



(ABN 65 086 426 253)

# **Closure Plan Update/Annual Environmental Management Report**

**for the**

**Canyon Coal Mine  
(MLs 1464 and 1471)**



**01 July 2012 – 30 June 2013**

**Whitehaven Coal Mining Limited  
Mine Closure Progress Report  
for the  
Canyon Coal Mine  
(MLs 1464 and 1471)**

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## 1 INTRODUCTION

The purpose of this report is to provide an update on the progressive closure of Whitehaven's Canyon Mine (ML 1464 and ML 1471) for the period 1<sup>st</sup> July 2012 – 30<sup>th</sup> June 2013.

## 2 ACHIEVEMENTS

### 2.1 Outline

Since mining ceased in July 2009, progressive rehabilitation, environmental monitoring and maintenance have occurred. Since closure in July 2009, over 17,000 trees and understorey species have been planted.

Overall the site is presenting an area that blends in with the surrounding agricultural landscape (Plate 1 and Plate 2). The final void area is generally a stable landscape that possesses good vegetation cover and drainage structures resulting in a secure void water body.



Plate 1 – Infill Understory Plantings, Zone 2(d) Native Vegetation





**Plate 2 - Zone 2(d) Native Vegetation**

The site has been fenced for the exclusion of stock and public access, with the fence being of the agricultural type to enhance the blending in with the surrounding agricultural landscape. The exclusion of stock and vehicle access has assisted in the success of the site's rehabilitation. Site personnel maintain observations of site to ensure both weeds and feral animals are eradicated on an as needs basis.

The offset requirements for the Canyon site have been endorsed as being included in Whitehaven's Regional Biobank site as evidenced by a letter of approval from the Department of Planning. The Biobank site was registered with the OEH on 28<sup>th</sup> June 2012.

From a social perspective, the progress of closure at the site has satisfied the surrounding community with good feedback received at the 2009, 2010 and 2012 Community Consultative Committee (CCC) meetings.

The following sub-sections provide a more detailed summary of the progress within each domain (as shown in Plate 18). Table 2 at the end of this section provides an updated schedule of works, with revised timeframes, where required.

## 2.2 Infrastructure Areas

### 1(a) Site Office and Facilities and Former Orica Hardstand

The crib and office facilities were removed in August 2010 with the exception of the toilet block, which is used by the environmental team and contractors associated with closure activities. The area, including the car park, was then topsoiled and seeded. Additionally, a small waterway was constructed to slowly drain away runoff into storage dams to the east of this area. The former Orica hardstand is yet to be rehabilitated, as it currently provides a useful safe stopping area for haul trucks on the passing haul road.

Plate 3 shows the area of the former office and crib room facilities.



Plate 3 - Zone 1(a) - Former Office and Crib Facilities

### 1(b) Workshop, Fuel Farm and Hardstand

In mid 2010, the two 50,000L diesel storage tanks were removed from the bunded area which had a capacity of 240,000L. The bunded area, which also contained stored oils, incorporated a clay over plastic over clay liner to minimise the potential of soil contamination in the event of a spill. Pipes and lockable valves were in place to enable removal of spills and rainwater from the area.

On 18<sup>th</sup> August 2010, soil testing for hydrocarbon contamination was conducted around the old fuel storage area which comprised collecting soil samples from 8 separate pits. Soil samples were taken at the surface, 1m and 2m intervals from pits

dug out by a backhoe. Four pits were located around the fuel storage area, one within the storage area and the remaining three down slope of the site to determine whether there has been any soil contamination away from the direct location. These samples were tested for total metals, recoverable metals and total petroleum hydrocarbons.

Analysis of the soil samples was conducted by ALS Laboratory Group Environmental Division in Sydney. Results of the sampling indicated that in two locations the levels of C10 – C36 Fractions of Hydrocarbons (Diesels and Lubricating Oils) exceeded the threshold concentrations for sensitive land use set in the NSW EPA Guidelines for Assessing Service Station Sites (2004). Heavy metals analysis indicated all samples were well within threshold limits.

Based on these results, the contaminated material was excavated and disposed of within a designated bunded area in September 2010 for future bioremediation. Following excavation of this material it was noted that contamination was present at greater depths than first identified. Subsequently, additional soil samples were collected to a depth of 2.5m, along with a resample of the two locations within the pit, to ensure all contaminated material was removed. Results of these sites found that contaminated material had been removed from all but one area (2 samples within the one large pit).

Wet weather hampered the continuation of remediation of the fuel storage area. When conditions permitted, the additional contaminated soil was excavated and stored in the bunded area onsite for bioremediation. Once bioremediated, the soil was disposed of offsite as general waste.

The former workshop has been decommissioned to the basic structure, as a potential agricultural shed for future land use on the site. The hardstand and storage area has had all mining related stores removed. The wash down sump has had an oil and grease analysis completed, with results indicating all parameters within compliance levels.

For the purposes of the commitments provided in the original Closure Plan, works in this domain have been completed. However, following submission of the Closure Plan Whitehaven sought approval from Narrabri Shire Council (NSC) for construction of offices, a storage shed and hardstand areas for a centralised maintenance storage area for Whitehaven's open cut mines. Consent was issued by NSC in mid 2011 and the final occupation certificate was issued in early 2012. The Maintenance Facility will remain for the foreseeable future and therefore may need to be excised from the Canyon ML at the time of relinquishment.



Plate 4 shows the area of the former fuel farm and hardstand and the remaining workshop.



**Plate 4 - Zone 1(b) - Workshop, Fuel Farm and Hardstand Area**

### **1(c) Coal loading bin and ROM Pad**

The removal of coal loader and associated infrastructure was completed in September 2010, with the loadout bin being commissioned at Whitehaven's Sunnyside Coal Mine. The ROM pad and ROM facilities area totalled 7.5 ha and was reshaped, stabilised with contours and waterways for drainage, top-soiled and seeded with a summer pasture mix. The waterway spills into a rehabilitated area to the south of the pad that is designed to slowly drain runoff into the final void. This area has also been top-soiled and seeded with a summer pasture mix for prevention of erosion. Further planting of native trees in clump formations was undertaken in November 2011.

Plate 5 shows the area of the former ROM pad.



**Plate 5 - Zone 1(c) - ROM Pad and Coal Loading Facilities**

#### **1(d) Explosives Magazine**

The explosives magazine is still currently used by blasting contractor Orica Mining Services. Whitehaven plans to leave the magazine in its current location for the foreseeable future as it provides a secure area which is isolated from the general public.

Plate 6 shows the remaining explosive magazines.



**Plate 6 - Zone 1(d) - Explosives Magazine**

## **2.3 Rehabilitation Zones**

### **2(a-f) - Pasture and Native Vegetation Zones**

Infill planting of 350 trees occurred south of the ROM pad and west of the haul road (Zone 2(f)) in October 2009.

A total of 5,660 tubestock was planted over January and February 2010 in the designated native vegetation rehabilitation zones 2(b), (d), (e) and (f). The tubestock consisted of a diverse range of shrub and tree species native to the area. Whitehaven made particular effort to ensure a significant mix of overstorey and understorey species were planted. This will ensure that the native vegetation zones regenerate in a way that enhances the original landscape by providing improved biodiversity.

A planting campaign of 3,800 tubestock, which incorporated a mix of tree and understorey species were planted over June 2010 using a contracted tree planting machine. 2,000 tubestock were sourced from those left over from the January/February 2010 campaign and the remaining 1,800 were supplied by the contractor. The area targeted was native vegetation Zone 2(f) within the south-east corner of the site.



Further infill planting of 1,000 understorey species was undertaken in September 2010 in Zones 2(b) and 2(d). Areas targeted within the zones were those on the mid-plateau section of rehabilitation which is a native vegetation zone consisting of trees planted around five years ago. The infill planting will ensure the introduction of a shrubby understorey such as Hop Bush and Golden Wattle, and hence will further improve the ecological merit of the area. Preparation for the planting involved adding fresh rip lines between existing vegetation and undertaking grass/weed control with a pre-spray of glyphosate, two weeks prior to planting.

Further infill planting of 320 understorey tubestock occurred in June 2011 on the western area of the rehabilitation.

Three clumps, comprising 2 tubestock each of 12 different tree or understorey species, were planted in February 2013 on the plateau identified as 2(a) Pasture Zone 1.

Plate 7 to Plate 13 provide examples of native vegetation rehabilitation at the site while Table 1 includes a summary of the number and type of species planted during the period July 2009 to February 2013.



**Plate 7 - Zone 2(a) - Pasture Zone 1**



**Plate 8 - Zone 2(b) - Pasture Zone 2**



**Plate 9 - Zone 2(c) - Native Vegetation Zone 1 (Photo 1)**





**Plate 10 - Zone 2(c) - Native Vegetation Zone 1 (Photo 2)**



**Plate 11 - Zone 2(d) - Native Vegetation Zone 2**





**Plate 12 - Zone 2(e) - Native Vegetation Zone 3**



**Plate 13 - Zone 2(f) - Native Vegetation Zone 4**

**Table 1 – Rehabilitation Species List**

Date	Scientific Name	Common Name	Approx Quantity
13-Jul-09	<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	160
	<i>Eucalyptus albens</i>	White Box	160
	<i>Eucalyptus populnea</i>	Bimble Box	80
	<i>Eucalyptus pilligaensis</i>	Pilliga Grey Box	40
15-Jul-09	<i>Eucalyptus melliodora</i>	Yellow Box	40
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	120
	<i>Eucalyptus melanophloia</i>	Silver-leaf Ironbark	40
	<i>Eucalyptus albens</i>	White Box	40
	<i>Eucalyptus populnea</i>	Bimble Box	80
	<i>Eucalyptus pilligaensis</i>	Pilliga Grey Box	80
21-Jul-09	<i>Eucalyptus albens</i>	White Box	80
	<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	80
	<i>Eucalyptus melanophloia</i>	Silver-leaf Ironbark	80
	<i>Eucalyptus populnea</i>	Bimble Box	160
	<i>Eucalyptus pilligaensis</i>	Pilliga Grey Box	80
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	160
28-Sep-09	<i>Eucalyptus albens</i>	White Box	1030
	<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	400
	<i>Eucalyptus melanophloia</i>	Silver-leaf Ironbark	
	<i>Eucalyptus populnea</i>	Bimble Box	400
	<i>Eucalyptus pilligaensis</i>	Pilliga Grey Box	400
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	800
	<i>Acacia Deanii</i>	Deane's Wattle	600
	<i>Casuarina cristata</i>	Belah	400
20-Oct-09	<i>Brachychiton populneus</i>	Kurrajong	300
	<i>Eucalyptus albens</i>	White Box	75
	<i>Eucalyptus melliodora</i>	Yellow Box	75
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	100
14-Jan-10	<i>Eucalyptus populnea</i>	Bimble Box	100
	<i>Acacia deanei</i>	Deans Wattle	200
	<i>Acacia decorai</i>	Western Golden Wattle	200
	<i>Acacia oswaldii</i>	Umbrella Wattle	120
	<i>Acacia salicina</i>	Black Wattle	160
	<i>Alectryon oleifolium</i>	Bullock Bush	30
	<i>Allocasaurina leuhmanii</i>	Bull Oak	160
	<i>Atalya hemoglauc</i>	White Wood	240
	<i>Brachychiton populneus</i>	Kurrajong	360
	<i>Callitris glaucophylla</i>	White Cypress	120
	<i>Casuarina cristate</i>	Belah	40
	<i>Dodonea heteromorpha</i>	Hop Bush	200
	<i>Dodonea viscosaa</i>	Sticky Hop Bush	800
	<i>Hovea lanceolata</i>	Lance-leaf Hovea	80
	<i>Notolea microcarpa</i>	Native Olive	40
	<i>Parsonsia eucalyptaphylla</i>	Gargaloo	80
	<i>Pittosporum angustifolium</i>	Budda Bush	800
	<i>Senna artcimoides</i>	Silver Cassia	80
	<i>Eremophila debile</i>	Winter Apple	20
	<i>Eucalyptus clauroclada</i>	Baradine Red Gum	320
	<i>Eucalyptus melanophloia</i>	Silver Leaf Ironbark	280
	<i>Eucalyptus albens</i>	White Box	200
	<i>Eucalyptus melliodora</i>	Yellow Box	240
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	280
	<i>Eucalyptus populnea</i>	Bimble Box	240
	<i>Eucalyptus pilliganensis</i>	Pilliga Box	600
25-Feb-10	<i>Atalya hemoglauc</i>	White Wood	120
	<i>Eucalyptus populnea</i>	Bimble Box	100
	<i>Dodonea heteromorpha</i>	Hop Bush	80

Date	Scientific Name	Common Name	Approx Quantity
	<i>Dodonea viscosa</i>	Sticky Hop Bush	80
	<i>Pittosporum angustifolium</i>	Budda Bush	320
	<i>Eucalyptus albens</i>	White Box	60
	<i>Eucalyptus clauroclada</i>	Baradine Red Gum	80
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	200
	<i>Eucalyptus melliodora</i>	Yellow Box	40
	<i>Eucalyptus pilliganensis</i>	Pilliga Box	160
	<i>Callitris glaucophylla</i>	White Cypress	30
	<i>Casuarina cristate</i>	Belah	80
	<i>Davisea genistifolia</i>	Broom Bitter Pea	400
	<i>Indigofera australis</i>	Native Indigo	20
25-Jun-10	<i>Dodonea viscosa</i>	Sticky Hop Bush	300
	<i>Pittosporum angustifolium</i>	Budda Bush	300
	<i>Eucalyptus melliodora</i>	Yellow Box	350
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	200
	<i>Eucalyptus albens</i>	White Box	350
	<i>Eucalyptus populnea</i>	Bimble Box	150
	<i>Brachychiton populneus</i>	Kurrajong	150
28-Sep-10	<i>Dodonea viscosa</i>	Sticky Hop Bush	300
	<i>Pittosporum angustifolium</i>	Budda Bush	150
	<i>Acacia deanei</i>	Deans Wattle	200
	<i>Acacia decorai</i>	Western Golden Wattle	150
	<i>Dodonea heteromorpha</i>	Hop Bush	200
28-29 June 2011 Western side rehab near fire break	<i>Senna coronilloides</i>		40
	<i>Pittosporum angustifolium</i>	Budda Bush	40
	<i>Acacia hakeoides</i>		40
	<i>Dodonea viscosa</i>	Sticky Hop Bush	80
	<i>Acacia decora</i>	Western Golden Wattle	40
	<i>Acacia salicina</i>	Black Wattle	40
	<i>Senna artemisioides</i>	Punty Bush	40
10-Nov-11 Old coal loader and opposite weighbridge	<i>Brachychiton populneum</i>	Kurrajong	40
	<i>Callitris glaucophylla</i>	White Cypress Pine	20
	<i>Capparis mitchelli</i>	Wild Orange	10
		Acacia	40
	<i>Eucalyptus albens</i>	White Box	20
	<i>Eucalyptus populnea</i>	Bimble Box/Poplar Box	20
	<i>Eucalyptus crebra</i>	Silver Narrow-leaved Ironbark	40
16-Nov-11 Old coal loader and opposite weighbridge	<i>Eucalyptus melanophloia</i>	Silver Leaf Ironbark	30
	<i>Eucalyptus crebra</i>	Narrow-leaf Ironbark	20
	<i>Eucalyptus populnea</i>	Bimble Box/Poplar Box	20
	<i>Eucalyptus albens</i>	White Box	30
	<i>Acacia deanei</i>	Deans Wattle	20
	<i>Dodonea viscosa</i>	Sticky Hop Bush	20
	<i>Brachychiton populneus</i>	Kurrajong	80
	<i>Callitris glaucophylla</i>	White Cypress Pine	20
7-Feb-13 2(a) Pasture zone 1 - Northern emplacement plateau (2 trees x each species x 3 clumps) and 5(b) Emplacement Area 2 (2 trees x each species x 1 clump)	<i>Eucalyptus pilliganensis</i>	Pilliga Box	8
	<i>Eucalyptus populnea</i>	Bimble Box	8
	<i>Brachychiton populneus</i>	Kurrajong	16
	<i>Dodonea viscosa</i>	Sticky Hop Bush	8
	<i>Eucalyptus beyeri</i>	Beyer's Ironbark	8
	<i>Casuarina christata</i>	Belah	8
	<i>Indigofera australis</i>	Native Indigo	8
	<i>Acacia decora</i>	Western Golden Wattle	8
	<i>Acacia salicina</i>	Black Wattle	8
	<i>Senna artemisioides</i>	Punty Bush	8
	<i>Hardenbergia violacea</i>	Sarsaparilla	8
	<i>Acacia oswaldii</i>	Umbrella Wattle	8
		<b>Total</b>	<b>17474</b>

## **2.4 Final Void**

### **3 - Void**

Although a summer cover crop consisting of predominately Japanese Millet was present in the void area, the intensity of rainfall events over late December 2009 and early January 2010 (a total of 184.6mm fell from the 22/12/09 – 3/1/10) resulted in numerous instances of gully erosion through contour banks and dam walls within the void. The major areas affected included the southern side of the void with three small instances of gully erosion through contours, and one small instance on the northern side of the void. A large channel was also eroded through the dam wall which was acting as a water velocity control structure in the lower void. These areas were further affected by 180.8 mm of rainfall over the following months of February and March 2010, creating major damage to the first void dam to the east with a large channel cut through the dam wall. In total an area of around 0.5ha was affected by erosion in the void.

Remediation work began in May 2010 with dozer contractors patching the problematic areas and reseeding with a winter cover crop consisting of predominately Rye Corn to further stabilise the soil. Major work occurred on the dam entering the void (to the east) with the wall filled and enlarged to incorporate a new rock lined spillway turfed with kikuyu grass. This work has prevented further instances of channelling through the dam wall and slowed water entering the void from the east, therefore reducing the chances of gully erosion through the lower water structures to the west. Works on the southern side of the void were also undertaken and included shaping and seeding of steeper slopes that were previously left due to access issues.

Earthen mounds were installed in June 2010 within the void to provide an alternative to rip-lines and were anticipated to be incorporated into future tree planting campaigns. Mounds also provide further stability within the void slope acting as smaller intermediate contours between larger contours, catching water runoff and therefore providing moisture to developing tubestock.

The approximate 35.9 ha of the void was re-seeded in September 2010 with a summer pasture mix to provide further stability on void slopes. The seed mix consisted of 250kg of Japanese Millet, 50kg Bambatsi Panic, 50kg Purple Pigeon Grass and 50kg Premier Digit Grass, which equates to approximately 11kg/ha of pasture. The new crop was required to replace the annual winter species crop and was particularly important in the prevention of erosion of slopes during summer storms.



As discussed previously, heavy rains in early 2012 resulted in new erosion on the southern face of the void. The area was remediated in late 2012 by Wards Earthmoving. Whilst works like this will occur as required, at this stage progression to final rehabilitation of the void have been delayed due to the pending Vickery Coal Project which will ultimately result in the Canyon void being backfilled with waste rock from the Vickery Project. Plate 16 and Plate 17 show the final void in mid 2013.



**Plate 14 - Zone 3 - Final Void (Photo 1)**



Plate 15 - Zone 3 - Final Void (Photo 2)

## 2.5 Enrichment Planting Zones

### 4(a-c) Enrichment Zones

Enrichment planting in zones 4a and 4c has not occurred. These zones formed part of the biodiversity offset for Canyon however, as discussed in Section 2.1 the Canyon's offset requirements have been included in Whitehaven's Regional Biobank Area. As a result, enrichment planting in these zones will not be undertaken.

Enrichment planting in zone 4b will also not be undertaken pending approval of the Vickery Coal Project as the Vickery waste emplacement will cover this area.

## 2.6 Emplacement Areas

### (5a-b) – Emplacement Areas 1 and 2

Both reject emplacement 1 (north), Plate 16, and 2 (south), Plate 17, areas have been filled, reshaped, top-soiled and seeded with summer pasture mix during September 2010. Planting of native trees was undertaken in November 2011 with additional planting in February 2013.





**Plate 16 - Zone 5(a) - Emplacement Area 1**



**Plate 17 - Zone 5(b) - Emplacement Area 2**





Plate 18 – Closure Domain Areas

**Table 2 - Update of Completed Works**

<b>DOMAIN</b>	<b>ACTIVITY</b>	<b>COMPLETION DATE</b>
1(a) Infrastructure Area: Site Office and Facilities Crib Room First Aid Room Car Park Area  Former Orica Hardstand	Removal of relocatable offices, piers and associated infrastructure	Completed
	Ripping of hardstand areas, removal of concrete pathway, sowing of cover crop	Former Orica hardstand will remain for the foreseeable future. All other actions completed.
1(b) Infrastructure Area:  Workshop Fuel Farm Storage/Hardstand Area	Dismantling of Workshop and removal off site.	Main shed remains
	Break up and removal of concrete off site	Completed
	Removal of wash down facilities (Truck tray and oil separating tank)	Remains as part of Maintenance Facility
	Removal of all stored items from hardstand area	Completed
	Removal of fuel tanks, pumps and associated infrastructure from fuel farm	Completed
	Soil sampling at depth ranges at workshop area, fuel farm and downslope of fuel farm, and at washdown bay.	Completed
	Soil remediation or removal if required	Completed
	Ripping of hardstand areas, replacement of topsoil, placement of drainage structures and sowing of cover crop	Part of this area has remained for the Maintenance Facility.
1(c) Infrastructure Area:  Coal Loading Bin ROM Pad Coal Loading facilities and road access area	Dismantling of Coal Bin and loader and transfer off site.	Completed
	Relocation of structures associated with coal loader	Completed
	Removal of all coal stockpiles at the ROM Pad	Completed
	Deep ripping of ROM Coal Pad and road access area	Completed
	Replacement of topsoil, placement of drainage structures	Completed
	Sowing of cover crop	Completed
	Planting to native vegetation	Completed
1(d) Infrastructure Area  Explosives Magazine	Dismantling and removal of magazine	To remain at this stage.
	Deep ripping and replacement of topsoil	To remain at this stage.
	Sowing to cover crop	To remain at this stage.
2(a) Pasture Zone 1	Reshaping, replacement of subsoil and topsoil, drainage structure establishment	Completed
	Establishment of cover crop	Completed
	Establishment of monitoring plot	Completed
	Planting of clumps of native	Completed



DOMAIN	ACTIVITY	COMPLETION DATE
	vegetation	
2(b) Pasture Zone 2	Deep Ripping of compaction zones (ie access roads, truck park area)	Completed
	Replacement of topsoil, placement of drainage structures	Completed
	Sowing to cover crop	Completed
2(c) Native Vegetation Zone 1	Reshaping, replacement of subsoil and topsoil, drainage structure establishment	Completed
	Establishment of cover crop	Completed
	Establishment of monitoring plot	Completed
	Establishment of riplines	Completed
	Planting to native vegetation	Completed
	Infill planting with understorey species	Completed
2(d) Native Vegetation Zone 2	Reshaping, replacement of subsoil and topsoil, drainage structure establishment	Completed
	Establishment of cover crop	Completed
	Establishment of monitoring plot	Completed
	Establishment of riplines	Completed
	Planting to native vegetation	Completed
	Infill planting with understorey species	Completed
2(e) Native Vegetation Zone 3	Reshaping, replacement of subsoil and topsoil, drainage structure establishment	Completed
	Establishment of cover crop	Completed
	Establishment of riplines	Completed
	Planting to native vegetation	Completed
2(f) Native Vegetation Zone 4	Cessation of active mining	Completed
	Reshaping, replacement of subsoil and topsoil, drainage structure establishment	Completed
	Establishment of cover crop	Completed
	Establishment of riplines	Completed
	Planting to native vegetation	Completed
3 Final Void	Final Shaping at depth of approximately 25 metres	Completed
	Final batter grades achieved in accordance with MOP	Completed
	Subsoil and topsoil replaced	Completed
	Drainage structures installed	Completed
	Banks of void sown to cover crop	Completed
	Banks of void planted out to native vegetation	Tubestock planting not to be completed pending Vickery Project approval. Void has established cover vegetation.
4(a) Enrichment	Establishment of rip lines through	Replaced by Biobank site

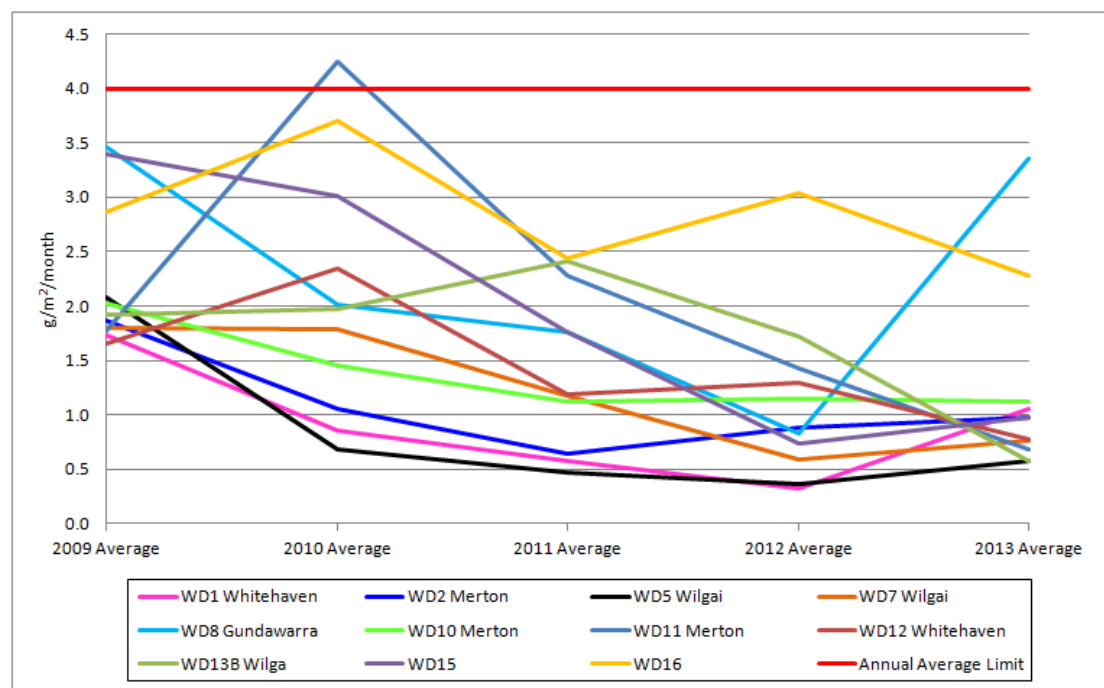
DOMAIN	ACTIVITY	COMPLETION DATE
Planting Zone 1	existing native pasture	(see section 2.5)
	Planting to native vegetation	Replaced by Biobank site (see section 2.5)
4(b) Enrichment Planting Zone 2	Planting to concentrated clump of native vegetation within existing rehabilitation area	Not to be completed pending Vickery approval.
4(c) Enrichment Planting Zone 3	Establishment of riplines through existing native pasture	Replaced by Biobank site (see section 2.5)
	Planting to native vegetation	Replaced by Biobank site (see section 2.5)
5(a) Emplacement Area 1	Reject emplacement area filled	Completed
	Reject emplacement covered with a minimum of 3 metres of inert overburden material	Completed
	Replacement of subsoil and topsoil	Completed
	Drainage structures in place	Completed
	Cover crop established	Completed
5(b) Emplacement Area 2	Reject emplacement area filled	Completed
	Reject emplacement covered with a minimum of 3 metres of inert overburden material	Completed
	Replacement of subsoil and topsoil	Completed
	Drainage structures in place	Completed
	Cover crop established	Completed
	Rip lines established	Completed
	Planting to native vegetation	Completed

### 3 ENVIRONMENT AND COMMUNITY

Monitoring of environmental parameters continues to be carried out on site during the closure process. These include air quality, wet weather discharge, void water, groundwater and flora and fauna monitoring. Despite ongoing monitoring and application of consent criteria, it would be difficult to attribute any exceedances to the site given there is no production and the site is well rehabilitated.

#### 3.1 Air Quality

Air quality is monitored monthly, with the intention of staged removal of monitoring points on relinquishment of area. Results are shown in Figure 1.



**Figure 1 - Annual Average Deposited Dust Results**

Figure 1 shows the annual average for each monitoring point since July 2009, compared with the consent limit of  $4\text{g/m}^2/\text{month}$ . It should be noted that September 2009 results have been excluded from the graphed data for all monitoring locations as these results were skewed by regional bushfires. December 2010 and January 2011 deposited dust results have also been excluded from WD-13B Womboola as they were highly anomalous with results from that monitoring location during other months as well as results from other monitoring locations during December and January.

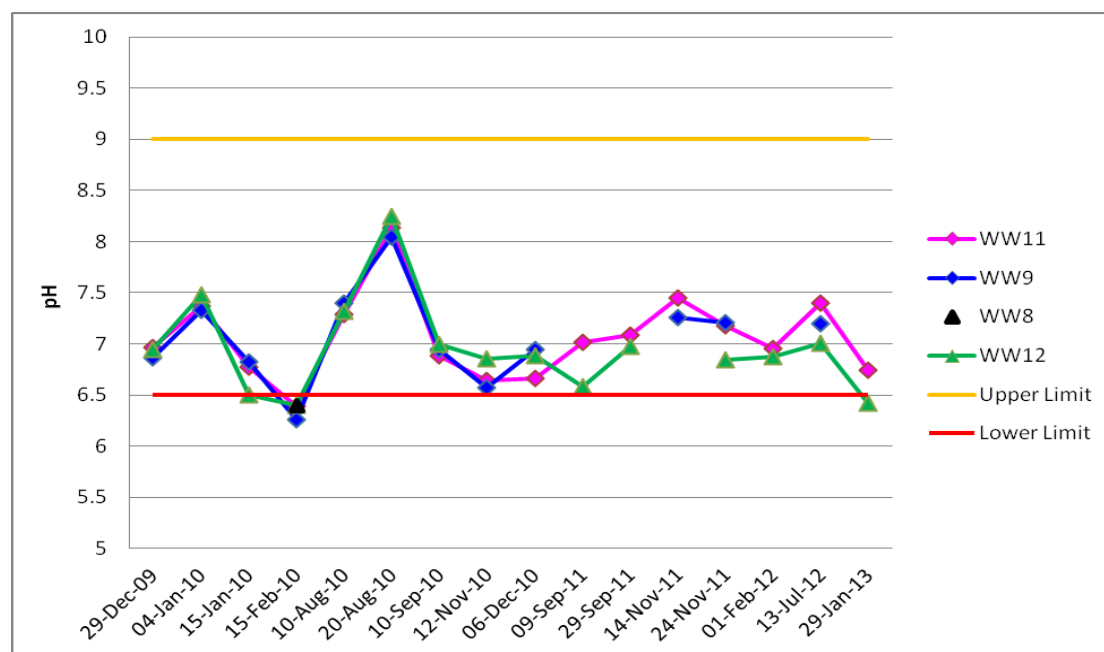
The graph shows that all monitoring locations have remained below the annual average criteria of  $4\text{g/m}^2/\text{month}$  since mining ceased in mid 2009. The overall trend of the data shows that deposited dust levels are generally remaining at low levels around the Canyon site and are continuing to fall as a consequence of established groundcover across all rehabilitated areas.

### 3.2 Wet Weather discharge – Surface Water

Wet weather surface water quality is monitored on the basis of wet weather discharge events, with the intention of staged removal of the relevant monitoring points on relinquishment of the area. WW8 (SD-2) and WW9 (SD-3) are the licenced discharge points, whilst WW11 and WW12 provide upstream and downstream water quality comparisons. One discharge occurred from WW9 during the period July 2012 – June 2013. A flow event was sampled at the ambient monitoring points in January

2013 however no discharge occurred from site. Results of pH, Total Suspended Solids (TSS) and Oil and Grease are presented below.

Figure 2 shows that discharge from WW9 on the 13<sup>th</sup> July 2012, as well as ambient flows upstream and downstream of Canyon, remained within the pH thresholds of 6.5 – 8. The downstream monitoring location (WW12) recorded a pH level slightly below the threshold in January 2013. This is not believed to be associated with Canyon as no wet weather discharge was recorded.



**Figure 2 - Wet Weather Discharge pH (2009 - 2013)**

The discharge from WW9 on the 13<sup>th</sup> July 2012 recorded a TSS level of 51mg/L. Whilst this is 1mg/L above the threshold of 50mg/L, it is noteworthy that the upstream monitoring location returned a TSS level of approximately 100mg/L. The elevated result at the upstream monitoring location is likely a result of farming practices and the unsealed Hoad Lane and is in no way influenced by the Canyon site. Figure 3 also shows that the ambient flows in January 2013, where discharge from site was not recorded, again exceeded the 50mg/L limit at the upstream monitoring location. On both occasions the TSS level was well below 50mg/L at the downstream monitoring location (WW12).

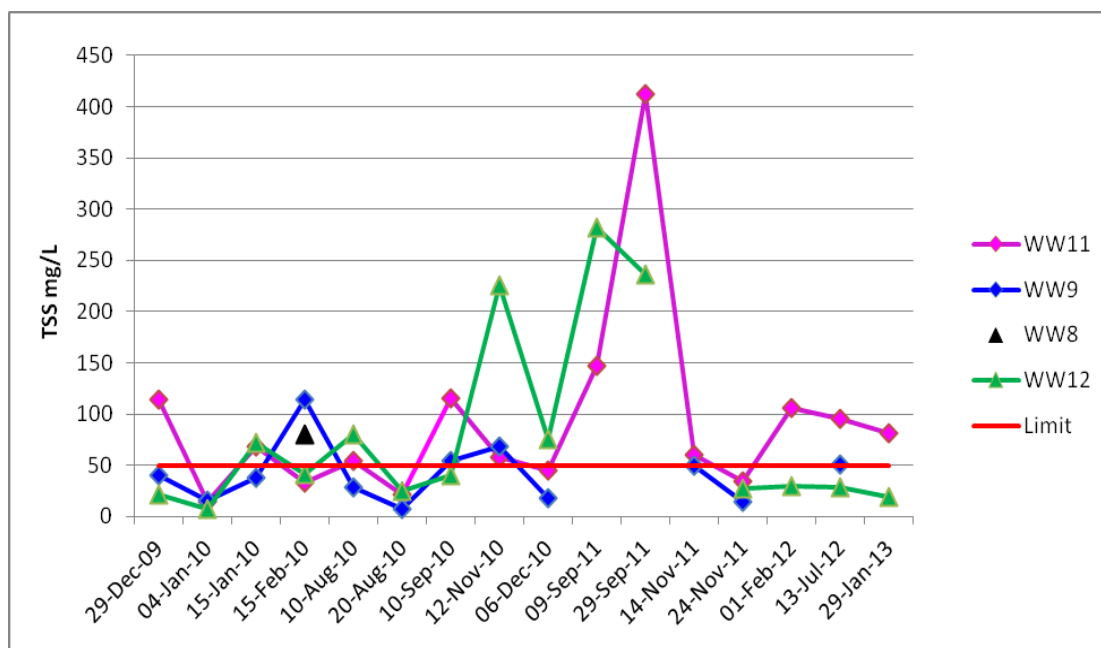


Figure 3 - Wet Weather Discharge TSS (2009 - 2013)

The oil and grease level for all wet weather monitoring undertaken during the period was <5mg/L.

### 3.3 Void – Surface Water

During final shaping of the void, care was taken to ensure the RL of the void floor was higher than the RL of the extracted coal seam in order to avoid groundwater seepage into the void. Initial water quality testing since completion of the final void is indicative of EC levels expected in surrounding surface water storages, with no indication of groundwater infiltration. The EC remained stable between July 2012 and June 2013, ranging from 358mg/L to 553 mg/L in the lower void. This is consistent with results since mine closure. During mining operations, pit water was generally in the range of 3000-4000µs/cm. pH levels remained between 8.22 and 8.79 from July 2012 to June 2013. The water will continue to be monitored over time to determine any change in void water quality.

### 3.4 Groundwater

Quarterly groundwater monitoring incorporates Standing Water Level (SWL), field Electrical Conductivity (EC) and field pH. Six monthly monitoring includes SWL, field pH and EC as well as laboratory analysis of EC, pH, metals and trace elements. Groundwater monitoring will be ceased through staged removal of relevant monitoring points on relinquishment of the area.



Figure 4 shows the SWL at all monitoring locations has remained very consistent throughout the last 12 months. Any variations in SWL at this stage are considered to be influenced by non-mining activities or seasonal variation.

Figure 5 shows a drop in EC levels since mine closure at some monitoring locations, however there has been a trend of increasing EC levels (particularly at GW7, GW8, GW9 and GW11) in the last twelve months. This may be attributable to the reduced rainfall compared to the previous few years. Ongoing EC trends will continue to be monitored for identification of long term trends.

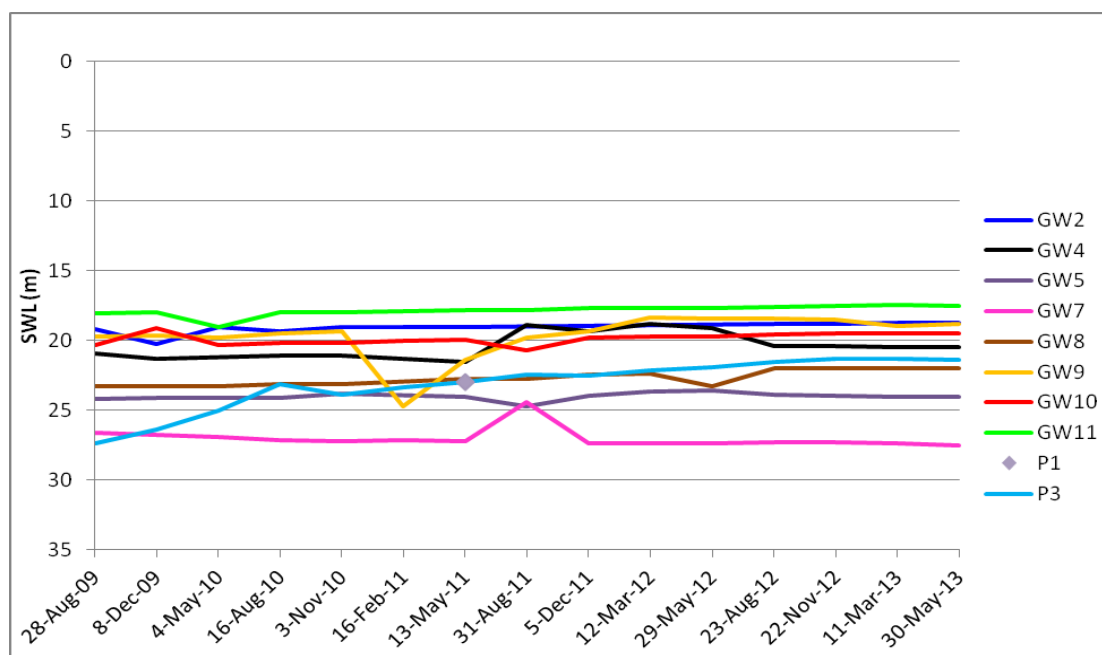


Figure 4 - Standing Water Level (2009 - 2013)

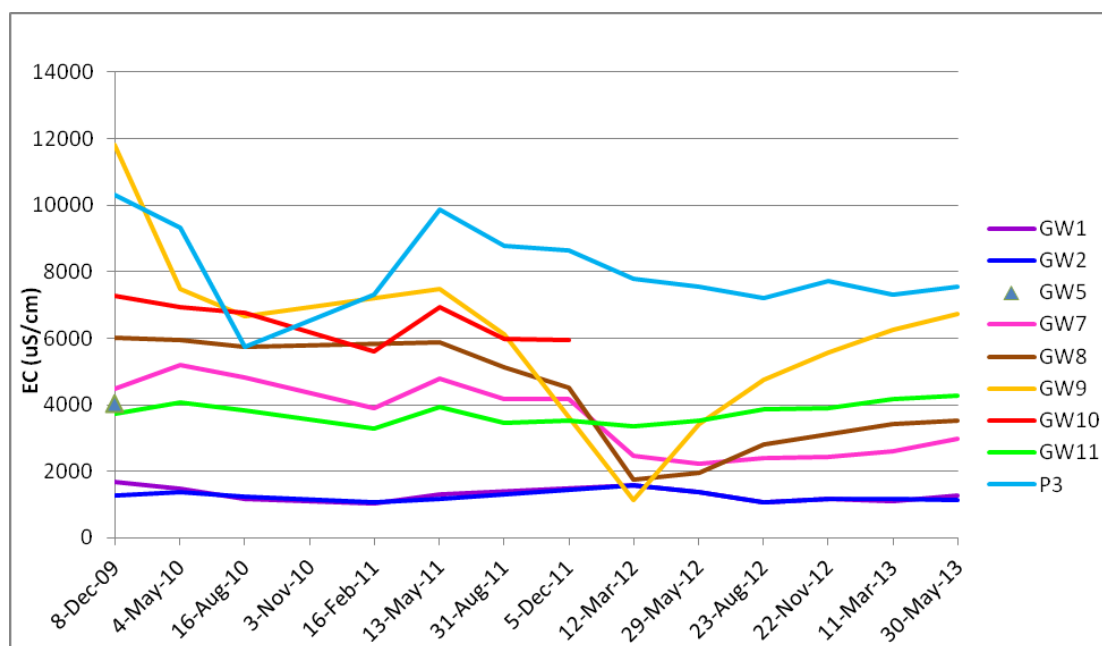


Figure 5 - Groundwater Electrical Conductivity (2009 - 2013)

### 3.5 Flora and Fauna

Flora and fauna has traditionally been monitored annually by Countrywide Ecological Services (CES) and Geoff Cunningham Natural Resource Consultants. CES undertook monitoring in August 2012 to provide ongoing assessment of winter trends across the site. The report (Appendix 1) identified that fifteen additional bird species, all relatively common and listed protected species, not previously recorded in the Canyon extension EIS were recorded during the monitoring period. The 12 months prior to monitoring had above average rainfall with a corresponding good growing season that resulted with excellent ground cover and a good seeding and flowering season. The above average rainfall also resulted in surface water runoff to the void which attracted a number of water birds.

Up to a dozen Grey-crowned Babblers, *Pomatostomus temporalis*, still persist in and around Plot 1 and Plot 4 and continue to forage through the remnant woodland southwest of the void. Another small family of around six individual were observed using Plot 7 and a roosting tree near four nests were located over the fence on the adjacent Vickery Mine. Only one of these nests was apparently active. It is noteworthy that this species have persisted in this area despite the disturbance it had endured from the operational activities of the Whitehaven extended coal mine and the loss a large part of its habitat over this mining lease.

CES expressed concern about the abundance of feral pigs at the mine. Whitehaven has undertaken trapping events over the last 12 months by both the environmental field officer and an adjoining landholder, however, as in the surrounding area, feral pig numbers are on the rise as a consequence of optimal breeding conditions. Continued trapping will be undertaken as a means of controlling feral pig numbers. Only two foxes were sighted which follows the drop in rabbit and hare numbers.

Only two reptiles were recorded, which CES noted was not unexpected due to the low overnight temperatures around the time of monitoring. The Long-necked Turtle, *Chelodina longicollis*, was seen within the mine area for the first time.

Eco Logical Australia Pty Ltd (Eco Logical) was engaged in 2011 to develop a more detailed rehabilitation monitoring program which assesses landscape functionality (rather than flora and fauna in isolation) to enable demonstration of progression towards rehabilitation goals and relinquishment. The first monitoring event was undertaken by Eco Logical in spring 2011 and provided in the previous Mine Closure Progress Report. The second monitoring event was undertaken in spring 2012 and is provide in Appendix 2.

The report indicated that rehabilitation of the Canyon site continues to be successful and that landscape functionality is continuing to trend towards that found in nearby control plots. Pasture area surveys indicated similar trends to those of baseline data collected in 2011. General trends in 2012 were the same as 2011 (with higher biomass being recorded in the rehabilitated zones). Woodland monitoring showed trends that could generally be expected, with the structure and composition of rehabilitated areas becoming more similar to control sites as the establishment age increases.

Monitoring by CES in winter and Eco Logical Australia in spring will continue in an effort to form a robust analysis of rehabilitation progress over different seasons as the site moves towards relinquishment.

### **3.6 Complaints**

No complaints were received in the period July 2012 to June 2013. This is not unexpected given the site is in closure. The last complaint was recorded in 2007 when the site was in operation.