SOUTH32 Illawarra Metallurgical Coal




APPIN MINE AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

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DOCUMENT REVISION LOG

Persons authorising this Plan

Name	Title	Date
Chris Schultz	Superintendent Environment	7 December 2020

Document Revisions

Revision	Description of Changes	Date
ICH Document – ICHMP0233		
0	New Document	September 2012
1.0	Addressed EPA responses to draft of Plan	December 2012
2.0	Modification of compliance monitoring to include optical photometers and high-volume air samplers	August 2013
3.0	Update following triennial independent audit	September 2014
4.0	The following changes have been made: • Consolidation of Air quality and greenhouse gas management and monitoring plans for the Bulli seam operations project and the Appin Ventilation Shaft No. 6 • Updated roles and responsibilities • References to parent company changed • Management Plan required to be updated following the Modification to the BSO Project Approval (08_0150) to incorporate the necessary management, monitoring and reporting at the No 6 Vent Shaft into this management plan. • Modification to hand-held particulate monitoring requirements.	May 2017
Conversion to APN Document – APNMP0112		
1.0	Review of content/format. Removal of dust deposition gauges and high volume air sampler from monitoring program. Incorporated comments from consultation.	December 2020

Persons involved in the review of this Plan

Name	Title	Company	Exp (yrs)	Date
Chris Schultz	Superintendent Environment	South32 IMC	25	December 2020
Ben Davis	Specialist Environment	South32 IMC	9	November 2020
Simon Pigozzo	Specialist Environment	South32 IMC	9	November 2020
David Gregory	Specialist Environment	South32 IMC	12	November 2020
Casey Bishop	Specialist Environment	South32 IMC	8	November 2020

1. INTRODUCTION

Appin Mine incorporates the underground mining operations, which extract coal from the Bulli Seam, and associated surface activities, including the West Cliff Coal Preparation Plant (WCCPP) and Coal Wash Emplacement Area (CWEA). Appin Mine is located approximately 25 kilometres (km) north-west of Wollongong in New South Wales (See Plan 1). Appin Mine is owned and operated by Endeavour Coal Pty Ltd, a subsidiary of Illawarra Coal Holdings Pty Ltd (ICHPL), which is a wholly owned subsidiary of South32 Limited. Appin Mine, Cordeaux Colliery and Dendrobium Mine (and associated facilities) collectively operate as South32 Illawarra Metallurgical Coal (IMC).

ICHPL received Project Approval 08_0150 (the Project Approval) from the Planning Assessment Commission of NSW under delegation of the Minister for Planning and Infrastructure on 22 December 2011[1] for current and proposed mining of the Bulli Seam Operations (BSO) for the next 30 years, and production of up to 10.5 Mtpa of ROM coal. This approval incorporates underground mining, transport and emplacement activities undertaken 24 hours a day, seven days per week.

This Air Quality and Greenhouse Gas Management Plan (AQMP) has been prepared to detail the relevant air quality criteria, compliance procedures and controls relating to the mining operations and associated activities. This plan has been prepared to satisfy Condition 12 of Schedule 4 of the Project Approval for the Air Quality and Greenhouse Gas Management Plan.

1.1 Objectives

The objectives of the AQMP are to:

- provide the framework for the responsible management of odour, particulate, and greenhouse gas (GHG) emissions associated with Appin Mine;
- describe the control measures for the management of emissions;
- prevent adverse air quality impacts on the amenity of local communities and the environment;
- describe compliance criteria for air quality and compliance criteria exceedance assessment protocols;
- describe the air quality monitoring program; and
- comply with the Project Approval and other relevant standards and requirements.

[1] Project Approval modifications approved in April 2015 (MOD 1) and October 2016 (MOD 2).

1.2 Scope

The scope of the AQMP applies to all existing and future activities related to Appin Mine including operational, construction and traffic air emissions at:

- Appin East, Appin West and Appin North Pit Top areas;
- Appin No. 2, No. 6 and future Ventilation Shaft sites;
- WCCPP; and
- CWEA.

Refer to Plan 1 for locations of the above.

1.3 Environmental Management System

IMC has a comprehensive Environmental Management System (EMS) in place to minimise the impact of its operations on the local environment and community. The AQMP is a component of the EMS which is certified to ISO 14001.

1.4 Consultation

Consultation has been undertaken as part of this review of the AQMP with the Environment Protection Authority (EPA). The comments from the consultation process have been incorporated into the current version of the AQMP.

Appendix 4 outlines comments from the relevant government agencies following consultation and the IMC response.

Consultation with agencies as stated in Condition 12 of Schedule 4 will only be undertaken where there is a material change to the air quality management system or if specifically requested by DPIE. Administrative or descriptive changes do not constitute a material change.

2. ROLES AND RESPONSIBILITIES

Roles and responsibilities associated with environmental management at Appin Mine are defined in the Environmental Management Strategy. Table 1 outlines the roles and responsibilities associated with the implementation and periodic review of the AQMP.

Table 1: Roles and Responsibilities

Role	Responsibilities
Superintendent Environment	Implement and periodically review the AQMP. Liaise with government regulators and IMC senior leadership team in relation to air quality issues, including reporting.
Site Specialist Environment	Advise, coach and mentor IMC operations with respect to meeting the standards and requirements of the AQMP. Monitor and review compliance against these requirements. Undertake monitoring and inspections as required.
Specialist Environment – Greenhouse Gas and Technology	Maintain GHG reporting spreadsheets for internal and external reporting.
Maintenance Technicians Operations Personnel	Operate and maintain air quality and GHG management controls and equipment in a competent, efficient and reliable manner.
Specialist Community	Meet the commitments contained within the AQMP for stakeholder engagement.
Vice President Operations Approvals Manager Appin Mine General Manager	Provide the necessary resources and systems to ensure that requirements of the AQMP are met.

3. LEGISLATION AND PLANNING

3.1 Project Approval Conditions and Statement of Commitments

Potential air quality and greenhouse gas impacts associated with Appin Mine were modelled during the preparation of the BSO Project Environmental Assessment (EA) 2009. The EA was assessed and approved under the *Environmental Planning and Assessment Act 1979* (*EP&A Act*) and associated Regulations.

All activities carried out at Appin Mine will be generally in accordance with the Project Approval and with the EA.

Appendix 2 outlines the air quality and greenhouse gas management requirements of the Project Approval and cross references where the requirements have been addressed within the AQMP.

Appendix 3 summarises the requirements of the commitments in the EA and cross references where the requirements have been addressed within the AQMP.

3.2 Environment Protection Licence Requirements

Environment Protection Licence (EPL) 2504 applies to Appin Mine and associated activities. A copy of the licence can be accessed at the Environment Protection Authority (EPA) website: http://www.epa.nsw.gov.au/prpoeoapp/.

3.3 Relevant Legislation

Key regulatory and AQMP obligations applicable to Appin Mine are managed via an online obligations management database. The obligations are allocated to responsible personnel. This process is detailed in the Environmental Compliance/Conformance Assessment and Reporting Procedure.

Legislation applicable to air quality and greenhouse gas management includes but is not limited to:

- *Protection of the Environment Operations Act 1997 (POEO Act)*;
- *Protection of the Environment Operations (Clean Air) Regulation 2010*;
- *Environmental Planning and Assessment Act 1979 (EP&A Act)*;
- *National Greenhouse and Energy Reporting Act 2007 (NGER Act)*;
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008*;
- *Clean Energy Legislation (Carbon Tax Repeal) Act 2014*;
- *National Environment Protection (Ambient Air Quality) Measure 1998*; and
- *National Environment Protection (National Pollutant Inventory) Measure 1998*.

3.4 Guidelines and Standards

This AQMP has been developed to be consistent with the principles of the following:

- ISO 14001:2015 Environmental Management Systems;
- South32 Sustainability Policy;
- South32 Environment Standard; and
- South32 Climate Change Strategy.

Other relevant guidelines for air quality and greenhouse gas management include:

- AS 3580.14-2011 – Methods for sampling and analysis of ambient air. Part 14: Meteorological monitoring for ambient air quality monitoring applications;
- AS/NZS 3580.10.1:2016 - Methods for sampling and analysis of ambient air Determination of particulate matter - Deposited matter - Gravimetric method;
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007);
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2017);
- NSW Coal Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (OEH, 2011);

- Coal Mine Particulate Matter Control Best Practice – Site-specific determination guideline (OEH, 2011); and
- Technical Guidelines as detailed on the Clean Energy Regulator website.

4. BASELINE ASSESSMENT

A baseline assessment was undertaken as part of the EA. An extensive review of the air quality monitored around the operations is presented in Appendix J of the BSO Project EA (PAE Holmes, 2009).

The EA is available via the South32 regulatory website link:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

The Air Quality Impact Assessment included baseline data and air quality monitoring data which showed that the annual average PM_{10} (suspended particles that are ≤10 µm in size) concentrations have been and are currently below the current air quality criteria at the monitored locations.

Concentrations of Total Suspended Particulate (TSP), inferred from the particulate matter for PM_{10} concentrations, show compliance with the current criterion. Results from the dispersion modelling, discussed in Section 7 of the Air Quality Impact Assessment, suggested that the Project-specific and cumulative dust concentrations and deposition levels would be in compliance with the air quality assessment criteria at sensitive receptor locations.

PM_{10} Dust Levels

Annual average mine-only PM_{10} concentrations are predicted to be ≤11 µg/m^3 at the nearest receptors and annual average mine-only TSP concentrations are predicted to be less than 15 µg/m^3, that are within the criteria.

Dust Deposition

Mine-only dust deposition at the nearest receptors is predicted to be less than 2 g/m^2/month. This is in compliance with the criterion of 2 g/m^2/month for the Project considered alone.

Sensitive Receivers

Table 7.1 of the Air Quality Impact Assessment provides the predicted dust concentrations at each of residential receptors. In relation to the Appin West Pit Top site, sensitive residential receptors are located in the north to south-east sector from site along Douglas Park Drive. Appin East sensitive residential receptors are located towards the north-west to north-east of site towards Appin. The nearest sensitive receptors for Appin North and the WCCPP are located in the western section of the Cataract Scout Camp, north to north-west of site towards Appin and east towards Wedderburn.

Odour

Odour levels in the ventilation shaft outlets are very low. Consequently, no odour impacts from ventilation shafts emissions are predicted at any sensitive receptors.

5. AIR QUALITY MANAGEMENT AND MITIGATION

The Project Approval requires implementation of best practice air quality management, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including from any spontaneous combustion on site.

5.1 Odour

Odours from mining operations may be caused by hydrocarbon emissions from ventilation shafts. Historical odour monitoring indicates that hydrocarbon levels in the ventilation shafts are generally low. This has informed predicted odour emission rates, which are not expected to result in detectable or distinguishable odour at the sensitive receptors of:

- Douglas Park;
- Appin; and
- Wilton.

The location where the greatest odour is expected (peak concentrations of 3 Odour Units) are elevated and in sparsely populated locations. Ventilation Shaft No. 6 fan facilities have been designed to mitigate air quality impacts associated with odour and particulates by:

- directing emissions away from Douglas Park and towards the Hume Highway transport corridor; and
- discharging mine ventilation air through evases at an angle of ~45 degrees to the vertical to ensure the plume has initial momentum flux to aid dispersion of odour and particulates.

Odour has not historically been or is expected to be an issue at any of the pit tops.

Coal from the Bulli Seam is not susceptible to spontaneous combustion.

5.2 Greenhouse Gas Emissions

The majority of GHG emissions at Appin Mine are Scope 1 (direct) fugitive emissions (refer to Figure 1) in the form of methane (refer to Figure 2). Scope 1 emissions account for approximately 90% of IMC's total GHG emissions, with the remainder associated with energy consumption (Scope 2 emissions). IMC's net annual GHG emissions are in the order of 2.0 to 3.3 Mt $CO_{2\text{-}e}$ per annum, dependent on production performance and regional gassiness of the relevant mining areas.

All measures to minimise the release of GHG and to support the South32 Climate Change Strategy are directed towards reducing methane emissions.

IMC has set relatively aggressive greenhouse gas emission targets, with a short-term target of maintaining Scope 1 emissions at FY15 levels through to the end of FY21, and then to progressively reduce emissions, such that the business is carbon neutral by 2050. The goal of carbon neutrality by 2050 aligns South32 with the Paris Agreement, as well as the NSW aspirational target for 2050.

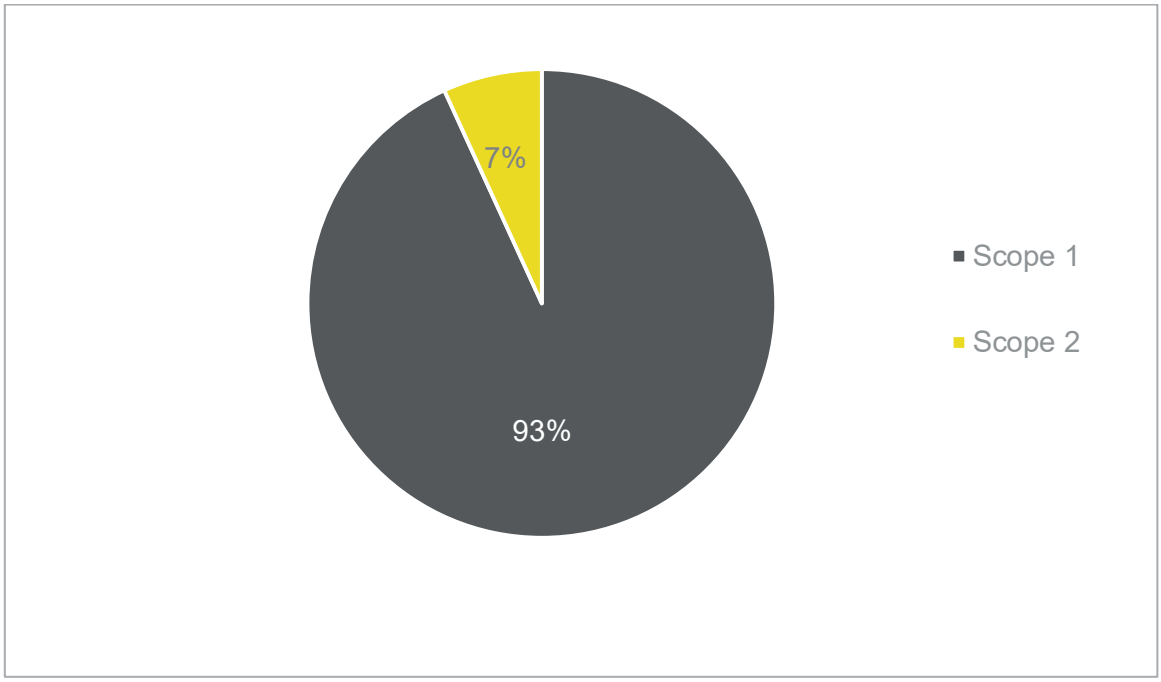


Figure 1: GHG emissions by scope

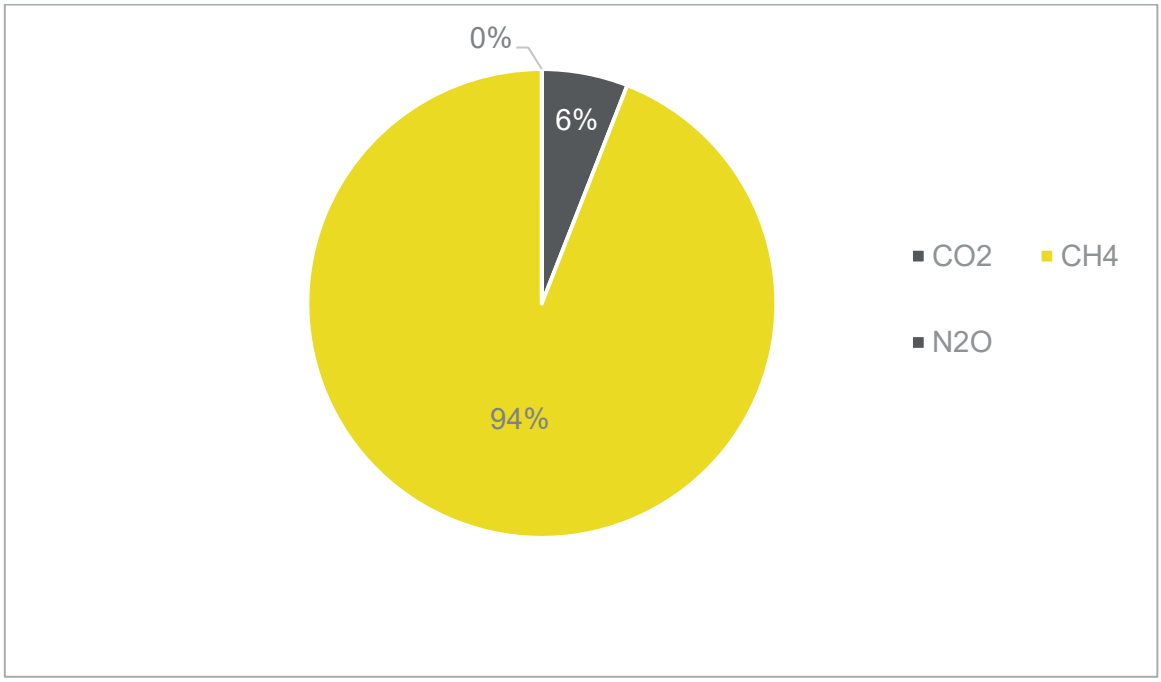


Figure 2: GHG emissions by gas

Potential air quality impacts and GHG emissions associated with the project were addressed in the BSO Project EA. IMC has programs in place to extract and utilise or flare methane from the coal seam and adjacent strata, preventing methane from being vented to atmosphere in the mine ventilation air stream. This has both environmental and safety benefits.

Means of capturing mine methane include:

- underground drilling programs which pre-drain methane from the coal seam and adjacent geological units prior to longwall mining; and
- goaf drainage drilling programs which capture methane from the coal seam and adjacent geological units which have been fractured by the longwall as coal is extracted.

Methane captured through these processes is preferentially piped to two existing, interconnected gas fired power stations, located at Appin Ventilation Shaft No. 2 and the Appin West Pit Top. Where gas cannot be transferred to the power stations it is flared to reduce its greenhouse gas intensity.

Specific measures implemented to minimise the release of greenhouse gas emissions associated with Appin Mine are summarised in Table 2.

Table 2: GHG Emission Minimisation Measures

Mitigation Action	Detail
Methane Drainage System	Comprehensive methane drainage extraction infrastructure is in place above and below ground for Appin Mine. This infrastructure will be expanded to support future underground mining. The extracted gas is beneficially utilised in the EDL Appin and Tower Power Plants. Utilisation of mine gas in the power generation projects results in the destruction of methane resulting in the release of carbon dioxide which has a Global Warming Potential (GWP) 28 times less than that of methane.
Flaring	Where methane gas cannot be transferred to the power stations, it is flared to reduce its GWP.

South32 will focus on three key areas to address the challenge of climate change including Emission Reduction, Climate Resilience and Climate Change Opportunity. Details of the Climate Change Strategy are available at:

https://www.south32.net/who-we-are/sustainability-approach/climate-change.

South32 publicly reports progress on commitments made in the Climate Change Strategy. These reports are available at:

https://www.south32.net/investors-media/investor-centre/annual-reporting-suite.

Future actions taken by IMC to minimise GHG emissions will be reported in the Annual Review that is available at:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

5.3 Particulate Matter

Particulate matter emission management measures that have been implemented across Appin Mine are outlined in Table 3 to Table 7.

Table 3: Particulate Matter Controls - Appin East

Area and/or Source	Management Measure/Control
Stockpile	Water cart Dust suppression system (sprays)
Internal haulage roads	Water cart Road sweeper Truck/Wheel wash facility[2] Road sprays Covered loads
Coal clearance/Coal bins	Enclosed conveyor system Enclosed transfer point (conveyor to bin) Minimal gap between bin unloading chute and truck trailer
Yard Area	Road sweeper
Site external road	Road sweeper

Table 4: Particulate Matter Controls - Appin West

Area and/or Source	Management Measure/Control
Internal roads	Road sweeper
Yard and mine handling area	Road sweeper Vehicle washdown bays
Waste Area and Access Road	Road sprays (access road) Use of dust suppressant

[2] Truck wash may be isolated in winter to prevent black ice forming on Appin Road.

Table 5: Particulate Matter Controls - Appin North

Area and/or Source	Management Measure/Control
Internal roads	Road sweeper
Yard Area	Road sweeper

Table 6: Particulate Matter Controls - WCCPP, Stockpile Areas and CWEA

Area and/or Source	Management Measure/Control
Internal haulage roads/coal bins	Water carts Road sweeper Truck wash facility
Emplacement (Active)	Water carts Moisture content of coal wash product Compaction Water sprays
Emplacement (rehabilitation areas)	Progressive rehabilitation Vegetation cover
Stockpile/s (ROM and Clean)	Water carts
Yard Area/s	Water carts Road sweeper
Conveyors/transfer points	Enclosed transfer points (within the WCCPP footprint) Dust suppression system at some tripper locations
Site external road	Water cart Road sweeper Designated truck tarping/cleaning area

Table 7: Particulate Matter Controls - Other

Area and/or Source	Management Measure/Control
Exhaust particulate emissions – mine vehicles	Wet diesel exhaust scrubbers on all underground type mine vehicles Diesel particulate filters or low emission Tier 3 engines on underground type mine vehicles Low emission diesel fuel used by mining vehicles

Transport of coal and coal wash on public roads	Truck wash facilities for all outbound truck movements Designated load inspection and tarping areas Covered loads (outbound movements) Road sweeper cleaning program – Appin Road
Ventilation Shaft No. 6 Site	Sealed access road Vegetation cover (where possible)
General Construction Activities	Appropriate and effective dust control measures are implemented, which may include: • potential dust generation areas wetted; • activities amended, halted or timed to minimise dust generation; • vehicle cleanliness maintained for vehicles leaving site on public or private roads; • material stockpiles wetted or covered where appropriate; and/or • use of water sprays, water carts and mobile vacuum sweepers where appropriate.

6. AIR QUALITY MONITORING PROGRAM

6.1 Odour Monitoring

During regular site inspections at ventilation shaft sites by the Specialist Environment, odour monitoring (in the form of a sensory review) will be undertaken. Where unusual odour is detected, further investigation will be undertaken, considering aspects such as the conditions underground, surface activities and data obtained from the relevant site weather station.

Should it be required, sampling of mine ventilation air emissions will be undertaken.

Targeted odour surveys may also be undertaken in response to community complaints should they be received.

IMC will investigate contingency measures for odour abatement where required.

6.2 GHG Monitoring

GHG data is reported to the Clean Energy Regulator annually in the form of a Section 19 Energy and Emissions Report. GHG emissions data is assured by a third party annually and the opinion is published on the South32 website.

Measurement of the concentration and volume of point source GHG emissions (namely fugitive releases of methane and carbon dioxide associated with mine gases) are undertaken on a Continuous Emissions Monitoring (CEM) basis. The CEM systems are designed to measure the flow, temperature, pressure, and the CH_4 and CO_2 concentrations

of an emission point to enable calculation of accurate outputs for GHG emissions reporting. From the flow, pressure and temperature readings, normalised flow rate is calculated in normal cubic meters per hour (Nm^3/hr). This data, along with raw CH_4 and CO_2 readings are sent from the PLC to the SCADA system where it is extracted for further computation, data review and reporting within an NGER Workbook.This is broken down into five distinct functional levels as shown in Figure 3.

Instrument Level	For each monitored Emissions Point, instrumentation is connected to the process to continuously measure Flow (litres/second), Temperature (Deg C), Pressure (kPa absolute), and periodically measure CH_4 and CO_2 Gas Composition
PLC Level	For each Emissions Site, a PLC is connected to the associated instruments. The PLC continuously monitors the input data from the connected instruments, manipulating this data in the form of calculations and measurement unit conversions. The PLC also monitors the health status of each instrument. This data is stored in PLC registers for extraction by the SCADA level.
SCADA Real Time Level (Site-Based)	For each Mine Site, a real time SCADA server is connected to the various PLCs across the mine. The data extracted from each Emissions Site PLC is available in real-time, as well as being trended for both historical purposes and to be extracted by the SCADA Historian Level.
SCADA Historian Level (Centralised Location)	For all of IMC, the SCADA Historian Level collates all nominated emissions data from the various Mine Site SCADA trends, extracting this data on both a periodic and change of value/state basis.
Reporting Level	The Master NGER Workbook for each financial year is the repository for all CEM and other emission data used for reporting. The workbook calculates emissions reported both internally and externally and contains validation routines to identify poor quality data.

Figure 3: Continuous Emissions Monitoring System Framework

6.3 Particulate Matter Monitoring

Sites selected for the air quality monitoring program are considered to be the most appropriate locations to provide reliable and representative indication of air quality impacts associated with Appin Mine.

The particulate matter monitoring program incorporates:

- use of real-time air quality monitors (optical photometers); and
- visual inspections and audits.

Dust deposition gauges and high volume air samplers may be used if required to investigate complaints or operational dust related issues, however they are not included in the regular dust monitoring program.

Air quality monitoring equipment is operated for diagnostic purposes, providing data for internal assessment of air quality and potential impacts from operations. The data can also be used for investigation of any community complaints. An IMC Specialist Environment reviews key data trends on a monthly frequency during monitoring, with this information used to supplement the information being obtained from inspections. Monitoring equipment is checked and calibrated as required.

Analysis and provision of results from dust monitoring apparatus will be undertaken by appropriately qualified laboratories, personnel, or subject matter experts.

Data from the particulate matter monitoring program will be uploaded into EQuIS. All monitoring data will be routinely reviewed, analysed and validated for compliance with the relevant criteria and in consideration of prevailing factors. The Specialist Environment will be involved in the review, analysis and validation of monitoring data for recording and reporting purposes, and to review the effectiveness of existing controls.

6.3.1 Air Quality Criteria

Appin Mine will ensure that all reasonable and feasible avoidance and mitigation measures will be utilised to ensure particulate emissions do not exceed the criteria in Condition 9 of Schedule 4 (Table 4, 5 and 6) of the Project Approval, which are replicated in Table 8 to Table 10 respectively.

Table 8: Long term criteria for particulate matter

Pollutant	Averaging Period	Criterion[3]
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter <10 µg (PM_{10})	Annual	[4]30 µg/m^3

Table 9: Short term criterion for particulate matter

Pollutant	Averaging Period	Criterion[3]
Particulate matter <10 µg (PM_{10})	24 hour	50 µg/m^3

[3] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with the EPA.
[4] In the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, the 24-hour impact assessment criteria for PM_{10} is 25 µg/m^3.

Table 10: Long term criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level[3]
Deposited dust[5]	Annual	2 g/m^2/month	4 g/m^2/month

The assessment of results will consider the influence of external sources of dust and the contribution to measured dust levels by the relevant IMC operation (see Section 7.2.1).

6.3.2 Optical Photometers

The fixed optical photometer (AE-PF3) located at the Appin East Pit Top[6] is used to provide an indication of compliance against both the long term criteria and short term criteria for particulate matter (as listed in Table 8 and Table 9).

Optical photometers AE-PF1 (located at the coal haulage exit at Appin East) and W-PF1 (located adjacent to Wedderburn Road) are used to inform operational activities and are not used for assessment of compliance. Alerts from these monitors are sent by text-message to the Environment Specialist when levels ≥40 µg/m^3 (greater than 80% of the PM_{10} criteria) are recorded, to enable the mobilisation of water trucks or road sweepers as required.

Optical photometer VS6-PF1 (located at Ventilation Shaft 6) is used to monitor particulate matter in the vicinity of Ventilation Shaft 6 and is not used for assessment of compliance. Data from VS6-PF1 will be made available to the Community Consultative Committee (CCC) and community members on request and may be used to investigate complaints or events.

The locations of the optical photometers are shown on Plan 2 and Plan 3. Additional detail on the optical photometers is provided in Appendix 1.

A portable optical photometer may be used to conduct spot checks, surveys and audits in addition to the specified program on an as required basis (i.e. in response to complaints and/or specific dust issues, or to gather background data for projects).

Targeted temporary residential air quality monitoring may be undertaken where residential receivers will possibly experience adverse air quality impacts directly associated with operational or construction activities, or in response to community complaints. Where required, consultation with relevant residents will be undertaken to establish additional air quality monitoring sites at private residences and privately-owned land.

[5] Deposited dust is to be assessed as insoluble solids.
[6] The current location of AE-PF3 on the Appin East property boundary will continue to be utilised until the monitor is relocated. The relocation of the monitor is pending the approval of the AQMP (2020) and the allocation of funding to facilitate the relocation process.

6.3.3 High volume air samplers

A high-volume air sampler (AE-HV1) had been installed adjacent to AE-PF3 since 2015 and had been run if the optical photometer (AE-PF3) recorded dust levels greater than 80% of the PM_{10} criteria. The monitor was decommissioned in 2020[7].

6.3.4 Dust Deposition Gauges

A network of dust deposition gauges (DDGs) have been utilised at Appin Mine (installed over the period of 2012 – 2014).

The DDGs have provided a long-term baseline of deposition in the area however do not feed into dust control actions or provide timely information regarding air quality conditions at a fine time scale. The existing data set from the site does not indicate that any of the operational sites or activities at Appin Mine are a cause for concern for particulate exposure to residents of the area.

The network of DDGs was decommissioned in 2020[8].

Targeted temporary residential air quality monitoring may be undertaken using DDGs in response to community complaints, or for construction activities (for background data and air quality during construction). Where required, consultation with relevant residents will be undertaken to establish additional air quality monitoring sites at private residences and privately-owned land. The DDGs would be installed for a minimum three-month period. A DDG would also be installed between the dust source and the sensitive receiver to provide a reference point.

6.3.5 Weather Stations

Weather (meteorological monitoring) stations are located at multiple locations across Appin Mine to monitor and record weather parameters such as wind speed and direction, temperature, humidity, and rainfall. Data from these stations may be used to inform evaluation of compliance with air quality criteria. Details on the weather stations is provided in the Meteorological Station Operation and Data Management Procedure.

Ambient air temperature readings will be monitored and recorded. Weather stations are installed on the Appin East and Appin North fixed optical photometers, with standalone weather stations installed at the Ventilation Shaft No. 6 and Appin West sites.

The locations of the weather stations are shown on Plan 2 and Plan 3.

6.3.6 Weather Alerts

IMC subscribes to an early warning weather alert service. With the assistance of the early warning weather alerts service for impending adverse weather conditions, pre-emptive dust control measures will be implemented where required. These measures may include

[7] A review of monitoring data indicated that the 80% trigger was only reached during extraordinary events and not as a result of operational activities. Operational controls are implemented as soon as practicable following any increase in dust emissions from the Appin East site.
[8] Pending approval of the AQMP (2020)

adjustments to existing dust control measures, manually activating suppression sprays, deployment of mobile sweepers or modification and/or suspension of activities.

7. COMPLAINTS AND NON-COMPLIANCE MANAGEMENT

7.1 Complaints and Dispute Resolution

IMC has a 24 hour, free community call line (1800 102 210) and email address (illawarracommunity@south32.net) which is displayed at IMC Projects and Mine Sites, and included in newsletters, letters and other correspondence. The call line is for all complaints and general enquiries regarding environmental or community issues associated with IMC's operations.

Community complaints and enquiries may also be received in person by any employee of IMC, with details to be immediately shared with the Community Team for investigation. All air quality complaints received in relation to Appin Mine will be managed in accordance with the Handling Community Complaints, Enquiries and Disputes Procedure.

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint. An initial response will be provided to the complainant within 24 hours of the complaint being made, with a follow up response being provided as soon as practicable once a more detailed investigation is complete.

Supplementary air quality monitoring surveys will also be undertaken as necessary and until satisfactory resolution of the issue.

A summary of all complaints received during the reporting year will be provided as part of the Annual Review. A log of complaints is also maintained on the IMC website at:

https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

7.2 Non-Compliance, Corrective Action, and Preventative Action

Events, non-compliances, corrective actions and preventative actions are managed in accordance with the Reporting and Investigation Standard and Environmental Compliance/Conformance Assessment and Reporting Procedure. These procedures, which relate to all IMC operations, detail the processes to be utilised with respect to event and hazard reporting, investigation and corrective action identification. The key elements of the process include:

- identification of events, non-conformances and/or non-compliances:
- recording of the event, non-conformance and/or non-compliance in the event management system (G360);
- investigation/evaluation of the event, non-conformance and/or non-compliance to determine specific corrective and preventative actions;
- assigning corrective and preventative actions to responsible persons in G360; and
- review of corrective actions to ensure the status and effectiveness of the actions.

Exceedances and non-compliances with air quality criteria will be reported to all relevant stakeholders as detailed in Section 8.3.

7.2.1 Protocol for Assessing Compliance

The process for assessing compliance considers whether external extraordinary factors unrelated to Appin Mine have adversely influenced a monitoring result. This is necessary to ensure that air quality accounting is reliable and accurate and ensures stakeholders are properly informed.

The protocol for confirmation of monitoring results, including exceedances of criteria in the Project Approval, includes the consideration of extraordinary factors unrelated to Appin Mine operations and not within Appin Mine's operational control. Such external factors include the adverse consequences of dust storm events, severe weather events, regional dry and dusty conditions elevating regional dust levels, local or regional bushfires, laboratory or analysis errors by external service providers, invalid or contaminated samples and other external unrelated operations or activities adversely influencing project air quality results (e.g.: construction, roadworks, regional traffic, land clearing, rural activities, unauthorised monitoring station interference).

7.2.1.1 Exceedances due to operational activities

Where an exceedance has been recorded and it has been validated that it is due to operational activities or the failure of controls, notifications to Government Agencies and landowners will occur as detailed in Section 8.3. The exceedance will be classified as a non-compliance.

7.2.1.2 Exceedances due to extraordinary events

Where an exceedance of air quality criteria has been recorded due to extraordinary events, the following process will be followed:

- the result will be recorded in the 14 day report with a qualifying comment;
- the result will be recorded in the Annual Review with a qualifying comment; and
- the data will be used in the calculation of average, minimum and maximum values for the project, with the inclusion of a qualifying comment.

Where deposited dust deposition rates or particulate matter mass data indicates levels that exceed the relevant criteria, further analysis of the particulate matter may be undertaken where necessary to qualify the constituents of the particulate matter sampled.

Exceedances due to extraordinary events will be notified to Government Agencies as detailed in Section 8.3.1, for information only. Landholders will not be notified.

7.2.1.3 Exceedances due to invalid samples

Where an exceedance of air quality criteria has been recorded due to an invalid sample (e.g. laboratory error or tampering with monitoring equipment), and this has been validated, these results will not be recorded. A file note will be maintained in the document management system providing justification for disregarding the sample. Notification to the

relevant Government Agency will occur if the sample is required for compliance monitoring, providing justification for disregarding the sample.

7.2.2 Adaptive Management

In accordance with Condition 3 of Schedule 6 of the Project Approval, where any exceedance of the criteria in Condition 9 of Schedule 4 has occurred, IMC is required to:

a) take all reasonable and feasible steps to ensure the exceedance ceases and does not recur;

b) consider all reasonable and feasible options for remediation and submit a report to DPIE describing these options and any preferred remediation measures or other course of action; and

c) implement remediation measures as directed by the Secretary.

7.3 Entitlements of Impacted Land Owners and Residents

If the particulate matter emissions generated by Appin Mine exceed the criteria in Condition 10 (Table 7, 8 and 9) of Schedule 4 of the Project Approval on a sustained basis, at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner, IMC will proceed with the process as reflected in Conditions 4 and 5 of Schedule 5[9] of the Project Approval. The land acquisition criteria are provided in Table 11, Table 12 and Table 13.

Table 11: Long term acquisition criteria for particulate matter

Pollutant	Averaging Period	Criterion[10]
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter <10 µg (PM_{10})	Annual	30 µg/m^3

Table 12: Short term acquisition criteria for particulate matter

Pollutant	Averaging Period	Criterion[10]
Particulate matter <10 µg (PM_{10})	24 hour	[11]150 µg/m^3
Particulate matter <10 µg (PM_{10})	24 hour	[12]50 µg/m^3

[9] Note incorrect reference to Condition 5-6 of Schedule 6 in the Project Approval.
[10] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with the EPA.
[11] Total impact (i.e. incremental increase in concentrations due to Appin Mine plus background concentrations due to other sources)
[12] Incremental impact (i.e. incremental increase in concentrations due to Appin Mine exclusively)

Table 13: Long term acquisition criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level[10]
Deposited dust[13]	Annual	2 g/m^2/month	4 g/m^2/month

7.4 Independent Review

If the owner of privately-owned lands considers that Appin Mine is exceeding the air quality criteria in Condition 10 of Schedule 4 (refer to Section 7.3), they are entitled to request, in writing, an Independent Review.

In accordance with Condition 2 and 3 of Schedule 5 the Project Approval, IMC will comply with the requirements of the Secretary and commission an Independent Review where the Secretary is satisfied that an Independent Review is warranted.

8. REPORTING AND REVIEW

8.1 Annual Review

IMC will report on the performance of the AQMP in the Annual Review.

The Annual Review is prepared in accordance with the requirement of Condition 4 of Schedule 6 of the Project Approval and is be submitted to relevant agencies in September each year. Annual Reviews are made available to the general public via the South32 website.

The Annual Review will include:

- air quality monitoring results and comparison to criteria for particulate matter;
- a summary of GHG emission data and any GHG related improvement opportunities implemented;
- air quality related complaints and management/mitigation measures undertaken;
- management/mitigation measures undertaken in the event of any confirmed exceedance of criteria for particulate matter; and
- review of the performance of management/mitigation measures and the monitoring program.

8.2 Public Reporting of Results (via website)

A summary of the particulate matter monitoring results, including details of exceedances and non-compliances (as determined in accordance with the protocol for assessing

[13] Deposited dust is to be assessed as insoluble solids.

compliance as described in Section 7.2.1 of the AQMP), will be provided on the IMC website in the 14 day report at: https://www.south32.net/our-business/australia/illawarra-metallurgical-coal/documents.

8.3 Exceedance Notifications

8.3.1 Notification of Criteria Exceedances – Government Agencies

In the event that an exceedance of the relevant criteria for particulate matter is confirmed, a notification is to be made in accordance with Condition 7 of Schedule 6 via the DPIE Major Projects Planning Portal: https://www.planningportal.nsw.gov.au/major-projects. This notification is to be made as soon as practicable after becoming aware of the exceedance[14]. The EPA is also to be notified of the exceedance (via email).

8.3.2 Notification of Criteria Exceedances – Landowners

In accordance with Condition 1 of Schedule 5 of the Project Approval, where an exceedance of criteria due to operational activities has been confirmed, the affected landowners will be notified in writing of the exceedance and regular monitoring results will be provided to each affected landowner until compliance with criteria is achieved. In addition, a copy of the NSW Health fact sheet entitled "Mine Dust and You" is to be provided to the affected landowners and/or existing tenants of the land.

Additional targeted particulate matter monitoring and analysis at the affected landowners' premises may be required to verify exceedances of criteria attributable to Appin Mine.

The CCC will also be advised of exceedances of criteria at the next available meeting.

8.4 Review of AQMP

In accordance with Condition 5 of Schedule 6 of the Project Approval, the AQMP will be reviewed, and if necessary revised, within three months, of:

- the submission of an annual review;
- the submission of an incident report;
- the submission of an Independent Environmental Audit report; or
- any modification to the conditions of the Project Approval (unless the conditions require otherwise).

Outcomes from each review will be documented in the Management Plan Review Log. The AQMP will only be revised where a material change to site operations or environmental management has occurred, or in accordance with the review period on the AQMP. Administrative or descriptive changes do not constitute a material change.

[14] The definition of an incident in the Project Approval is "A set of circumstances that causes or threatens to cause material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in this approval".

Where a review triggers a revision of the AQMP, the AQMP will be revised and submitted to the Secretary for approval.

8.5 Audits

8.5.1 Independent Environmental Audit

In accordance with Condition 9 of Schedule 6 of the Project Approval, an Independent Environmental Audit (IEA) shall be commissioned every three years, that will include a review of the AQMP. The report is required to be submitted to the Secretary within six weeks of completion of the IEA, in accordance with Condition 10 of Schedule 6.

IEAs have been conducted in 2013, 2016/17 and 2019, with the next IEA to be conducted in 2022. Recommendations from the IEA will be incorporated into the AQMP where appropriate.

8.5.2 ISO 14001

As part of the ISO 14001 certification, IMC maintains an environmental auditing and governance program across all of its operational sites. The program, which includes the use of competent internal and accredited external auditors, is an integral part of maintaining certification under the ISO 14001 standard.

External surveillance audits are undertaken on an annual basis, with recertification audits undertaken every three years.

Internal Governance Reviews of the AQMP are nominally undertaken on an annual basis.

9. SUMMARY OF COMMITMENTS

Commitment	Section in AQMP
IMC will provide personnel and resources to implement the AQMP.	Section 2
IMC will comply with the conditions of the approval and relevant legislation.	Section 3
IMC will implement and maintain reasonable and feasible air quality mitigation measures across all sites to comply with air quality criteria and minimise the impact on the environment and community.	Section 5
IMC will undertake air quality monitoring as required by the Project Approval and EPL.	Section 6
IMC will review monitoring data and review controls where data analysis indicates controls are not effective.	Section 6.3
IMC will conduct additional monitoring and spot checks to investigate complaints and ineffective controls.	Section 6.3.2 and 6.3.4
IMC will maintain and calibrate monitoring equipment as required.	Section 6.3
IMC will subscribe to early warning weather alerts.	Section 6.3.6
IMC will take all reasonable and feasible measures to ensure exceedances cease as soon as practicable and take appropriate remedial action as required.	Section 7.2.2
IMC will progress land acquisition where air quality land acquisition criteria are exceeded on a sustained basis.	Section 7.3
IMC will commission an Independent Review where requested by the Secretary.	Section 7.4
IMC will report and investigate complaints, incidents and exceedances of limits as required, and identify and implement corrective actions.	Section 7
IMC will undertake reporting as required.	Section 8
IMC will review the AQMP as required.	Section 8.4
IMC will undertake audits as required.	Section 8.5

10. ACRONYMS

Term	Definition
AQMP	Air Quality and GHG Management Plan
BSO	Bulli Seam Operations
CEM	Continuous Emissions Monitoring
CCC	Community Consultative Committee
CH_4	Methane
$CO_{2\text{-}e}$	Carbon dioxide equivalent
CWEA	Coal Wash Emplacement Area
DDG	Dust deposition gauge
DPIE	Department of Planning, Industry and Environment
EA	Environmental Assessment
EDL	Energy Developments Limited
EMS	Environmental Management System
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act
EPL	Environment Protection Licence
EQuIS	Environmental monitoring database
FY	Financial year
G360	IMC event reporting system
GHG	Greenhouse Gas
GWP	Global Warming Potential
HSE	Health Safety and Environment
ICHPL	Illawarra Coal Holdings Pty Ltd
IEA	Independent Environmental Audit
IMC	Illawarra Metallurgical Coal

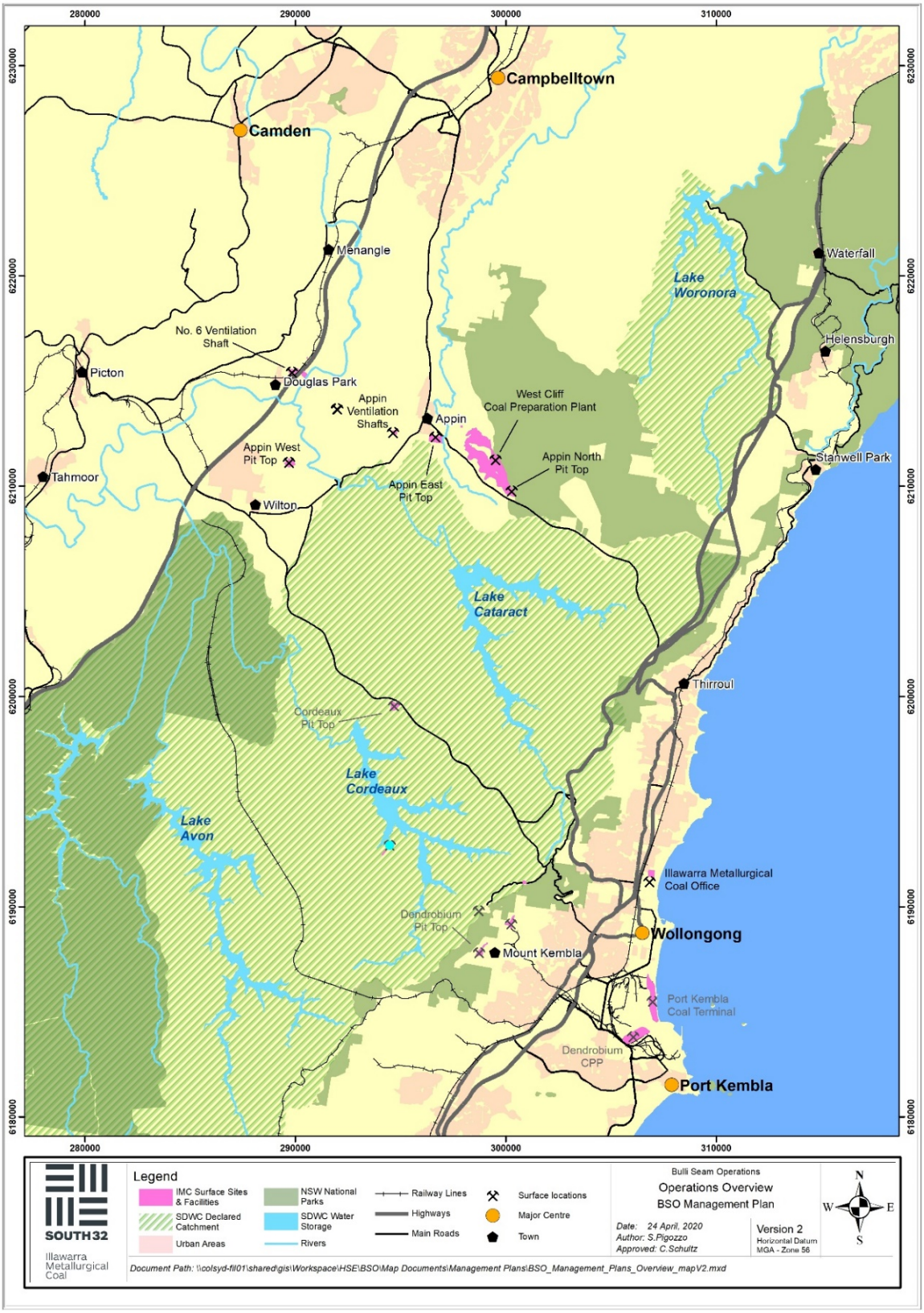
km	kilometre
kPa	kilopascal
NGER	National Greenhouse Emissions Reporting scheme
N_2O	Nitrous oxide
Mtpa	Million tonnes per annum
PLC	Programmable Logic Control
PM_1	Particulate matter (1 micron)
$PM_{2.5}$	Particulate matter (2.5 microns)
PM_4	Particulate matter (4 microns)
PM_{10}	Particulate matter (10 microns)
POEO	Protection of the Environment Operations
STIS	Surface to In-Seam drilling
TSP	Total Suspended Particulate
WCCPP	West Cliff Coal Preparation Plant

11. REFERENCES

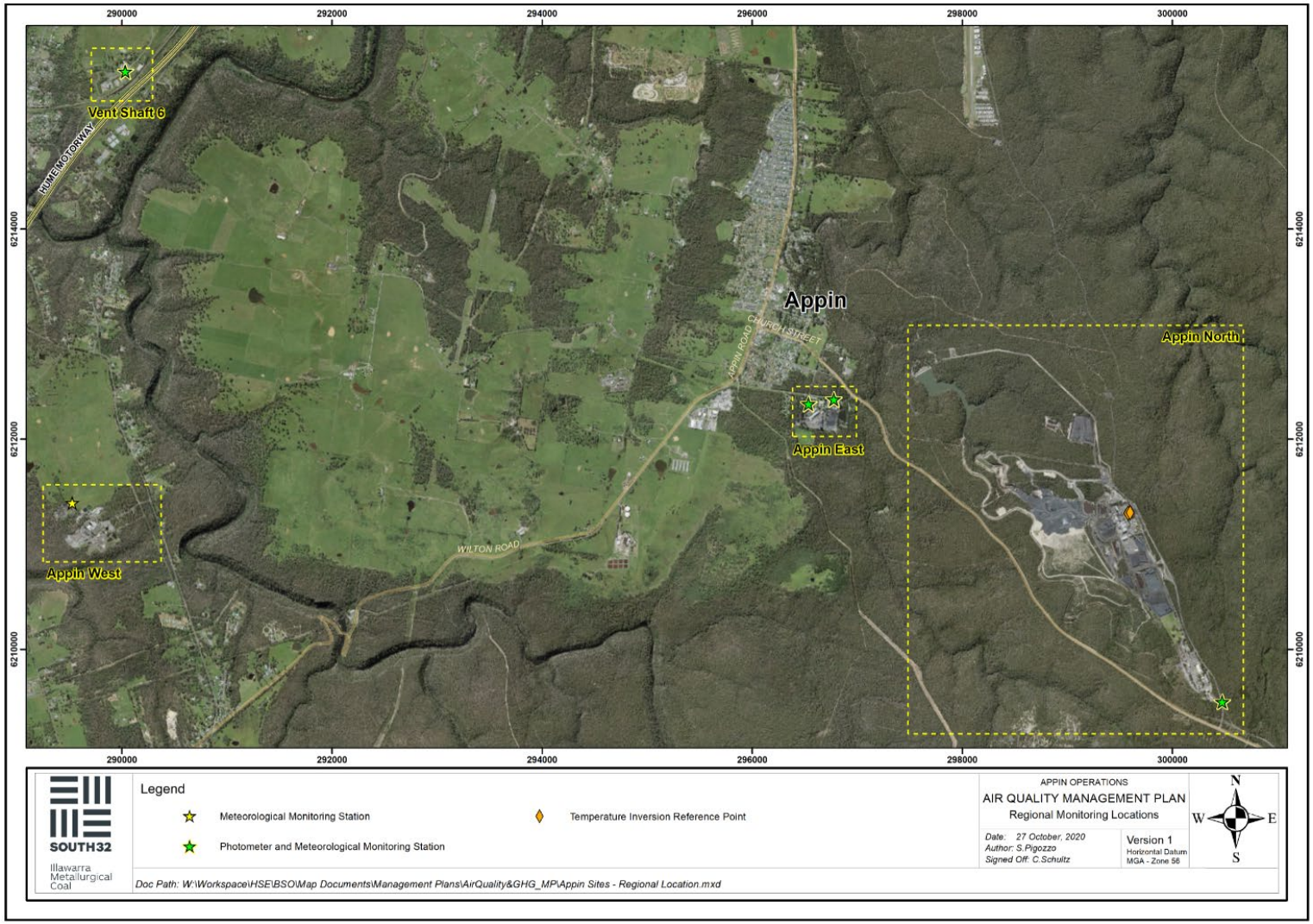
- Project Approval 08_0150
- EPL 2504
- BSO Project Environmental Assessment
- Air Quality Impact Assessment: Bulli Seam Operations - PAE Holmes (13 July 2009)
- Handling Community Complaints, Enquiries and Disputes Procedure (ICHP0112)
- Reporting and Investigation Standard (IMCSTD0069)
- Environmental Compliance/Conformance Assessment and Reporting Procedure (IMCP0186)
- ISO 14001:2015 Environmental Management Systems Standard
- Carbon Emissions Measurement and Reporting Management Plan (IMCMP0255)
- Meteorological Station Operation and Data Management (IMCP0206)
- https://www.health.nsw.gov.au/environment/factsheets/Pages/mine-dust.aspx

12. PLANS

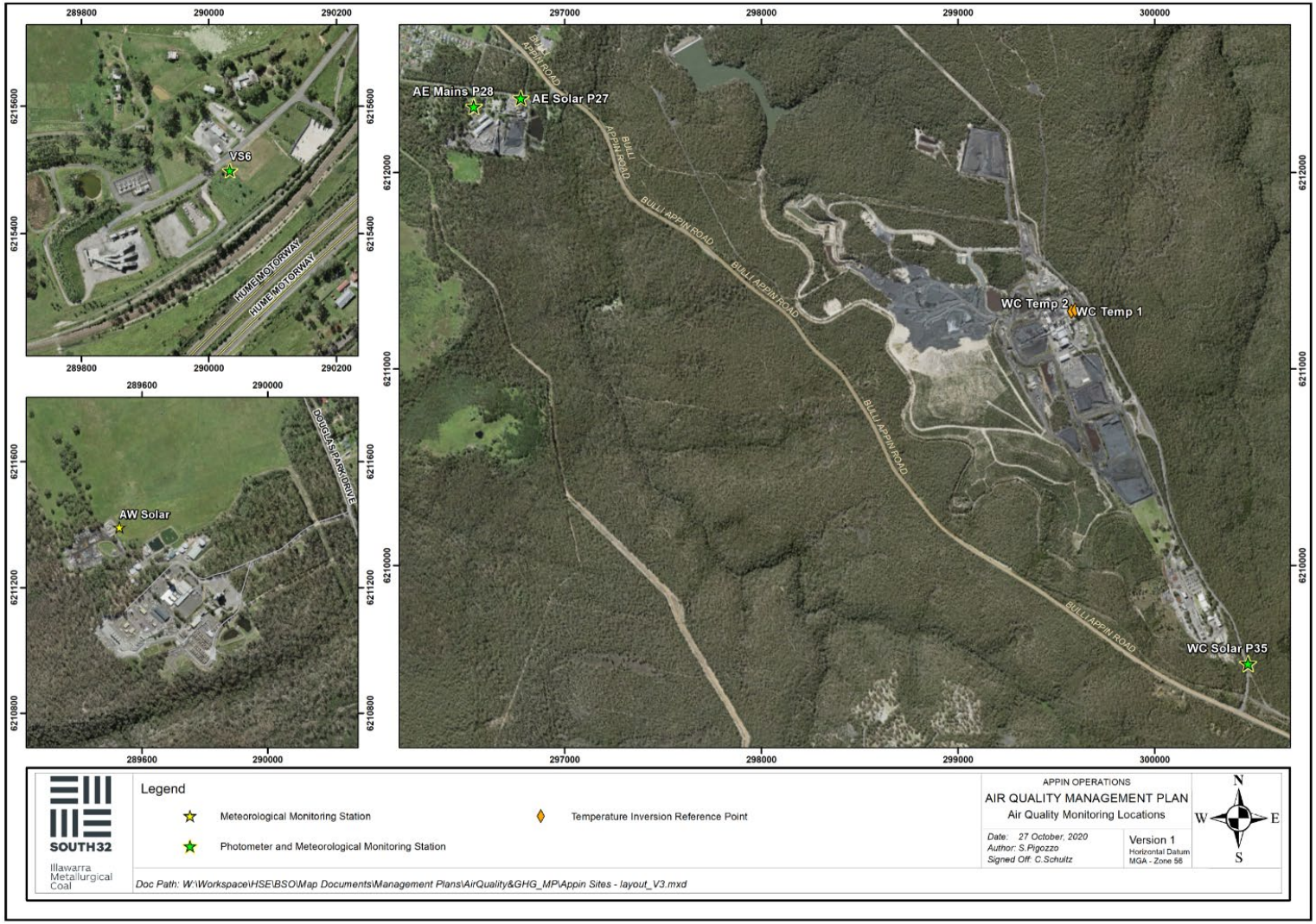
Plan 1: Appin Mine Locality Plan



Plan 2: Appin Mine Monitoring Locations - Regional



Plan 3: Appin Mine Monitoring Locations - Sites



13. APPENDICES

Appendix 1: Particulate matter monitoring program

Site ID	Location	Parameter	Measurement Method	Frequency?	Function
AE-PF1	NE corner of pit top property boundary – coal stockpile vehicle entry/exit point	Particulate Matter: PM_{10}	Real-time Photometer (fixed)	Continuous	Real-time monitoring of dust emissions at the coal stockpile area truck entry/exit point onto public roads. Real-time Operational Control – stockpile, internal roads and public road dust control measures performance reference monitor.
AE-PF3	NW corner of Appin East pit top boundary between nearest residential receivers	Particulate Matter: PM_1, $PM_{2.5}$, PM_4, PM_{10}	Real-time Photometer (fixed)	Continuous	Amenity goal reference. Real Time Operational Control. Site dust control performance reference.
W-PF1	Appin North southern property boundary at the Wedderburn and Appin Road intersection	Particulate Matter: PM_{10}	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of dust emissions at the Wedderburn Road and Appin Road intersection. Real-time Operational Control – roadway dust emissions.
VS6-PF1	Ventilation Shaft 6	Particulate Matter[15]: PM_{10} and $PM_{2.5}$	Real-time Photometer (fixed)	Continuous	Fixed monitor for real-time monitoring of particulate matter at the Ventilation Shaft 6 site (from the ventilation shaft, Hume Highway and other ambient sources). Long term trends and general amenity. Not used for assessment of compliance.

[15] The current monitor in this location is a hire unit. It is planned pending budget availability for this monitor to be replaced with a unit capable of also measuring PM_1 and PM_4.

Appendix 2: Project Approval Conditions: Air Quality and GHG Management

<table>
<tr><th>Condition</th><th>Requirement</th><th>Section</th></tr>
<tr><td>Condition 12 of Schedule 2</td><td>Operation of Plant and Equipment
The Proponent shall ensure that all plant and equipment used at the site is:
(a) maintained in a proper and efficient condition; and
(b) operated in a proper and efficient manner.</td><td>Section 6</td></tr>
<tr><td>Condition 7 of Schedule 4</td><td>Odour
The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.</td><td>Section 5.1</td></tr>
<tr><td>Condition 8 of Schedule 4</td><td>Greenhouse Gas Emissions
The Proponent shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Secretary.</td><td>Section 5.2</td></tr>
<tr><td>Condition 9 of Schedule 4</td><td>Air Quality Criteria
The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 4, 5 and 6 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.
Table 4: Long term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 5: Short term criterion for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 6: Long term criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
Notes for Tables 4-6:
• [a] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);
• [b] Incremental impact (ie incremental increase in concentrations due to the project on its own);
• [c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and</td><td>Section 5.3</td></tr>
</table>

<table>
<tr>
<td>Condition 10 of Schedule 4</td>
<td>
Air Quality Acquisition Criteria

If the particulate matter emissions generated by the project exceed the criteria in Tables 7, 8 and 9 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner the Proponent shall acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 5.

Table 7: Long term acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a]90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a]30 µg/m^3</td></tr>
</table>
Table 8: Short term acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d]Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a]150 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[b]50 µg/m^3</td></tr>
</table>
Table 9: Long term acquisition criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c]Deposited dust</td><td>Annual</td><td>[b]2 g/m^2/month</td><td>[a]4 g/m^2/month</td></tr>
</table>
Notes for Tables 7 - 9:

[a]Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to other sources);
[b] Incremental impact (ie incremental increase in concentrations due to the project on its own);
[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Secretary in consultation with EPA.

</td>
<td>Section 7.3</td>
</tr>
<tr>
<td>Condition 11 of Schedule 4</td>
<td>
Operating Conditions

The Proponent shall:

(a) implement best management air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by generated by the project, including from any spontaneous combustion on site;

(b) minimise any visible air pollution generated by the project; and

(c) regularly assess the air quality monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval;

to the satisfaction of the Secretary.
</td>
<td>Section 5

Section 5

Sections 6 and 7</td>
</tr>
<tr>
<td>Condition 12 of Schedule 4</td>
<td>
Air Quality & Greenhouse Gas Management Plan

The Proponent shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. This plan must:
</td>
<td></td>
</tr>
</table>

	(a) be prepared in consultation with EPA, and submitted to the Secretary for approval by 30 September 2012; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including consideration of applying a real-time air quality management system that employs both reactive and proactive mitigation measures; (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site; and (d) include an air quality monitoring program that uses a combination of high-volume samplers and dust deposition gauges to evaluate the performance of the project, and includes a protocol for determining exceedances with the relevant conditions of this approval.	Section 1.4 Section 6 Section 5.2 Section 6
Condition 13 of Schedule 4	**Meteorological Monitoring** During the life of the project, the Proponent shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*	Section 6.3.5
Condition 1 of Schedule 5	**Notification of Landowners** As soon as practicable after obtaining monitoring results showing: a) an exceedance of any relevant criteria in schedule 4, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with relevant criteria; and b) an exceedance of any air quality criteria in Schedule 4, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).	Section 8.3.2
Condition 2 of Schedule 6	**Management Plan Requirements** The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of:	Section 4

	• the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the project; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the project over time; (g) a protocol for managing and reporting any: • incident; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and • a protocol for periodic review of the plan.	Section 3 Section 6.3.1 Section 5 Section 8 Section 7.2 Section 7.2 Section 7 Section 8 Section 8.4
Condition 3 of Schedule 6	**Adaptive Management** The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of the criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity: a) take all reasonable and feasible steps to ensure the exceedance ceases and does not recur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing these options and any preferred remediation measures or other course of action; and c) implement remediation measures as directed by the Secretary to the satisfaction of the Secretary.	Section 7.2.2

Appendix 3: EA Commitments: Air Quality and GHG Management

EA Section	EA Commitment	Section
5.13.4	Management measures for the Project would include, but would not necessarily be limited to: • compaction of moist coal wash material following emplacement in the West Cliff Coal Wash Emplacement; • progressive rehabilitation of the West Cliff Coal Wash Emplacement; • watering of unsealed and some sealed haul roads; • enclosure of crushing and screening processes; • enclosure of transfer conveyors; • water sprays at ROM and product coal stockpiles; • truck wash for all heavy vehicles travelling off-site; • coal covers on trucks transporting ROM coal and product coal off-site; and • speed limits for all roads around the surface facilities.	Section 5
5.13.4	Air quality monitoring will continue to be undertaken using the dust monitoring network. The results of air quality monitoring would be used to optimise air quality controls, validate the air quality modelling predictions and would be reported to the relevant authorities via the AEMRs.	Section 6
5.13.4	Odour In the event of an issue or complaint arising with respect to odour, suitable complaint response, monitoring and/or management measures would be implemented.	Section 7
5.13.4	Air Quality Management Plan An Air Quality Management Plan (AQMP) will be developed that builds on existing site management plans, describes mitigation and management measures and would provide a framework for the ongoing monitoring and management of air quality at the Project, complaint response protocols and reporting requirements.	This document
5.13.5	An Energy Savings Action Plan will be prepared and implemented for the Project to further improve energy performance and management systems.	An Energy Savings Plan was developed and implemented.
5.14.3	WestVAMP would continue to be used at the West Cliff Colliery subject to future contract negotiations and ongoing economic viability.	WestVAMP is no longer operational.

5.14.3	Implement surface goaf gas drainage at the Project that involves flaring or power generation.	Section 5.2
5.14.3	Comply with the requirements of the Carbon Pollution Reduction Scheme.	Section 5.2

Appendix 4: Agency Consultation

Agency Comments	IMC Response
Environment Protection Authority (EPA)	
Response received 16 November 2020 The Environment Protection Authority (EPA) refers to Endeavour Coal's request for comments on the Appin Mine Air Management Plan, APNMP0112 version 1.0 (version 5 old format). The EPA has reviewed the updated management plan and has no general comments to make. The EPA notes that Endeavour proposes to remove the dust deposition gauges and use monitoring results from aerosol photometers for comparison with health and amenity guideline criteria. The dust gauges will be kept and used to investigate fallout complaints as required. The HVAS and dust gauges currently in use are limited in that they can only provide historical time averaged data. The proposed changes will provide real time monitoring results for a range of parameters such as PM10, PM2.5 and PM1 that can be correlated with site operations and wind direction. The EPA previously agreed in principal to the proposed changes and will modify the licence following submission of a request for licence variation. The EPA notes that the existing air quality monitoring requirements on the licence must be followed until the variation has been approved.	Comments noted
Department of Planning, Industry and Environment	
Response received 7 December 2020 Update Section 8.4 to clarify that the management plan will only be revised then submitted and approved by the Secretary in accordance with the requirements of the conditions of approval.	Section 8.4 has been revised as requested

Appendix 5: Management Plan Approval

To be included when received