Attachment 1

Environmental Assessment for Proposed Modification to DA97/800 (Mod 10)

Executive Summary

Mandalong Mine is an existing underground coal mine operation located in the Lake Macquarie Local Government Area. It is approximately 130 kilometres north of Sydney and 35 kilometres south-west of Newcastle near Morisset in New South Wales (NSW). Centennial Mandalong Pty Limited (Centennial Mandalong) is the operator of Mandalong Mine.

Underground longwall mining operations commenced at Mandalong Mine in January 2005 following construction of the Mandalong Mine Access Site and decline tunnel. Centennial Mandalong has approval to extract up to 6 Mtpa of ROM coal from the West Wallarah Seam utilising a combination of longwall and continuous mining methods.

The Cooranbong Entry Site currently processes up to 4 Mtpa of coal each year. The coal is brought in from the underground workings of the Mandalong Mine using the south drift conveyor located at the north-western end of the site. The coal is then screened and crushed before it is transported to the Newstan Colliery Surface Site via the sealed private haul roads and to Eraring Power Station (EPS) via an enclosed overland conveyor.

Centennial Mandalong is approved to deliver up to 4 Mtpa of coal from the Cooranbong Entry Site to Centennial's Newstan Colliery Surface Site via private haul roads for further processing and up to 4 Mtpa of coal directly to EPS via Eraring Energy's overland conveyor.

In 2014, the forecast total coal production at the Mandalong Mine is 6 million tonnes. The distribution of the ROM coal produced at the Mandalong Mine for 2014 is:

- 2.8 million tonnes to Eraring Power Station;
- 1.3 million tonnes to the Newstan Colliery Surface Site; and
- 1.9 million tonnes to Delta Electricity via the Wyee Rail Unloader.

Based on these forecasts, there would be an exceedance of existing Development Consent condition 1A(b) as the total volume of coal handled and transported from the Cooranbong Entry Site to either Newstan Colliery or Eraring Power Station would be 4.1 million tonnes, exceeding the current volumetric limit of 4 million tonnes.

As such, Centennial Mandalong are seeking to modify Development Consent DA 97/800 to allow for an additional 100,000 tonnes of ROM coal above the current consent limit of 4 million tonnes per annum to be handled at the Cooranbong Entry Site for the 2014 calendar year only.

The total volume of coal transported to Eraring Power Station via the Origin Energy owned overland conveyor would not exceed the current consent limit of 4 million tonnes per annum as previously assessed and approved. Nor will the volume of coal transported to the Newstan Colliery Surface Site exceed the current consent limit of 4 million tonnes per annum as previously assessed and approved.

An assessment of the potential environmental impacts of the proposed modification has been undertaken. The assessment provided below has been based on information detailed within the Northern Coal Logistics Project EIS currently on exhibition.

As part of the Northern Coal Logistics Project, it is proposed to increase the amount of coal handled at and delivered from the Cooranbong Entry Site to the EPS and Newstan Colliery Surface Site from the current limit of 4 Mtpa to up to 6 Mtpa.

The results of the assessments undertaken for the Northern Coal Logistics Project indicate that with 6 million tonnes per annum being handled at and transported from the Cooranbong Entry Site, all air

and noise quality criteria can be achieved with no additional management measures required to be implemented beyond those currently in place.

As such, it can be assumed that all air and noise quality criteria will be met if the proposed increase in coal handling and transport volumes from 4 million tonnes to 4.1 million tonnes is carried out.

The inability to handle more than 4 million tonnes of ROM coal at the Cooranbong Entry Site will result in restricted operations at the Mandalong Mine in order to remain compliant with the consent criteria. This may involve a number of employees being stood down temporarily from the operations and Centennial Mandalong incurring a significant loss at a time when the industry is struggling with difficult and changing market conditions.

Introduction

Mandalong Mine is an existing underground coal mine operation located in the Lake Macquarie Local Government Area. It is approximately 130 kilometres north of Sydney and 35 kilometres south-west of Newcastle near Morisset in New South Wales (NSW). Centennial Mandalong Pty Limited (Centennial Mandalong) is the operator of Mandalong Mine.

Mandalong Mine, which is an extension of the old Cooranbong Colliery, was originally granted Development Consent DA 97/800 by the then Minister for Urban Affairs and Planning on 14 October 1998 under Part 4 of the EP&A Act following the submission of the Cooranbong Colliery Life Extension Project Environmental Impact Statement (Umwelt 1997) and a Commission of Inquiry. The currently approved Mandalong Mine comprises the underground workings and surface infrastructure of the:

- Mandalong Mine, including the Mandalong Mine Access Site, encompassing underground workings and associated surface infrastructure near Morisset; and
- Cooranbong Entry Site encompassing a coal delivery system and surface infrastructure (coal handling and processing) near Dora Creek; and

The other operations directly related to the currently approved Mandalong Mine are the two components which comprise the Delta Link Project, namely:

- The construction and use of the Mandalong Coal Delivery System for the underground transportation of coal from the Mandalong Mine to the Delta Entry Site; and
- The receipt and handling of coal at the Wyee Coal Handling Plant at the Delta Entry Site.

Existing Approvals

The approved Mandalong Mine, and the other operations which directly relate to it, are currently regulated by the three planning approvals listed below.

Development Consent DA 97/800 for the Mandalong Mine - being development application DA 97/800 lodged with LMCC on 27 November 1997 and described in the Cooranbong Colliery Life Extension Project Environmental Impact Assessment (Umwelt 1997), including the Applicant's submissions to the Commission of Inquiry, and as modified on nine occasions as follows:

- **MOD 1 (August 2001) -** minor changes to the conditions of consent relating to the preparation of subsidence management plans and notification of landholder requirements, as described in the modification application prepared by Powercoal, dated 29 March 2001.

- **MOD 2 (February 2005) -** installation of methane drainage plant and the transport of 1,000 tonnes of mined coal by road, as described in *Mandalong Mine Methane Drainage Plant and Coal Haulage, Statement of Environmental Effects*, dated 28 October 2004 and prepared by Sinclair Knight Merz.

- **MOD 3 (March 2006) -** installation and operation of enclosed methane gas flare units for high purity methane drainage gas. This was undertaken in response to condition 60a(iii) imposed as part of MOD 2, which required Centennial Mandalong to submit a report on the progress towards implementing greenhouse gas abatement measures. This modification is as described in the *Statement of Environmental Effects for the Installation and Operation of Enclosed Methane Gas Flare Units*, dated February 2006 and prepared by Umwelt.

- **MOD 4 (July 2009) -** installation and operation of gas engines (yet to be constructed) to produce up to 12 megawatts of electricity using high purity methane drainage gas, increase the coal

production rate from 4 Mtpa to 6 Mtpa, relocate a ballast borehole and update subsidence conditions. This modification is as described in the Environmental Assessment entitled *Mandalong Mine Modification to Development Consent Environmental Assessment*, dated September 2008.

- **MOD 5 (November 2009) -** coal from Mandalong Mine (Cooranbong Entry Site) permitted to be washed at Newstan Colliery and a temporary increase in the volume of coal transported by conveyor from the Cooranbong Entry Site to the Eraring Power Station stockpiles for subsequent road haulage to Newstan Colliery (until construction of the Cooranbong Private Haul Road was complete). This modification is as described in the Statement of Environmental Effects entitled *Washing of Mandalong Coal at Newstan Section 96(A) Application Statement of Environmental Effects*, dated October 2009.

- **MOD 6 (November 2009) -** changes to the locations and heights of approved (but not previously constructed) coal handling infrastructure at the Cooranbong Entry Site. This modification is as described in the Statement of Environmental Effects entitled *Relocation of Infrastructure within the* Mandalong Services Site Section 96(1A) Application Statement of Environmental Effects, dated November 2009.

- **MOD 7 (October 2011) -** installation and operation of a new technology known as a ventilation air methane regenerative after burner (VAM-RAB) as a trial unit to demonstrate the ability of the technology to capture and abate ventilation air methane from the underground mine. This modification is as described in the *Environmental Assessment: Ventilation Air Methane Abatement Demonstration Project, Mandalong Mine – Section 75W Modification*, dated June 2011 and additional information provided in the document entitled *Mandalong Mine Ventilation Air Methane Abatement Demonstration Project – Response to Submissions* dated September 2011.

- **MOD 8 (August 2012) -** increase in the volume of coal permitted to be transported from the Cooranbong Entry Site to both Newstan Colliery and Eraring Power Station from 2 Mtpa to up to 4 Mtpa and back haulage of middlings (middle quality coal product) from Newstan Colliery to Cooranbong Entry Site for subsequent supply to the Eraring Power Station. This modification is as described in the *Environmental Assessment: Mandalong Mine – Cooranbong Entry Site – Cooranbong Distribution Project – Section 75W Modification to Development Consent DA 97/800*, dated May 2012 and additional *Noise Mitigation Assessment*, dated 31 May 2012.

- **MOD 9 (February 2013) -** administrative amendment to conditions 1A(c) and (d) to allow the coal delivery limits approved as part of MOD 8 (i.e. up to 4 Mtpa from Cooranbong Entry Site to both Newstan Colliery and Eraring Power Station).

Development Consent DA 35-2-2004 for the Delta Entry Site – being for the transportation of coal to the Delta Entry Site via the underground Mandalong Coal Delivery System, as approved by development consent DA 35-2-2004 and described in the Delta Link Project – Statement of Environmental Effects (Umwelt 2004). This development consent is held by Centennial Mandalong.

Development Consent DA 2501/2004 for the Wyee Coal Handling Plant at the Delta Entry Site – as approved by development consent DA-2501/2004 and described in the Delta Link Project – Statement of Environmental Effects (Umwelt 2004) and revised information letter dated 27 April 2004. This development consent is held by Delta Electricity.

Existing Operations

Underground longwall mining operations commenced at Mandalong Mine in January 2005 following construction of the Mandalong Mine Access Site and decline tunnel. Since this time, Centennial Mandalong has extracted up to 6 Mtpa of ROM coal from the West Wallarah Seam utilising a combination of longwall and continuous mining methods.

The primary components of the currently approved Mandalong Mine operation are:

- Extract up to 6 Mtpa of ROM coal from the West Wallarah and Wallarah-Great Northern Seams using a combination of longwall mining methods and traditional bord-and-pillar mining methods within the current mining lease areas;
- Operation of coal handling and processing infrastructure, along with coal stockpiling, at the Cooranbong Entry Site up to 4 Mtpa of ROM coal;
- Transport coal from Cooranbong Entry Site to Eraring Power Station at a rate of up to 4 Mtpa via a dedicated overland conveyor owned and operated by Eraring Energy;
- Transport coal from Cooranbong Entry Site to Newstan Colliery at a rate of up to 4 Mtpa by truck via the Cooranbong Private Haul Road owned by Centennial Mandalong and the Newstan-Eraring Private Haul Road owned by Eraring Energy;
- Transport stone material from the Cooranbong Entry Site by truck, via the above-mentioned private haul roads, to Newstan Colliery for use in rehabilitation or emplacement with the Newstan Colliery reject emplacement areas;
- Transport reject material from the Cooranbong Entry Site to the Hawkmount Quarry (owned by LMCC) by truck, via the above-mentioned private haul roads, for emplacement;
- Dispose of fine reject material (tailings) from the Cooranbong Entry Site underground into disused workings of the Cooranbong Colliery;
- Employ up to 305 full-time employees; and
- Operate 24 hours per day, seven days per week.

Under the provisions of Development Consent DA 97/800, Mandalong Mine has an approved life of 21 years expiring on 14 October 2019.

Cooranbong Entry Site

The Cooranbong Entry Site is located approximately 2 kilometres north of Dora Creek. The site is accessed from Gradwells Road, and the Main Northern Railway Line traverses on a north-south alignment to the east. A significant area of the land within the Cooranbong Entry Site is already highly disturbed and developed for coal receipt, handling and transport purposes.

Cooranbong Entry Site was originally developed as part of the Cooranbong Colliery (now part of Mandalong Mine) in 1981. While there have been several changes over the years, the development has now been part of the local area for over 30 years. Historically the Cooranbong Entry Site has provided domestic coal to Eraring Power Station. Following the completion of the Cooranbong Private Haul Road in 2010 linking the Cooranbong Entry Site to the Newstan-Eraring Private Haul Road, coal has also been transported to the Newstan Colliery Surface Site for processing and transport in to the export market.

The primary items of existing infrastructure at the Cooranbong Entry Site are summarised below.

Administration Buildings and Bathhouse

Administration buildings and bathhouse facilities cater for the existing Cooranbong Entry Site personnel and visitors. These facilities have the capacity to cater for a much larger number of site personnel, which currently total 14.

Car Park

A sealed car parking area, which is accessed off the adjoining Gradwells Road, caters for site personnel and visitors. This area provides approximately 200 parking spaces.

Mechanical Workshops and Service Buildings

Mechanical workshops and service buildings at the Cooranbong Entry Site are utilised for maintenance work.

Fuel and Hydrocarbon Storage

Diesel fuel is stored in a 30,000 litre above-ground tank, which is fully enclosed and bunded, located to the west of the main workshop building.

Mine Ventilation Infrastructure

The mine ventilation system for the underground workings of Mandalong Mine includes a ventilation shaft and ventilation fan at the Cooranbong Entry Site. The ventilation fan currently exhausts approximately 140 cubic metres per second (m^3/sec) and ventilates the main headings that accommodate the underground conveyors that run from the Mandalong Mine workings through to both the Cooranbong Entry Site and the Delta Entry Site.

Coal Handling Plant

ROM coal from the underground workings of Mandalong Mine is delivered to the surface at Cooranbong Entry Site via the south drift conveyor. The CHP at the Cooranbong Entry Site, which has an approved capacity of 4 Mtpa, comprises aerial conveyor systems, rotary breaker and sizer, crushing plant, coal bins (2,000 tonne ROM coal bin and 2,000 tonne product coal bin), coal stockpiles (3,000 tonne and 100,000 tonne ROM coal stockpiles and 1,500 tonne emergency coal stockpile) and an automatic truck loading facility.

A noise impact assessment undertaken by SLR in 2012 of the Cooranbong Entry Site identified a number of noise mitigation measures to be implemented in order for the operations to achieve the relevant noise criteria. These mitigation measures were:

- Installation of a real-time noise monitor, which was undertaken in March 2013; and
- Cladding the CHP in noise attenuating panels, which is scheduled for completion by December 2014.

Coal Production Plant

A CPP with a capacity of 4 Mtpa is approved to be established at the Cooranbong Entry Site, however it has not been constructed. The approved CPP comprises two 300 tonne per hour modules, along with two 50,000 tonne product stockpiles.

Other Infrastructure Items

Other items of infrastructure at the Cooranbong Entry Site are:

- Equipment and materials storage areas;

- Machinery washdown bay;
- Firefighting and emergency equipment store;
- Compressor building;
- Electrical sub-station;
- Water management infrastructure, including dams;
- Wheel wash facility at the entrance to the private haul road network; and
- Emergency services helipad.

Servicing

The Cooranbong Entry Site is serviced via connections to HWC's reticulated potable water system, Ausgrid's reticulated electricity network and Telstra's reticulated telecommunications networks.

Sewage

generated by on-site staff amenities is collected (pump-out system) on a regular basis by a licensed contractor for off-site disposal.

Current Projects

Centennial Coal currently has two projects in the planning system being:

- The Mandalong Southern Extension Project; and
- The Northern Coal Logistics Project.

Information regarding these two projects is provided below.

Mandalong Southern Extension Project

In September 2014 the Mandalong Southern Extension Project EIS was submitted to the Department of Planning and Environment. The EIS is currently being assessed by the Department of Planning and Environment.

In brief, the Mandalong Southern Extension Project includes:

- All currently approved operations, facilities and infrastructure of the Mandalong Mine pursuant to:
    - Development Consent DA 97/800 (as modified); and
    - Various approvals, licences, permits, certificates and authorities listed in the EIS, including an existing approved Subsidence Management Plan (SMP) except as otherwise indicated in the EIS. The principal components of the currently approved operations that will not form part of the Mandalong Southern Extension Project are the operations, management and rehabilitation of the Corranbong Entry Site and Hawkmount Quarry currently authorised by Development Consent 97/800. The exceptions to this are the mine ventilation shaft and fan and Borehole Dam at the surface of the Cooranbong Entry Site;
- Expansion and continuation of longwall mining for 25 years from the granting of a mining lease(s) over the Southern Extension Area, with rehabilitation to be undertaken following this period; and
- Modifications to existing facilities and infrastructure, along with the construction and operation of new facilities and infrastructure, within the Mandalong Mine Southern Extension Project Application Area that are required to support the Project.

Northern Coal Logistics Project

In October 2014 the Northern Coal Logistics Project Environmental Impact Statement (EIS) was submitted to the Department of Planning and Environment. The EIS is currently on exhibition. The Northern Coal Logistics Project centres on the utilisation of the existing surface infrastructure at Newstan Colliery and Cooranbong Entry Site, along with existing private haul roads and rail loading infrastructure, all of which are currently authorised by the existing planning approvals for the Newstan Colliery and Mandalong Mine. These facilities are integral to the on-going handling, processing and transport of coal from the underground workings of Newstan Colliery and Mandalong Mine into domestic and export markets.

Proposed Modification

The Cooranbong Entry Site currently processes up to 4 Mtpa of coal each year. The coal is brought in from the underground workings of the Mandalong Mine using the south drift conveyor located at the north-western end of the site. The coal is then screened and crushed before it is transported to the Newstan Colliery Surface Site via the sealed private haul roads and to Eraring Power Station (EPS) via an enclosed overland conveyor.

Centennial Mandalong is approved to deliver up to 4 Mtpa of coal from the Cooranbong Entry Site to Centennial's Newstan Colliery Surface Site via private haul roads for further processing and up to 4 Mtpa of coal directly to EPS via Eraring Energy's overland conveyor.

In 2014, the forecast total coal production at the Mandalong Mine is 6 million tonnes. The distribution of the ROM coal produced at the Mandalong Mine is:

- 2.8 million tonnes to Eraring Power Station;
- 1.3 million tonnes to the Newstan Colliery Surface Site; and
- 1.9 million tonnes to Delta Electricity via the Wyee Rail Unloader.

Based on these forecasts, there would an exceedance of existing Development Consent condition 1A(b) as the total volume of coal transported to either Newstan or Eraring would be 4.1 million tonnes, exceeding the current volumetric limit of 4 million tonnes.

Centennial Mandalong are seeking to modify Development Consent DA 97/800 to allow for an additional 100,000 tonnes of ROM coal above the current consent limit of 4 million tonnes per annum to be handled at the Cooranbong Entry Site for the 2014 calendar year only.

The total volume of coal transported to Eraring Power Station via the Origin Energy owned overland conveyor would not exceed the current consent limit of 4 million tonnes per annum as previously assessed and approved. Nor will the volume of coal transported to the Newstan Colliery Surface Site exceed the current consent limit of 4 million tonnes per annum as previously assessed and approved.

Environmental Assessment

An assessment of the potential environmental impacts of the proposed modification has been undertaken and provided below. The assessment provided below has been based on information detailed within the Northern Coal Logistics Project EIS currently on exhibition.

A number of residences/sensitive receptors are located in the area surrounding the Cooranbong Entry Site which has the potential to be impacted by the current and proposed operations undertaken at the Cooranbong Entry Site. Based on a detailed understanding of the operations undertaken at the Cooranbong Entry Site and the surrounding environment, the only potential impacts of the proposed modification have been determined to be air and noise.

A list of the nearest sensitive receptors identified in the vicinity of the Cooranbong Entry Site is presented in **Table 1**. It is noted that the receptor numbers represent the respective house numbers close to Cooranbong Entry Site.

Table 1 – Sensitive Receives Surrounding the Cooranbong Entry Site

Receiver ID	Location (m, UTM)	
	Easting	Northing
22	359,999.6	6,340,497.4
23	360,226.8	6,340,525.2
26	360,202.1	6,340,460.8
28	360,077.6	6,340,254.9
30	359,299.0	6,339,788.6
31	359,721.6	6,340,039.6
32	360,189.7	6,340,230.2
33	359,181.8	6,339,820.8
35	359,869.7	6,339,907.7

Air Quality

The air quality in the region surrounding the Cooranbong Entry Site is influenced by emissions generated by a range of sources, originating from both within and outside of the local area. Specifically, for the area surrounding the Cooranbong Entry Site, air quality will be influenced by pollution transported into the area from more distant sources, emissions from power stations in the area, non-Project related traffic-generated pollution and pollution generated by the Project itself.

As part of the Northern Coal Logistics Project, it is proposed to increase the amount of coal handled at and delivered from the Cooranbong Entry Site to the EPS and Newstan Colliery Surface Site from the current limit of 4 Mtpa to up to 6 Mtpa.

As part of the Northern Coal Logistics Project Air Quality Impact Assessment, SLR Consulting Pty Limited (SLR) utilised regional background air quality data from monitoring sites operated by the Environmental Protection Authority (EPA) at Newcastle, Beresfield and Wallsend, supplemented with emissions to atmosphere from the Vales Point and Eraring power stations. A dispersion modelling exercise was undertaken by SLR using publicly available information, specifically stack sources associated with the power stations, to determine the contribution from power station emissions. In addition to emissions from stack sources, emissions from coal stockpiles and ash dams were also considered by SLR using the National Pollutant Inventory (NPI) default values.

The site-specific ambient air quality levels adopted by SLR are summarised in **Table 2**.

Table 2 – Ambient Air Quality Criteria for the Proposed Modification

Air Quality Parameter	Averaging Period	Assumed Background Ambient Level	Notes
TSP	Annual	30.9 µg/m^3 PLUS Power Station Increments	Maximum Increment due to Power Station is 0.79 µg/m3 at Receptor '23'
PM_{10}	24-hour	Varying	Maximum Increment due to Power Station is 4.0 µg/m3 at Receptor '23'
	Annual	14.7 µg/m^3 PLUS Power Station Increments	
$PM_{2.5}$	24-hour	Varying	Maximum Increment due to Power Station is 0.85 µg/m3 at Receptor '22'
	Annual	4.6 µg/m^3 PLUS Power Station Increments	
Deposited Dust	Annual	2 g/m^2/month	Assumed
Odour	1-hour	0 OU	Assumed

To assess the worst case impacts from the operations at the Cooranbong Entry Site, two scenarios were assessed being:

- Scenario A - To assess the impacts due to the receipt and handling of 6 Mtpa of coal from the Mandalong Mine and the export of 6 Mtpa of coal to Newstan Colliery Surface Site by trucks
- Scenario B - To assess the impacts due to the receipt and handling of 6 Mtpa of coal from the Mandalong Mine and the export of 6 Mtpa of coal to EPS by overland conveyor

Atmospheric pollutants likely to be generated by the activities at the Cooranbong Entry Site include fugitive emissions of particulates (PM_{10}, $PM_{2.5}$ and TSP and deposited dust) and odour from the ventilation fans.

The emission sources and major pollutants identified at the Cooranbong Entry Site are summarised in **Table 3**.

Table 3 – Emission Sources and Pollutants from the Cooranbong Entry Site Operations

Emission Source	Emission Type	Pollutants
Haul roads	Wheel generated dust	TSP, PM10, PM2.5
Haul trucks	Wind erosion	TSP, PM10, PM2.5
Front end loader (FEL)	Material handling	TSP, PM10, PM2.5
Bulldozer	Material handling	TSP, PM10, PM2.5
Coal stockpiles	Wind erosion	TSP, PM10, PM2.5
Coal bins	Material handling	TSP, PM10, PM2.5
Loading stockpiles	Material handling	TSP, PM10, PM2.5

Emission Source	Emission Type	Pollutants
Unloading from stockpiles	Material handling	TSP, PM10, PM2.5
Miscellaneous transfer points (including conveying)	Material handling	TSP, PM10, PM2.5
Coal screening	Process emissions	TSP, PM10, PM2.5
Coal crushing	Process emissions	TSP, PM10, PM2.5
Ventilation fans	Process emissions	TSP, PM10, PM2.5, Odour

Air quality impact assessment criteria adopted by the EPA are contained in the Approved Methods (DEC 2005). These criteria are derived from a range of sources and are the defining ambient air quality criteria for NSW. They have been developed in consultation with a number of organisations, including the National Health and Medical Research Council (NHMRC), National Environment Protection Council (NEPC), World Health Organisation (WHO) and ANZECC.

The air quality goals adopted for this assessment, which conform to current EPA and Federal air quality criteria, are summarised in **Table 4**.

Table 4 - Air Quality Goals

Pollutant	Averaging Time	Goal
TSP	Annual	90 µg/m^3 (NSW EPA)
PM_{10}	24 Hours Annual Annual	50 µg/m^3 (NSW EPA) 30 µg/m^3 (NSW EPA) 20 µg/m^3 (WHO)
$PM_{2.5}$	24 Hours Annual	25 µg/m^3 (NEPM interim advisory reporting standard only) 8 µg/m^3 (NEPM interim advisory reporting standard only)
Dust Deposition	Annual	Maximum Incremental (Project only) increase of 2 g/m^2/month Maximum Total of 4 g/m^2/month (Project and other sources)
Odour	1-hour	4 OU (99th percentile)

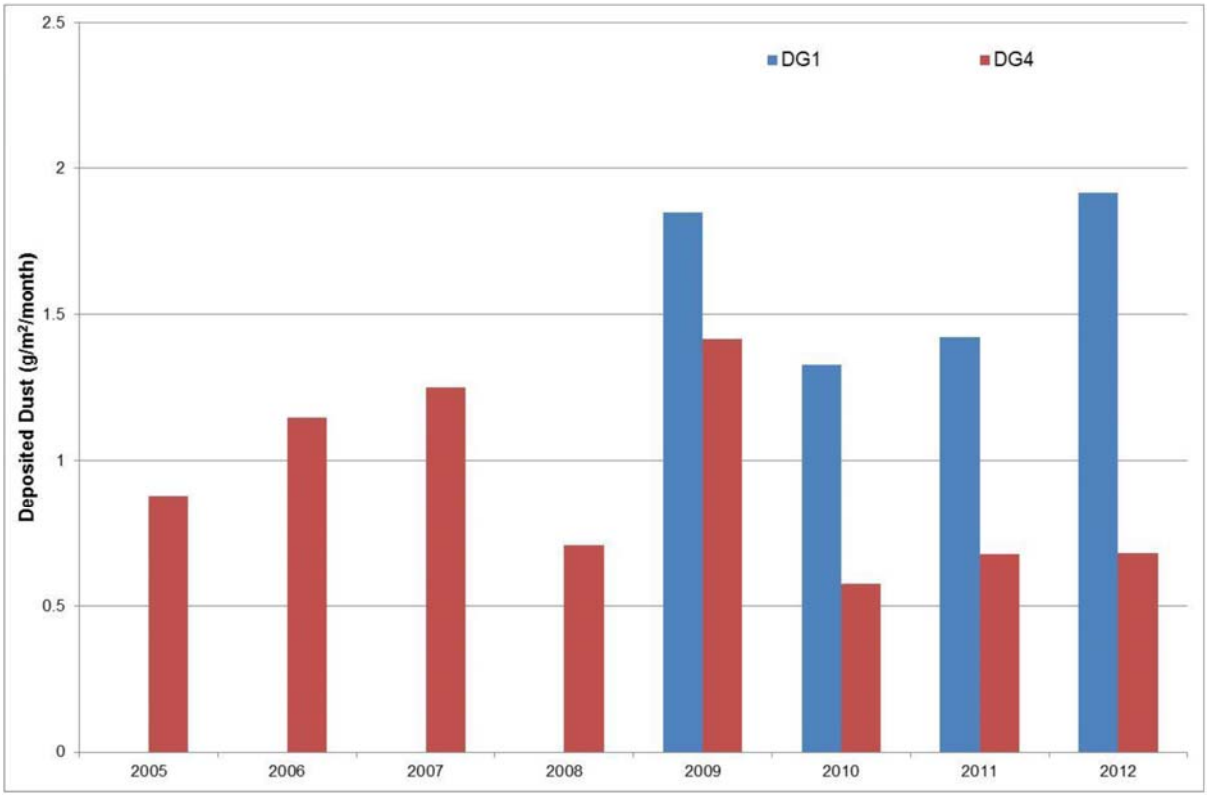
On-site ambient monitoring has been performed at the Cooranbong Entry Site for dust deposition only. Two dust deposition gauges are maintained at the Cooranbong Entry Site, DG1 and DG4, installed in November 2009 and January 2005 respectively. A summary of the dust deposition monitoring program is listed in **Table 5** and shown in **Figure 1**.

Table 5 – Dust Deposition Monitoring Results at the Cooranbong Entry Site

Gauge #	Monitoring Period	Average Deposition Rate (g/m2/month)
DG1	November 2009 – December 2012	1.6
DG4	January 2005 – December 2012	0.9

Overall Average		**1.3**

Figure 1 – Summary of Dust Deposition Monitoring at the Cooranbong Entry Site



It is noted that the long term average dust deposition rates shown in **Table 5** include the contribution of operations at Cooranbong Entry Site and background dust levels.

Table 6 shows the results of the dispersion modelling for dust deposition from the Cooranbong Entry Site at each of the identified receptors around Cooranbong Entry Site.

Table 6 – Predicted Annual Dust Deposition Rates

Receptor ID	Annual Average Dust Deposition Rate (g/m2/month)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	2.0	<0.1	0.5	2.5	0.1	2.1
23	2.0	<0.1	0.4	2.4	0.1	2.1
26	2.0	<0.1	0.3	2.3	0.1	2.1
28	2.0	<0.1	0.2	2.2	<0.1	<2.1
30	2.0	<0.1	0.2	2.2	<0.1	<2.1

Receptor ID	Annual Average Dust Deposition Rate (g/m2/month)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
31	2.0	<0.1	0.2	2.2	<0.1	<2.1
32	2.0	<0.1	0.2	2.2	<0.1	<2.1
33	2.0	<0.1	0.2	2.2	<0.1	<2.1
35	2.0	<0.1	0.2	2.2	<0.1	<2.1

Note: Criteria – 2 g/m^2/month (incremental), 4 g/m^2/month (cumulative)

The results indicate that incremental and cumulative annual average dust deposition rates at all nominated receptors surrounding the Cooranbong Entry Site are predicted to be well below the criterion of 2 g/m2/month (incremental increase in dust deposition) and below 4 g/m2/month (cumulative dust deposition) for both modelled scenarios.

Table 7 presents the annual average TSP concentrations predicted by the dispersion modelling from the Northern Coal Logistics Project at each of the identified receptors around Cooranbong Entry Site.

Table 7 – Predicted Annual Average TSP Concentrations

Receptor ID	Annual Average TSP Concentrations µg/m^3					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	30.9	0.7	11.5	43.1	8.6	40.2
23	30.9	0.8	8.0	39.7	6.6	38.3
26	30.9	0.8	7.1	38.8	6.6	38.3
28	30.9	0.7	5.4	37.0	3.8	35.4
30	30.9	0.6	5.2	36.7	3.5	34.9
31	30.9	0.6	5.6	37.2	2.4	33.9
32	30.9	0.7	4.6	36.2	1.8	33.4
33	30.9	0.6	5.3	36.8	1.5	33.0
35	30.9	0.6	4.0	35.6	1.7	33.2

Note: Project criterion – 90 µg/m^3

The results indicated that the annual average TSP concentrations are predicted to be well below the criterion of 90 µg/m3 at all identified sensitive receptor locations around Cooranbong Entry Site for both modelled scenarios.

Table 8 presents the annual average PM10 concentrations predicted by the dispersion modelling from the Northern Coal Logistics Project at each of the identified receptors around Cooranbong Entry Site.

Table 8 – Predicted Annual Average PM10 Concentrations

Receptor ID	Annual Average PM10 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	14.7	0.7	2.2	17.6	1.1	16.1
23	14.7	0.8	1.6	17.1	1.2	16.3
26	14.7	0.8	1.4	16.9	1.2	16.3
28	14.7	0.7	1.1	16.5	1.1	16.1
30	14.7	0.6	1.0	16.3	0.9	15.8
31	14.7	0.6	1.1	16.4	0.9	15.9
32	14.7	0.7	0.9	16.3	1.1	16.1
33	14.7	0.6	1.0	16.3	0.9	15.8
35	14.7	0.6	0.8	16.1	0.9	15.9

Note: Project criterion – 20 µg/m^3

The results indicated that the annual average PM_{10} concentrations are predicted to be well below the criterion of 30 µg/m3 criteria set by the EPA and the 20 µg/m3 criteria set by the WHO at all identified sensitive receptor locations around Cooranbong Entry Site for both modelled scenarios.

Table 9 presents the annual average $PM_{2.5}$ concentrations predicted by the dispersion modelling from the Northern Coal Logistics Project at each of the identified receptors around Cooranbong Entry Site.

Table 9 – Predicted Annual Average PM2.5 Concentrations

Receptor ID	Annual Average PM2.5 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	4.6	0.1	0.6	5.2	0.3	5.0
23	4.6	0.1	0.4	5.1	0.3	5.0
26	4.6	0.1	0.4	5.1	0.3	5.0
28	4.6	0.1	0.3	5.0	0.2	4.8
30	4.6	<0.1	0.3	4.9	0.2	4.8
31	4.6	0.1	0.3	5.0	0.2	4.8
32	4.6	0.1	0.3	4.9	0.2	4.8
33	4.6	<0.1	0.3	5.0	0.2	4.8
35	4.6	0.1	0.2	4.9	0.2	4.8

Note: Project criterion – 8 µg/m^3

The results indicated that the annual average PM2.5 concentrations are predicted to be well below the criterion of 10 µg/m3 set by the WHO and 8 µg/m3 set by the NEPM at all identified sensitive receptor locations around Cooranbong Entry Site for both modelled scenarios.

Table 10 presents the 24-hour average PM_{10} concentrations predicted by the dispersion modelling from the Northern Coal Logistics Project at each of the identified receptors around Cooranbong Entry Site.

Table 10 – Predicted 24 Hour Average PM10 Concentrations

Receptor ID	Maximum 24-hour Average PM10 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	32.8	3.8	34.4	46.7	7.8	33.0
23	32.8	4.0	21.8	37.2	7.2	33.0
26	32.8	3.7	23.7	35.0	7.5	33.1
28	32.8	2.9	12.3	33.2	6.9	33.1

Receptor ID	Maximum 24-hour Average PM10 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
30	32.8	1.9	12.5	33.3	6.5	33.1
31	32.8	2.3	16.3	36.4	5.7	33.1
32	32.8	2.9	12.2	33.3	5.4	33.1
33	32.8	2.0	10.3	33.3	4.8	33.2
35	32.8	2.2	13.6	33.2	4.4	33.1

Note: Project criterion – 50 µg/m^3

The results indicated that the 24-hour average PM_{10} concentrations are predicted to be well below the criterion of 50 µg/m_3 at all identified sensitive receptor locations around Cooranbong Entry Site for both modelled scenarios.

Table 11 presents the 24-hour average $PM_{2.5}$ concentrations predicted by the dispersion modelling from the Northern Coal Logistics Project at each of the identified receptors around Cooranbong Entry Site.

Table 11 – Predicted 24 Hour Average PM2.5 Concentrations

Receptor ID	Maximum 24-hour Average PM2.5 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
22	18.8	0.8	7.4	18.9	2.0	18.9
23	18.8	0.8	5.1	18.9	2.0	18.9
26	18.8	0.8	6.0	18.9	2.4	18.9
28	18.8	0.6	3.7	18.9	1.0	18.9
30	18.8	0.5	3.2	18.9	1.1	18.9
31	18.8	0.6	3.7	18.9	1.4	18.9
32	18.8	0.6	3.3	18.9	1.0	18.9
33	18.8	0.5	2.8	19.1	1.1	18.9

Receptor ID	Maximum 24-hour Average PM2.5 (µg/m3)					
	Background		Scenario A		Scenario B	
	Regional	Power Station	Increment	Cumulative	Increment	Cumulative
35	18.8	0.4	3.2	18.9	1.1	18.9

Note: Project criterion – 25 µg/m^3

The results indicated that the annual average $PM_{2.5}$ concentrations are predicted to be well below the criterion of 25 µg/m_3 at all identified sensitive receptor locations around Cooranbong Entry Site for both modelled scenarios.

Table 12 presents the 99th percentile 1-hour average odour concentrations predicted by the dispersion modelling for the Northern Coal Logistics Project at each of the nominated residences/properties.

Table 12 – 99th Percentile 1-hour Average Odour Concentrations

Receptor ID	Increment	Odour Criteria
22	<1	4
23	<1	4
26	<1	4
28	<1	4
30	<1	4
31	<1	4
32	<1	4
33	<1	4
35	<1	4

It is noted that the 99th percentile 1-hour average odour concentration is predicted to be below the criterion of 4 odour units for the receptors surrounding Cooranbong Entry Site for all modelled scenarios.

Noise

An ambient noise survey conducted as part of SLR's previous report 'Mandalong Mine – Cooranbong Entry Site Noise Impact Assessment' dated 18 April 2012, has been used to establish the Project Specific Noise Criteria for the Northern Coal Logistics Project and this assessment.

Background noise levels were monitored by SLR. The objective of the background noise survey was to measure LA90(period) and Laeq(15minute) noise levels at the nearest potentially affected residential locations during the day, evening and night-time periods to enable the determination of the intrusiveness and amenity criteria for the Project.

Background noise levels were monitored at two separate locations, considered to be representative of the nearest potentially affected receivers, from Wednesday 11 August 2010 to Thursday 19 August 2010, inclusive at logger location 1 and from Wednesday 31 August 2011 to Saturday 10 September 2011, inclusive at logger location 2. Details of monitoring locations are provided in **Table 13**.

Table 13 - Ambient Noise Monitoring Locations

Location	Address Location Description
Location 1	Gradwells Road, Dora Creek
Location 2	Gradwells Road, Dora Creek

The background noise levels for the receivers surrounding the Cooranbong Entry Site are presented in **Table 14**.

Table 14 – Background Noise Levels for Receives Surrounding the Cooranbong Entry Site

Location	Period	Measured Background LA90 Noise Level	Adopted Rating Background Level	Measured LAeq(Period)	Estimated Existing Industrial (non-Cooranbong) Contribution Laeq
Location 1	Daytime	37 dBA	37 dBA	56 dBA	40 dBA
	Evening	41 dBA	37 dBA*	49 dBA	43 dBA
	Night-time	40 dBA	37 dBA*	50 dBA	43 dBA
Location 2	Daytime	37 dBA	37 dBA	52 dBA	39 dBA
	Evening	44 dBA	37 dBA*	49 dBA	43 dBA
	Night-time	40 dBA	37 dBA*	49 dBA	43 dBA

The noise emission design criteria for the Northern Coal Logistics Project were established with reference to the INP. In accordance with the INP, the project specific noise levels reflect the most stringent noise level requirements from the noise levels derived from both the intrusive and amenity criteria. Applying the most stringent requirement as the Project Specific Noise Criteria ensures that both intrusive noise is limited and amenity is protected. Project Specific Noise Criteria are presented in **Table 15**.

Table 15 – Project Specific Noise Criteria

Location	Period	Measured Background Noise Level (LA90)	Adopted RBL LA90	Intrusiveness Criteria LAeq(15minute)	Amenity Criteria LAeq(Period)	Project Specific Noise Criteria LAeq(15min)
Receiver	Day	37 dBA	37 dBA	42 dBA	60 dBA	42 dBA

Locations 22, 23, 26, 28, 32	Evening	41 dBA	37 dBA	42 dBA	50 dBA	42 dBA
	Night	40 dBA	37 dBA	42 dBA	41 dBA[1]	41 dBA[1]
Receiver Locations 30, 31, 33, 35	Day	37 dBA	37 dBA	42 dBA	60 dBA	42 dBA
	Evening	44 dBA	37 dBA	42 dBA	50 dBA	42 dBA
	Night	40 dBA	37 dBA	42 dBA	41 dBA[1]	41 dBA[1]

1. A modification factor of minus 4 dBA has been applied to acceptable noise level to account for existing level of industrial noise.

The relevant sleep disturbance noise goals for each sensitive receptor are provided in **Table 16**.

Table 16 – Sleep Disturbance Noise Goals

Location	Period	Measured Background Noise Level (L_{A90})	Adopted RBL L_{A90}	Sleep Disturbance Noise Goal
All Residential Receiver Locations surrounding Mandalong Mine – Cooranbong Entry Site	Night	40 dBA	37 dBA	52 dBA

Noise emission levels were predicted from the Cooranbong Entry Site for the typical operational scenario described in **Table 17**. This represents a worst case scenario with both conveyors, CHP infrastructure and truck loading operations occurring concurrently.

Table 17 – Noise Operational Scenario for the Cooranbong Entry Site

Plant and Equipment	Day	Evening	Night
Coal Handing Plant			
Coal Handling Plant (CHP)	✓	✓	✓
Rotary Breaker	✓	✓	✓
Rotary Breaker Drivehead House	✓	✓	✓
Site Conveyors (per 100m)	✓	✓	✓
Vent Fan	✓	✓	✓
100,000t ROM Stockpile			
Front End Loader 2	✓	✓	✓

Plant and Equipment	Day	Evening	Night
Front End Loader to Newstan Colliery)	✓	✓	✓
Dozer	✓	✓	✓
Coal Haul Truck	✓	✓	✓
1200t Truck Loading Bin			
Coal Haul Truck Being Loaded with Coal	✓	✓	✓
Coal Haul Truck	✓	✓	✓
3000t Stockpile			
Front End Loader	✓	✓	✓
Truck Dumping Coal	✓	✓	✓
South Drift			
South drift drivehead house	✓	✓	✓
South drift Conveyor	✓	✓	✓
Servicing Shed			
Compressors	✓	✓	✓
Exhaust Fan	✓	✓	✓
Eraring Energy Operation			
Final Product Bin Drivehead house	✓	✓	✓
Final Product Bin	✓	✓	✓
Eraring Conveyor (per100m)	✓	✓	✓

Noise emission levels were predicted from the Cooranbong Entry Site for the typical operational scenario described in Table 17. This represents a worst case scenario with conveyors, CHP infrastructure and truck loading operations occurring concurrently.

Predicted noise levels at the nearest potentially affected residential locations are provided in **Table 18**.

Table 18 – Predicted Noise Levels for Receivers Surrounding the Cooranbong Entry Site

Location	Period	Predicted Noise Level Laeq(15minute) (dBA)		Project Specific Noise criteria
		Calm	Temperature Inversion	(dBA)
22	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
23	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
26	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
28	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
30	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
31	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
32	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41
33	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42

Location	Period	Predicted Noise Level Laeq(15minute) (dBA)		Project Specific Noise criteria
		Calm	Temperature Inversion	(dBA)
	Night	<35	<35	41
35	Day	<35	Not Applicable	42
	Evening	<35	Not Applicable	42
	Night	<35	<35	41

The results presented **Table 18** indicate that operational noise levels from the Cooranbong Entry Site are predicted to meet the Project Specific Noise Criteria at all residential locations considered in the assessment.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the Cooranbong Entry Site are likely to be less than those predicted.

The sleep disturbance criteria were also predicted to meet the Project Specific Noise Criteria for sleep disturbance at the Cooranbong Entry Site under temperature inversion weather conditions (worst case scenario) at all receiver locations.

Conclusions

The results of the assessments undertaken for the Northern Coal Logistics Project indicate that with 6 million tonnes per annum being handled at and transported from the Cooranbong Entry Site, all air and noise quality criteria can be achieved with no additional management measures required to be implemented beyond those currently in place.

As such, it can be assumed that all air and noise quality criteria will be met if the proposed increase in coal handling and transport volumes from 4 million tonnes to 4.1 million tonnes is carried out.

Justification

The inability to handle more than 4 million tonnes of ROM coal at the Cooranbong Entry Site will result in restricted operations at the Mandalong Mine in order to remain compliant with the consent criteria. This may involve a number of employees being stood down temporarily from the operations and Centennial Mandalong incurring a significant loss at a time when the industry is struggling with difficult and changing market conditions.