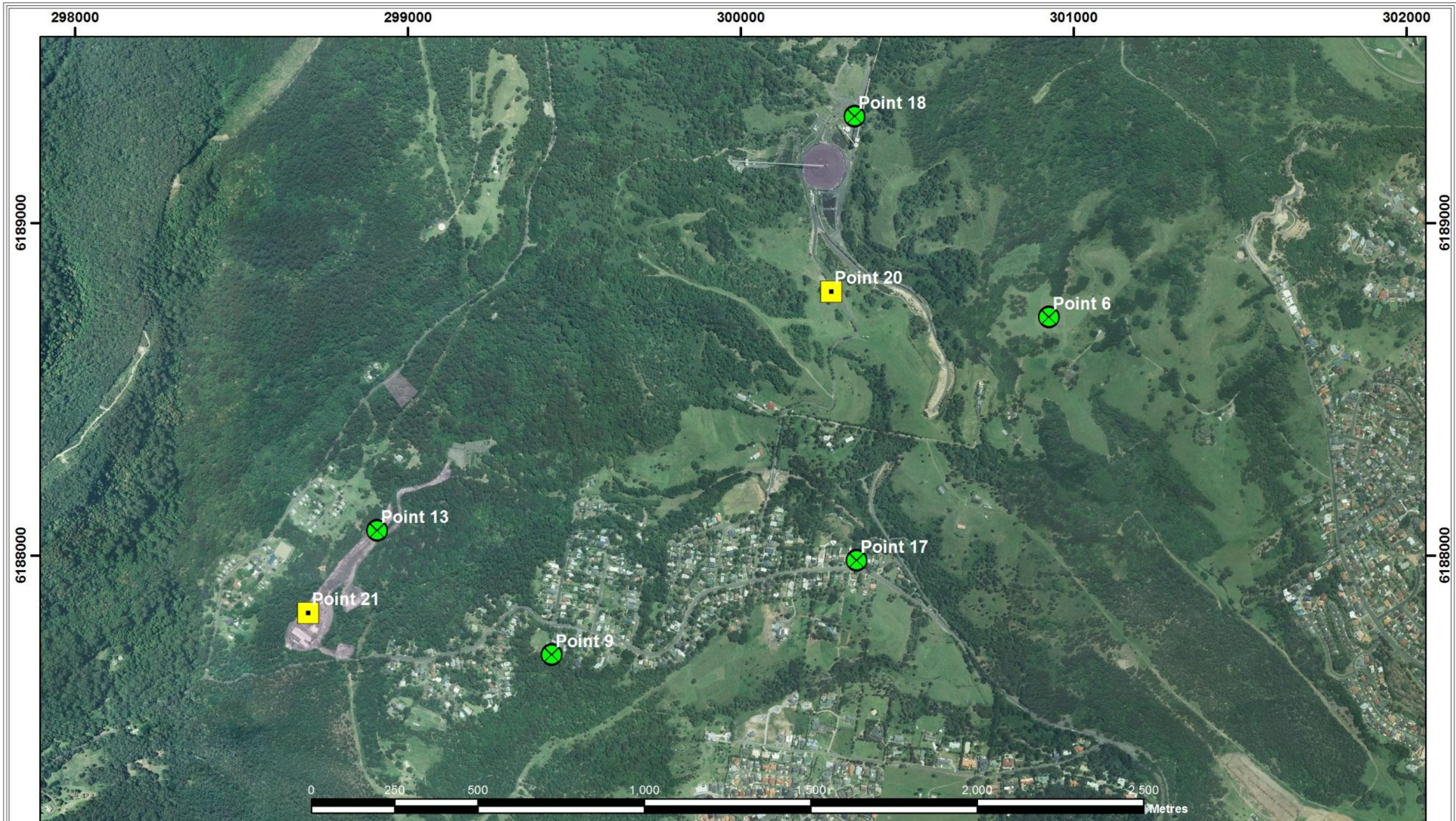
Date: July 2015
Author: M. Grierson

Version 1
 Horizontal Datum
 MGA - Zone 56



PLAN 7

Air Quality Monitoring Locations



Legend

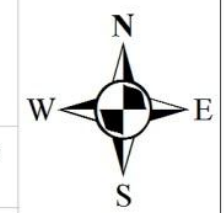
-  DDG
-  HVAS

Annual Environmental Management Plan
Dust Monitoring Locations

Date: July 2015
Author: Michelle Grierson

Horizontal Datum
MGA - Zone 56

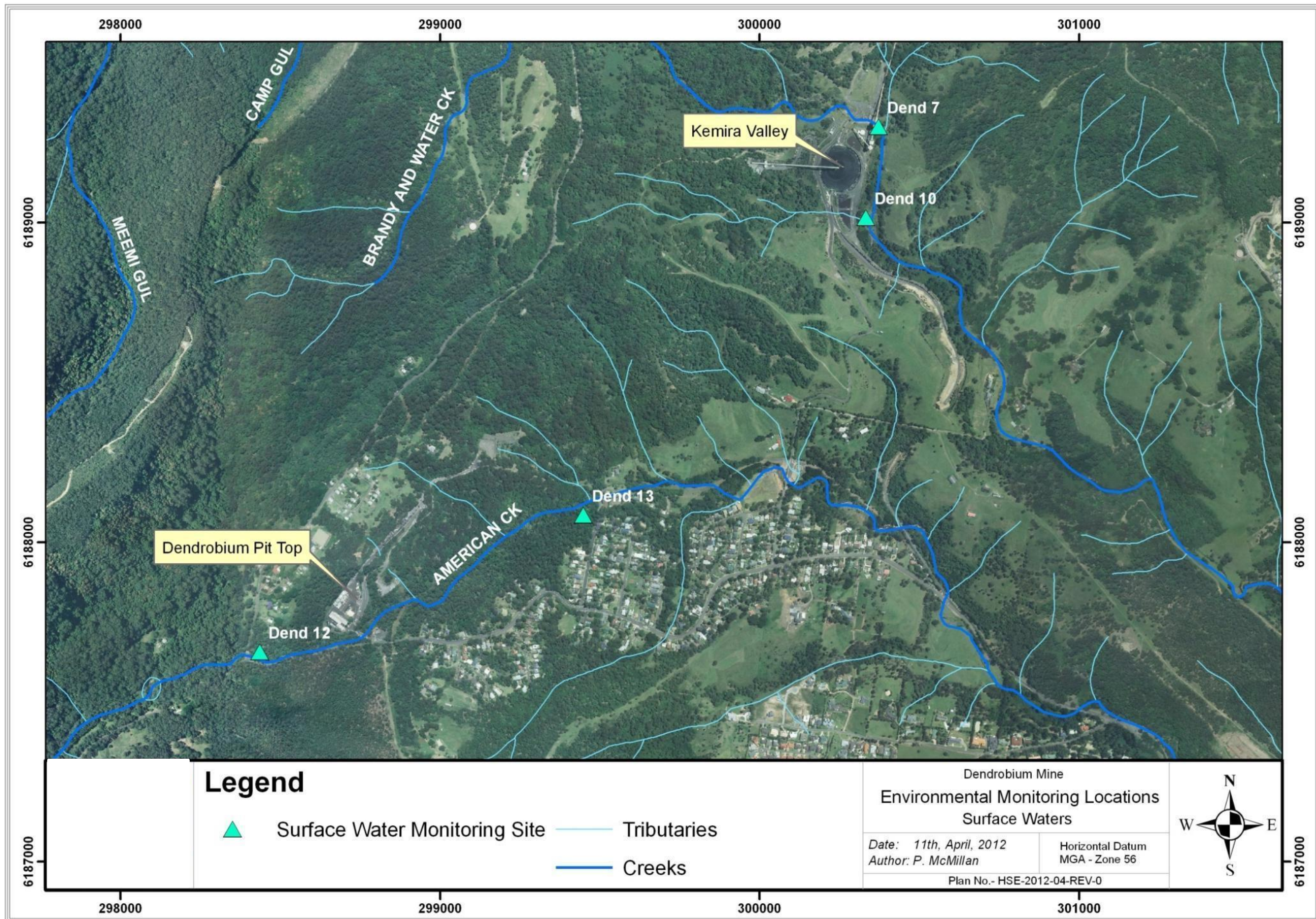
Plan No. - HSE-2012-01-REV-3



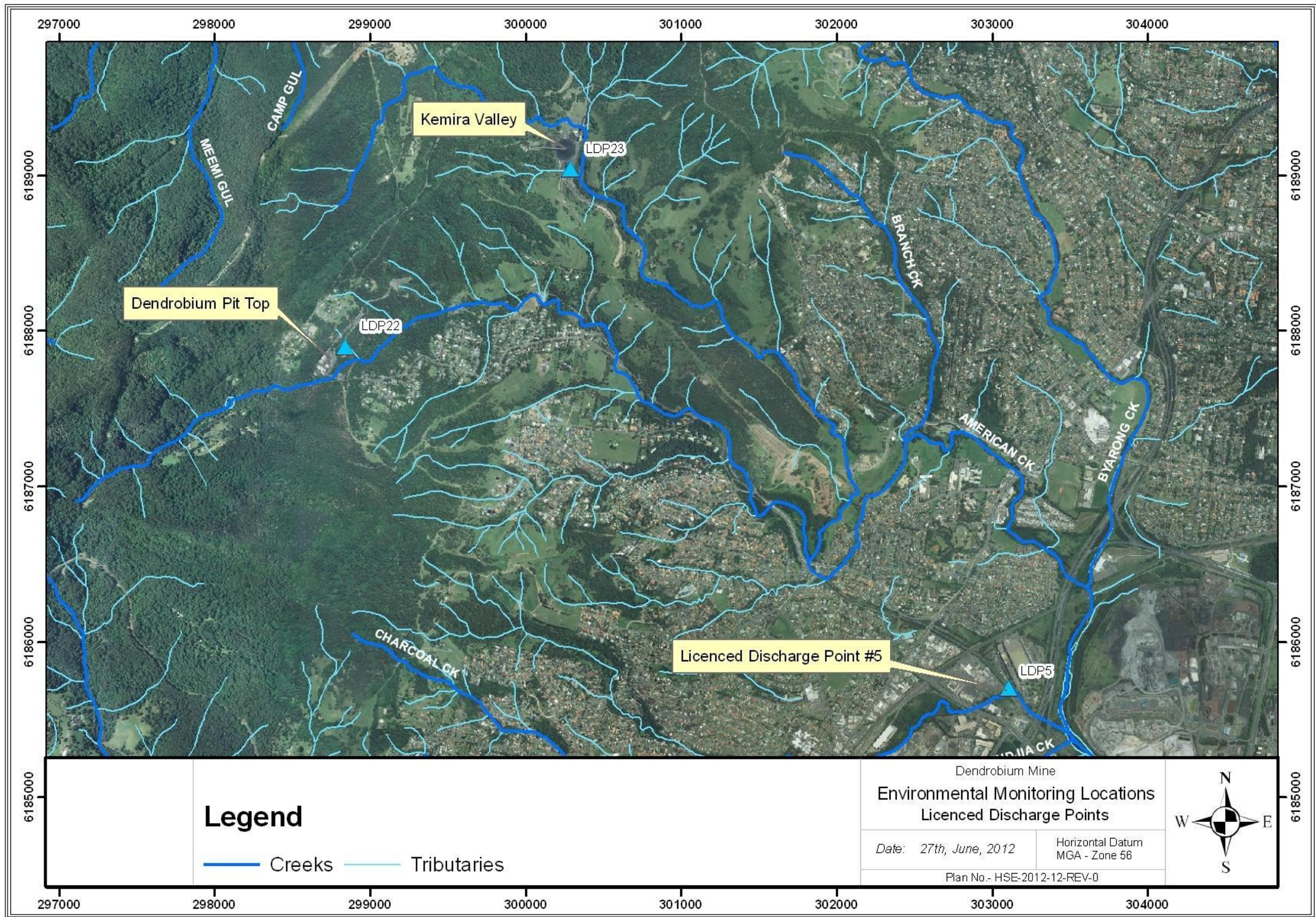
PLAN 8

A – Surface Water Quality Monitoring Locations

B – LDP Location



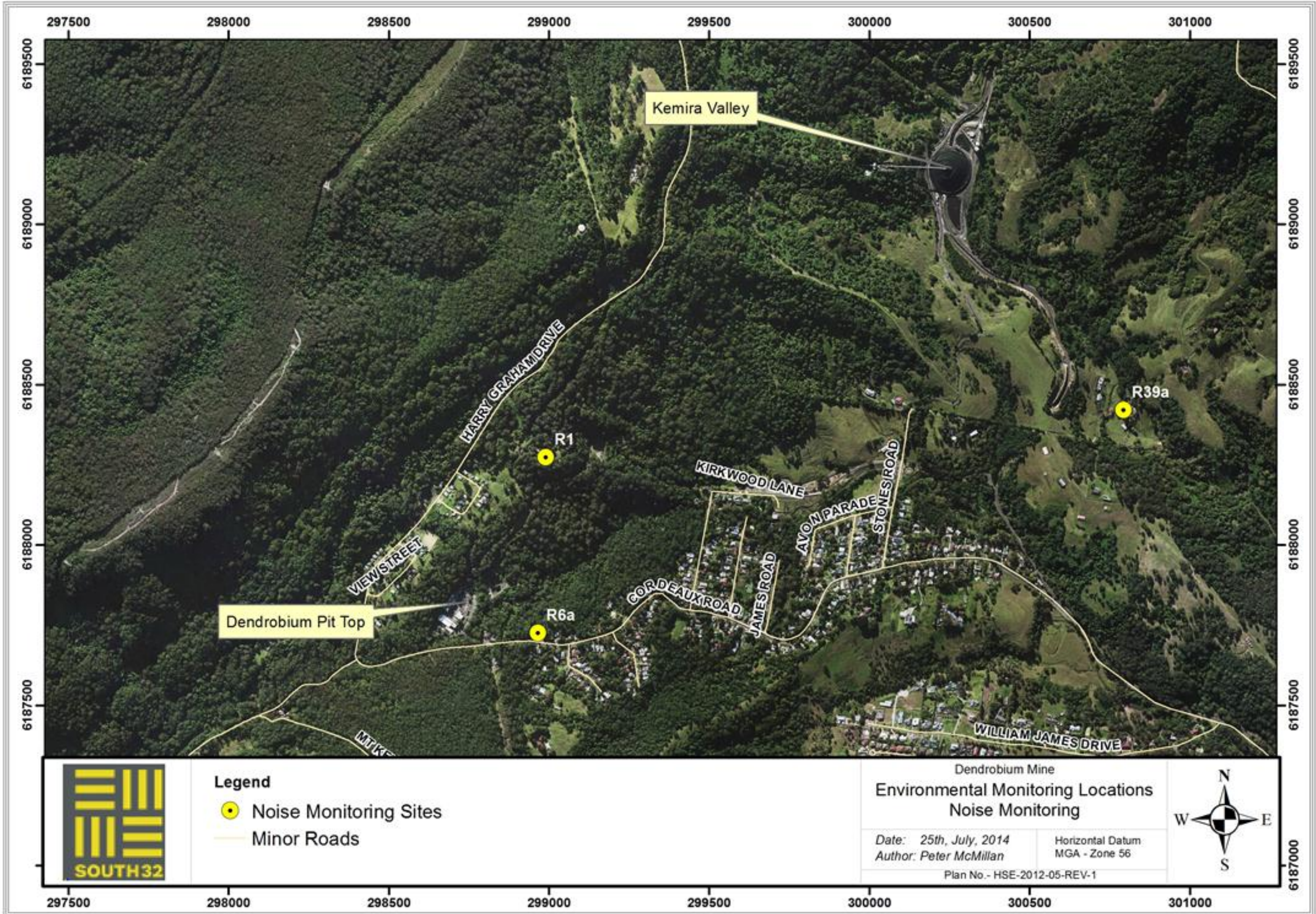
A)



B)

PLAN 9

Noise Monitoring Locations.



Legend
 ● Noise Monitoring Sites
 — Minor Roads

Dendrobium Mine
Environmental Monitoring Locations
Noise Monitoring
 Date: 25th, July, 2014
 Author: Peter McMillan
 Horizontal Datum
 MGA - Zone 56
 Plan No. - HSE-2012-05-REV-1

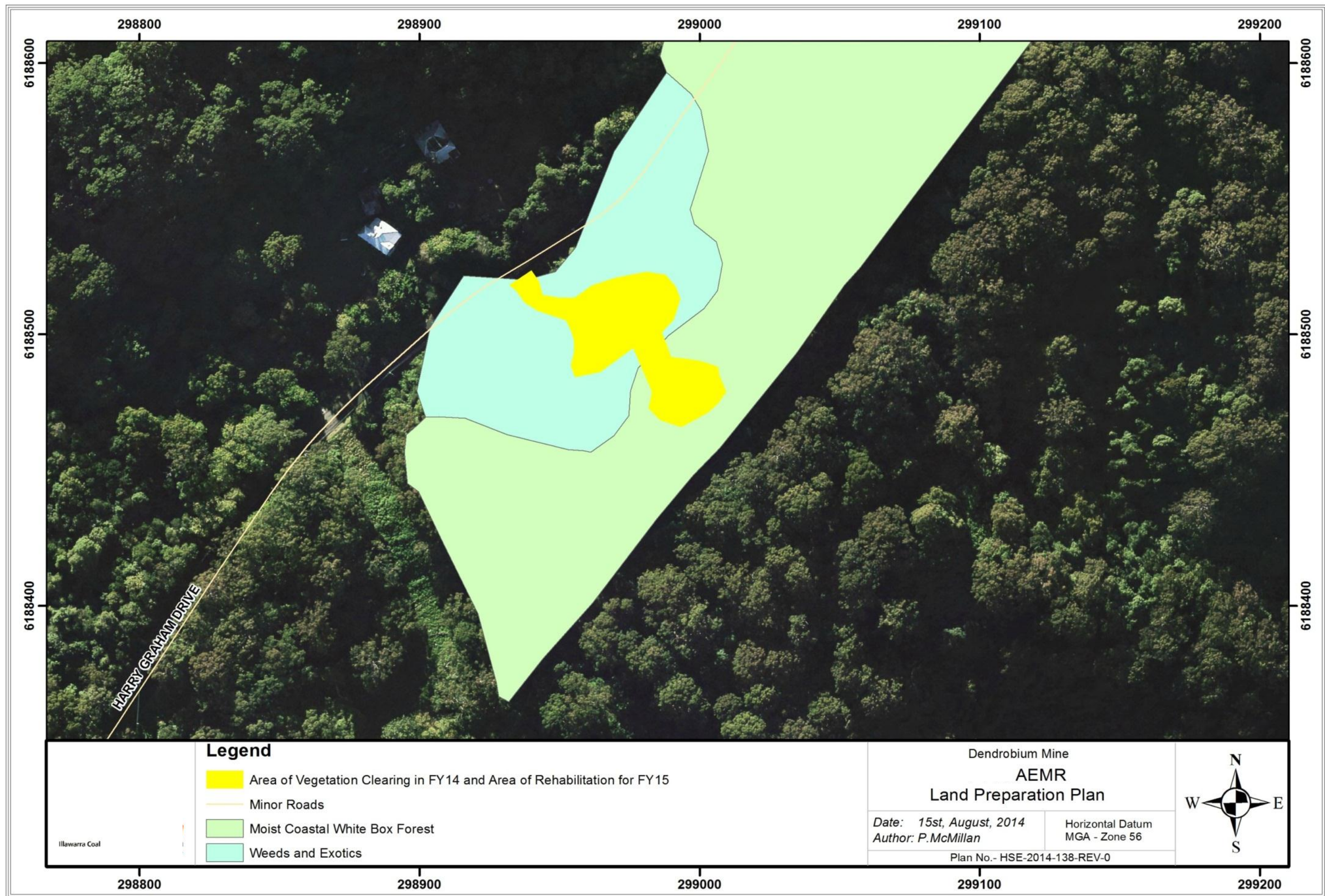


PLAN 10

A- Active Emplacement Area and Rehabilitation Progress

– Dendrobium Tunnel

B-Planned Rehabilitation – All Other Areas



HARRY GRAHAM DRIVE

Legend

- Area of Vegetation Clearing in FY14 and Area of Rehabilitation for FY15
- Minor Roads
- Moist Coastal White Box Forest
- Weeds and Exotics

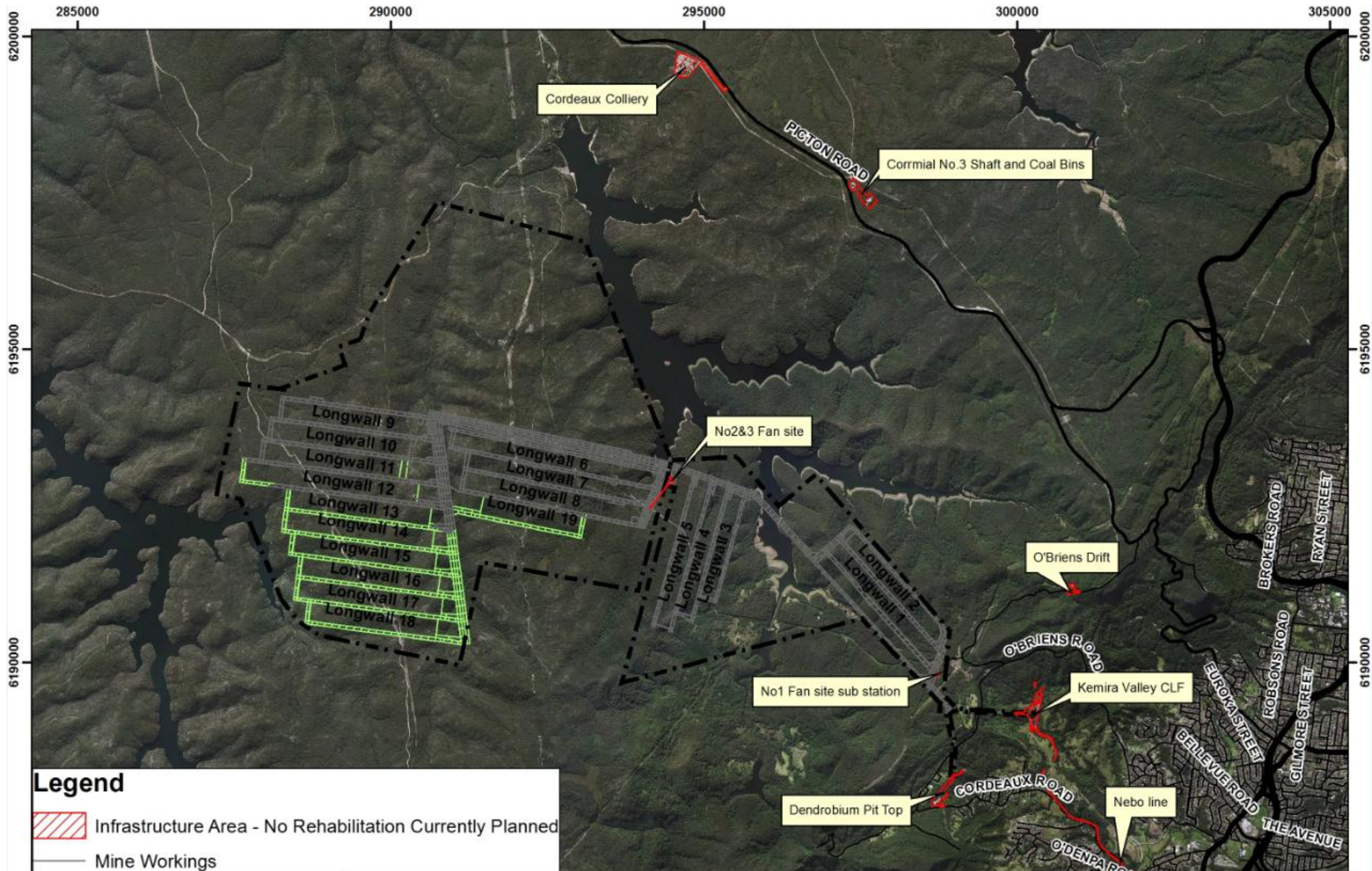
Dendrobium Mine
AEMR
Land Preparation Plan

Date: 15st, August, 2014	Horizontal Datum MGA - Zone 56
Author: P. McMillan	



Plan No. - HSE-2014-138-REV-0



Illawarra Coal

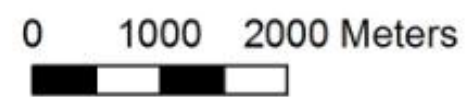


Legend

-  Infrastructure Area - No Rehabilitation Currently Planned
-  Mine Workings

NOTES

Datum - MGA 94 Coordinate System



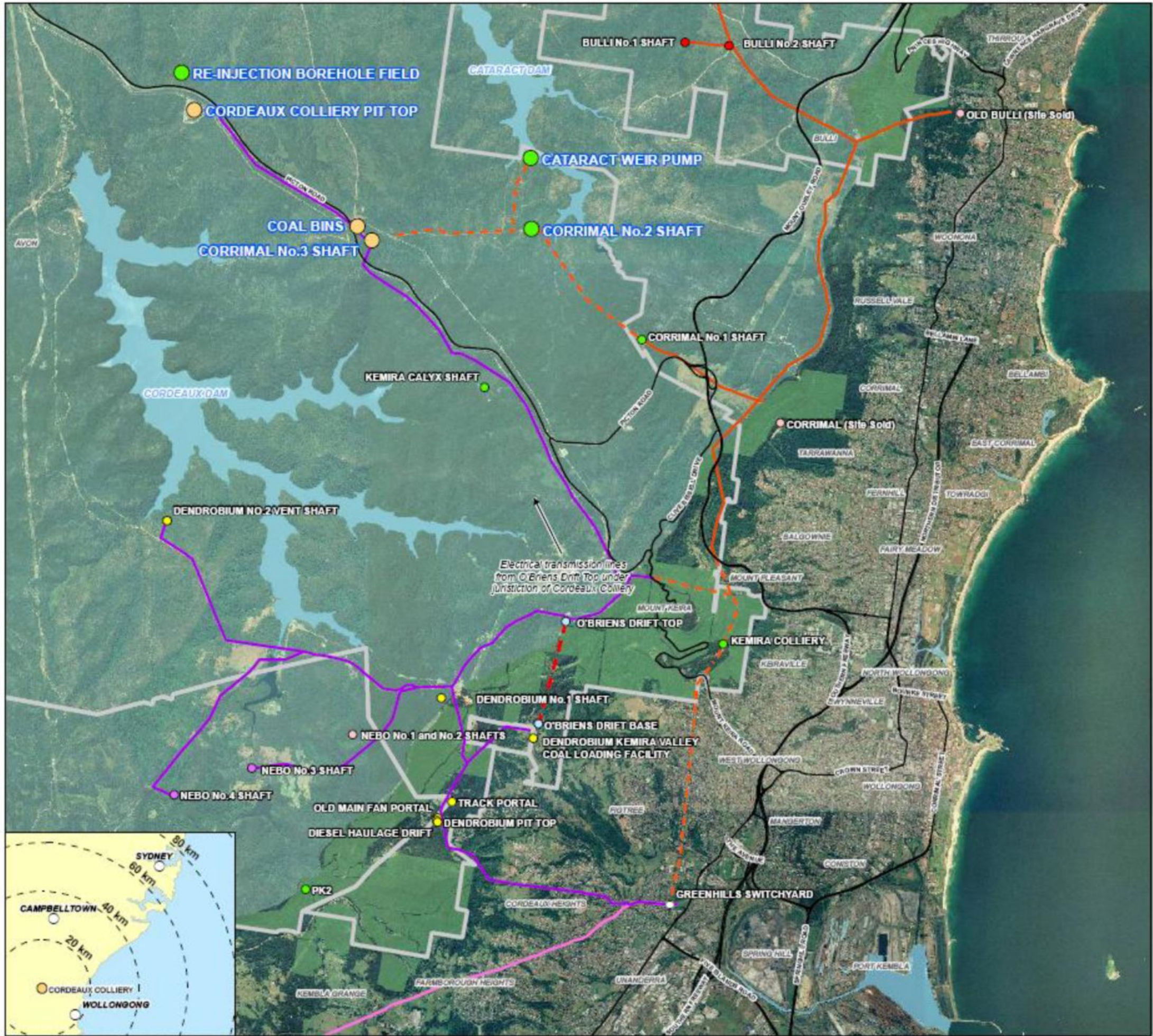
Dendrobium Mine
 Illawarra Coal
 Cordeaux Rd, Mt Kembla, NSW, 2526, Australia
 ABN 85 098 744 088

Name	Date
M.Grierson	30/06/2015

Rehabilitation - Past and Future
 Excluding Dendrobium Tunnel Rehabilitation

PLAN 11

Cordeaux Colliery Locality Plan



ILLAWARRA COAL

Locality Plan

CORDEAUX COLLIERY CLOSURE PLAN

- Legend**
- Care and Maintenance Sites
 - Non Operational Site
 - Operational Site
 - Rehabilitated Site
 - Sealed (Not Rehabilitated)
 - Site Sold (Not Rehabilitated)
 - Site Sold (Rehabilitated Site)
 - Greenhills Switchyard
 - 33kV Conductors (Dendrobium)
 - Disused Overhead Power Lines
 - Overhead Power Lines Rehabilitated/Ownership Transferred
 - Other 33kV Conductors
 - Kemira Tunnel
 - Major Roads (LPMA)
 - BHPIC Mining Leases
 - NPWD Reserve (LPMA)
 - Major Waterbodies (LPMA)
 - SCA Special Areas (Sydney Catchment Authority)

CORDEAUX COLLIERY SITES



FIGURE 2.1

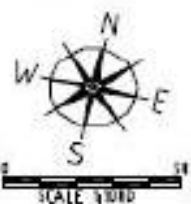
Scale 1:60,000 (at A3)



Map Produced by Cardno Forbes Rigby Pty Ltd
 Date: 04 December 2009
 Coordinate System: Zone 58 MGA/GDA94
 GIS MAP REF: 110025-01_1801_LocalityPlan_Cordeaux.mxd 04

PLAN 12

Cordeaux Colliery Pit Top Infrastructure



August 2012

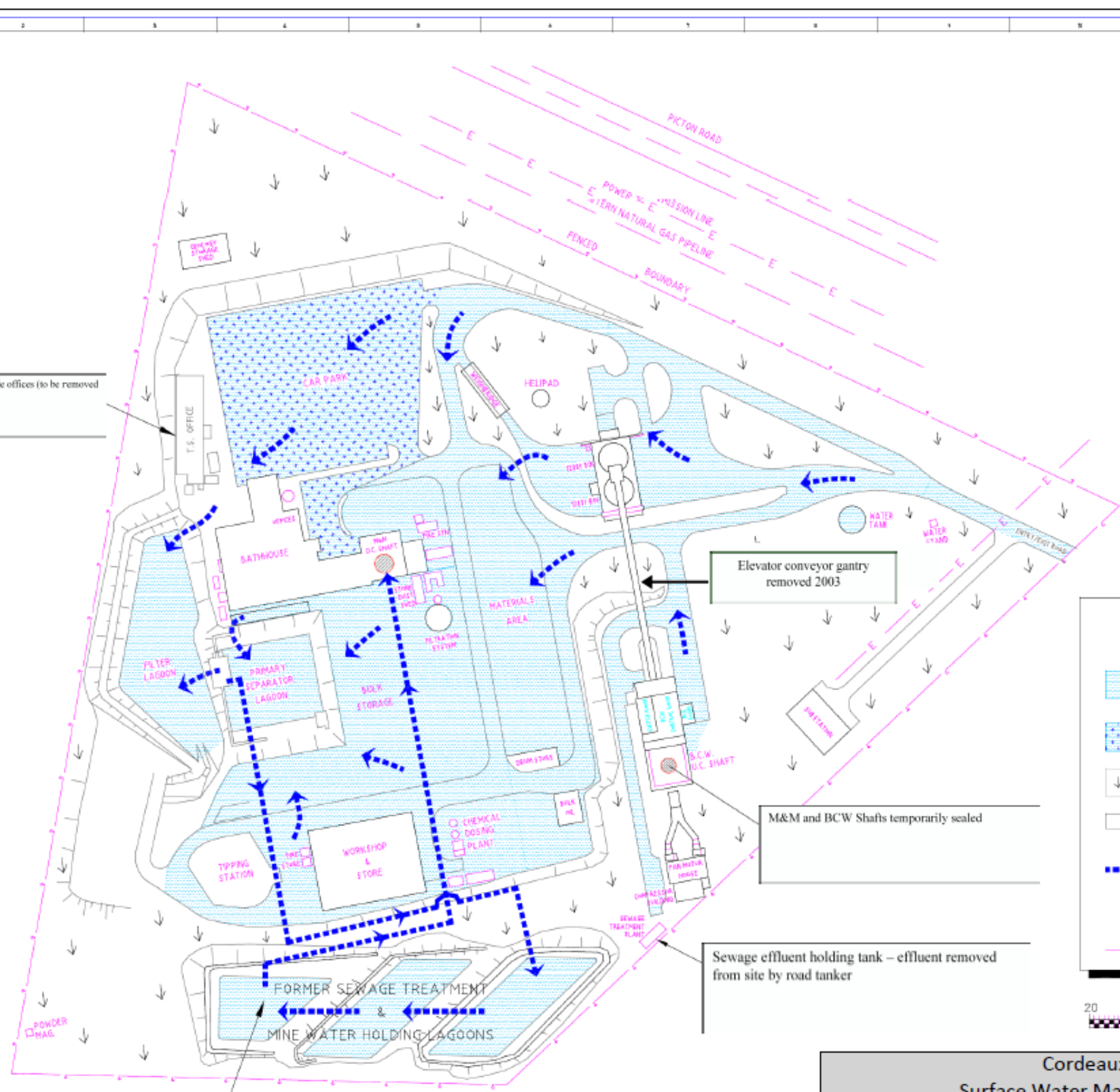
Pit Top Infrastructure Plan

Cordeaux Colliery Pit Top Site

PLAN 13

Cordeaux Colliery Pit Top Surface Water Management

Redundant TES demountable offices (to be removed this MOP period)



Elevator conveyor gantry removed 2003

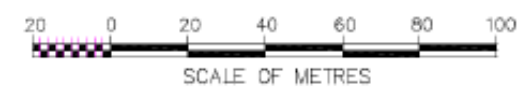
M&M and BCW Shafts temporarily sealed

Sewage effluent holding tank – effluent removed from site by road tanker

Excess site run-off water discharged to old workings u/g

LEGEND

- FORMERLY DIRTY WATER RUNOFF AREA CONVERTED TO CLEAN RUNOFF SINCE MINE CLOSURE
- CLEAN WATER RUNOFF AREA
- AREAS OF SITE VEGETATION
- BUILDINGS TO BE REMOVED FROM SITE
- CLEAN WATER RUNOFF
- MINE SHAFT TO BE TEMPORARILY SEALED
- POWER TRANSMISSION LINE



Cordeaux Colliery
Surface Water Management System
 Drawing No. DP-3472

August 2012

APPENDIX A

EPA Annual Return

APPENDIX B

Rehabilitation Security Cost Estimate – Department of
Industry Only.

APPENDIX C

Dendrobium Mine Compliance Report

APPENDIX D

Dendrobium Mine Complaint Report

APPENDIX E

End of Panel Surface and Groundwater Impact
Assessment Dendrobium Area 3B Longwall 10