

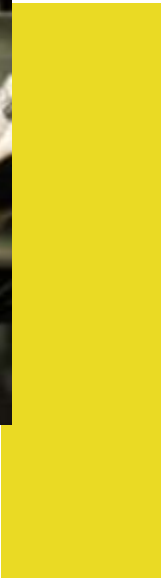


Illawarra Coal



Air Quality, Greenhouse Gas & Energy Management Plan

Bulli Seam Operations



VERSION HISTORY

VERSION	DESCRIPTION OF CHANGES	DATE
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: <ul style="list-style-type: none"> • 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

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1 INTRODUCTION

The BSO incorporates the current and future operations of the Appin Mine. Underground mining operations are conducted in the Bulli Seam coal measure. The Appin Mine and West Cliff Washery (located at Appin North entry) sites are located approximately 25km north-west of Wollongong in New South Wales (See Plan No. 1). The mine is owned and operated by Illawarra Coal Holdings Pty Ltd (Illawarra Coal), a wholly owned subsidiary of South32. The BSO workforce consists of ~730 full-time employees and ~400 contractors, and operates 24 hours per day, seven days per week.

Approval was granted by the Department of Planning and Infrastructure (DOPI NSW) for current and proposed mining of the BSO on the 22 December 2011. This incorporates environmental and other performance criteria and production of up to 10.5 million tons per annum of Run-of Mine coal until 2041.

2 SCOPE

This document has been prepared to comply with the intent and requirements of Schedule 4, condition 12 of Bulli Seam Operation Project Approval. This document has been developed in consultation with the Environment Protection Authority (previously the Department of Environment and Climate Change).

The scope of this document includes current and future activities associated with the BSO regarding air quality and emissions.

3 ROLES AND RESPONSIBILITIES

Responsibilities	Role
Implementation and periodic review of this Management Plan	Environment Supervisor
Meeting the commitments contained within this management plan for the operational areas.	Environment Specialists
Operate and maintain Air Quality and GHG management controls and equipment in a competent, efficient and reliable manner.	Maintenance Technicians Operations Personnel
Meeting the commitments contained within this management plan for stakeholder engagement.	Community Specialist

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Provide the necessary resources and systems to ensure that requirements of this Management Plan are met.

Vice President Operations
Vice President HSE
Operations Managers

4 DEFINITIONS

Term	Definition
Appin North	Previously referred to as West Cliff.
Emissions	Dust, odours, combustion emissions, greenhouse gas (GHG) emissions, visible air pollution and other particulate or gaseous emissions produced by the project

5 RELEVANT LEGISLATION

Environmental Planning and Assessment Act 1979

Protection of the Environment Operations Act 1997

National Greenhouse and Energy Reporting Act 2007

National Environment Protection (National Pollutant Inventory) Measure

Protection of the Environment Operations (Clean Air) Regulation 2010

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6 ENVIRONMENTAL MANAGEMENT SYSTEM

Illawarra Coal is committed to minimising the impact of its operations on the local environment and community and has a comprehensive Environmental Management System (EMS) implemented to fulfil this commitment. The EMS is certified to ISO14001:2004 'Environmental Management Systems'. The Air Quality and Greenhouse Gas Management Plan (AQGHGMP) is a component of the EMS.

6.1 Odour

Bulli Seam Operation Project Approval

Condition 7: The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the *Protection of the Environment Operations Act 1997*.

Condition 11 (a) implement best practice air quality management on site, 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.

Odours from mining operations may be caused by hydrocarbons from vent shafts and mine safety gas wells. Historical odour monitoring indicates that levels in the ventilation shafts are low. This has informed our predicted odour emission rates, which are not expected to result in detectable or distinguishable odour at our sensitive receptors of:

- Douglas Park
- Appin Township
- Wilton

The location where the greatest odour is expected (peak concentrations of 3 Odour Units) are elevated and in sparsely populated locations. The recently commissioned Ventilation Shaft #6 fan facilities have been designed to mitigate air quality impacts associated with odour and particulates by:

- Directing discharge away from the Douglas Park Township and towards the Hume Highway transport corridor.
- 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.

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6.1.1 Monitoring

Odour monitoring will be undertaken through sensory surveys during regular environmental inspections. Where required, further investigation will be undertaken, considering aspects such as the conditions underground, surface activities and data obtained from the ambient air quality monitoring equipment and the site meteorological station.

Should it be required, sampling of mine ventilation air emissions will be undertaken. This would provide another level of information used to identify the potential for the development of offensive odours being emitted to the atmosphere.

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

For further information of the Odour Monitoring program, please refer to Section 9.

Illawarra Coal will continue to investigate a range of contingency measures for odour abatement where required. Although the options are limited due available technologies and the large volumes and high velocities of air which pass through the ventilation shafts.

6.2 Greenhouse Gas Emissions

Bulli Seam Operation Project Approval

Condition 8: 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.

Condition 12 (c) 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: describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site

The majority of GHG emissions at the BSO are Scope 1 (direct) emissions (Figure 1 in the form of methane (Figure 2) , as such all measures to minimize the release of GHG and to support focus area 3 of the climate change strategy are directed towards reducing methane.

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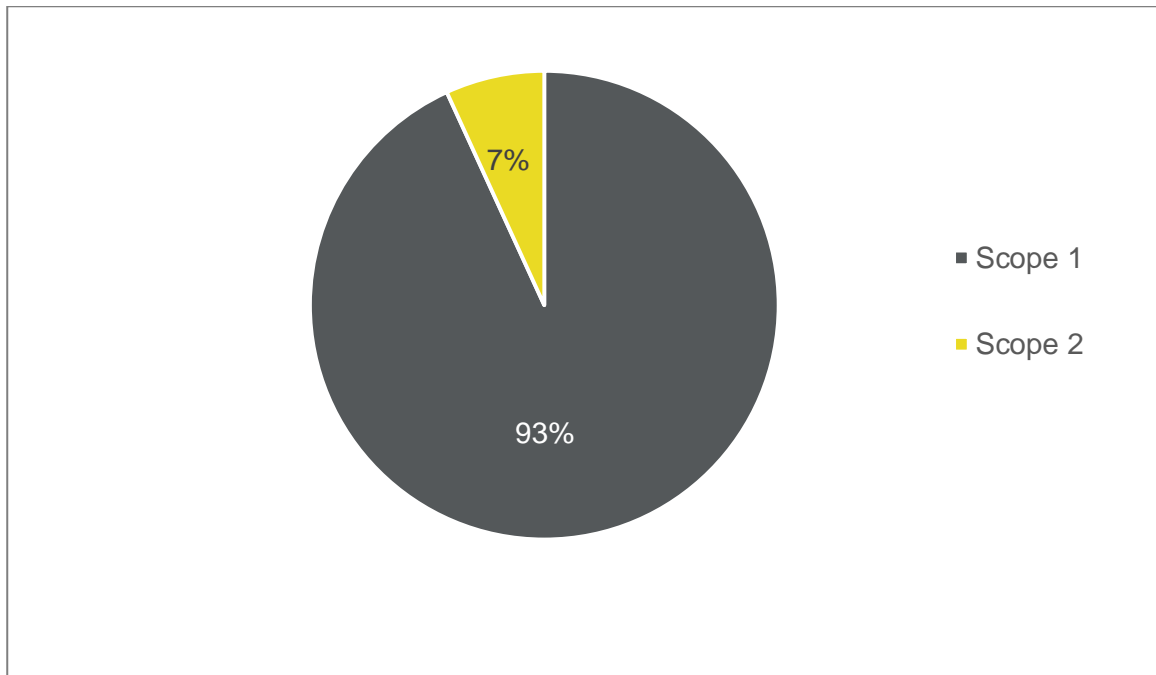


Figure 1: Greenhouse Gas emissions by scope

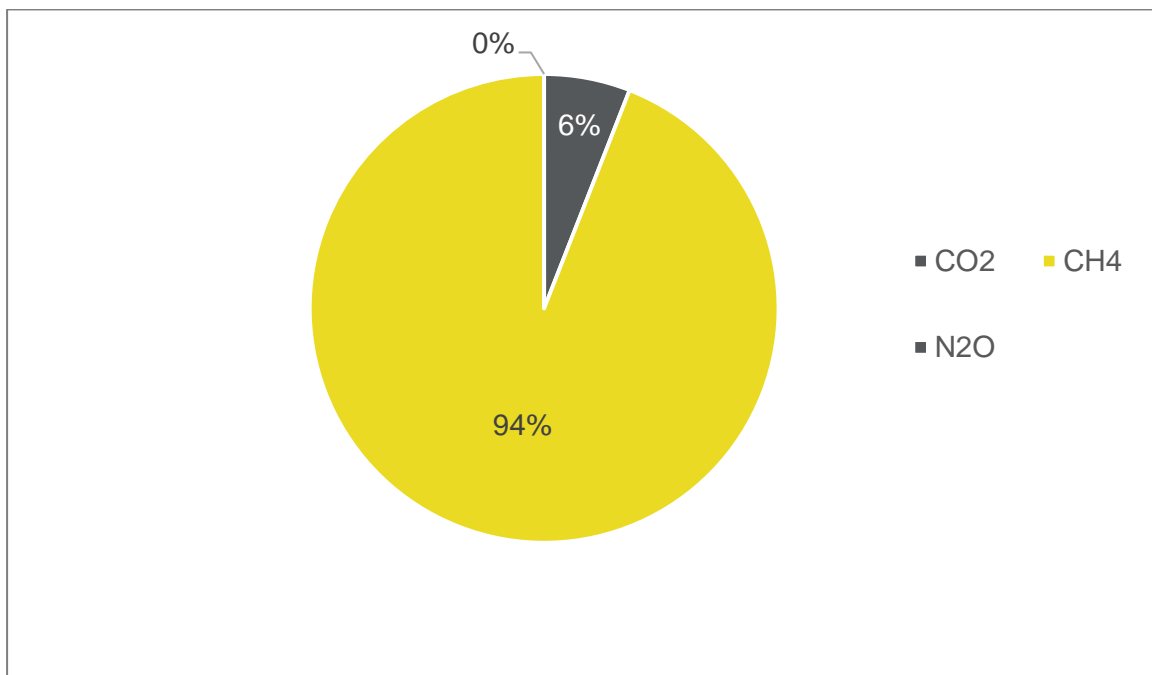


Figure 2: Greenhouse Gas emissions by gas

6.2.1 Greenhouse Gas Monitoring

The BSO report GHG data 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.

Table 1: Provides a summary of the Continuous Emissions Monitoring System

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 Illawarra Coal, 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. The collated data is trended for later analysis and reporting which forms part of the reporting level.
Reporting Level	The Reporting Level comprises of 2 parts: <ol style="list-style-type: none"> a. Emission Estimate and NGER Reporting Tools: Officially recognised manual data collation, review and validation of GHG Emissions (manual extraction from Historian) for NGER Reporting; and b. SCADA data extraction process (secondary verification tool – not used for NGER reporting).

Ventilation Shaft #6 incorporates transducers to measure duct flow, CH₄ and CO₂ concentration in real time. The gases are sampled from the duct via a vacuum system and

analysed through a high accuracy, infrared analyser. The transducer outputs are fed to a PLC for calculations of CO₂-e output from the fan ducts. The calculation algorithms are designed from the NGER determination documents.

6.3 Air Quality Criteria

Bulli Seam Operation Project Approval

Condition 9: 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.

Condition 11

The proponent shall:

(a) implement best practice air quality management on site, 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

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

(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.

The BSO Air Quality Impact Assessment was submitted in support of the Project approval application to NSW Department of Planning provided data and commentary is provided below. The BSO EA is available via the South32 regulatory website (link below).

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

6.3.1 Dust Levels

The BSO Air Quality Impact Assessment included baseline data and air quality monitoring data which showed that the annual average PM₁₀ (suspended particles that are ≤10 µm in size) concentrations have been, and are currently below the EPA's current air quality criteria at the monitored locations.

Concentrations of Total Suspended Particulate (TSP), inferred from the Particulate matter for PM₁₀ concentrations, show compliance with the current EPA criterion. Results from the dispersion modelling, discussed in Section 7 of the Air Quality Impact Assessment suggested

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that the Project-specific and cumulative dust concentrations and deposition levels would be in compliance with the EPA's air quality assessment criteria at sensitive receptor locations.

a. *PM₁₀ Dust Levels*

Annual average mine-only PM10 concentrations are predicted to be $\leq 11 \mu\text{g}/\text{m}^3$ at the nearest receptors and annual average mine-only TSP concentrations are predicted to be less than $15 \mu\text{g}/\text{m}^3$ and are within the EPA's criteria.

b. *Dust Deposition*

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

c. *Sensitive Receptors*

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 the Appin Township. For Appin North and West Cliff Coal Preparation Plant the nearest sensitive receptors are located in the western section of the Cataract Scout Camp, north to north-west of site towards Appin Township and east towards Wedderburn.

6.4 Air Quality Monitoring

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

The air quality monitoring program incorporates:

- Collection and measurement of dust samples from strategically placed dust deposition gauges at representative sites;
- Use of real-time air quality monitors: fixed Optical Photometers and portable Optical Photometers);
- Use of a real-time air quality monitoring trailer that monitors ambient air quality for $\text{PM}_{2.5}$, PM_{10} , NO , NO_x , NO_2 , VOC , NMVOC , CH_4 , O_3

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- Use of a high volume air sampler to determine the land acquisition values; and
- Dust emission spot checks using portable optical photometers; and
- Visual inspections and audits.

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 Illawarra Coal environmental representative reviews key data trends on a monthly frequency during monitoring, with this information used to supplement the information being obtained from inspections and sensory monitoring.

6.4.1 Particulate Dust Monitoring

The fixed optical photometer (AE-PF3) located on the Appin East property boundary is used to provide an indication of compliance against both the Long Term Criteria and Short Term Criteria for Particulate Matter (Table 8 and Table 9). If the optical photometer indicates dust levels greater than 80% of the PM₁₀ criteria, additional monitoring will be undertaken using the HVAS located within the same compound (AE-HV1). The HVAS will be run for 24hrs as soon as practically possible following the 80% trigger being reached. The monitoring must be completed with a 7-day period.

Targeted residential air quality monitoring will be undertaken wherever there is a potential for residential receivers to experience adverse air quality impacts directly associated with operational 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.

Portable optical photometers can be used to conduct spot checks, surveys and audits in addition to the specified program on an as required basis (ie. in response to complaints and/or specific dust issues).

Refer to the Plans below for the locality of fixed dust deposition gauges, real-time air quality monitors, meteorological stations and survey points:

PLAN 1 – LOCATION PLAN

PLAN 2 – APPIN EAST MONITORING LOCATIONS

PLAN 3 – APPIN WEST MONITORING LOCATIONS

PLAN 4 – APPIN NORTH / WEST CLIFF MONITORING LOCATIONS.

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6.4.2 Dust Deposition Gauges

Dust deposition gauges and real-time monitoring localities have been selected to provide reliable data for evaluating compliance with air quality criteria and to inform the evaluation of performance of dust control measures.

Further detail of the air quality monitoring program are included in Section 9.

6.4.3 Weather Stations

Weather (meteorological monitoring) stations are located at multiple locations across the BSO to monitor and record weather parameters such as wind speed and direction, temperature, humidity, and rainfall. Data from the station will be used to inform evaluation of compliance with air quality criteria.

Ambient air temperature readings will be monitored and recorded for real time measurement of temperature lapse rate at the West Cliff / Appin North site. The height and temperature differential will be obtained by measurement at the West Cliff Bulk Coal Winder Tower. Additionally, weather stations are equipped on the Appin East fixed optical photometers, with a standalone weather stations installed at the Vent Shaft #6 site.

With the assistance of weather station monitoring data and 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 adjustments to existing dust control measures, manually activating suppression sprays, deployment of mobile sweepers or modification and/or suspension of activities.

6.5 Air Quality Controls

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. Table 2 to

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Table 6 provide details of the air emission management measures that have been implemented across the Bulli Seam Operations.

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6.5.1 Dust Controls

Table 2: Operational Controls – Appin East

Area and/or Source	Air Emission Management Measure/Control
Stockpile	Water cart Dust Suppression System (Sprays)
Internal Haulage Roads	Water cart Road Sweeper Truck/Wheel wash facility ¹ 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

¹Truck wash maybe isolated in winter to prevent black ice forming on Appin Road

Table 3: Operational Controls – Appin West

Area and/or Source	Air Emission Management Measure/Control
Internal Roads	Road Sweeper
Yard & Mine Handling Area	Road Sweeper Vehicle Washdown Bay
Waste Area and Access Road	Road Sprays (access road) / Mobile Spray (Bull yard)

Table 4: Operational Controls – Appin North

Area and/or Source	Air Emission Management Measure/Control
Internal Roads	Road Sweeper
Yard Area	Road Sweeper

Table 5: Operational Controls – West Cliff (CPP, Stockpile and Emplacement)

Area and/or Source	Air Emission Management Measure/Control
Internal Haulage Roads / Coal Bins	Water carts Road Sweeper Truckwash facility
Emplacement (Active)	Water carts Moisture content of coal wash product Compaction
Emplacement (Rehab)	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 CPP footprint) Suppression system at some tripper locations
Site External Road	Water cart Road Sweeper Designated Truck Tarping/Cleaning Area

Table 6: Operational Controls – Other Emission Sources West Cliff (CPP, Stockpile and Emplacement)

Area and/or Source	Air Emission Management Measure/Control
Exhaust Particulate Emissions – Mine Vehicles (combustion)	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 on Public Roads	Truck wash facilities for all outbound truck movements Designated Load Inspection and Tarping Areas All loads covered (outbound movements) Road Sweeper cleaning program – Appin Road
Ventilation No.6 Shaft Site	Sealed Access Road Speed restrictions Vegetation cover (where possible) Periodic watering (on an as required basis)
General Construction Activities	Appropriate and effective dust control measures implemented, which may include: <ul style="list-style-type: none"> • Potential dust generation areas wetted • Activities amended, halted or timed to prevent raising dust • Vehicle cleanliness maintained for vehicles leaving site on public or private roads • Material stockpiles wetted or covered where appropriate • Use of water sprays and mobile vacuum sweepers where appropriate

6.5.2 Greenhouse Gas Controls

Potential air quality impacts and GHG emissions associated with the project were addressed in the BSOP Environmental Assessment 2009 (EA). The Appin Flaring Project has been commissioned to minimise GHG emissions from the BSO and was registered under the Australian Federal Government’s Emissions Reduction Fund in FY16.

The project involves the installation of new flaring equipment at the Appin Mine to combust coal mine waste gas, reducing its global warming potential and mitigating climate change. The flaring units were commissioned in FY17 and, it is estimated, will abate approximately two million tonnes of CO₂-e during the seven year Emissions Reduction Fund agreement with the Australian Clean Energy Council.

Illawarra Coal has programs in place to extract and utilise or flare mine methane from the coal seam and adjacent strata, in doing so, preventing it being vented to atmosphere in the mine ventilation air stream. This has both environmental and safety benefits.

Means of capturing mine methane include:

- Surface to In Seam (STIS) and underground drilling programs which pre-drain methane from the coal seam and adjacent geological units prior to longwall mining.
- Goaf Drainage drilling programs which capture methane from coal seam and adjacent geological units which have been fractured by the longwall as it passes through.
- Methane captured through these processes is preferentially piped to two existing, interconnected gas fired power stations, located at Appin VS#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 the BSO project are summarised in

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Table 7: GHG Emission Minimisation.

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Table 7: GHG Emission Minimisation

Mitigation Action		Detail
Methane Drainage System		Comprehensive methane drainage extraction infrastructure is in place above and below ground for the Appin mining domains. This infrastructure will be expanded to support future underground mining associated with the project. 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 when utilised 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.
Mine Safety Management	Gas	Mine gas extracted by Mine Safety Gas Well means is either utilised, flared, or emitted under controlled conditions.

South32 publically report progress and encourage high standards of transparency and accountability in our business governance, risk and government interactions, this extends to the commitments made in the Climate Change Policy. Future actions taken to minimise GHG emissions will be reported in the Annual Report and published on the South32 website.

<http://www.south32.net/sustainability/sustainability-reporting>

6.6 Air Quality Analysis, Data Review and Reporting

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

All monitoring data will be routinely reviewed, analysed and validated for compliance with the relevant criteria and in consideration of prevailing factors. Illawarra Coal Environmental Specialists will be involved in the review, analysis and validation of monitoring data for recording and reporting purposes.

All air quality monitoring results will be maintained by Illawarra Coal within a controlled database, with data required to be published made available on the South32 website. A

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summary of data will be reported in the Annual Report with appropriate commentary, explanation and analysis of results.

Where deposited dust deposition rates or particulate matter mass data indicates levels in exceedance of criteria, further analysis of the particulate matter will be undertaken where necessary to qualify the constituents of particulate matter sampled.

Upon receipt of air quality results indicating values above the defined air quality criteria, the process for evaluating compliance will be undertaken in accordance with the following section.

6.6.1 Evaluating Compliance

The process for evaluating compliance considers whether external extra-ordinary factors unrelated to the project have adversely influenced a result. This is necessary to ensure that air quality accounting is reliable and accurate and assures that stakeholders are properly informed.

The protocol for confirmation of monitoring results, including exceedances of project approval criteria, includes the consideration of extra-ordinary factors unrelated to BSO operations and not within BSO 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 (eg: construction, roadworks, regional traffic, land clearing, rural activities, unauthorised gauge interference).

Where external factors have adversely affected project air quality monitoring results, the sample result will be recorded including a qualifying comment to account for the perceived criteria exceedance. Invalid samples will not be included in calculations for determining 'average', 'minimum' or maximum values for the project. However, where a sampling result is legitimate and an exceedance is validated, this will be recorded as a criteria exceedance for records and stakeholder notification purposes.

Non-compliant monitoring data is considered an 'event' in Illawarra Coal's management systems and is recorded and managed via a structured process for investigation, actions and reporting. Non-compliances with the air quality criteria will be reported to all relevant agencies via the Annual Report.

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6.6.2 Air Quality Acquisition Criteria

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Condition 10: 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.

If the particulate matter emissions generated by the project exceed the criteria in the tables below 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 Illawarra Coal will proceed with the process as reflected in Conditions 4-5 of Schedule 5 of the BSO Project Approval.

Table 8: Long Term Acquisition Criteria for Particulate Matter (referred to as Table 7 in BSO Project Approval)

Pollutant	Averaging period	^d Criterion
Total Suspended Solids (TSP) matter	Annual	^a 90µg/m ³
Particulate matter <10um (PM10)	Annual	^a 30µg/m ³

Table 9: Short Term Acquisition Criteria for Particulate Matter (referred to as Table 8 in BSO Project Approval)

Pollutant	Averaging period	^d Criterion
Particulate matter <10um (PM ₁₀)	24 hour	^a 150 µg/m ³
Particulate matter <10um (PM ₁₀)	24 hour	^b 50 µg/m ³

Table 10: Long Term Acquisition Criteria for deposited dust (referred to as Table 9 in BSO Project Approval)

Pollutant	Averaging Period	Maximum increase in deposited dust level	in Maximum deposited dust level	total
^c Deposited dust	Annual	^b 2g/m ² /month	^a 4g/m ² /month	

Notes for Tables:

- ^aTotal impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources);
- ^bIncremental impact (i.e. incremental increase in concentrations due to the project on its own);
- ^cDeposited 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
- ^dExcludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed to by the Director-General in consultation with OEH.

6.7 Complaints Management

All air quality complaints received in relation to the Bulli Seam operations are managed in accordance with the Illawarra Coal procedure, Handling Community Complaints and Enquiries (Document No. ICHP0112).

Upon receipt of a community complaint, preliminary investigations will commence as soon as practicable to determine the likely cause of the complaint using information such as the meteorological conditions, activities being undertaken on site at the time of the complaint and available monitoring data.

Additional monitoring may be required to be undertaken to verify and validate community concerns. A response will be provided to the complainant as soon as practicable. This may include the provision of relevant monitoring data if requested. A summary of all complaints received during the reporting year will be provided as part of the Annual Report.

6.8 Investigations

Non-compliance, corrective actions and preventative actions are managed in accordance with the Illawarra Coal Event Management procedure (ICHP0098) and ICHPL. This procedure relates to all Illawarra Coal operations, details the processes to be utilised with respect to the event reporting and identification of non-conformances, the application of appropriate corrective action(s) to address non-conformances and the establishment of preventative actions to avoid non-conformances. The key elements of the process include:

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Identification of non-conformance and/or non-compliances:

- Recording of non-conformance and/or non-compliance in electronic event management system;
- Evaluation of the non-conformance and/or non-compliance to determine specific corrective and preventative actions;
- Corrective and preventative actions to be assigned to responsible person; and
- Management review of corrective actions to ensure the status and effectiveness of the actions.

7 INDEPENDENT REVIEW AND AUDIT

7.1 Independent Review

Illawarra Coal will comply with any directive from the Director-General to engage approved and appointed personnel to conduct an independent review of non-compliance with relevant air quality criteria as per Schedule 5, Condition 2 of the BSO Project Approval.

7.2 Independent Audit

In accordance with Condition 9, Schedule 6 of the BSO Project Approval, an independent Environmental Audit of this Plan and air quality monitoring program will be undertaken by December 2013 and every three years thereafter. The audit report will be submitted to the Director General within 6 weeks of completion.

The 2013 Audit was conducted by URS and the recommendations from the audit were included in the 2014 review and submission of this Plan.

ERM conducted the 2016 Development Consent Audit in January/February 2017 (Extension granted by Department of Planning and Environment (DPE) and Department of Environment and Energy) report was provide on the 22nd of March 2017 to both departments. No recommendations other than to continue with the current dust control measures.

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7.3 Revision

In accordance with Condition 5, schedule 6 of the BSO Project Approval, this Plan and associated monitoring program will be reviewed, and if necessary revised, within 3 months, of:

- the submission of an annual review;
- the submission of an incident report related to dust that has caused, or threatens to cause, material harm to the environment;
- the submission of an independent Environmental Audit report; or
- any modification to relevant Project approval conditions (unless the conditions require otherwise).

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8 APPENDICES

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9 APPENDIX A – AIR QUALITY MONITORING PROGRAM

Site ID	Location	Parameter	Measurement Method	Frequency?	Function
AE-DD14	SE zone of Stockpile Area at property boundary	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at SE corner of Stockpile at property boundary Operational Control - Stockpile and internal roadway dust control measures performance reference
AE-DD15	NE zone of stockpile area	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NW corner of Appin East pit top property boundary Amenity goal reference Operational Control - Site dust control performance reference
AE-DD16	NW property boundary of pit top facility	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NW corner of Appin East pit top property boundary Amenity goal reference Operational Control - Site dust control performance reference
AE-DD17	NE corner of pit top property boundary and coal stockpile vehicle entry/exit point	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at NE corner of Appin East pit top property boundary Amenity goal reference Operational Control - Stockpile and public road dust control measures performance reference
AE-DD18	SW zone of Stockpile Area	Particulate Matter – g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at SE corner of Stockpile Operational Control - Stockpile and internal roadway dust control measures performance reference
AE-PF1	NE corner of pit top property boundary – coal stockpile vehicle entry/exit point	Particulate Matter: PM10	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: PM2.5, PM10	Real-time Photometer (fixed)	Continuous	Amenity goal reference Real Time Operational Control Site dust control performance reference
AE-HV1	NW corner of Appin East pit top boundary between nearest residential receivers	Particulate Matter - PM10 and TSP monitor	High Volume Air Sampler	As Required	Amenity goal reference Review against land acquisition levels Real Time Operational Control Site dust control performance reference
AW-DD1	Appin West pit top – adjacent mine access road, employee car park and EDL power plant	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at Appin West pit top Operational Control – Site and road dust control measures performance reference
AW-DD2	Appin West property boundary at Mine Entrance Point off Douglas Park Drive	Particulate Matter g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at the Appin West Mine Gate Entrance Point and the public road Amenity goal reference Operational Control – Site and mine access road dust control measures performance reference
W-DD1	Appin North southern property boundary at the Wedderburn Rd and-Appin Rd junction	Particulate Matter – g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Particulate dust deposition rate at the Wedderburn Rd and-Appin Rd junction Operational Control – Mine entrance road and coal truck dust control measures performance reference Amenity goal reference
W-DD3	Appin North pit-top south site	Particulate Matter – g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Operational Control – Site dust control performance reference for the Appin North pit-top south site
W-DD8	Brennans Creek Dam	Particulate Matter – g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Operational Control – Site dust control performance reference.

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Site ID	Location	Parameter	Measurement Method	Frequency?	Function
					Indicator for dust deposition rates between the emplacement area activities and the nearest Appin township residential area Baseline and historical dust deposition trends related to the expansion of the emplacement area north towards the nearest residential receivers. Amenity goal reference
W-DD10	Appin North property boundary between the product stockpiles adjacent to Wedderburn Road and the Dharawal State Conservation Area boundary	Particulate Matter – g/m2/mth Ash, Combustible Solids, Insoluble Solids	Deposition Gauge	Monthly	Site dust control performance reference for product stockpiles and Wedderburn Road coal truck transport corridor.
W-PF1	Appin North southern property boundary at the Wedderburn and Appin Road intersection	Particulate Matter: PM10	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.

10 APPENDIX B - CONSENT CONDITIONS: AIR QUALITY AND GHG MANAGEMENT

Condition	Requirement	Section addressing requirements
7 (Schedule 4)	Odour The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	Section 6.1- Odour
8 (Schedule 4)	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.	Section 6.2- Greenhouse Gas Emissions
11 (Schedule 4)	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 relocated, modify and/or stop operations on site to ensure compliance with the relevant conditions of this approval; To the satisfaction of the Secretary.	Section 6.4.1 - Particulate Dust Monitoring Section 6.4.2 - Dust Deposition Gauges Section 6.4.3 - Weather Stations Section 6.5 - Air Quality Controls Section 6.5.1 - Dust Controls Section 6.5.2 - Greenhouse Gas Controls Section 6.6 - Air Quality Analysis, Data Review and Reporting Section 6.6.1 - Evaluating Compliance
12 (Schedule 4)	Air Quality and Greenhouse Gas Management Plan The Proponent shall prepare and implement a detailed Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Secretary. This plan must: 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 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 11 - Appendix C – Consultation with EPA Section 6.4.1 - Particulate Dust Monitoring Section 6.4.2 - Dust Deposition Gauges Section 6.4.3 - Weather Stations Section 6.5 - Air Quality Controls Section 6.5.1 Dust Controls Section 6.5.2 Greenhouse Gas Controls
13 (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 <i>Approved Methods for Sampling of Air Pollutants in New South Wales</i> guideline; and is capable of continuous real-time measurement of temperature lapse rate in accordance with the <i>NSW Industrial Noise Policy</i>	Section 6.4.3 - Weather Stations

11 APPENDIX C – CONSULTATION WITH EPA

EPA Request	IC Response
Install a second weather station at West Cliff.	A weather station exists at West Cliff and has been included in this Management Plan.
Review monitoring program (number location and frequency) in relation to the Project Approval criteria.	Additional monitoring units and sites have been included (high volume air sampler, photometric and dust deposition gauges) have been included and HVAS as per discussions with local EPA representatives and DoPI.
Provide a description of sensitive receptors.	Link to the Environmental Assessment was included. The Management Plan has been updated with a summary of sensitive receptors.
Provide a brief analysis regarding current or past community complaints and how monitoring targets these areas.	A summary of complaints and how monitoring targets these areas has been included.
Provide a summary of baseline and historical monitoring results.	A summary of baseline and historical data collated in the Environmental Assessment has been included.
Provide justification for the selection of pollutants equipment, schedule and location.	Additional monitoring units and sites have been included (HVAS, photometric and dust deposition gauges) have been included as per discussions with local EPA representatives.
Provide justification for a single weather station.	A weather station exists at West Cliff and an Appin East weather station will be installed. This has been included in this Management Plan.
Provide a protocol for confirmation monitoring where the project approval criteria / indicators are recorded.	A protocol has been included in the Management Plan.
Review all dust gauge locations against the relevant Australian Standards.	This was completed as part of the development of the Management Plan and this was a development consent condition. A comment was provided in the Management Plan to state this.
Review HVAS location at West Cliff as considered representative of background conditions.	The HVAS location at West Cliff was included as an indicator of the effectiveness of controls within the emplacement. As per discussions with local EPA representatives this site has been changed to a dust deposition gauge.
Effectiveness of proposed controls to be included.	The use of fixed and portable photometers, auditing, spot checks and surveys has been included in the Management Plan.
Additional dust deposition gauges at West Cliff and Appin.	As per discussions with local EPA representatives two additional gauges were added.

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Air Quality, Greenhouse Gas Management Plan
 Bulli Seam Operations

EPA Request	IC Response
Provide dust gauges in residential areas.	A HVAS and fixed photometer has been installed at the Appin East site to measure residential dust levels and a fixed photometer at the entry / exit points for coal haulage at Appin East and West Cliff.
Real time air quality monitoring for PM ₁₀ . Comparison of real time monitoring results with air quality criteria and health performance under the NEPM.	A HVAS and fixed photometer will be installed at the Appin East site to measure residential dust levels and fixed photometers at the entry / exit points for coal haulage at Appin East and West Cliff. If the fixed photometer indicates results within 20% of the land acquisition values, the HVAS will be run. Data will be averaged to calculate 24 hour and annual requirements.
Use of optical photometers to audit operational and residential areas	The use of portable optical photometers during site and residential surveys and their locations have been included in the Management Plan. Fixed optical photometers are planned to be installed at the entry / exit points for coal haulage at Appin East and West Cliff.
Indicative program to reduce nuisance road dust and public complaints	The use of portable optical photometers during site and residential surveys and their locations have been included in the Management Plan. Fixed optical photometers are planned to be installed at the entry / exit points for coal haulage at Appin East and West Cliff. Current controls are listed in the Management Plan.

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12 APPENDIX D - OTHER RELEVANT STANDARDS, POLICIES AND GUIDELINES

The following standards are relevant:

- AS-2923 – Guide for measurement of horizontal wind for air quality applications (1987);
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (OEH, 2005);
- AS/NZS 3580.10.1:2003 - Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method; and
- Standard ISO14001:2004 'Environmental Management Systems;
- 'Benchmarking Study' conducted for the Office of Environment and Heritage (OEH) titled "International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining"; and
- OEH guideline titled "Coal Mine Particulate Matter Control Best Practice – Site-specific determination guideline".

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13 PLANS

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PLAN 1 – LOCATION PLAN



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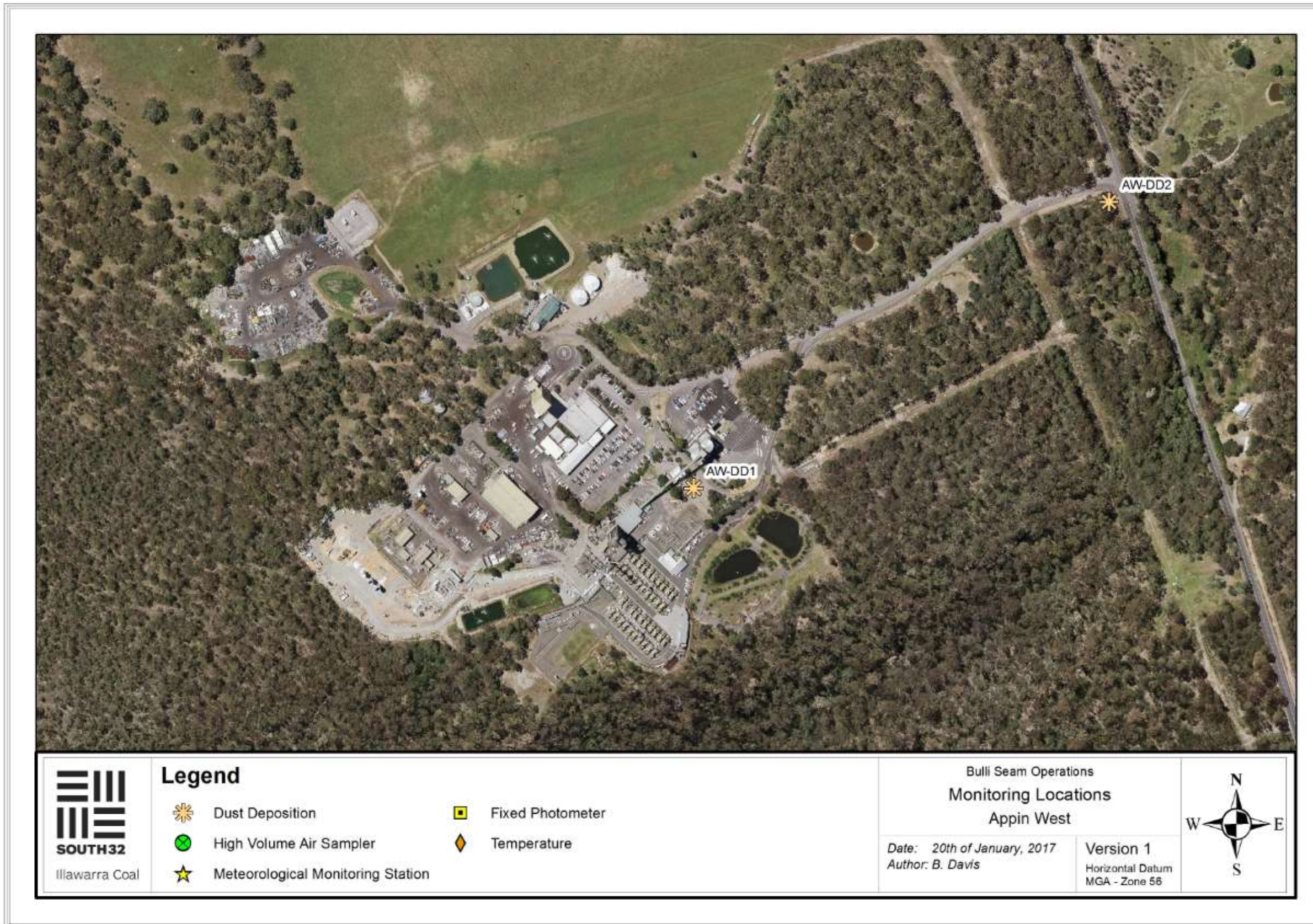
PLAN 2 – APPIN EAST MONITORING LOCATIONS



	Legend		Bulli Seam Operations Monitoring Locations Appin East		
	Dust Deposition High Volume Air Sampler Meteorological Monitoring Station	Fixed Photometer Temperature	Date: 20th of January, 2017 Author: B. Davis	Version 1 Horizontal Datum MGA - Zone 56	

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PLAN 3 – APPIN WEST MONITORING LOCATIONS



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PLAN 4 – APPIN NORTH / WEST CLIFF MONITORING LOCATIONS

