Response to Submissions

JUNE 2010

South East Open Cut Project

&

Modification to the

Existing ACP Consent

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Existing ACP Development Consent

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June 2010

South East Open Cut Project & Modification to the Existing ACP Consent

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1 INTRODUCTION

An Environmental Assessment Report (EA) for the South East Open Cut (SEOC) Project and modification to the existing development consent for the Ashton Coal Project (ACP) was publicly exhibited from Friday 27 November 2009 to Monday 18 January 2010.

Government authority and public submissions received by the NSW Department of Planning (DoP) on the EA have been provided to Ashton Coal Operations Pty Limited (ACOL) for a response. ACOL in conjunction with Wells Environmental Services (WES) and specialist consultants has prepared a response to the issues raised in these submissions, which is the subject of this report.

Since exhibiting the EA and in consideration of the issues raised in submissions on the EA, ACOL has made a number of changes to the design and layout of the project to further reduce its impacts on the environment and surrounding community. These changes are described later in **Section 1**.

A summary of the issues raised in submissions on the EA is provided in **Section 2**. ACOL's response to government authority submissions is provided in **Section 3** and its response to public submissions is provided in **Section 4**. A more detailed breakdown of the issues raised in each submission is provided in **Appendix 1**.

In response to the issues raised in these submissions, ACOL has revised its statement of commitments for the SEOC Project. The revised statement of commitments is provided in **Section 5**.

Specialist's reports on noise and dust, additional to the information provided in the EA, are included in **Appendix 2** and **3** respectively; a detailed response on groundwater issues is provided in **Appendix 4**; and revised conceptual illustrations of progressive and post-mining landform development is provided in **Appendix 5**.

1.1 Background

ACOL operates the ACP, which is located approximately 14 kilometres (km) north-west of Singleton in the Camberwell district of the upper Hunter Valley, NSW.

Development consent (DA 309-11-2001-i) was granted for the ACP by the Minister for Planning in October 2002. This development consent was subsequently modified in 2003, 2005, 2007 and 2010.

The development consent (as previously modified) allows the extraction of coal at a rate of up to 5.2 Million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and for the undertaking of associated coal mining activities.

The ACP currently comprises three main operational entities:

- North East Open Cut (NEOC), which produces up to 2.4Mtpa of ROM coal and operates from 7am to 10pm Monday to Saturday and 8am to 10pm on Sunday.
- The ACP underground mine, which produces up to 3.2Mtpa of ROM coal using longwall extraction methods and operates 24 hours, 7 days a week.
- The ACP coal handling and preparation plant (CHPP), which processes up to 5.2Mtpa ROM coal, loads product coals onto trains for transport to the port at Newcastle, and operates 24 hours, 7 days a week.

The NEOC will exhaust available coal by the end of 2010 and it is proposed to transfer the existing equipment and workforce to the SEOC in a staged manner. This will ensure continuity of open cut ROM coal supply and employment for the 160 full time open cut mine (NEOC) employees.

1.2 Project Summary

The SEOC Project comprises an open cut coal mine, offices, workshop, access road, ROM coal facility, out of pit emplacement and integration with the existing ACP. The SEOC will produce approximately 3.6Mtpa of ROM coal at peak production over a period of 7 years. ROM coal will be processed by the existing ACP CHPP and transported to market by train.

To enable the SEOC Project to integrate with the existing ACP operations, ACOL is also seeking to modify its existing development consent (DA 309-11-2001-i). The modification application (DA 309-11-2001-i MOD 5) also seeks to increase the peak production rate to 5Mtpa from the existing underground mine, and provide for an increase of the throughput at the ACP CHPP to 8.6Mtpa of ROM coal.

The SEOC Project will operate 24 hours a day, 7 days a week.

1.3 Land Ownership Status

Since exhibiting the EA, ACOL has purchased additional private properties in the areas surrounding the SEOC Project, including Camberwell. Property purchases by other mines also have further reduced the number of existing privately-owned properties in the area.

At the time of writing, Camberwell (defined by the Rural 1(d) Small Rural Holdings zone within the Singleton Local Environment Plan 1996 - refer to black line on Figure 1 and Figure 2) comprises 7 privately-owned residences, 4 privately-owned vacant land holdings and more than 30 mine-owned residences and further mine-owned vacant land holdings.

On 16 April 2010, the Minister for Lands converted land which was the Camberwell Common to a Crown reserve for rural purposes. In doing so the Camberwell Common Trust was dissolved. ACOL has subsequently been granted a licence for grazing and site investigation on these lands. ACOL intends to negotiate with the Minister for Lands for the purchase of the land or to seek an agreement to allow mining in accordance with any mining lease granted to ACOL.

The current status of land ownership is presented in **Figure 1** and **Figure 2**.

1.4 Project Changes

- As indicated above, ACOL has made a number of changes to the design and layout of the project to further reduce the impacts of the SEOC on the environment and surrounding community. These changes include:
- Minor amendments to the general layout and arrangement of the SEOC Project, as shown by **Figure 3** and **Figure 4,** comprising:
  - Minor adjustment in the location of clean water dam 2 to reduce the impact on vegetation areas and sediment dam 1, which is required to avoid potential conflict with other aspects of the project.
  - Revised conveyor layout to accommodate a curved conveyor design, which removes the need for the transfer station immediately west of Glennies Creek and further reduces noise emissions.
  - Adjustment to open cut pit, environmental bund and out-of-pit emplacement extents in the northern and eastern part of the project area. This adjustment reduces the pit shell limits and marginally increases the footprint of the environmental bund in these areas.
  - Changes to the design of the environmental bund and final landform to conform to the design principles of Australian coal industry's research program (ACARP) - Research Project C18024, which incorporates natural landform features into the design of the bund. This includes introducing undulating ridges, faces, gullies and spurs into the bund design (refer **Appendix 5**).

- Changes to construction and mine sequencing, as shown by **Figure 5**, **Figure 6**, **Figure 7**, **Figure 8**, **Figure 9**, and **Figure 10**:
  - A minor change to the Year 1 progression plan is required to account for the change in open cut pit, environmental bund and out-of-pit emplacement extents. This change does not alter the volume of materials being moved in Year 1.
  - In Year 1, excavation will begin in three separate areas - a central box cut and two borrow pits. The central box cut will provide overburden material for the construction of the environmental bund, while the two borrow pits will provide construction materials for the office and workshop facilities area, flood levee and ROM coal facility area, as well as the environmental bund. The borrow pits will be located as close as possible to each construction area to minimise haul distances. The borrow pits are within the bounds of the original disturbance of Year 1 and form part of the excavations for that year.
  - Crushing stations will be temporarily installed in the borrow pits to process construction materials. Up to two crushing stations will be required at each borrow pit. The crushing stations will be located below ground level and will each have a nominal processing capacity of up to 2000 tonnes per day.
- Upgrading of the main SEOC site access intersection with the New England Highway:
  - A rural seagull intersection with separate right turn lanes (into and out of the SEOC site) will be constructed in place of the EA proposed channelised right turn and auxiliary left turn intersection.
- Staging of 66kV and 132kV powerline realignments, as shown by **Figure 11**:
  - The 66kV and 132kV powerlines will be realigned within a 50m north-south oriented easement along the eastern boundary of the ACP underground mine. The realigned powerline route will extend south to the existing east-west 132kV powerline easement. At this juncture, the realigned 66kV and 132kV powerlines will follow the existing 132kV powerline to the east to rejoin their existing alignment. However, because ACOL is still negotiating with Energy Australia and relevant landowners over the final powerline route, the easterly extension of the realigned route will only be temporary. Within 2 to 3 years of commencement of mining, it will be necessary to further realign the 66kV and two 132kV powerlines within the southern part of the SEOC Project area. Depending upon the outcome of negotiations over easements, the three powerlines will either be realigned along the southern extension of the EA Option 1 proposed powerline route (west of Glennies Creek) or alternatively along the southern portion of EA Option 2 (see Option 2-South in Figure 11) proposed powerline route (east of Glennies Creek) (refer EA Section 4.6.1).
- Use of noise attenuated mobile equipment:
  - Noise attenuated trucks will be used for dumping in exposed locations on the environmental bund and overburden emplacements. Unattenuated trucks will be used for hauling coal and on unexposed overburden emplacement areas for the SEOC.
  - New fleet (haul trucks and digger), where required in future years, will be fitted with noise attenuation.
- Minor changes to equipment fleet, as described in **Table 1**, include:
  - One additional dozer working within the open cut.
  - One additional dozer working on the coal stockpiles.
  - Two wheeled (i.e., not tracked) loaders, not previously described.
  - Up to four 2000t/day crushing stations for processing construction materials in Year 1.
  - Minor changes to the size of previously described equipment.
- Changes to operating hours in Year 1:
  - Prior to mining coal, excavation and bulk materials handling will generally be carried out up to 24 hours a day 7 days a week.
  - Site access intersection construction will generally be carried out up to 24 hours a day 7 days a week.
  - Equipment and plant maintenance will generally be carried out up to 24 hours a day 7 days a week (i.e., equipment and plant maintenance will be undertaken during night time periods on any day, as required).

- Civil works, comprising facilities and infrastructure fabrication and construction will generally be carried out up to 15 hours a day 7 days a week.
- Mining will be carried out 24 hours a day 7 days a week.

- Amendment to the Project Boundary, as shown in **Figures 1** to **4**, comprising:
  - Minor adjustment along the conveyor route to ensure the new conveyor arrangement (including erosion and sediment control structures) is contained completely within the project boundary. This adjustment is within the extents of land described in the land development schedule for the project (i.e., Lot 3 DP 1114623, refer *EA Appendix 1A*).
  - Adjustment to the northern project boundary to include land between Perry Street and the New England Highway, which has been recently acquired by ACOL. This will ensure the footprint of the redesigned environmental bund (including erosion and sediment control structures) is contained completely within the project boundary. It will also ensure the SEOC project boundary is consistent with ACOL's mining lease application area for the project. This adjustment is within the extents of land described in the land development schedule for the project (i.e., Lots 1, 2, 8, 9, 10 and 11 Section 13 DP 758214, Lot 96 DP 752442, Lots 1, 2, 3 and 4 DP 120193, Lot 1 DP 244624, Lot 1 DP797883, Lots 175 and 176 DP 1002770, refer *EA Appendix 1A*).

Table 1: Revised indicative equipment fleet for the SEOC.

Indicative Equipment	Indicative Size	Proposed Quantity	
		Year 1	Year 7
Mining Operations			
Coal and Overburden Excavators #	18m³ (was 26m³) to 34m³	4	4
Coal and Overburden Trucks *	170 to 240t	18 (existing and new fleet)	18 (existing and new fleet)
Graders	5.0m blade	2	2
Water Carts	75,000L (was 100,000L)	3	3
Dozers – Coal/Dump/Face	22.0m³ (was 19m³)	5 (was 4)	5 (was 4)
Wheel Loaders (not previously specified)	13m³ to 25m³	2	2
Rubber Tyred Dozers	26m³ blade (was 8m³)	1	1
Drills		3	3
Ancillary Equipment			
Tool Carrier		1	1
Shot Crew FEL	3.5m³	1	1
Ancillary Excavator		1	1
Dewatering Pumps		3	3
Puddle Jumper Pumps		2	2
Service Carts		2	2
Maint Truck / Hyab		1	1
18t Crane		1	1
Scissor Lift		1	1
Light Vehicles		12	12
ROM Facility			
Coal Stockpile Dozers	51.0m³ blade	3 (was 2)	3 (was 2)
Coal Rehandle Front End Loader		2	2
Ancillary FEL		1	1
Light Vehicles		2	2

Existing excavators from the NEOC will be transferred to the SEOC.
* Existing haul trucks from the NEOC will be transferred to the SEOC.

1.5 Assessment of Project Changes

Noise and dust emission levels associated with the described project changes have been remodelled (refer **Appendix 2** and **Appendix 3** respectively). The results indicate there will be a general reduction in the level of noise and dust on surrounding receivers. However the majority of the impacts will remain above the project criteria for either noise or dust. The potential for additional impacts associated with the proposed project changes are described in **Table 2**, with a summary of impacts to adjoining dwellings and properties shown by **Table 3**.

Table 2: Environmental impacts associated with project changes.

Environmental Aspect	Project Change	Analysis of Impacts
Noise	Conveyor design. Use of attenuated trucks in exposed locations. Borrow pits and crushing stations.	Use of attenuated trucks in exposed locations on the environmental bund and the removal of one of four conveyor transfer stations will marginally reduce noise emission levels for the project (Appendix 2. A summary of revised SEOC noise impacts are presented in Table 3.
Air Quality	Pit, environmental bund and overburden emplacement footprint. Borrow pits and crushing stations.	The proposed changes marginally reduce dust emission levels for the project during Year 1 (Appendix 3) for properties north of the SEOC. Overall the changes do not result in increased dust emission levels at private properties to that described and assessed in the EA. There will be no increase in the extent of exposed areas, the volume of materials handled or the length of haul distances. A summary of revised air quality impacts are presented in Table 3.
Aboriginal cultural heritage	Clean water and sediment dam minor relocations. Environmental bund and overburden emplacement footprint.	Minor adjustment in the disturbance areas for dams and the environmental bund will not result in further impacts to surrounding Aboriginal cultural heritage values to that described and assessed in the EA.
Ecology	Clean water and sediment dam minor relocations. Environmental bund and overburden emplacement footprint.	Minor adjustment in the disturbance areas for dams and the environmental bund will not result in further impacts to surrounding ecological values to that described and assessed in the EA.
Groundwater	Pit extents.	The proposed changes will not result in further impacts to groundwater to that described in the EA.
Surface water	Clean water and sediment dam minor relocations. Environmental bund and overburden emplacement footprint.	The proposed changes enhance clean and dirty water management for the SEOC and will not result in further impacts to surface water to that described in the EA.
Visual amenity	Conveyor design. Environmental bund design.	The revised conveyor layout and environmental bund design will generally soften the visual impacts of the SEOC Project on surrounding residents and road users.
Traffic	Site access intersection.	The revised site access intersection design will generally improve the performance of the site access intersection. This will have marginal road safety benefits for traffic entering and leaving the site and traffic travelling on the New England Highway.

Taking into account the revised noise and dust modelling and change in landownership status, predicted impacts by the SEOC over the seven year mining life (i.e., noise and or dust emission levels are predicted to be above impact assessment criteria) to privately or non mine-owned properties are characterised as follows:

- The Camberwell village precinct (i.e., land holdings within the Rural 1(d) planning zone, noted as Camberwell North, Central or South in Table 3) includes:

  - Seven (7) privately-owned residences (properties 18, 23, 24A, 30, 32, 34, 35).
  - Five (5) privately-owned properties that are vacant land or with uninhabitable structures (properties 20, 24B, 46, part 129, and 188). Note: property 24B contains an uninhabitable dwelling and property 46 is the community hall that is in a derelict state. Part 129 is an isolated strip of land located adjacent to Glennies Creek.
- Areas outside the Camberwell village precinct that includes:
  - Nine (9) privately-owned rural properties with residential dwellings (properties 83, 114, 117, 120, 121, 129, 130A, 130B, 184A).
  - Three (3) privately-owned vacant rural properties (properties 134, 182, 185).
  - Camberwell Church (property 151).

Of these 25 privately or non mine-owned properties (i.e., 24 private properties, Camberwell Church and Community Hall) the level of predicted impacts are as follows:

- Those predicted to experience significant exceedances in noise levels (i.e., greater than 5dB above project specific noise impact assessment criteria) and/or an exceedance in 24 hour average PM_{10} dust levels for more than 5 days per year (i.e. would have rights to acquisition on their request) include:
  - Fourteen (14) properties (properties 18, 23, 24A, 30, 32, 34, 35, 83, 117, 120, 121, 129, 130A and 130B) containing residences (Property 129 is within the disturbance bounds).
  - Five (5) properties (properties 20, 24B, 46, Part 129 and 188) that are vacant or contain uninhabitable structures.
- Those predicted to experience marginal to moderate exceedances in noise criteria (i.e. are within a management zone) include:
  - Three (3) properties (properties 114, 151 and 185) that are predicted to experience moderate exceedances in noise levels (i.e., between 3 and 5dB above project specific noise impact assessment criteria).
  - Three (3) properties (134, 182, 184A) that are predicted to experience only marginal exceedances in noise levels (i.e., between 1 and 2dB above project specific noise impact assessment criteria). Property 134 and 182 are vacant properties, where marginal exceedances are predicted for more than 25% of the property.

Where noise levels significantly exceed project specific noise impact assessment criteria at a privately-owned residence or on more than 25% of the property or dust levels exceed the relevant dust criteria, ACOL will acquire the property if requested by the owner. Where noise levels are between 2 and 5dB above project specific noise impact assessment criteria at a privately-owned residence, at the request of the owner ACOL will investigate and implement appropriate noise mitigation measures at the residence. Notwithstanding, ACOL will continue to consult with potentially impacted private land owners to determine a mutually acceptable outcome. ACOL is currently negotiating to acquire the community hall from Singleton Council.

Table 3 lists non mine-owned properties (at the time of writing the original EA) and project specific noise and dust levels above impact assessment criteria that are predicted to occur at some stage during the life of the SEOC.

Table 3: Comparison of EA Impacts against the revised impacts as a result of changes to the project.

Property Number	Landowner	Location	Property Status (10 May 2010)	EA Impacts (Exhibited November 2009 to January 2010) Project Alone PM_{10} 24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone				Revised Project Impacts (June 2010) Project Alone PM_{10}24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone			
				Year 1	Year 3	Year 5	Year 7	Year 1	Year 3	Year 5	Year 7
2	Ninness	Camberwell South	ACOL acquired	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	>5dB	-	-	-	-
8	Chisholm	Camberwell South	ACOL purchase contract	PM_{10} 24hr >5dB	24hr >5dB	PM_{10} 24hr >5dB	>5dB	-	-	-	-
11	Richards	Camberwell South	ACOL purchase contract	PM_{10} 24hr >5dB	>5dB	PM_{10} 24hr >5dB	>5dB	-	-	-	-
18	Turner	Camberwell Central	Private	>5db	>5db	>5db	>5dB	>5dB	-	1-2dB	-
(v) 20	Olofsson	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	1-2dB	3-5dB	3-5dB
23 # ^	Lopes	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	-	3-5dB	3-5dB
024A # ^	Vollebreght & Clarke	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	1-2dB	3-5dB	3-5dB
(d) 024B # ^	Vollebreght & Clarke	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	1-2dB	3-5dB	3-5dB
26	Schubert	Camberwell North	ACOL purchase contract	>5dB	>5dB	>5dB	>5dB	-	-	-	-
30 # ^	Bennett	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	1-2dB	3-5dB	3-5dB
32	Stapleton	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	3-5dB	3-5dB	3-5dB
34 # ^	Olofsson	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	-	1-2dB	1-2dB
35 #	De Jong	Camberwell North	Private	>5dB	>5dB	>5dB	>5dB	>5dB	1-2dB	1-2dB	1-2dB
(d) 46 (Hall)	Camberwell Community Hall	Camberwell South	Private	PM_{10} 24hr >5dB	PM_{10} 24hr	PM_{10} 24hr	-	PM_{10} 24hr >5dB	PM_{10} 24hr	PM_{10} 24hr	-
50	Standing	Camberwell South	ACOL acquired	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	>5dB	-	-	-	-

Property Number	Landowner	Location	Property Status (10 May 2010)	EA Impacts (Exhibited November 2009 to January 2010) Project Alone PM_{10} 24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone				Revised Project Impacts (June 2010) Project Alone PM_{10}24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone			
				Year 1	Year 3	Year 5	Year 7	Year 1	Year 3	Year 5	Year 7
51	Bailey	Camberwell South	ACOL acquired	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	>5dB	-	-	-	-
52	Foord	Camberwell North	ACOL purchase contract	>5dB	>5dB	>5dB	>5dB	-	-	-	-
83 #	Hall	North-East of SEOC	Private	>5dB	PM_{10} 24hr	PM_{10} 24hr	-	3-5dB	PM_{10} 24hr	PM_{10} 24hr	-
084A	Tisdell	North-East of SEOC	Integra purchase contract	3-5dB	PM_{10} 24hr	-	-	-	-	-	-
084B[c]	Tisdell	North-East of SEOC	Integra purchase contract	3-5dB	PM_{10} 24hr	PM_{10} 24hr	-	-	-	-	-
111 *	Richards	North-East of SEOC	Private	3-5dB	-	-	-	-	-	-	-
114 # *	Richards	North-East of SEOC	Private	>5dB	1-2dB	3-5dB	-	3-5dB	-	-	-
117 ^	McInerney	North-East of SEOC	Private	>5dB	3-5dB	>5dB	>5dB	>5dB	-	-	-
119	Beasley	North-East of SEOC	ACOL purchase contract	PM_{10} 24hr >5dB	PM_{10} 24hr	PM_{10} 24hr	-	-	-	-	-
120	Ernst	North-East of SEOC	Private	PM_{10} 24hr >5dB	PM_{10} 24hr	-	-	PM_{10} 24hr >5dB	PM_{10} 24hr	-	-
121	Burgess	North-East of SEOC	Private	PM_{10} 24hr >5dB	PM_{10} 24hr	PM_{10} 24hr	-	PM_{10} 24hr >5dB	PM_{10} 24hr	PM_{10} 24hr	-
126	Smiles	Within SEOC pit	ACOL acquired	-	-	-	-	-	-	-	-
129	Bowman, W.H., M., W.G., & Elder, G.	Within SEOC pit	Private	>5dB	PM_{10} 24hr >5dB	>5dB	>5dB	>5dB	PM_{10} 24hr >5dB	In pit	In pit
130A	Bowman, A.	South-West of SEOC	Private	>5dB	>5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	>5dB	>5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB

Property Number	Landowner	Location	Property Status (10 May 2010)	EA Impacts (Exhibited November 2009 to January 2010) Project Alone PM_{10} 24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone				Revised Project Impacts (June 2010) Project Alone PM_{10}24hr = PM_{10} 24 hr average above 50µg/m³ more than 5 days/ yr >5dB = Significant noise levels 5dB or more above criteria 3-5dB = Moderate noise levels - within management zone 1-2dB = Minor noise levels - within management zone			
				Year 1	Year 3	Year 5	Year 7	Year 1	Year 3	Year 5	Year 7
130B	Bowman, A.	South of SEOC	Private	>5dB	>5dB	>5dB	>5dB	>5dB	3-5dB	>5dB	>5dB
(v) 134	Bowman, W.G., Elder, G., Bowman, A.	South of SEOC	Private	3-5dB	3-5dB	3-5dB	3-5dB	1-2dB	1-2dB	1-2dB	1-2dB
(d) 151 Church	Trustees of Church	West of Camberwell	Private	3-5dB	-	-	-	3-5dB	-	-	-
(v) 182	Bowman, E.	South of SEOC	Private	3-5dB	3-5dB	3-5dB	3-5dB	1-2dB	1-2dB	1-2dB	1-2dB
184A	Moxey	South of SEOC	Private	-	1-2dB	1-2dB	-	-	1-2dB	1-2dB	1-2dB
(v) 185	Taggart & McLeod	South of SEOC	Private	>5dB	>5dB	3-5dB	3-5dB	3-5dB	1-2dB	3-5dB	1-2dB
(v) 188	Wonnarua Local Aboriginal Land Council	Camberwell South	Private	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	PM_{10} 24hr >5dB	>5dB	PM_{10} 24hr >5dB	PM_{10} 24hr 3-5dB	PM_{10} 24hr 3-5dB	3-5dB
Private / non-mine-owned properties *(At time of assessment i.e. November 09 / June 10)*				36	36	36	36	25	25	25	25
Total private / non-mine-owned properties impacted at or above acquisition levels *(At time of assessment i.e. November 09 / June 10)*				23 [plus 5 (v) or (d)]	23 [plus 5 (v) or (d)]	22 [plus 4 (v) or (d)]	18 [plus 3 (v) or (d)]	13 [plus 4 (v) or (d)]	5 [plus 2 (v) or (d)]	5 [plus 2 (v) or (d)]	3
Total private / non-mine-owned properties within Management Zone for noise *(At time of assessment i.e. November 09 / June 10)*				3 [plus 3 (v) or (d)]	3 [plus 2 (v) or (d)]	2 [plus 3(v) or (d)]	3 (v)	2 [plus 4 (v) or (d)]	6 [plus 5 (v) or (d)]	8 [plus 5 (v) or (d)]	7 [plus 6 (v) or (d)]

(a) – ACOL or acquired or under purchase contract with ACOL or Integra
(v) - Vacant land - no dwelling.
(d) - Unoccupied house in poor condition OR not a dwelling.

*. Acquisition rights under the Glendell Coal Mine Consent (DA 80/952).
#. Mitigation rights under the Glendell Coal Mine Consent (DA 80/952).
^. Potential acquisition rights under the proposed Integra Western Open Cut Extension.

Ref.	Land Owner
18	Sandra Phyllis Turner
20	Torbjorn Anders Olofsson & Diedre Ella Olofsson
23	Valda Kim Lopes
24	John Leonardus Vollebreght & Tracey Lee Clarke
30	Alan John Bennett
32	Colin Leslie Stapleton
34	Torbjorn Anders Olofsson & Diedre Ella Olofsson
35	Meindert De Jong & Thelma Eileen De Jong
46	Alfred Nowland, Edgar Moore, John Thomas Dunn
81	Rodney George Hall & Doreen Ann Hall
83	Gregory James Hall
84	Isobel Mary Tisdell
86	Four Mile PTY Limited
100	Alan Charles Noble
101	Gregory James Donnellan
111	Bruce Howard Richards & Rosalie Ellen Richards
114	Bruce Howard Richards & Rosalie Ellen Richards
117	John Charles McInerney & Judith McInerney
120	Stephen Francis Ernst & Carol Dawn Ernst
121	Trevor Geoffrey Burgess
129	W.H. Bowman, M. H. Bowman, W.G. Bowman & G. R. Elder
130	Alistair Stuart Bowman
131	Malcolm James Ryan & Elaine Tze Mei Ryan
132	Paul Raymond Burley & Catherine Maree Burley
133	Tony Zanardi & Sandra Maree Zanardi
134	WG Bowman, GR Elder & AS Bowman
135	Canravo PTY Limited
136	Keith Heuston PTY Limited
137	Wyoming Holsteins PTY Limited
139	Robert John Algie
142	Tansil PTY Limited
144	Chriss Inav Maskey
145	HJ Kauter, WH Bowman & H Wright
146	Todd Anthony Mills & Sharon Ann Mills
147	SD Edwards, T-A Howard & JV Clifton
151	Trustees of Church Property-Diocese of Newcastle
152	Energy Australia
154	WG Bowman, GR Elder & IH Bowman
158	Savage Minerals Limited & Enex Foydell Limited
159	Glendell Tenements PTY Limited
160	RHA Pastoral Company PTY Limited
167	Crown Land
161	Vale Australia (GC), Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
162	William Edwin Gardner & Anne Mary Gardner
181	Coal & Allied Operations PTY Limited
182	Elizabeth Stuart Bowman
184	Bruce Eric Moxey & Thea Anne Moxey
185	Anthony James Taggart & Anette Maree McLeod
188	Wanaruah Local Aboriginal Land Council

Ashton Coal Operations Limited - Owned / Acquisition Agreement	
56-1	Ashton (G. & F. WOOD)
56-2	Ashton (R.W. NINNESS)
56-3	Ashton (T. CASLICK)
56-4	Ashton (K & M. GALE)
56-5	Ashton (DENNIS RICHARD YATES)
56-6	Ashton (KEITH JOHN MILLER & DIANNE MARION MILLER)
56-7	Ashton (M. PUGH)
56-8	Ashton (M.J. CHISHOLM & J.T. CHISHOLM)
56-9	Ashton (ESTATE LATE J. TULLOCH)
56-10	Ashton (R & K. HILL)
56-11	Ashton (B.H. RICHARDS & R.E. RICHARDS)
56-12	Ashton (MICHELE THERESE PEACHEY)
56-13	Ashton (R & H. MELL)
56-14	Ashton (J. SPITERI)
56-15	Ashton (H. STEPHENSON)
56-16	Ashton (MIRACLEREACH PTY LTD)
56-17	Ashton (JOHN DEAKIN HANCOCK)
56-19	Ashton (MONTGOMERY)
56-21	Ashton (P. HOLZ & C. BALL)
56-22	Ashton (STEVEN JOHN ROBERTSON)
56-25	Ashton (L. MERCHANT)
56-26	Ashton (C.I. SCHUBERT & R.A. SCHUBERT)
56-27	Ashton (F. McALARY)
56-28	Ashton (D & S. ORCHARD)
56-29	Ashton (A. FARUGGIA)
56-31	Ashton (C. GREEN)
56-33	Ashton (J. COYLE)
56-36	Ashton (T & L. BYRNES)
56-37	Ashton (T & G. HASSETT)
56-38	Ashton (K & P. PATTERSON)
56-39	Ashton (W. F. JAMES)
56-40	Ashton (P. CLARKE)
56-41	Ashton (T. McKEAN & B. TAYLOR)
56-42	Ashton (C. BRODIE)
56-43	Ashton (D. SCHOLZ)
56-44	Ashton (G. ANDREWS)
56-45	Ashton (ROSLYN MARY LETHBRIDGE)
56-47	Ashton (PAUL ASHFORD & VIRGINIA ARNEJO ASHFORD)
56-48	Ashton (M. WALSH)
56-49	Ashton (L. STEVENS)
56-50	Ashton (C. STANDING)
56-51	Ashton (R.J. BAILEY & C.N. BAILEY)
56-52	Ashton (LA. FOORD & SD. FOORD)
56-115	Ashton (P. & D. RICHARDS)
56-118	Ashton (R. & L. WOODS)
56-119	Ashton (M.A. BEASLEY & M.K. BEASLEY)
56-122	Ashton (K. & Y. MOSS)
56-123	Ashton (STAFFORD & STAFFORD-SMITH)
56-124	Ashton (A. & L. HORADAM)
56-125	Ashton (C. & M. LANE)
56-126	Ashton (NG. & MF. SMILES)
56-127	Ashton (P. MOORE)
56-150	Ashton

0 500 1000 1500m

LEGEND

- Dwelling
- Community Infrastructure
- Glendell Tenement - Ashton Lease
- SEOC Project Boundary
- Boundary of 1(d) Zone - Camberwell Village
- Proposed South East Open Cut
- Environmental Bund
- Infrastructure and Levee Bank
- Owned - Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Under Purchase Contract
- Under Purchase Agreement - Vale

ML 1529

ML 1533

EL 4918

SEE FIGURE 2

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

New England Highway

Maison Dieu Road

South East Open Cut Project

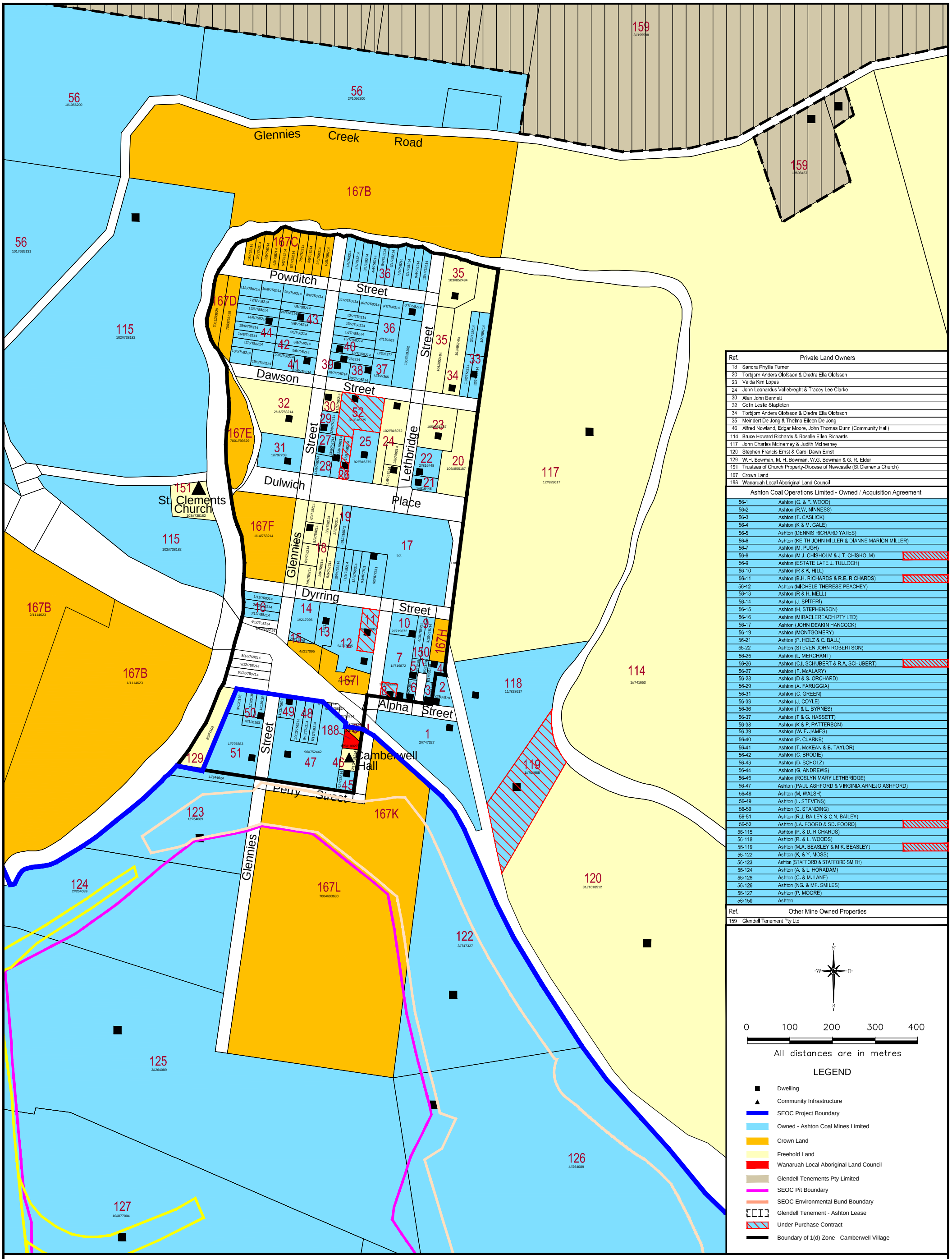
Land Ownership of Camberwell as of 28th May 2010

Figure 1

Revised EA Plan 2

Prepared by Pegasus Technical

CAD FILE: 06287C.dwg



AshtonCoal

South East Open Cut Project

Land Ownership of Camberwell as of 28th May 2010

Figure 2

Revised EA Plan 3

Prepared by Pegasus Technical

CAD FILE: 06283D.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

TRANSFER 4

GLENNIES CREEK ROAD

EXISTING UNDERGROUND FACILITIES

CONSTRUCTION AND MAINTENANCE ACCESS

EXISTING ACP ACCESS

TRANSFER 3

TRANSFER 2

CAMBERWELL VILLAGE

EXISTING APPROVED UNDERGROUND

NEW

CONSTRUCTION ACCESS

GLENNIES CREEK

SD2b

SD3

SD2a

ENGLAND

GLENNIE STREET

MAIN SEOC SITE ACCESS

ROM FACILITY

SOUTH EAST OPEN CUT

HIGHWAY

STAGE 1 LEVEE

CW1

SD1

WATER STORAGE

STAGE 2 LEVEE

CW2

OFFICE AND WORKSHOP FACILITIES

N

W E

S

0 100 200 300 400 500

All distances are in metres

SEOC Pit Shell

Out of Pit Emplacement

SEOC Project Boundary

Existing Infrastructure

Proposed Infrastructure

Clean Water Dam

Sediment Dam

AshtonCoal

South East Open Cut Project

Proposed SEOC General Arrangement

Figure 3

Revised EA Plan 4

Prepared by Pegasus Technical

CAD FILE: 05009F.dwg

NEW ENGLAND HIGHWAY
MAIN NORTHERN RAILWAY
SWAMP CREEK
BETTY'S CREEK
MT OWEN RAIL SPUR
RAIL LOADING FACILITIES
EXISTING APPROVED NORTH EAST OPEN CUT
CHPP
UNDERGROUND FACILITIES
GLENNIES CREEK ROAD
BARRETT PIT
CAMBERWELL VILLAGE
BOWMANS CREEK
EXISTING APPROVED UNDERGROUND
NEW ENGLAND HIGHWAY
GLENNIES CREEK
HUNTER RIVER
PROPOSED WATER STORAGE
SOUTH EAST OPEN CUT
PROPOSED SURFACE FACILITIES
GLENNIES CREEK

N
W
E
S

0 250 500 750 1000m

- ACP Development Consent Area
- Proposed SEOC Project Area
- Previous SEOC Project Area
- Approved North East Open Cut
- Approved Underground
- Voluntary Conservation Area
- Existing Infrastructure Area
- Proposed Infrastructure
- Proposed South East Open Cut
- Watercourses
- Conveyor

AshtonCoal

Prepared by Pegasus Technical

South East Open Cut Project

Existing Ashton Coal Project and Proposed SEOC General Arrangement and Topography

Figure 4
Revised EA Plan 5

CAD FILE: 05401F.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

TRANSFER 4

EXISTING UNDERGROUND FACILITIES

TRANSFER 3

TRANSFER 2

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SD2b

SD3

ROM FACILITY

SOUTH EAST OPEN CUT

WATER STORAGE

STAGE 1 LEVEE

SD1

CW1

CW2

OFFICE AND WORKSHOP FACILITIES

0 100 200 300 400 500

All distances are in metres

- SEOC Project Boundary
- SEOC Pit Shell
- Out of Pit Emplacement
- Coal Haul Road
- Emplacement Haul Road
- Pit Access Roads
- Existing Infrastructure
- Proposed Infrastructure
- Topsoil Pre-Strippping
- Active Pit
- Unshaped Overburden
- Rehabilitation
- Clean Water Dam
- Sediment Dam
- Mine Water Dam

AshtonCoal

South East Open Cut Project

Proposed mining progression plan for Year 1

Figure 5

Revised EA Plan 9

Prepared by Pegasus Technical

CAD FILE: 05012E.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

TRANSFER 4

EXISTING UNDERGROUND FACILITIES

TRANSFER 3

TRANSFER 2

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SD2b

SD2a

SD3

SOUTH EAST OPEN CUT

ROM FACILITY

WATER STORAGE

CW1

SD1

CW2

STAGE 3 LEVEE

OFFICE AND WORKSHOP FACILITIES

0 100 200 300 400 500

All distances are in metres

- SEOC Project Boundary
- SEOC Pit Shell
- Out of Pit Emplacement
- Coal Haul Road
- Emplacement Haul Road
- Pit Access Roads
- Existing Infrastructure
- Proposed Infrastructure
- Topsoil Pre-Strippping
- Active Pit
- Unshaped Overburden
- Rehabilitation
- Clean Water Dam
- Sediment Dam
- Mine Water Dam

AshtonCoal

South East Open Cut Project

Proposed mining progression plan for Year 3

Figure 6

Revised EA Plan 10

Prepared by Pegasus Technical

CAD File: 05013E.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

TRANSFER 4

EXISTING UNDERGROUND FACILITIES

TRANSFER 3

TRANSFER 2

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SD2b SD2a SD3

ROM FACILITY

SOUTH EAST OPEN CUT

WATER STORAGE

CW1

SD1

CW2

STAGE 3 LEVEE

OFFICE AND WORKSHOP FACILITIES

0 100 200 300 400 500

All distances are in metres

- SEOC Project Boundary
- SEOC Pit Shell
- Out of Pit Emplacement
- Coal Haul Road
- Emplacement Haul Road
- Pit Access Roads
- Existing Infrastructure
- Proposed Infrastructure
- Topsoil Pre-Strippping
- Active Pit
- Unshaped Overburden
- Rehabilitation
- Clean Water Dam
- Sediment Dam
- Mine Water Dam

AshtonCoal

South East Open Cut Project

Proposed mining progression plan for Year 5

Figure 7

Revised EA Plan 11

Prepared by Pegasus Technical

CAD FILE: 05014E.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

TRANSFER 4

EXISTING UNDERGROUND FACILITIES

TRANSFER 3

TRANSFER 2

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SD2b SD2a SD3

ROM FACILITY

SOUTH EAST OPEN CUT

WATER STORAGE

CW1 CW2 SD1

STAGE 3 LEVEE

OFFICE AND WORKSHOP FACILITIES

0 100 200 300 400 500

All distances are in metres

- SEOC Project Boundary
- SEOC Pit Shell
- Out of Pit Emplacement
- Coal Haul Road
- Emplacement Haul Road
- Pit Access Roads
- Proposed Dam
- Existing Infrastructure
- Proposed Infrastructure
- Topsoil Pre-Strippping
- Active Pit
- Unshaped Overburden
- Rehabilitation
- Clean Water Dam
- Sediment Dam

AshtonCoal

South East Open Cut Project

Proposed mining progression plan for Year 7

Figure 8

Revised EA Plan 12

Prepared by Pegasus Technical

CAD FILE: 05015E.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

EXISTING UNDERGROUND FACILITIES

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SD2b

SD2a

SD3

SD1

CW1

CW2

SOUTH EAST OPEN CUT

WATER STORAGE

STAGE 3 LEVEE

TAILINGS DISPOSAL AND WATER RECOVERY PIPELINES

TAILINGS STORAGE

OFFICE AND WORKSHOP FACILITIES

0 100 200 300 400 500

All distances are in metres

- SEOC Project Boundary
- SEOC Pit Shell
- Out of Pit Emplacement
- Tailings Disposal Pipeline
- Existing Infrastructure
- Proposed Infrastructure
- Tailings Storage Area
- Unshaped Overburden
- Rehabilitation
- Clean Water Dam
- Sediment Dam

AshtonCoal

South East Open Cut Project

Proposed mining progression plan for Year 9 of the SEOC tailings deposition

Figure 9

Revised EA Plan 13

Prepared by Pegasus Technical

CAD FILE: 05016E.dwg

MAIN NORTHERN RAILWAY

EXISTING CHPP

EXISTING RAIL LOADING FACILITIES

EXISTING APPROVED NORTH EAST OPEN CUT

EXISTING UNDERGROUND FACILITIES

EXISTING APPROVED UNDERGROUND

CAMBERWELL VILLAGE

NEW ENGLAND HIGHWAY

SOUTH EAST OPEN CUT

Note: For Vegetation refer to Plan 68

CAPPED TAILINGS STORAGE AREA

0 100 200 300 400 500

All distances are in metres

- SEOC Pit Shell
- Out of Pit Emplacement
- Proposed Drainage
- Existing Infrastructure
- Rehabilitation
- Capped Tailings Area
- Clean Water Dam

AshtonCoal

South East Open Cut Project

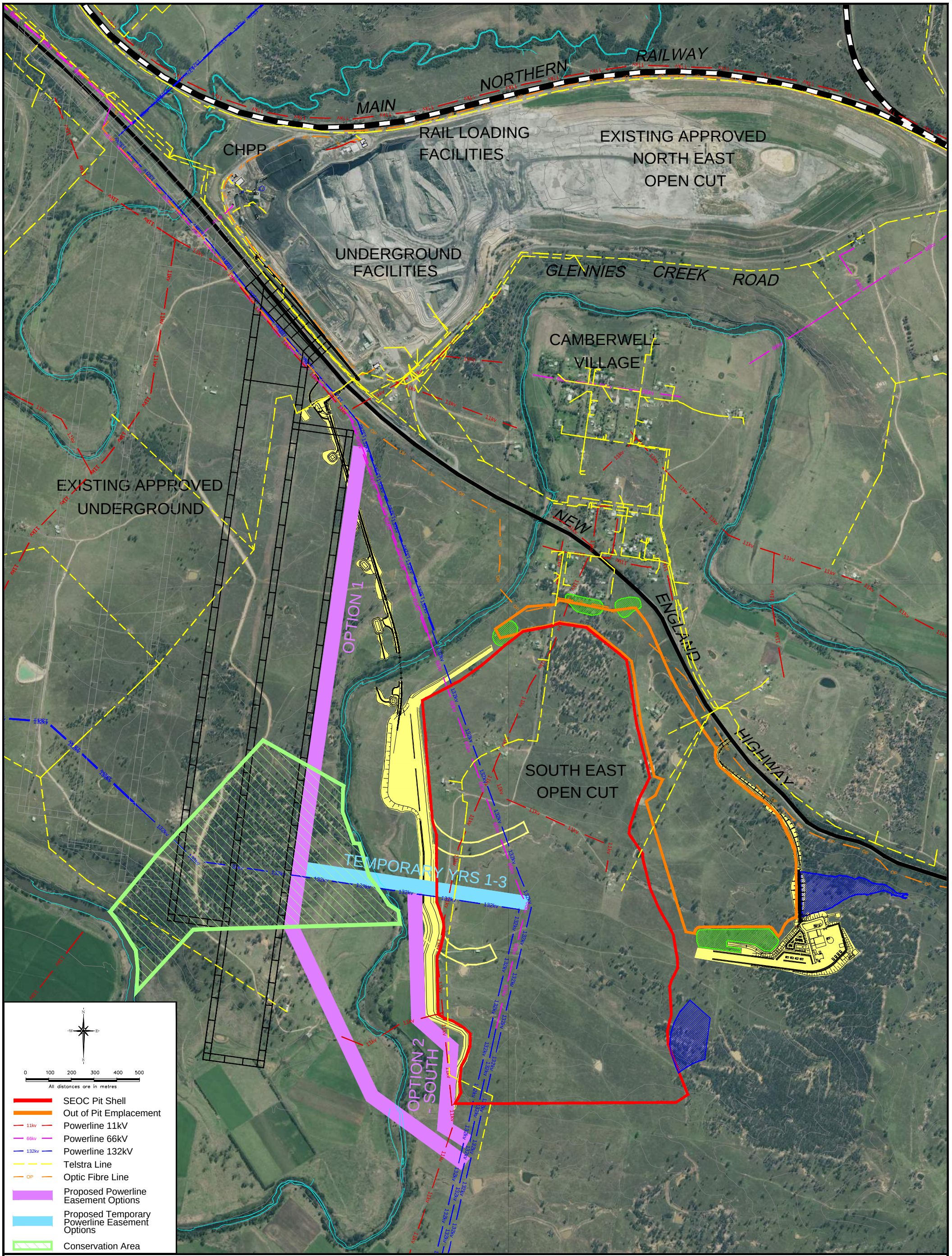
Proposed final landform, after tailings storage is capped Year 18, approximately 2028

Figure 10

Revised EA Plan 14

Prepared by Pegasus Technical

CAD FILE: 05017F.dwg



AshtonCoal

South East Open Cut Project

Existing and Proposed Electrical and Utility Easements

Figure 11

Revised EA Plan 22

Prepared by Pegasus Technical

CAD File: 05020G.dwg

2 SUMMARY OF SUBMISSIONS

The DoP forwarded 49 submissions on the EA from interested stakeholders to ACOL for response. This includes 7 submissions in support, 34 submissions objecting to or raising issues of concern and 8 submissions from government authorities. The list of interested stakeholders includes:

- Government Authorities (8 submissions):
  - NSW Department of Environment, Climate Change and Water (DECCW).
  - NSW Office of Water (NOW).
  - NSW Heritage Office - Heritage Branch.
  - NSW Department of Lands.
  - NSW Roads and Traffic Authority (RTA).
  - NSW Dams Safety Committee (DSC).
  - Hunter Central Rivers Catchment Management Authority (HCRMA).
  - Singleton Council.
- Special Interest Groups (6 submissions).
- General Public (35 submissions).

The contribution made by all stakeholders in responding to the public exhibition of the EA is a valuable and important part of the assessment process. ACOL would like to thank all stakeholders for their contribution.

All submissions which raised issues or concerns on the project were comprehensively reviewed. Specific issues identified in each submission were grouped under the most relevant environmental aspect category (e.g. air quality, acoustic and vibration). Issues that could not be grouped under an appropriate environmental aspect category were grouped under the 'Other' category. **Figure 12** presents the number of submissions by category of issue (some submissions fall under more than one category). A summary of the categorised issues raised in individual submissions for which responses were compiled is presented in **Appendix 1**.

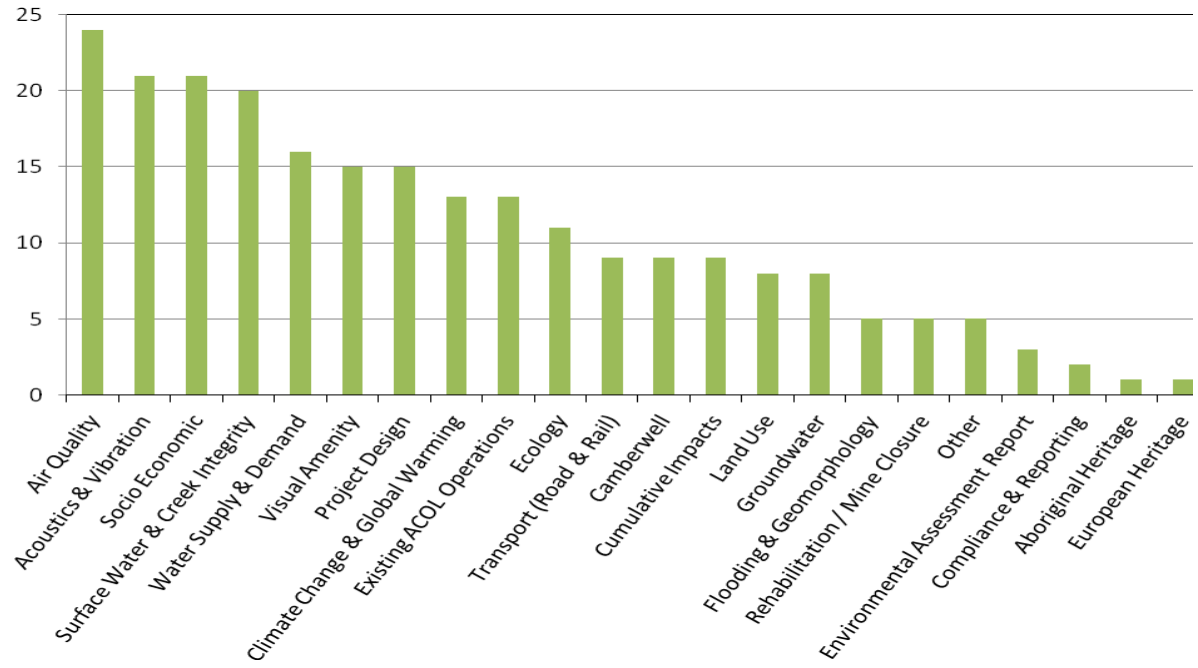


Figure 12: Issue category against the number of times issues were raised.

3 RESPONSE TO GOVERNMENT AUTHORITY ISSUES

ACOL's response to the issues raised by government authorities is provided in **Table 4**.

Table 4: Response to Government Authority Submissions.

Agency and Issue Reference	Issue	Response
3.1 Department of Environment Climate Change and Water		
3.1.1	An Environment Protection Licence (EPL) will not be an effective instrument to prevent noise and blasting from the mine exceeding acceptable criteria or to control dust emissions in a way that would prevent cumulative dust impacts exceeding the National Environment Protection Measure (NEPM) PM_{10} criteria in Camberwell Village and at other properties close to the mining operation.	Since exhibiting the EA, ACOL has remodelled the noise and dust impacts of the SEOC, taking into account the changes proposed in the first two years of operations (see Section 1.3 and Appendix 2 and 3). In addition ACOL has continued to acquire properties in the surrounding area to further minimise the potential for impact on privately-owned residences. At the time of writing, 7 residences in Camberwell remain in private ownership (see Section 1.3). All of these privately-owned properties are predicted to experience project specific noise and dust levels above relevant impact assessment criteria, at some time during the life of the SEOC (see Table 1). ACOL is committed to acquire, or enter into negotiated agreements with the owners of the remaining privately-owned properties that will be directly affected by the SEOC above impact assessment criteria. ACOL currently leases numerous dwellings within Camberwell to its employees including a number of senior management personnel. To minimise adverse impacts to residents (mine-owned or otherwise) ACOL has and will continue to offer measures to ameliorate impacts. This includes: • First flush devices for rainwater collection. • Water filters, with replacement filters as needed. • Annual rainwater tank cleaning. • Double glazing has generally been found to be ineffective on most dwellings within the village. ACOL will provide to the each land owner or tenant of properties predicted to be impacted by the SEOC information on particulate matter and its potential health impacts including NSW Health's brochure "Mine Dust and You", available at:

<table>
<tr><th>Agency and Issue Reference</th><th>Issue</th><th>Response</th></tr>
<tr><td></td><td></td><td>http://www.health.nsw.gov.au/pubs/2005/mine_dust.html.
ACOL will advise landholders and tenants where monitoring indicates that noise or dust levels are above the relevant criteria.
Where tenants of ACOL owned properties choose not to reside within the dwelling due to concerns of dust or noise, ACOL will permit the tenant to break the lease agreement and vacate the property. Vacant properties will be maintained by ACOL in a habitable condition to ensure the quality of housing is preserved for future occupation post mining. This will ensure Camberwell is sustained beyond mining.</td></tr>
<tr><td>3.1.2</td><td>The Major Project Application for Ashton's SEOC mine should not be determined by the Minister for Planning until such time as the Independent Cumulative Impact Assessment studies for air and noise commissioned by the Department of Planning (DoP) are completed and the community of Camberwell Village has an opportunity to comment on the findings and recommendations of the studies.</td><td>The EA includes an assessment of cumulative mining impacts. This includes consultation with the independent experts engaged to by the Department of Planning to assess cumulative impacts on Camberwell.
ACOL believes that additional property purchases by it and other mining companies, and the proposed project changes has significantly reduced the potential for the cumulative effects of surrounding mining projects to impact on privately-owned residences.</td></tr>
<tr><td>3.1.3</td><td>The ability of the proposed biodiversity offset package to satisfy DECCW's biodiversity offsetting principles is dependent upon acquisition of an additional 34.5 ha of remnant woody vegetation. DECCW does not have the mechanisms for the proposed bond/security arrangement for acquisition of the additional offset land and this is not a preferred option.</td><td>ACOL is committed to offset its biodiversity impacts to satisfy the DECCW's maintain or improve principles for managing biodiversity impacts. This includes a commitment to acquire additional suitable vegetated land to offset the biodiversity impacts of the SEOC within 3 years of gaining project approval. ACOL maintains its commitment to provide a bond to further demonstrate its commitment to securing adequate biodiversity offsets for the project.</td></tr>
<tr><td>3.1.4</td><td>• DECCW is unable to recommend conditions of consent in the absence of an Aboriginal cultural heritage (ACH) assessment and further information on the following:
• Additional Aboriginal cultural heritage (ACH) assessment is required in the area proposed for the office and workshop facilities to determine the extent, nature and significance of any ACH values located there. The results of this assessment should be used to inform the development assessment process and develop appropriate ACH management strategies for the impact area, in consultation with the registered Aboriginal stakeholders.</td><td>The area of the proposed office and workshop facilities is located within Survey Area 6 (SA6) and was addressed as part of the field survey (see EA Appendix 13 Section 1.2 and Figure 2). This area is described as follows (extracted from EA Appendix 13 Table 3).
<table>
<tr><td>Transect</td><td>SA6</td></tr>
<tr><td>Location</td><td>Spur running down from eastern boundary of study area, west to Glennies Creek</td></tr>
<tr><td>Survey Type</td><td>Foot & Vehicle Transects</td></tr>
<tr><td>Landform</td><td>Slopes</td></tr>
<tr><td>Area</td><td>119ha</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Agency and Issue Reference</th><th>Issue</th><th>Response</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Surface visibility</td><td><10%</td></tr>
<tr><td>Arch Visibility</td><td>10%</td></tr>
<tr><td>Effective area</td><td>11900sqm</td></tr>
<tr><td>Sites / Artefacts</td><td>12sites incl.
59 artefacts</td></tr>
<tr><td>Notes</td><td>Gentle to moderate slope. Modified and cleared. Divided into several paddocks and currently used for pasture for cattle and horses. Very low surface visibility due to heavy grass cover. Few exposures around dams, along vehicular and stock tracks.</td></tr>
</table>
No sites were located within the infrastructure area. This is potentially due to the lack of surface visibility and probable lower potential for the area to contain dense sites, and not due to exclusion from the survey area. It is acknowledged that the effective archaeological visibility in the area was relatively low at up to 1%.

Studies and site surveys undertaken for the EA indicate that the densest sites occur on the terraces of Glennies Creek, including consideration of surface visibility. The interface between creek terraces and colluvium (from upslope) was identified as the most sensitive in terms of the potential preservation of older sites. Hence, the spur / slope landform unit is of lower archaeological potential, given the trend of increasing historic Aboriginal activity (shown by dense artefact scatters) with closer proximity to Glennies Creek.

Therefore, the location of the infrastructure is likely to have low archaeological potential and scientific significance, while the cultural significance of the infrastructure area has been assessed with the remainder of the development area.

Subsurface testing will be carried out during the preparation of the Aboriginal heritage management plan for the SEOC. This will ensure sites obscured from view during assessment for the EA due to ground cover conditions are suitably surveyed.

No additional Aboriginal Cultural Heritage assessment is required outside of that associated with the ACHMP process.
</td></tr>
<tr><td>3.1.5</td><td>• The ACH assessment needs to adequately address the cultural significance of the ACH values identified within the project area.</td><td>The SEOC Project area is generally regarded by Aboriginal community members as having high cultural significance (see EA Appendix 13 exec summary). This advice has been provided to ACOL in its consultation with Aboriginal community representatives.</td></tr>
</table>

Agency and Issue Reference	Issue	Response
		The Aboriginal community reports are contained in *EA Appendix 13, Appendix D.* The following extracts reiterate the cultural significance of the SEOC Project area as indicated by Aboriginal community representatives in the field: • "the study area is of high cultural significance and recommend that a manual salvage is to be undertaken"(letter dated 14.7.09) • "all country that we belong to is of the highest significance to us ...." (letter dated 15.7.09) • "all of the sites found during the Ashton Coal Assessment are culturally important'(letter dated 11.6.09) • "our understanding through verbal and written history of the location we acknowledge the high significance of this area" (letter dated 14.6.09) • DECCW were contacted by a community elder with her concerns re the potential impact on the Glennies and Bowmans Creek areas. • The EA also discussed the historical links between the Aboriginal community and the Glennies Creek area (*EA Appendix 13 Section 2.5*), which further emphasises the significance of the area to the Aboriginal community.
3.1.6	• The DECCW supports the development of an ACHMP, to be maintained for the life of the development.	ACOL is currently developing the ACHMP for the SEOC in consultation with Aboriginal community representatives. The next community meeting is planned to be held in mid May 2010. This meeting will discuss the methodology for some exploratory work to be carried out later in May. The exploratory work will seek to define the extent of sites, by testing the parameters of known sites and testing areas of low visibility / archaeological potential. The questions to be answered by the work and the methodology for the work will be developed in conjunction with the Aboriginal community representatives. The results of the exploratory work will be used to develop the scope and methodology for the salvage of sites should the project be approved.
3.1.7	• Additional management measures are required to be developed to ensure scarred tree SA5/9 is protected in perpetuity.	The scar tree (SA5/9) is located outside the disturbance area of the proposed clean water storage dam CW1 and will be clear of physical infrastructure works. During wet periods the base of the tree may for short periods become inundated. However, as noted by the specialist arborist (*EA Appendix 8*, *Appendix F*), root systems are known to extend up to twice the mature height of the particular tree species and it would be expected that the upslope root plate would be rarely inundated and could return to aerobic respiration after only a short period. Hence, significant impacts to the scar tree are unlikely. It is noted that each tree is subject to its own response to its growing environment, despite predictions that are made. ACOL is committed to protecting the scar tree and will implement the following management measures

Agency and Issue Reference	Issue	Response
		as part of this commitment: • The tree will be fenced within a 10m radial exclusion zone. • The accurate recording of the tree's drip line and elevation. • Six monthly photographic and notated recording of tree health (i.e. new leaves or buds, leaf size, twig growth, crown dieback and bark abnormalities against dam water levels. • Where monitoring shows adverse tree stress, dam water levels will be reviewed and lowered where feasible. • In the event that the tree has an adverse reaction, the registered Aboriginal Stakeholders will be consulted regarding the preferred mitigation strategy for the tree (e.g. insitu conservation of stag or lopping for removal to keeping place).
3.2 NSW Office of Water		
3.2.1	A summary of the key issues and comments raised within the NOW Submission are as follows: • NOW's position requires modification of the proposed mine layout to provide protection to the regulated Glennies Creek, its dependent water users in Zones 2 and 3 of the Hunter Regulated River, and high priority groundwater dependent ecosystems and other environmental water requirements. • In NOW's opinion, the western limit to the Ashton South East Open Cut pit shell directly intercepts the connected alluvial groundwater zone associated with Glennies Creek. This position is based on the geomorphic depositional facies along and within the western margin of the proposed pit shell, and identification of significant lengths of saturated alluvial materials along the pit shell boundary. • NOW has assessed the proposal as posing significant risks to the maintenance of flow and water accounts to Zones 2 and 3 of the regulated Hunter River system, and leaves the regulated Glennies Creek with a weakened valley margin, with the potential risk of significant inflows migrating from the connected alluvium to the proposed open-cut pit and future backfilled mine pit. • The modelled hydraulic conductivity parameters and orientation of permeable zones is not consistent with NOW's understanding of geomorphic processes in operation along Glennies Creek, and is inconsistent with exploratory and piezometric monitoring bore log data presented in the Environmental Assessment.	The SEOC is a relatively small resource that is limited by sub-cropping coal measures to the east and Glennies Creek to the west. Alternatives such as highwall mining along the western side of the open cut requires significantly higher capital expenditure and operational costs, and require the highwall to remain exposed for longer periods while auguring or punch mining is undertaken. This results in longer rehabilitation times, greater exposure of bare earth and reduced resource utilisation. During development feasibility studies, ACOL considered other alternatives for increasing the set back distance of the pit highwall to Glennies Creek. However, there was no feasible alternative that did not significantly impact on the economic viability of the Project. ACOL commissioned specialist consultants to investigate the interface of the SEOC pit shell with adjacent alluvial lands adjoining Glennies Creek, including assessment of the potential impacts to Glennies Creek and alluvial groundwaters. These investigations have determined that the SEOC Project can operate with minimal impact to the Glennies Creek water source. Aquaterra has prepared a detailed response to the issues raised by NOW, these are contained within Appendix 4. A summary of the salient aspects of the response is provided below: • Substantial drilling, hydraulic testing and monitoring have been undertaken across the interface of the pit shell and alluvial lands. This information has been used to develop a numerical groundwater model used to simulate the potential impacts of the project. Monitoring and testing results have also been used to understand and define the nature and location of alluvial and

Agency and Issue Reference	Issue	Response
	• . The EA fails to adequately assess the likely or potential impacts upon the connected alluvium to Glennies Creek and the potential impacts upon the regulated river and its users. • NOW regards the excavation through gravel braids at the base of both lower and upper alluvial terraces as placing unacceptable risks upon the regulated river system, which is an essential source of water supply to water users along both Glennies Creek and the Hunter River to its tidal pool. • NOW's position prohibits the additional take of water from the regulated Hunter River system outside the dealings framework specified under the HRRWSP and HURAWSP. NOW details a series of suggested conditions of approval, these are summarised as follows: • The applicant shall submit detailed mapping outlining the boundary to the connected Glennies Creek alluvium to the NSW Office of Water. • No mining excavation may occur within 150 metres of Glennies Creek or its connected alluvium. • All mining operations shall be conducted in such a way as to avoid interception of river flows, increasing afflux and stream velocity past any structure built on the Glennies Creek floodplain, and inducing instability or contamination of Glennies Creek. • The Applicant shall ensure it has secured all necessary water supply. • The applicant shall account for any interception or redirection of flows within any unregulated river, and/or alluvial groundwater from the Glennies Creek alluvium in accordance with the rules of the *Hunter Unregulated River and Alluvial Water Sharing Plan 2009,* to the satisfaction of the NSW Office of Water. • The applicant must obtain any necessary access licences from the regulated Hunter River to account for any interception or redirection of riverine flow in Glennies Creek, in accordance with the *Hunter Regulated River Water Sharing Plan 2004,* to the satisfaction of the NSW Office of Water. • The applicant shall ensure that all above licences account for interception or redirection of water under all relevant Available Water Declarations under either the *Hunter Regulated River Water Sharing Plan 2004* or *Hunter Unregulated River and Alluvial Water Sharing Plan 2009,* to the satisfaction of the NSW Office of Water. • A groundwater management plan shall be developed for the project, which	colluvial materials in the vicinity of parts of the western pit shell. The interaction of these materials form a complex system of interacting/directly-connected alluvial layers/lenses, and non-interacting/poorly-connected alluvial layers, which become more dominant towards the pit shell. • The 'risks' to Zones 2 and 3 of the Hunter Regulated system have been fully quantified through the analysis of baseflow impacts – this defines the amount of water that will be 'lost' to downstream users within the system. • Aquaterra has consulted with NOW on numerous occasions and at the request of NOW has modelled 4 additional scenarios to that presented within the EA (including that described within the NOW submission). These have been undertaken to demonstrate the sensitivity of the numerical groundwater model and assigned hydrogeological parameters on predicted baseflow impacts. • The additional modelled scenarios have resulted in predicted baseflow impacts ranging from 19.3ML/annum to 24.8Ml/annum, compared to EA predicted baseflow losses of 17.2ML/annum. Modelling of the alluvium structure described within NOW's submission predicts a baseflow loss of 21.7ML/annum. • NOW have not questioned the techniques associated with the field testing, but have indicated that the monitoring period has been too short. Monitoring over the preceding 3 to 4 years clearly shows that rises in alluvial groundwater levels are transient and only occur after larger rainfall events (and rarer flood events). • The assessment has been very conservative, and represents an absolute upper bound on the sorts of impacts and pit inflows that could be expected given the geomorphology described by NOW. More extensive zones of high permeability simply can't be justified given the field testing that was undertaken. • Despite these conservatively predicted small base flow losses, ACOL is proposing to offset impacts on the Glennies Creek water source using a high security surface water licence. As there are no other groundwater users in the area, it is considered that this represents the best approach to mitigation – i.e. it directly offsets any impacts that occur to downstream users of Zones 2 or 3 of the Regulated Hunter River (as noted under the 'Flow Maintenance in Glennies Creek' section of the NOW submission). • Given the very conservative risk analysis and detailed investigations that have quantified the level of risk from the currently proposed pit shell to Glennies Creek as low, ACOL is certain that the current standoff in excess of 150m from the banks of Glennies Creek is sufficient for the creeks protection. • ACOL has committed to develop and implement a groundwater management plan for the project. This will be developed in consultation with NOW and other relevant government agencies and will establish groundwater level management criteria, water quality protection levels, trigger levels for response actions and response actions.

Agency and Issue Reference	Issue	Response
	establishes groundwater level management criteria, water quality protection levels, trigger levels for response actions, and closure criteria to the project.	
3.3 Industry and Investment		
Minerals		
3.3.1	It should be noted that a mining lease cannot be granted contrary to Sections 58 and 62 of the Mining Act 1992.	ACOL recognise the requirement for Mining Leases to be granted in accordance with Sections 58 and 62 of the Mining Act 1992.
Rehabilitation and Final Landform		
3.3.2	The EA does not nominate definable native vegetation community/assemblages or discuss the effectiveness of the proposed revegetation species for their intended function as habitat corridors. I&I recommend ACOL provide additional detail on the following issues during the Rehabilitation and Environmental Management Plan (REMP) process: • There is no commitment to design rehabilitation based on known vegetation assemblages in the Hunter Valley or analogue communities available in nearby areas. • No evidence to suggest that the "treed" vegetation will satisfy its function as a habitat connectivity corridor. • It is not clear whether the proponent has considered what fauna species are likely to use the "treed" vegetation. I&I NSW recommends the proponent provide additional detail on these issues during the Rehabilitation and Environmental Management Plan (REMP) process.	ACOL acknowledges the issues raised by I&I and will address these issues in the preparation of the REMP, which it will prepare in consultation with, and to the satisfaction of, I&I. Experience and lessons learnt during rehabilitation at ACOL's exiting operations, at other mine sites in the Hunter Valley and documented in relevant research reports (e.g. ACARP Report C13048) will be incorporated into the rehabilitation strategy and REMP for the SEOC.
3.3.3	The EA has conflicting final rehabilitation plans: Plan 14, "Proposed final landform, after tailings storage is capped Year 18, approximately 2028", depicts the full capping and rehabilitation of the final void. In contrast, Figure 5.55, "Conceptual final landuse and offset strategy proposed for the SEOC Project area and the ACP at completion of longwall mining" shows the existence of a narrow final void structure in the south of the project. It is unclear as to whether further filling of this void with tailings will occur post-mining. If	The final void will be filled to 31m AHD, capped with 1 to 2m of material and revegetated (EA Section 4.4.5).The remaining highwall will be along the northern, western and southern sides up to 30m in height. The highwall will be benched and/or battered depending on highwall stability. EA Plan 14 shows an indicative area for the capped tailings storage area, but obscures (through the use of 10m contours) the extent of the remaining highwall along the northern, western and southern sides of the final void. EA Figure 5.55 correctly illustrates up to a 30 m highwall along the northern, western and southern sides of the final void.

Agency and Issue Reference	Issue	Response
	so I&I are unclear as to where the tailings will come from, whether the remaining void will be filled with capping material and where this material may be stored	A description of the final void is included within the EA (*Section 4.4.5 – Final Landform and Rehabilitation*, *Section 4.4.12 – Mine Closure*, Section *4.4.6.4 - Coal Handling and Preparation Facilities* and *Section 5.29 - Mine Closure)*. The void will be filled with tailings from the processing of ROM coal from the approved ACP underground mine. Following completion of tailings emplacement, the tailings will be capped and rehabilitated. As previously indicated a highwall of approximately 30m will remain. Capping material will be stored adjacent to the void and will be vegetated until required for capping.
3.3.4	I&I NSW recommends: ACOL include an Integrated Ashton Coal Project Final Landuse/ Rehabilitation Design which depicts the site at mine closure (for all areas subject to this proposal) with adequate landform and vegetation community detail.	The proposed indicative post mining landform designed using the Natural Regrade approach is presented in Figures 5 to 10, with further illustrations provided in Appendix 5. Final landform contours and vegetation community detail will be provided within the REMP.
Agriculture		
	The EA provides limited information on the impacts of the mining proposal on agricultural land use within and adjacent to the EA boundary. I&I's key issues include:	The coal resources are owned by the State of NSW. ACOL is responsible for developing the resources within its mining tenements for the broader benefit of NSW. The SEOC Project forms part of ACOL's mining tenements.
3.3.5	• Change of the ownership and use of farmland areas due to cumulative mining developments and predicted noise and air quality. Loss of farming infrastructure and the cessation of agricultural land use for a period extending for many years post mining.	The SEOC will result in a medium term (i.e. 15-20 years) loss of agricultural land use within the SEOC disturbance footprint. The impacts of noise and dust on surrounding properties will result in shorter term impacts of less than 7 years. The EA assessed the noise and dust impacts of the SEOC and cumulative impacts of existing approved and operating mines on privately-owned residences surrounding the SEOC Project area. Since exhibiting the EA, ACOL has acquired additional properties, which further reduces the number of privately-owned residences predicted to be impacted by the project. This has also lessened the number of privately-owned residences potentially impacted by cumulative mining impacts. In addition, ACOL is continuing to consult with potentially affected landowners to determine appropriate mitigation measures with respect to impacts to private residences and agricultural activities, including property acquisition. Where adjoining properties are impacted above accepted criteria, ACOL will negotiate with the landowner to determine an appropriate outcome, which may include property acquisition. ACOL currently allows continued agricultural activities such as grazing to occur on its land holdings through lease back or agistment arrangements. ACOL supports the use of its acquired agricultural landholdings outside of mine development areas for continued agricultural activity. Where feasible, agricultural improvements and farm infrastructure outside the mine disturbance area will be retained for use. Further, ACOL expects that the majority of its agricultural land holdings where this land does not

Agency and Issue Reference	Issue	Response
		conflict with native vegetation rehabilitation or offset objectives will be available and used for agricultural activities post-mining. The assessment of cumulative impacts to agriculture is a complex issue. As the agricultural suitability of much of the land not directly impacted by mining will remain the same, changes in landownership and willingness of the landowners (mine related or otherwise) to use the land to its agricultural potential are not easily quantified and specifically relate to the landowners desire to undertake agricultural activities.
3.3.6	• Cumulative ground water depressurization and resultant dewatering of alluvial soils extending for up to 100 years post mining.	• ACOL has recognised that the SEOC project will result in a small loss to base flow to Glennies Creek and the drawdown of water within the alluvium, which will result in minor drawdowns in the water table. Measured baseline groundwater levels within the alluvium showed that the water table is 6 to 8 metres below ground level along the boundary of the open cut, which is well below the root zone of most, if not all agricultural crops, even taking into account capillary rise of the water table. • Hence, it is not expected that a minor lowering of watertable levels will impact on the agricultural productivity of the land that would be expected to occur primarily in the upper 0.3 to 0.5m of the land. Further, there is no physical mechanism that would alter the soil structure as a result of a slight lowering of a water table that is already well below the productive surface soils. Because the surface zone is free draining (i.e. no saturated connection to the water table), the change in the water table level will also have no effect on the effectiveness of irrigation activities. Groundwater was not observed with the root zone of agricultural crops (to 3 metres depth) in any of the soil test pits during the site assessment. The Loamy Rudosols (located on the alluvial flats) were observed to be free draining with no evidence of water table observed within the test pit.
3.3.7	Risk of changes in downstream flows and quality due to mining (e.g. increased sedimentation and salinity).	The implementation of appropriate surface water management plans (refer to EA *Section 5.11*) will ensure the changes in downstream water flows and quality are negligible.
3.3.8	Permanent reduction in the agricultural productive potential due to increased slopes, changes to the porosity and composition of subsoils and shallow topsoils on rehabilitated mined lands, environmental bunds, levies and tailings emplacement areas.	ACOL's rehabilitation objectives for the SEOC include a mix of native vegetation and agricultural grazing lands. The final landform will be shaped and graded to mimic the natural slopes, breaks and drainages observed within the surrounding landscape (Appendix 5). This will be topsoiled or covered with an appropriate soil medium and reseeded and revegetated to a mix of native woodlands and grazing lands. This will enable ACOL to improve native vegetation cover, native fauna habitat and wildlife connectivity in the areas, as well as maintaining agricultural capability.

Agency and Issue Reference	Issue	Response
3.3.9	Permanent loss of agricultural lands due to proposed creation of substantial riparian corridors and connective linkages.	The creation of riparian corridors and linkages are essential to the improvement of habitat connectivity across the Hunter Valley. Riparian corridors and habitat linkages promote healthier waterways while preserving movement and exchange of wildlife through the habitat. These riparian corridors will generally be restricted to less than 40m from the upper banks of Glennies Creek. It is worth noting that past land clearing and uncontrolled stock movement has led to degradation along Glennies Creek. Fencing and enhancement and reestablishment of riparian vegetation is designed to remediate this past degradation.
3.3.10	The project should also consider and justify why a larger set back to reduce the impacts on the Glennies Creek alluvial ground water resources, or the alternative of underground mining is not feasible.	As previously indicated (see response to NOW's submission), the SEOC is a relatively small resource that is limited by sub-cropping coal measures to the east and Glennies Creek to the west. Alternatives were considered but deemed unfeasible and uneconomic. Further, the shallow depth of cover would not support a safe productive underground mine.
Fisheries		
3.3.11	Design criteria for the delivery of water to Glennies Creek should ensure that the "controlled release point" be stable and suitable for the long-term use after mine closure. Preferably the "controlled release point" should also not intrude into Glennies Creek itself.	ACOL will ensure the delivery of water to Glennies Creek is through a controlled release point. In the longer term the rehabilitation of the site incorporates the lower 50-150m portion of existing drainage lines that feed into Glennies Creek. These drainage lines will be engineered where required to improve stability and will provide for adequate long term stable drainage into Glennies Creek.
3.4 Dam Safety Committee		
3.4.1	ACOL is required to provide the DSC with further advice about the design of dams CW1 and CW2 including an assessment of "Sunny Day" and "Flood Consequence Categories" for both dams.	ACOL notes the advice and comments provided by the DSC and will comply with DSC's requirements.
3.4.2	The DSC is currently regulating mining within the Narama Notification Area around the Ravensworth Inpit Storage Dam under the Dam Safety Act, 1978 and Mining Act 1992. ACOL is required to advise the DSC of any changes to its mine plan within the Narama Notification Area.	ACOL notes the advice and comments provided by the DSC and will comply with DSC's requirements.
3.5 NSW Heritage Office		

Agency and Issue Reference	Issue	Response
3.5.1	The Heritage Branch acknowledge that ACOL's draft Statement of Commitments is adequate to manage the heritage items identified as potentially being impacted by the SEOC Project.	The comments and advice are noted. ACOL will manage identified sites commensurate with their level of significance. The Non-Aboriginal Heritage Management Plan developed for the SEOC by a appropriately qualified heritage consultant will detail the level of archival recording required for each site.
3.6 Hunter Central Rivers – Catchment Management Authority		
3.6.1	The HCRCMA consider that the principles of the Hunter-Central Rivers Catchment Action Plan (CAP) should apply to the project with respect to such issues as Regional Significance of Native Vegetation, Offsets, Riparian Health, Groundwater, Soil and Salinity.	The HCRCMA have developed guiding principles for mining and extractive industries within the CAP. The SEOC Project incorporates industry best practice principles and the principles of the CAP. These principles will also guide development and implementation of environmental management plans for the SEOC, should the project be approved. In addition, ACOL's rehabilitation and offset objectives for the project, which are designed to improve native vegetation cover, including riparian vegetation, native fauna habitat and wildlife connectivity, comply with the CAP principles.
3.6.2	The establishment of local provenance River Red Gum stands and the establishment of connective corridors or riparian and box woodland communities has merit and is supported by the HCRCMA.	ACOL is committed to rehabilitate mine disturbed areas to achieve improved environmental outcomes including planting and revegetation with local conservation significant species, including river red gum, where feasible.
3.6.3	The HCRCMA recommends that the offset strategy for the project be consistent with the DECCW's "Principles for use of biodiversity offsets in NSW".	ACOL has sought to design the project to achieve an "improve or maintain "status meeting the requirements of the DECCW. This will be achieved through the implementation of the following strategy that includes: • Offsetting the clearing of EEC with like vegetation at a ratio of 2.5:1. • Securing the offset areas in perpetuity. • Offset the loss of hollows with the replacement of 3 nest boxes/hollows for each hollow removed. • Enhance and manage approximately 35ha of the Glennies Creek riparian corridor. • Revegetation of the open cut operations with suitable species to comprise a mix of grasslands and woodlands. • Additional offsets will be provided for vegetation cleared as a consequence of realigning powerlines that traverse the SEOC Project area, these are: - For Option 1 - The incorporation of approximately 8.5ha of land immediately north of the existing VCA comprising relic ironbark woodland and more than 350m of creek frontage to Glennies Creek. - For Option 1 - The replacement of lost vegetation associated with the planted tree corridor

Agency and Issue Reference	Issue	Response
		(0.9ha), to maintain a continuous northerly vegetation corridor. - If Option 2 is used impacts will be mitigated through the offset of like vegetation at a ratio of 2.5:1 and secured in perpetuity utilising mechanisms such as a Voluntary Conservation Agreement with the DECCW. • The implementation and the management of offsets will be administered through an Offset and Riparian Corridor Management Plan. The SEOC Project will result in the removal of some planted vegetation; however, where feasible the project design has avoided impacts to native vegetation, and has proposed an offset strategy that will result in a net improvement of biodiversity in the local area.
3.6.4	The EA does not indicate what distance or buffer is being used to minimise impacts on surface waters and aquifers. The EA states that it avoids impacts by moving the proposal back from Glennies Creek but no distance is given.	With the exception of conveyor infrastructure the disturbance footprint of the open cut mine and infrastructure areas will be set back from the banks of Glennies Creek by a minimum of 150 metres and will be outside areas of connected alluvium. ACOL believe this will provide adequate protection to Glennies Creek surface and alluvial water sources from the impacts of mine development.
3.6.5	Base flow reductions as a result of mining will impact on Glennies Creek and the Hunter River. A Groundwater Management Plan should include monitoring of groundwater levels and groundwater dependant ecosystems.	ACOL will prepare and implement a groundwater management and monitoring plan for the SEOC Project. This will be prepared in consultation with relevant government authorities.
3.7 Land and Property Management Authority		
3.7.1	The Land and Property Management Authority advised the Department of Planning that if project approval is granted for SEOC Project ACOL would be expected to comply with current processes relating to the transfer, revocation and purchases of any Crown Land.	As indicated in Section 1.3, ACOL currently has access to the Crown land within the SEOC foot print for grazing and investigative purposes. Should project approval be gained ACOL intends to negotiate with the Minister for Lands for the purchase of the land or to seek an agreement to allow mining in accordance with any mining lease granted to ACOL.
3.8 Singleton Council		
3.8.1	All residents within the Camberwell village are potentially impacted by noise or blasting associated with the SEOC Project should have the opportunity for their properties to be acquired by ACOL.	Since exhibiting the EA, ACOL has continued to acquire properties in the surrounding area to further minimise the potential for impact on privately-owned residences. It has also committed to project changes in the first two years of operations to further minimise the noise and dust impacts of the project.

Agency and Issue Reference	Issue	Response
		At the time of writing, 7 privately-owned properties in Camberwell are predicted to experience noise and dust levels above the relevant impact assessment criteria, at some time during the life of the project (see Section 1.3)..
3.8.2	Council is concerned about those properties which are deemed to fall within a Management Zone – which are within 2-3dBA of being in an Acquisition Zone.	ACOL is committed to acquire, or enter into a negotiated agreement with privately-owned properties that will be directly affected by the SEOC Project above impact assessment criteria. In addition ACOL has a current commitment to purchase upon request any property within Camberwell for market value. This commitment will continue for the period of the SEOC project.
3.8.3	Council requests that should approval be granted to the SEOC Project that the consent conditions be drafted to ensure the visual mitigation measures are implemented within appropriate time frames.	ACOL has made a commitment to revegetate the northern face (the area of main visibility from the highway) within 12 months of its emplacement (*EA Section 6*). Further, ACOL has already commenced establishing a tree screen by planting several rows of seedlings along the highway boundary. As described in Section 1.3 and EA Section 4.4.5.2, ACOL is participating in an ACARP study that aims to integrate natural landform features into the design of the environmental bund, waste rock emplacement areas and the final landform. This will improve the general visual appearance of the vegetated bund and overburden dumps from Camberwell and New England Highway viewpoints. An indicative design for the environmental bund is included in Appendix 5. ACOL is committed to construct and vegetate the environmental bund in an appropriate timeframe to ensure that it provides adequate visual, noise and dust mitigation, wherever practicable.
3.8.4	The proposed Camberwell Village Enhancement Plan has merit but further discussion and agreement is required with Singleton Council	ACOL is committed to consult with council in finalising an appropriate enhancement program for Camberwell.
3.8.5	Council is concerned that mining will result in long term damage to Glennies Creek. Council notes the 150 metre setback of the project to Glennies Creek. Council requires that consent conditions be drafted which ensure the integrity of Glennies Creek environment is not compromised.	With the exception of conveyor infrastructure the disturbance footprint of the open cut mine and infrastructure areas will be set back from the banks of Glennies Creek by a minimum of 150 metres and will be outside areas of connected alluvium. ACOL believe this will provide adequate protection to Glennies Creek surface and alluvial water sources from the impacts of mine development.
3.9 Roads and Traffic Authority		
3.9.1	The RTA has no objection to the development and has provided recommended conditions for the project.	ACOL is committed to construct and operate road access intersections in accordance with RTA road design guidelines.

4 RESPONSE TO PUBLIC AND SPECIAL INTEREST GROUPS

4.1 Compliance and Reporting

Issues

- Who checks the mine operations; are they doing the right thing.
- The regulation and compliance of conditions of consent for mining operations in the Hunter Valley, particularly in relation to ecological impacts, is very poor or non-existent.
- There is no confidence that this company is capable of operating in an environmentally responsible manner.

Response

The coal mining industry is one of the most regulated industries in NSW, if not Australia. State and Federal legislation and policies have been put in place to minimise social and environmental impacts associated with coal mining. Each operating mine is required to operate in accordance with relevant licenses, approvals and permits, to undertake monitoring and to regularly report on the outcomes, which is made available to government and the public.

The checking of compliance of operations with respect to licenses, approvals and permit requirements is undertaken by government agencies (e.g. Department of Planning, Department of Environment, Climate Change and Water, Department of Industry and Investment) and by the operating coal mine consistent with its statutory obligations.

ACOL has made a commitment to construct, operate and manage the ACP and SEOC project as an integrated coal mine complex in an environmentally responsible manner in accordance with all of its relevant approvals.

4.2 Land Use

Issues

- The land is prime agricultural land.
- It will have an adverse effect on farming enterprises downstream from the project.
- Any more mines threaten the continuation of food production in the Valley.
- Lack of consideration and assessment of the mines impact on the adjoining agricultural lands.
- Annual value of agricultural production and its dependent secondary industries may be severely impacted if a mining operation damages the regulated river system.
- The extension of an existing open cut operation in an area where mining is the predominant land use, represents the highest value and best use of the land in question.

Response

Coal, as with other mineral resources, is owned by the state and extracted by private companies on behalf of and for the benefit of the state. The government controls where, when and how these mineral resources can be accessed and extracted through the issuing of Exploration Licences and Mining Leases. This includes balancing access and extraction of mineral resources against other land uses, including agriculture. Mining is a temporary land use and post mining the disturbed land is rehabilitated and returned to an agreed land use, which often includes agricultural use.

ACOL engaged the Soil Conservation Service (Department of Lands) to assess the capability and suitability of land within the SEOC footprint to support agricultural activities. The lands to be directly impacted by the SEOC contain a mix of arable cropping land (land generally adjacent to Glennies Creek) and land capable of supporting livestock grazing. None of the land within the footprint of the SEOC Project is classified as prime agricultural land.

ACOL's rehabilitation objectives for the SEOC Project are to return mine disturbed land to a mix of agricultural (similar to existing) and conservation end uses. Consequently, parts of the site will continue to contribute toward agricultural production.

Specialist impact assessment reports prepared for the SEOC Project conclude that downstream industries (such as agriculture) will not be adversely impacted by the project proceeding. However, ACOL acknowledges the potential for adjoining agricultural properties to be impacted by the project. ACOL is committed to manage and mitigate its impacts to minimise the effect on adjoining landowners.

ACOL is committed to consulting with potentially affected landowners to ensure the continuance of agricultural production on adjoining lands. ACOL also supports the continuance of agricultural production within its land holdings through the leasing of its land holdings to local farmers that utilise local sale yards and businesses to ensure agricultural production and the supporting businesses remain viable during and after mining.

4.3 Air Quality

4.3.1 Inclusion of relevant local features

Issue

- Concerns that the air quality modelling did not adequately consider aspects such as topography, wind, change in weather patterns, inversions, capture of dust and gasses, creek air currents.

Response

The air quality modelling undertaken complies with the DECCW's requirements for air dispersion modelling in its *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW DEC, 2005).

The air quality assessment provided a best estimate of the impact zone due to dust emissions arising from the proposed operations. These estimates took into consideration all meteorological conditions that have been measured in the study area. Detailed topographic information was included in the calculations.

4.3.2 Odour and Blast Fumes

Issues

- Odour.
- Fumes from blasting hazardous to health of humans and livestock.

Response

Emissions of odours can arise if self-heating (i.e., spontaneous combustion) of the coal is allowed to occur without proper control. Self-heating of coal occurs at different rates depending on the composition of the coal and how it is managed. Self-heating of coal may give rise to smouldering fires in the stockpiles which can lead to emissions of smoke and odour. Such events would be able to be brought under control rapidly.

Potential for self-heating of the coal in the product stockpiles would be reduced through the use of water sprays and prudent stockpile management.

There have been no instances of self heating of coal in the six years of operation of the existing NEOC, and this situation is likely to be the same for the SEOC Project. The potential for odour generation is therefore considered to be low and it follows that the frequency of odour events would also be low. Such events, if any, would be sporadic and short term, making it difficult to quantify the potential odour that may arise from the SEOC. However, with proper management, the potential for adverse odour impacts to be observed at the nearest residential properties is considered to be negligible.

The explosive used in blasting would be ammonium nitrate fuel oil (ANFO), detonation of which produces gases. The principal gases are nitrogen, water vapour and carbon dioxide together with smaller amounts of carbon monoxide and nitrogen oxides.

Samples of blasting dust taken at the Ravensworth Open Cut Mine in 1992 measured a maximum nitrogen dioxide (NO_2) concentration of 3ppm over an exposure period of six minutes. Scientific literature suggests that no adverse health effects would be expected due to this exposure although a noticeable odour would be present. Given that the concentration at the nearby residences would be significantly lower than the 3ppm measured onsite at Ravensworth, it is unlikely that there would be any adverse impacts due to NO_2 emissions from the blasting.

In a detailed measurement program for nitrogen oxides (NO_x) in blast plumes in the Hunter Valley, Attalla et. al., (2008) concluded that nitrogen dioxide (NO_2) concentrations decrease rapidly between 200m and 2km from the site of the blast, and are undistinguishable from background levels at 5km.

4.3.3 Rainwater tanks

Issue

- Health related issues associated with emissions and rainwater tanks.

Response

In 2009, the University of Queensland, on behalf of Ashton Coal Pty Ltd, Integra Coal Operations and BHP Billiton Energy Coal Pty Ltd, carried out studies to address community concerns that mining generated dust containing heavy metals (including lead) was exceeding national guidelines. Further that this dust and its accumulation in tank water was giving rise to increased respiratory and other illnesses (Noller, 2009). The study measured lead levels at residences in proximity to coal mine operations in Camberwell and Muswellbrook, with reference sites distant from mining activity.

To determine if there is a potential for the dust to generate high lead levels in tank water samples of water were taken directly from rainwater tanks (no samples were taken from taps inside houses); samples of sludge were taken from the bottom sediment layer of the tanks; and samples of house dust from floor wipes and window sill and trough wipes were also collected. All samples were analysed for lead content. Ambient air samples of Total Suspended Particulate (TSP) and samples of fines from overburden, coal and topsoil were also analysed for lead content.

Tank water and sludge analysis

The tank water showed no exceedance of the Australian Drinking Water Guideline (ADWG) for lead in any of the water samples. The ADWG provide the threshold levels considered safe for human consumption. There was no significant difference in drinking water lead levels between houses close to coal mining operations and that obtained from background sites, including Newcastle town water.

While the sludge in tanks appears to contain lead, it is not being transferred to water. The high pH of the tank water (pH > 7.0) ensures that lead is not solubilised from the sludge. Some tanks contained more sludge than others, however it was noted that these tanks may not have been cleaned for some time, and at some sites no cleaning had ever been undertaken. NSW Health guideline (NSW Health, 2008) recommends that sludge is cleaned from tanks every two years.

Overburden, coal and topsoil analysis

The average levels of lead measured in overburden, coal and topsoil samples were within the range for lead in Australian coal.

It is unlikely that the dust from mines is the cause of high lead levels found in some tank sludge samples, as the mine sources measured have significantly lower percentage lead levels. It is more likely that sites with higher concentration of lead in the sludge could be due to historical use of lead in paint, roof materials etc.

TSP results

The TSP results of ambient air showed no detectable lead, and as such it would be unlikely to exceed the National Environmental Protection Measures (NEPM) ambient air quality criteria.

House dust results

The results of the samples taken from houses can be summarised as follows:

- Floor wipes were all below the relevant criteria.
- Window sills were all below the relevant criteria.
- Window troughs exceeded the relevant criteria at 2 houses, indicating some localised source of lead and lack of cleaning of window tracks. All other houses were below the relevant criteria.
- Dust concentrations from carpet in Camberwell houses are higher than found in the soil but do not exceed the relevant criteria.

The dust found in window sills is the least available (in terms of potential for human inhalation/ingestion) of the samples collected and can be controlled by regular cleaning. Importantly, the floors and windowsills which are more commonly accessed by children were found to be low in lead concentration and indicate no association with an external dust source, such as soil or coal. The carpet dust mean lead concentration was lower than reported for floor dust from other cities.

Other Rainwater Tank Studies

Other research conducted in Queensland (in close proximity to the Dalrymble Bay Coal Terminal) investigated the potential health risks as a result of elements contained in coal dust deposited on rooftops entering rainwater tanks systems used for potable supply (Lucas *et. al.*, 2009).

Leaching tests were conducted on numerous coal types to identify the potential for trace element release into rainwater in the tank. In addition, rainwater samples were collected from both the rainwater tanks and taps of three homes within the dust deposition zone of Dalrymple Bay area.

The leaching tests indicated that negligible amounts of trace elements in coal dust were released in the rainwater, and all trace elements were below the ADWG. The ADWG provide the threshold levels considered safe for human consumption.

The analysis of the rainwater from homes also showed that no trace element exceeded the ADWG.

The research concluded:

> *"…….tank and tap samples were all below ADWG and indicated a minimal likelihood of coal dust being an issue with respect to human health"*

Camberwell Tank Cleaning Program

In September 2006, ACOL implemented an annual roof and tank cleaning program which it offers to all Camberwell residences. As part of this program, ACOL has also offered to install water filters at all Camberwell residences.

4.3.4 Health

Issue

- Long and short term health related issues including, sinus, asthma, from increased dust levels.

Response

Table 3 compares the rate of hospitalisations and death due to asthma and chronic obstructive pulmonary disease (COPD) per 100,000 persons population in the Hunter & New England Health Area (which includes Singleton LGA) with NSW as a whole (NSW Health, 2008a). These data show that the incidences of hospitalisation and death due to asthma and hospitalisations due to COPD are lower in the Hunter & New England Health Area (including Singleton LGA) than in NSW as a whole. However, there is a slightly higher incidence of deaths due to COPD and lung cancer.

Table 5: Hospitalisations and deaths due to asthma, COPD and lung cancer (rates per 100,000 population).

Area Health Service	Asthma		COPD		Lung Cancer
	Hospitalisations	Deaths	Hospitalisations	Deaths	Deaths
	Rate per 100,000 persons population				
Hunter & New England AHS	169.9	1.63	227.5	26.4	34.9
NSW	198.0	1.72	236.3	24.0	34.0

4.3.5 Measurement of $PM_{2.5}$

Issue

- Measurement should be in PM2.5.

Response

The creation of fine particles from rocks and crustal materials requires the input of chemical and/or mechanical energy to break the larger material into smaller particles (e.g. weathering processes). The energy required is proportional to the surface area created. In practice, it is not possible to create ultrafine[1] particles by mechanical means. Ultrafine particles, and indeed much of the mass in the $PM_{2.5}$ range of airborne particulates, are created via chemical processes (e.g. combustion or chemical reactions involving the gases produced in combustion). Hence the physical process of mining crustal materials (e.g. coal and overburden) does not generate dust in the ultra fine size range and has little dust in the $PM_{2.5}$ size range (PAEHolmes, pers. com., 2010). Typically, only 4% to 5% of the particles emitted from mining operations are in the $PM_{2.5}$ size range (SPCC, 1986).

In 2003, the Ambient Air NEPM was amended to incorporate an advisory reporting standard for Australian States and Territories of $PM_{2.5}$. The advisory reporting standard is 25µg/m^3 averaged over 24 hours, and 8µg/m^3 averaged over one year. The majority of the $PM_{2.5}$ fraction measured would typically be from combustion sources (e.g. vehicle engines, boilers and fires), rather than earth moving activities (see Section 4.3.6 for further details).

At present there are no legislated criteria for $PM_{2.5.}$ Nevertheless, PAEHolmes modelled the predicted levels of $PM_{2.5}$ potentially arising from the project (*EA Appendix 3, Appendix B*). The $PM_{2.5}$ modelling shows that areas outside the active mining area are unlikely to experience any significant $PM_{2.5}$ emissions from the project.

4.3.6 Dust composition

Issue

- It is imperative that accurate data is collected about the current poisons in the air and the likely increase in volume if the extension is granted.

Response

[1] The term ultrafine particles refers to particles with equivalent aerodynamic diameters of 0.1 µm

The Australian Coal Association Research Program (ACARP) funded a three-year monitoring program to characterise the concentration and composition of fine particles ($PM_{2.5}$ and PM_1) in the Hunter Valley (ACARP 2007 and 2008).

Continuous monitoring took place in 2005 (PM_{10} and $PM_{2.5}$) and 2006 (PM_1) at two representative population sites in the Hunter Valley (Muswellbrook and Singleton), and at two sites immediately adjacent to mining operations "Glenville" and Rix's Creek). The Glenville property is located between the current Ashton and Integra Open Cut operations

Data collected at Glenville showed only one event where the 24-hour average $PM_{2.5}$ concentration was measured above the NEPM advisory reporting standard of 25μg/m^3. The Rix's Creek data showed two events, and Muswellbrook and Singleton did not record any events above the 24-hour average NEPM advisory reporting standard. The annual average concentrations at Glenville and Muswellbrook were below the NEPM advisory reporting standard of 8μg/m^3, while Rix's Creek and Singleton were slightly above.

$PM_{2.5}$ monitoring has continued at Muswellbrook and the most recent State of Environment Report published by Muswellbrook Shire Council shows that annual average $PM_{2.5}$ concentrations have remained below the NEPM advisory reporting standard.

Elemental compositional analysis of the samples collected (see **Table 4**) has shown the fine particles ($PM_{2.5}$) are primarily sourced from combustion products (almost 67% of the emissions are from motor vehicles and power generation) and sea salt and its reacted products (15%), with a smaller contribution from local soils (11% of emissions result from mining and agriculture).

Table 6: Contribution of different sources to coarse and fine particulate matter.

Source	Element	% Coarse Matter ($PM_{2.5-10}$)	% Fine Matter ($PM_{2.5}$)
Combustion	Black Carbon (BC), Chromium (Cr), Fluorine (F), Nickel (Ni) and Sulphur (S)	18.83	66.87
Industry	Cobalt (Co), Copper (Cu), Manganese (Mn) and Zinc (Zn)	0.32	0.23
Motor Vehicles	Bromine (Br) and Lead (Pb)	0.16	0.26
Sea salts	Chlorine (Cl) and Sodium (Na)	39.90	15.19
Soils	Aluminium (Al), Calcium (Ca), Iron (Fe), Silicon (Si) and Titanium (Ti)	38.48	10.62
Woodsmoke/Biomass burning	Potassium (K)	1.97	0.94
Others	Hydrogen (H), Phosphorous (P) and Vanadium (V)	0.33	5.88

Source: ACARP (2007)

4.3.7 Contamination of pasture, livestock and milk production

Issues

- Contamination of pasture and impacts to livestock.
- Contamination of the milk production in nearby dairy.

Response

The air quality impact of the SEOC Project was assessed by comparing estimates of dust concentrations and deposition levels with DECCW air quality criteria. The air quality criteria have been set for the protection of human health and to keep dust nuisance within internationally accepted levels. While the DECCW air quality criteria are designed to protect human health, it is likely that the criteria may also protect the health and amenity of other mammals, including horses and cattle.

The DECCW's Action for Air 2009 update publication shows that between 1994 to 2007 the number of days when particulate concentrations exceed the 24-hour average PM_{10} goal are generally fewer in the Lower Hunter region than in the Sydney Metropolitan region, and both Sydney and the Lower Hunter have significantly fewer days above the criteria than the Tablelands region, where there is

significant livestock, but little mining activity (DECC, 2009). Livestock (horses and other mammals) are kept and raced in Sydney and other cities where PM_{10} concentrations are similar or higher than the levels experienced outside the area predicted to be impacted by the mine.

Specific studies have been conducted into the issue of dust effects on livestock and production, as summarised below.

Milk production

Two research trials were conducted by Andrews and Srikandarajah (1992) to investigate the effects of coal mine dust on dairy farms in the Hunter Valley. These studies concluded that coal mine dust, at levels much higher than would be experienced in practice, had no effect on the production of dairy cow.

Furthermore, the amount of soil ingested by dairy animals for typical grazing behaviour far outweighs the quantity of dust ingested by consumption of the deposited dust on the pasture.

Vegetation

A 2006 study entitled "Airborne Particulates and Vegetation: Review of Physical Interactions" (Doley, 2006) examined the physical effects of dust on vegetation. The study noted that the effects may be associated with "a reduction in light reaching the photosynthesis apparatus of the leaf" and an increase in leaf temperature. A relevant conclusion for the study suggested that there is no discernible effect on the most sensitive plant functions with dust loads of less than $8g/m^2$ on the leaf surface during growth.

Air quality impacts of the project were assessed against a dust fallout criteria of $4g/m^2$/month. Thus, in areas outside the zone where dust deposition levels are predicted to be more than $4g/m^2$/month due to the proposed mining operations, the impact of dust deposition levels is considered to be negligible.

4.3.8 Lifestyle amenity

Issue

- Lifestyle and amenity related impacts including dust on property and impacts on clothes washing.

Response

Deposited dust from coal mining has no known association with health impacts and is recognised in the criteria as an amenity issue.

Any area predicted to experience cumulative annual average dust deposition levels at or above $4g/m^2$/month is considered in the assessment process to be impacted above impact assessment criteria. ACOL is committed to acquire, or enter into a negotiated agreement with privately-owned properties that will be directly affected by the SEOC Project above impact assessment criteria.

4.3.9 Dust warning system

Issue

- No dust and health warning system like Sydney.

Response

The DECCW, in conjunction with NSW Health operates a real time and predictive forecasting system to provide health alerts to susceptible members of the community in Sydney. The health alerts are not a dust warning system, but are based on an air quality index (AQI) value derived from a matrix of six air pollutants.

AQI reporting is available for the Lower Hunter Region, and interested parties can register to be automatically provided with AQI reports.

More information on the DECCW/ NSW Health Air Quality Index (AQI) can be found at:

- http://www.environment.nsw.gov.au/AQMS/aqi.htm
- http://www.health.nsw.gov.au/factsheets/environmental/air_quality.html

The Bureau of Meteorology may from time to time issue forecasts and warnings for potential dust storms.

ACOL is a signatory to the Memorandum of Understanding for the Upper Hunter Regional Air Quality Monitoring Network and as such is committed to supporting the installation and operation of the air quality monitoring network as currently proposed DECCW.

4.3.10 Air conditioning

Issue

- Mines should air condition private houses to reduce health and amenity related impacts.

Response

Air conditioning itself does not reduce dust levels; however some air conditioning systems are fitted with air filters or pollen filters which can capture dust and reduce dust levels. Generally these filters are able to capture large particles such as fibres from carpet, clothes and furnishings, and pollens, moulds and the like rather than fine particulate matter.

Hence air conditioning systems may have some positive effect in reducing coarse particles, rather than reducing fine particles. Mine generated dust levels from mining activity at non-impacted privately owned residences are generally at levels that are below accepted criteria.

4.3.11 Absence of assessment

Issue

- Air quality assessment does not provide an assessment of the modelled dust concentration (PM10 and TSP) in relation to relevant criteria for the project considered in isolation. The relevant project specific dust concentration criteria (for PM10 and TSP) are exceeded by the Project alone at a number of private residences.

Response

The air quality criteria used for identifying which properties are likely to experience air quality impacts are those specified in the DECCW's Approved Methods (Modelling and Assessment of Air Pollutants in NSW) (DEC, 2005)**.** These criteria have been applied in the assessment process following the practices used in contemporary approvals for mining projects in NSW.

The criteria are:

- 50 $\mu g/m^3$ for 24-hour average PM_{10} for the Project considered alone;
- 30 $\mu g/m^3$ for annual average PM_{10} due to the Project and other sources;
- 90 $\mu g/m^3$ for annual average TSP concentrations due to the Project alone and other sources;
- 2 g/m^2/month for annual average deposition (insoluble solids) due to the Project considered alone; and
- 4 g/m^2/month for annual average predicted cumulative deposition (insoluble solids) due to the Project and other sources.

A detailed assessment of the predicted impacts at all the residences from both the project alone, and the cumulative impact with other mines and other sources was described in the EA (*EA Appendix 3 Section 8.3*).

4.4 Climate Change and Global Warming

Issues

- Concern that the expansion of coal mining will contribute to global warming and associated climate change.
- This project and the coal it will extract will emit a significant amount of greenhouse pollution and therefore is not sustainable in the context of the need to avoid catastrophic climate change.

Response

The EA includes an assessment of greenhouse gas emissions and the potential for the project to contribute to global warming (see *EA Section 5.7*). Scope 1 and Scope 2 emissions for the project are estimated to be 0.19Mt of CO_2 – equivalent (CO_2 – e). Further, total annual average Scope 1, 2 and 3 greenhouse gas emissions are estimated to be 5.02Mtpa of CO_2 – e.

When compared with the 2007 Scope 1 and Scope 2 emissions in Australia, the annual average Scope 1 and Scope 2 project emissions represent:

- 0.3% of the annual greenhouse emissions of 69.5Mt from mining in Australia (DCC, 2009b);
- 0.9% of the annual greenhouse emissions of 21.6Mt from mining in NSW (DCC, 2009b);
- 0.03% of the total annual greenhouse emission of 597.2Mt in Australia (DCC, 2009c); and
- 0.12% of the total annual greenhouse emissions of 162.7Mt in NSW (DCC, 2009c).

The SEOC Project was calculated to contribute 0.02% of global CO_2 – e annual emission from fuel burning and would therefore contribute to the increase in global temperature of 0.000004°C.

It should be noted that if coal is not produced at the SEOC Project, coal would be extracted at some other location and have a similar impact. Not proceeding with the SEOC project would not reduce or remove the global demand for power generation or steel manufacture. However, it would impact on the benefits that the project will bring to NSW and the nation.

4.5 Acoustics and Vibration

Issues

- Health issues associated with noise and vibration.
- More noise would be unfair and unjust to the community; noise causes aggression.
- Beeping of trucks reversing and noise from machinery affects sleep.
- Inversions have not been factored into the assessment.
- Impact of noise on pets and stock. Noise can affect the behaviour of cows, therefore their production.
- The proposed conveyor belt will add to the noise as the land is open to the village.
- Noise impact on the bowman holding will render uninhabitable the houses at No. 1 (130A) and Nos. 2 Dairy (130B).
- Damage to property and stock from flyrock/fallout.
- Road closures and evacuations due to blasting unacceptable.
- The EA underestimates the impact of mine blasting and vibration on Property 130.
- Vibration from diesel trains impacting village.
- Coal trains create vibrations that can be felt in the houses in the village.

Response

The noise impacts of the SEOC Project have been modelled (including inversion scenarios) and noise predictions made and compared for private receptors against appropriate criteria defined by

the Industrial Noise Policy (see *EA Section 5.8.2*). This assessment predicted that 16 privately-owned residences will experience noise levels of greater than 5dB(A) above the determined impact assessment criteria.

Since exhibiting the EA, ACOL has remodelled the noise impacts of the SEOC, taking into account the changes proposed in the first two years of operations (see Section 1.3 and **Appendix 2**). In addition, ACOL has continued to acquire properties in the surrounding area to further minimise the potential for impact on privately-owned residences. These measures have reduced the potential noise impacts of the project on surrounding privately-owned residences. At the time of writing, ACOL predicts 7 privately-owned residences will experience noise levels greater than 5dB(A) as a result of the SEOC, at some time during the life of the project (see Table 1). It is expected that these properties will be granted acquisition rights should the project be approved.

Prior to leasing properties, ACOL will make the potential tenant aware of the noise impacts that may be experienced at the residence. Regardless of this upfront information, where tenants of ACOL owned properties choose not to continue residing in Camberwell due to concerns of noise (or dust) then ACOL will permit the tenant to break the lease agreement and vacate the property. Vacant ACOL residences will be maintained in a habitable condition to ensure future occupation of housing in Camberwell is supported once mining impacts are reduced.

With regard to noise impacts on pets, stock and wildlife, the tolerance of noise varies with the animal species and its sex, age, other physical stresses, etc., and can vary between individual species of a population (Busnel, 1978). Where landowners are concerned about the impacts of noise on stock, ACOL is committed to consulting with the affected landowner to determine appropriate mitigation measures. This may include measures to relocate impacted pets or stock during noisier activities or the acquisition of the property where project impacts are determined to be above DECCW impact assessment criteria.

ACOL will continue to consult with all potentially affected landowners to determine the most appropriate management measure to be implemented (e.g. negotiated agreement, property acquisition, or relocation) to minimise the impacts (noise, dust and blasting) of the project on neighbouring stock, dairying and farming activities.

ACOL commit to the development of a Blasting Vibration Management Plan for the SEOC to adequately address the risks associated with blasting, including fly-rock, vibration and overpressure. This will include the implementation of risk management measures such as defining and implementing blast exclusion zones, which may require road closures, evacuation of adjacent dwellings and property and removal of stock from within the designated zone. Typically a 500m buffer is applied as a blast exclusion zone, however smaller exclusion zones may be used where risk assessments justify a reduction. Blasting will be managed so as to minimise the potential impacts on surrounding properties and landowners.

At the time of writing 3 privately-owned properties (1 containing a dwelling) and the community hall are within the 500m blast exclusion zone for the first two years of mine development. After this time these properties and the New England Highway, with exception of Property 130, will be outside the blast exclusion zone. However, each of these properties is predicted to experience noise and or dust levels above the relevant impact assessment criteria and will therefore be subject to acquisition by ACOL at the request of the landowner.

The blast management plan will also include measures to reduce the potential for dust and fume emissions during blasting (refer Section 4.4).

ACOL will develop a Road Closure Plan to the satisfaction of relevant government authorities to adequately manage the temporary closure of public roads during blasting. The closure of roads as a result of the existing ACOL activities has been undertaken without significant delay or without risk to the safety of the travelling public.

Blast vibration calculations for Property 130 were based on an approximate distance to the centre of the structures surrounding Property 130A (or Dairy 1). The distance of the closest structure is

approximately 200m closer (i.e. approximately 600m from the open cut); even in this instance the predicted overpressure and vibration will be significantly less than the relevant criteria.

The SEOC Project will not significantly change the frequency of trains on the Main Northern Line or trains being loaded at the ACP siding. The existing ACP rail loading facility has approval to load trains until the completion of mining within the underground mine, approximately 7 years after the completion of mining in the SEOC.

4.6 Groundwater

Issues

- Destruction of alluvium and damage to aquifers.
- Groundwater in Common is only 2m below surface, gradient reversal in alluvial waters toward open cut pit.
- Pit is within highly connected alluvium.
- Predicted losses of groundwater in the Glennies Creek alluvium are unsustainable.
- 100 year recovery is too long.
- Groundwater study flawed as similar studies were done for Underground and were flawed.
- Geological faulting and structure potentially unknown that may lead to more leakages with no remediation.

Response

Detailed hydrogeological investigations have been undertaken for the SEOC Project by Aquaterra Pty Limited in accordance with Environmental Assessment Requirements, accepted guidelines, and in consultation with the NOW. Refer to *EA Appendix 5* for the detailed assessment.

Extensive groundwater monitoring and testing has been used to define the extent of alluvium and alluvial groundwater resources in connection with Glennies Creek. This has enabled ACOL to design the western highwall of the open cut pit to be outside the defined area of alluvium and connected alluvial groundwater resource, and to minimise mining impacts on these water sources.

Aquaterra predict that the project will result in a minor loss of groundwater baseflows (i.e., 0.03% of average flows and 0.33% during low flow conditions) in Glennies Creek. The predicted baseflow losses are predicted to fully recover post-mining, with the majority of the recovery predicted to occur within the first 15 to 20 years after mining. Given the relatively short mining time frame, minimal loss of baseflows and short period of groundwater recovery, the predicted loss of alluvial groundwater associated with Glennies Creek is unlikely to result in unsustainable impacts. Any losses will be mitigated through the use of licence offsets, as appropriate.

Geological mapping and predictive modelling (based on exploration, open cut and underground data) has determined there are no significant faults or other geological structures that are likely to present zones of increased permeability between the open cut and Glennies Creek. High inflows associated with geological faulting have not been encountered within the underground, which is located immediately to the west of Glennies Creek. All hydrogeological behaviour within the hard rock has been as anticipated to date. Groundwater impacts of the current ACOL operation including the underground operation are consistent with the 2001 EIS predictions.

As described in *Section 4.4.4.3* of the EA ACOL will construct a levee along the western boundary of the open cut pit. This will protect Glennies Creek and the open cut pit during flood events. Where required the levee will include a subsurface barrier to improve pit stability and further limit the already minimal predicted inflows.

In November 2008, groundwater levels in the vicinity of the Common were determined to be 6-8m below ground level, except in low lying areas very close to the river (i.e. well to the west of the pit shell and Common).

Further discussion related to groundwater is contained within the *Section 3.2.1* and **Appendix 4** of this document in responses to issues raised within the NOW submission.

4.7 Surface Water and Creek Integrity

4.7.1 Camberwell Common

Issues

- Risk of Camberwell Common collapsing into Glennies Creek, blocking its flow.

Response

The SEOC Project is located south of the New England Highway more than 1400m from the northern Camberwell Common where cracking from the existing open cut has been identified. Hence there will be no impacts from the SEOC on this land. Notwithstanding, extensive geotechnical investigations have been undertaken in relation to the existing cracking and at no stage has there been a risk of land collapse or blockage to Glennies Creek.

4.7.2 Water Management

Issues

- Assessment of the storm water is totally inadequate. The report writers have little understanding of local weather conditions and local water flows. The planned fresh water dam will never hold the amount of water that can race down the slopes.
- Object to “conceptual water management plans” only having been developed.
- Concern about how the mine will effectively manage their discharge in times of high river and high creek flow.

Response

WorleyParsons developed conceptual water management plans for the life of operations to address the management of water across the SEOC mine site including management measures to minimise impacts to the environment and maintain safety within the open cut. The conceptual water management plans were prepared by experienced engineers, based on accepted modelling practices, using long term meteorological data to industry standards for water management on mine sites. These plans are used as a basis for the water management for the mine site and are refined and improved with the detailed engineering design. Water Management Plans for the SEOC will be dynamic being refined during construction and mining to improve water management. ACOL has successfully operated the NEOC since 2002 as a nil discharge mining operation gaining valuable experience of local conditions, this experience will be used as a foundation for water management of the SEOC.

The SEOC Project will not discharge water from the mine site. As described in the EA (*EA Section 4.4.7* and *Section 5.11.3.3*), the mine design incorporates two clean water dams (CW1 and CW2) located to the east of the open cup. CW1 and CW2 will collect clean water from upstream. Water in these dams will be transferred to other water storages or Glennies Creek via a pump and pipe network to ensure sufficient freeboard is maintained.

The mine design incorporates a levee system along the western side of the open cut and ROM coal facility to eliminate the interaction of mining operations with Glennies Creek, including flood flows in excess of a 1 in 100 year average recurrence interval (ARI) storm event. Additional water management safeguards in place for the SEOC project during periods of high rainfall include the ability to store water within the open cut voids of both the SEOC and NEOC.

4.7.3 Conveyor Belt Failure

Issues

- If coal ends up in Glennies Creek due to conveyor belt failure, contamination would kill the aquatic creatures and possibly affect all downstream users.

Response

The conveyor design includes over 600m of conveyor elevated above the floodplain and incorporates a span over Glennies Creek with stanchions constructed outside the banks of the creek. It will be elevated approximately 7m above the banks of Glennies Creek and 14m above the creek. This will ensure it is outside the 1 in 100 year flood level. Its location will also avoid an isolated River Red Gum occurrence. The conveyor, maintenance walkways and saddled pipelines will be enclosed. This will minimise the risk of coal falling from the structure and entering Glennies Creek. The enclosed conveyor has been designed to incorporate drainage from the enclosed section of conveyor, in the event that a pipeline bursts or water is required during maintenance. The laundered water will be recovered and transferred to the mine water management system. In typical operational scenarios no water is expected within the conveyor structure (other than that contained in pipelines). No coal or water from the conveyor structure will enter Glennies Creek.

The conveyor will be constructed from both sides with no crossing of the creek. Access to the conveyor will be via two separate entrances o the New England Highway.

Prior to the commencement of construction activities, rural fencing will be erected around the drip line of the nearby River Red Gum and sedimentation controls will be erected.

The elevation of the conveyor means that riparian vegetation on the banks of Glennies Creek will be lopped rather than removed. This will further minimise impacts on the riparian zone including bank stability. Where vegetation is required to be removed for construction, sediment controls will be established and the bank revegetated with suitable grasses and native species to maintain bank stability. The central span of the conveyor will be positioned above the creek using a crane positioned on either bank of the creek. The construction of footings may encounter groundwater, in this case water will be transferred to sediment containment dams.

4.7.4 Loss of Water and Damage to Glennies Creek

Issues

- Open cut project is located close enough to Glennies Creek to have a detrimental effect on its environmental health and quality of water travelling through it.
- The potential for impacts to water quality in Glennies Creek from mining.
- The impact of loss of water quality from Glennies Creek to the Hunter River may have serious implications on the Hunter River Salinity Trading Scheme.
- Risk of cracking on Glennies Creek and use of precautionary principle.
- NSW Government should mandate a safety zone of at least 1 kilometre around all rivers in the state to protect them from further permanent damage through the effects of mining under or too close to river beds.
- This project proposes to mine up to 150 metres from the banks of Glennies Creek. The proposed exclusion zone was 1 km in 2005. What has changed since then.
- The proposed mining should be prevented from entering a substantial buffer zone around and below every river.

Response

The design of the SEOC has been fully cognisant of the location and sensitivities associated with Glennies Creek. Detailed hydrogeological investigations (*EA Appendix 5*) and surface water investigations (*EA Appendix 6*) have assessed the potential for the SEOC to impact on the integrity of Glennies Creek and the quality of its regulated surface water flows. These studies predict that the

project will have only minimal impacts to Glennies Creek surface flows (minor baseflow losses), which ACOL has proposed to offset. Hence the project will not affect parties to the Hunter Salinity Trading Scheme or the ability of this scheme to effectively function. Further, due to the setback distance between the pit shell and the creek, development and operation of the mine will not crack the bed of Glennies Creek.

ACOL is not aware of any NSW government legislation or policy that restricts mining to beyond 1km from creeks or rivers. ACOL has engaged industry respected technical specialists to assessed the risk of potential impact that development and operation of the SEOC poses to Glennies Creek. This assessment included extensive and rigorous field testing, computer modelling and hydrogeological and hydrological analysis, the outcomes of which indicate that the SEOC will have only marginal impacts on groundwater baseflows to Glennies Creek.

4.7.5 Breach of Legislation

Issue

- Ashton cannot be given consent to mine in any location or in any manner which has the potential to take water illegally.
- If Ashton Coal reduces the surface and base flow of Glennies Creek then they are in breach of the Hunter Unregulated River and Alluvial Water Sharing Plan and the Water Management Act 2000.

Response

ACOL will consult with NOW regarding water licensing for the SEOC. ACOL will at all times comply with the requirements of the *Water Management Act 2000* and the *Water Act 1912*.

ACOL has proposed to offset predicted baseflow losses to Glennies Creek using existing (high security) water licence allocations

4.8 Water Demand and Supply

Issues

- Reliability of supply from the Hunter River is critically dependent upon integrity of the river from excavation.
- Project will have severe adverse effects on water supply and quality for downstream users.
- Mining so close to the Hunter River threatens the water supply of those who live and work below Glennies Creek.
- If we go into drought again with even more substantial demand for water what will happen.
- Glennies Creek is critical to maintain river flows and reliable water supply to all users down to and partly within the Hunter tidal pool below Maitland; it is critical that the highest level of protection is provided to this water supply source as any damage to its flows cannot be replaced from any other source.
- There is no indication of the impact on employment at the mine during periods of water shortage or the impacts on water availability for other industries if the coal mining sector continues to buy up water licences.
- Impacts to Singleton town water supply if more flows from dam are needed have not been assessed.

Response

ACOL agree that the integrity of Glennies Creek is of critical importance to maintaining regulated river flows to the water users and the environment downstream. ACOL has undertaken detailed studies of the hydrogeological environment and have determined that the open cut can occur without

significant impact to Glennies Creek. In addition, ACOL will develop and implement a water management plan, including a surface and ground water response plan with triggers, actions and contingencies, to ensure that impacts to Glennies Creek are minimised.

Further, ACOL recognises the economic risks associated with an operation that is poorly designed or constructed and as such has invested significant human and economic capital in the design of the project, and will continue to do so during the detailed design and construction of the project. ACOL is confident this will ensure the integrity of Glennies Creek and its water supply are not adversely impacted by the project.

The EA included an assessment of the availability of water to meet operational demands under a range of climatic scenarios while operating at peak capacity. It should be noted that the ability of the mine to operate at peak capacity (and therefore maximum water usage) is dependent on having only one move of the longwall in anyone year, the regular occurrence of this is unlikely, and therefore peak water usage is also likely to be infrequent. However, in order to address the potential for shortfalls in water availability several contingencies were proposed. Of these contingencies acquiring additional water licences, reducing coal processing in the washery (which equates for approximately 70% of water usage) or reducing production were proposed.

Water use from Glennies Creek Dam is the responsibility of State Water which administers water discharges from the dam based on required environmental flows and licensed allocations under the relevant water sharing plan. ACOL is required to seek and acquire sufficient water allocations in accordance with relevant water licensing requirements. Hence, the risk of impact to Singleton Town Water supplies is negligible.

Water licences are actively traded within the Hunter Valley where the value of water licences reflects the availability and economic value of the waters' use, noting licence availability is contingent on the willingness of sale of the licence by the existing water user. The dependence of coal mining on water supply does result in a higher average licence price in the Hunter Valley (National Water Commission - Australian Water Markets Report 2008–2009). While this results in higher prices to obtain licences, it also results in higher prices when licences are sold. Taking water for domestic and stock purposes does not require a licence, these land uses are not affected by price changes in the water market.

ACOL actively monitor water use and where water shortages are anticipated, water availability and production are balanced to avoid changes to staffing levels.

4.9 Flooding and Geomorphology

Issues

- If a flood occurred, water would flood into the mine and then all the mine crap would enter both Glennies Creek and the Hunter River.
- There will be changes to flood patterns and creek behaviour as a result of this operation.
- Changes to the creek geomorphology at four sites as identified in the EA are unacceptable.
- Proposed flood levy constructions could alter the flow path of flood waters and even worse if over topped thus allowing for water from the pit workings to return to the Hunter and its tributaries.

Responses

WorleyParsons were engaged to undertake an assessment of flood behaviour for both Glennies Creek and the Hunter River for the site of the SEOC project. The results of the assessment were then used by ACOL in the design of the SEOC project.

The flood study determined that the 100 year ARI flood level was 62.7m and was governed by backwater flooding from the Hunter River, as opposed to flooding in Glennies Creek. ACOL haS adopted an infrastructure design level of 64m which incorporates an additional 1.3m of free board

and a staged flood levee at 64m to be constructed along the western extent of the open cut around the ROM facility.

The SEOC pit will result in a minor loss of flood storage capacity in a 1:100 year flood event by 30mm. WorleyParsons concluded that the project is not expected to result in any measurable divergence or convergence of flood waters or levels on nearby properties.

ACOL recognise that floods of greater magnitude than the design level of 64m can occur. Depending on the magnitude and intensity of the flood event (such as a Probable Maximum Flood – PMF – coinciding with a Glennies Creek Dam breach) all personnel would be evacuated to the office and workshop facilities located above the flood level. An extreme flood event would inundate the open cut workings, potentially resulting in the flooding of the open cut and damage to infrastructure (plant and equipment). Similarly through no impact of the SEOC project, public and private infrastructure and property such as crops, fencing, livestock, dwellings and natural ecological features within the landscape would also be severely impacted or transported downstream. The SEOC project has the advantage by being designed to withstand a 1:100 year ARI flood event, not inconsistent with government designed infrastructure.

The comment in relation to changes in creek geomorphology appears to be a result of the misinterpretation of *EA Section 5.13.2*. This section of the EA describes four sites along the western boundary of the open cut that, based on the existing stream characteristics, may be vulnerable to natural changes in the creek alignment. The section continues, stating that investigation of these sites determined that they are not within a geomorphically active zone of Glennies Creek, and that the SEOC will not alter the geomorphic processes in Glennies Creek.

WorleyParsons was also required to investigate the potential impact of the open cut mine on the geomorphology of Glennies Creek, including the potential for Glennies Creek to migrate toward the mine. WorleyParsons concluded that flow velocities across the eastern overbank of Glennies Creek are expected to be less than 0.9m/s during events up to and exceeding the 500 year recurrence flood. The flood protection levee proposed around the open cut area will be deigned to resist flood flows based on the peak overbank flow velocities for the 500 year recurrence flood. Hence, the design of the SEOC project is not expected to impact on the geomorphic process of Glennies Creek.

4.10 Ecology

4.10.1 Loss of Flora and Fauna

Issue

- The flora and fauna once there will be gone.
- Nobody will ever know how many trees they have cut down or will cut down if SEOC gets approved.
- The proposal to destroy a further 24.7ha of the endangered ecological community, Central Hunter Ironbark-Spotted Gum-Grey Box Forest cannot be mitigated.
- The ridge ACOL wishes to mine/demolish has remnant trees and vegetation. These will be destroyed by the proposed extension.
- Rehabilitation work (tree plantings) on private property would be undone by mining expansion.
- Poor ecological study undertaken in the area of impact. The fauna study fails to identify the presence of a number of species in the project site listed for protection under key environmental legislation.

Response

The impacts of the SEOC project on flora, fauna and aquatic ecology were assessed by ERM Australia Pty Ltd, EcoHub Pty Ltd and Marine Pollution Research Pty Limited in accordance with relevant assessment guidelines and in consultation with the DECCW. This included an assessment

of native flora and fauna species known to occur or likely to occur at the site, including listed threatened species and their habitat. The assessment also included the mapping of vegetation communities and recording of hollow bearing trees, as habitat features, which enabled the existing biodiversity values of the site to be quantified.

The SEOC will result in the clearing of 24.7ha of Hunter Ironbark-Spotted Gum-Grey Box Forest, an endangered ecological community (EEC – at the time of EA printing it was only a preliminary determination by the NSW Scientific Committee), and occurrences of non-threatened native vegetation which lie within the disturbance footprint of the project.

The design of the SEOC incorporates avoidance of existing vegetation and wherever practicable facilities have been located in existing cleared areas or areas of scattered regrowth.

ACOL will implement a biodiversity offset strategy developed in consultation with the DECCW to mitigate the remaining biodiversity impacts. This includes:

- Offsetting the clearing of EEC with like vegetation at a ratio of 2.5:1.
- Securing the offset areas in perpetuity.
- Offset the loss of hollows with the replacement of 3 nest boxes/hollows for each hollow removed.
- Enhance and manage approximately 35ha of the Glennies Creek riparian corridor.
- Revegetation of the open cut operations with suitable species to comprise a mix of grasslands and woodlands.
- Additional offsets will be provided for vegetation cleared as a consequence of realigning powerlines that traverse the SEOC Project area, these are:
  - For Option 1 - The incorporation of approximately 8.5ha of land immediately north of the existing VCA comprising relic ironbark woodland and more than 350m of creek frontage to Glennies Creek.
  - For Option 1 - The replacement of lost vegetation associated with the planted tree corridor (0.9ha), to maintain a continuous northerly vegetation corridor.
  - If Option 2 is used impacts will be mitigated through the offset of like vegetation at a ratio of 2.5:1 and secured in perpetuity utilising mechanisms such as a Voluntary Conservation Agreement with the DECCW.
- The implementation and the management of offsets will be administered through an Offset and Riparian Corridor Management Plan which will be developed in consultation with relevant government authorities.

The SEOC Project will result in the removal of some planted vegetation; however, where feasible the project design has avoided impacts to native vegetation, and has proposed an offset strategy that will result in a net improvement of biodiversity in the local area.

4.10.2 Regional Ecological Impacts

Issues

- NSW Government programs such as the Great Eastern Ranges Initiative are being compromised by the ongoing destruction of threatened vegetation and species habitat in the Hunter Valley due to open cut mine expansion.
- The Mt Owen extension approval granted in 2004 had a requirement to establish a Hunter Coalfields Flora and Fauna Advisory Committee. This condition has never been met.
- The threatened species now using the lower Glennies Creek valley cannot be further displaced because there are few areas left on the valley floor that have any intact vegetation available to meet habitat requirements.
- Rainfall has decreased dramatically due to extensive open-cut mining over the last twenty years in the upper Hunter Valley because there are no trees.

Response

The EA for the SEOC acknowledges the Great Eastern Ranges initiative and recognises the importance in improving connectivity across the Hunter Valley. The rehabilitation strategy and final landform plan have been designed to increase native species habitat and improve wildlife connectivity in the area.

The Hunter Coalfields Flora and Fauna Advisory Committee was a concept proposed within the Mt Owen development consent and in other mining consents authorised around the same time. The SEOC is a new project proposal separate (temporally, spatially and ownership wise) to the Mt Owen mine. Hence the conditions of the Mt Owen consent do not apply to the SEOC, nor did the Director-General of Planning direct ACOL to consider the conditions of the Mt Owen consent in the assessment for the SEOC.

The SEOC Project includes an offset strategy to lessen the impacts to native flora and fauna and minimise the displacement of fauna that may have been displaced by neighbouring operations. In addition, ACOL will further minimise the biodiversity impacts of the SEOC through rehabilitation of the open cut, implementing voluntary conservation agreements, making riparian corridor improvements. Management and improvement of native vegetation through rehabilitation and regeneration will improve vegetation connectivity across the valley. The SEOC has also been designed with progressive rehabilitation, this will mean that the un-vegetated area at any one time will be minimised. It should also be noted that as the NEOC is nearing completion and the rehabilitation is well advanced, these areas will also begin to form habitat for displaced fauna.

The correlation between the loss of vegetation by mining and the decrease in rainfall over the last 20 years cannot be readily proven in the Hunter Valley given the significant array of variables. Natural global climatic cycles such as El Nino and La Nina are generally attributed to rainfall pattern changes, although this is an evolving area of science. ACOL's offset strategy and rehabilitation and land management commitments meet the DECCW's maintain or improve imperatives for managing biodiversity impacts, hence the SEOC is unlikely to impact on rainfall patterns in the area.

4.10.3 Ecological Legislation

Issue

- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands are listed as Key Threatening Processes under the Threatened Species Conservation Act (1995).
- Double standards when it comes to the environment – ban on local farmers and landholders removing trees but the mine can remove hundreds of metres of trees.

Response

The EA assessed the aquatic and terrestrial ecology of Glennies Creek and the surrounding areas (*EA Appendix11* and *EA Appendix 10*, respectively). These studies determined that, based on the project design including water management measures, the project would not pose a threat to the regulated flows in Glennies Creek or existing aquatic and terrestrial species reliant on these controlled flows. River Red Gum was identified at two locations along the banks of Glennies Creek. The SEOC will not directly impact either of these River Red Gum occurrences, nor will the minor changes to the hydrological environment (i.e minor loss of baseflow) impact these trees, particularly since flows within Glennies Creek are highly regulated.

ACOL has invested significant efforts into understanding the vegetation and designing the SEOC project, which includes implementation of a strategy to offset the impacts caused by clearing. As with any other proposal to clear vegetation, ACOL has had to justify the need to clear vegetation within its project application and EA.

4.11 Visual Amenity

Issues

- Tranquil living has been replaced with visual imperfections.
- Changes to the existing landscape will become an “eye sore”.
- Location and design of the proposed mine in no way maintains a reasonable level of visual amenity to the residences on the Bowman property.
- Proposed project will despoil the scenery.
- Impacts from lighting plant and machinery, vehicle lights and lighting of the site in general. This creates sleep deprivation especially during 24 hour operations.
- Animals also affected by lighting from the mine.
- Mines threaten tourism (moonscape that is now the Hunter region).

Responses

The location of a coal mine is determined by the presence of coal which is found within the underlying geology. Other factors (natural and manmade) such as site topography, hydrology, ecology, natural hazards and the location or availability of infrastructure also play a role in determining the location of a coal mine. Clearly, a myriad of factors need to align before a coal mine can be approved, constructed and operated. The Hunter Valley is endowed with an array of natural resources, one of which is coal. ACOL has identified a coal resource within its existing tenements which is seeking approval from the government to extract on behalf of the state.

The local landscape character is heavily influenced by the areas topography, surface drainage and vegetation coverage. Major cultural modifications in the local landscape include roads, railway, power transmission lines, Camberwell village, electricity generating plants, other coal mining operations, farms and dwellings, most of which have received approval from relevant levels of government to be developed within the landscape, consistent with statutory planning for the area.

In order to reduce the visual impact of the SEOC, ACOL engaged O’Hanlon Design Pty Ltd to undertake an analysis of the area’s visual character and provide recommendations to mitigate potential visual impacts associated with the project (*EA Appendix 12*). In addition to establishing an environmental bund which mimics the natural landscape (see Section 1.3 and **Appendix 5**) and screens views from the New England Highway and Camberwell, ACOL has committed to:

- Retain existing vegetation around the new infrastructure areas and on the road fringes to the highway wherever possible.
- Select colours for the conveyor and transfer station to reduce bulk and scale.
- Soften the engineered faces of the out of pit emplacement with meandering drainage lines and modulation of the ridges and faces.
- Minimise stray light within the infrastructure areas.
- Provide shields on all floodlights in the open cut area, and where practicable direct the light away from public areas or privately owned residences.
- Install shielded lights on the conveyor system and reduce brightness.
- Task and general lighting should be screened from viewers were possible but lighting levels must always be selected to meet safe working practices.
- Where possible, after initial stripping and bund formation, program works on the north faces of the out of pit emplacement to be carried out during daylight hours and work behind the emplacement during the evenings and night.
- Where safe to do so, trucks on access roads should make use of portable visual edge markers to increase drivers’ visibility of road edges when driving with dipped headlamps.
- Remove redundant infrastructure elements and conveyors on completion.

The SEOC has been designed as a progressive mine that moves south over the seven (7) year mining period rehabilitating behind the mining operations to minimise the exposure of bare earth. The

final landform will be developed utilising software that creates a more natural looking landform that is more stable and typical of the local topography. These measures will minimise the visual impact of the development. Further ACOL have made commitments to revegetate the northern face of the overburden (i.e. the area exposed to the public on the highway) within 12 months of emplacement.

In terms of tourism the mining sector provides significant benefits to the tourism industry through the influx of people attending meetings, contracting and also employees that utilise the key aspects of the tourism industry (i.e. restaurants, events, recreational facilities and accommodation).

4.12 Heritage – Aboriginal and European

No private or special interest group submission raised specific concerns relating to Aboriginal or European Heritage.

4.13 Transport (Road and Rail)

Issues

- Traffic will increase significantly from this project.
- Access road to Camberwell will be dangerous if project proceeds.
- Construction of access to the mine will create a hazard on a busy section of the New England Highway.
- Concern about safety of school buses and visitors safety as a result of increased traffic.
- Xstrata Coal (NSW) Pty Limited note the proposed Lemington Road realignment to the existing Brunkers Lane road under existing approvals and its inclusion in the proposed Ravensworth Operations Project.
- The rail transport assessment does not include an assessment of the potential impacts of other rail users within the vicinity of ACOL operations.
- ACOL has not consulted with the owners of the Ravensworth Coal Terminal regarding the predicted impact of the proposed SEOC Project on the capacity, safety and maintenance of the Ravensworth Loop.
- The Licence Agreement does not contemplate the use by ACOL of the loop as a result of the commencement of a new open cut mine constituting the South East Open Cut.

Responses

The EA included an assessment of the interaction of the construction and operation of the SEOC with existing and future traffic volumes on the New England Highway and Glennies Creek Road (*EA Appendix 15*). This included consideration of a temporary increase in traffic during construction and the safety of local road users, including school buses. It should be noted that as this project provides a continuation of employment for existing employees at the NEOC (that is due to close), operational traffic along the New England Highway will not change.

The RTA has reviewed the EA for the project in relation to the road system and has formed the opinion that the project can proceed subject to appropriate vehicle access and conveyor design. The RTA advised a construction traffic management plan and works authorisation deed will need to be prepared to the satisfaction of Singleton Council and RTA, prior to commencement of any road works on the highway. ACOL commits to undertaking the SEOC project construction and operations consistent with the requirements of the RTA.

Further consultation with the RTA since the exhibition of the EA has resulted in the proposed main intersection to the SEOC being upgraded from a channelised right turn (CHR) and auxiliary left turn

(AUL) intersection to a rural seagull intersection that contains separate lanes for right turns into and out of the SEOC.

As indicated in Section 3.9.1, ACOL has committed to construct and operate access intersections in accordance with the requirements of the RTA. Further, ACOL has continued to consult with council and the RTA in finalising the detailed design for the site intersections and conveyor road overpass.

ACOL is committed to implementing these traffic management measures which will be designed to ensure the safe carriage of other road users during construction and operation of the SEOC.

With respect to rail transport, ACOL is aware that there are planned track upgrades to enable a greater tonnage of coal to be transported to upgraded port facilities. During the preparation of the EA, the Hunter Valley Coal Chain Logistics Team was consulted regarding rail capacity. ACOL was advised that with planned upgrades the rail line would be capable of sustaining, on average, the required one additional train per day. However this requirement is based on the ACP (SEOC, underground and CHPP) operating at maximum production. ACOL expect the increase in train movements is likely to be less than one per day, on average.

ACOL has a commercial agreement with the owners of the Ravensworth Coal Terminal and Ravensworth Loop. As a licensed user of the Ravensworth Loop, ACOL will continue to consult with the owners of this rail infrastructure to ensure its access and use is available to ACOL for the remaining life of the ACP.

4.14 Socio-Economic

4.14.1 Health Study

Issue

- There should be no more new mines or extensions to existing mines until a thorough and independent health study is conducted.

Response

ACOL is supportive of a health study being conducted for the Hunter Valley. However, its current imperative is to ensure continued employment of its open cut workforce beyond completion of the NEOC, which is currently scheduled to occur in late 2010.

ACOL is committed to the acquisition of private properties, or the implementation of reasonable and feasible mitigation measures, where noise and dust levels are predicted to exceed the impact assessment criteria.

4.14.2 People, Home, Lifestyle, Community and Region Impacts

Issues

- The mine owners do not care about the people who live here, all they care about is their profit margin.
- Personal impact on family; aspirations for home.
- Loss of lifestyle and amenity.
- Proposed project will have severe adverse effects on the local community, Singleton and the region.

Response

Since the inception of the ACP operation in 2002, ACOL has been developing and refining the management plans and implementing new management practices to minimise impacts on surrounding properties. Initiatives such as tank cleaning, water filters, trial of first flush devices, the

clean up of properties within Camberwell, donations for the restoration of Camberwell Church, and the contribution of funds for the enhancement of Camberwell illustrates the value that ACOL place on people living in the area.

The SEOC will result in the exceedance of accepted criteria at privately-owned residences in the vicinity of the project. ACOL has continued to consult with potentially affected residences, with a view to reach a mutually acceptable agreement to ensure that the impact of the project on private land owners is minimised. For the wider community (Singleton and the Hunter Region) the SEOC provides the opportunity for continued employment for 160 people, as well as employment that will be generated by construction, future maintenance works and other service industries. These aspects have a positive impact in the flow on effects to other local businesses in the region. Royalties and taxes paid by ACOL, contractors and employees to the state and federal governments are also used to fund public infrastructure, schools and hospitals that further benefit local and regional communities.

4.14.3 Employment and Royalties

Issue

- Proponent is double dipping with job figures for open cut and Mod 6 longwall projects, therefore economic justifications and assumptions are highly questionable.
- The 160 employees will have to find work after 7 year life of the project, therefore it is not unreasonable for them to make that transition now.
- The proposed development will contribute significantly to the local economy and create substantial employment opportunities within the actual mining operation and support industries.
- The development will be done with the greatest regard to the environment and especially with the community of Camberwell.
- The development application will provide further opportunities for obtaining contracts with Ashton Coal and will support the growth of our company in Singleton and the Hunter Valley.

Response

ACOL currently employ approximately 340 staff and contractors in the existing Ashton Coal Operations (consisting of the NEOC and underground operation), 160 of these are employed within the NEOC and will be directly impacted by the closure of the open cut. There is no double dipping of job figures and therefore the economic justifications and assumptions based on employment are valid as presented in the EA.

ACOL values their employees, and while they acknowledge the relatively short mine life for the SEOC, the additional 7 years of employment for these people and support of their families is still valuable to both ACOL and the employee. The existing employees have gained training and experience in the operations of the ACP and developed workplace camaraderie and team spirit that will directly apply to the SEOC, some of which would be lost if workers had to transition to different forms of employment.

Numerous submissions were received in support of the SEOC project noting the significant financial benefits that accrue to the local, regional, state and federal economies from employment, taxes and royalties. In total the SEOC Project is expected to generate $2.3 billion dollars worth of output. The development of the SEOC will provide confidence and opportunity for local businesses to grow and employ more people.

4.14.4 Justification of Project

Issues

- The net direct social, economic and environmental benefits to the State and region substantially outweigh any cost.

- The extension of an existing open cut operation in an area where mining is the predominant land use represents the highest value and best use of the land in question.
- The long term and irreparable damage to water sources and the ecological integrity of the Hunter Region caused by these proposals far outweighs their economic justification.
- The economic justification for threatening the health of Bowman's Creek, Glennies Creek and the Hunter River in a critical zone that is a major water source for other industries is completely unrealistic, poorly calculated and socially irresponsible.
- The principles of ecological sustainable development and social justice must be taken into account. The proposal has no valid justification and will cause the ongoing decline of the long term social and environmental integrity of the Hunter Region.

Response

The EA included a detailed justification for the project (*EA Section 7*), including consideration of the objects of the EP&A Act and an analysis of the project against the principles ecologically sustainable development. In addition, ACOL commissioned Gillespie Economics to undertake a Benefit Cost Analysis for the project (*EA Section 5.26.2 and EA Appendix 18*).

The SEOC project will result in a net community benefit of $368 million dollars after discounting the cost of the predicted environmental impacts of the project.

It is considered that with the implementation of impact avoidance, management and mitigation measures these community benefits will be realised.

4.14.5 Property Valuation and Purchase

Issues

- The devaluation of our land that would be created from the project.
- We are concerned for the value of our property if we find that we cannot remain as residents due to the affects of this operation, during the mines working life and beyond, due to the close proximity to our property.
- The price offered for the properties should be replacement cost and not market value.
- They claim they will pay market value but Camberwell's house and land value has fallen to the point of non-existence with the presence of mines in the vicinity.
- Concern about the ability of land owners to negotiate with large mining companies for the sale of their properties and to receive a fair outcome due to limited resources.
- There is no written or verbal agreement to purchase "Rosedale" property.
- There has been insufficient explanation given by Ashton Coal for its need to acquire A.S. Bowman's farm, which is located next to the South East Open Cut.

Responses

A review of property prices within Camberwell indicates that Camberwell properties are attracting a far higher market value than average for similar land.

Analysis was undertaken of the median prices paid for properties in Camberwell over the last 10 years. Compared to the median prices for the Muswellbrook, Singleton and Paterson areas the analysis shows that property prices prior to ACOL commencing operations in 2003 were generally below the median price for both Singleton and Paterson, and more consistent with Muswellbrook. Over the five years to 2005 the Camberwell median price has steadily increased consistent with the increase seen in the Muswellbrook, Singleton and Paterson areas. More recently in 2006 - 2008 and 2010 the median property prices for Camberwell have significantly exceeded the increases seen in the Muswellbrook, Singleton and Paterson areas. As the owner of a large number of properties in Camberwell, ACOL is also interested in ensuring that the value of the Camberwell property market is maintained, so that post-mining it can capitalise on its current housing investments.

Property acquisition negotiations between ACOL and interested landowners are based on an independent property valuation using accepted industry practice that considers the value of the land without impediment (perceived or otherwise) from the proposed project, the existing and permissible use of the land and the presence of improvements, and/or approved buildings or structures which have been physically commenced at the time of valuing. Reasonable costs are also paid to landowners for relocation and legal opinions and expert advice for determining the acquisition price of the land. In many cases the price offered by coal mines is considerably greater than market price.

ACOL has continued to consult and negotiate with surrounding landowners whose properties are predicted to be impacted by the SEOC. ACOL will use its best endeavours to enter into an agreement with the owners of the Rosedale property (property 129) or will offer to purchase the property. Portions of the AS Bowman property (property No. 130) adjoining the SEOC are predicted to be impacted by noise and dust above accepted amenity and health criteria for human habitation. The feasibility of agricultural operations and residing within the nearest dwelling in the areas most affected by the SEOC are currently being considered by the landholder and ACOL.

4.15 Rehabilitation/Mine Closure

Issue

- Rehabilitation cannot put the countryside back the way it was.
- The so called “rehabilitation” of mine sites is deplorable.
- Trees will never grow to the age and size of those destroyed.
- The repair work is not moving as fast as the new mines commence.
- They don’t rehabilitate the area with the same trees they cut down.
- Regardless of any rehabilitation to the mine, surrounding country side will remain scarred for eternity and less desirable for any prospective purchaser of our property.

Response

A conceptual rehabilitation strategy (refer to *EA Plan 69*) has been prepared for the SEOC to guide the future rehabilitation of the mine site. The strategy involves the planting of native woodland corridors (generally consistent with existing vegetation communities) across the mine site linking existing remnant vegetation with the remaining areas will be prepared to support grazing of livestock. The strategy will be realised through the implementation of a Landscape and Revegetation Management Plan that will describe rehabilitation objectives and completion criteria on which the success of the mine site rehabilitation will be assessed and reported annually.

In addition, a significant bond will be held by the government (I&I – Minerals) to ensure the rehabilitation objectives for the project are met. In the event these objectives are not met, ACOL will be given the opportunity to make good the works or forfeit the bond.

The SEOC has been designed to allow progressive rehabilitation commencing in the north adjacent to the New England Highway. The progress that ACOL has made in the rehabilitation of the NEOC is clear evidence that in time the rehabilitated landforms can blend into the surrounding lands. Lessons learnt at the NEOC, at other Hunter Valley coal mines and through industry, academic and government research initiatives will be applied to the rehabilitation of the SEOC.

ACOL’s commitment to the application of best practice rehabilitation is demonstrated through its participating in a current ACARP project which is assessing the use of different rehabilitation design methods and technologies to develop stable and visually aesthetic landforms. One of these methods is a natural regrade technique which has been integrated with a computer based design model to guide the design of the final landform. The natural regrade landform rehabilitation design technique is based on the elements of surrounding natural landform features, including mimicking surrounding topography, ridge and spur slopes, slope break points, sub-catchment extents and drainage gradients while taking into consideration the material types available for landform reconstruction and

natural erosion processes. ACOL is actively designing the SEOC final landform using this software with a view to providing a more natural final landform (see **Appendix 5**).

ACOL acknowledge that the creation and re-establishment of native vegetation on a mine site will take considerable time, however, with the implementation of the above strategy the rehabilitation of the SEOC will be progressive and provide a final landform that is stable with a self sustaining diverse landscape.

In addition the final landscape will serve to provide increased native vegetation cover and native fauna habitat, as well as providing areas suitable for stock grazing.

4.16 Project Design

4.16.1 Location, Operating Hours and Tailings Disposal

Issue

- Life will become unbearable for residents living in close proximity to the mine that will be operational 24 hours per day.
- Environmental bund will not shield Camberwell village or neighbours from dust, blasting, noise, etc.
- The distance of the project to Glennies Creek and Camberwell village is too small.
- The mine plan to remove the ridge to allow access to the coal seams will create massive volumes of dust. The southeast summer winds will blow it straight down into Camberwell village.
- XCN seek clarification of further details for the long-term capacity for management of additional reject and tailings material in the Ravensworth voids.

Response

As briefly described in Section 1.3, ACOL has revised the operating hours for the first 12 months of operations, during the construction of the environmental bund. This operational change, in conjunction with additional property acquisitions by ACOL, has reduced the predicted number of privately-owned residences potentially impacted (i.e. within noise or dust management or acquisition zones) by the SEOC from 29 to 15 since the EA was exhibited. ACOL is continuing to consult with potentially impacted residences to determine a mutually acceptable outcome, including implementation of mitigative measures, where practicable, temporary relocation or property acquisition. ACOL has made a commitment to purchase properties affected in excess of impact assessment criteria where requested by the landowner. In addition ACOL will continue its existing offer to purchase any property within Camberwell Village (whether impacted by the project or not) for market value where requested by the landowner.

The location of a coal mine is dependent on the geology and the available coal resource. The SEOC is located south of Camberwell and will result in the removal of overburden to access the coal seams, changing the natural topography. The final landform proposed will in most areas be higher than the existing topography and once established will not be a source of dust into Camberwell. Air quality modelling has predicted that receptors north of the mine within Camberwell will be impacted above criteria and where requested by the landowner will be acquired by ACOL. ACOL has designed the SEOC based on detailed hydrological studies that have determined the proposed buffer from Glennies Creek is sufficient to limit significant impacts.

ACOL has an agreement with Macquarie Generation (the owners of the Ravensworth void) for continued emplacement of ACP tailings in the Ravensworth Void. When this void reaches capacity ACOL will then use the NEOV void and SEOC void for tailings emplacement.

4.16.2 Powerline Realignment

Issues

- New power line will take part of farm, affecting amount of feed for livestock.
- High voltage power lines need to be distant from electric fences used to feed cows.
- Location of realigned power lines has the potential to disrupt access to an existing high pressure hose irrigator
- Working under and around the power lines long term causes serious concern for health and safety of residents and employees.
- New power line route occurs on the edge of an unstable creek bank.

Response

The Option 1 powerline alignment (the currently preferred option) traverses the eastern side of the ACP underground mine longwall panel 1 footprint before crossing southeast across Property 130 connecting with the existing easement. The powerlines will not significantly alter the productivity of the land on the western side of Glennies Creek, however it will require those working the land to be vigilant in movement of machinery and use of irrigators, as well as avoiding running electric fences parallel with the powerlines.

The southern 132kV line for Option 2 traverses a thin section of alluvial land along the western side of the open cut. In the event that this option is selected consideration will be given to the farming practices that could occur beneath the power lines.

ACOL will continue to consult with affected private landowners to determine the most appropriate mitigation measures to reduce the potential impacts to the farming enterprise and those working the land. The detailed design of the powerline will allow for some variation in the alignment to lessen impacts to the agricultural use of the land.

The design of the powerline route will be undertaken by Energy Australia (the asset owner) and will need to be cognisant of the stability of the creek bank, variation in spans between power poles provides flexibility in the placing of power poles.

4.17 Camberwell

Issues

- 150 years of history will be gone for the Camberwell village.
- This project, being so close to Camberwell, will have to have significant effect on the air quality of the village.
- Camberwell being the lowest point of reference would be the holding point of pollution (dust).
- The area proposed to be mined is open to the village. The land sloping north will allow dust to fall directly onto the village.
- Camberwell residents have no idea who ACOL is renting residences to. Sense of community has deteriorated, therefore having to increase security, live with rubbish generated by tenants, etc.
- Camberwell well suited in location for commuting to work; having to relocate further away would be expensive and time-consuming.

Response

Camberwell is located within a convenient location adjacent to a permanent waterway and main transport corridor close to Singleton and the mining and power industries. ACOL recognise these and other qualities and has developed a strategy to maintain and enhance Camberwell into the future (*EA Section 5.26.7*). As the largest property owner in Camberwell, ACOL has a vested interest in maintaining its housing stock to ensure that Camberwell is maintained, post-mining. ACOL's strategy for Camberwell includes implementing improvement works to enhance the area. These

improvements will be developed in consultation with the residents of Camberwell, Singleton Council and other interested stakeholders.

The EA acknowledges the effect the SEOC will have on the air quality in Camberwell. ACOL has made a commitment to manage its operation so that offsite dust emissions are kept to a minimum wherever possible. However, dust generating activities in close proximity to Camberwell in the early establishment phase of the project will be unavoidable. ACOL has also made a commitment to acquire affected properties where SEOC impacts are above relevant impact assessment criteria.

As part of its strategy to minimise the impacts of the SEOC on private residences ACOL has acquired a substantial number of properties in Camberwell. ACOL currently provides these houses to mine employees, including senior management staff, or as rental properties in the open Singleton rental market. Rental properties are managed by a well respected local Singleton Realestate agent. Tenants entering into a rental agreement with ACOL go through the same checking and verification process applied to rental properties elsewhere in the Hunter Valley, and are required to maintain the properties to the same level as rental properties elsewhere in the Hunter Valley. As with any landlord ACOL has no requirement to consult with owners of private residents neighbouring its properties prior to renting a residence. As with many communities where the occupation of properties change, the bonds between neighbours and a sense of community take time to develop.

4.18 Cumulative Impacts

4.18.1 Cumulative Noise and Dust Impacts

Issues

- A little bit of dust from each mine in area, but together residents are being slowly poisoned from pollutants in the air.
- Where is our accumulative impact study and the results.
- Unsatisfactory that the EA should have gone on exhibition before the Camberwell Cumulative Impact Study has been released for community and expert evaluation.
- The noise levels increase with every new mine or extensions.
- The cumulative effect of so many mines plus three coal fired power stations concentrated in the Muswellbrook and Singleton shires need reviewing.
- Cumulative impacts by Ashton and the surrounding mines will have adverse effects on the whole village.

Response

The EA included assessment of the cumulative dust and noise impacts in the area incorporating impacts from surrounding mines including the existing NEOC and the proposed SEOC (*EA Sections 5.5 and 5.8 respectively*). As previously described, ACOL has made a commitment to purchase properties affected by the SEOC above the accepted impact assessment criterion at the request of the landowner. Properties predicted to be impacted by other mines (e.g. Glendell, Integra) will have certain rights for mitigative measures to be applied to their residence, or to have their property acquired by that company, in accordance with the particular mines development consent or project approval. Where impacts are attributable to more than one mine, ACOL will use its best endeavours to jointly acquire that property in conjunction with the other mines, if requested by the landowner.

The Independent Review of Cumulative Impacts on Camberwell Village was due to be publicly released in July 2009. ACOL and its technical specialists have consulted with the independent experts conducting the cumulative study and have incorporated salient aspects of that consultation within the respective assessments. The EA was accepted for public exhibition by the DoP in November 2009. As of May 2010 the outcomes of the cumulative study have not been publicly released. ACOL has no control over the release of the Independent Review of Cumulative Impacts

on Camberwell Village. The SEOC EA has included assessment of the cumulative dust and noise impacts and taken account of consultation with the independent experts conducting the assessment, and as such ACOL do not believe that the determination of the SEOC project should be delayed by the delay in the release of the Independent Review of Cumulative Impacts on Camberwell.

ACOL has partnered with DECCW and other coal and power industry companies to fund the Upper Hunter Air Quality Monitoring Network that will continuously measure dust particulates in the air at up to 14 sites throughout the region. Air quality data from the monitoring network will be accessible 24 hours per day via the DECCW's website.

The SEOC project represents a continuation of mining as opposed to an expansion. As the SEOC commences the existing NEOC will draw to a close. However, there will be a short period of time when noise and dust generating activities will over lap between the two projects. However, this will be limited and ACOL is proposing to ramp up the SEOC in a staged manner with reduced operating hours, and limited equipment while the NEOC winds down. Following completion of mining in the NEOC, currently scheduled for late 2010, the resulting cumulative impacts will be subsequently reduced.

4.18.2 Cumulative Ecological and Water Impacts

Issues

- The cumulative impact of ongoing removal of vegetation of any age and condition in this section of the Hunter valley is major and must not be approved for a project with a 7 year life span.
- The destruction of alluvial aquifers, connectivity between surface and groundwater systems and diversion of natural creek beds in the Hunter Region is not considered in any form of planning framework that recognises cumulative impacts or irreplaceability.

Response

The SEOC Project includes a rehabilitation and offset strategy to lessen the impacts to native flora and fauna and minimise the displacement of fauna that may have been displaced by neighbouring operations. The strategy that includes rehabilitation of the open cut, voluntary conservation agreements, riparian corridor improvements, vegetation management and native vegetation regeneration will improve native vegetation connectivity across the valley. In addition, the SEOC will be progressively rehabilitated so that the amount of un-vegetated area at any one time will be minimised. It should also be noted that as the NEOC is nearing completion and the rehabilitation of that pit continues, additional areas of habitat will become available for displaced fauna.

The groundwater assessment for the EA (*EA Appendix 5*) includes an assessment of the cumulative impacts of the SEOC and surrounding mines on local groundwater sources. As described in the EA and in Sections 4.6 and 4.7, the SEOC will not adversely impact on surface water flows within the regulated Glennies Creek, its connected alluvial aquifer or on the integrity of these water sources.

4.18.3 Broad Coal Mining Impacts

Issues

- Previous and existing mines in the area – history has shown it has affected all residents greatly.
- Mines threaten food production and tourism.
- There has been a lack of research on the long term effects of open cut mining in the Hunter Valley on the NSW environment and economy.
- A thorough survey of existing health problems in the area must be done and scientific opinion obtained about the likely increase in such problems and the cost to the community of dealing with these problems.
- There is evidence already in existence in the Upper Hunter to the adverse effect that mining has had on salinity levels in streams eg. Wybong Creek.

Response

ACOL recognises the impacts of mines near residential receptors and has committed to acquire affected properties at the request of the landowner. However, ACOL also recognise the significant benefits that coal mining has on the economic prosperity of the local community and the Hunter Region.

Natural resource management requires approval authorities to balance the use of natural resources, be it agriculture, coal mining, or conservation, against the impacts and benefits of the proposed land use. The SEOC provides considerable economic benefit for local regional and state economies at the cost of a relatively small agricultural impact (beef and dairy production), in the context of agricultural production in the Hunter Valley and NSW as a whole.

The rehabilitation strategy for the SEOC includes returning mine disturbed land to a condition suitable to support grazing. The impact of the SEOC on potential agricultural land use will be temporary, as mine disturbed land will be progressively returned to either native woodland or grazing land. The alluvial lands adjacent to Glennies Creek will be made available for agricultural use by ACOL, where safe and practicable.

Mining operations act as a significant catalyst for the construction and continued operations of tourist facilities both within the economic profile areas of Singleton, Cessnock, Maitland and Muswellbrook. Importantly, the tourism sector within Singleton has expanded in part to satisfy the demand for accommodation and food services associated with construction and visitations to the mines for business and service purposes.

ACOL has made commitments to establish an offset strategy with associated management plans that will form part of a Project Approval. Regulation and compliance of coal mines with Project Approval conditions is generally maintained through independent audits and yearly reporting of monitoring, rehabilitation and production. The DoP, where appropriate, will enforce fines and penalties against the mining company in the event of non-compliance with conditions of Project Approval.

ACOL support the conduct of research into health impacts of coal mining in the Hunter Valley.

Several studies have been undertaken in the Hunter Valley reviewing coal mining and its associated impacts this has included:

- *The Upper Hunter cumulative impact study and action strategy* prepared in 1997 by the Department of Urban Affairs and Planning (now NSW Planning) included consideration of a wide range of cumulative impacts in the upper Hunter and proposed 39 action requirements. Many of these actions appear to have been initiated, however some are ongoing.
- *Strategic Study of Northern New South Wales Coalfields* prepared in November 1999 by the Minerals Consultative Committee included a series of recommendations on transport infrastructure, environmental issues, subsidence, water, land use issues, community consultation and impacts, employment and rehabilitation.

The SEOC environmental assessment included an economic assessment of the SEOC project and a benefit cost analysis of the project in the context of predicted impacts and community benefit. The analysis concluded the project would result in a net community benefit of $368 million. Coal mining across NSW has a significant impact on the economic prosperity of the state.

In the longer term the impacts of coal mining on the environment will be relative to the effectiveness and implementation of environmental management plans, in particular with regard to the rehabilitation of the site.

As described in the EA (*EA Appendix 6*), the SEOC incorporates water management plans for the management of water across the site and protection of waterways. In the longer term groundwater modelling indicated that groundwater levels, once recovered are likely to result in a negligible to slight reduction in salinity within Glennies Creek (*EA Appendix 5*).

4.19 Environmental Assessment Report

Issues

- There is not enough information on the potential damage for the open cut to be approved.
- One would have to have a degree in just about everything to understand the environmental assessment volumes which the powers that be put out for us mere mortals who are expected to read 5 or 6 volumes 2" thick and we think it is all B.S. anyway.
- The SEOC Environmental Assessment Report fails to adequately identify the nature of the alluvium in the lower reaches of Glennies Creek.
- The EA produced for this unsustainable development proposal is highly inadequate and fails to identify and address key critical impacts.
- The paucity of recordings in the Environmental Assessment of threatened species known to use the area covered by the mine exploration licence is an indication of the report's many inadequacies.

Response

The EA for the SEOC has addressed the Director-General's (of Planning) environmental assessment requirements (DGRs) to a standard acceptable to the DoP, The EA includes a comprehensive assessment of the key issues identified in the DGRs, including an assessment of land and agricultural suitability, ground and surface water and flora and fauna, which were undertaken in accordance with government and industry impact assessment guidelines. These assessments were undertaken by technical specialists experienced in their field of endeavour. The EA was deemed to be adequate by the DoP and other relevant government authorities, which culminated in the EA being publicly exhibited.

4.20 Existing ACOL Operations

4.20.1 Existing Dust Noise and Blasting Impacts

Issues

- Camberwell village now experiences high levels of dust, noise and vibration.
- At present we are putting up with the lights and the constant hum/drone of your trucks and shovels and the clatter of dozer trucks and not to mention the earth shuddering shakes that our house is copping from the blasts that you are letting off.
- As a result of the blasting, my home improvements, most noticeably the cracks appearing, have also been accelerated however upon Ashton inspection their reports conclude that the house has moved because of the weather been hot and cold.
- The existing Development Consent stated no mining after 10.00pm. But the noise continues all night because the trains are loaded at night.

Response

Noise, dust and vibration within Camberwell have been assessed within the EA for the SEOC, including potential cumulative impacts. These studies identified that existing noise and dust levels as a result of surrounding mines, industry, agriculture and the New England Highway were nearing the accepted criteria. With the closure of the NEOC, movement of the SEOC to the south, and the SEOC being removed from the prevailing wind axis's the impacts from ACOL operations on Camberwell will reduce. ACOL has a long standing voluntary offer to purchase properties within Camberwell when requested by landowners.

Noise, dust and vibration perceived within Camberwell emanating from a north westerly direction may not only be attributable to the ACP (where mining is conducted for 15 hours per day only) but

potentially also to the Glendell operations (a 24 hour per day operation) to the northwest of the NEOC.

Blasting within the NEOC is monitored by blast vibration and overpressure monitors established near the St Clements Church and within Camberwell. In the initial years of mining within the NEOC, blast criteria at the church were exceeded on occasion. However, at no point in the mining of the NEOC has the 5mm/s criteria been exceeded, it is noted that the standard criteria for vibration at residential buildings is 10mm/s. Further, as mining has progressed and greater understanding of site specific ground conditions has been gained, ACOL has been able to design and manage blasts to ensure that it complies with the required 2mm/s blasting ground vibration levels at all residences within Camberwell which is less than the industry standard (5mm/s) which has been applied to all other operations with the potential to impact on Camberwell. This experience will be carried over and applied to the SEOC operation.

Where concerns of blast related impacts have occurred, ACOL has commissioned independent consultants who have made assessments and conclusions. The findings of these independent consultants have been supplied directly to the property owners and have not been changed by ACOL.

ACOL's existing development consent permits the loading of trains and use of the CHPP 24 hours per day, 7 days per week. The operation of these facilities is required to be within the noise impact criteria set for the project within the development consent.

4.20.2 Existing Water Related Impacts

Issues

- The tank water being grey and causing residents to have stomach problems, the water was tested and did not meet Australian standard, and this was never a problem till Ashton started mining too close to the village.
- The existing operation has cracked the creek and allowed uncontrolled inflow of first alluvial then river water into Longwall 1 of the underground operation.
- The current mining operation already has a significant impact on the integrity of the lower Glennies Creek water source.

Response

There has been no supporting evidence to suggest that mining impacts have caused tank water within Camberwell to become unsafe to drink however as described in Section 4.15.2, ACOL has responded to Camberwell residents concerns over tank water quality through the initiation of several measures, including offering annual tank cleaning services and installation of water filters. ACOL will continue to offer these services to all residents in Camberwell for the life of the SEOC.

The existing longwall operation encountered water inflows within the development stage of first workings for Longwall Panel 1. These inflows were not due to the cracking of the creek as no subsidence movements had occurred at that time. The inflows have been continually monitored and reported to relevant government agencies as required by ACOL's standard reporting requirements. The encountered mine inflows are within the predicted limits described in the EIS for the ACP (HLA, 2001) and are consistent with the development consent for the mine. These inflows have steadily reduced, as was predicted in the EIS despite the ongoing mining operations. ACOL holds water licences against which it offsets the inflows to the underground. The SEOC will not adversely impact on Glennies Creek.

4.20.3 Cracking of Common and Mining Proximity

Issues

- Mining 500 metres to homes is absolutely absurd.

- The cracking on the common was mishandled by Ashton.

Response

The existing NEOC is located within 500m of Camberwell, and has remained within 1000m of residences from the mining commencement to closure. In contrast, the SEOC commences within 500m of Camberwell, but within 2 to 3 years mining operations will be more than 1000m south of the village.

In consultation with the relevant government agencies ACOL has proactively managed and remediate the impacts of the ACP including surface cracks on the Common. In consultation with geotechnical experts, ACOL has since altered its NEOC mine design to avoid further cracking of the Common and has coordinated the repair to the observed cracks.

4.21 Other

4.21.1 Mobile Phone Coverage

Issue

- Project will make mobile phone coverage worse, since Ashton placed bund behind property, no mobile phone reception at home.

Response

A review of Optus and Telstra network coverage indicate that coverage is available within Camberwell, however both Telstra and Optus advise that local obstacles such as road cuttings, trees, buildings, concrete walls and hills can affect coverage. Optus and Telstra network phones have been tested in the village and surrounds and in most areas were found to have reception. Several changes have also occurred to the mobile network since the construction of the existing ACP's eastern emplacement (i.e. CDMA to NEXTG), which may have changed available coverage.

The construction of the SEOC emplacement would not be anticipated to significantly change reception for the majority of dwellings. Notwithstanding the apparent change in mobile coverage, Camberwell is well serviced by hard wired telecommunications that will not change as a result of the SEOC emplacement.

4.21.2 Other

Issues

- Object to another seven year extension as the first mine was for seven years and they would be gone eliminating pollution.
- Political donations were not placed on the submission by the owners and previous owners, and this constitutes a conflict of interest and how will the residents get a fair deal.
- Close proximity of the lease to our property boundary (less than 2km).

Response

ACOL is required under the terms of its exploration licences to fully explore and develop available coal resources within the bounds of the exploration licence area. The SEOC represents a product of the exploration where ACOL believe the coal resource can be recovered in an environmentally and economically responsible manner. The SEOC also represents continued employment for over 160 people.

ACOL has disclosed in full all political gifts and donations in accordance with Section 147 of the EP&A Act.

The location of the SEOC is dependent on the underlying geology. Environmental, social and other physical constraints have been considered within the mine design and associated mitigation measures proposed where impacts could not be reasonably avoided. ACOL has committed to acquire any property where it is predicted or demonstrated that the SEOC will cause adverse impacts above relevant impact assessment criteria.

5 REVISED STATEMENT OF COMMITMENTS

Following consideration of the issues raised in submissions on the EA, ACOL has revised its commitments for the project. The revised statement of commitments is summarised in **Table 7**. These commitments replace the statement of commitments provided in Section 6 of the EA.

Table 7: ACOL commitments for the SEOC Project.

Item	Description	Timing
5.1.1	General Commitments	
A1	ACOL will construct and operate the SEOC project in an environmentally responsible manner and use its best endeavours to implement best practice environmental management procedures, wherever reasonable and feasible.	For the life of the project.
A2	To ensure that the SEOC project operates with environmental safeguards in place during its life cycle, ACOL will prepare and implement a comprehensive Environmental Management Strategy for the SEOC, including environmental management and monitoring plans.	For the life of the project.
A3	ACOL commits to construct, operate and manage the ACP and SEOC as one coal mine complex in an environmentally responsible manner in accordance with the ACP Development Consent (as amended), the SEOC Project Approval and all other applicable approvals.	For the life of the project.
A4	ACOL commits, to the extent practicable and as may be required by the Director-General, to apply for and obtain further approvals (single or integrated), licences and/or authorities as are required for the operation of the ACP and SEOC.	For the life of the project.
5.1.2	Land Acquisition	
B1	ACOL will purchase affected properties (if so requested by any affected private landholder) in accordance with the conditions of Project Approval.	Where requested by the landowner.
B2	Where a private property is impacted by the ACP/ SEOC and a neighbouring mine to such an extent where cumulative impact criteria are exceeded, ACOL will, on request from the landowner establish a mechanism for joint acquisition.	Where requested by the landowner.
5.1.3	Property Impacts	
C1	ACOL will provide to the landholder or the tenant of properties that are predicted to be impacted by the SEOC information pertaining to the potential health impacts of particulate matter (such as NSW Health "Mine Dust and You" brochure, available at http://www.health.nsw.gov.au/pubs/2005/mine_dust.html, or its equivalent).	Prior to commencement and prior to establishing a new tenancy lease.
C2	ACOL will advise landholders and tenants where monitoring indicates that SEOC noise or dust levels exceed project approval impact assessment criteria at the affected residence.	Upon confirmation of monitoring results.
C3	Where tenants choose not to reside within an ACOL owned dwelling due to concerns of dust or noise, ACOL will permit the tenant to break the lease agreement and vacate the property. Vacant properties will be maintained by ACOL so as not to degrade the quality of housing stock, and to ensure Camberwell is sustained beyond mining.	Upon request.
5.1.4	Air Quality	
D1	Develop and implement an Air Quality Management Plan (AQM) for the SEOC.	Before commencement.
D2	Implement an air quality monitoring network to maintain compliance with Project Approval.	In accordance with

Item	Description	Timing
		management plan.
D3	Construct the environmental bund (and out of pit emplacement) with undulating ridges, faces, gullies and spurs to minimise wind entrained dust.	During bund construction and out of pit emplacement.
D4	Enclose conveyors in a profiled coloured steel cladding.	During construction.
D5	Disturb only the minimum area necessary for mining.	At all times.
D6	Reshape, topsoil and rehabilitate completed overburden emplacement areas as soon as practicable.	At all times.
D7	Maintain coal handling areas / stockpiles in a moist condition using water carts to minimise wind-blown and traffic-generated dust.	At all times.
D8	All roads and trafficked areas will be watered as required using water trucks to minimise the generation of dust.	At all times.
D9	All haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.	At all times.
D10	Obsolete roads will be ripped and re-vegetated.	As required.
D11	Long term topsoil stockpiles will be re-vegetated.	At all times.
D12	When drilling: • Dust aprons will be lowered. • Drills will be equipped with dust extraction cyclones, or water injection systems. • Water injection or dust suppression sprays will be used when high levels of dust are being generated.	At all times.
D13	When blasting: • Meteorological conditions will be assessed prior to blasting. • Adequate stemming will be used at all times.	At all times.
D14	Investigation where appropriate of: • The use of chemical dust suppressants. • The benefits of installing permanent water sprays on haulage roads for improved dust control. • Additional screens and sprays on infrastructure and or equipment to reduce dust emissions in material handling.	As required/ where emissions are problematic.
5.1.5	Greenhouse Gas Emissions	
E1	Investigate the potential for energy savings, including: • Use of hybrid diesel/LNG engines for future replacement of mining fleet. • Use of biodiesel blends as an alternate fuel. • Use of heat pump hot water and air conditioning systems. • Efficiencies of the specified transformers and look at cost/benefits of upgraded equipment. • Use of payload information to ensure that maximum efficiency of the haulage trucks is consistently achieved. • Implementing a fuel monitoring and database management system to track diesel use for major equipment. • Install high efficiency lights with photo-sensors and timers where safe to do so.	Prior to upgrading equipment and facilities or negotiating supply contracts.

Item	Description	Timing
	Where reasonable and feasible ACOL will implement identified energy savings measures.	
E2	Ensuring operators are trained to understand the importance of energy efficiency and the use of specific equipment.	During operations.
E3	Specifying the use of energy efficient equipment and ensure that pumps are sized correctly in operational facilities.	During operations.
5.1.6 Noise & Blasting		
F1	Prepare and implement a Noise Management Plan to (NMP) for the SEOC.	Before Commencement.
F2	Undertake quarterly attended monitoring at the nearest sensitive private dwellings to determine compliance with project criteria.	In accordance with NMP.
F3	Maintain equipment and machinery in good working order.	As required / specified by manufacturer.
F4	Maintain haulage roads in good condition free of pot-holes or unnecessarily rough areas to reduce haulage related noise.	At all times.
F5	Provide awareness and understanding of construction noise issues through site inductions for all staff, contractors and visitors to the SEOC, including highlighting of noise reducing universal work practices including: • Avoiding shouting/yelling, unless required for safety. • Reducing or avoiding the use of stereos outdoors. • Avoiding of slamming vehicle doors. • Avoiding dropping materials from height.	When people are entering site for first time.
F6	Use and operation of equipment to: • Reduce throttle settings and turn off equipment when not being used. • Avoid metal to metal contact on equipment. • Where possible use quieter equipment (e.g. rubber wheeled tractors instead of steel tracked tractors), in situations where either piece of equipment will suit the purpose.	As required.
F7	During purchase of new equipment. • Specify noise attenuation in mobile plant supply contracts (e.g., grid box silencers and modified mufflers to dump trucks and modified mufflers to excavators). • Install broadband reverse alarms to machinery that regularly reverses (e.g. bull dozers and front-end loaders).	During purchase.
F8	Measurement of sound-power levels of mobile plant and equipment.	Within 1 week of machinery being used on site.
F9	Ensure design and construction of infrastructure employs appropriate noise suppression methods.	During Design and Construction.
F10	Implement a 500m or risk based blast exclusion zone.	Prior to blasting
F11	Provide notifications the morning of the blast to those requested to be on the blast notification list.	Prior to blasting
F12	Develop and implement a Blast and Vibration Management Plan (BVMP).	Prior to blasting.

Item	Description	Timing
5.1.7 Groundwater		
G1	Prepare and implement a Groundwater Management Plan (GWMP) for the SEOC.	Within 12 months of commencement.
G2	The GWMP will incorporate: • A Groundwater Response Plan comprising "trigger levels" for selected sites to assess monitoring results based on groundwater levels, inflows and water quality. • Monthly monitoring of groundwater mine inflows from all open cut sumps. • Monthly monitoring of extracted groundwater quality including EC and pH of water pumped from the mine and/or from dewatering, or open-cut sumps. • Quarterly sampling of water transferred from the mine, or open-cut sumps for hydrochemical analysis. • Monthly monitoring of water levels in the network of monitoring bores.	As specified.
G3	Implement audits and data reviews: • Annual review of monitoring data by an approved experienced hydrogeologist to assess the impacts of the project on the groundwater resources, and compare impacts with the groundwater model predictions. • Two years after the commencement of coal production undertake a modelling post-audit, in accordance with industry best-practice (MDBC, 2001), and if necessary the model be recalibrated and confirmatory forward predictions made at that time. • Undertake further post-audits during the fourth or fifth year of mining, as this represents the most vulnerable time in relation to potential inflows from Glennies Creek.	As stated, annually, 2 years, 4 or 5 years.
G4	Implement measures of the Groundwater Response Plan in the event of unforseen adverse impacts to groundwater levels, inflows or quality.	As required.
5.1.8 Surface Water		
H1	Prepare and implement a Site Water Management Plan (SWMP) for the SEOC.	Before commencement.
H2	Implement a monitoring program comprising: • Monthly sampling of the on-site dams (sediment dams and select clean water dams). • Monthly sampling of all surface water monitoring sites. • Comprehensive sampling of both onsite dams and monitoring sites on a quarterly and annual basis.	At all times.
H3	Add additional monitoring site on Glennies Creek immediately downstream of the SEOC project area.	Before commencement.
H4	Monitor all key water movements around the mine site. Monitoring will be recorded on a minimum monthly basis or following significant rainfall events.	Monthly and following significant rainfall.
H5	Monitor dam storage levels. Dam levels will be assessed on a monthly basis and following significant rainfall events.	Monthly and following significant rainfall.
H6	Maintain and operate the ACOL weather stations.	At all times.
H7	Inspection of all dams, drains and culverts on a monthly basis and following significant rain.	Monthly and following significant rainfall.
H8	Inspection of rehabilitation areas on a monthly basis and following significant rain.	Monthly and following significant rainfall.

Item	Description	Timing
H9	Undertake routine maintenance of: • Accumulated sediment from dams and drains as required. • Underperforming rehabilitation areas as required. • Erosion control measures as required. • Wastewater management system. • Sediment chamber and oil and grease trap treating runoff from the hardstand area.	As required.
H10	Use the water balance to monitor the performance of on-site water management and to upgrade or change water storages and other water management provisions that may be required at the site.	Annually
H11	Reconstruct drainages and Tributary 4 through the post mining landscape.	During construction of Tributary 4.
H12	• In the event of operational water shortages, ACOL will implement the following measures: • Obtain additional water extraction licenses. • Reduce the throughput through the CPP, which accounts for approximately 70% of the water usage. • Or reduce production levels., as a last resort	As required.
H13	In the event of unforseen adverse impacts ACOL will: • Increase monitoring frequency and sampling points to identify and confirm the source of any suspected degradation to water quality. • Review the SWMP in order to identify opportunities to improve or rectify any identified problem. The data collected as part of the monitoring programme will enable fully informed decisions to be made. • Provision of flocculation equipment on sedimentation ponds to improve the rate of sedimentation. • Augment the sediment dams to create greater retention volume and residence time to increase the capacity for suspended sediment to settle out. • Increase pumping capacity at each of the sedimentation ponds to minimise the potential for sediment laden discharges from the ponds. • If any component of the surface water management framework is identified as creating an unacceptable environmental impact, remedial actions will be established in close liaison with the relevant authority.	As required.
5.1.9 Flooding		
I1	Develop a Flood Evacuation Plan (FEP) for the SEOC.	Prior to mining in an area below the 1 in 100 ARI.
I2	Temporarily cease mining operations if flood levels in either the Hunter River or Glennies Creek are expected to meet or exceed a safe water level. The safe water level will be determined as part of the detailed design of the levee system and specified in the Flood Evacuation Plan.	As required.
I3	In the event of an extreme flood, all personnel will evacuate to the office and workshop facilities area located above the estimated Glennies Creek Dam break flood extent.	As required.
I4	The levee system is to be inspected and certified as adequate by a qualified engineer after a 1 in 20 ARI flood event.	As required following flood.

Item	Description	Timing
I5	The flood protection levee will be designed to resist scour due to flood flows based on the peak overbank flow velocities for the 500 year recurrence flood. The levee should consist of at least a grass covered embankment with localised rock armour sections where required.	During construction.
5.1.10 Soils		
J1	Prepare and implement an Erosion and Sediment Control Plan (ESCP) and Soil Stripping Management Plan (SSMP) for the SEOC.	Before Commencement.
J2	Where possible do not strip topsoil in overly wet or dry conditions.	During construction and operations.
J3	Strip topsoils to depths generally specified within EA Table 5.37.	During construction and operations.
J4	Limit rehandling of topsoil resources by using recovered topsoil immediately, where practicable.	During construction and operations.
J5	If the soil is to be stockpiled for an extended period of time, the stockpile height will generally not exceed 3m and the stockpile will be revegetated.	During construction and operations.
J6	Maintain a topsoil inventory.	During construction and operations.
J7	Apply appropriate soil ameiliorants such as superfine lime, gypsum fertiliser and/ or use of imported organic materials such as recycled wastes or biosolids.	As required
5.1.11 Acid Rock Drainage		
K1	Monitor key seepage, pit water and drainage from overburden materials and washery waste materials for indicators of ARD and salinity.	As required.
K2	Monitoring to include analysis of pH, EC, Sulphate (SO_4) and acidity/alkalinity, with follow up multi element testing if any low pH conditions (<5.0) are detected.	As required.
5.1.12 Flora and Fauna		
L1	Prepare and implement a Flora and Fauna Management Plan (FFMP) for the SEOC.	Before commencement.
L2	Undertake targeted surveys for nest sites within the woodland prior to vegetation clearance, with any nests belonging to threatened species identified to be protected or relocated if possible.	Before clearing.
L3	Undertake pre-clearance inspections to locate and mark potential habitat trees and verify number and type of hollows to be removed.	Before clearing.
L4	Avoid vegetation clearing where possible in spring when the threatened birds and arboreal mammals assessed are likely to have young in the nests.	Before clearing.
L5	To allow for or encourage dispersal of fauna, vegetation should be selectively cleared around habitat trees or nest trees. Habitat trees should be felled a minimum of 24 hours later.	During clearing.
L6	Employ a suitably qualified animal handler or ecologist when clearing identified habitat trees, in order to safely capture and relocate disturbed resident fauna.	During clearing.
L7	Where possible relocate any fallen timber and dead wood to the riparian corridor, rehabilitation area or offset area.	During clearing.
L8	Fence the riparian corridor to exclude cattle and define the extent of clearance.	Before commencement.

Item	Description	Timing
L9	Locate and fence the River Red Gum to the drip line to ensure no direct or indirect impacts during construction and ongoing maintenance.	Before commencement.
L10	Rehabilitate disturbed areas to minimise erosion and weed invasion.	As required.
L11	Revegetate disturbed areas using species from an acceptable level of local provenance except where this is not practicable.	As required.
L12	Undertake weed and pest management over those lands controlled by ACOL.	As required.
L13	Conduct annual surveys within rehabilitated and revegetated areas.	As required.
L14	Enhance and manage a corridor of vegetation approximately 100 metres wide (i.e. ~20m both sides of creek) along the length of Glennies Creek adjacent to the SEOC project area, equating to an area of approximately 35 ha.	Within 3 years of Project Approval, subject to landownership authority.
5.1.13 Flora and Fauna Offsets		
M1	Prepare and implement an offset strategy for the SEOC, including: • Offsetting the clearing of EEC with like vegetation at a ratio of 2.5:1. • Securing the offset areas in perpetuity. • Offsetting the loss of hollows with the replacement of 3 nest boxes/hollows for each hollow removed. • Enhancing and managing approximately 35ha of the Glennies Creek riparian corridor. • Revegetating the open cut operations with suitable species to comprise a mix of grasslands and woodlands. • Additional offsets will be provided for vegetation cleared as a consequence of realigning powerlines that traverse the SEOC Project area, these are: - For Option 1 - The incorporation of approximately 8.5ha of land immediately north of the existing VCA comprising relic ironbark woodland and more than 350m of creek frontage to Glennies Creek. - For Option 1 - The replacement of lost vegetation associated with the planted tree corridor (0.9ha), to maintain a continuous northerly vegetation corridor. - If Option 2 is used impacts will be mitigated through the offset of like vegetation at a ratio of 2.5:1 and secured in perpetuity.	Within 3 years of Project Approval.
M2	The management of offset areas will include : • Fencing to exclude cattle as required to remove grazing pressure. • Control of feral animals where practical. • Weed management program to reduce competition and encourage growth of native species in the understorey. • Fallen timber and branches within the disturbance area will be relocated to the offset areas to provide additional nesting and foraging habitat, or beneficially used within the Ashton Project area. • As a priority species to be used in any revegetation will include locally occurring species such as Narrow-leaved Ironbark (Eucalyptus crebra), Grey Box (E. moluccana), Forest Red Gum (E. tereticornis), Grey Gum (E. punctata), Gorse Bitter Pea (Daviesia ulicifolia), Western Golden Wattle (Acacia decora), Fan Wattle (A. amblygona) and Silver-stemmed Wattle (Acacia parvipinnula). • Fallen hollow logs and branches will be retained and relocated for habitat. • Searches for Speckled Warbler nests to determine habitat range of this population and to establish an appropriate monitoring strategy to ensure its long term viability in the area.	Within 3 years of Project Approval.

Item	Description	Timing
	• Baseline assessment of the community and habitat values of the offset area. • Identification of environmental weeds to be targeted in the weed management plan. • An ongoing monitoring program.	
5.1.14	Aquatic Ecology	
N1	Management measures for aquatic ecology will be incorporated into the Flora and Fauna Management Plan for the SEOC.	Prior to mining.
N2	Integrate tributary rehabilitation with Glennies Creek riparian corridor.	During tributary rehabilitation.
N3	Undertake bank erosion stabilisation (where caused by land use, predominantly in the tributaries).	During operations.
5.1.15	Visual Impacts	
O1	Soften the engineered faces of the out of pit emplacement with undulating ridges, faces, gullies and saddles.	During construction.
O2	Remove redundant infrastructure elements and conveyors on completion.	On completion
O3	Retain existing vegetation around the new infrastructure areas and on the road fringes to the highway wherever possible.	During construction.
O4	Select colours for the conveyor and transfer station to reduce bulk and scale.	During construction.
O5	Minimise stray light from infrastructure areas.	During construction.
O6	Where possible, after initial stripping and bund formation, program works on the north faces of the out of pit emplacement during daylight hours and work behind the emplacement during the evenings and night.	During bund construction and initial operations.
O7	Provide shields on all floodlights in the open cut area, and where practicable direct the light away from public areas or privately owned residences.	At all times.
O8	Install shielded lights on the conveyor system and reduce brightness.	During construction.
O9	Where safe to do so, trucks on access roads should make use of portable visual edge markers to increase drivers' visibility of road edges when driving with dipped headlamps.	At all times.
O10	Task and general lighting should be screened from viewers were possible but lighting levels must always be selected to meet safe working practices.	At all times.
5.1.16	Aboriginal Heritage	
P1	Prepare and implement an Aboriginal Cultural Heritage Management Plan (ACHMP) for the SEOC in consultation with a qualified archaeologist and the local Aboriginal community.	Prior to disturbance of sites.
P2	Salvage all artefacts from impacted areas in collaboration with a qualified archaeologist and the local Aboriginal community.	Prior to disturbance of sites.
P3	Undertake site specific recommendations as per EA Table 5.49.	Prior to disturbance of sites.
P4	Avoid impacts to Aboriginal sites outside mine disturbance areas.	At all times.
P5	If Aboriginal objects are uncovered during the project the site is to be managed in accordance with the ACHMP and the site registered in the Aboriginal Heritage Information Management System (AHIMS).	At all times.

Item	Description	Timing
P6	The ACHMP will include a cultural awareness document clearly highlighting and explaining the materials likely to be exposed by earth moving activities and will be supplied to workers and kept on site at all times.	At all times.
P7	If human remains are located during project activity all works must cease in the immediate area to prevent any further impacts to the find(s). The local police, are to be called, if the police consider the site not an investigation site for criminal activities, the Aboriginal community and the Department of Environment and Climate Change (DECC) are to be notified. Works shall not resume in the designated area until approval from the police and DECC is obtained.	At all times.
P8	The ACHMP is to include management measures for the scar tree SA5/9 that include: • The accurate recording of the tree's drip line and elevation. • The tree will be fenced within a 10m radial exclusion zone. • Six monthly photographic and notated recording of tree health (i.e. new leaves or buds, leaf size, twig growth, crown dieback and bark abnormalities against dam water levels. • Where monitoring shows adverse tree stress, dam water levels will be reviewed and lowered where feasible. • In the event that the tree has an adverse reaction, the registered Aboriginal Stakeholders will be consulted regarding the preferred mitigation strategy for the tree (e.g. insitu conservation of stag or lopping for removal to keeping place).	Prior to and during use of clean water dam CW1.
5.1.17 European Heritage		
Q1	Undertake management measures as specified in Table 5.50.	Prior to site disturbance.
5.1.18 Traffic and Transport		
R1	Prepare and implement a Traffic Management Plan (TMP) for the SEOC, including traffic control measures for the access intersection.	Prior to construction.
R2	Prepare and implement a Road Closure Plan (RCP) to manage the temporary closure of the New England Highway and other public roads that may be required during construction, delivery of large loads and for blasting.	Prior to commencement.
R3	Warning signage will be placed on the New England Highway for the duration of the construction works at each construction intersection.	During construction.
5.1.19 Hazards		
S1	Apply a 100m buffer zone around the open cut pit shell and a 50m set back of the fuel/oil storages in the pit-top services facilities from the site boundary.	At all times.
S2	Portable magazines stores will be located no closer than 150m to the site boundary.	At all times.
S3	Maintain a 500m exclusion zone during blasts unless otherwise determined by a risk assessment process.	At all times
S4	Prepare an Emergency Response Plan (ERP), where relevant integrate with the ACP.	Prior to mining.
S5	Undertake regular emergency response drills.	At all times.
S6	Ensure all vehicles on site are fitted with at least one dry powder type extinguisher. Larger vehicles will carry at least one 9kg dry powder extinguisher and smaller vehicles at least one 4.5kg dry powder extinguisher.	At all times.
S7	Prepare a dangerous goods notification form, in accordance with the NSW *Occupational Health and Safety (Dangerous Goods Amendment) Regulation 2005* and submit the forms to WorkCover NSW, for the proposed diesel storage, and other dangerous goods storages	As required.

Item	Description	Timing
	on site, in accordance with the *Section 6a* and *Schedule 5* of the regulation.	
S8	Prepare a Spontaneous Combustion Management Plan (SCMP) and where relevant integrate with the ACP.	Prior to Mining.
5.1.20	Bushfire	
T1	Maintain perimeter roads, management tracks and management zones.	At all times.
T2	Incorporate fire suppression assets such as water carts, dozers and static water storages into the mine and facility design.	During construction.
T3	Design and maintain appropriate access for emergency vehicles.	At all times.
5.1.21	Waste	
U1	Prepare and implement a Waste Management Plan (WMP) for the SEOC where relevant integrate with the ACP.	Prior to construction
U2	Maintain effluent disposal areas in accordance with DECCW guidelines.	At all times.
U3	Undertake waste management measures as specified in EA Table 5.58.	At all times.
5.1.22	Rehabilitation and Connectivity	
V1	Prepare and implement a Landscape Management Plan (LMP) for the SEOC.	Within 6 months of commencement.
V2	Establish stabilising vegetation on the northern face of the environmental bund and out of pit emplacement within twelve months of emplacement.	Within 12 months of emplacement.
V3	Undertake progressive rehabilitation of the mine site.	At all times.
V4	Enhance vegetation connectivity in an east to west direction.	Progressively.
V5	Enhance vegetation connectivity in an east to west direction and north to south along Glennies Creek.	*See L14 & M1*
V6	Rehabilitation of the SEOC to consist of a mixture of open woodland and pastures.	Progressively.
5.1.23	Agriculture	
W1	ACOL will use its best endeavours to: • Lease or operate undisturbed agricultural lands within its landholdings for agricultural use, where practicable. • Source goods and services for agricultural activities on ACOL owned land from local businesses and services, where practicable.	For the life of the project.
5.1.24	Mine Closure	
X1	Develop a mine closure plan for the SEOC, taking into consideration the principles and objectives for mine closure specified within the ANZEC MCA document *Strategic Framework for Mine Closure*, 2000 (or prevailing document).	At least 2 years prior to completion of mining in SEOC (e.g. before 2015 at scheduled rates).
X2	Relinquish the SEOC site in a condition that does not endanger public health and safety and allows the use of land for low intensity grazing and enhancement of local biodiversity.	At closure.
X3	Aim for the closure of the SEOC site in a condition that does not require ongoing maintenance above that would be otherwise expected as part of responsible land management.	At closure.

Item	Description	Timing
5.1.25	Sustaining Camberwell Village	
Y1	Prepare a Camberwell Village Enhancement Plan in consultation with the residents of the village, Singleton Council and the DoP. Implement a program of works in accordance with the approved plan via a Voluntary Planning Agreement with the Minister for Planning and Singleton Council, or, fund a program of works of other identified social – community infrastructure for the Singleton local government area via a Voluntary Planning Agreement with the Minister for Planning and the Singleton Council.	Within 2 years of Project Approval.

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Appendix 1

Breakdown of submissions by category

South East Open Cut Project

&

Modification to the

Existing ACP Consent

Summary of submissions and categorisation.

Submission Maker	Compliance & Reporting	Land Use	Air Quality	Climate Change & Global Warming	Acoustics & Vibration	Groundwater	Surface Water & Creek Integrity	Water Supply & Demand	Flooding & Geomorphology	Ecology	Visual Amenity	Aboriginal Heritage	European Heritage	Transport (Road & Rail)	Socio Economic	Rehabilitation / Mine Closure	Project Design	Camberwell	Cumulative Impacts	Environmental Assessment Report	Existing ACOL Operations	Other	Project Support
GOVERNMENT AUTHORITIES																							
Department of Environment Climate Change and Water (DECCW)			●		●					●		●							●				
NSW Office of Water						●	●	●															
Heritage Branch NSW Government, Planning													●										
Singleton Shire Council					●		●				●				●								
Dam Safety Committee																	●						
Roads and Traffic Authority														●									
Hunter Central Rivers Catchment Management Authoirty							●																
GENERAL PUBLIC & SPECIAL INTEREST																							
R. & C. Bailey			●		●		●				●				●		●	●	●		●		
M.K. Beasley [*2]			●	●	●						●			●	●		●	●			●		
H. Bowman		●	●	●	●			●			●				●								
T. & C. Burgess			●				●								●			●			●		
G. & K. Cheetham			●				●												●		●	●	
S. & C. Ernst [*2]			●	●	●			●			●			●	●		●	●					
The Maytom Family			●		●		●				●				●		●						
J. & J. McInerney			●		●												●		●				

Submission Maker	Compliance & Reporting	Land Use	Air Quality	Climate Change & Global Warming	Acoustics & Vibration	Groundwater	Surface Water & Creek Integrity	Water Supply & Demand	Flooding & Geomorphology	Ecology	Visual Amenity	Aboriginal Heritage	European Heritage	Transport (Road & Rail)	Socio Economic	Rehabilitation / Mine Closure	Project Design	Camberwell	Cumulative Impacts	Environmental Assessment Report	Existing ACOL Operations	Other	Project Support
R. & S. Ninness [*2]			●	●	●		●			●	●			●	●	●	●	●			●	●	
A. Taggart & A. McLeod			●		●						●				●							●	
Coalroc Contractors Pty Limited (G. Tinney)																							●
S. & C & J. Turner			●	●	●		●		●	●	●				●	●	●	●			●		
D. & M. Bridge			●		●																		
M. & T.E. DeJong		●	●		●	●	●	●						●	●	●	●	●	●		●	●	
S. Bowman		●					●	●							●				●	●			
M. Beasley			●	●	●						●			●	●		●				●		
J. Vollebregt & T. Clarke			●		●			●							●		●				●		
B. Whitten [*2]								●															
J. Wokes		●					●				●												
J.H. & M.R. Moore	●		●		●			●		●					●				●	●			
W. Bowman			●	●	●	●	●	●		●	●				●	●	●	●	●		●		
Orbit Planning on behalf of A. S. & E.S Bowman		●	●		●	●	●	●	●		●						●						
B. Russell						●	●	●													●		
C. Russel			●			●	●		●	●					●				●				
B.W. & R.A. Cherry			●	●	●					●	●			●	●	●							
Mistletoe Wines (K. & G. Sloan) [*2]		●	●	●	●			●		●	●			●	●		●						
Atlas Copco Austrlaia Pty Ltd (R. Swan -Regional Manager)																							●

Submission Maker	Compliance & Reporting	Land Use	Air Quality	Climate Change & Global Warming	Acoustics & Vibration	Groundwater	Surface Water & Creek Integrity	Water Supply & Demand	Flooding & Geomorphology	Ecology	Visual Amenity	Aboriginal Heritage	European Heritage	Transport (Road & Rail)	Socio Economic	Rehabilitation / Mine Closure	Project Design	Camberwell	Cumulative Impacts	Environmental Assessment Report	Existing ACOL Operations	Other	Project Support
Daracon Group (D. Mingay - Managing Director)																							●
Emeco International (T. Halls - General Manager)																							●
Hardy Bros Mining & Constructions Pty Ltd (B. Hardy - Project Manager)																							●
Hardy Bros Mining & Constructions Pty Ltd (G. Roach - Engineering Manager)																							●
Integra Coal Operations Pty Ltd (S. Kovac - General Manager)																						●	●
Xstrata Coal (NSW) Pty Limited (D. O'Brien - Group Manager - Environment and Community)			●											●			●						
Hunter Environment Lobby Inc. (J. Davis - President)	●			●		●	●	●		●					●			●		●	●		
Hunter Valley Water Users Association (A. Burns - President)							●	●	●												●		
Hunter Valley Wine Industry Association (G. Krieger - President) [*2]		●	●	●	●	●	●	●	●	●													
Singleton Shire Healthy Environment Group (Dr. J. Drinan)															●								
Rivers SOS (C. Russell)		●		●			●																
Nature Conservation Council of NSW (C. Faehrmann - Executive Director)				●				●		●													

Summary of issues raised and where referenced in the document.

Category	Issues identified from submissions	*Response Reference*
Compliance and Reporting	• Who checks the mine operations; are they doing the right thing. • The regulation and compliance of conditions of consent for mining operations in the Hunter Valley, particularly in relation to ecological impacts, is very poor or non existent. • There is no confidence that this company is capable of operating in an environmentally responsible manner.	*Section 4.1*
Land Use	• The land is prime agricultural land. • It will have an adverse effect on farming enterprises downstream from the project. • Any more mines threaten the continuation of food production in the Valley. • Lack of consideration and assessment of the mines impact on the adjoining agricultural lands. • Annual value of agricultural production and its dependent secondary industries may be severely impacted if a mining operation damages the regulated river system. • The extension of an existing open cut operation in an area where mining is the predominant land use, represents the highest value and best use of the land in question.	*Section 4.2*
Air Quality	• Concerns that the air quality modelling did not adequately consider aspects such as topography, wind, change in weather patterns, inversions, capture of dust and gasses, creek air currents.	*Section 4.3.1*
	• Inadequate dust estimates.	*Section 4.3*
	• Odour.	*Section 4.3.2*
	• Fumes from blasting hazardous to health of humans and livestock.	*Section 4.3.2*
	• Health related issues associated with emissions and rainwater tanks.	*Section 4.3.3*
	• Long and short term health related issues including, sinus, asthma, from increased dust levels.	*Section 4.3.4*
	• Measurement should be in $PM_{2.5}$.	*Section 4.3.5*
	• It is imperative that accurate data is collected about the current poisons in the air and the likely increase in volume if the extension is granted.	*Section 4.3.6*
	• Contamination of pasture and impacts to livestock.	*Section 4.3.7*
	• Contamination of the milk production in nearby dairy.	*Section 4.3.7*
	• Lifestyle and amenity related impacts including dust on property and impacts on clothes washing.	*Section 4.3.8*
	• No dust and health warning system like Sydney.	*Section 4.3.9*
	• Mines should air condition private houses to reduce health and amenity related impacts.	*Section 4.3.10*
	• Air quality assessment does not provide an assessment of the modelled dust concentration (PM10 and TSP) in relation to relevant criteria for the project considered in isolation. The relevant project specific dust concentration criteria (for PM10 and TSP) are exceeded by the Project alone at a number of private residences.	*Section 4.3.11*
Climate Change Global Warming	• Concern that the expansion of coal mining will contribute to global warming and associated climate change. • This project and the coal it will extract will emit a significant amount of greenhouse pollution and therefore is not sustainable in the context of the need to avoid catastrophic climate change.	*Section 4.4*
Acoustics & Vibration	• Health issues associated with noise and vibration. • Beeping of trucks reversing and noise from machinery affects sleep.	*Section 4.5*

Category	Issues identified from submissions	*Response Reference*
	• Impact of noise on pets and stock. Noise can affect the behaviour of cows, therefore their production. • More noise would be unfair and unjust to the community; noise causes aggression. • The proposed conveyor belt will add to the noise as the land is open to the village. • Noise impact on the bowman holding will render uninhabitable the houses at No. 1 (130A) and Nos. 2 Dairy (130B). • Damage to property and stock from flyrock/fallout. • Road closures and evacuations due to blasting unacceptable. • Vibration from diesel trains impacting village. • Fumes from blasting hazardous to health of humans and livestock. • Large diesel train engines create vibrations that send tremors through the rock stratas and is being felt in the houses in the village. • The EA underestimates the impact of mine blasting and vibration on the Bowman houses.	
Groundwater	• Destruction of alluvium and damage to aquifers. • Groundwater in Common is only 2m below surface, gradient reversal in alluvial waters toward open cut pit. • Pit is within highly connected alluvium. • Predicted losses of groundwater in the Glennies Creek alluvium are unsustainable. • 100 year recovery is too long. • Groundwater study flawed as similar studies were done for Underground and were flawed. • Geological faulting and structure potentially unknown that may lead to more leakages with no remediation. • Groundwater up to rim in places within the mine pit with nothing to show how river is to be protected.	*Section 4.6*
Surface Water and Creek Integrity	• Risk of Camberwell Common collapsing into Glennies Creek, blocking its flow. • Assessment of the storm water is totally inadequate. The report writers have little understanding of local weather conditions and local water flows. The planned fresh water dam will never hold the amount of water that can race down the slopes. • Object to “conceptual water management plans” only having been developed. • Concern about how the mine will effectively manage their discharge in times of high river and high creek flow. • If coal ends up in Glennies Creek due to conveyor belt failure, contamination would kill the aquatic creatures and possible affect all downstream users. • Open cut project is located close enough to Glennies Creek to have a detrimental effect on its environmental health and quality of water travelling through it. • The potential for impacts to water quality in Glennies Creek from mining. • The impact of loss of water quality from Glennies Creek to the Hunter River may have serious implications on the Hunter River Salinity Trading Scheme. • Risk of cracking on Glennies Creek and use of precautionary principle. • NSW Government should mandate a safety zone of at least 1 kilometre around all rivers in the state to protect them from further permanent damage through the effects of mining under or too close to river beds.	*Section 4.7.1* *Section 4.7.2* *Section 4.7.2* *Section 4.7.2* *Section 4.7.3* *Section 4.7.2* *Section 4.7.2* *Section 4.7.4* *Section 4.7.4* *Section 4.7.4*

Category	Issues identified from submissions	*Response Reference*
	• This project proposes to mine up to 150 metres from the banks of Glennies Creek. The proposed exclusion zone was 1 km in 2005. What has changed since then.	*Section 4.7.4*
	• The proposed mining should be prevented from entering a substantial buffer zone around and below every river.	*Section 4.7.4*
	• Ashton cannot be given consent to mine in any location or in any manner which has the potential to take water illegally.	*Section 4.7.5*
	• If Ashton Coal reduces the surface and base flow of Glennies Creek then they are in breach of the Hunter Unregulated River and Alluvial Water Sharing Plan and the Water Management Act 2000.	*Section 4.7.5*
Water Demand and Supply	• Reliability of supply from the Hunter River is critically dependent upon integrity of the river from excavation. • Project will have severe adverse effects on water supply and quality. • Mining so close to the Hunter River threatens the water supply of those who live and work below Glennies Creek. • If we go into drought again with even more substantial demand for water what will happen. • Glennies Creek is critical to maintain river flows and reliable water supply to all users down to and partly within the Hunter tidal pool below Maitland; it is critical that the highest level of protection is provided to this water supply source as any damage to its flows cannot be replaced from any other source. • There is no indication of the impact on employment at the mine during periods of water shortage or the impacts on water availability for other industries if the coal mining sector continues to buy up water licences. • Impacts to Singleton town water supply if more flows from dam are needed have not been assessed.	*Section 4.8*
Flooding & Geomorphology	• If a flood occurred, water would flood into the mine and then all the mine crap would enter both Glennies Creek and the Hunter River. • There will be changes to flood patterns and creek behaviour as a result of this operation. • Changes to the creek geomorphology at four sites as identified in the EA report are unacceptable. • Proposed flood levy constructions could alter the flow path of flood waters and even worse if over topped thus allowing for water from the pit workings to return to the Hunter and its tributaries.	*Section 4.9*
Ecology	• The flora and fauna once there will be gone.	*Section 4.10.1*
	• Nobody will ever know how many trees they have cut down or will cut down if SEOC gets approved.	*Section 4.10.1*
	• The proposal to destroy a further 24.7ha of the endangered ecological community, Central Hunter Ironbark-Spotted Gum-Grey Box Forest cannot be mitigated.	*Section 4.10.1*
	• The ridge ACOL wishes to mine/demolish has remnant trees and vegetation. These will be destroyed by the proposed extension.	*Section 4.10.1*
	• Rehabilitation work (tree plantings) on private property would be undone by mining expansion.	*Section 4.10.1*
	• Poor ecological study undertaken in the area of impact. The fauna study fails to identify the presence of a number of species in the project site listed for protection under key environmental legislation.	*Section 4.10.1*
	• NSW Government programs such as the Great Eastern Ranges Initiative are being compromised by the ongoing destruction of threatened vegetation and species habitat in the Hunter Valley due to open cut mine expansion.	*Section 4.10.2*

Category	Issues identified from submissions	*Response Reference*
	• The Mt Owen extension approval granted in 2004 had a requirement to establish a Hunter Coalfields Flora and Fauna Advisory Committee. This condition has never been met.	*Section 4.10.2*
	• The threatened species now using the lower Glennies Creek valley cannot be further displaced because there are few areas left on the valley floor that have any intact vegetation available to meet habitat requirements.	*Section 4.10.2*
	• Rainfall has decreased dramatically due to extensive open-cut mining over the last twenty years in the upper Hunter Valley because there are no trees.	*Section 4.10.2*
	• Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands are listed as Key Threatening Processes under the Threatened Species Conservation Act (1995).	*Section 4.10.3*
	• Double standards when it comes to the environment – ban on local farmers and landholders removing trees but the mine can remove hundreds of metres of trees.	*Section 4.10.3*
Visual Amenity	• Tranquil living has been replaced with visual imperfections. • Changes to the existing landscape will become an "eye sore". • Location and design of the proposed mine in no way maintains a reasonable level of visual amenity to the residences on the Bowman property. • Proposed project will despoil the scenery. • Impacts from lighting plant and machinery, vehicle lights and lighting of the site in general. This creates sleep deprivation especially during 24 hour operations. • Animals also affected by lighting from the mine. • Mines threaten tourism (moonscape that is now the Hunter region).	*Section 4.11*
Heritage - Aboriginal	Nil by General Public or Special Interest Group	-
Heritage - European	Nil by General Public or Special Interest Group	-
Transport (Road & Rail)	• Traffic will increase significantly from this project. • Access road to Camberwell will be dangerous if project proceeds. • Construction of access to the mine will create a hazard on a bust section of the New England Highway. • Concern about safety of school buses and visitors safety as a result of increased traffic. • Xstrata Coal (NSW) Pty Limited note the proposed Lemington Road realignment to the existing Brunkers Lane road under existing approvals and its inclusion in the proposed Ravensworth Operations Project. • The rail transport assessment does not include an assessment of the potential impacts of other rail users within the vicinity of ACOL operations. • ACOL has not consulted with the owners of the RCT regarding the predicted impact of the proposed SEOC Project on the capacity, safety and maintenance of the Ravensworth Loop. • The Licence Agreement does not contemplate the use by ACOL of the loop as a result of the commencement of a new open cut mine constituting the South East Open Cut.	*Section 4.13*
Socio Economic	• There should be no more new mines or extensions to existing mines until a thorough and independent health study is conducted.	*Section 4.14.1*
	• Loss of lifestyle and amenity.	*Section 4.14.2*
	• Personal impact on family; aspirations for home.	*Section 4.14.2*
	• The mine owners do not care about the people who live here, all they care about is their profit margin.	*Section 4.15.2*

Category	Issues identified from submissions	*Response Reference*
	• Proposed project will have severe adverse effects on the local community, Singleton and the region.	*Section 4.14.2*
	• Proponent is double dipping with job figures for open cut and Mod 6 longwall projects, therefore economic justifications and assumptions are highly questionable.	*Section 4.14.3*
	• The 160 employees will have to find work after 7 year life of the project, therefore it is not unreasonable for them to make that transition now.	*Section 4.14.3*
	• The proposed development will contribute significantly to the local economy and create substantial employment opportunities within the actual mining operation and support industries.	*Section 4.14.3*
	• The development will be done with the greatest regard to the environment and especially with the community of Camberwell.	*Section 4.14.3*
	• The development application will provide further opportunities for obtaining contracts with Ashton Coal and will support the growth of our company in Singleton and the Hunter Valley.	*Section 4.14.3*
	• The net direct social, economic and environmental benefits to the State and region substantially outweigh any cost.	*Section 4.14.4*
	• The extension of an existing open cut operation in an area where mining is the predominant land use represents the highest value and best use of the land in question.	*Section 4.14.4*
	• The long term and irreparable damage to water sources and the ecological integrity of the Hunter Region caused by these proposals far outweighs their economic justification.	*Section 4.14.4*
	• The economic justification for threatening the health of Bowman's Creek, Glennies Creek and the Hunter River in a critical zone that is a major water source for other industries is completely unrealistic, poorly calculated and socially irresponsible.	*Section 4.14.4*
	• The principles of ecological sustainable development and social justice must be taken into account. The proposal has no valid justification and will cause the ongoing decline of the long term social and environmental integrity of the Hunter Region.	*Section 4.14.4*
	• The devaluation of our land that would be created from the project.	*Section 4.14.5*
	• We are concerned for the value of our property if we find that we cannot remain as residents due to the affects of this operation, during the mines working life and beyond, due to the close proximity to our property.	*Section 4.14.5*
	• The price offered for the properties should be replacement cost and not market value.	*Section 4.14.5*
	• They claim they will pay market value but Camberwell's house and land value has fallen to the point of non-existence with the presence of mines in the vicinity.	*Section 4.14.5*
	• Concern about the ability of land owners to negotiate with large mining companies for the sale of their properties and to receive a fair outcome due to limited resources.	*Section 4.14.5*
	• There is no written or verbal agreement to purchase "Rosedale" property.	*Section 4.14.5*
	• There has been insufficient explanation given by Ashton Coal for its need to acquire A.S. Bowman's farm, that is located next to the South East Open Cut.	*Section 4.14.5*
Rehabilitation/ Mine Closure	• Rehabilitation cannot put the countryside back the way it was. • The so called "rehabilitation" of mine sites is deplorable. • Trees will never grow to the age and size of those destroyed. • The repair work is not moving as fast as the new mines commence. • They don't rehabilitate the area with the same trees they cut down. • Regardless of any rehabilitation to the mine, surrounding country side will remain scarred for eternity and less desirable for any prospective purchaser of our property.	*Section 4.15*

Category	Issues identified from submissions	*Response Reference*
Project Design	• Life will become unbearable for residents living in close proximity to the mine that will be operational 24 hours per day.	*Section 4.16*
	• Environmental bund will not shield Camberwell village or neighbours from dust, blasting, noise, etc.	*Section 4.16*
	• The mine plan to remove the ridge to allow access to the coal seams will create massive volumes of dust. The southeast summer winds will blow it straight down into Camberwell village.	*Section 4.16*
	• XCN seek clarification of further details for the long-term capacity for management of additional reject and tailings material in the Ravensworth voids.	*Section 4.16*
	• New power line will take part of farm, affecting amount of feed for livestock.	*Section 4.16.2*
	• High voltage power lines need to be distant from electric fences used to feed cows.	*Section 4.16.2*
	• Location of realigned power lines has the potential to disrupt access to an existing high pressure hose irrigator	*Section 4.16.2*
	• Working under and around the power lines long term causes serious concern for health and safety of residents and employees.	*Section 4.16.2*
	• New power line route occurs on the edge of an unstable creek bank.	*Section 4.16.2*
	• The distance of the project to Glennies Creek and Camberwell village is too small.	*Section 4.16.2*
Camberwell	• 150 years of history will be gone for the Camberwell village. • This project, being so close to Camberwell, will have to have significant effect on the air quality of the village. • Mining is too close to the village, 500 metres is absolutely absurd. • Camberwell being the lowest point of reference would be the holding point of pollution (dust). • The area proposed to be mined is open to the village. The land sloping north will allow dust to fall directly onto the village. • Camberwell residents have no idea who ACOL is renting residences to. Sense of community has deteriorated, therefore having to increase security, live with rubbish generated by tenants, etc. • Camberwell well suited in location for commuting to work; having to relocate further away would be expensive and time-consuming.	*Section 4.17*
Cumulative Impact	• A little bit of dust from each mine in area, but together residents are being slowly poisoned from pollutants in the air.	*Section 4.18.1*
	• Where is our accumulative impact study and the results.	*Section 4.18.1*
	• Unsatisfactory that the EA report should have gone on exhibition before the Camberwell Cumulative Impact Study has been released for community and expert evaluation.	*Section 4.18.1*
	• The noise levels increase with every new mine or extensions.	*Section 4.18.1*
	• The cumulative effect of so many mines plus three coal fired power stations concentrated in the Muswellbrook and Singleton shires need reviewing.	*Section 4.18.1*
	• Cumulative impacts by Ashton and the surrounding mines will have adverse effects on the whole village.	*Section 4.18.1*
	• The cumulative impact of ongoing removal of vegetation of any age and condition in this section of the Hunter valley is major and must not be approved for a project with a 7 year life span.	*Section 4.18.2*
	• The destruction of alluvial aquifers, connectivity between surface and groundwater systems and diversion of natural creek beds in the Hunter Region is not considered in any form of planning framework that recognises cumulative impacts or irreplaceable.	*Section 4.18.2*

Category	Issues identified from submissions	*Response Reference*
	• Previous and existing mines in the area – history has shown it has affected all residents greatly.	*Section 4.18.3*
	• Mines threaten food production and tourism.	*Section 4.18.3*
	• There has been a lack of research on the long term effects of open cut mining in the Hunter Valley on the NSW environment and economy.	*Section 4.18.3*
	• A thorough survey of existing health problems in the area must be done and scientific opinion obtained about the likely increase in such problems and the cost to the community of dealing with these problems.	*Section 4.18.3*
	• There is evidence already in existence in the Upper Hunter to the adverse effect that mining has had on salinity levels in streams eg. Wybong Creek.	*Section 4.18.3*
Environmental Assessment Report	• There is not enough information on the potential damage for the open cut to be approved. • One would have to have a degree in just about everything to understand the environmental assessment volumes which the powers that be put out for us mere mortals who are expected to read 5 or 6 volumes 2" thick and we think it is all B.S. anyway. • The SEOC Environmental Assessment Report fails to adequately identify the nature of the alluvium in the lower reaches of Glennies Creek. • The EA produced for this unsustainable development proposal is highly inadequate and fails to identify and address key critical impacts. • There is no indication of the impact on employment at the mine during periods of water shortage or the impacts on water availability for other industries if the coal mining sector continues to buy up water licences. • The paucity of recordings in the Environmental Assessment of threatened species known to use the area covered by the mine exploration licence is an indication of the report's many inadequacies.	*Section 4.19*
Existing ACOL Operations	• Camberwell village now experiences high levels of dust, noise and vibration.	*Section 4.20.1*
	• At present we are putting up with the lights and the constant hum/drone of your trucks and shovels and the clatter of dozer trucks and not to mention the earth shuddering shakes that our house is copping from the blasts that you are letting off.	*Section 4.20.1*
	• As a result of the blasting, my home improvements, most noticeably the cracks appearing, have also been accelerated however upon Ashton inspection their reports conclude that the house has moved because of the weather been hot and cold.	*Section 4.20.1*
	• The existing Development Consent stated no mining after 10.00pm. But the noise continues all night because the trains are loaded at night.	*Section 4.20.1*
	• The tank water being grey and causing residents to have stomach problems, the water was tested and did not meet Australian standard, and this was never a problem till Ashton started mining too close to the village.	*Section 4.20.2*
	• The existing open cut operation has cracked the creek and allowed uncontrolled inflow of first alluvial then river water into Longwall 1 of the underground operation.	*Section 4.20.2*
	• The current mining operation already has a significant impact on the integrity of the lower Glennies Creek water source.	*Section 4.20.2*
	• Mining 500 metres to homes is absolutely absurd.	*Section 4.20.3*
	• The cracking on the common was mishandled by Ashton.	*Section 4.20.3*
Other	• Project will make mobile phone coverage worse, since Ashton placed bund behind property, no mobile phone reception at home.	*Section 4.21.1*
	• Object to another seven year extension as the first mine was for seven years and they would be gone eliminating pollution.	*Section 4.21.2*

Category	Issues identified from submissions	*Response Reference*
	• Political donations were not placed on the submission by the owners and previous owners, and this constitutes a conflict of interest and how will the residents get a fair deal.	*Section 4.21.2*
Support	• The extension of an existing open cut operation in an area where mining is the predominant land use represents the highest value and best use of the land in question.	*Section 4.2*
	• The proposed development will contribute significantly to the local economy and create substantial employment opportunities within the actual mining operation and support industries.	*Section 4.14.3*
	• The development will be done with the greatest regard to the environment and especially with the community of Camberwell.	*Section 4.14.3*
	• The development application will provide further opportunities for obtaining contracts with Ashton Coal and will support the growth of our company in Singleton and the Hunter Valley.	*Section 4.14.3*
	• The net direct social, economic and environmental benefits to the State and region substantially outweigh any cost.	*Section 4.14.4*

Appendix 2

Revised noise impact assessment for SEOC Project

South East Open Cut Project

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Modification to the

Existing ACP Consent

4 June 2010

Ref: 07373/3570

Lisa Richards
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P.O. Box 699
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ASHTON SEOC – RE-MODELLED NOISE SCENARIOS

This letter report presents the results of re-modelling the original Year 1, 3, 5 and 7 scenarios of the Ashton SEOC. The purpose of the modelling was to determine what noise reduction could be achieved at assessed receivers by introducing several engineered noise reduction options.

In order to reduce the level of noise impacts as far as reasonably and feasibly possible, ACOL has committed to a number of engineered noise reduction measures. The re-modelled noise levels include the following changes;

- Conveyor enclosed along all sides exposed to Camberwell.
- Transfer station (1) will be omitted.
- Transfer stations (2) and (3) will be fully enclosed.
- Attenuated trucks will be used on overburden in exposed locations.
- Unattenuated trucks will be used on low level overburden and coal.
- A new Liebherr 996 excavator will have full attenuator package.
- Mobile crushing stations have been included for Year 1 in the ROM pad borrow pit and at the surface facilities construction area, these are relatively minor sources (108 dB(A) sound power) that are below ground level or placed behind a purpose-built bund.
- Pit layout is based on June 2010 “South East Open Cut pit and Dump Progression Plans”.
- The night time noise criterion at receivers in the northern section of Camberwell village has been reduced from 41 dB(A) to 37 dB(A) following consultation with the Department of Planning.

Sound power levels for original and re-modelled scenarios.

Noise Source	Sound power level, dB(A)				Source Height, m
	$L_{eq(15min)}$		L_{max}		
	Nov '09 EA	June '10	Nov '09 EA	June '10	
Loading empty coal wagons	101	101	116	116	3
3 x loco's idling on loop	105	105	111	111	3
Loader ROM hopper	114	114	120	120	3
Rotary breaker (enclosed)	108	108	112	112	5
Tracked dozer (fwd/reverse cycle)	115	115	128	128	2
Overburden drill	114	114	116	116	1
O/B excavator	117	116	125	125	5
Coal excavator	116	116	122	122	5
Overburden dump (full cycle)	115	109	121	120	3
Overburden haul (on slope, per 350m)	115	108	123	116	3
Overburden haul (on flat, per 350m)	113	107	118	113	3
Coal haul (per 350m)	111	111	120	120	3
Transfer station	112	101	116	105	5
Coal washery	112	112	116	116	15
Conveyors (per 100m)	96	84	N/A	N/A	2-10
Stacker/reclaimers (each)	105	105	N/A	N/A	10

Year 1 scenario

November 2009 Noise Impact Assessment (NIA)

Noise source locations for the original Year 1 scenario are included in the project noise impact assessment. There are five excavators and associated truck fleets working overburden and coal. There are two dumping locations on the environmental bund, each accompanied by a dozer, and the ROM facility and coal transfer system back to the existing CHPP are operational. There is no attenuation applied to any mobile or stationary plant/machinery. All activities are occurring on a 24-hour basis.

The original noise level predictions for this scenario are reproduced below. Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey. The results show the entire Camberwell village in a noise acquisition zone.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	37	47	37	35	40	46	48	41
117	38	47	37	35	40	45	48	41
34	38	48	38	35	40	46	49	41
23	39	49	40	36	42	47	50	41
24	40	50	40	36	42	49	50	41
52	41	50	41	38	44	50	51	41
30	45	52	45	41	47	52	52	41
32	45	52	45	41	47	52	52	41
26	41	50	42	39	47	49	51	41
151	49	53	50	46	51	54	54	50
18	45	52	48	44	48	52	50	41
11	45	52	47	44	48	50	50	41
8	45	52	47	44	48	50	50	41
2	45	52	46	44	48	50	50	41
50	51	53	51	51	51	53	52	41
51	51	53	51	51	51	53	52	41
119	45	51	45	44	50	51	50	44
120	48	52	47	45	50	52	53	44
121	50	51	50	45	50	50	53	44
83	39	45	40	35	35	40	50	41
84	34	40	35	29	29	35	45	41
114	43	50	41	39	45	50	49	41
111	30	42	29	25	30	40	43	41
129	45	51	52	52	46	42	44	37
130A	40	50	50	50	45	40	40	37
130B	33	44	45	43	35	30	31	37
184A	24	36	36	33	28	20	23	37

TABLE 12
(SEOC Nov 2009 NIA)
Predicted Year 1 intrusive noise levels.

June 2010 Noise Impact Assessment (NIA) Year 1 scenario

Re-modelled noise levels for Year 1 are summarised in Table 12(a) and figures C1-C7. The model includes the changes detailed earlier in the document.

Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey. Properties purchased or under purchase contract with ACOL since the November 2009 assessment are shaded yellow.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	31	44	30	30	37	45	43	37
117	35	43	32	31	37	43	42	37
34	31	44	30	29	37	44	44	37
23	33	45	33	30	38	44	44	37
24	34	45	34	31	39	46	45	37
52	35	46	35	34	40	49	46	37
30	36	46	35	34	40	49	46	37
32	40	50	38	38	46	>50	49	37
26	40	49	40	39	45	>50	50	37
151	45	54	45	45	53	55	51	50
18	43	51	43	40	45	>50	>50	41
11	42	49	42	40	45	50	49	41
8	42	47	42	40	45	48	47	41
2	42	47	41	39	45	48	45	41
50	>50	>50	>50	>50	>50	>50	>50	41
51	>50	>50	>50	>50	>50	>50	>50	41
119	43	48	40	40	46	50	48	44
120	44	49	41	40	46	51	49	44
121	50	>50	47	45	48	>50	>50	44
83	35	42	35	30	30	35	45	41
84	29	38	30	24	24	30	40	41
114	38	45	35	32	42	46	45	41
111	20	36	22	<20	25	38	37	41
129	40	50	49	50	45	38	37	37
130A	43	46	>50	>50	46	40	41	37
130B	30	42	44	43	34	28	28	37
184A	<20	34	35	35	25	<20	<20	37

TABLE 12(a)
June 2010 Re-modelled Year 1 intrusive noise levels

The above results show that the proposed attenuation measures have reduced predicted noise levels sufficiently that receivers R83 and R114 are no longer in a noise acquisition zone for the period of the project but remain in a noise management zone.

Year 3 scenario

November 2009 Noise Impact Assessment (NIA)

Noise source locations for the original Year 3 scenario are included in the project noise impact assessment.

The original noise level predictions for this scenario are reproduced below. Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	35	45	35	30	32	40	47	41
117	30	43	35	28	28	35	45	41
34	35	45	36	31	31	40	46	41
23	35	45	39	31	31	40	46	41
24	37	47	39	33	34	43	48	41
52	39	47	40	35	36	45	49	41
30	42	49	43	39	40	47	51	41
32	42	49	43	39	40	47	51	41
26	35	45	40	32	32	40	47	41
151	45	52	48	46	47	49	53	50
18	40	50	46	39	39	45	51	41
11	40	48	46	40	37	42	50	41
8	40	47	45	40	36	41	49	41
2	38	46	45	38	35	40	45	41
50	47	52	50	45	47	47	52	41
51	47	52	50	45	47	47	52	41
119	31	44	40	30	29	34	41	44
120	32	43	40	30	29	34	42	44
121	33	42	38	32	30	35	45	44
83	28	39	35	27	25	30	41	41
84	27	37	35	25	24	29	39	41
114	28	42	38	28	28	33	43	41
111	25	37	27	22	23	33	40	41
129	55	56	56	57	55	54	53	37
130A	45	53	51	50	50	40	44	37
130B	36	45	47	45	37	33	38	37
184A	24	37	38	35	27	20	23	37

TABLE 13
(SEOC Nov 2009 NIA)
Predicted Year 3 intrusive noise levels.

June 2010 Noise Impact Assessment (NIA) Year 3 scenario

Re-modelled noise levels for Year 3 are summarised in Table 13(a) and figures C8-C14. The model includes the changes detailed earlier in the document.

Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey. Properties purchased or under purchase contract with ACOL since the November 2009 assessment are shaded yellow.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	26	36	26	22	28	35	**39**	37
117	23	35	29	20	24	29	35	37
34	25	36	29	22	25	32	37	37
23	25	36	30	23	26	32	37	37
24	26	37	30	25	28	33	**38**	37
52	29	**38**	30	25	30	35	**38**	37
30	30	**38**	30	25	31	37	**38**	37
32	31	**39**	31	28	34	40	**39**	37
26	32	**40**	35	30	34	**39**	**40**	37
151	37	43	40	35	40	46	44	50
18	32	41	39	30	33	39	41	41
11	31	40	38	30	31	35	40	41
8	31	40	38	30	30	34	39	41
2	30	39	37	28	29	32	38	41
50	38	44	**42**	37	37	41	**43**	41
51	41	**45**	**45**	40	40	**43**	**46**	41
119	27	35	35	27	28	30	37	44
120	27	33	33	25	26	29	35	44
121	31	37	37	28	28	32	40	44
83	24	33	33	23	22	27	36	41
84	23	30	30	20	20	25	34	41
114	24	34	34	22	23	32	35	41
111	20	30	30	<20	<20	30	29	41
129	**45**	**50**	**50**	**>50**	**50**	**45**	**40**	37
130A	**>50**	**>50**	**>50**	**>50**	**>50**	**>50**	**50**	37
130B	35	40	40	42	35	30	31	37
184A	20	31	31	33	20	<20	<20	37

TABLE 13(a)
June 2010 Re-modelled Year 3 intrusive noise levels.

Year 5 scenario

November 2009 Noise Impact Assessment (NIA)

Noise source locations for the original Year 5 scenario are included in the project noise impact assessment.

The original noise level predictions for this scenario are reproduced below. Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	35	45	35	30	32	41	47	41
117	30	43	34	28	28	37	46	41
34	35	45	35	31	31	40	47	41
23	35	45	36	31	31	40	46	41
24	37	46	38	34	34	43	48	41
52	39	47	40	35	35	45	49	41
30	42	49	42	39	40	47	51	41
32	42	49	42	39	40	47	51	41
26	35	45	40	32	32	40	47	41
151	45	52	46	42	43	50	53	50
18	40	50	45	40	39	45	51	41
11	40	47	45	40	37	42	50	41
8	40	46	45	40	36	41	49	41
2	36	45	42	36	35	40	46	41
50	47	52	49	45	44	48	52	41
51	47	52	49	45	44	48	52	41
119	30	43	40	30	29	33	41	44
120	30	43	39	30	29	33	40	44
121	33	41	35	31	30	36	45	44
83	28	40	35	27	25	32	41	41
84	27	38	34	25	24	29	40	41
114	29	42	36	28	27	34	45	41
111	25	38	25	24	24	33	40	41
129	54	>55	55	>55	>55	>55	55	37
130A	46	55	50	55	55	46	45	37
130B	37	48	47	49	41	35	41	37
184A	25	38	36	37	30	23	24	37

TABLE 14
(SEOC Nov 2009 NIA)
Predicted Year 5 intrusive noise levels.

June 2010 Noise Impact Assessment (NIA) Year 5 scenario

Re-modelled noise levels for Year 5 are summarised in Table 14(a) and figures C15-C21. The model includes the changes detailed earlier in the document.

Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey. Properties purchased or under purchase contract with ACOL since the November 2009 assessment are shaded yellow.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	25	38	27	24	24	33	38	37
117	24	36	28	20	20	34	36	37
34	25	39	29	22	24	34	37	37
23	25	40	30	22	25	34	37	37
24	26	40	30	23	25	35	38	37
52	28	40	30	25	26	35	38	37
30	30	40	30	26	27	36	39	37
32	31	40	31	28	30	40	40	37
26	32	42	35	30	30	40	40	37
151	36	44	41	35	35	44	44	50
18	32	42	39	30	30	39	41	41
11	31	41	38	30	28	35	39	41
8	31	41	37	30	27	35	39	41
2	28	40	36	28	26	34	38	41
50	38	45	41	35	35	41	42	41
51	41	48	44	38	38	45	46	41
119	26	39	35	22	25	33	37	44
120	25	37	32	25	24	29	34	44
121	30	40	32	27	27	35	40	44
83	24	36	29	22	22	29	37	41
84	23	34	26	20	20	28	35	41
114	23	36	30	23	22	35	36	41
111	20	34	20	<20	<20	31	33	41
129	46	50	50	>50	>50	46	45	37
130A	>50	>50	>50	>50	>50	>50	>50	37
130B	34	45	45	47	40	34	34	37
184A	23	34	34	35	28	20	<20	37

TABLE 14(a)
June 2010 Re-modelled Year 5 intrusive noise levels.

Year 7 scenario

November 2009 Noise Impact Assessment (NIA)

Noise source locations for the original Year 7 scenario are included in the project noise impact assessment.

The original noise level predictions for this scenario are reproduced below. Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	35	45	35	30	32	40	47	41
117	30	42	34	29	28	36	46	41
34	35	45	36	31	31	40	47	41
23	35	45	37	31	31	40	47	41
24	37	47	39	34	34	43	48	41
52	39	48	40	35	36	45	50	41
30	42	49	43	39	40	47	51	41
32	42	49	43	39	40	47	51	41
22	35	45	40	32	31	40	47	41
18	40	50	46	40	39	45	51	41
11	40	48	46	40	37	42	50	41
8	40	47	46	39	36	41	48	41
2	36	45	45	36	34	39	46	41
50	46	52	50	45	43	48	52	41
119	30	43	40	30	29	34	41	44
120	30	40	40	30	29	33	39	44
121	32	40	37	30	29	35	40	44
83	29	38	35	26	25	30	40	41
84	27	36	34	25	24	28	38	41
114	29	42	38	28	27	34	44	41
111	25	37	32	23	23	33	39	41
129	>55	>55	>55	>55	>55	>55	55	37
130A	46	55	50	55	55	47	45	37
130B	36	45	47	45	38	32	35	37
184A	23	35	37	34	25	<20	22	37

Receiver listed as 22 should be 26. Receivers 151 and 51 were not included in this Table in the EA.

TABLE 15
(SEOC Nov 2009 NIA)
Predicted Year 7 intrusive noise levels.

June 2010 Noise Impact Assessment (NIA) Year 7 scenario

Re-modelled noise levels for Year 7 are summarised in Table 15(a) and figures C22-C28. The model includes the changes detailed earlier in the document.

Exceedances of the critical night time criteria are in bold type. Major exceedances of more than 5 dB (acquisition zone) are shaded grey. Properties purchased or under purchase contract with ACOL since the November 2009 assessment are shaded yellow.

	Predicted intrusive noise level dB(A),$L_{eq(15min)}$							
			Winds					
Receiver	Neut	Inv	N	NE	ESE	S	WSW	Criteria
35	25	37	28	23	25	35	39	37
117	24	35	29	20	23	34	36	37
34	25	38	28	23	24	35	38	37
23	25	40	30	24	24	35	38	37
24	26	40	30	24	23	36	40	37
52	29	40	30	25	27	38	40	37
30	30	41	30	25	28	39	40	37
32	31	42	31	28	31	42	41	37
26	32	42	35	30	31	42	42	37
151	37	45	40	35	37	44	44	50
18	31	41	38	30	31	41	41	41
11	30	40	38	30	28	35	40	41
8	30	39	37	29	27	34	39	41
2	29	39	36	28	26	32	38	41
50	38	45	41	36	37	44	45	41
51	42	49	45	40	41	48	49	41
119	28	38	35	26	25	30	37	44
120	24	36	33	24	24	28	34	44
121	28	37	30	27	28	34	38	44
83	24	36	29	21	22	29	35	41
84	23	34	26	20	20	28	33	41
114	23	35	30	21	23	32	35	41
111	20	34	20	<20	<20	30	33	41
129	45	>50	50	>50	>50	45	45	37
130A	>50	>50	>50	>50	>50	>50	>50	37
130B	35	44	43	44	36	31	34	37
184A	<20	33	32	32	25	<20	<20	37

TABLE 15(a)
June 2010 Re-modelled Year 7 intrusive noise levels.

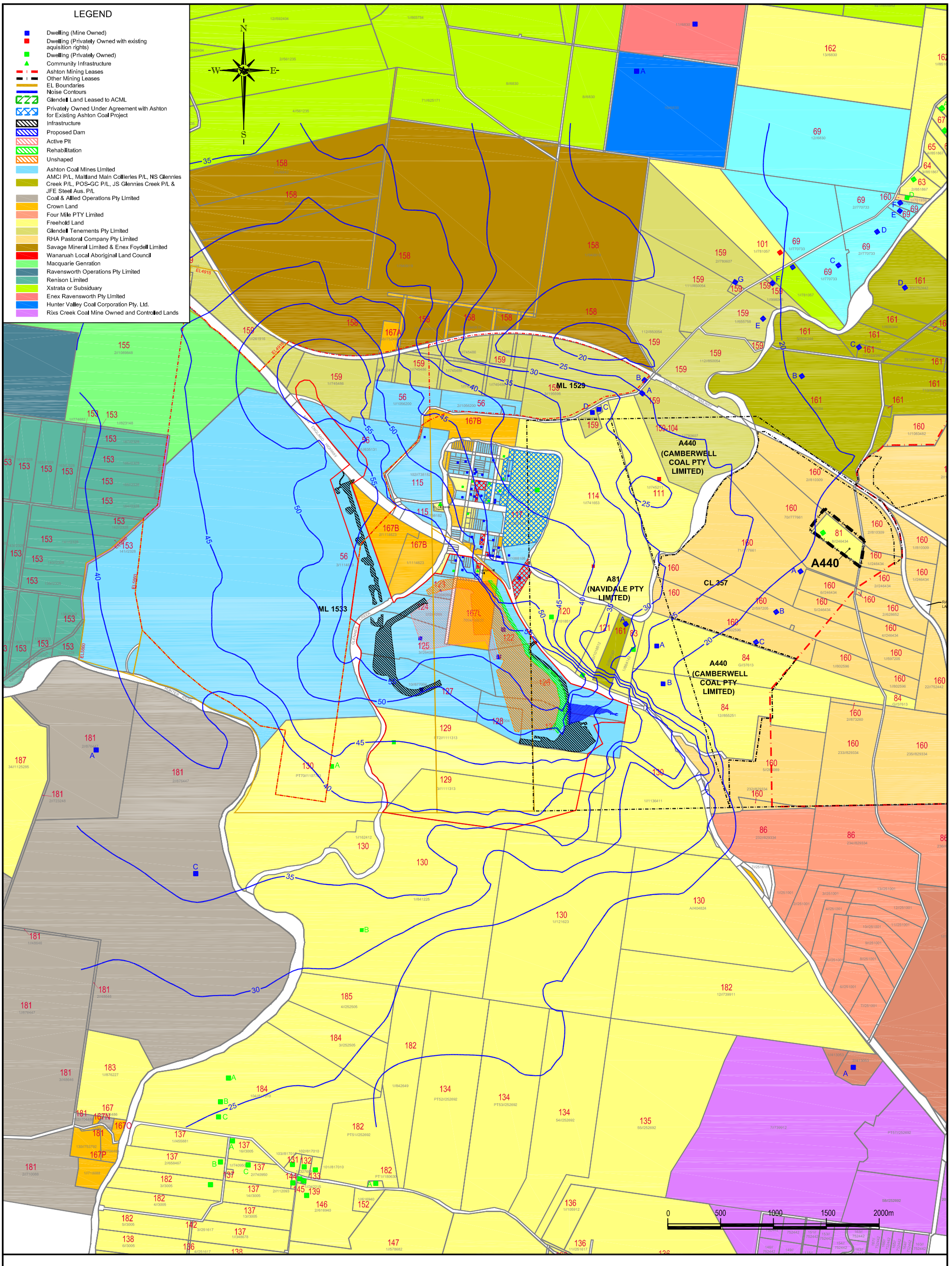
I trust this information satisfies your requirements at this time. Please call our office on 4954 2276 if you require further information.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Neil Pennington
Principal/Director

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands



South East Open Cut Project

AshtonCoal

Year 1 Noise Contours (ACP and SEOC Only) East–south–east wind

Plan C1

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06349A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N S E W

ML 1529 ML 1533 EL4918 EL5880 EL5881

A440 (CAMBERWELL COAL PTY LIMITED) A81 (NAVIDALE PTY LIMITED) CL 357 A440 (CAMBERWELL COAL PTY LIMITED) A440

NEW ENGLAND HIGHWAY HUNTER RIVER GLENDELL CREEK

0 500 1000 1500 2000m

South East Open Cut Project

Year 1 Noise Contours (ACP and SEOC Only) Inversion conditions

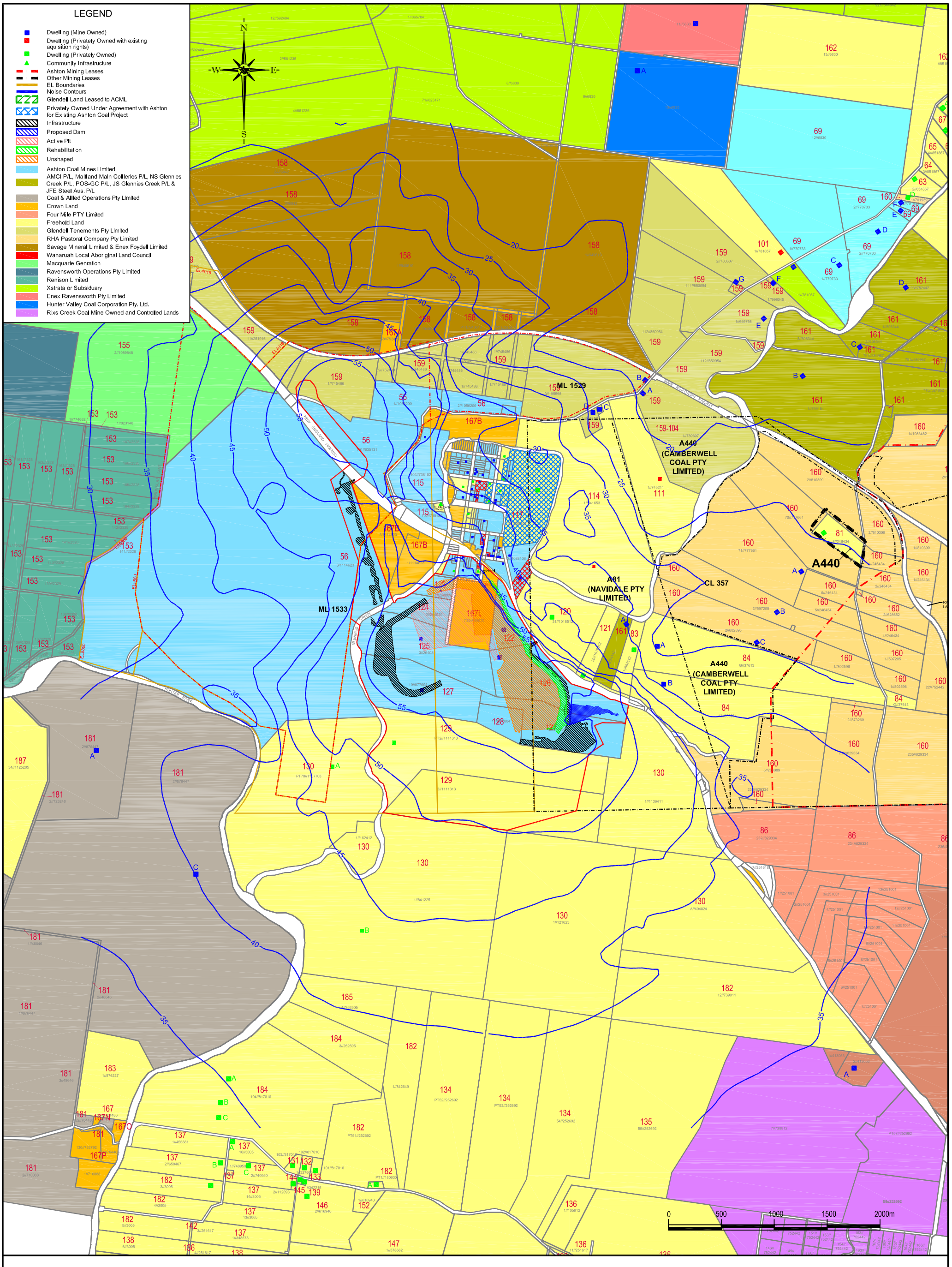
Plan C2

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06350A.dwg



AshtonCoal

South East Open Cut Project

Year 1 Noise Contours (ACP and SEOC Only) North wind

Spectrum Acoustics

Plan C3

Prepared by Pegasus Technical

CAD FILE: 06351A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

A440

A440 (CAMBERWELL COAL PTY LIMITED)

NEW ENGLAND HIGHWAY

GLENNIES CREEK ROAD

HUNTERS RANGE

EL4916

EL5880

EL5881

0 500 1000 1500 2000m

AshtonCoal

South East Open Cut Project

Year 1 Noise Contours (ACP and SEOC Only) North-east wind **Plan C4**

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06352A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N W E S

ML 1529

ML 1538

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

A440

NEW ENGLAND HIGHWAY

GLENNIES CREEK

HUNTER RIVER

0 500 1000 1500 2000m

South East Open Cut Project

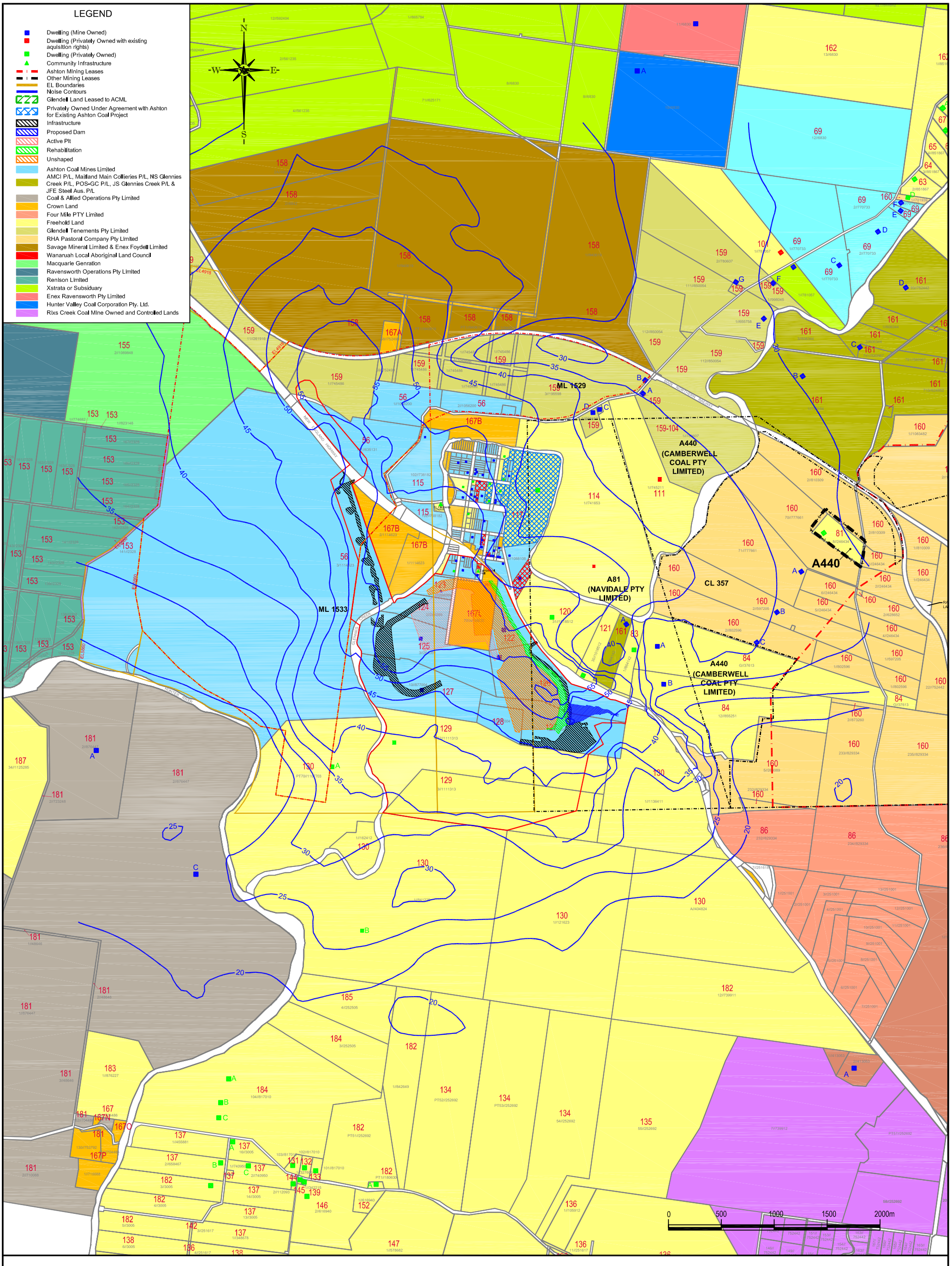
Year 1 Noise Contours (ACP and SEOC Only) Neutral conditions **Plan C5**

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06353A.dwg



South East Open Cut Project

Year 1 Noise Contours (ACP and SEOC Only) South wind

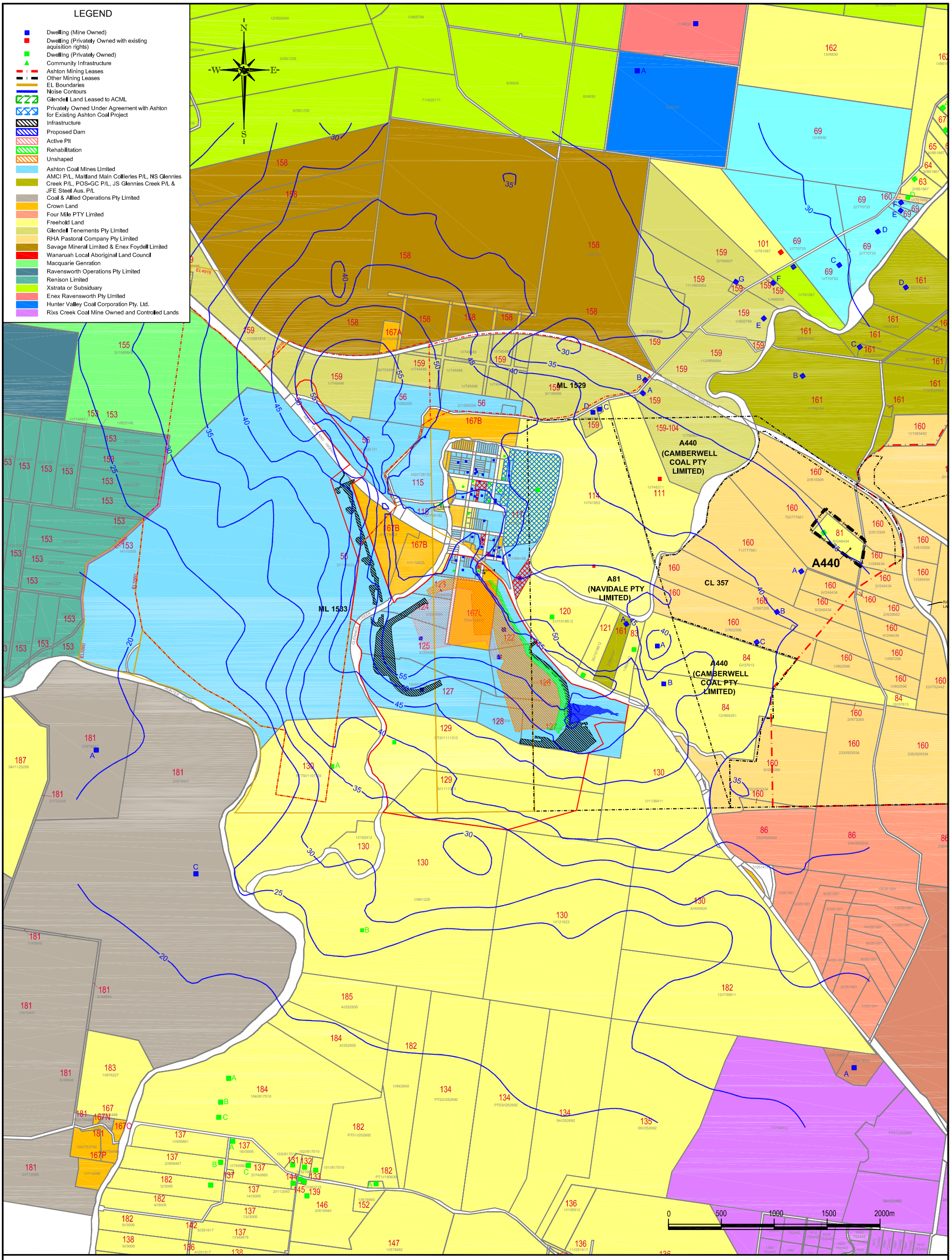
Spectrum Acoustics

AshtonCoal

Plan C6

Prepared by Pegasus Technical

CAD FILE: 06354A.dwg



South East Open Cut Project

Year 1 Noise Contours (ACP and SEOC Only) West-south-west wind

Plan C7

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06355A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N S E W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

A440

A440 (CAMBERWELL COAL PTY LIMITED)

NEW ENGLAND HIGHWAY

HUNTER RIVER RAILWAY

GLENNIES CREEK ROAD

0 500 1000 1500 2000m

South East Open Cut Project

AshtonCoal

Year 3 Noise Contours (ACP and SEOC Only) East-south-east wind

Plan C8

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06356A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N S E W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

HUNTER RIVER

0 500 1000 1500 2000m

South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) Inversion conditions

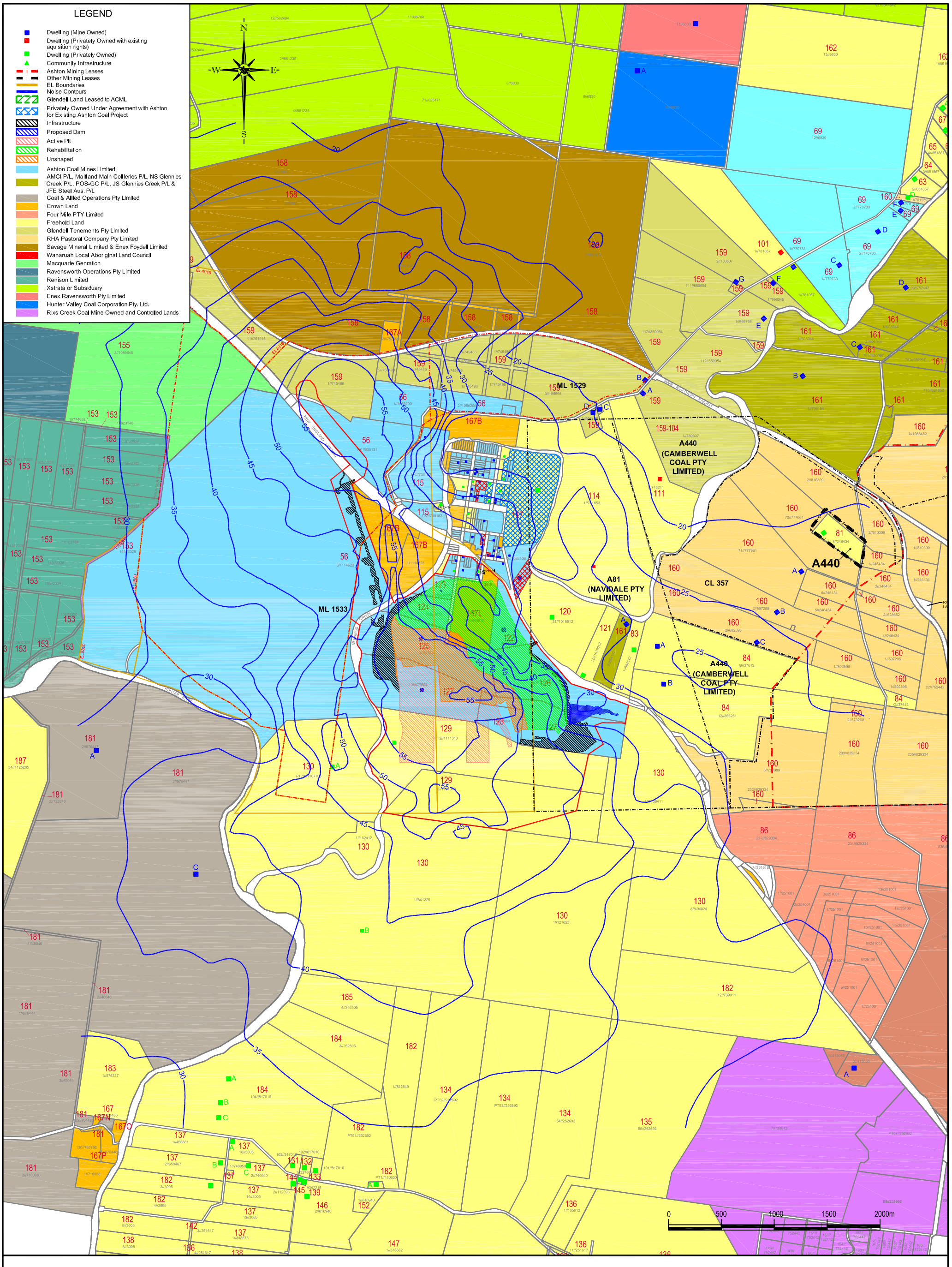
Plan C9

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06357A.dwg



AshtonCoal

South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) North wind

Spectrum Acoustics

Plan C10

Prepared by Pegasus Technical

CAD FILE: 06358A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

A440 (CAMBERWELL COAL PTY LIMITED)

NEW ENGLAND HIGHWAY

HUNTERS RANGE

GLENNIES CREEK ROAD

MAIN NORTHERN RAILWAY

EL4918

EL5860

0 500 1000 1500 2000m

AshtonCoal

South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) North-east wind

Plan C11

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06359A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N, S, E, W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

A440

A440 (CAMBERWELL COAL PTY LIMITED)

NEW ENGLAND HIGHWAY

HUNTER RIVER

GLENNIES CREEK ROAD

EL4918

EL5821

EL5820

0 500 1000 1500 2000m

South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) Neutral conditions

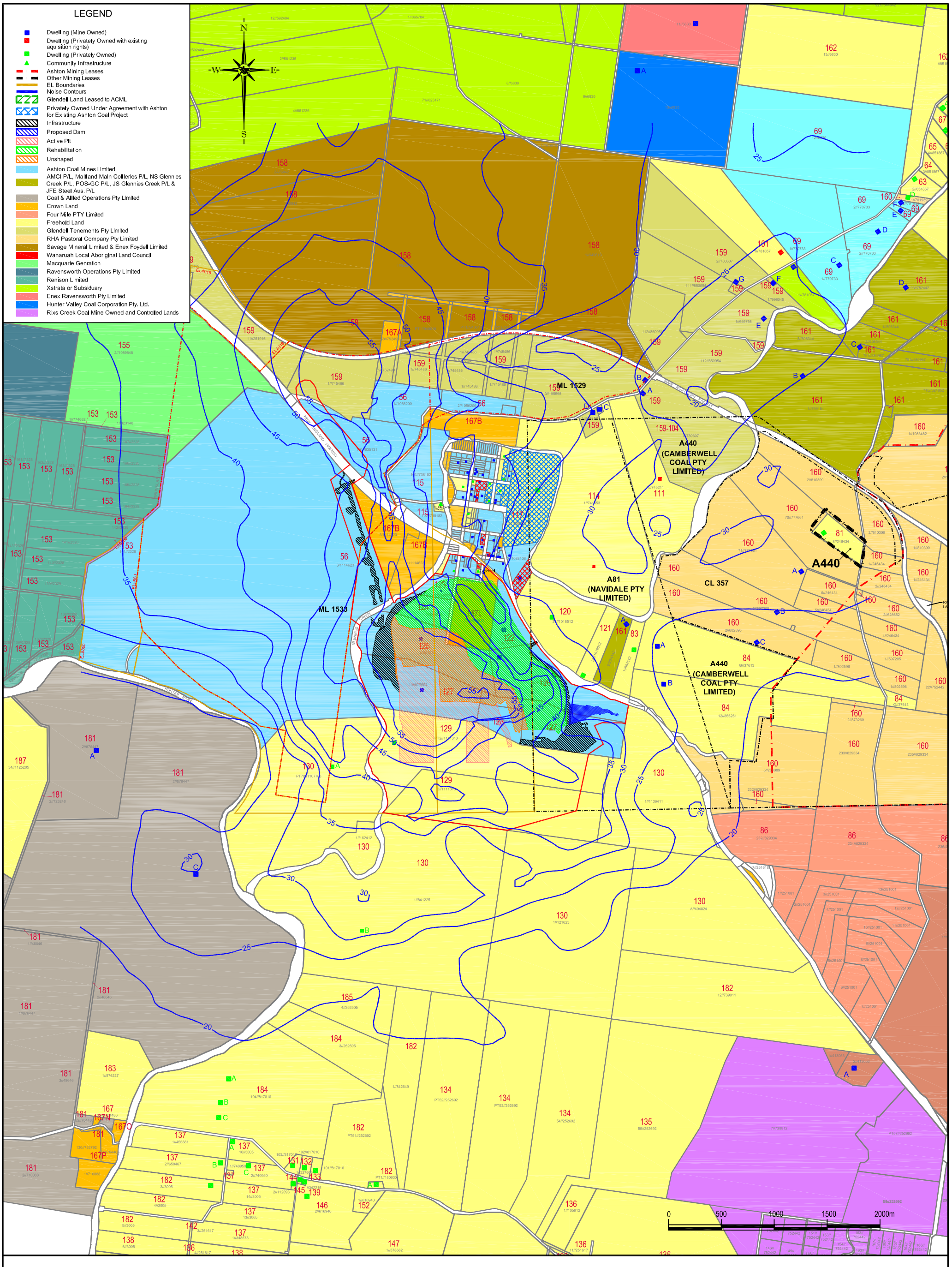
Spectrum Acoustics

Plan C12

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06360A.dwg



South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) South wind

Spectrum Acoustics

Plan C13

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06361A.dwg

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing aquisition rights)
- Dwelling (Privately Owned)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Noise Contours
- Glendell Land Leased to ACML
- Privately Owned Under Agreement with Ashton for Existing Ashton Coal Project
- Infrastructure
- Proposed Dam
- Active Pit
- Rehabilitation
- Unshaped
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Macquarie Genration
- Ravensworth Operations Pty Limited
- Renison Limited
- Xstrata or Subsidiary
- Enex Ravensworth Pty Limited
- Hunter Valley Coal Corporation Pty. Ltd.
- Rixs Creek Coal Mine Owned and Controlled Lands

N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

A440 (CAMBERWELL COAL PTY LIMITED)

0 500 1000 1500 2000m

South East Open Cut Project

Year 3 Noise Contours (ACP and SEOC Only) West-south-west wind

Plan C14

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06362A.dwg

LEGEND

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N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

0 500 1000 1500 2000m

South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) East-south-east wind

Spectrum Acoustics

Plan C15

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06363A.dwg

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N S E W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

A440 (CAMBERWELL COAL PTY LIMITED)

0 500 1000 1500 2000m

South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) Inversion conditions

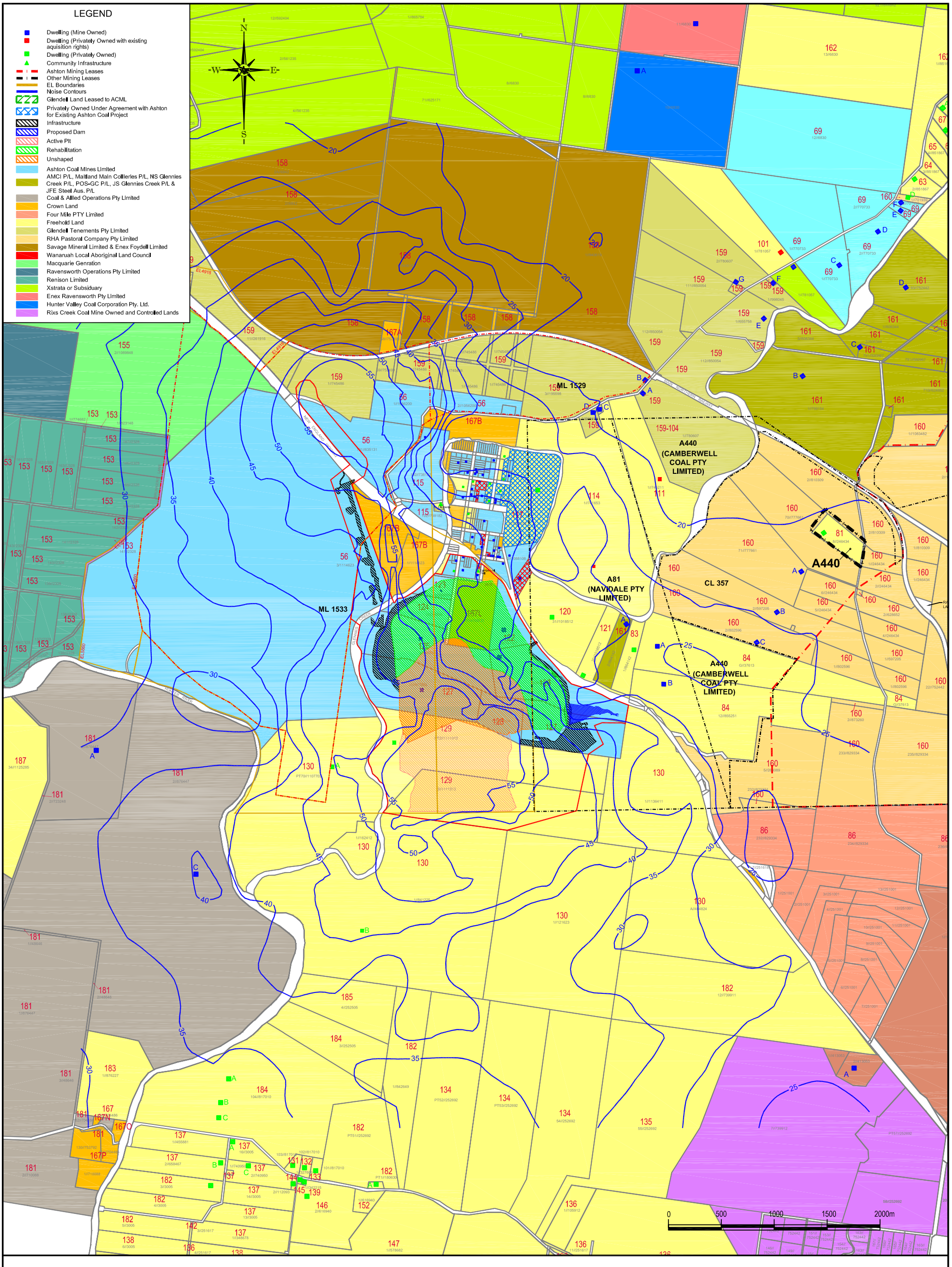
Spectrum Acoustics

AshtonCoal

Plan C16

Prepared by Pegasus Technical

CAD FILE: 06364A.dwg



AshtonCoal

South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) North wind

Spectrum Acoustics

Plan C17

Prepared by Pegasus Technical

CAD FILE: 06365A.dwg

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N S E W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

A440

A440 (CAMBERWELL COAL PTY LIMITED)

NEW ENGLAND HIGHWAY

HUNTER RIVER

GLENNIES CREEK

0 500 1000 1500 2000m

South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) North-east wind

Plan C18

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06366A.dwg

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N S E W

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

CL 357

EL4918

EL5820

NEW ENGLAND HIGHWAY

GLENNIES CREEK RD

HUNTER RIVER

0 500 1000 1500 2000m

South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) Neutral conditions

Plan C19

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06367A.dwg

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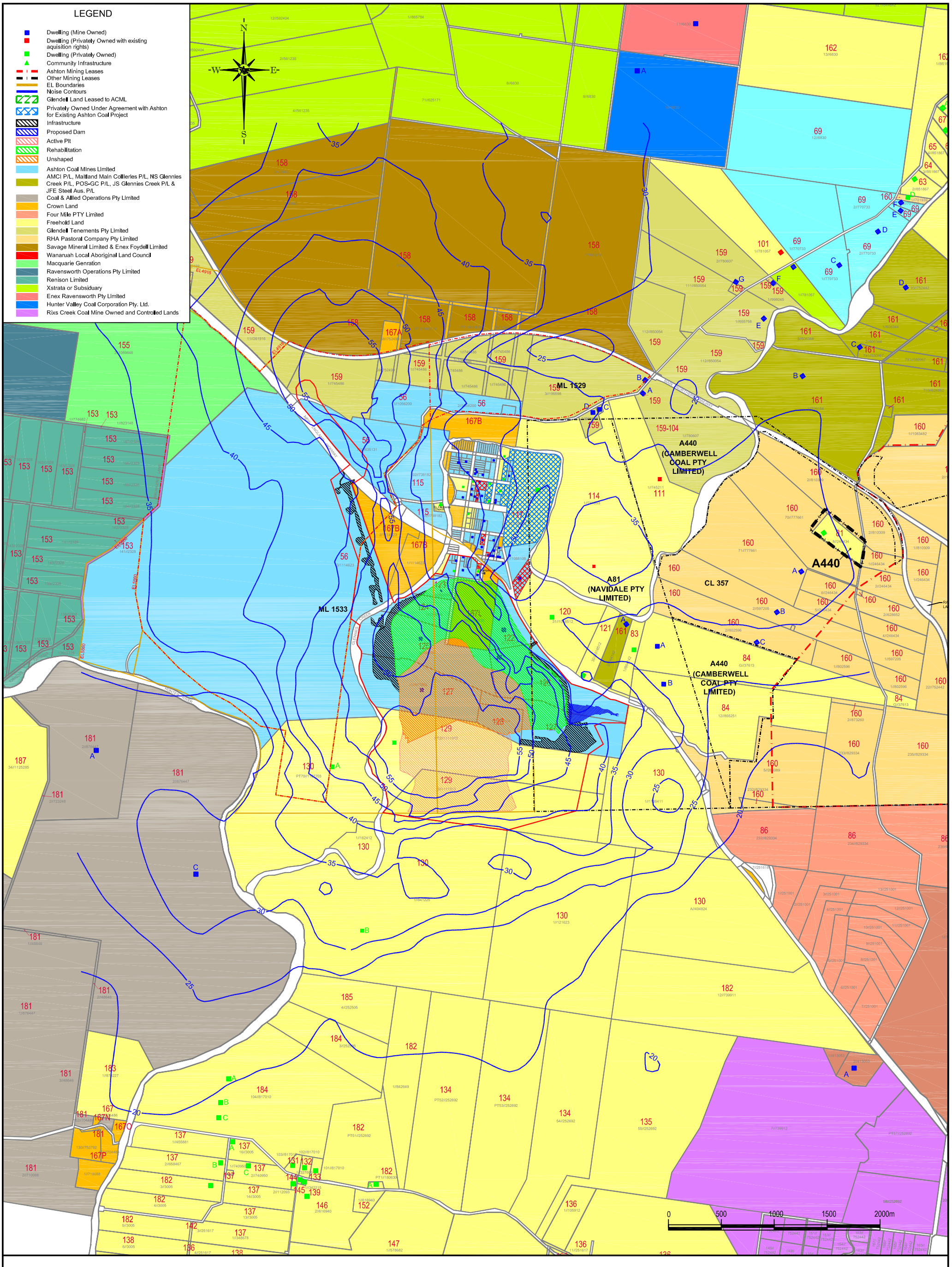


South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) South wind

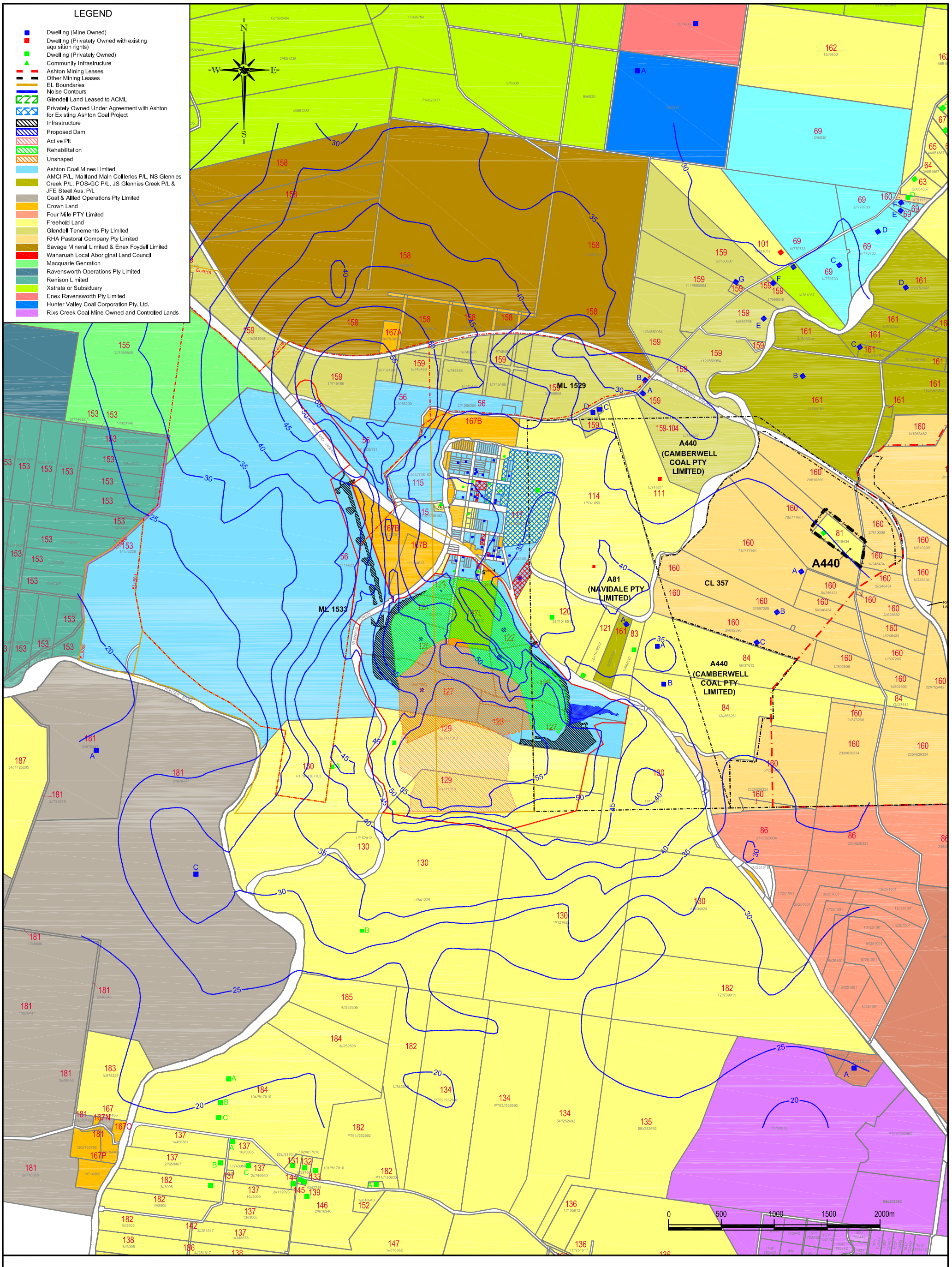
Spectrum Acoustics

Plan C20

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06368A.dwg



South East Open Cut Project

Year 5 Noise Contours (ACP and SEOC Only) West-south-west wind

Plan C21

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06369A.dwg

LEGEND

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N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

A440 (CAMBERWELL COAL PTY LIMITED)

HUNTER RIVER

GLENNIES CREEK

0 500 1000 1500 2000m

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) East-south-east wind

Spectrum Acoustics

Plan C22

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06370A.dwg

LEGEND

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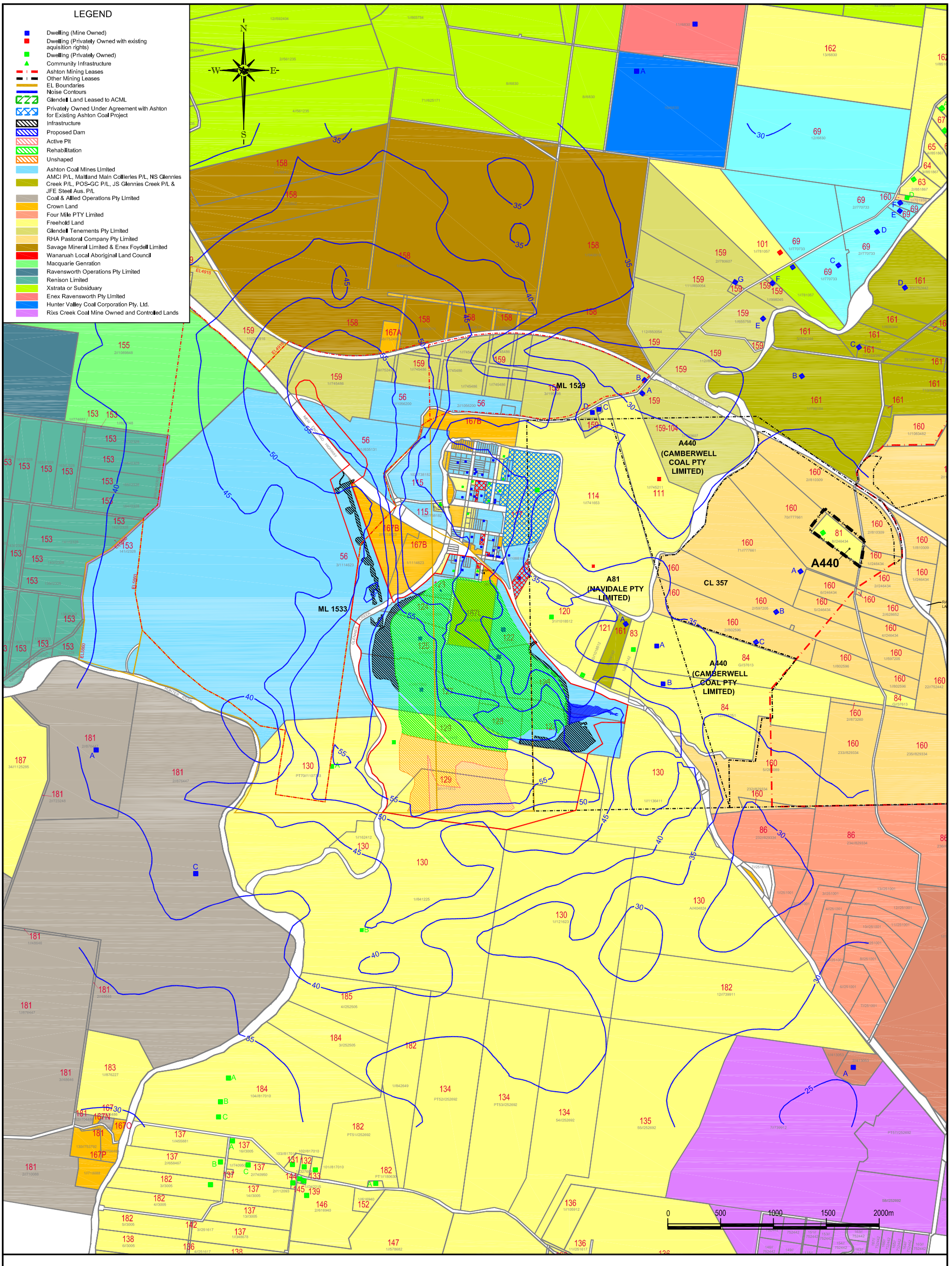

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) Inversion conditions

Plan C23

Spectrum Acoustics

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06371A.dwg

LEGEND

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N W E S

ML 1529

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

ML 1533

CL 357

A440

A440 (CAMBERWELL COAL PTY LIMITED)

0 500 1000 1500 2000m

AshtonCoal

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) North wind

Spectrum Acoustics

Plan C24

Prepared by Pegasus Technical

CAD FILE: 06372A.dwg

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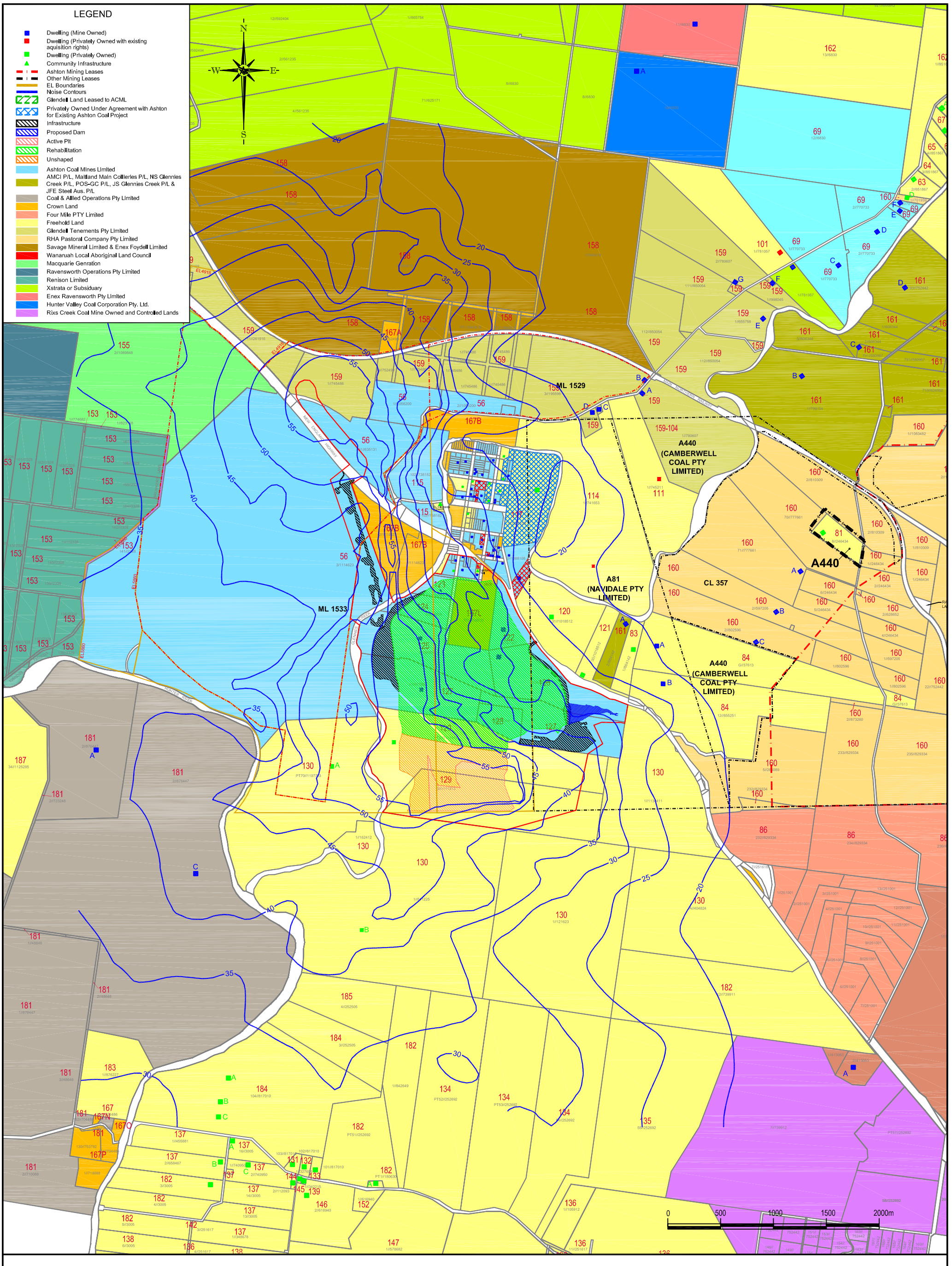

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) North-east wind

Spectrum Acoustics

Plan C25

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06373A.dwg

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N W E S

ML 1529

ML 1538

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

A440 (CAMBERWELL COAL PTY LIMITED)

NEW NEW ENGLAND HIGHWAY

GLENNIES CREEK

HUNTER RIVER

EL4918

EL5920

0 500 1000 1500 2000m

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) Neutral conditions

Plan C26

AshtonCoal

Spectrum Acoustics

Prepared by Pegasus Technical

CAD FILE: 06374A.dwg

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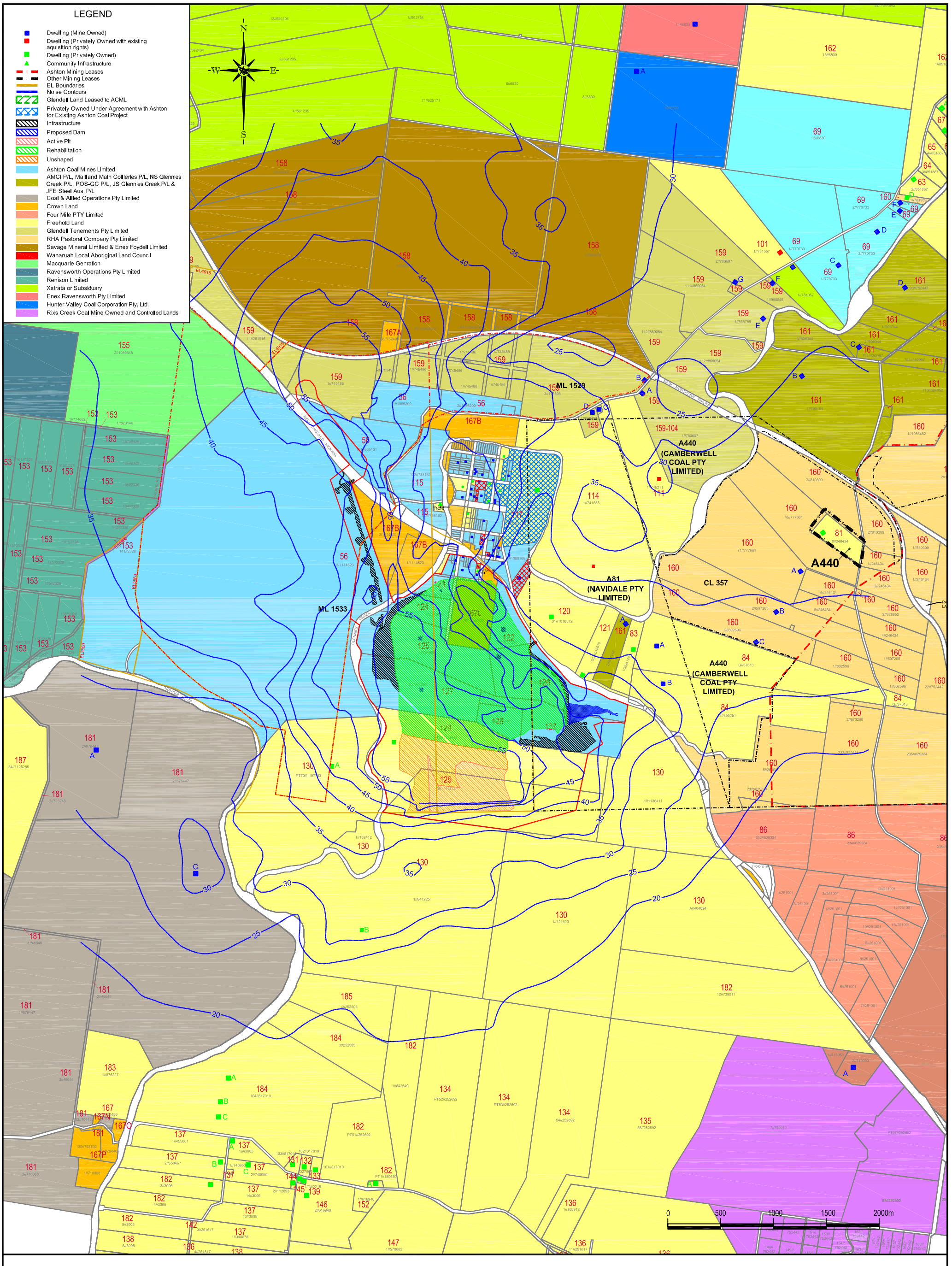

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) South wind

Spectrum Acoustics

Plan C27

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06375A.dwg

LEGEND

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N W E S

ML 1529

ML 1533

A440 (CAMBERWELL COAL PTY LIMITED)

A81 (NAVIDALE PTY LIMITED)

A440

CL 357

0 500 1000 1500 2000m

South East Open Cut Project

Year 7 Noise Contours (ACP and SEOC Only) West-south-west wind

Plan C28

Spectrum Acoustics

AshtonCoal

Prepared by Pegasus Technical

CAD FILE: 06376A.dwg

Appendix 3

Revised air quality impact assessment for SEOC Project Year 1

South East Open Cut Project

&

Modification to the

Existing ACP Consent

9 June 2010

Lisa Richards
Environment and Community
Relations Manager
Ashton Coal Operations Ltd.

Dear Lisa,

Re: Assessment of Incremental (Mine Only) Air Quality Impacts for a Rescheduled Start Date and Revised Mine Plan for the Proposed South East Open Cut Mine

Ashton Coal Operations Pty Limited (Ashton) has asked PAEHolmes to investigate the air quality impacts arising from a later start date and revised mine plan for the proposed South East Open Cut (SEOC) for Year 1 (2010).

This letter provides a brief overview of the assessment approach and predicted potential air quality impacts at receptors in the vicinity of Camberwell village that would arise from the optimised 2010 mine plan.

This letter only addresses incremental impacts arising from the mine alone in year 1. Cumulative impacts and potential impacts in any subsequent year are not presented.

1. INTRODUCTION

PAEHolmes completed an air quality impact assessment for the proposed SEOC mine in 2009, the "Project". The assessment was submitted to Department of Planning (DoP) as part of the Environmental Assessment (EA) for the Project.

Due to a delay start in the anticipated start date, and in order to reduce potential impacts as far as practicable at Camberwell village, Ashton has revised the 2009 EA mine plan for the SEOC. The key elements of the 2010 mine plan include:

- Reduced coal extraction;
- Increased dust control in exposed areas (targeted watering of high risk exposed areas and use of crusting agents or equivalent); and,
- Bund extension immediately to the north of the proposed SEOC.
- Mobile crushing stations in the ROM pad borrow pit and at the surface facilities construction area, these are below ground level or placed behind a purpose-built bund.

PAEHolmes

SYDNEY

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Eastwood NSW 2122

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Fax: + 61 2 9874 8904

info@paeholmes.com
www.paeholmes.com

BRISBANE

GOLD COAST

TOOWOOMBA

A PEL COMPANY

Queensland Environment Pty Ltd
Trading as PAEHolmes
ABN: 86 127 101 642

2 EMISSION ESTIMATION

Dust emissions were estimated using the same approach as that described in the previous Air Quality Impact Assessment report submitted with the EA for the proposed SEOC (see Section 7 of 2009 Air Quality Assessment / Appendix 3 of the EA). The revised inventory is presented below.

Table 1: Summary of estimated TSP emissions from the Project (kg/y)

ACTIVITY	Year 1 (First Half)	Year 1 (Second Half)	TOTAL
Topsoil Removal - Dozers/Excavators stripping topsoil (ROM pit and borrow pits)	2,039	-	2,039
Topsoil removal - Sh/Ex/FELs loading topsoil from open pit	584	-	584
Topsoil removal - Sh/Ex/FELs loading topsoil from borrow pits	4,732	-	4,732
Topsoil removal - Hauling topsoil from open pit to out of pit dump	9,650	-	9,650
Topsoil removal - Hauling topsoil from borrow pit 1 to ROM pad	56,207	-	56,207
Topsoil removal - Hauling topsoil from borrow pit 2 to MIA	8,146	-	8,146
Topsoil removal - Emplacing topsoil at out of pit dump	584	-	584
Topsoil removal - Emplacing topsoil at ROM pad and MIA	4,732	-	4,732
OB - Drilling	2,110	4,151	6,260
OB - Blasting	1,620	4,471	6,092
OB - Excavator loading OB from pit to haul truck	24,822	48,834	73,656
OB - Hauling to out of pit dump	201,808	-	201,808
OB- Emplacing at out of pit dump	24,822	-	24,822
OB - Hauling to blue OB area	-	35,154	35,154
OB - Hauling to green OB area	-	57,901	57,901
OB - Hauling to east dump	-	372,219	372,219
OB- Emplacing at emplacement area	-	48,834	48,834
OB - Excavator loading OB from borrow pits 1 and 2 to crusher	6,059	-	6,059
OB - Crushing rock in borrow pits 1 and 2	2,106	-	2,106
OB - Screening rock in borrow pits 1 and 2	3,861	-	3,861
OB - Excavator loading crushed/uncrushed OB from borrow pits 1 and 2 to haul truck	14,819	-	14,819
OB - Hauling from borrow pit 1 to ROM/levee	74,568	-	74,568
OB - Hauling from borrow pit 2 to MIA	17,779	-	17,779
OB- Emplacing all rock from borrow pits to ROM/levee and MIA	14,819	-	14,819
OB - Dozers on OB	11,967	11,967	23,934
CL - Dozers ripping/pushing/clean-up	-	48,852	48,852
CL - Sh/Ex/FELs loading open pit coal to trucks	-	86,575	86,575
CL - Hauling open pit coal to ROM pad	-	32,422	32,422
CL - Unloading ROM to ROM stockpiles	-	10,794	10,794
CL - Loading ROM directly to hopper to be crushed	-	25,973	25,973
CL - Loading from stockpile to crusher using FELs	-	60,603	60,603
CL - Crushing ROM	-	4,163	4,163
CL - ROM hopper unloading coal to conveyor 1	-	15,420	15,420
CL- Conveyor to CHPP	-	993	993
CL - Unloading to transfer point 1	-	323	323
CL - Unloading to transfer point 2	-	323	323
CL - Unloading to transfer point 3	-	323	323
CL - Unloading to transfer point 4	-	323	323
CL - Unloading to transfer point 5	-	323	323
CL - Unloading to CHPP	-	461	461
CL - Unloading underground coal to CHPP	20,000	20,000	40,000
CL- Handle coal at CHPP (100%)	598	1,058	1,656
CL- Rehandle coal at CHPP (+10%)	60	106	166
CL - Loading product coal to trains	359	359	717
CL - Loading rejects and tailings to haul trucks	158	462	620
CL - Hauling rejects and tailings to NEOC voids	7,441	21,785	29,226
CL - Unloading rejects and tailings to NEOC voids	158	462	620
WE - OB (south east) Dump	-	38,544	38,544
WE - Open pit	12,439	24,178	36,617
WE - North bund	-	2,050	2,050
WE - East Bund	13,490	11,747	25,238
WE - ROM stockpiles	-	5,116	5,116
WE - Product stockpiles	-	-	-
WE - Out of pit dump	9,811	-	9,811
WE - OB extraction (994 2x trucks)	10,512	-	10,512
WE - Dam construction	526	-	526
WE - Product Stockpiles	-	1,752	1,752
WE - ROM Pad	26,806	-	26,806
WE - Borrow Pits	25,579	12,790	38,369
Grading roads	7,189	43,132	50,320
Upcast Vent	31,536	31,536	63,072
Total	**654,495**	**1,086,474**	**1,740,969**

The total anticipated TSP emissions are around 1,740 tonnes of TSP which is approximately 94 tonnes more than in the 2009 EA mine plan. Whilst this represents an increase in the total quantity of dust generated, this does not necessarily result in greater impacts.

3 MODELLING METHODOLOGY

In order to provide sufficient resolution of the ramp-up stage of the first year of activity, the approach taken has been to model the potential dust impacts based on a detailed mine plan, broken down into two 6-month stages.

The proposed SEOC operations were modelled for Year 1, with a projected starting date in September 2010. The modelling applied seasonally corresponding meteorological data from September 2007 to August 2008. The figures below show the mine plans that represent the first half and second half of year 1 of the proposed SEOC operations.

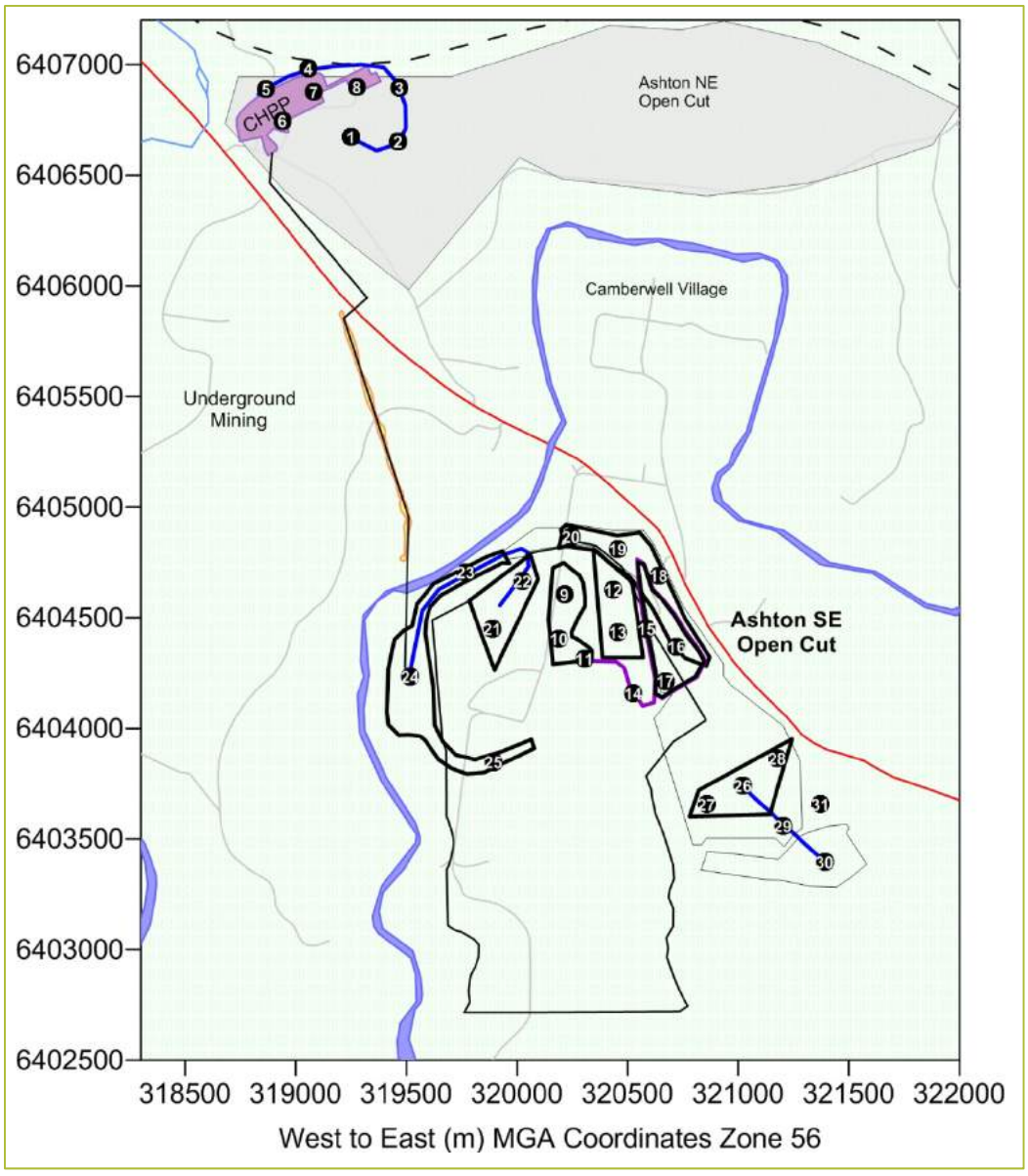


Figure 1: Modelling sources locations – Year 1 (First Half)

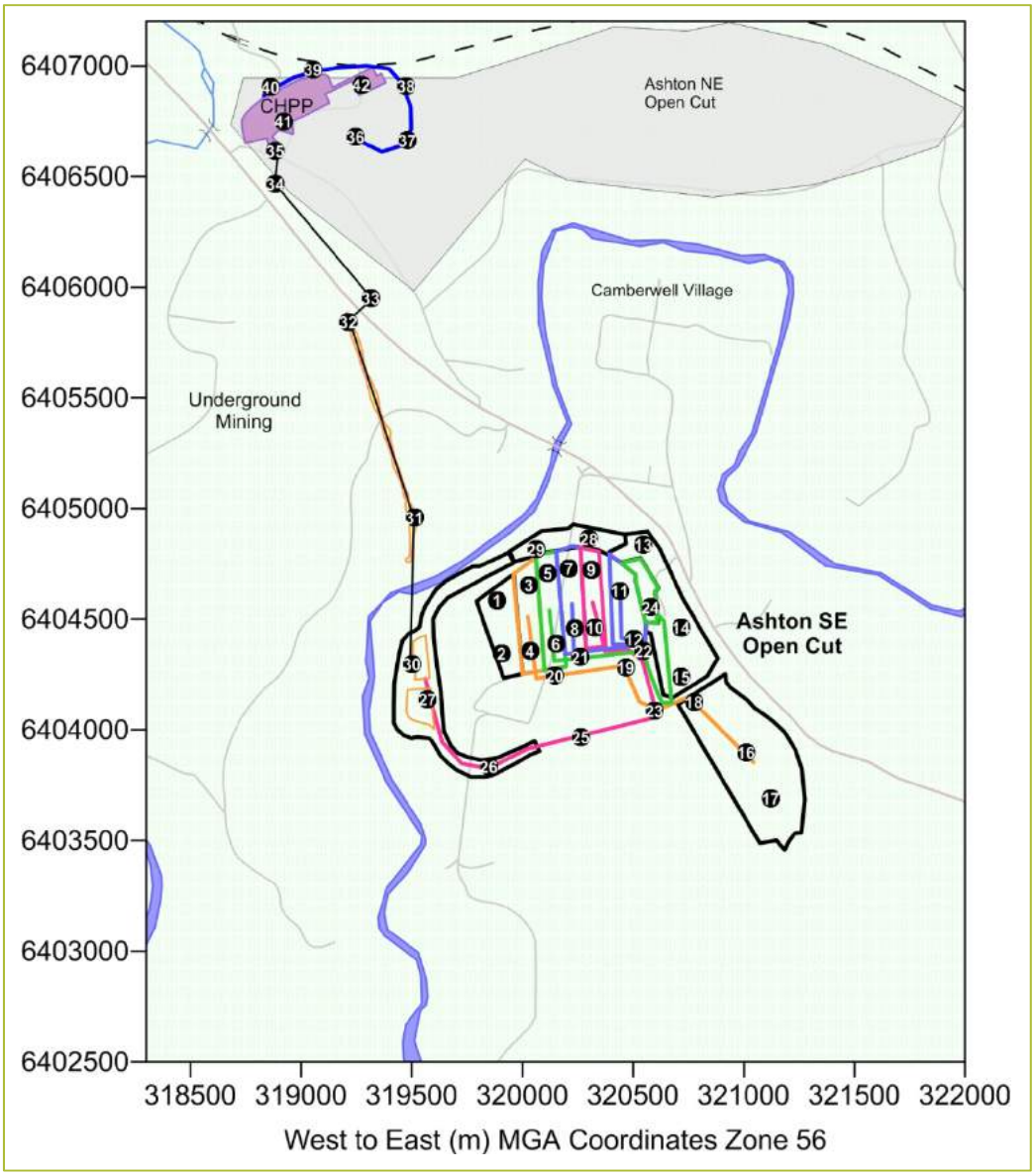


Figure 2: Modelling sources locations – Year 1 (Second Half)

4 RESULTS AND ASSESSMENT

4.1 24-hour average PM_{10} impact

Note that Ashton Coal Operations Limited (ACOL) has acquired some private residences since 2009 and this is a factor in the reduces amount of affected private residences as shown in **Table 3**.

Table 2 presents all privately owned receptors that are predicted to experience impacts in year 1 as a result of the 2010 revised mine plan. **Table 3** presents the results from the 2009 EA as presented in Table 8.6 of the Air Quality Impact Assessment Report which shows all privately owned receptors that were predicted to experience impacts in years 1, 3, 5, 7 as a result of the original 2009 EA plan.

Compared to the 2009 EA, fewer residences are now predicted to experience 24-hour average impacts in year 1. The revised 2010 mine plan results show that there are now 8 privately owned receptors in year 1 predicted to experience an impact above the DECCW criterion of 50 µg/m^3 for 24-hour average PM_{10}, (compared to 14 in the 2009 EA). Of these 8, 3 would experience such impacts on more than 5 days in year 1, per the DoP acquisition criterion for 24-hour average PM_{10} (compared with 9 in the 2009 EA).

Note that Ashton Coal Operations Limited (ACOL) has acquired some private residences since 2009 and this is a factor in the reduces amount of affected private residences as shown in **Table 3**.

Table 2: Number of days 24-hour average PM_{10} concentrations are predicted to exceed 50 µg/m^3 due to Project alone at private residences only as at June 2010

ID	Number of days above criteria	
	2009 EA	2010 mine plan (revised start date and mine plan)
18	1	1
46	**54**	**14**
83	3	3
084A[a]	-	2
084B[a]	2	4
114[b]	4	2
120	**29**	**14**
121	**49**	**55**

Notes:

a. These residences have Acquisition Right agreements with Integra Mine.

b. These residences have Acquisition Right agreements with Glendell.

Table 3: 2009 Environmental Assessment Table 8.6

Number of days 24-hour average PM_{10} concentrations are predicted to exceed 50 $\mu g/m^3$ due to Project alone at private residences only (2009 EA)

ID	Number of days above criteria			
	2009 EA Year 1	2009 EA Year 3	2009 EA Year 5	2009 EA Year 7
2[d]	**13**	**9**	**8**	-
8[d]	**13**	**9**	**8**	-
11[d]	**7**	3	**7**	-
18	1	1	5	-
23	-	-	3	-
024A	-	-	3	-
024B	-	-	3	-
26[d]	-	-	2	-
30	-	-	1	-
34	-	-	3	-
35	-	-	2	-
46	**54**	**13**	**10**	-
50[d]	**57**	**9**	**7**	-
51[d]	**127**	**19**	**10**	-
52[d]	-	-	3	-
83	3	**14**	**9**	-
084A[a]	-	**8**	4	-
084B[a]	2	**13**	**9**	-
114[b]	4	3	3	-
117	-	2	2	-
119[d]	**130**	**10**	**9**	-
120	**29**	**15**	-	-
121	**49**	**43**	**26**	-
129[c]	-	**20**	NA	NA
130A	-	3	**27**	**34**
151	2	2	2	-
187	-	-	1	-

Notes:

a. These residences have Acquisition Right agreements with Integra Mine.
b. These residences have Acquisition Right agreements with Glendell.
c. Residence would not exist by Year 5 due to mining.
d. ACOL Acquired our under purchase contract.

Figure 6 presents the predicted 24-hour average PM_{10} concentrations at the 98.6 percentile level, which is an indication of the DoP acquisition criteria for 24-hour average mine only impact. The contour shows the approximate area within which 5 or more days above the criteria are predicted to occur.

4.2 Annual average impacts

Table 4 presents the predicted annual average PM_{10}, TSP and deposited dust levels arising from the proposed SEOC alone at each receptor in the area around the proposed SEOC.

Figure 3 to Figure 5 plot the predicted annual average dust concentrations due to the operations of the SEOC alone in Year 1.

Compared to the equivalent 2009 EA plots, (and noting that the annual average criteria are cumulative), the predicted annual average:

- PM_{10} results are reduced and predicted levels of 30 µg/m^3 or more are predominantly within the lease boundary;
- TSP results are reduced and predicted levels of 90 µg/m^3 or more are almost entirely within the lease boundary; and,
- Deposited dust results (near 2 g/m^2/month) are essentially unchanged.

Closer inspection of the results shows that generally, the predicted levels to the north-west are reduced, and levels to the south east are increased slightly when compared to the 2009 EA results. While there is a slight increase to the south east it is noted that no increase to the impacted residences. The changes are expected to arise due to the revised start date.

The aim of this study is to assist Ashton to reduce dust levels under its control to the maximum practicable extent, and to verify the extent of the reduction. This would result in lower cumulative levels, and thus cumulative dust levels have not been further assessed.

5 CONCLUSIONS

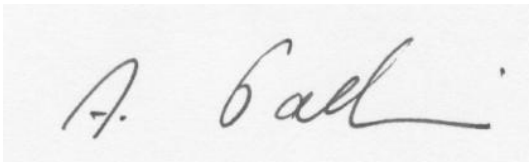
This letter-report presents an assessment of potential dust impacts at Camberwell village arising from a revised start date and a revised 2010 mine plan for Year 1 of the proposed Ashton SOEC.

The modelling took account of meteorological conditions and terrain information, used hourly varying emission estimates and two detailed (6-month) mine plan stages matched with prevailing weather conditions for each stage to predict the potential dust concentrations that may arise at selected receptor locations.

The predictions show that with the revised start date and mine plan, the potential dust impacts from the proposed SEOC appear to be reduced most significantly at the nearest privately owned receptors in Camberwell village to the north, with generally overall lower impacts to the north-west, and slightly greater impacts to the south-east whilst not impacting on additional private residences.

****

Please do not hesitate to contact me if you need any further information or clarification of any of the issues related to this assessment.



Yours sincerely

Aleks Todoroski
Technical Manager
PAEHolmes

6 REFERENCES

PAEHolmes (2009)

"Air Quality Impact Assessment: Ashton South East Open Cut Mine", October, 2009

Appendix A: Results

Table 4: Summary of predicted annual average air quality impacts for Year 1

ID	Year 1 – Project alone			Year 1 - Project and other sources		
	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)
	Assessment criteria					
	N/A	*N/A*	*2*	*30*	*90*	*4*
Private residences						
18	4	4	0.1			
23	3	4	0.1			
024A	3	4	0.1			
024B	4	4	0.1			
30	3	4	0.1			
32	3	4	0.1			
34	3	3	0.1			
35	3	3	0.1			
46	10	12	0.3			
58	0	0	0.0			
60	0	0	0.0			
061A	0	0	0.0			
061B	0	0	0.0			
061C	0	0	0.0			
62	0	0	0.0			
63	0	0	0.0			
64	0	0	0.0			
65	0	0	0.0			
66	0	0	0.0			
067A	0	0	0.0			
067B	0	0	0.0			
68	0	0	0.0			
069A	0	0	0.0			
70	0	0	0.0			
71	0	0	0.0			
072B	0	0	0.0			
072C	0	0	0.0			
73	0	0	0.0			
74	0	0	0.0			
75	0	0	0.0			
76	0	0	0.0			
77	0	0	0.0			
78	0	0	0.0			
80	0	0	0.0			
81	1	1	0.0			
83	7	8	0.4			
084A[a]	5	6	0.3			
084B[a]	7	8	0.5			
87	0	0	0.0			
89	0	0	0.0			
91	0	0	0.0			
92	1	1	0.0			
93	1	1	0.0			
94	1	1	0.0			
95	1	1	0.0			
96	1	1	0.0			
97	0	0	0.0			
98	0	0	0.0			
99	1	1	0.0			
100A	0	0	0.0			
100B	0	0	0.0			
100C	0	0	0.0			
100D	0	0	0.0			
101A	0	0	0.0			

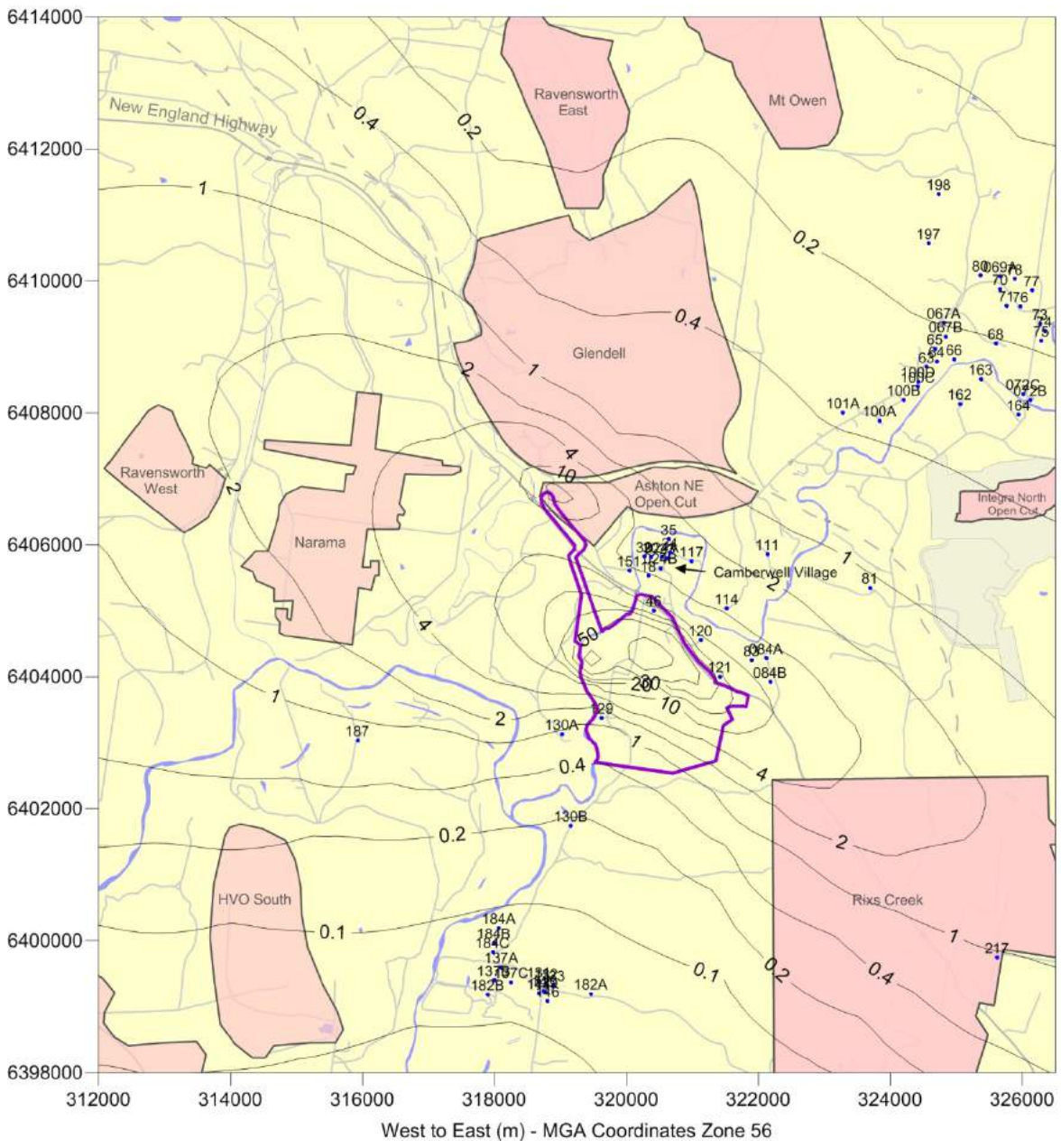
ID	Year 1 – Project alone			Year 1 - Project and other sources		
	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)
	Assessment criteria					
	N/A	*N/A*	*2*	*30*	*90*	*4*
102	1	1	0.0			
103	1	1	0.0			
105	1	1	0.0			
107	1	1	0.0			
108	1	1	0.0			
111	1	2	0.0			
114	4	4	0.1			
117	3	3	0.1			
120	11	14	0.8			
121	21	25	1.8			
129	1	1	0.1			
130A	1	1	0.0			
130B	0	0	0.0			
131	0	0	0.0			
132	0	0	0.0			
133	0	0	0.0			
137A	0	0	0.0			
137B	0	0	0.0			
137C	0	0	0.0			
139	0	0	0.0			
144	0	0	0.0			
145	0	0	0.0			
146	0	0	0.0			
151	4	5	0.1			
162	0	0	0.0			
163	0	0	0.0			
164	0	0	0.0			
169	0	0	0.0			
182A	0	0	0.0			
182B	0	0	0.0			
184A	0	0	0.0			
184B	0	0	0.0			
184C	0	0	0.0			
187	1	1	0.0			
197	0	0	0.0			
198	0	0	0.0			
201	0	0	0.0			
202	0	0	0.0			
203	0	0	0.0			
204	0	0	0.0			
205	0	0	0.0			
206	0	0	0.0			
207	0	0	0.0			
208	1	1	0.0			
209	1	1	0.0			
210	1	1	0.0			
211	1	1	0.0			
212	1	1	0.0			
213	1	1	0.0			
214	1	1	0.1			
215	1	1	0.1			
216	1	1	0.1			
217	1	1	0.0			
Mine-owned residences						
1	7	8	0.2			
2	6	7	0.2			

ID	Year 1 – Project alone			Year 1 - Project and other sources		
	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)
	Assessment criteria					
	N/A	*N/A*	*2*	*30*	*90*	*4*
3	6	7	0.2			
4	5	6	0.1			
5	5	6	0.1			
6	6	7	0.2			
7	6	7	0.2			
8	6	7	0.2			
10	5	5	0.1			
11	5	6	0.1			
12	6	7	0.1			
13	5	6	0.1			
17	4	5	0.1			
21	4	4	0.1			
22	3	4	0.1			
25	4	4	0.1			
26	4	4	0.1			
27	4	4	0.1			
28	4	4	0.1			
29	3	4	0.1			
31	4	4	0.1			
33	3	3	0.1			
36	3	3	0.1			
36	3	4	0.2			
38	3	4	0.1			
39	3	4	0.1			
40	3	4	0.2			
41	3	4	0.2			
43	3	4	0.2			
44	3	4	0.2			
45	12	15	0.5			
47	13	17	0.6			
49	9	10	0.3			
50	11	14	0.4			
51	17	22	0.9			
52	3	4	0.1			
069B	0	0	0.0			
079A	0	0	0.0			
079B	0	0	0.0			
079C	0	0	0.0			
101B	0	0	0.0			
115	5	6	0.3			
118	6	7	0.2			
119	8	10	0.3			
122	89	149	19.5			
123	81	110	6.3			
125	63	99	7.1			
127	58	94	9.2			
128	10	13	1.1			
153	1	1	0.0			
159A	1	1	0.0			
159B	1	1	0.0			
159C	1	1	0.0			
159D	1	1	0.0			
159E	0	0	0.0			
159F	0	0	0.0			
159G	0	0	0.0			
160A	1	2	0.0			

ID	Year 1 – Project alone			Year 1 - Project and other sources		
	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)	PM_{10} ($\mu g/m^3$)	TSP ($\mu g/m^3$)	Dust deposition (g/m^2/month)
	Assessment criteria					
	N/A	*N/A*	*2*	*30*	*90*	*4*
160B	2	2	0.1			
160C	3	3	0.1			
160D	0	0	0.0			
161A	1	1	0.0			
161B	0	0	0.0			
161C	5	6	0.3			
161D	0	0	0.0			
166	0	0	0.0			
168	0	0	0.0			
181A	1	1	0.0			
181B	0	0	0.0			
181C	0	0	0.0			
189	2	2	0.0			
190	2	2	0.0			
191	2	2	0.0			
192	0	0	0.0			
193	0	0	0.0			
194A	0	0	0.0			
194B	0	0	0.0			
195	0	0	0.0			
196	0	0	0.0			
199	0	0	0.0			
200	0	0	0.0			
218A	1	1	0.0			
218B	0	0	0.0			
218C	1	1	0.0			

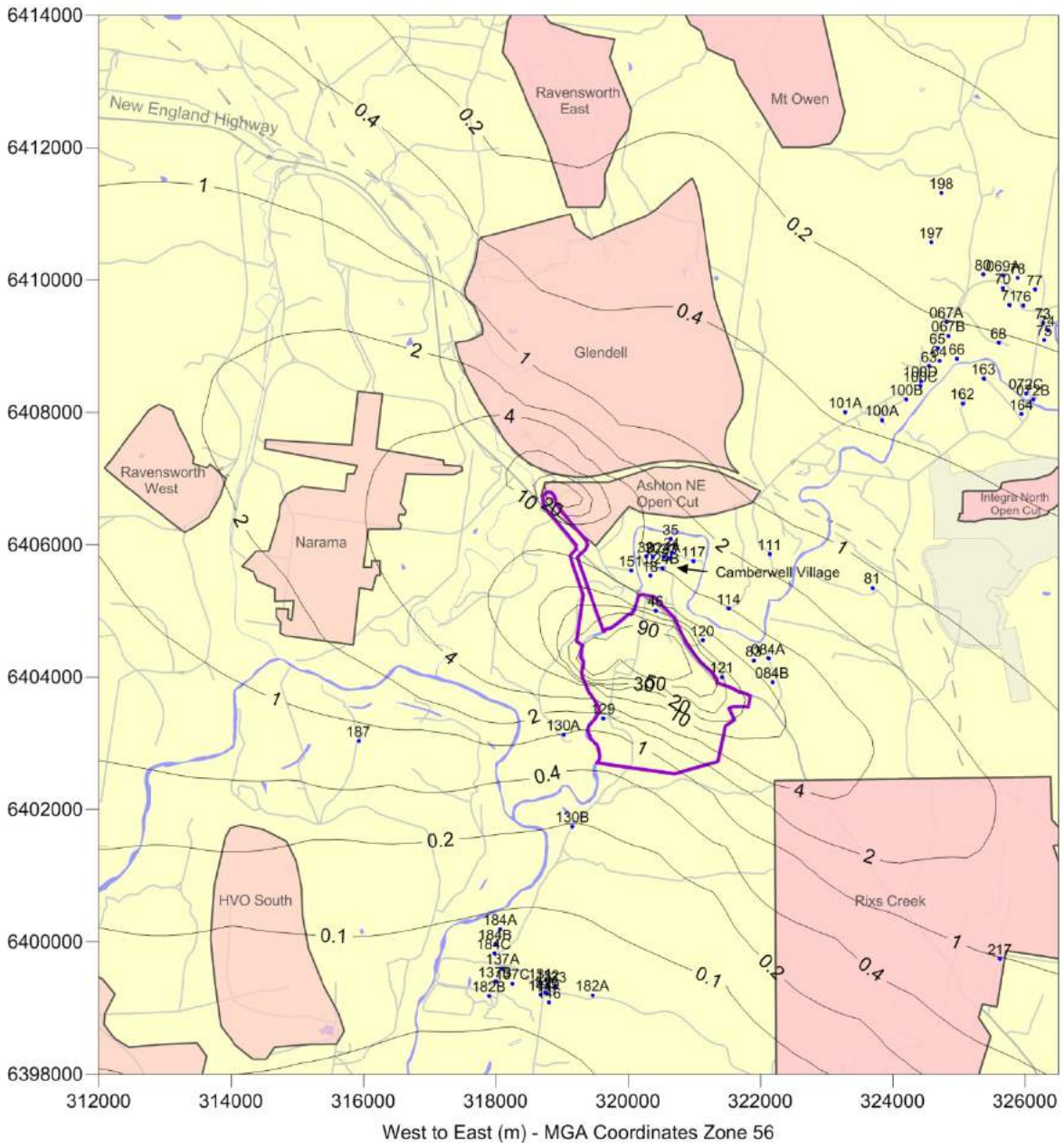
Notes:

[a.] These residences have Acquisition Right agreements with Integra.



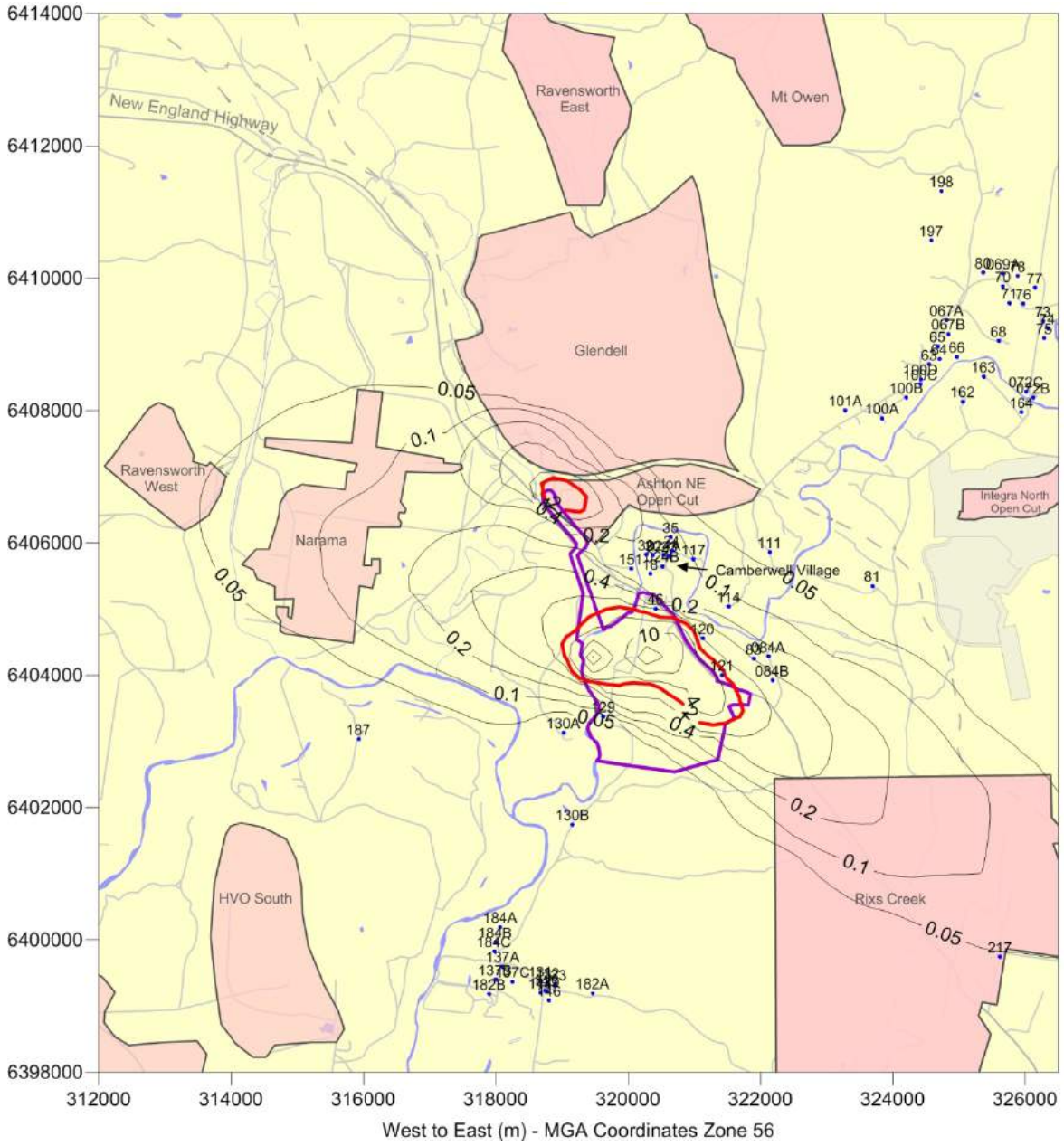
Species: PM_{10}	**Averaging Time:** Annual	**Percentile:** Maximum	**Scenario:** Year 1 Project only	**Location:** Ashton SEOC
Model Used: ISCMOD	**Units:** $\mu g/m^3$	**Assessment criteria:** N/A	**Met Data:** Repeater Station 2007-2008	**Plot:** F Triffett

Figure 3: Predicted annual average PM_{10} concentration due to emissions from the Project in Year 1



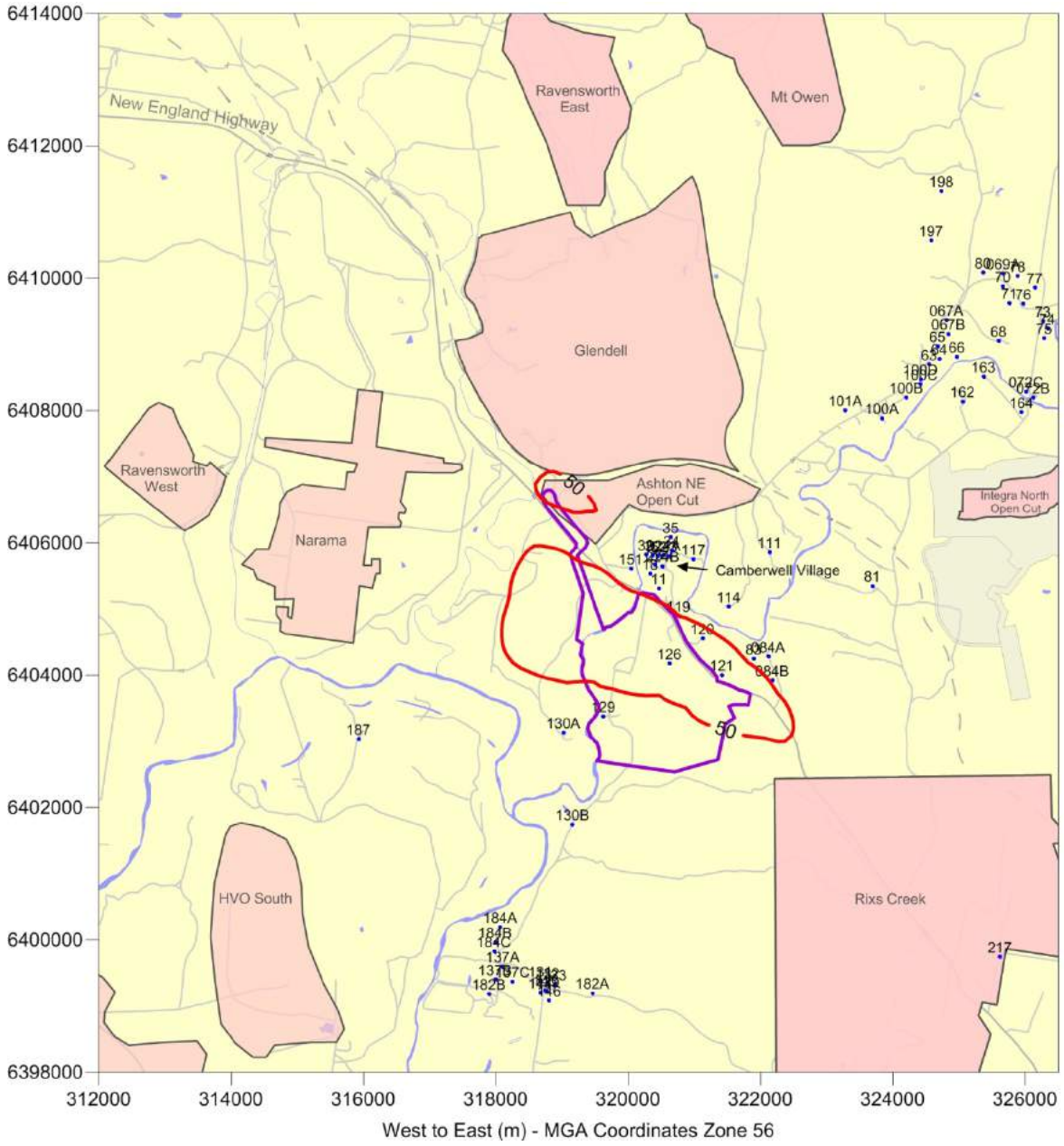
Species: TSP	**Averaging Time:** Annual	**Percentile:** Maximum	**Scenario:** Year 1 Project only	**Location:** Ashton SEOC
Model Used: ISCMOD	**Units:** µg/m^3	**Assessment criteria:** N/A	**Met Data:** Repeater Station 2007-2008	**Plot:** F Triffett

Figure 4: Predicted annual average TSP concentration due to emissions from the Project in Year 1



Species: Dust Deposition	**Averaging Time:** Annual	**Percentile:** Maximum	**Scenario:** Year 1 Project only	**Location:** Ashton SEOC
Model Used: ISCMOD	**Units:** g/m^2/month	**Assessment criteria:** 2 g/m^2/month	**Met Data:** Repeater Station 2007-2008	**Plot:** F Triffett

Figure 5: Predicted annual average dust deposition levels due to emissions from the Project in Year 1



Species: PM_{10}	**Averaging Time:** 24-hour	**Percentile:** 98.6	**Scenario:** Year 1 Project only	**Location:** Ashton SEOC
Model Used: ISCMOD	**Units:** µg/m^3	**DoP acquisition criteria:** 50 µg/m^3	**Met Data:** Repeater Station 2007-2008	**Plot:** F Triffett

Figure 6: Predicted 24-hour average PM_{10} concentrations at the 98.6th percentile due to emissions from the Project in Year 1

Appendix 4

Detailed response to the NSW Office of Water's submission

South East Open Cut Project

&

Modification to the

Existing ACP Consent

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Memo

To	Lisa Richards	**Company**	Ashton Coal Ltd
From	Doug Hunt	**Job No.**	S36
Date	16 April 2010	**Doc No.**	70
Subject	Response to NOW Submission for SEOC		

RESPONSE TO NOW SUBMISSION RELATING TO ASHTON COAL SOUTH EAST OPEN CUT

This memo presents a summary response to the NOW Submission for the South East Open Cut, dated 30 March 2010. Our comments are ordered according to the headings and paragraph numbers used in the NOW submission. References to the 'Groundwater Impact Assessment Report' refer to the consultant's report (dated 02/07/2009) submitted in support of the Environmental Assessment (EA).

1. ATTACHMENT A: NSW OFFICE OF WATER COMMENTS

RIVER CORRIDOR PROTECTION.

- **Para 1:** The use of the phrase 'highly connected' is somewhat misleading in this paragraph. Whilst some parts of the alluvium are 'highly connected', Aquaterra carried out a number of pump tests that involved boreholes that penetrated the entire thickness of the saturated alluvium. Many of these bores showed low permeability, particularly in the northern half of the pit shell. An overview of the permeabilities encountered is provided in *Figure 4.7 of the Groundwater Impact Assessment Report* shows the values that were used. A copy of **Figure 4.7** is presented, for reference in **Appendix A** of this memo**.** In addition to these tested permeabilities, many of the boreholes that were not hydraulically tested were dry when drilled, or did not contain enough water to provide a groundwater sample. These were fully completed through the alluvium/colluvium and show very low permeability. An overview of the location of the dry and 'moist' boreholes that were drilled is shown in **Figure 1.** This shows extensive dry areas along the western pit boundary, which further supports the general conclusions over permeability contained in *Figure 4.7 of the Groundwater Impact Assessment Report.* Based on the results of the investigations, it would be far more appropriate to describe the alluvium as '… a complex system of interacting/directly-connected alluvial layers/lenses, and non-interacting/poorly-connected alluvial layers, which become more dominant towards the pit shell'

  It is not clear what the relevance of the statement relating to the southern 200m of the proposed open cut pit is. *Appendix B, Transect 10 of the Groundwater Impact Assessment Report* shows that the pit boundary in this area is incised into a rapidly rising Permian basement, and there are no saturated unconsolidated materials (alluvium or colluvium) present at the pit boundary in this location.

Ashton Coal Operations Ltd
0 125 250 500 Meters
Legend
Exploration Holes
Water encountered & EC uS/cm (0 = no reading)
Unknown due to hole collapse
Dry
Moist
Pikes_Gully_Mine_Plan_Master
SEOC Pit outline
aquaterra
Project: S55 D2
Date: 18/11/2009
Drawing No. 002
Revision : A
Drawn: JVDA
Datum: WGS1984
Figure 1
South East Open Cut Project
Exploration hole water strike information
Glennies Creek
LW1 Backroad Pipe Outflow
Backroad sump

- **Para 2:** The investigations for the Groundwater Assessment Report have shown that impacts on the Glennies Creek water source will be minimal, and ACOL are proposing that the full impact is offset by the use of high security surface water licence. Although the pit shell does intersect some unconsolidated materials, the impact assessment shows that these are not well connected to the Glennies Creek alluvium. It is acknowledged that the pit shell is located within 150m of the connected alluvium, but extensive testing and risk analysis (which is further evaluated below) has shown that the inflows from the water source to the pit will be small and can be mitigated through licence offset. It is therefore considered that the project is in compliance with the Stream/Aquifer Guidelines. Although the pit shell is located within 150m of the connected alluvium of a Schedule 3 stream, the investigations have been carried out to a point whereby the geology and potential interaction between the pit shell and the alluvium is understood well enough so that the potential interactions between the pit, alluvium and creek can be fully quantified, and whereby the risks and uncertainties can be fully evaluated. This memorandum contains updated risk/scenario assessments (as described in the **Groundwater Sensitivity Modelling Section** below) that show the impact of the pit on Glennies Creek cannot be large, and will be no more than 30% above the baseline scenario shown in the EA, even if extremely conservative assumptions are used.
- **Para 3:** Comments as per para 2 above.
- **Para 4:** Although the pit shell does intersect some saturated unconsolidated materials, the water quality and hydraulic testing, as referred to above, comprehensively shows that these are not well connected with Glennies Creek, and are not considered to be part of the alluvial aquifer connected to Glennies Creek. Although unconsolidated materials associated with paleo deposition from the creek and/or from major Hunter River flood events are found near the pit shell, the coarser, potentially more permeable horizons are generally intercalated with low permeability silts and clays, particularly in the areas beneath the upper terraces.

  There is a distinct change in water chemistry from the area around the more permeable, connected materials nearer Glennies Creek, to the intercalated materials found near the pit shell. The changes in permeability and water chemistry are fully described in *Section 4.6.4 of the Groundwater Impact Assessment Report*. This is a detailed assessment based on observed data, and NOW does not seem to have questioned the data or approach that has been used in trying to categorise the changes in the properties of the unconsolidated materials (alluvium and colluvium) that is observed from west to east from the creek area. **Figure 1** above shows the much greater predominance of dry boreholes that occurred across much of the pit shell, indicating very low permeability, even in areas where transects suggested that saturated materials should be present.
- **Para 5:** This general geomorphology concurs with our understanding. However, as discussed above, NOW does not seem to have allowed for the presence of fines and clay matrix materials that are often present within the sand and gravel layers, and which significantly reduce hydraulic conductivity in areas away from the creek. Low permeability material has often been deposited in this area by back flooding from the Hunter, and there appears to be intercalating with colluvium on the edges of the alluvium. Both of these mechanisms tend to significantly reduce permeability within sand and gravel horizons that have not been regularly 'washed' by the more frequently active floodplain closer to Glennies Creek. If a simple north-south trending conceptual model is used, then this will tend to reduce linkage between the pit shell and the creek – the *Groundwater Impact Assessment Report* attempted to provide a more thorough understanding of the geomorphological mechanisms that are involved in order to ensure that any areas where there was a greater risk of east-west trending connectivity were identified and allowed for in the modelling.

  As noted previously, site investigation test bores were fully screened through the entire thickness of the saturated alluvium. Each well point therefore vertically sampled the entire thickness of the alluvium, so it sampled the full bulk permeability of the 'complex overlays' of sands and gravels that are referred to in the NOW submission. The EC values provide a clear demarcation between connected (low EC) and poorly-connected/unconnected (high EC) alluvium/colluvium. This line of demarcation has a generally north-south orientation – we have conservatively highlighted the 3000 µS/cm EC contour as approximating this line of demarcation. The poorly-connected groundwater (as shown by the higher ECs) occurs east of the alluvial area – i.e. near the pit shell. Low permeability (and high salinity) was determined at all sites but one along or close to the western pit shell boundary. All the

more permeable sites were located well to the west of the pit shell boundary. A copy of **Figure 4.5** from the Groundwater Impact Assessment, which shows the recorded ECs and EC contours for the alluvium/colluvium, is provided in **Appendix A** of this memo.

- **Para 6:** The 'risks' to Zones 2 and 3 of the Hunter Regulated system have been fully quantified through the analysis of baseflow impacts – this defines the amount of water that will be 'lost' to downstream users within the system. It has been subjected to further significant sensitivity analysis, as described below.

GROUNDWATER SENSITIVITY MODELLING

- **Para 1:** The sensitivity analysis that was carried out sought to 'link' all of the recorded high permeability zones with the pit shell in a manner that is consistent with the available field data. The largest risk from this was considered to be if there was a direct east-west connection that had resulted from the flushing of the paleo sands and gravels by historic surface water outflows (as described in *Section 4.6.6. of the Hydrogeological Impact Assessment*)**.** This was not done in an attempt to limit inflows – rather it was done to evaluate what appeared to be the largest risk of impacts on the water source (i.e. east-west trending high permeability materials). It was thought that the sensitivities that were done assessed NOW's concerns (which were raised in relation to potential 'stringers' of high permeability materials), whilst ensuring that the modelling actually reflected field data.

  In order to ensure that all of NOW's potential concerns have been addressed, a further sensitivity analysis has been run through the model for the purposes of this response. This is a highly conservative representation of the possible braiding that might theoretically occur sub-parallel to the creek. It should be noted that, whilst there are a number of possible geomorphological interpretations for the alluvium, these must reflect the actual site investigation data that were gathered for the EA. Higher permeability channels have therefore been assigned in all feasible areas where they could occur, (i.e. higher permeability has been assigned in all potential channel braid areas where low permeability has not been proven, either through hydraulic testing or the presence of 'dry' holes, as shown in **Figure 1**). The permeability of the channels reflects the values that were recorded in the field. The model assumes that these extend through the full thickness of the alluvium. The assessment is therefore very conservative, and represents an absolute upper bound on the sorts of impacts and pit inflows that could be expected given the geomorphology described by NOW. More extensive zones of high permeability simply can't be justified given the field testing that was undertaken.

  Further details of this scenario, and the scenarios that were submitted on the 4th November are contained within **Appendix B** of this report.

The predicted impacts from each of the sensitivity analyses that have been undertaken are summarised in **Table 1** below, and compared with the 'Base Case' described in the *Hydrogeological Impact Assessment*. These are described in terms of predicted baseflow losses from Glennies Creek. These are the best representation of the impact on the water sources, as they account for groundwater and recharge that is lost from both the creek and the alluvium, both directly into the pit and into the cone of depression caused by the pit.

The values contained in Table 1 compare with 'Base Case' baseflow losses of 17.2 ML/a (47m^3/d), as described in the *Hydrogeological Impact Assessment.*

Table 1:

Scenario	Total Baseflow Losses (ML/annum)	Notes/Comments
EA Base Case	17.2 (47m^3/d)	*EA model.* Uncertainty analysis was carried out by increasing/decreasing horizontal permeability by a factor of 2 for the alluvium. This resulted in +/- 3ML/annum
A: *Worst Case North-South Oriented Channels*	21.7	*New Scenario*: Represents the absolute worst case that could be realistically conceived given the geomorphology described in the NOW submission
1: Scenario 1: *Realistic Worst Case*	20.4	*Scenario Submitted on 4th November.* Assumes east-west oriented gravel braiding that connects through to the pit shell
2: Scenario 2: *Maximum Potential 'Braiding' Connectivity*	24.8	*Scenario Submitted on 4th November.* Assumes east-west oriented gravel braiding that connects through to the pit shell, but with very wide channels (up to 150m wide)
3. *Scenario 3: Generalised Background Connectivity*.	19.3	*Scenario Submitted on 4th November.* Equivalent to the base case presented in the

These scenarios present the full range of inflows that could be expected to occur. Trying to increase predicted baseflow impacts beyond this would require that all of the field investigation data is simply ignored in favour of assumed alluvial properties.

FLOW MAINTENANCE IN GLENNIES CREEK.

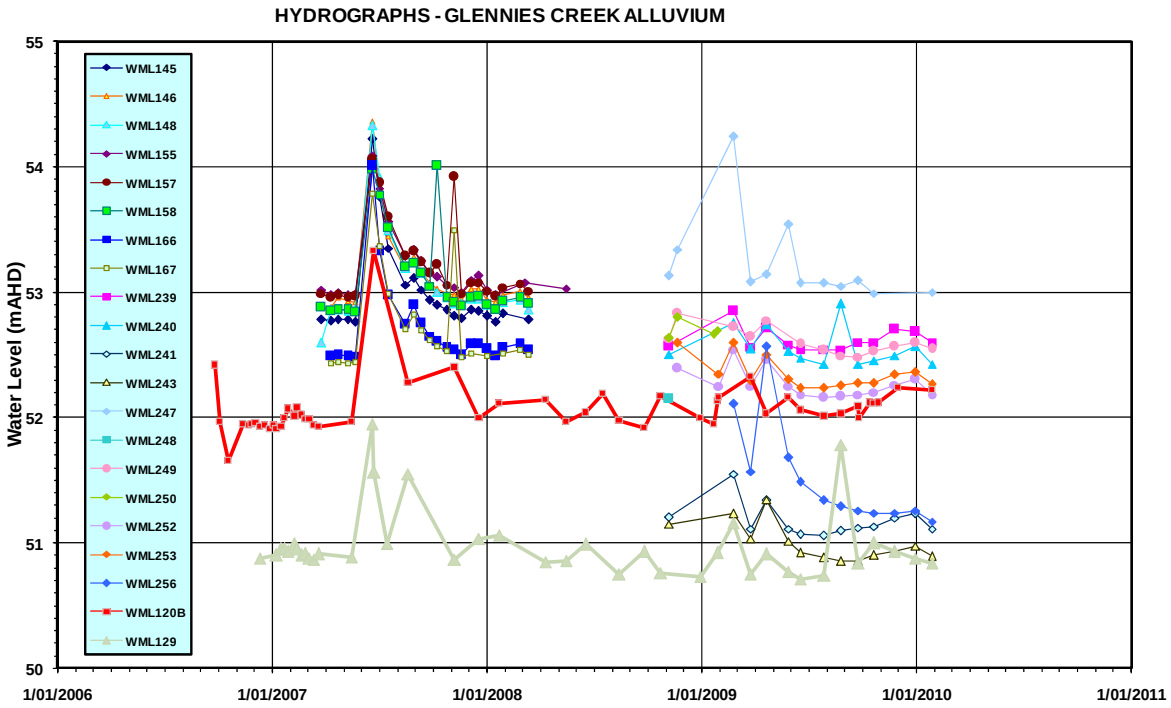
- **Para 1 plus associated bullets:** The failure to address the risk is strongly disputed, as baseflow impacts are fully considered within the EA. The sensitivity analysis provided above clearly quantifies the risks that impacts could be larger than the EA. It shows that, at most, losses from the Creek could only reach 24.8ML/a under the most conservative scenarios, and 21.7ML/a under the most conservative assessment of geomorphology as described by NOW.

  Groundwater levels in Glennies Creek alluvium have been monitored since June 2006, and there is a continuous record of more than 3 years. Although most of the piezometers were only installed in November 2008, two piezometers on the western side of Glennies Creek (WML120B and WML129) have been monitored since June 2006, and water levels were monitored in a further 8 shallow exploration holes between March 2007 and March 2008, before they were grouted up. Then, new piezometers WML239 to WML294 have been monitored monthly since November 2008.

  The monitoring that is available clearly shows that rises in alluvium water levels are transient and only occur after larger rainfall events (and rarer flood events). Alluvial water levels are controlled by recharge rates from rainfall, and baseflow discharges are controlled by the difference between groundwater levels and water levels within Glennies Creek, not flow rates. Baseflow rates will tend to be insensitive to long term climatic variation. Water levels in the creek are also influenced by discharges from the Glennies Creek Dam upstream, while alluvium groundwater levels only tend to fluctuate by small amounts between rainfall or spate/flood flow events.

  This is confirmed by the ongoing monitoring data that has been gathered since the impact assessment was submitted, as provided in **Figure 2**. The hydrographs show a significant recharge event following the large rainfall in June 2007, which also saw flooding in Glennies Creek and the Hunter River. However, subsequent recharge events in response to rainfall without any flooding in August 2007, December 2007, March 2008, February 2009, April 2009, and the period July-October 2009 confirm that rainfall infiltration is the primary recharge mechanism.

Figure 2: Ongoing Monitoring Results for Glennies Creek Alluvium



Post mining recovery was evaluated within *Section 6.8* of the *Hydrogeological Impact Assessment*. This showed that groundwater levels will return to at, or even slightly above, baseline values, and baseflows in Glennies Creek will therefore return to pre-mining conditions within the 100 year recovery simulation.

▼ **Para 2:** The potential for gradient reversal and pit inflows has been fully accounted for and quantified in the EA. The above analysis shows that sensitivity risks are small, and Ashton is proposing to entirely offset these losses through the surrender of a high security water access licence. The fact that the water source is fully allocated is not therefore relevant to the impact assessment or proposed mitigation measures.

2. ATTACHMENT B: RECOMMENDED CONDITIONS

Riverine Corridor

1. It is considered that the 3,000µS/cm contour, as presented within the EA, already shows the limit of the connected alluvium. This is based on detailed analysis of the groundwater conditions using investigative drilling, hydraulic testing and water quality analysis.

2. It is not clear why the mining excavation cannot be located within 150m of the connected alluvium, when very conservative risk analysis and detailed investigations have quantified the level of risk from the currently proposed pit shell.

Water Accounting

7. Ashton Coal is seeking to offset impacts using a high security surface water licence. As there are no other groundwater users in the area, it is considered that this represents the best approach to mitigation – i.e. it directly offsets any impacts that occur to downstream users of Zones 2 or 3 of the Regulated Hunter River (as noted under the 'Flow Maintenance in Glennies Creek' section of the NOW submission).

Groundwater Management Plan

8. It is not entirely clear which part of the *Hunter Unregulated River and Alluvial Water Sharing Plan* is being referred to under this point, however it is noted that Ashton is proposing to directly offset any impacts through the use of a high security licence on Glennies Creek itself (i.e. in compliance with the *Hunter Regulated River WSP*). The

anticipated inflows to the pit are not expected to be measurable (i.e. they will only form damp areas and diffuse seepage faces on the high wall), and the level of impact will be too small to measure within the creek itself. Therefore, as well as recording any inflows that can be measured into the pit, the Groundwater Management Plan should also be used to ensure that impacts on groundwater gradients between the pit shell and the river are consistent with the EA predictions.

Yours sincerely
Aquaterra

Doug Hunt

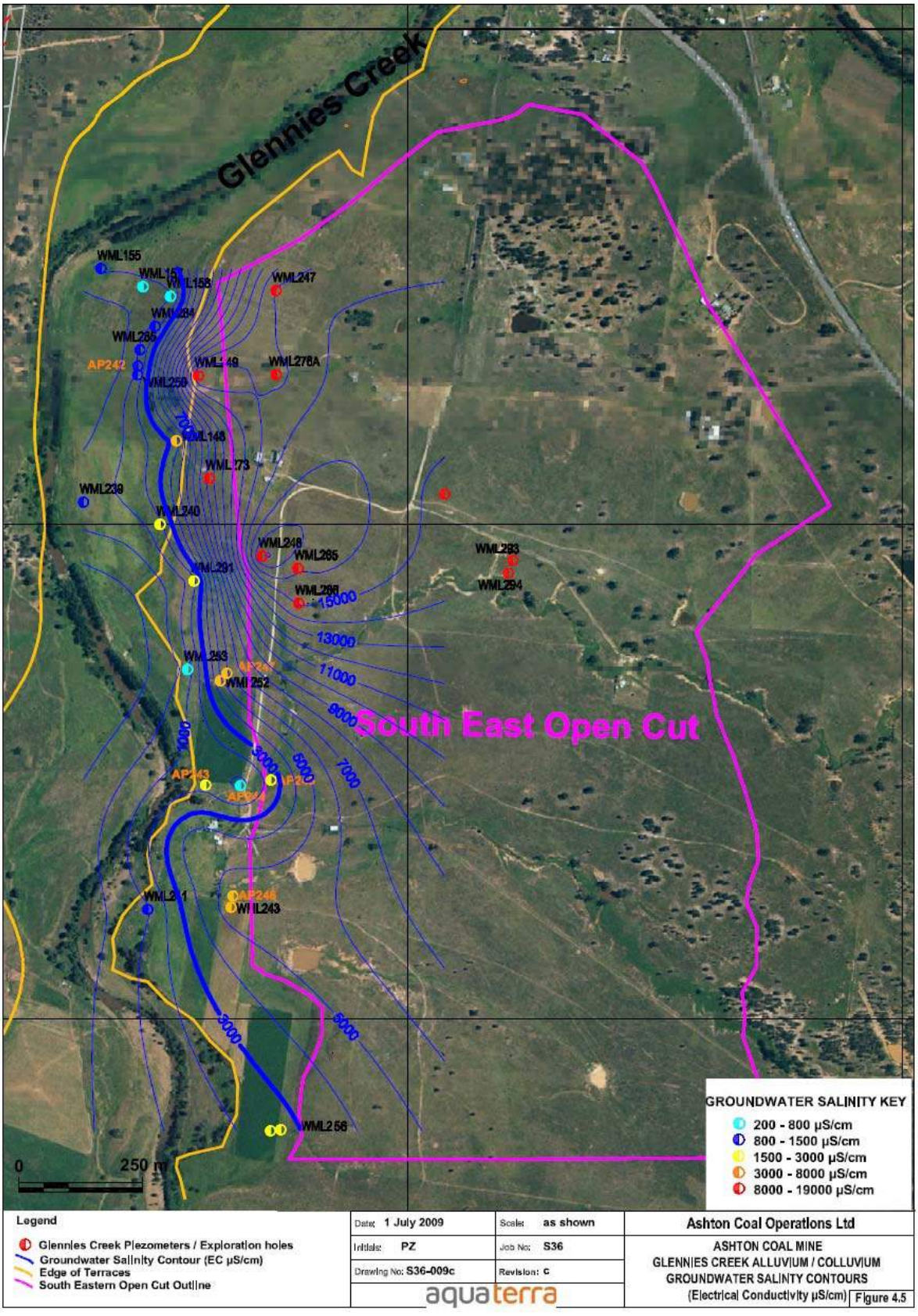
Doug Hunt
Principal Consultant

Peter Dundon

Peter Dundon
Senior Principal Consultant

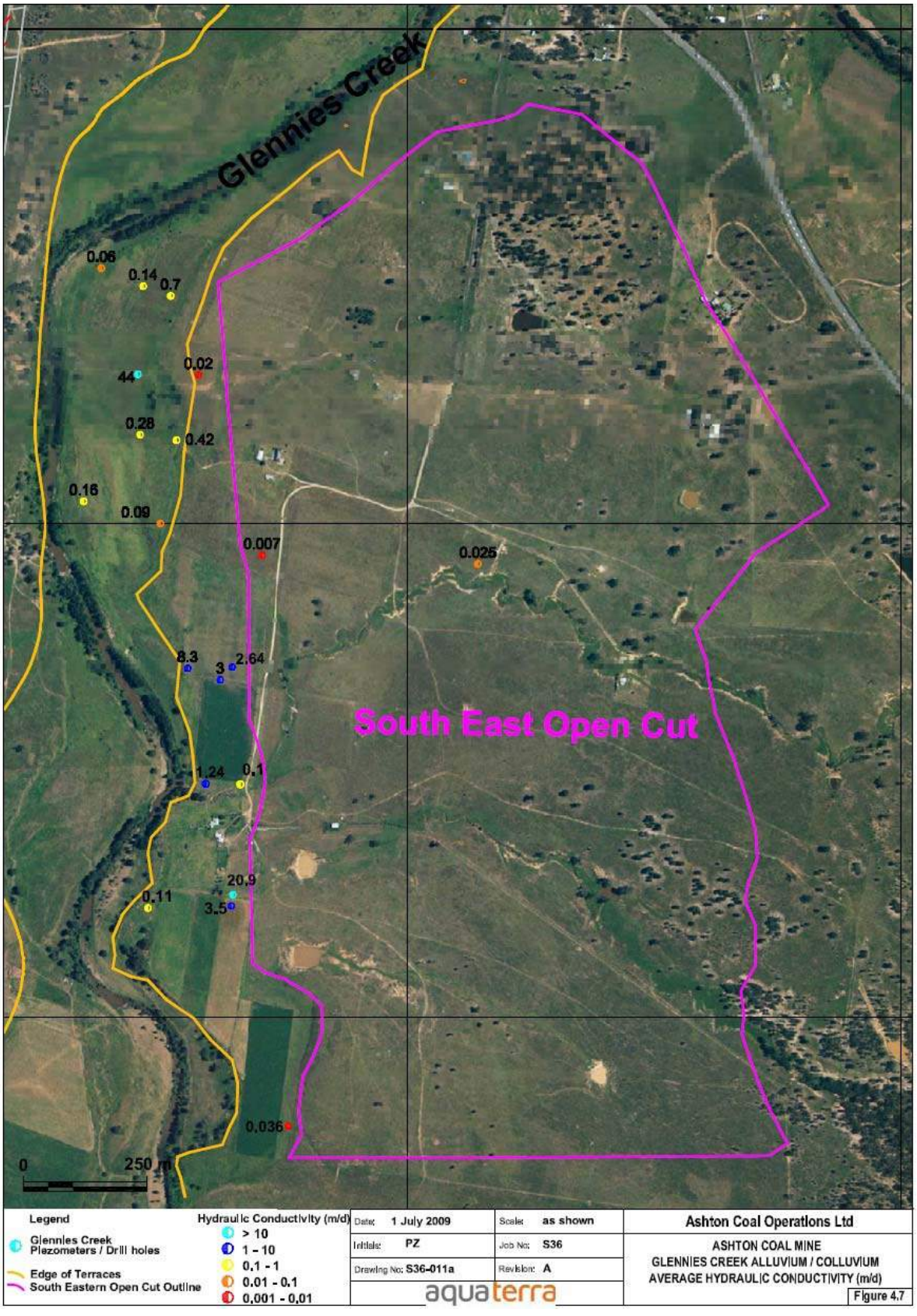
APPENDIX A: COPIES OF FIGURES FROM THE GROUNDWATER IMPACT ASSESSMENT REPORT

Copy of Figure 4.5. showing salinity contours



Copy of Figure 4.7. Showing Measured Hydraulic Properties*

**Note, the 'dry' holes shown in Figure 1 of this memo could not be tested, but indicate very low permeability through the alluvium.*



APPENDIX B: FULL DESCRIPTION OF SENSITIVITY ANALYSES SUBMITTED.

The following text and figures detail the sensitivity analyses that have been carried out in response to the NOW submissions. It should be noted that none of these are considered to be a better than the base case presented in the EA, which reflects our best interpretation of the hydraulic testing and water quality results obtained during the investigations.

New Scenario Carried out in Relation to the Current NOW Submission

- *Scenario A: Worst Case North-South Oriented Channels.* For this scenario, high permeability channels have been assumed in all locations where hydraulic testing results did not prove that large, high permeability channels were not present. Embayments have been simulated to try and artificially create links between the pit shell and the creek where there is any feasibility that this might occur. The channel areas have been provided with a hydraulic permeability that is representative of the test results that were found in each given area. The permeabilities used are shown in **Figure B1.** This scenario is as conservative as it can be with north-south trending channels and given the hydraulic test results that were obtained. It is almost certainly excessive, as it assumes high permeability channels that are 50-150m wide that are oriented in the 'worst' realistic way to provide connectivity between the creek and the pit shell.

Scenarios Submitted Following 4th November Meeting

The following scenarios were submitted to NOW following the meeting on 4th November 2009, and represent analyses of the risks that more east-west oriented high permeability areas might extend to the pit shell.

- *Scenario 1: Realistic Worst Case.* The hydraulic properties used in this scenario are shown in **Figure B2**. In this scenario, the key high permeability zones have been extended through to the pit shell in all of the areas where the baseline studies indicated that there could be an east-west cross connection caused by historic east-west drainage and associated embayments. Because the model uses cells that are 50m by 50m, this effectively assumes that clean gravels with an average conductivity of between 5 and 20m/d intersect the pit shell in channels 50m wide at four separate locations. This is not supported by the EC results and contours, but it is acknowledged that it is feasible given the granularity of the hydraulic testing programme that was carried out at the site.
- *Scenario 2*: *Maximum Potential 'Braiding' Connectivity.* The hydraulic properties used in this scenario are shown in **Figure B3.** For this scenario, hydraulic properties in the two zones where saturated gravels are present at the pit shell have been modified so that high permeability extends through to the pit shell across the whole of the potential area where significant saturated gravels exist and hydraulic testing has not actively proved there is low permeability. This means that the two high permeability zones in the northern part of the model intersect the pit shell over lengths of 100m and 150m respectively. Pit inflows are more sensitive to the larger, more southerly of these zones, which has been assigned a permeability that is higher than any of the actual values that were recorded during testing near the pit shell.
- *Scenario 3: Generalised Background Connectivity*. The hydraulic properties used in this scenario are shown in **Figure B4.** For this scenario, the potential risk that small, regular, partly clean gravel braids could intercept the pit shell over a wide area has been evaluated. This has been done by effectively increasing the extent of the 0.8m/d permeability zone so that it extends across any areas near the pit shell where there might be embayments or cross connections caused by the historic east-west drainage patterns. It should be noted that this does not reflect the results of the hydraulic testing, and effectively assumes that the hydraulic testing that was carried out tended to intersect lower permeability areas for some unknown reason.

Figure B1: Hydraulic Properties for Worst Case North-South Oriented Channels Scenario

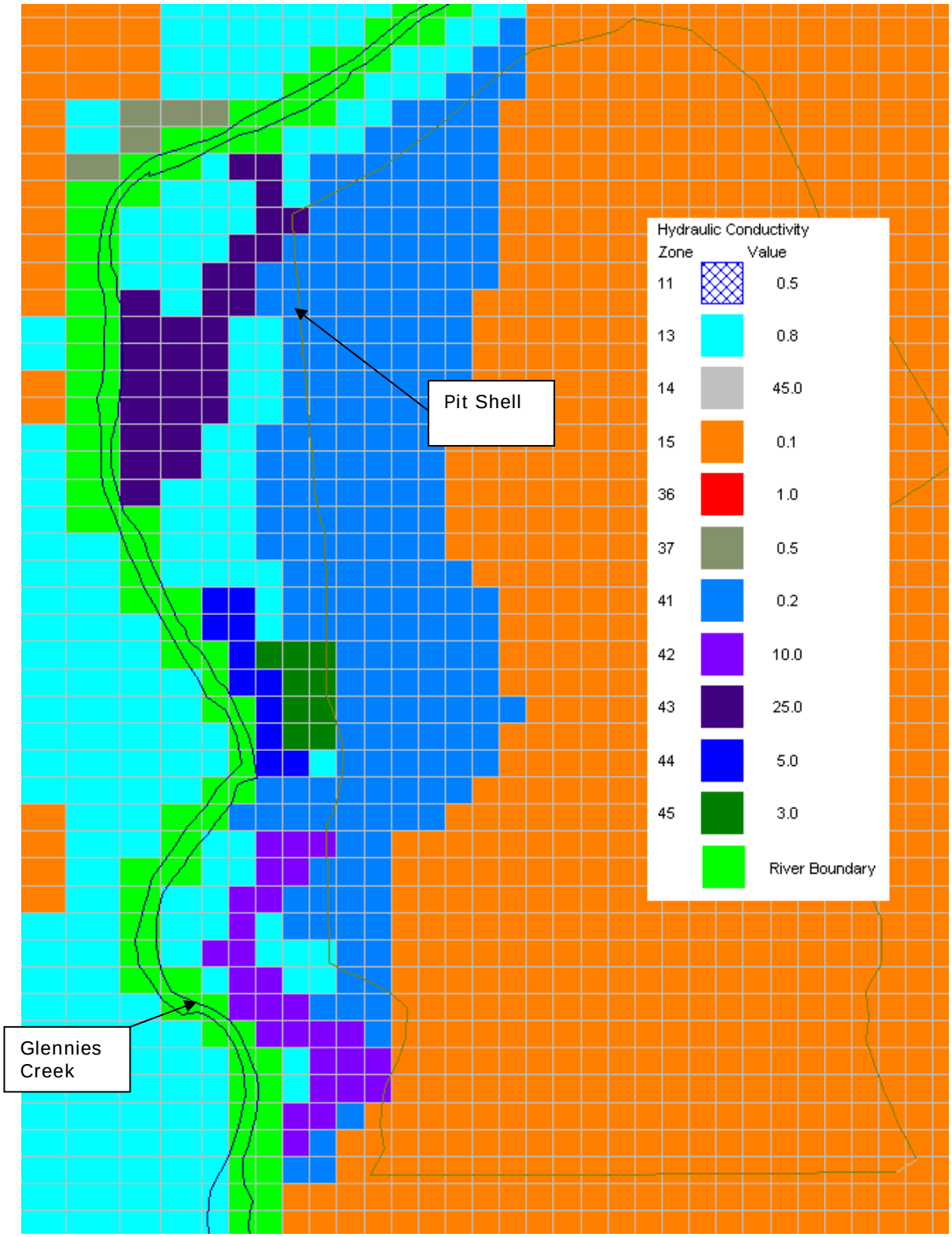


Figure B2: Hydraulic Properties for 'Realistic Worst Case' Scenario

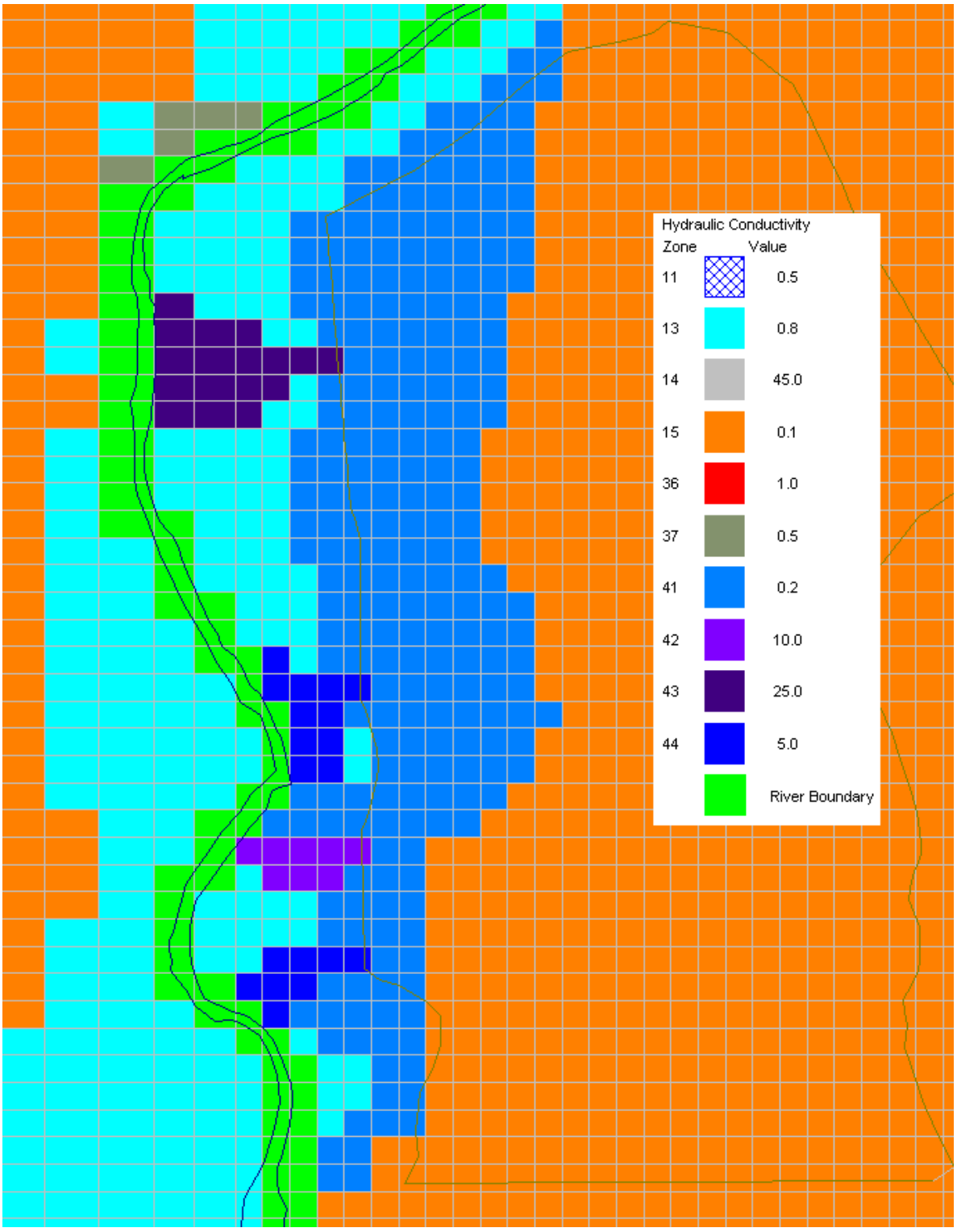


Figure B3: Hydraulic Properties for 'Maximum Braiding Connectivity' Scenario

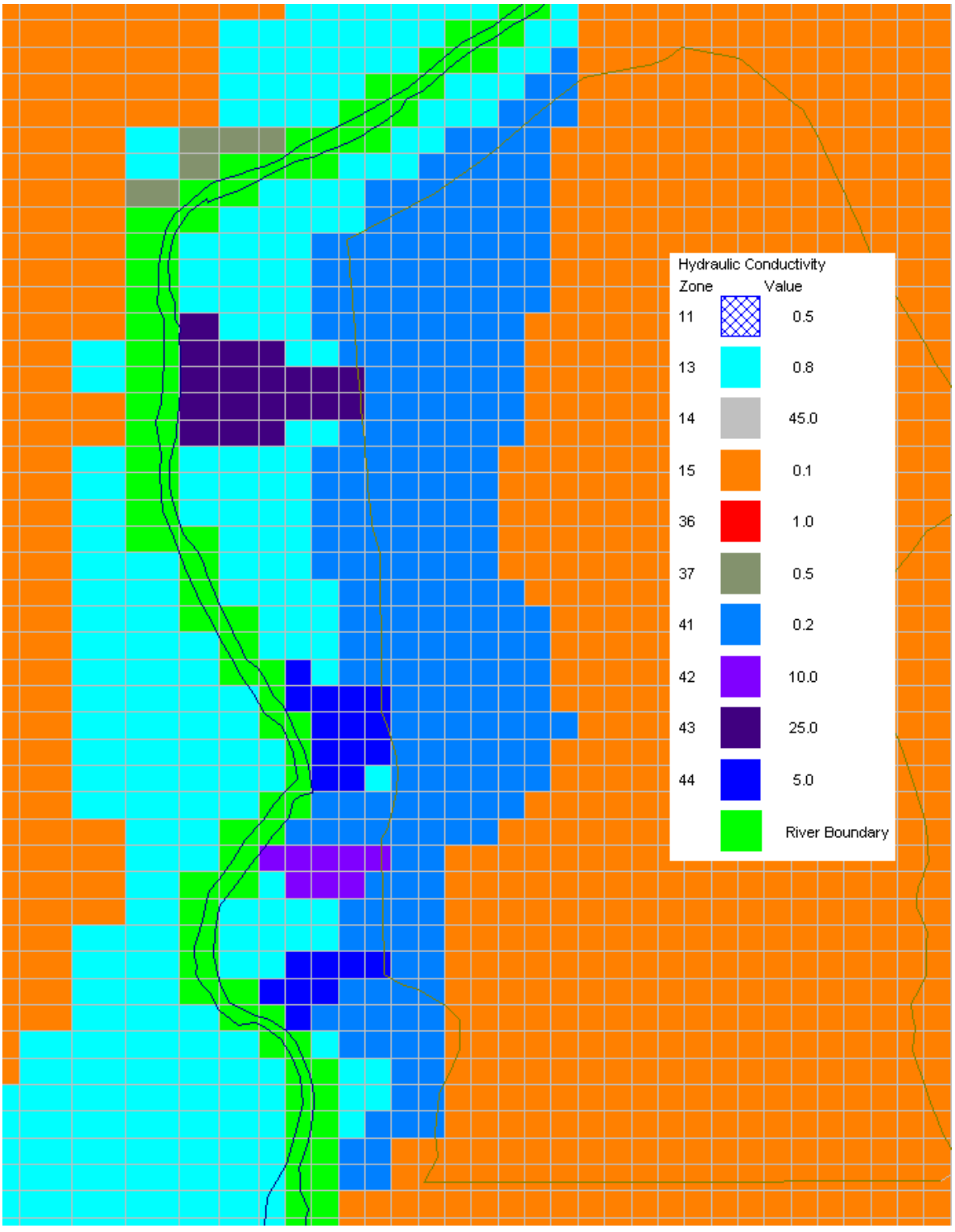
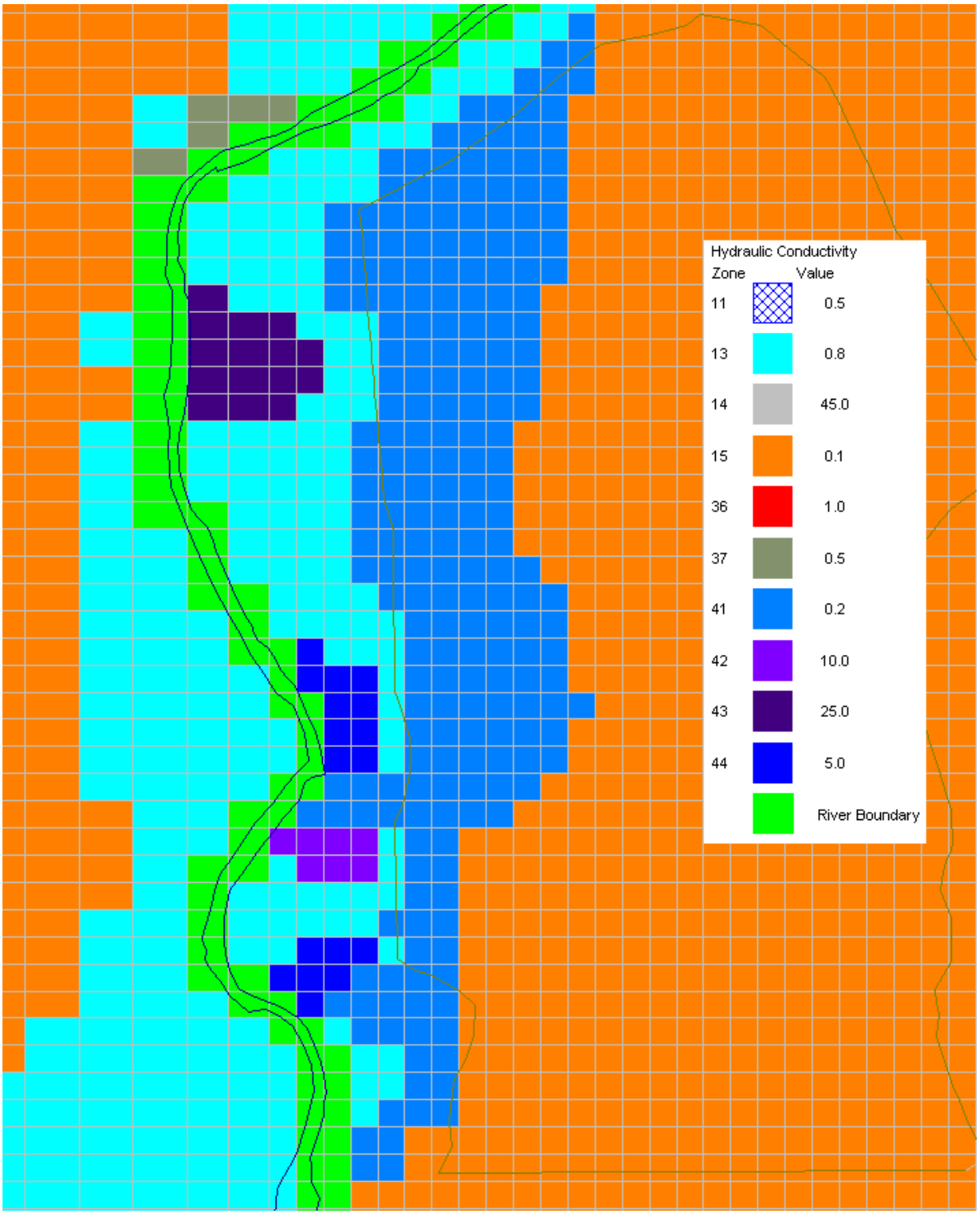


Figure B4: Hydraulic Properties for 'Generalised Background Connectivity' Scenario



Appendix 5

Revised indicative landform design

South East Open Cut Project

&

Modification to the

Existing ACP Consent

Final land form design

The EA proposed a final landform design based on traditional mine site rehabilitation techniques, including prescriptive slope criteria for emplacement areas in accordance with Industry and Investment NSW - Mineral Resources mine rehabilitation principles. Slope criteria historically involved emplacement designs with targeted 10 degree outer batters, with up to 18 degrees being accepted for steeper slope domains. These designs traditionally concentrate water flows to evenly placed engineered contour drains designed to break up the slope length and engineered rock lined drop structures which are designed to transport water from the slope. Over time, experience has shown that there has been persistent problems with drainage stability under these design scenarios. Growing experience is indicating that this approach is not self sustaining and has the potential to lead to long term landform instability. In addition, engineered structures are expensive to construct in the initial instance, and when not designed and constructed well, difficult and costly to maintain.

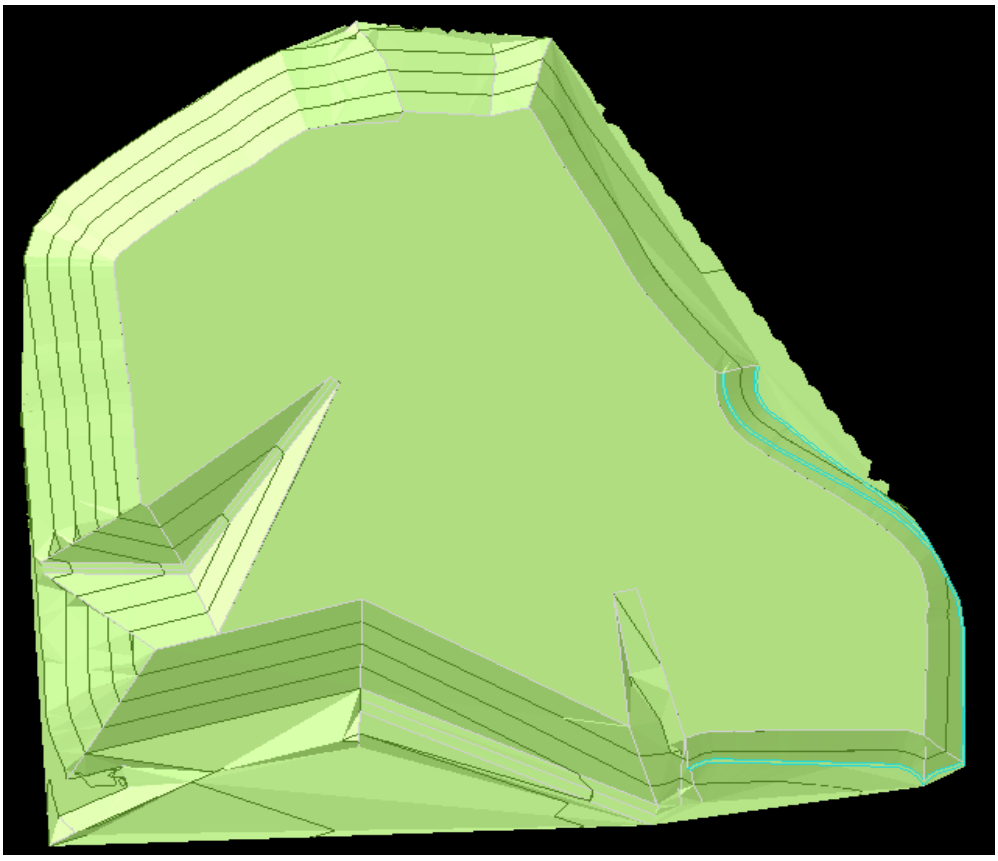
Evolving expectations from Government and Community are that final coal mine rehabilitation should be relatively natural in appearance and self sustaining. Industry is rising to this challenge and there are numerous design techniques being developed to cater for the evolving rehabilitation design expectations. ACOL has been investigating the implementation of a method developed in America over the last ten years called Geofluv. This works on fluvial geomorphic principles to design a stable final landform which is also natural in appearance. The fundamental concepts of the Geofluv approach to stable landform design are taken from the study of the development of landforms over time, from youthful, actively eroding landforms to mature, 'stable' landforms. The approach has critical input factors that measure and integrate the effects of local variation in climate, earth materials, and vegetation that define local landform stability against erosion. This is achieved by collecting empirical measurements from stable landforms in the area of interest and using these as inputs to the design. This approach provides a high degree of certainty that the GeoFluv landform design will perform similarly to the stable, natural landform.

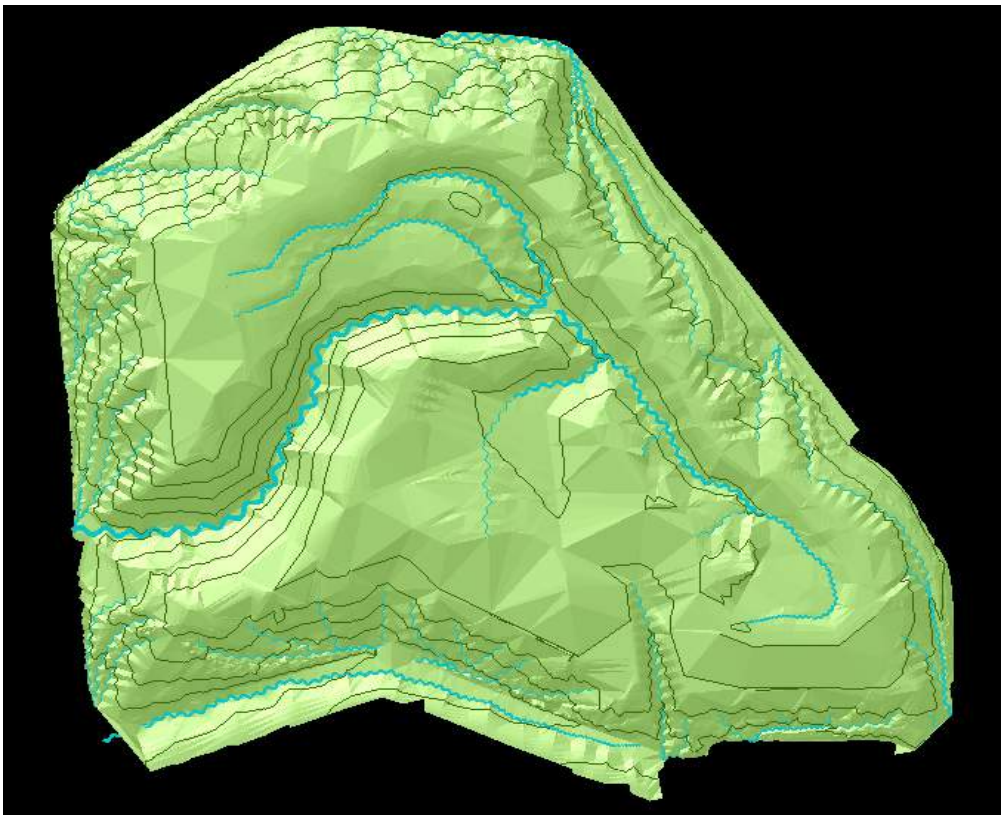
The Geofluv approach has been integrated into a computer based design software package, Carlson Natural Regrad. ACOL has used this software to develop a final landform design for the SEOC that has evolved from traditional landform design (as described in the EA) to a Geofluv approach. The key features of the changed design are:

- Rather than large flat areas there are complex undulating slopes and valleys transecting the landform.
- Valley patterns vary to match different slope variances, long parallel slopes and shorter straight down slope channels..
- Final landform height is slightly higher than the traditional design to cater for the volume of spoil lost for the creation of the valley systems.
- Variation in slope and aspect provide for a variety of vegetation commensurate with naturally occurring habitat development.
- Improved visual aesthetics from Camberwell and the New England Highway.
- Computer generated detailed construction plans. The digital files can be used directly to guide operators in computer controlled earthmoving equipment to control shaping of the constructed landform.

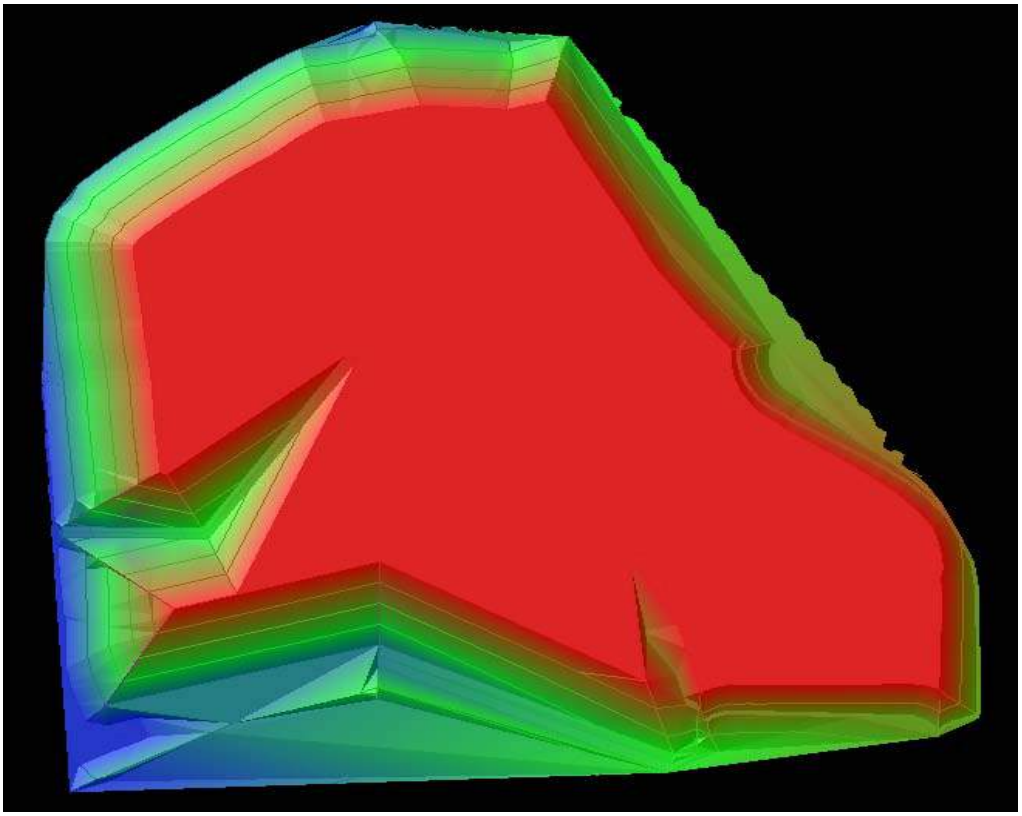
ACOL has engaged the founder of Geofluv to undertake the design for the environmental bund and the final landform design for the SEOC.

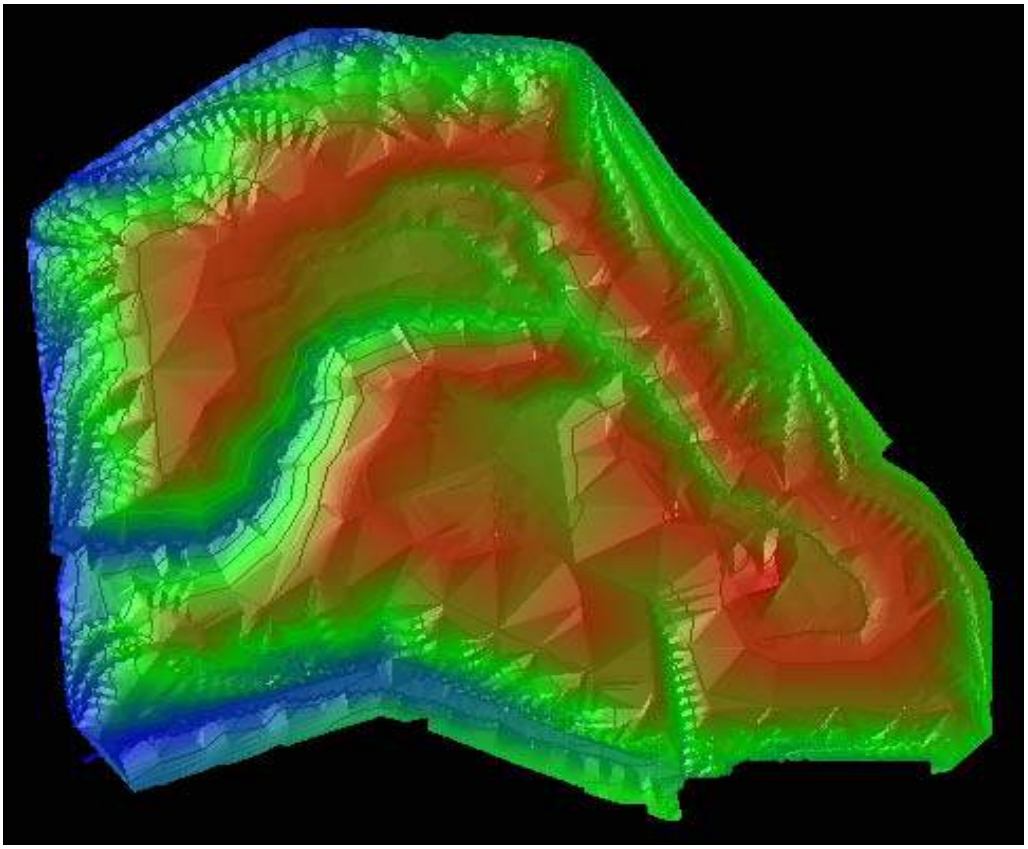
An illustrative comparison of the two approaches (i.e. traditional versus Geofluv) is shown below, including examples of reconstructed mining landforms using this approach. More detailed information on the use of Geofluv and other examples of its use are available at: www.carlsonsw.com.



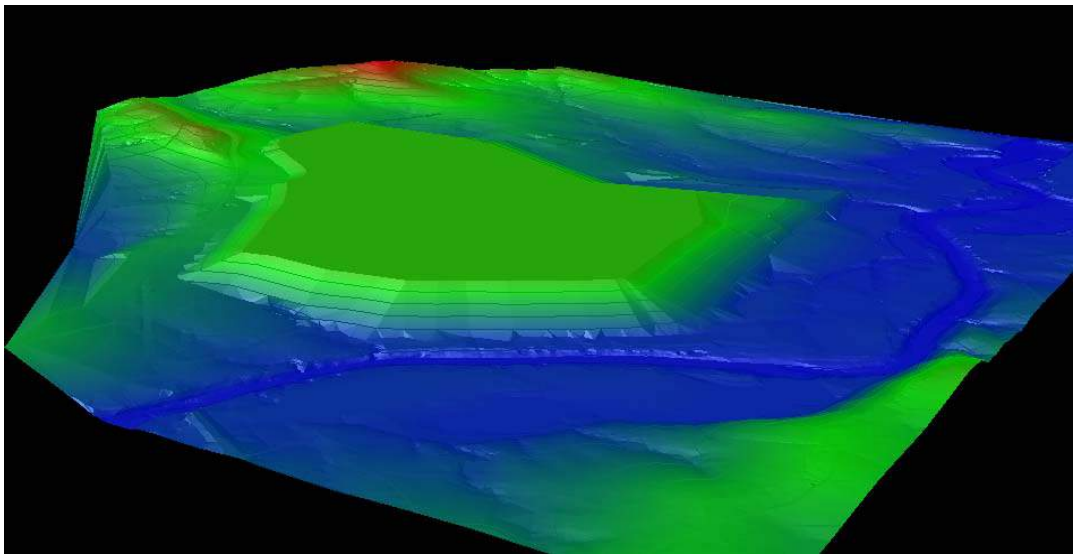


View from above of post-mining landform (colour by elevation) showing traditional mine rehabilitation design (top) and proposed indicative modelled natural landform design (bottom). The area shown represents completion of mining and landform reconstruction in SEOC Year 5.

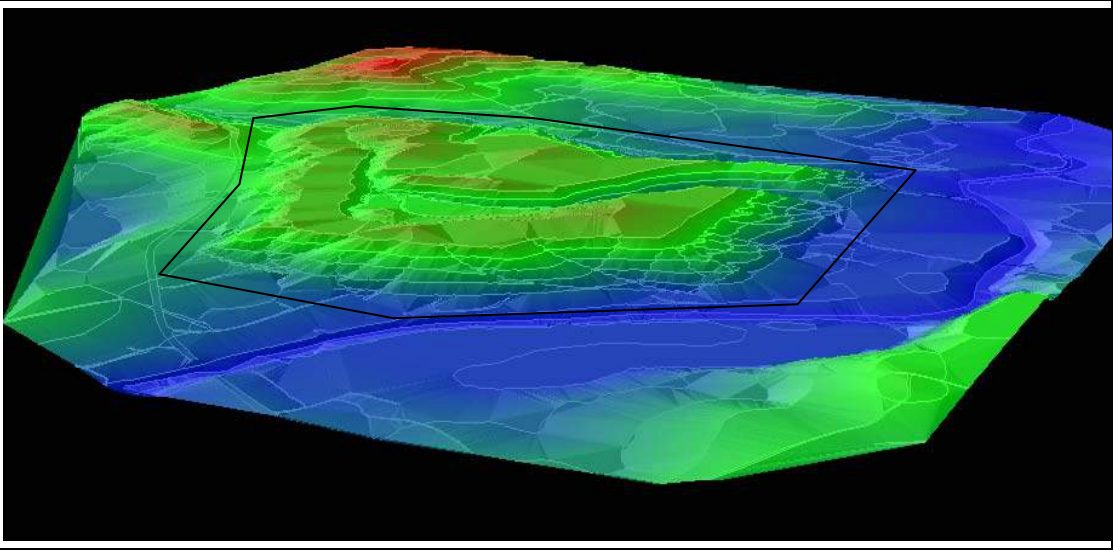




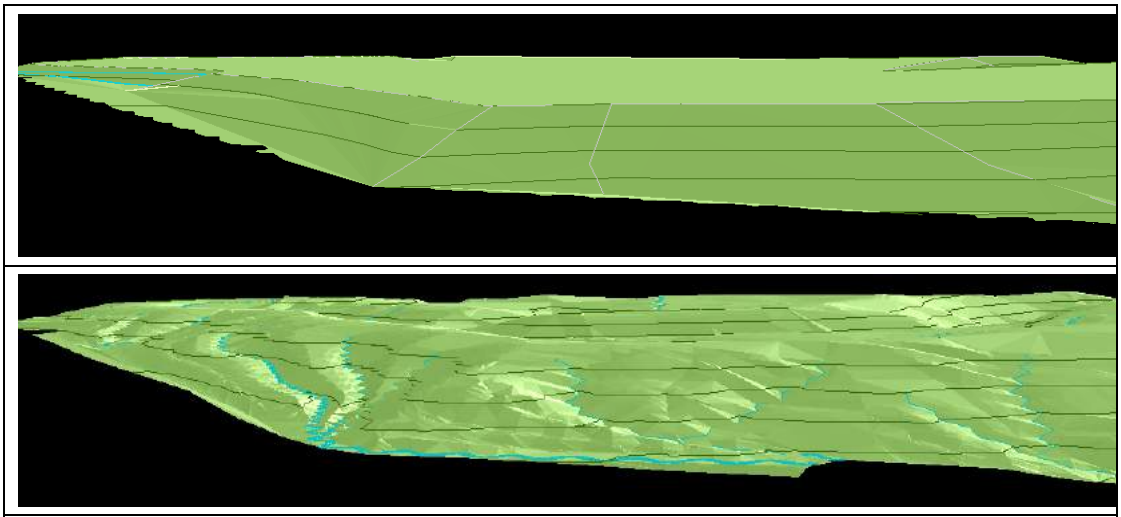
View from above of post-mining landform (colour by elevation) showing traditional mine rehabilitation design (top) and proposed indicative modelled natural landform design (bottom). The area shown represents completion of mining and landform reconstruction in SEOC Year 5.



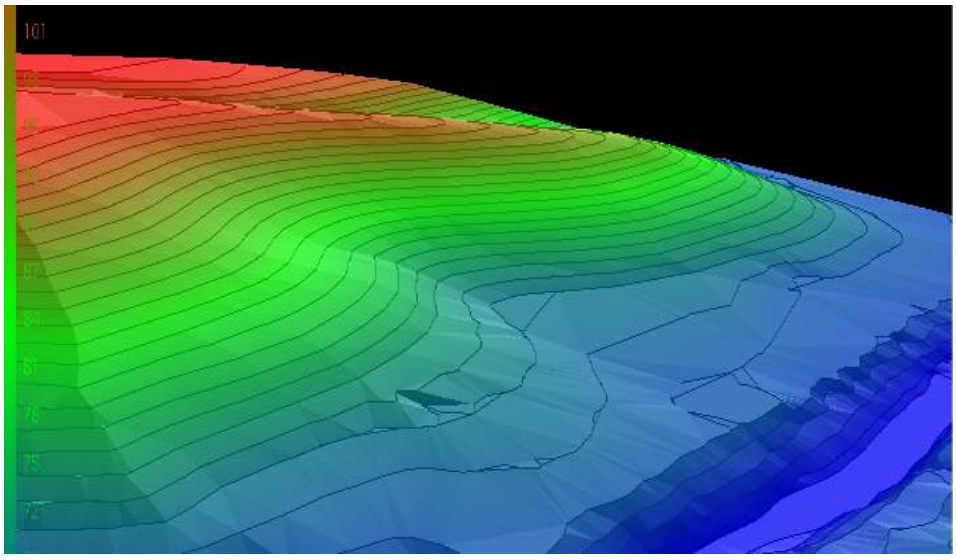
View from northwest looking down on top of post-mining landform design using a traditional approach to landform reconstruction and mine rehabilitation. The area shown represents completion of mining and landform reconstruction in SEOC Year 5.

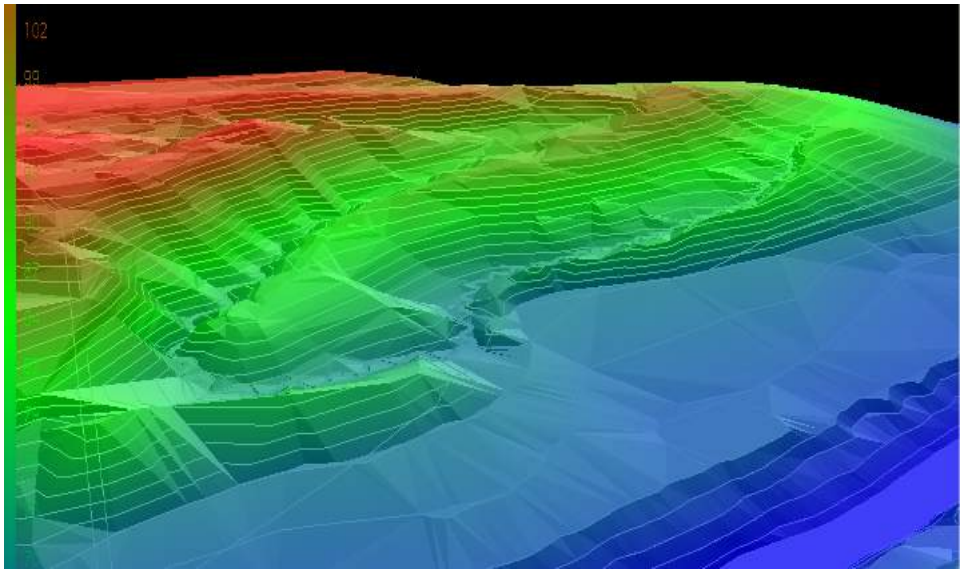


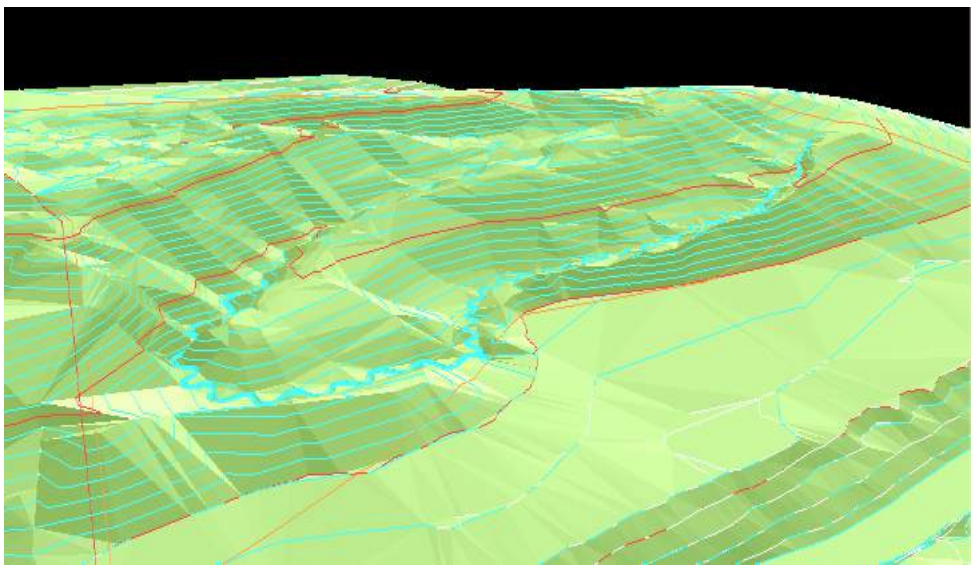
View from northwest looking down on top of post-mining landform design proposed indicative modelled natural landform design. SEOC is within the black line, the area outside of this is the existing natural landform. The area shown represents completion of mining and landform reconstruction in SEOC Year 5.



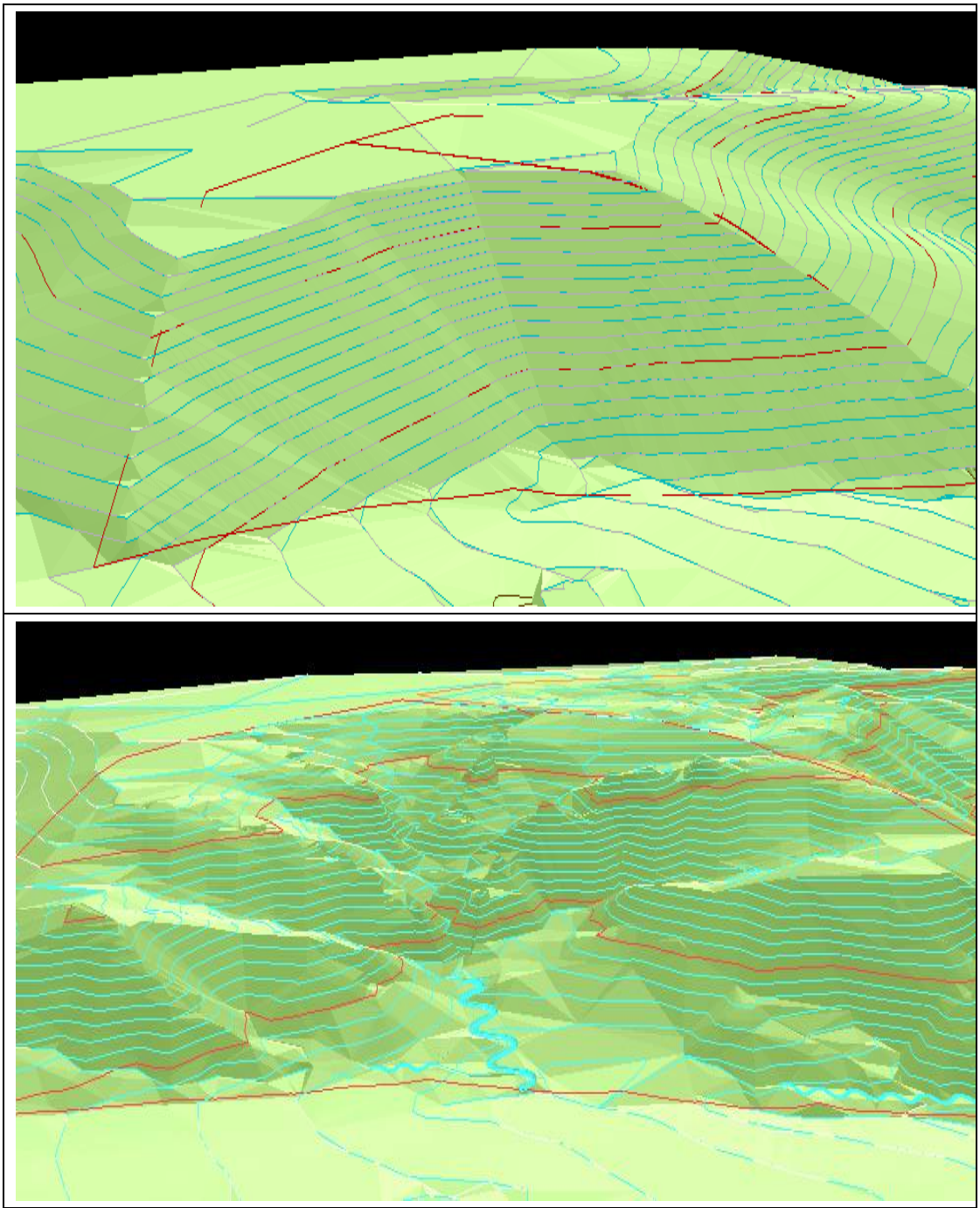
View from northeast of environmental bund showing traditional design (top) and proposed indicative modelled natural landform design (bottom). View as from Camberwell and the New England Highway.







Zoomed in view of post-mining landform design on the North Western slope showing traditional mine rehabilitation design (top) and proposed indicative modelled natural landform design (middle and bottom)



Zoomed in view of a section of post mining landform design on the northern slope showing traditional mine rehabilitation design (top) and proposed indicative modelled natural landform design (bottom).

Actual mine rehabilitation sites from the USA showing post-mining landforms designed using modelled natural landform design techniques. These rehabilitation sites have similar design profiles as those applied to the SEOC final landform design.