APPENDIX C
AIR QUALITY IMPACT ASSESSMENT

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MOOLARBEN STAGE 2 PREFERRED PROJECT

Hansen Bailey

Job No: 5576

22 November 2011

A PEL Company

PROJECT TITLE:	**MOOLARBEN STAGE 2 PREFERRED PROJECT**
JOB NUMBER:	**5576**
PREPARED FOR:	Dianne Munro
	HANSEN BAILEY
AUTHORS:	P. Henschke & J. Cox
APPROVED FOR RELEASE BY:	D. Roddis
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Queensland Environment Pty Ltd trading as
PAEHolmes ABN 86 127 101 642

SYDNEY:
Suite 203, Level 2, Building D, 240 Beecroft Road
Epping NSW 2121
Ph: +61 2 9870 0900
Fax: +61 2 9870 0999

ADELAIDE:
72 North Terrace, Littlehampton SA 5250
PO Box 1230, Littlehampton SA 5250
Ph: +61 8 8391 4032
Fax: +61 7 3844 5858

MELBOURNE:
Suite 62, 63 Turner Street, Port Melbourne VIC 3207
PO Box 23293, Docklands VIC 8012
Ph: +61 3 9681 8551
Fax: +61 3 9681 3408

PERTH:
Level 18, Central Park Building,
152-158 St Georges Terrace, Perth WA 6000
Ph: +61 8 9288 4522
Fax: +61 8 9288 4400

BRISBANE:
Level 1, La Melba, 59 Melbourne Street
South Brisbane QLD 4101
PO Box 3306, South Brisbane, Qld 4101
Ph: +61 7 3004 6400
Fax: +61 7 3844 5858

GLADSTONE:
Suite 2, 36 Herbert Street, Gladstone QLD 4680
Ph: +61 7 4972 7313
Fax: +61 7 3844 5858

Email: info@paeholmes.com

Website: www.paeholmes.com

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1 INTRODUCTION

PAEHolmes was commissioned on behalf of Moolarben Coal Mines Pty Limited (MCM) (the Proponent) to undertake an air quality assessment for the Moolarben Coal Stage 2 Project (Stage 2). The purpose of this assessment is to form part of a Preferred Project Report (PPR) being prepared by Hansen Bailey to support the application for Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to facilitate the development of a 24-year open cut and underground coal mine and associated infrastructure and integration with the existing Stage 1 operations.

Specifically, the Preferred Project will consist of:

- The construction and operation of an open cut (OC) mining operation (OC4) extracting up to 12 Million tonnes per annum (Mtpa) Run of Mine (ROM) coal and up to 13 Mtpa combined rate with the Stage 1 open cuts;
- The construction and operation of two underground (UG) mining operations (UG1 and UG2) extracting up to 4 Mtpa ROM coal cumulative with the Stage 1 underground;
- The construction and operations of the Stage 2 ROM coal facility;
- Extension of the life of the Coal Handling and Preparation Plant (CHPP) to Year 24 of Stage 2 and increased throughput of up to 17 Mtpa (13 Mtpa open cut and 4 Mtpa underground);
- The development of the Northern Out Of Pit (OOP) emplacement area;
- The construction and operation of two conveyors and associated facilities between the Stage 2 ROM coal facility and Stage 1 CHPP;
- The construction and operation of a Mine Access Road;
- The construction and operation of administration, workshop and related facilities;
- The construction and operation of water management infrastructure; and
- The installation of supporting power and communications infrastructure.

This assessment has adopted the methodology used in the Air Quality Impact Assessment for Moolarben Coal Project Stage 2 prepared by Holmes Air Sciences (now PAEHolmes) in 2009 (**Holmes Air Sciences, 2009**). This assessment refers to the Project as described in the PPR as the Preferred Project. The Moolarben Coal Complex (MCC) is defined in this assessment as the combination of Stage 1 Operations and the Preferred Project.

The assessment generally follows the conventional procedures outlined by the NSW Office of Environment and Heritage[a] (OEH) in its document titled "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**DEC, 2005**) (referred to hereafter as DECCW Approved Methods) and contemporary standards adopted by the Department of Planning (DoP)

[a] The NSW EPA exists as a legal entity operated within the Office of Environment and Heritage (OEH) which came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms NSW EPA, OEH, DECCW, DECC and DEC are interchangeable in this report.

in recent project approvals that lie outside of this document. A computer-based dispersion model is used, with local meteorological data and estimates of dust emissions, as the best available scientific tool to predict the concentration and deposition rate of particulate matter from the MCC and other mines expected to be operating concurrently with MCM.

1.1 Scope of work

The scope of work for this study includes:

- A description of the MCC focusing on aspects relevant for air quality;
- Consideration and incorporation where relevant of all additional commitments in relation to air quality in the Response to Submissions (RTS) and additional requests for information since 2008;
- A review of meteorological conditions in the area;
- A review of air quality monitoring data undertaken with a view to describing existing air quality conditions and establishing background air quality;
- An analysis of the MCC and generation of dust emissions inventories for representative stages in the life of the mine;
- A description of the modelling approach used to predict the concentrations of particulate matter and dust deposition for comparison with ambient air quality assessment criteria;
- Predicted dispersion and dust fallout patterns due to emissions from the MCC;
- Predicted cumulative effects with other mining operations and existing sources of dust;
- Consideration of dust mitigation and management measures to minimise dust emissions; and
- Revised greenhouse gas predictions for scope 1, 2 and 3.

2 LOCAL SETTING AND TOPOGRAPHY

The MCC is located approximately 40 km north-northeast of Mudgee and approximately 22 km northeast of Gulgong. The location and mine lease of the MCC area is shown in **Figure 2-1**. Also shown are the neighbouring mining leases which have been included in the cumulative assessment, the Ulan Coal Mine and Wilpinjong Coal Mine along with the approved Moolarben Coal Stage 1.

The local land use consists of forests (uncleared land), small farms, grazing and some cropping, small mining operations (mining clay, slate and sandstone) and large scale mining at the Ulan open cut and the Wilpinjong open cut mine. Apart from the village of Ulan which supports residences, a school, a hotel and other community facilities, there are a number of isolated rural residences most of which are associated with agricultural enterprises and rural residential lots along Ridge Road to the southwest. **Figure 2-2** shows the nearby sensitive receptors and the locations of weather stations for MCM and Ulan Coal Mine. Identification labels have been given to each residence and are provided in tabular form with figure reference in **Appendix A**.

The topography is characterised by undulating terrain, which is steep in parts. Cliff-lines and steep sided valleys are prevalent throughout the area. **Figure 2-3** shows a pseudo three dimensional plot of the terrain constructed using the data used in the dispersion modelling.

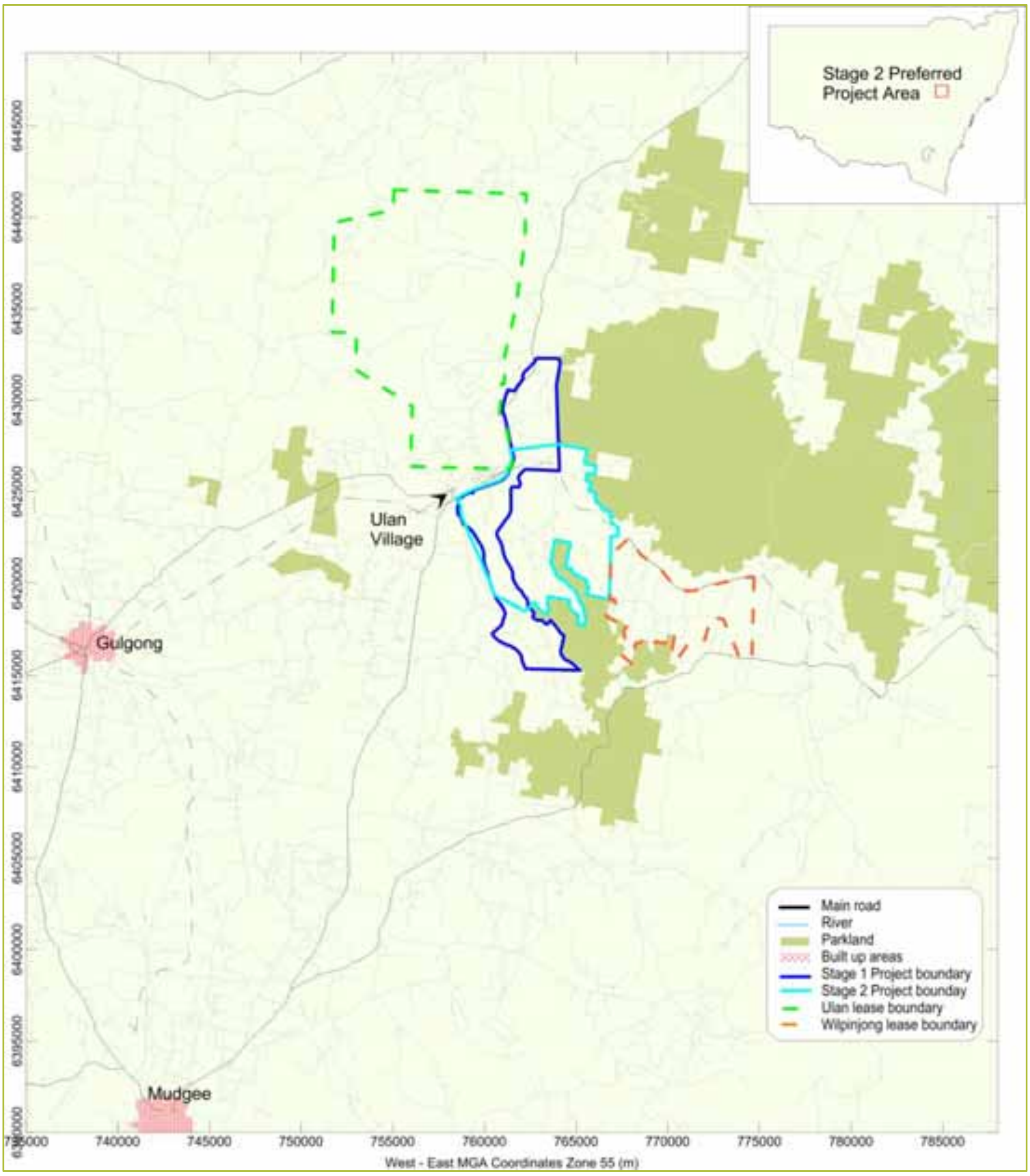

Figure 2-1: Site location

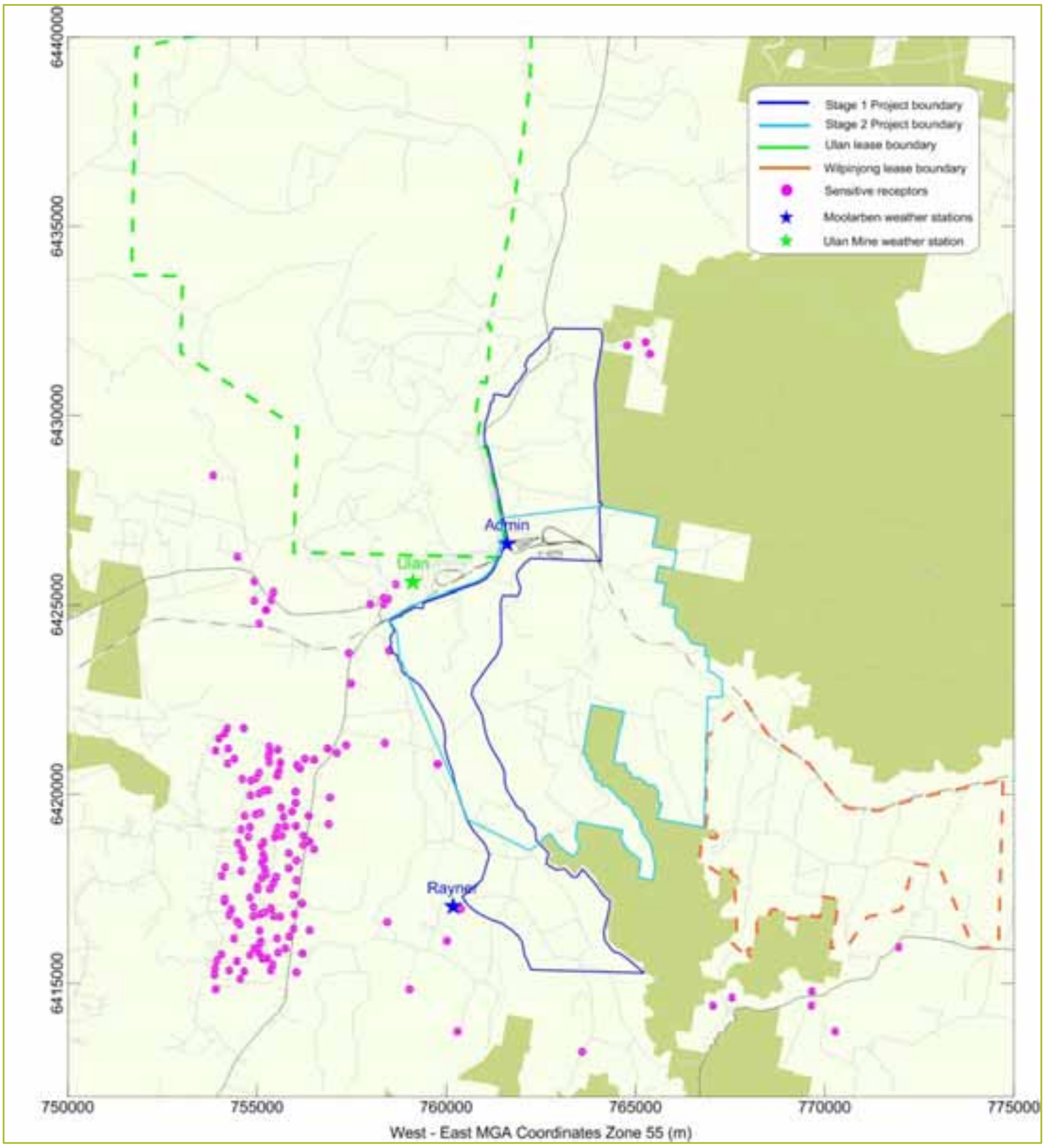

Figure 2-2: Sensitive receptor location and weather stations

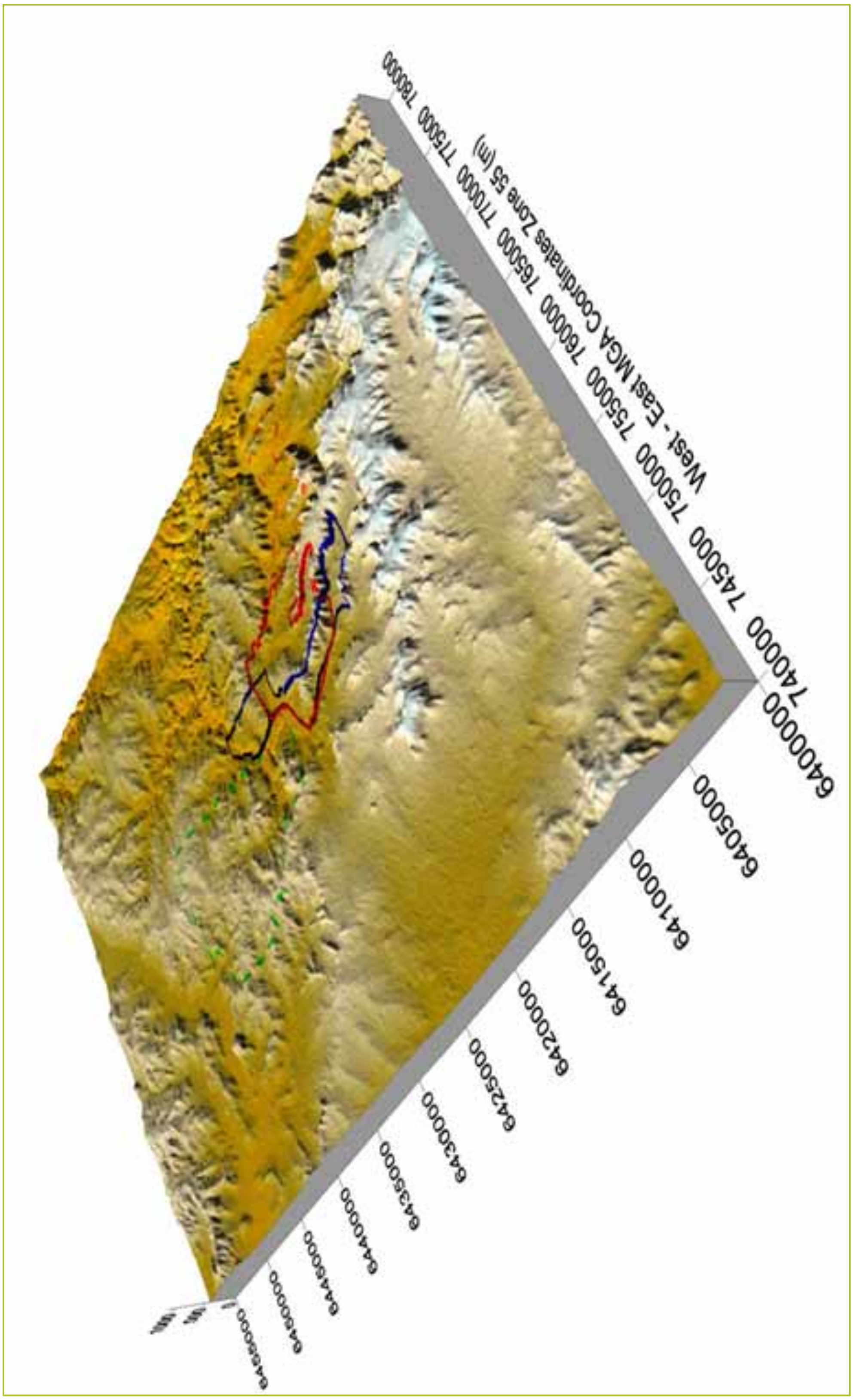

Figure 2-3: Psuedo-3D terrain plot of area

3 AIR QUALITY ASSESSMENT CRITERIA

3.1 Introduction

Extraction of coal requires the clearing of land and excavation of overburden material to recover the coal by heavy earth moving equipment. These activities generate fugitive dust emissions in the form of particulate matter described as total suspended particulate matter (TSP)[b], particulate matter with equivalent aerodynamic diameters 10 µm or less (PM_{10})[c] and particles with equivalent aerodynamic diameters of 2.5 µm and less ($PM_{2.5}$).

In practice, emissions of carbon monoxide (CO), sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) will occur from diesel-powered equipment and vehicle exhausts. Emissions on open cut mines are comparatively small and too widely dispersed to give rise to significant off-site concentrations. For this reason these pollutants are not considered further in this report.

This section provides information on the air quality criteria used to assess the predicted impacts of the MCC. The assessment criteria provide benchmarks, which are intended to protect the community against the adverse effects of air pollutants. These criteria generally reflect current Australian community standards for the protection of health and protection against nuisance effects. To assist in interpreting the significance of predicted concentration and deposition levels, some background discussion on the potential harmful effects of dust is provided below.

3.2 Assessment criteria - Particulate matter

Particulate matter has the capacity to affect health and to cause nuisance effects. The extent to which health or nuisance effects occur relates to the size and/or chemical composition of the particulate matter.

The human respiratory system has in-built defensive systems that prevent particles larger than approximately 10 µm from reaching the more sensitive parts of the respiratory system. Particles with aerodynamic diameters less than 10 µm are referred to as PM_{10}. Particles larger than 10 µm, while not able to affect health, can be deposited on materials and generally degrade aesthetic elements of the environment. For this reason, air quality goals make reference to measures of the total mass of all particles suspended in the air. This is referred to as TSP. In practice, particles larger than 30 to 50 µm settle out of the atmosphere too quickly to be regarded as air pollutants. The upper size range for TSP is usually taken to be 30 µm and includes PM_{10} as a subset ($PM_{2.5}$ particles are a sub-component of PM_{10} and therefore also a sub-component of TSP).

The health-based assessment criteria used by DECCW have, to a large extent, been developed by reference to epidemiological studies undertaken in urban areas with large populations where the primary pollutants are the products of combustion. This means that, in contrast to dust of crustal[d] origin, the particulate matter would be composed of smaller particles and would generally contain acidic and carcinogenic substances that are associated with combustion.

The Director-General's Requirements (DGR's) for the Project require an assessment of the potential impacts of the Project, taking into consideration any relevant guidelines. The DGR's

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[b] TSP refers to all particles suspended in air. In practice, the upper size range is typically 30 µm.

[c] PM_{10} refers to all particles with equivalent aerodynamic diameters of less than 10µm, that is, all particles that behave aerodynamically in the same way as spherical particles with a unit density.

[d] The term crustal dust is used to refer to dust generated from materials that constitute the earth's crust.

list the DECCW Approved Methods as applicable guidelines. **Table 3-1** and **Table 3-2** include the air quality criteria from the DECCW Approved Methods that are relevant to this study.

Table 3-1: Air quality criteria/ standards for particulate matter concentrations

Pollutant	Criterion/Standard	Averaging Period	Source
TSP	90 µg/m³	Annual mean	NHMRC
PM_{10}	50 µg/m³	24-hour average	NSW DEC (**2005**) (impact assessment criteria) NEPM (ambient air quality standard, allows five exceedences per year, e.g. for bushfires and dust storms)
	30 µg/m³	Annual mean	NSW DEC (**2005**) (impact assessment criteria)

3.3 Assessment criteria - Dust deposition

In addition to health impacts, airborne dust also has the potential to cause nuisance effects by depositing on surfaces. **Table 3-2** shows the maximum acceptable increase in dust deposition over the existing dust levels from an amenity perspective. These criteria for dust fallout levels are set to protect against nuisance impacts (**NSW DEC, 2005**).

Table 3-2: DECCW criteria for dust (insoluble solids) fallout

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m²/month*	4 g/m²/month

* grams per square metre per month

3.4 Recent Project Approval conditions

Recent DoP Project Approval Conditions are relevant to managing an operating project, and it is appropriate to consider these in the overall assessment of mitigation and management options for a proposed project. Recent conditions include the criteria summarised in **Table 3-3** and **Table 3-4**.

Table 3-3: Air quality assessment criteria

Pollutant	Criterion	Averaging Period	Application
TSP	90 µg/m³	Annual mean	Total impact
PM_{10}	50 µg/m³	24-hour average	Total impact
	30 µg/m³	Annual mean	Total impact
Deposited dust	2 g/m²/month	Annual mean	Incremental impact
	4 g/m²/month	Annual mean	Total impact

Table 3-4: Air quality acquisition criteria

Pollutant	Criterion	Averaging Period	Application
TSP	90 µg/m³	Annual mean	Total impact
PM_{10}	150 µg/m³	24-hour average	Total impact
	50 µg/m³	24-hour average	Incremental impact
	30 µg/m³	Annual mean	Total impact
Deposited dust	2 g/m²/month	Annual mean	Incremental impact
	4 g/m²/month	Annual mean	Total impact

The criteria for TSP and PM_{10} in recent DoP Project Approval Conditions exclude all extraordinary events such as bushfires and dust storms. Total impact includes the impact of a project and all other sources, whilst incremental impact refers to the impact of a project considered in isolation.

3.4.1 Further Comments

Mining emissions generate particles in all the above size categories, namely $PM_{2.5}$, PM_{10} and TSP. However, the great majority of the particles from mining operations are due to the abrasion or crushing of rock and coal and general disturbance of dusty material. As such most of the emissions will be larger than 2.5 μm. This is in contrast to particles found in bushfire smoke, or in the atmosphere in urban areas, where many of the particles are the result of combustion processes. A study of the distribution of particle sizes near (10 to 200 m) mining dust sources was undertaken on behalf of the State Pollution Control Commission (SPCC – now OEH) in 1986. The average of approximately 120 samples showed that $PM_{2.5}$ comprised 4.7% of the TSP, and PM_{10} comprised 39.1% of the TSP in the samples (**SPCC, 1986**). Thus, although emissions of $PM_{2.5}$ do occur from mining, the percentages of the emissions in this size range are small and in practice the concentrations of $PM_{2.5}$ in the vicinity of mining dust sources are likely to be low compared with internationally recognised goals.

In May 2003, NEPC released a variation to the NEPM (**NEPC, 2003**) to include advisory reporting standards for $PM_{2.5}$. The advisory reporting standards for $PM_{2.5}$ are a maximum 24-hour average of 25 $\mu g/m^3$ and an annual average of 8 $\mu g/m^3$. However, there is no time line for compliance. The goal was to gather sufficient data nationally to facilitate the review of the Air Quality NEPM which is currently underway. The variation includes a protocol setting out monitoring and reporting requirements for particles as $PM_{2.5}$.

At this stage, the advisory reporting $PM_{2.5}$ standards are not part of the NSW DECCW assessment criteria and while predictions have been made as to the likely contribution the emissions from the MCC would make to ambient $PM_{2.5}$ concentrations, these predictions have not been used to assess impacts against the proposed advisory standard.

4 EXISTING ENVIRONMENT

This section describes the dispersion meteorology, local climate conditions and existing dust levels in the area surrounding the MCM.

4.1 Dispersion meteorology

The Gaussian dispersion model used for this assessment (see **Section 6**) requires information about the dispersion characteristics of the area. In particular, data are required for wind speed, wind direction, atmospheric stability class[e] and mixing height[f].

DECCW Approved Methods specifies the requirements for meteorological data used in air dispersion modelling. The requirements are as follows:

- Data must span at least one year;
- Data must be 90% complete; and
- Data must be representative of the area in which emissions are modelled.

Meteorological data are currently collected by MCM from two sites (WS1 (Admin – formerly known as Ulan Village, relocated in May 2009) and WS2 (Rayner), the locations of which are shown on **Figure 4-1**). The location of Ulan Mine meteorological station is also shown.

The meteorological station WS1, previously known as "Ulan", was installed in Ulan Village in July 2005 and relocated to the Administration building of Moolarben Coal in May 2009. WS2 was installed in December 2004. There have been ongoing problems with the data collected at both WS1 and WS2, as summarised in **Table 4-1** from MCM Annual Environmental Management Reports (AEMR's).

[e] In dispersion modelling, stability class is used to categorise the rate at which a plume will disperse. In the Pasquill-Gifford stability class assignment scheme, as used in this study, there are six stability classes A through to F. Class A relates to unstable conditions such as might be found on a sunny day with light winds. In such conditions plumes will spread rapidly. Class F relates to stable conditions, such as occur when the sky is clear, the winds are light and an inversion is present. Plume spreading is slow in these circumstances. The intermediate classes B, C, D and E relate to intermediate dispersion conditions.

[f] The term mixing height refers to the height of the turbulent layer of air near the earth's surface into which ground-level emissions will be rapidly mixed. A plume emitted above the mixed-layer will remain isolated from the ground until such time as the mixed-layer reaches the height of the plume. The height of the mixed-layer is controlled mainly by convection (resulting from solar heating of the ground) and by mechanically generated turbulence as the wind blows over the rough ground.

Table 4-1: Comments on meteorological data from MCM AEMR's

AEMR Reporting period	WS1	WS2
1st September 2007 – 31st August 2008	Operational issues - No data June to August 2008	Abnormal wind records September 2007 to January 2008
1st September 2008 – 31st August 2009	Technical issues - No data September 2008. Relocated from Ulan Village to Administration Building May 2009 Programming error July 2009 – no temperature, humidity, solar radiation or rainfall.	Operational issues - No data August 2009 Technical issues – no wind speed data November and December 2008
1st September 2009 – 31st August 2010	Some data lost during upgrade to real-time website repository – 95% complete – missing data supplemented from WS2	Technical difficulties – 92% complete - missing data supplemented from WS1
1st September 2010 – 31st August 2011	99.5% complete	Technical difficulties – 81% complete - missing data supplemented from WS1

Annual and seasonal windroses of the available data from WS1 (Ulan/Admin) and WS2 (Rayner) are presented as follows:

- July 2005 – June 2006: WS1 (Ulan) - **Figure 4-2**; WS2 - **Figure 4-3**;
- July 2006 – June 2007: WS1 (Ulan) - **Figure 4-4**; WS2 - **Figure 4-5**;
- July 2007 – June 2008: WS1 (Ulan) - **Figure 4-6**; WS2 - **Figure 4-7**;
- July 2008 – June 2009: WS1 (Ulan) – not plotted (only five months of data are available - October 2008 to February 2009 – and the site was relocated in May 2009); WS2 - **Figure 4-8**.
- July 2009 – June 2010: WS1 (Admin) **Figure 4-9**; WS2 **Figure 4-10**;

It is apparent from the windroses that whilst the prevailing wind directions are similar between each site and year, there are a significant number of calm periods (that is, windspeeds less than 0.5 m/s). A detailed analysis of the data showed that these "calm" periods have often been recorded for extended periods of time (sometimes greater than two months). As such none of these datasets would satisfy the specified DECCW requirements for dispersion modelling.

Therefore, meteorological data collected from the neighbouring Ulan Coal Mine meteorological station (the location is shown on **Figure 4-1**) were used in this assessment. Meteorological data for the period July 2007 to June 2008 found a total of 8,496 hours of data available. This corresponds to 96.9% of the data potentially available in a year. Ulan Coal Mine meteorological station is located less than 1km from the Ulan Village (WS1) site. WS1 (Ulan) data for 2005 were used in the Air Quality Impact Assessment for Moolarben Coal Project Stage 2 prepared by Holmes Air Sciences (now PAEHolmes) in 2009 (**Holmes Air Sciences, 2009**). The use of these data also allows for a more robust cumulative assessment as they were also used in the recent EA for Ulan Coal Mine.

Hourly average data collected over the period 2007-2008 were used to create annual and seasonal windroses shown in **Figure 4-11**. The windroses show that on an annual basis, the most common winds for the area are from the southwest and east quadrants. This pattern of winds is similar for autumn and to a lesser extent spring. The summer windrose shows a high percentage of winds from the east and the winter windrose shows dominate winds originating from the southwest and west-southwest. On an annual basis, the percentage of calms (winds less than 0.5 m/s) is 6%.

Figure 4-12 presents the windroses from Ulan (WS1) for comparison. Whilst there are some differences in the prevailing winds, for example, an annual basis Ulan (WS1) shows more winds from the east-south-east compared with Ulan Mine, the data selected are considered representative of the wider area, and as noted above, use of the same data as the recent Ulan Coal EA allows for a more robust cumulative assessment.

Table 4-2 shows the frequency of occurrence of the stability categories expected in the area for the period of July 2007 to June 2008 at Ulan Mine. Overall, stability class D occurs for the greatest proportion of time with 39.5% which is characterised by rapid dispersion. F class which represents poor dispersion occurs for 14.5% of the time. Joint wind speed, wind direction and stability class frequency tables are provided in **Appendix B**.

Mixing height was determined using a scheme defined by **Powell** (**1976**) for day-time conditions and an approach described by **Venkatram**, (**1980**) for night-time conditions. These two methods provide a good estimate of mixing height in the absence of upper air data.

Table 4-2: Frequency of occurrence of stability classes

Stability Class	Percentage Frequency (%)
A	7.9
B	6.3
C	12.2
D	39.5
E	19.5
F	14.5
Total	99.9

N.B: Total does not add up to exactly 100% due to rounding

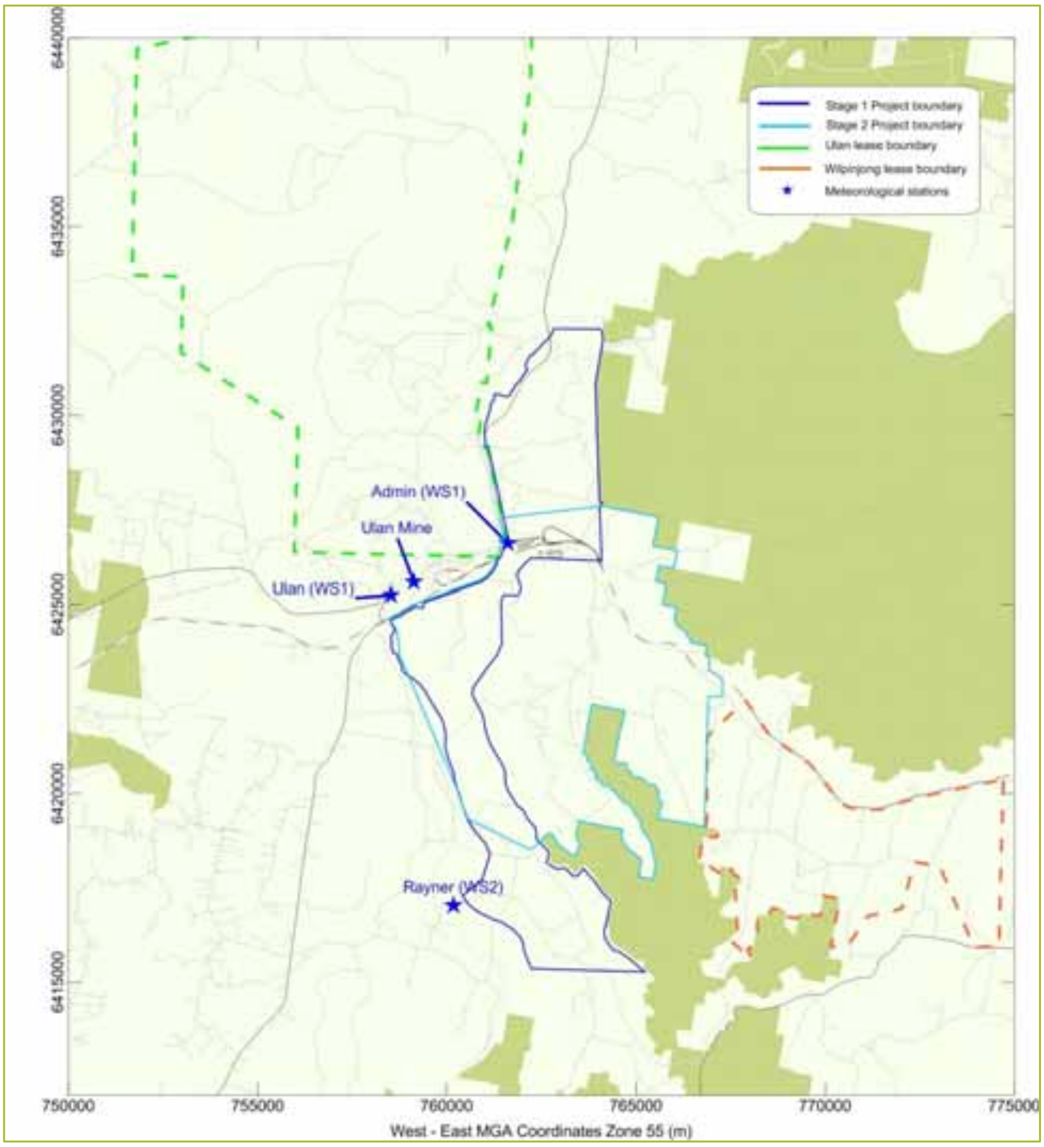


Figure 4-1: Location of meteorological stations

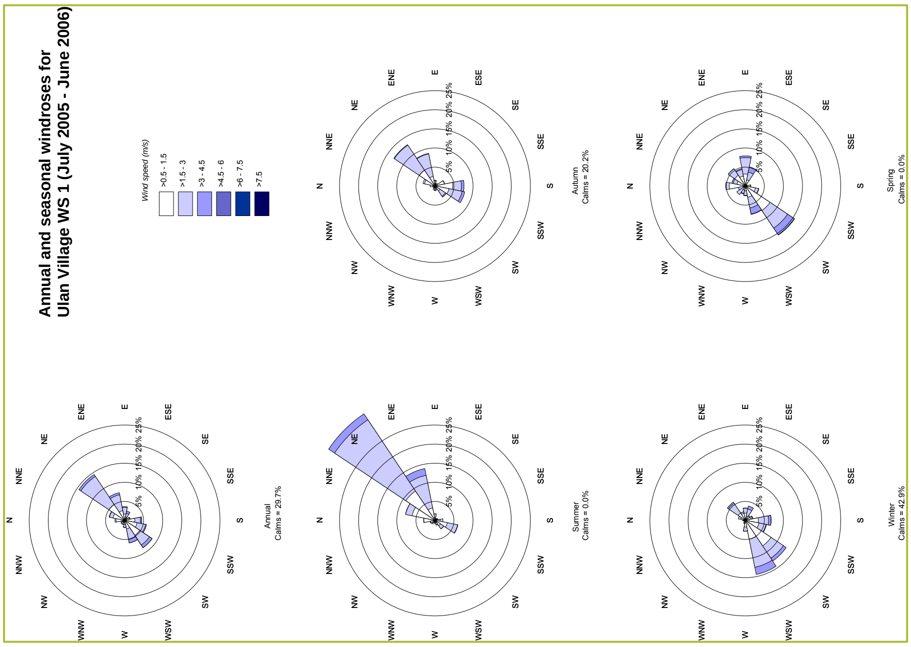


Figure 4-2: Annual and seasonal windrose for Ulan Village WS1 (July 2005 – June 2006)

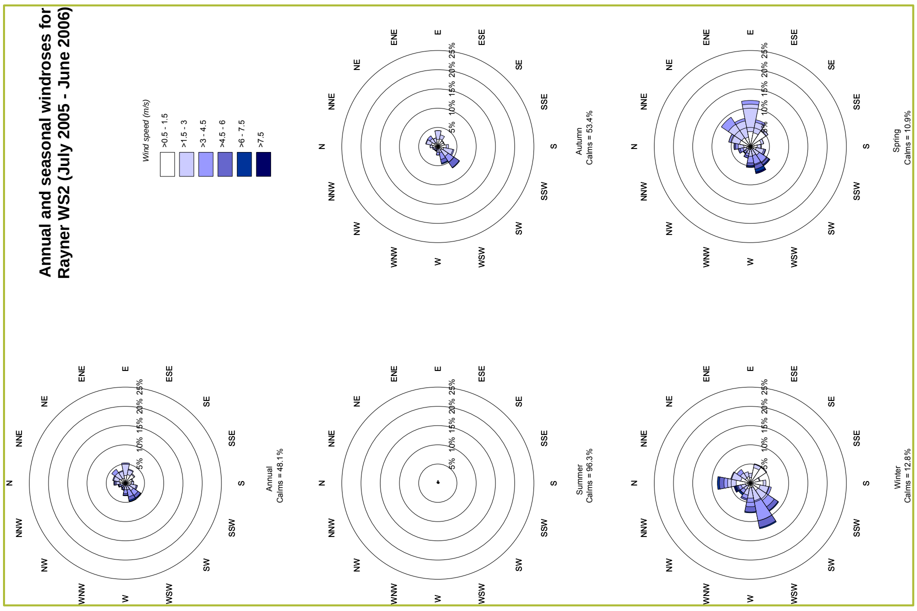


Figure 4-3: Annual and seasonal windrose for Rayner WS2 (July 2005 – June 2005)

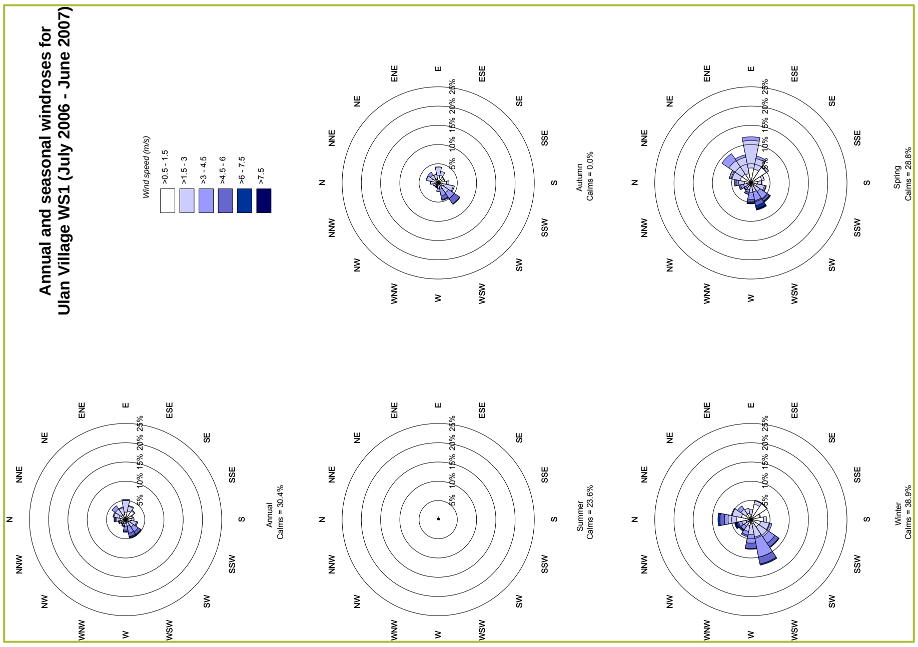


Figure 4-4: Annual and seasonal windrose for Ulan Village WS1 (July 2006 – June 2007)

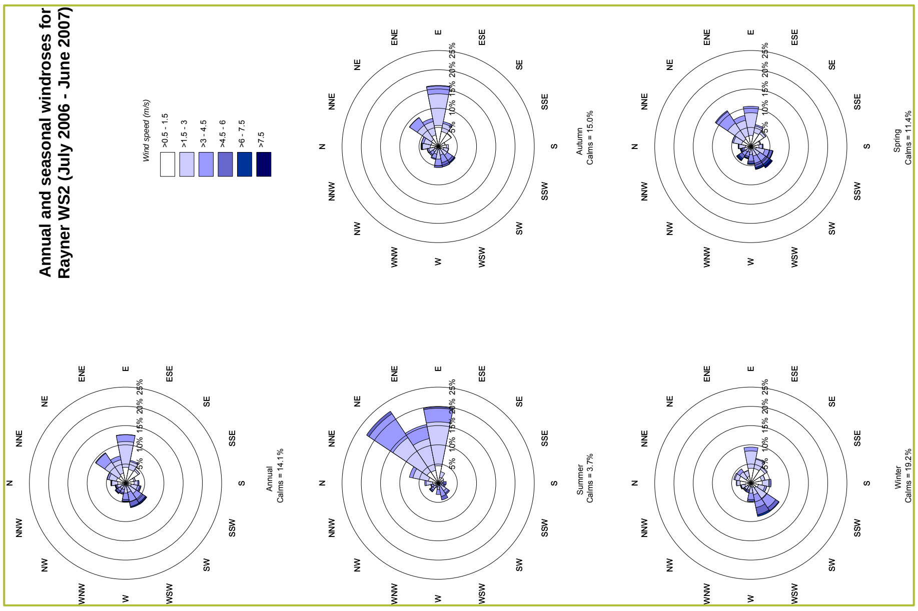


Figure 4-5: Annual and seasonal windrose for Rayner WS2 (July 2006 – June 2007)

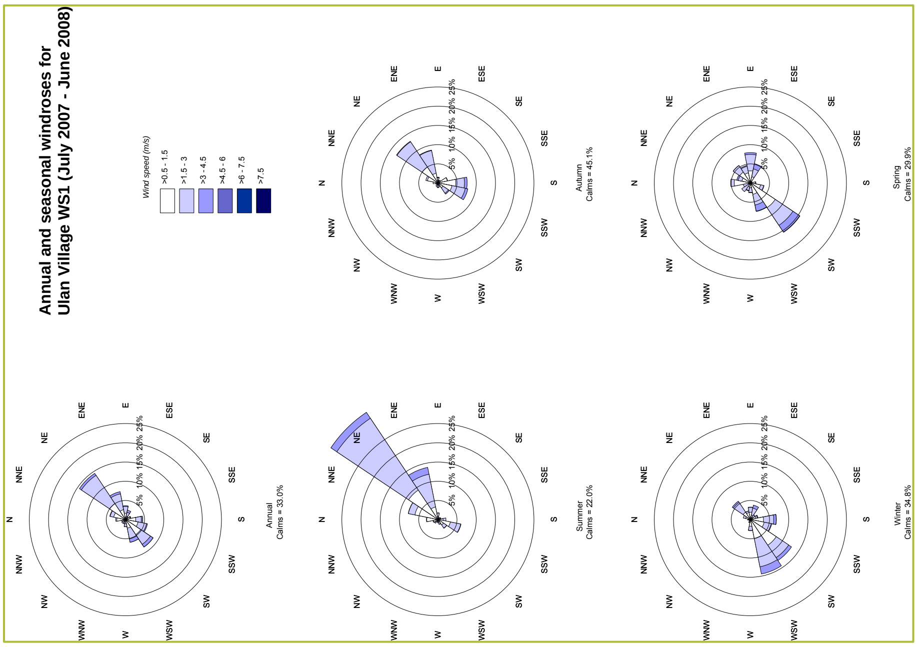


Figure 4-6: Annual and seasonal windrose for Ulan Village WS1 (July 2007 – June 2008)

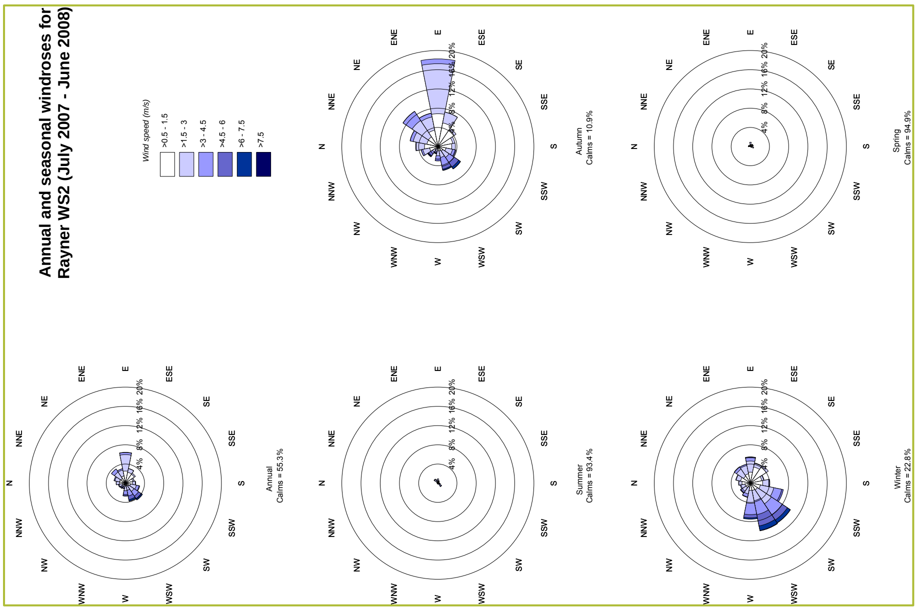


Figure 4-7: Annual and seasonal windrose for Rayner WS2 (July 2007 – June 2008)

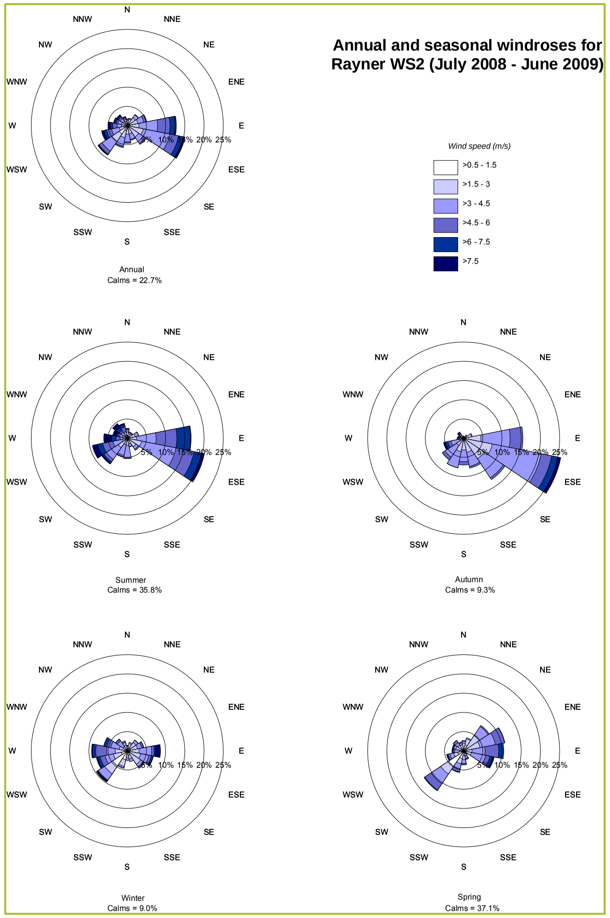


Figure 4-8: Annual and seasonal windrose for Rayner WS2 (July 2008 – June 2009)

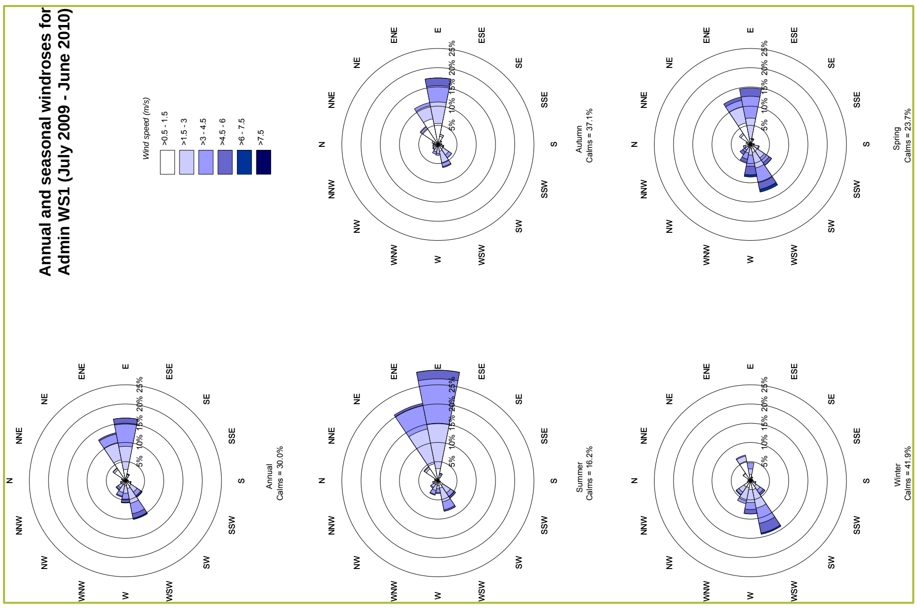


Figure 4-9: Annual and seasonal windrose for Admin WS1 (July 2009 – June 2010)

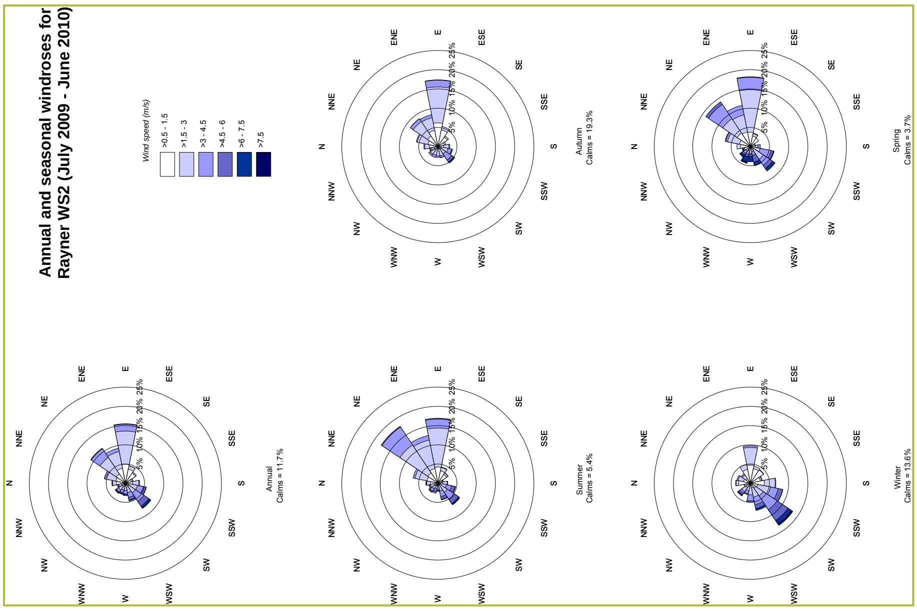


Figure 4-10: Annual and seasonal windrose for Rayner WS2 (July 2009 – June 2010)

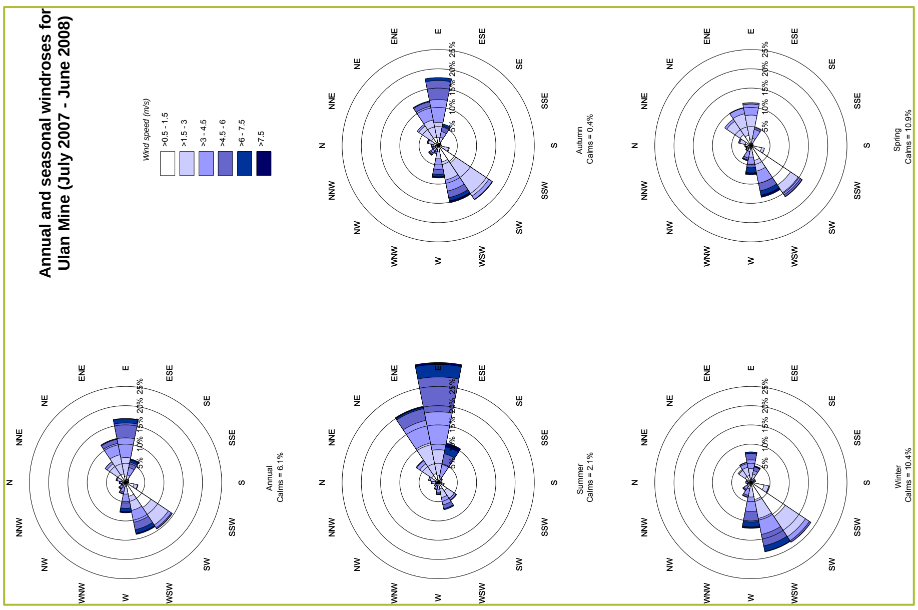


Figure 4-11: Annual and seasonal windroses – Ulan Coal Mine, July 2007 to June 2008

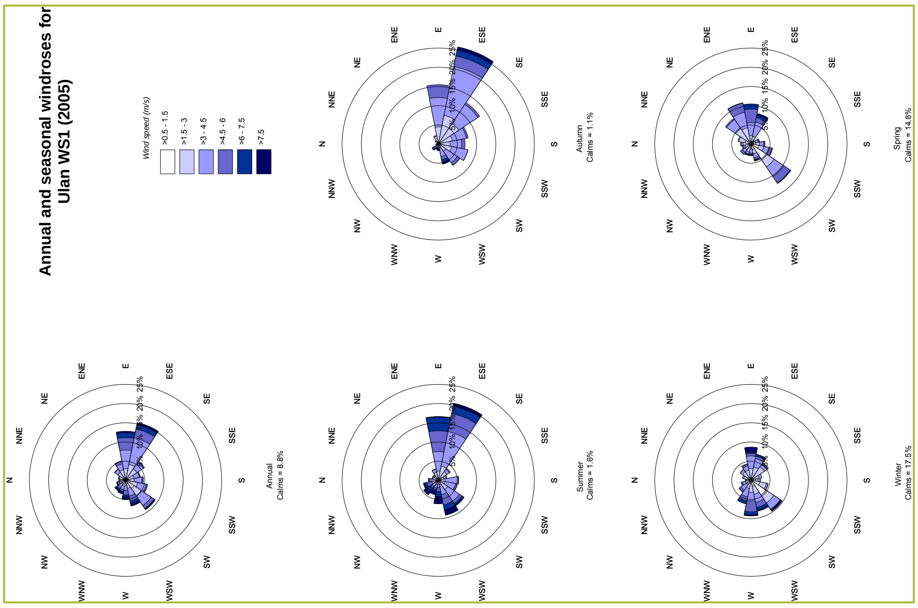


Figure 4-12: Annual and seasonal windroses – Ulan (WS1) - 2005

4.2 Climate data

Climatic data are available from the Bureau of Meteorology monitoring station at Gulgong Post Office (Station Number 062013) located approximately 24 km west-southwest of MCM. Climate data collected from this station for the period 1881 to 2011 were reviewed (**Bureau of Meteorology, 2011a**). The station provides information on the long-term average values of climatic elements such as temperature, humidity, rainfall and the number of rain days per year etc.

Table 4-3 presents a summary of temperature, humidity and rainfall data for the Gulgong Post Office station. Temperature and humidity data consist of monthly averages of 9am and 3pm readings. Also presented are monthly averages of maximum and minimum temperatures. Rainfall data consist of mean rainfall and the average number of rain days per month.

The annual average maximum and minimum temperatures at Gulgong Post Office are 23.0°C and 9.6°C respectively. On average January is the hottest month with an average maximum temperature of 31.0°C. July is the coldest month, with an average minimum temperature of 2.6°C.

Rainfall data collected at Gulgong Post Office show that January is the wettest month, with an average rainfall of 70.0 mm. The average annual rainfall is 652.6 mm with an annual average of 62.9 rain days.

Table 4-3: Temperature, humidity and rainfall data from Gulgong Post Office

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
9 am Temperatures (ºC)													
Mean	21.7	20.6	18.9	15.8	11.3	7.7	6.7	8.5	12.6	16.5	18.3	20.8	15.0
9 am Relative humidity (%)													
Mean	64	71	71	70	79	84	84	76	70	61	63	62	71
3 pm Temperatures (ºC)													
Mean	29.5	28.4	26.2	22.3	18.0	14.3	13.5	15.3	18.5	22.1	25.1	28.2	21.8
3 pm Relative humidity (%)													
Mean	37	42	41	42	49	57	54	46	44	40	39	36	44
Daily Maximum Temperature (ºC)													
Mean	31.0	29.8	27.4	23.4	19.1	15.4	14.7	16.4	19.6	23.4	26.5	29.6	23.0
Daily Minimum Temperature (ºC)													
Mean	16.7	16.3	13.7	9.8	6.4	3.6	2.6	3.4	6.1	9.3	12.2	14.9	9.6
Rainfall (mm)													
Mean	70.0	61.8	54.4	44.5	45.2	51.0	49.5	46.7	46.3	56.5	59.5	67.3	652.6
Rain days (Number)													
Mean	5.1	4.8	4.5	3.9	4.8	6.0	6.1	5.8	5.3	5.6	5.5	5.5	62.9

Station number 062013; Commenced: 1881; Last record: 2011; Latitude (deg S): -32.36; Longitude (deg E): 149.53 Source: **Bureau of Meteorology (2011a)**

4.3 Existing air quality

4.3.1 Introduction

Air quality standards and goals refer to pollutant levels that include the contribution from specific projects and existing sources. To fully assess the potential impacts of a proposed development against all relevant air quality standards and goals (see **Section 3**) it is necessary to characterise the existing or background conditions.

Data from the existing monitoring programs in the area surrounding the MCM, collected since January 2005 were reviewed for this report. The locations of the air quality monitoring sites are shown in **Figure 4-13**.

The air quality monitoring network consists of nine dust deposition gauges, two High Volume Air Samplers (HVAS) fitted with size-selective inlets to measure PM_{10} concentrations at intervals of six days and three Tapered Element Oscillating Microbalances (TEOM) that measure PM_{10} concentrations in real-time.

The monitors measure dust deposition rates and PM_{10} concentration levels in the air due to emissions from all sources that contribute to dust in the area. These sources include emissions from existing mining at MCM, emissions from neighbouring mines, agricultural activities and other emission sources in the area.

Figure 4-13: Locations of ambient monitoring sites

4.3.2 Dust deposition

Dust deposition data from January 2005 to December 2010 have been reviewed for this study. The current MCM monitoring network consists of nine dust deposition monitors located in areas surrounding the mine (see **Figure 4-13** for the locations).

Dust deposition is measured using a simple device consisting of a funnel and bottle to measure the rate at which dust settles onto the surface over periods approximating one month.

The monitoring results for each of the dust deposition gauges have been provided by MCM and are presented in **Appendix C**. **Table 4-4** summarises the annual average dust deposition levels monitored from January 2005 to December 2010.

Field notes that accompany the monitoring data indicate that many of the samples were contaminated with material such as insects, bird droppings and plant matter. This is not unusual in rural environments. Those samples affected by bird droppings, insects and/or seeds have been excluded from the averages of the reported dust deposition in **Table 4-4**. Samples that are reported to be affected by dust from farming, grazing, and mining or roadway emissions are included.

Table 4-4: Monitored dust (insoluble solids) deposition levels for MCM network ($g/m^2/month$)

Gauge	2005	2006	2007	2008	2009	2010
D1	1.4	0.9	1.0	1.2	0.9	1.1
D2	1.7	1.0	2.0	-	2.5	1.8
D3	1.8	1.9	2.1	-	1.8	0.6
D4	1.9	1.1	1.7	1.6	2.0	1.9
D5	1.5	1.3	1.5	1.9	2.0	2.0
D6	1.0	0.8	0.9	1.3	1.5	0.7
D7	1.2	1.3	1.3	1.7	1.7	1.5
D8	1.1	0.9	1.5	1.2	1.5	0.8
D9				0.9*	1.0	0.4
Average	**1.5**	**1.1**	**1.5**	**1.5**	**1.7**	**1.3**

*Results available from October 2008. These results have not been included when calculating the annual average

All gauges recorded an annual average insoluble deposition level of less than the criteria of 4 $g/m^2/month$. The data shows that the level of dust deposition in the existing environment is low and in all areas the acceptable increase in annual average dust deposition would be 2 $g/m^2/month$

4.3.3 Particulate matter concentrations (PM_{10})

4.3.3.1 High Volume Air Samplers (HVAS)

The air quality monitoring network for MCM includes monitoring of PM_{10} with size-selective inlet heads attached to two HVAS monitors (see **Figure 4-13**). Measurements are made over a 24-hour period, every sixth day. The monitor located close to Ulan Village (HV01), commenced operation on 28 October 2005, the second monitor located near Ridge Road (HV02) commenced on 30 May 2009.

Monitoring results of these monitors are presented in **Table 4-5** and **Figure 4-14**. To date 292 observations of 24-hour PM_{10} concentrations are available for HV01 and 97 observations for HV02. The average concentration over all data collected to date at HV01 has been 15.0 $\mu g/m^3$ and the maximum 24-hour concentration has been 53.9 μg/m³ in December, 2009. The average concentration over all data collected to date at HV02 has been 10.3 μg/m³ and the maximum 24-hour concentration has been 44.3 μg/m³ also in December, 2009.

It can be seen from **Figure 4-14** that there is only one occasion where the DECCW's 24-hour goal of 50 μg/m³ is exceeded at HV01. An investigation into this exceedence found that on the day of the run period of the HVAS unit, a widespread dust storm was reported for most of western NSW (**Bureau of Meteorology, 2011b**), indicating that the mining operations did not cause this. On this day, HV02 also recorded its maximum value however it did not exceed 50 μg/m³. The results from **Table 4-5** indicate that the annual average goal of 30 μg/m³ is not exceeded.

The current contributors to PM_{10} are likely to be mining operations at MCM, Ulan and to a lesser extent those at Wilpinjong and natural and agricultural activities in the area. The data indicate that current mining operations are not having a significant effect on air quality in Ulan Village or for residents located on Ridge Road.

Table 4-5: HVAS annual average PM_{10} (μg/m³)

HVAS	2005	2006	2007	2008	2009	2010
HV01*	12	19	18	14	15	10
HV02**	-	-	-	-	11	9
Annual Average	**12**	**19**	**18**	**14**	**13**	**10**
					Average over all sites and years	**14**

* Data available from October 2005
** Data available from May 2009

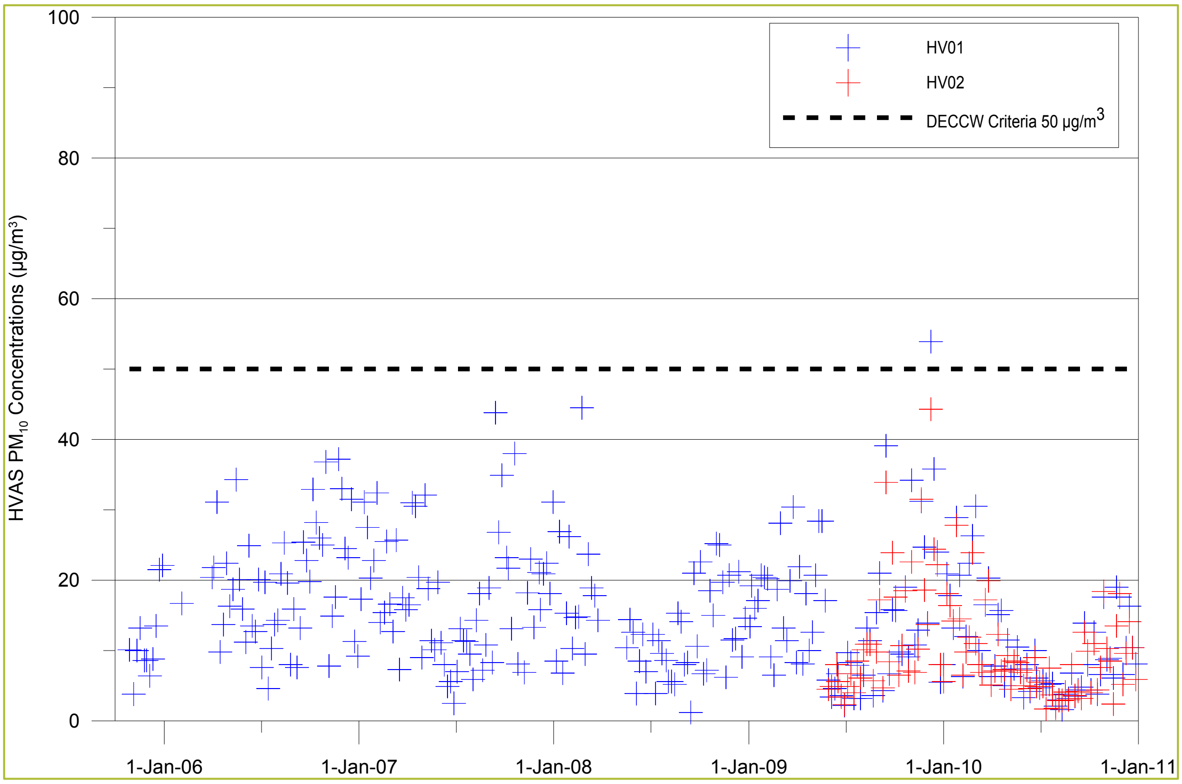


Figure 4-14: HVAS 24-hour PM_{10} concentrations

4.3.3.2 Tapered Element Oscillating Microbalances (TEOM)

Additional real-time PM_{10} monitoring using TEOMs is also conducted as part of the internal monitoring scheme for MCM. Three TEOM monitoring stations have been set up around the general vicinity of MCM and enable the mine to monitor PM_{10} levels on a day-by-day basis. TEOM01 is located at Ulan School, TEOM02 is located on Murragamba Road and TEOM03 is located on Toole Road (see **Figure 4-15**).

Table 4-6 and **Figure 4-15** show the PM_{10} concentrations measured at the TEOM monitoring sites. These data are presented in full in **Appendix C.** Monitoring data are available from October 2008 till December 2010 for each of these monitors. The average values presented in **Table 4-6** exclude elevated monitoring values due to non-mining events.

Figure 4-15 shows some elevated 24-hour PM_{10} concentrations throughout the monitoring data set. On two occasions the monitors recorded 24-hour PM_{10} concentrations greater than 200µg/m^3, these data have been removed from the figure to provide a better representation of the data. Other elevated events have been summarised in **Table 4-7** with a description of the possible cause of the exceedence. Regional dust events have been reported by BoM (**Bureau of Meteorology, 2011b**) and cross referenced with monitored exceedences. Comments on the other exceedences include localised events and wind directions not originating from MCM, indicating the possible cause of the event cannot be directly related to activities occurring at MCM.

Table 4-6: TEOM Annual Average PM_{10} (µg/m^3)

TEOM	2008*	2009	2010
TEOM01	11	12	13
TEOM02	15	14	16
TEOM03	9	8	10
Average	**12**	**11**	**13**
		Average over all sites and years	**12**

* Data available from October 2008

Table 4-7: Exceedence events for TEOM Monitors

Date	TEOM01	TEOM02	TEOM03	Comment
23/11/2008	114.1	102.3	106.3	Regional Dust Storm*
19/01/2009	63.3	-	-	Localised event**
2/02/2009	53.6	-	-	Predominant wind not from MCM**
4/03/2009	54.7	56	-	Regional Dust Storm*
5/03/2009	64.9	68	-	Regional Dust Storm*
16/04/2009	81.4	62	-	Regional Dust Storm*
25/04/2009	119.4	99.7	-	Predominant wind not from MCM**
1/07/2009	60.4	57.5	65.6	Regional Dust Storm*
23/09/2009	3035	2805	2853	Regional Dust Storm*
26/09/2009	112.2	104	99.99	Regional Dust Storm*
2/10/2009	51.6	51.8	-	Regional Dust Storm*
13/10/2009	66.1	-	51.9	Regional Dust Storm*
14/10/2009	117.5	115.8	101.4	Regional Dust Storm*
24/10/2009	-	-	56.1	Predominant wind not from MCM**
16/11/2009	-	60	-	Regional Dust Storm*
17/11/2009	-	-	51.8	Regional Dust Storm*
22/11/2009	72.3	72.3	70.6	Regional Dust Storm*
28/11/2009	-	82.5	88.8	Regional Dust Storm*
29/11/2009	-	227.4	223.9	Regional Dust Storm*
8/12/2009	-	66.136	-	Localised event**

* **Bureau of Meteorology (2011b)** - Monthly Weather Review, http://www.bom.gov.au/climate/mwr/

** Moolarben Coal Mines (MCM) monitoring field notes

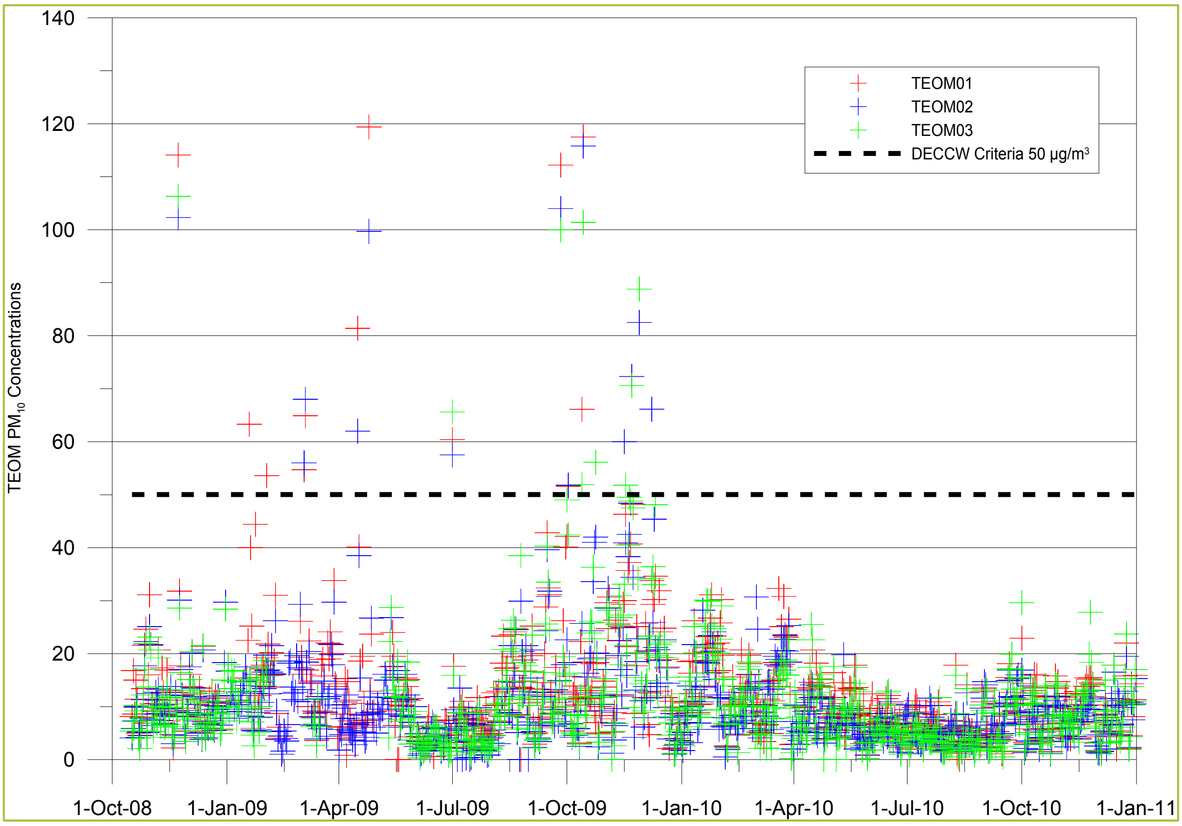


Figure 4-15: TEOM 24-hour PM_{10} concentrations

5 ESTIMATED DUST EMISSIONS

Dust emissions arise from various sources within open-cut coal mines. Total dust emissions were estimated by analysing the types of dust generating activities taking place at the site for six mine stage years.

For predictive modelling, emissions from dust generating sources associated with a proposed development are estimated and are referred to as emission factors. These emission factors allow for the various sources of a proposed development to be simulated in the modelling.

Emission factors developed both locally and by the US EPA were used to estimate the amount of dust produced by each activity. The emission factors applied are considered to be the most applicable and representative for determining dust generation rates for the proposed activities. The fraction of fine, inhalable and coarse particles for each activity were taken into account in the dispersion modelling.

The assessment has considered six selected years during the proposed mining (Year 2, 7, 12, 16, 19 and 24). These cover impacts arising for a range of production levels (including overburden production). The operational description for the Preferred Project and Moolarben Stage 1 (Pits 1 to 3) has been used to determine haul road distances and routes, stockpile and pit areas, activity operating hours, truck sizes and other details that are necessary to estimate dust emissions for each year of assessment. All significant dust generating activities from the MCC have been identified and dust emission estimates for each of the six mine plan years are presented below in **Table 5-1**.

Further details of the methods used in calculating the dust emissions are presented in **Appendix D**. Detailed emission inventories for all modelled years are presented in **Appendix E.** The estimated emissions take account of proposed air pollution controls including passive controls such as those inbuilt into the mine plan, including stockpile size and alignment, length of haul roads and active controls which include the intensity of watering, extent of rehabilitation, etc.

It should be noted that the underground portal vents for each of the underground mines have not been included in the emission estimation. These sources are minor in relation to the total dust emissions generated from the other activities taking place on-site. The impacts from these sources are unlikely to affect overall impact.

Table 5-1: Estimated TSP Emissions (kg/year)

ACTIVITY	Year 2	Year 7	Year 12	Year 16	Year 19	Year 24
OB - Stripping topsoil - Pit 1	280	0	0	0	0	0
OB - Stripping topsoil - Pit 2	280	0	0	0	0	0
OB - Stripping topsoil - Pit 3	0	0	0	0	0	560
OB - Stripping topsoil - Pit 4	280	280	560	560	560	0
OB - Drilling - Pit 1	1,350	0	0	0	0	0
OB - Drilling - Pit 2	1,350	0	0	0	0	0
OB - Drilling - Pit 3	0	0	0	0	0	1,831
OB - Drilling - Pit 4	1,809	8,436	8,436	7,312	9,899	0
OB - Blasting - Pit 1	3,027	0	0	0	0	0
OB - Blasting - Pit 2	3,027	0	0	0	0	0
OB - Blasting - Pit 3	0	0	0	0	0	10,508
OB - Blasting - Pit 4	4,696	42,437	42,437	36,779	49,712	0
OB - Sh/Ex/FELs loading - Pit 1	27,189	0	0	0	0	0
OB - Sh/Ex/FELs loading - Pit 2	27,189	0	0	0	0	0
OB - Sh/Ex/FELs loading - Pit 3	0	0	0	0	0	24,584
OB - Sh/Ex/FELs loading - Pit 4	36,437	169,938	169,938	147,279	199,395	0
OB - Hauling to emplacement - Pit 1	141,679	0	0	0	0	0
OB - Hauling to emplacement - Pit 2	94,453	0	0	0	0	0
OB - Hauling to emplacement - Pit 3	0	0	0	0	0	70,631
OB - Hauling to emplacement - Pit 4	221,515	1,517,228	867,831	741,375	1,026,574	0
OB - Emplacing at dumps - Pit 1	27,189	0	0	0	0	0
OB - Emplacing at dumps - Pit 2	27,189	0	0	0	0	0
OB - Emplacing at dumps - Pit 3	0	0	0	0	0	24,584
OB - Emplacing at dumps - Pit 4	36,437	169,938	169,938	147,279	199,395	0
OB - Dozers on O/B - Pit 1	232,705	0	0	0	0	0
OB - Dozers on O/B - Pit 2	232,705	0	0	0	0	0
OB - Dozers on O/B - Pit 3	0	0	0	0	0	651,590
OB - Dozers on O/B - Pit 4	279,262	930,853	930,853	930,853	930,853	0
OB - Dozers on Rehabilitation - Pit 1	46,541	0	0	0	0	0
OB - Dozers on Rehabilitation - Pit 2	46,541	0	0	0	0	0
OB - Dozers on Rehabilitation - Pit 3	0	0	0	0	0	93,082
OB - Dozers on Rehabilitation - Pit 4	46,541	186,164	186,164	186,164	186,164	0
CL - Drilling - Pit 1	991	0	0	0	0	0
CL - Drilling - Pit 2	1,309	0	0	0	0	0
CL - Drilling - Pit 3	0	0	0	0	0	999
CL - Drilling - Pit 4	1,190	3,575	3,402	3,216	3,426	0
CL - Blasting - Pit 1	3,394	0	0	0	0	0
CL - Blasting - Pit 2	5,157	0	0	0	0	0
CL - Blasting - Pit 3	0	0	0	0	0	3,438
CL - Blasting - Pit 4	4,470	23,281	21,604	19,861	21,831	0
CL - Loading ROM to trucks -Pit 1	234,383	0	0	0	0	0
CL - Loading ROM to trucks -Pit 2	309,779	0	0	0	0	0
CL - Loading ROM to trucks -Pit 3	0	0	0	0	0	236,437
CL - Loading ROM to trucks -Pit 4	281,624	846,190	805,044	761,135	810,639	0
CL - Loading ROM to trucks -UG1	0	270,213	270,213	0	0	0
CL - Loading ROM to trucks -UG2	0	0	0	270,213	0	0
CL - Loading ROM to trucks -UG3	0	0	0	0	270,213	270,213
CL - Hauling ROM coal to dump hopper - Pit 1	65,212	0	0	0	0	0

ACTIVITY	Year 2	Year 7	Year 12	Year 16	Year 19	Year 24
CL - Hauling ROM coal to dump hopper - Pit 2	169,768	0	0	0	0	0
CL - Hauling ROM coal to dump hopper - Pit 3	0	0	0	0	0	275,633
CL - Hauling ROM coal to dump hopper - Pit 4	132,968	425,924	425,575	504,398	543,356	0
CL - Hauling ROM coal to dump hopper - UG 1	0	70,625	70,625	0	0	0
CL - Hauling ROM coal to dump hopper - UG 2	0	0	0	148,084	0	0
CL - Hauling ROM coal to dump hopper - UG 3	0	0	0	0	0	0
CL - unloading ROM coal at stockpile/hopper Pit 1	234,383	0	0	0	0	0
CL - unloading ROM coal at stockpile/hopper Pit 2	309,779	0	0	0	0	0
CL - unloading ROM coal at stockpile/hopper Pit 3	0	0	0	0	0	236,437
CL - unloading ROM coal at stockpile/hopper Pit 4	281,624	846,190	805,044	761,135	810,639	0
CL - unloading ROM coal at stockpile/hopper UG 1	0	270,213	270,213	0	0	0
CL - unloading ROM coal at stockpile/hopper UG 2	0	0	0	270,213	0	0
CL - unloading ROM coal at stockpile/hopper UG 3	0	0	0	0	270,213	270,213
CL - Rehandle ROM coal at stockpile/hopper	289,025	169,238	161,009	152,227	162,128	101,330
CL - Handling coal at CHPP	25,829	34,919	33,632	32,259	33,807	15,847
CL - Dozers at CHPP	222,363	222,363	222,363	222,363	222,363	222,363
CL - Loading rejects (too wet)	0	0	0	0	0	0
CL - Transporting rejects (nominal) back to Pit 1	26,085	0	0	0	0	0
CL - Transporting rejects (nominal) back to Pit 2	67,907	0	0	0	0	0
CL - Transporting rejects (nominal) back to Pit 3	0	0	0	0	0	110,253
CL - Transporting rejects (nominal) back to Pit 4	53,187	170,369	170,230	201,759	217,342	0
CL - Transporting rejects (nominal) back to UG1	0	7,062	7,062	0	0	0
CL - Transporting rejects (nominal) back to UG2	0	0	0	14,808	0	0
CL - Transporting rejects (nominal) back to UG3	0	0	0	0	0	0
CL - Unloading rejects (too wet)	0	0	0	0	0	0
CL - Loading product coal stockpile	825,787	1,116,404	1,075,257	1,031,348	1,080,853	506,650
CL - Loading coal to trains	825,787	1,116,404	1,075,257	1,031,348	1,080,853	506,650
WE - OB spoil area - All pits	416,976	487,760	357,707	579,130	494,708	144,596
WE - Open pit - All pits	262,800	324,132	206,898	307,438	146,908	51,996
WE - ROM stockpiles	7,008	7,008	7,008	7,008	7,008	7,008
WE - Product stockpiles	17,520	17,520	17,520	17,520	17,520	17,520
Grading roads	383,414	287,560	287,573	287,560	287,560	191,707
TOTAL TSP (kg)	**6,999,389**	**9,742,224**	**8,669,393**	**8,820,628**	**9,083,919**	**4,046,660**
ROM coal production	**12,224,224**	**16,526,265**	**15,917,169**	**15,267,183**	**16,000,000**	**7,500,000**
TSP/ROM Ratio	**0.57**	**0.59**	**0.54**	**0.58**	**0.57**	**0.54**

(OB – overburden, CL – coal, WE – Wind erosion)

To show the operation of the conveyor would not cause any additional dust impacts, an additional scenario was modelled for one representative worst-case year. Year 19 was chosen to represent a possible worst-case impact from the operation of the conveyor as this mine plan year would have the greatest quantity of ROM coal transported along the conveyor.

All other modelled years are anticipated to show impacts below this year. The modelled years, as shown in **Table 5-1** with the use of the haul road, are conservative as this activity would generate more dust emissions and show dust impacts greater than with the operation of the conveyor.

A summary of the estimated dust emissions for Year 19 with the operation of the conveyor is shown below in **Table 5-2**.

Table 5-2: Estimated TSP Emissions for Year 19 Conveyor Option (kg/year)

ACTIVITY	Year 19
OB - Stripping topsoil - Pit 1	0
OB - Stripping topsoil - Pit 2	0
OB - Stripping topsoil - Pit 3	0
OB - Stripping topsoil - Pit 4	560
OB - Drilling - Pit 1	0
OB - Drilling - Pit 2	0
OB - Drilling - Pit 3	0
OB - Drilling - Pit 4	9,899
OB - Blasting - Pit 1	0
OB - Blasting - Pit 2	0
OB - Blasting - Pit 3	0
OB - Blasting - Pit 4	49,712
OB - Sh/Ex/FELs loading - Pit 1	0
OB - Sh/Ex/FELs loading - Pit 2	0
OB - Sh/Ex/FELs loading - Pit 3	0
OB - Sh/Ex/FELs loading - Pit 4	199,395
OB - Hauling to emplacement - Pit 1	0
OB - Hauling to emplacement - Pit 2	0
OB - Hauling to emplacement - Pit 3	0
OB - Hauling to emplacement - Pit 4	1,026,574
OB - Emplacing at dumps - Pit 1	0
OB - Emplacing at dumps - Pit 2	0
OB - Emplacing at dumps - Pit 3	0
OB - Emplacing at dumps - Pit 4	199,395
OB - Dozers on O/B - Pit 1	0
OB - Dozers on O/B - Pit 2	0
OB - Dozers on O/B - Pit 3	0
OB - Dozers on O/B - Pit 4	930,853
OB - Dozers on Rehabilitation - Pit 1	0
OB - Dozers on Rehabilitation - Pit 2	0
OB - Dozers on Rehabilitation - Pit 3	0
OB - Dozers on Rehabilitation - Pit 4	186,164
CL - Drilling - Pit 1	0
CL - Drilling - Pit 2	0
CL - Drilling - Pit 3	0
CL - Drilling - Pit 4	3,426
CL - Blasting - Pit 1	0
CL - Blasting - Pit 2	0
CL - Blasting - Pit 3	0
CL - Blasting - Pit 4	21,831
CL - Loading ROM to trucks -Pit 1	0
CL - Loading ROM to trucks -Pit 2	0
CL - Loading ROM to trucks -Pit 3	0
CL - Loading ROM to trucks -Pit 4	810,639
CL - Loading ROM to trucks -UG1	0
CL - Loading ROM to trucks -UG2	0
CL - Loading ROM to trucks -UG3	270,213
CL - Hauling ROM coal to dump hopper - Pit 1	0

ACTIVITY	Year 19
CL - Hauling ROM coal to dump hopper - Pit 2	0
CL - Hauling ROM coal to dump hopper - Pit 3	0
CL - Hauling ROM coal to Conveyor - Pit 4	392,651
CL - Conveying ROM to dump hopper - Pit 4	1,314
CL - Hauling ROM coal to dump hopper - UG 1	0
CL - Hauling ROM coal to dump hopper - UG 2	0
CL - Hauling ROM coal to dump hopper - UG 3	0
CL - unloading ROM coal at stockpile/hopper Pit 1	0
CL - unloading ROM coal at stockpile/hopper Pit 2	0
CL - unloading ROM coal at stockpile/hopper Pit 3	0
CL - unloading ROM coal from Conveyor	810,639
CL - unloading ROM coal at stockpile/hopper UG 1	0
CL - unloading ROM coal at stockpile/hopper UG 2	0
CL - unloading ROM coal at stockpile/hopper UG 3	270,213
CL - Rehandle ROM coal at stockpile/hopper	162,128
CL - Handling coal at CHPP	33,807
CL - Dozers at CHPP	222,363
CL - Loading rejects (too wet)	0
CL - Transporting rejects (nominal) back to Pit 1	0
CL - Transporting rejects (nominal) back to Pit 2	0
CL - Transporting rejects (nominal) back to Pit 3	0
CL - Transporting rejects (nominal) back to Pit 4	217,342
CL - Transporting rejects (nominal) back to UG1	0
CL - Transporting rejects (nominal) back to UG2	0
CL - Transporting rejects (nominal) back to UG3	18,112
CL - Unloading rejects (too wet)	0
CL - Loading product coal stockpile	1,080,853
CL - Loading coal to trains	1,080,853
WE - OB spoil area - All pits	494,708
WE - Open pit - All pits	146,908
WE - ROM stockpiles	7,008
WE - Product stockpiles	17,520
Grading roads	287,560
TOTAL TSP (kg)	**8,952,640**
ROM coal production	**16,000,000**
TSP/ROM Ratio	**0.59**

(OB – overburden, CL – coal, WE – Wind erosion)

In addition to contributions from the MCC, all nearby approved mining operations were included in the modelling to assess cumulative effects. Emissions from other approved mines in the area were derived from estimates provided in air quality impact assessments in the public domain. The total estimated annual TSP emission from approved nearby mines is presented in **Table 5-3**. For the years where there is no estimated annual TSP, it is assumed (as per their current planning approval) that the other mines no longer operate.

The cumulative impacts presented in the study include an allowance for background dust levels to represent the contribution from other non-modelled sources such as distant mining activity, agricultural activity and the land generally.

It should be emphasised that cumulative impacts depend on the scheduling of mine development outlined in reports in the public domain. Many of the studies present an assessment of worst case effects and are based on specific years of that mine's operation that frequently do not coincide with the six modelled years assessed for the MCC. Thus the actual scheduling of other mine activity and impacts is likely to differ in scale and time. A conservative approach has been adopted in this study whereby the estimated maximum value of TSP for the other mining operations was adopted, where applicable.

Table 5-3: Estimated TSP Emissions from nearby mining operations (kg/year)

Mine	Year 2	Year 7	Year 12	Year 16	Year 19	Year 24
Ulan*	3,651,854	2,864,227	1,490,258	1,490,258	1,490,258	-
Wilpinjong**	3,981,503	4,153,793	4,153,793	-	-	-

* (PAEHolmes, 2009a)
** (PAEHolmes, 2010)

6 ASSESSMENT APPROACH

The assessment generally follows the DECCW Approved Methods which specify how assessments based on air dispersion models should be undertaken. The Approved Methods include guidelines for the preparation of meteorological data to be used in dispersion models and relevant air quality impact criteria (see **Section 3**).

This assessment generally follows the guidelines in the approved methods, but deviates in relation to the use of the ISCMOD model instead of the AUSPLUME, CALPUFF and TAPM models which are named in the Approved Methods. The ISCMOD model has been specially developed from the US EPA's ISCST3 model which provides for greater accuracy with the prediction of short-term PM_{10} concentrations compared to the models referenced in the DECCW Approved Methods. The use of ISCMOD has been accepted for use in NSW by the DECCW for a number of years for recently completed mining and quarry assessments, including mining projects in the Hunter Valley.

ISCMOD was derived from the ISCST3 model by applying changes to the horizontal and vertical dispersion curves following recommendations made by the American Meteorological Society (AMS) Expert Panel on Dispersion Curves (**Hanna et al., 1977**). The ISCST3 model is fully described in the user manual and the accompanying technical description (**US EPA, 1985**). The modelling used three particle-size categories (0 to 2.5 μm - referred to as $PM_{2.5}$, 2.5 to 10 μm - referred to as CM (coarse matter) and 10 to 30 μm - referred to as the Rest). Emission rates of TSP were calculated using emission factors derived from **US EPA (1985)** and **SPCC (1983)** (see **Appendix D**).

The distribution of particles has been derived from measurements in the **SPCC (1986)** study. The distribution of particles in each particle size range is as follows:

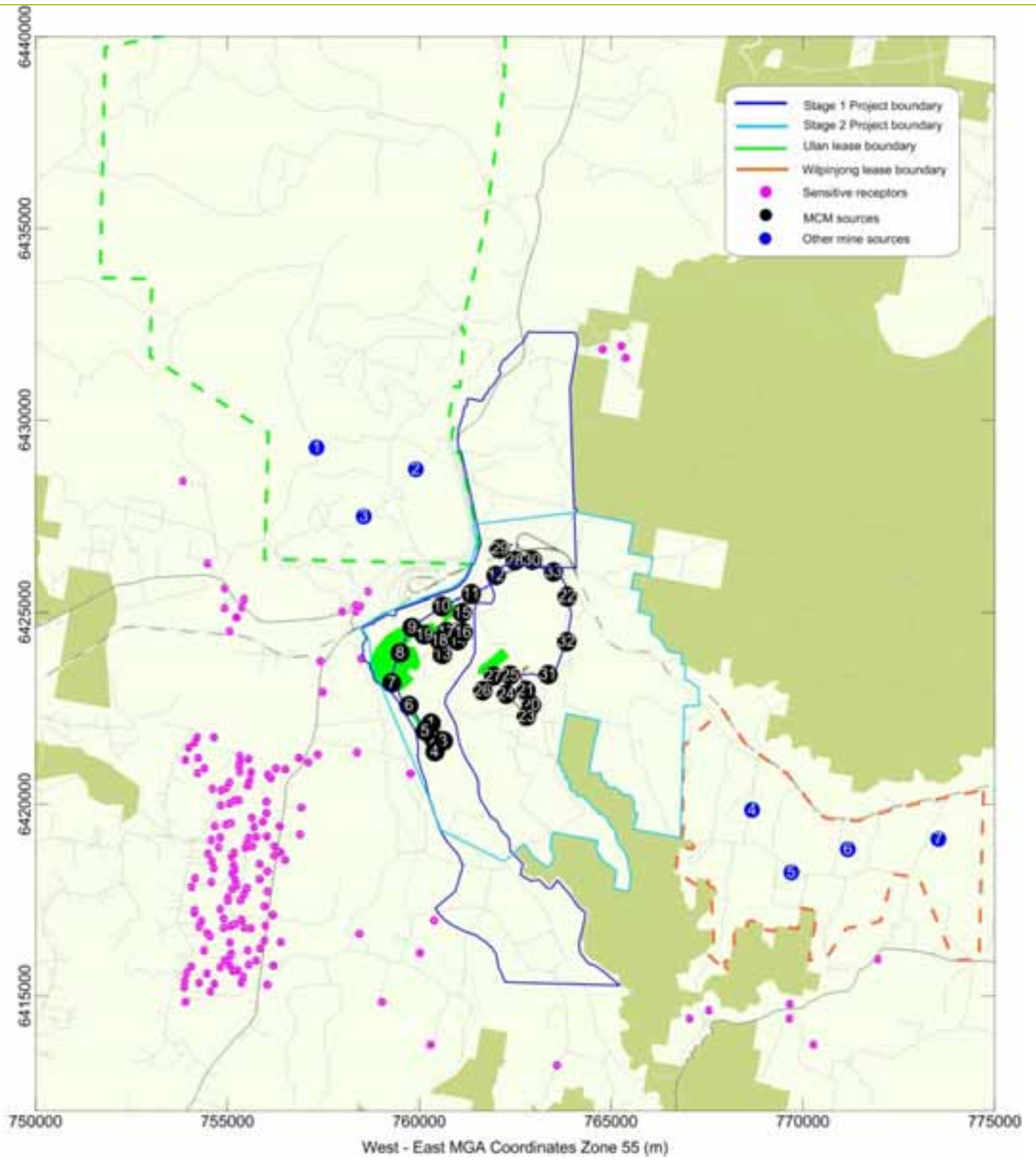
- $PM_{2.5}$ (FP) is 4.68% of TSP;
- $PM_{2.5-10}$ (CM) is 34.4% of TSP; and
- PM_{10-30} (Rest) is 60.92% of TSP.

Each source in the group was assumed to emit at the full TSP emission rate and to deposit from the plume in accordance with the deposition rate appropriate for particles with an aerodynamic diameter equal to the geometric mean of the limits of the particle size range, except for the $PM_{2.5}$ group, which was assumed to have a particle size of 1 μm. The predicted concentration in the three plot output files for each group were then combined according to the weightings in the dot points above to determine the concentration of PM_{10} and TSP.

The ISCST3 model also has the capacity to take into account dust emissions that vary in time, or with meteorological conditions. This has proved particularly useful for simulating emissions on mining or quarry operations where wind speed is an important factor in determining the rate at which dust is generated.

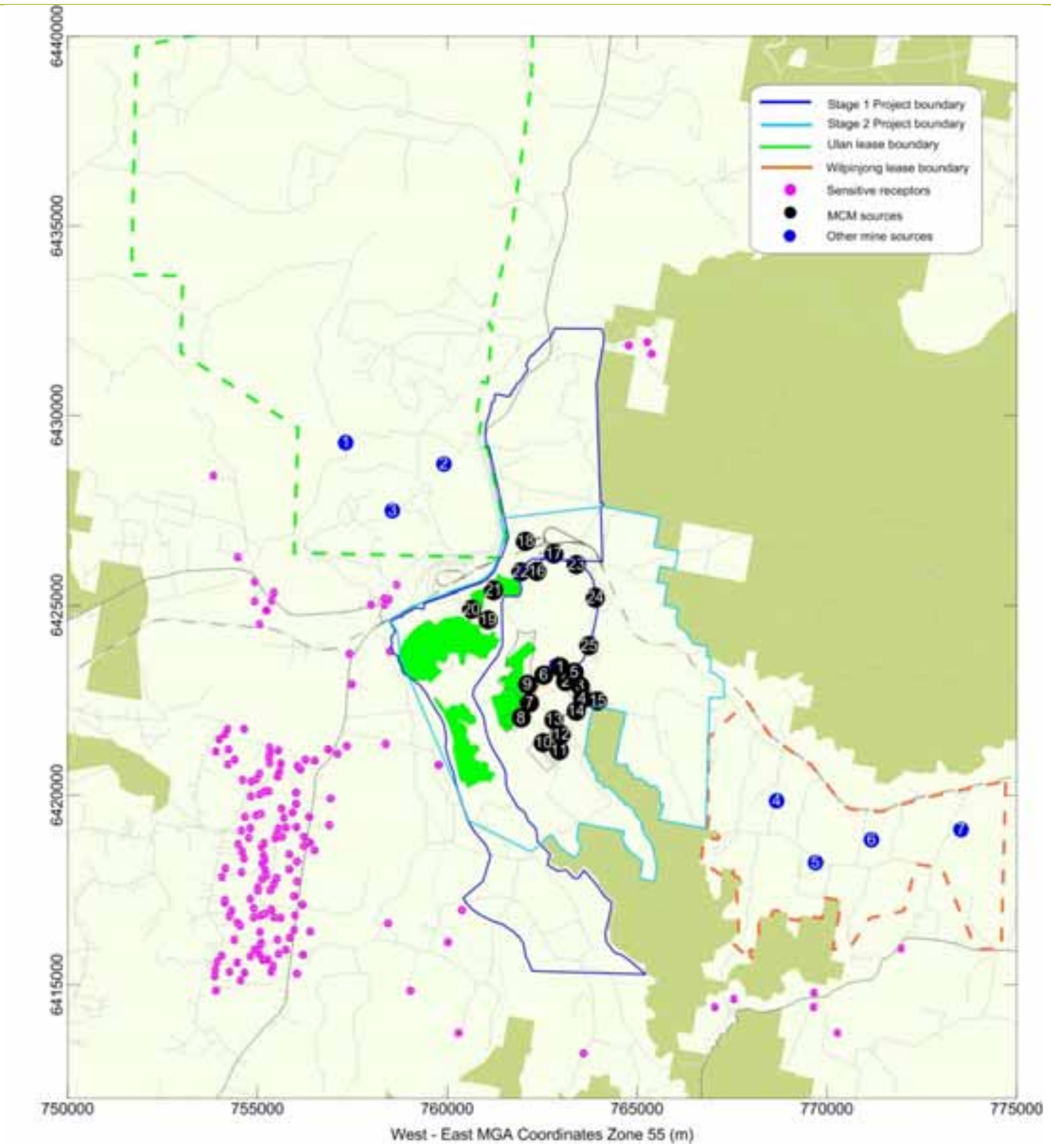
For the current study, the operations were represented by a series of volume sources located according to the location of activities for the modelled scenarios (see **Figures 6.1 – 6.7**). Estimates of emissions for each source were developed on an hourly time step taking into account the activities that would take place at that location. Thus, for each source, for each hour, an emission rate was determined which depended upon the level of activity and the wind speed. It is important to do this to ensure that long-term average emission rates are not combined with worst-case dispersion conditions, which are associated with light winds. Light winds at a mine site would correspond with periods of low dust generation (because wind erosion and other wind-dependent emissions rates would be low) and also correspond with periods of poor dispersion. If these measures are not taken then the model has the potential to significantly overstate impacts.

For cumulative modelling, each neighbouring mine was treated as a number of volume sources. These were located at the apparent points of major emissions as estimated from the publicly available information of the pits and/or major dust sources on the mine or facility. Modelled sources from these mines were considered in three classes as follows; wind erosion sources, wind sensitive sources and wind insensitive sources.



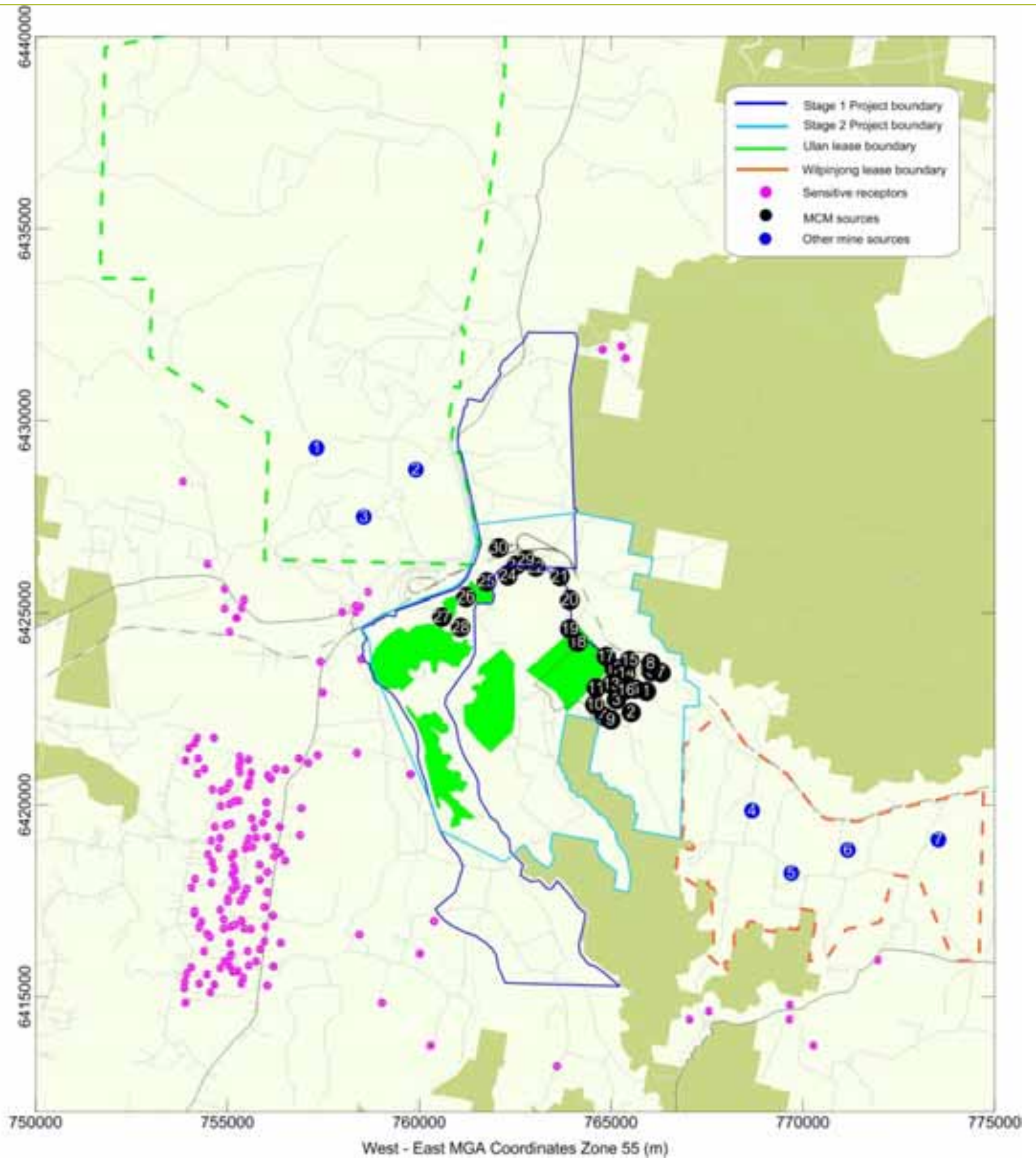
Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 2 Operations	2	P Henschke

Figure 6-1: Location of modelled dust sources – Year 2



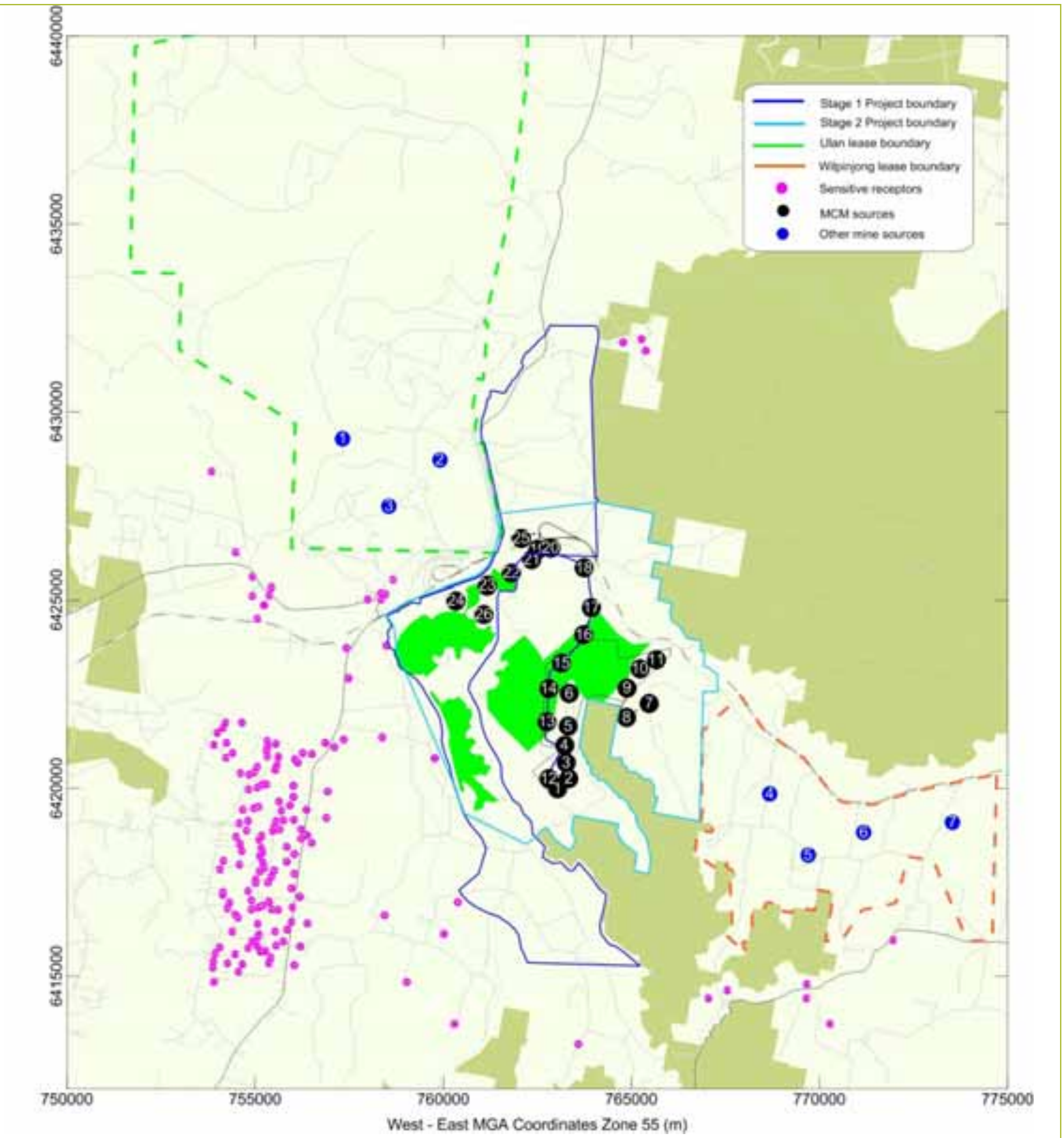
Species:	Location:	Scenario:	Modelling Year:	Plot:
Dust Sources	Moolarben Coal Complex	Year 7 Operations	7	P Henschke

Figure 6-2: Location of modelled dust sources – Year 7



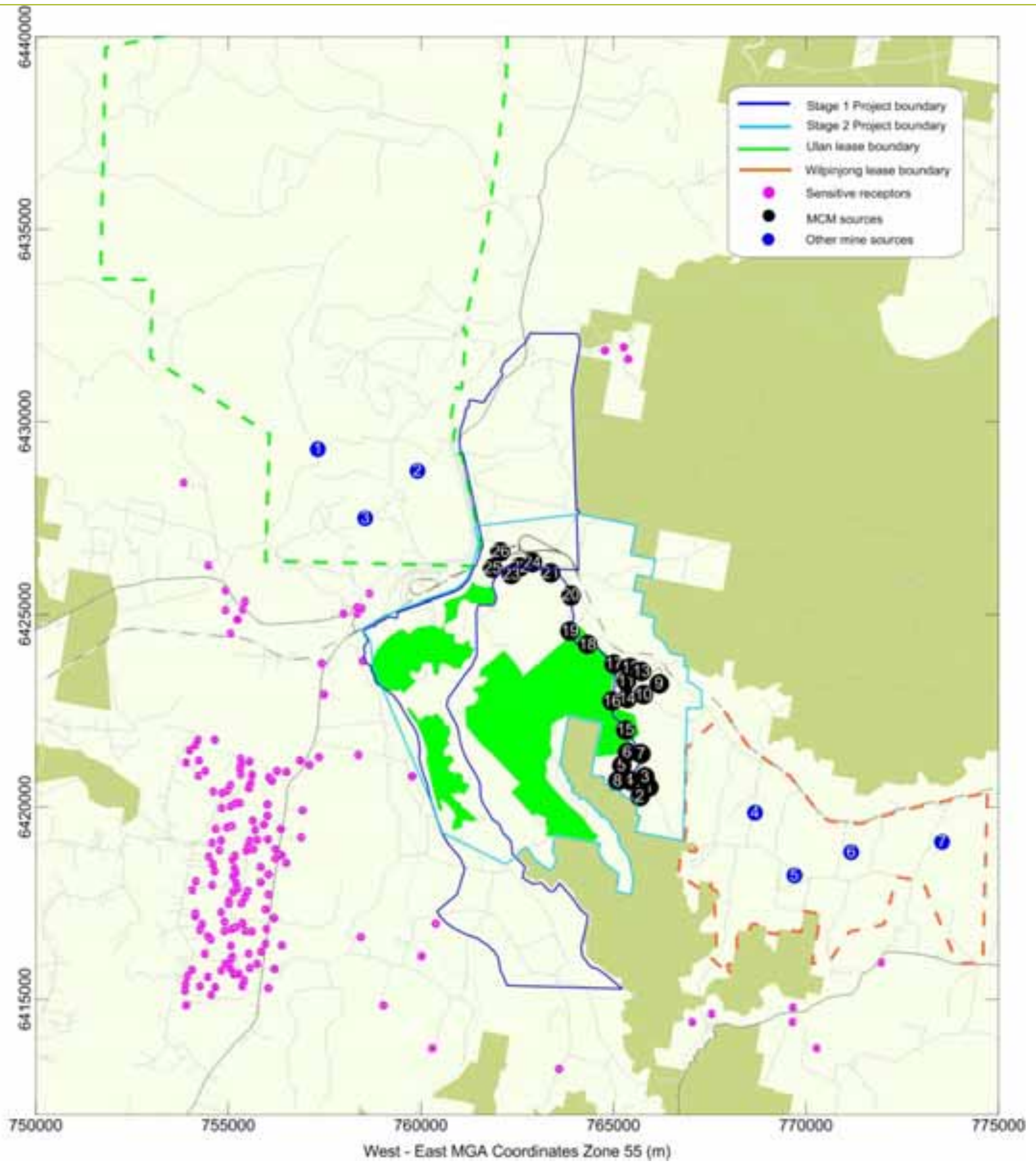
Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 12 Operations	12	P Henschke

Figure 6-3: Location of modelled dust sources – Year 12



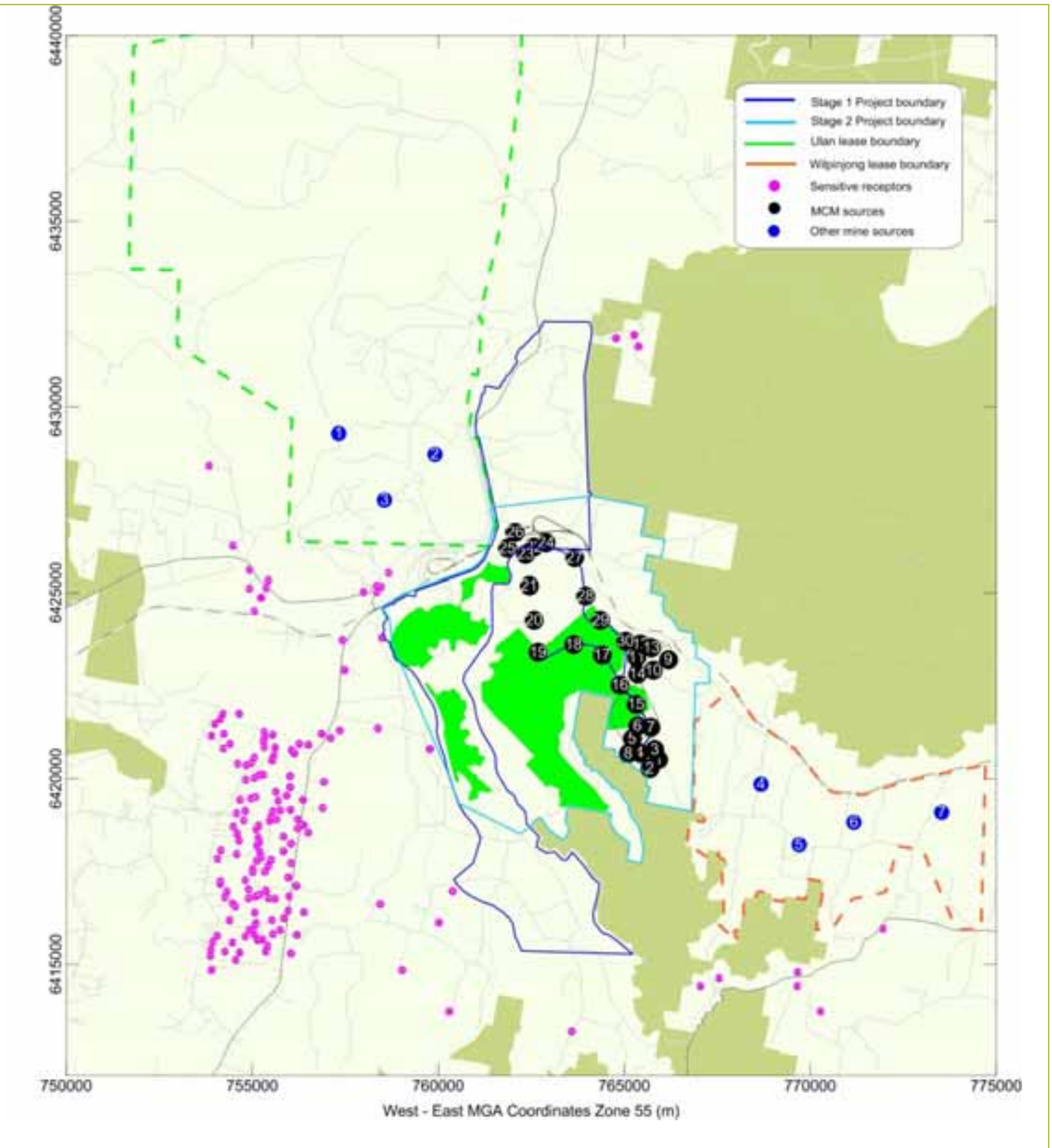
Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 16 Operations	16	P Henschke

Figure 6-4: Location of modelled dust sources – Year 16



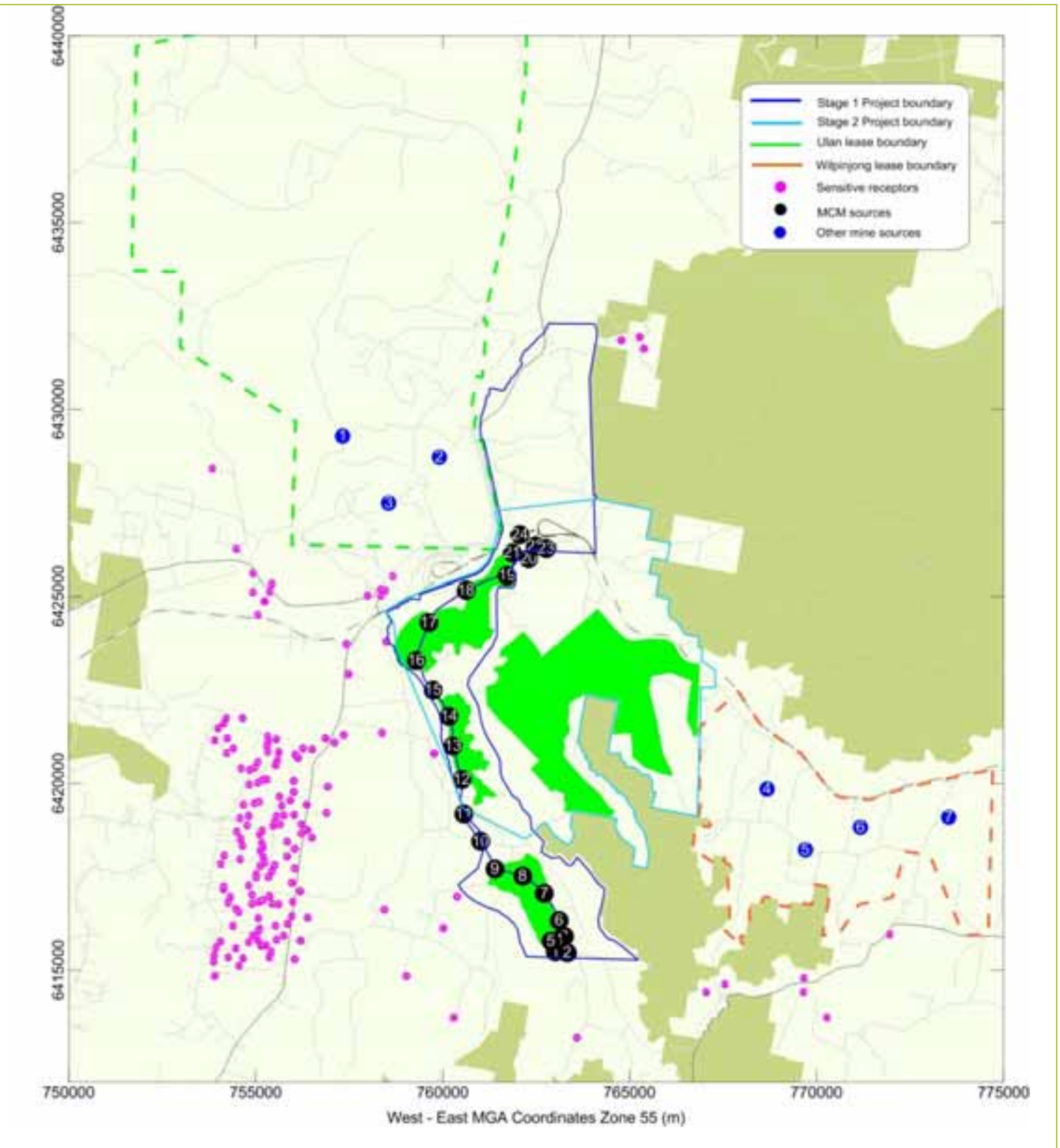
Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 19 Operations	19	P Henschke

Figure 6-5: Location of modelled dust sources – Year 19



Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 19 Operations w/ Conveyor option	19	P Henschke

Figure 6-6: Location of modelled dust sources – Year 19 Conveyor Option



Species:	**Location:**	**Scenario:**	**Modelling Year:**	**Plot:**
Dust Sources	Moolarben Coal Complex	Year 24 Operations	24	P Henschke

Figure 6-7: Location of modelled dust sources – Year 24

Dust concentrations and deposition rates were predicted over the modelling domain shown in **Figure 2-2** with the mine site located approximately in the centre. Modelling used the meteorological data discussed in **Section 4.1** and the dust emission estimates from **Section 0** operating 24 hours per day. Dust emission inventories are provided in **Appendix E**.

To assess cumulative impacts, modelling results are presented which consider the contribution of surrounding mines in the area as well as other local sources of dust. The MCC model results were added to predicted levels of annual average TSP, PM_{10} and dust deposition due to emissions from other mines. In addition, the contribution of other non-modelled mines and dust sources in the area was included through the use of a constant background level for annual average TSP, PM_{10} and dust deposition (see **Section 6.1**).

6.1 Accounting for background dust levels

The background levels for the area were estimated from the monitoring data reviewed in **Section 4**. It should be noted that these data include dust from all sources in the vicinity of the monitors, including Moolarben Stage 1, Ulan Coal Mine, Wilpinjong Coal Mine and other sources.

As MCM do not directly monitor for TSP concentrations, a background concentration has been estimated from measured PM_{10} concentrations by assuming that 40% of the TSP is PM_{10}. This relationship was obtained from data collected by co-located TSP and PM_{10} monitors operated for reasonably long periods of time in the Hunter Valley (**NSW Minerals Council, 2000**). Use of this relationship indicates that annual average TSP concentrations are of the order of 32.5 $\mu g/m^3$, which is less than the DECCW assessment criterion of 90 $\mu g/m^3$. It should be noted that this ratio is specific to measurements made in the Hunter Valley, NSW, with the major dust source being coal mining. The origin of dust generated from this project would be very similar, given its crustal nature, to the dust generated in the Hunter Valley and in the absence of any other data, it has been used here.

The estimated uniform constant background levels for annual average TSP, PM_{10} and dust deposition were as follows:

- 32.5 $\mu g/m^3$ for annual average TSP;
- 13 $\mu g/m^3$ for annual average PM_{10}; and
- 2 g/m^2/month for annual average dust deposition.

7 ASSESSMENT OF POTENTIAL IMPACTS

7.1 Introduction

The DECCW air quality criteria used for identifying which properties are likely to experience air quality impacts are those specified in the DECCW Approved Methods. These have been applied in the assessment process following the practices used in contemporary approvals for mining projects in NSW.

The criteria are:

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

Predictions for 24-hour and annual average $PM_{2.5}$ concentrations for the MCC are provided in **Appendix F.**

7.2 Model predictions

Dust concentrations and deposition rates for the selected years of assessment are presented as isopleth diagrams (see **Appendix G**) showing the following:

- Predicted maximum 24-hour average PM_{10} concentration;
- Predicted annual average PM_{10} concentration;
- Predicted annual average TSP concentration; and
- Predicted annual average dust deposition.

It is important to note that the isopleth figures are presented to provide a visual representation of the predicted impacts. To produce the isopleths it is necessary to make interpolations, and as a result the isopleths will not always match exactly with predicted impacts at any specific location. The actual predicted impacts at each of the sensitive receptors are presented in tabular form.

Locations which are predicted to experience either concentration or deposition levels above the DECCW's assessment criteria are shown in bold. Properties that are highlighted are subject to acquisition by MCM upon written request from the landowner under the Stage 1 Project Approval.

The following sections examine predicted 24-hour PM_{10}, annual average PM_{10}, TSP and dust deposition impacts. A separate cumulative assessment of 24-hour average PM_{10} is provided in **Section 7.3**.

7.2.1 Year 2

Tabulated model results for Year 2 are presented in **Table 7-1** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.1.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.1 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 2 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3 from the MCC alone.

The only privately owned residence predicted to experience maximum 24-hour average PM_{10} concentrations above the relevant criterion in Year 2 is Residence 5. It is noted that this residence is subject to acquisition by MCM upon written request from the landowner under Stage 1 Project Approval.

7.2.1.2 Predicted annual average PM_{10} concentrations

Figure G.2 shows the predicted annual average PM_{10} concentrations for Year 2 due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.5** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above 90 µg/m^3 in Year 2.

7.2.1.3 Predicted annual average TSP concentrations

Figure G.3 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 2. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.6** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 2.

7.2.1.4 Predicted annual average dust deposition (insoluble solids)

Figure G.4 shows the predicted annual average dust deposition rate for Year 2 for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC above 2 g/m^2/month in Year 2.

Figure G.7 shows the predicted annual average dust deposition rate for Year 2 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 2.

Table 7-1: Modelling predictions Year 2

ID	Easting	Northing	PM$_{10}$ 24hr (µg/m³)	PM$_{10}$ Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	106	14	28	16	50	0.7	2.8
9	757478	6422930	34	8	23	9	43	0.5	2.6
11	765376	6431622	18	4	22	4	42	0.0	2.2
11	765265	6431931	16	3	22	3	41	0.0	2.2
11	764784	6431839	17	3	22	3	42	0.0	2.2
26	757430	6423741	36	8	23	9	43	0.5	2.6
30	758435	6416631	17	1	16	2	36	0.0	2.1
31	760008	6416123	12	1	16	1	35	0.0	2.1
32	763590	6413194	4	0	15	0	35	0.0	2.0
35	759021	6414840	9	1	15	1	35	0.0	2.1
37	756179	6417107	24	2	17	2	36	0.0	2.1
39	756038	6415288	19	1	16	1	35	0.0	2.1
40	756389	6416414	21	2	16	2	36	0.0	2.1
41	756863	6421212	31	7	21	7	41	0.3	2.4
41	756194	6415791	20	2	16	2	35	0.0	2.1
46B	758663	6425526	37	8	23	9	44	0.7	2.8
47	760293	6413734	9	1	15	1	35	0.0	2.0
58	756926	6419919	36	5	19	5	39	0.2	2.2
59	756886	6419210	38	4	19	4	38	0.1	2.2
60	756500	6418546	33	3	18	3	37	0.1	2.1
61	756375	6418755	33	3	18	4	38	0.1	2.1
63	756497	6420923	28	6	20	6	40	0.3	2.3
64	756262	6420946	27	5	20	6	40	0.2	2.3
70	756132	6420692	26	5	20	5	40	0.2	2.3
74	756021	6420067	26	4	19	5	39	0.2	2.2
75	756012	6419777	27	4	19	4	38	0.1	2.2
76	755920	6419546	28	4	18	4	38	0.1	2.2
77	756357	6419434	32	4	19	4	38	0.1	2.2
78	755750	6419149	27	3	18	4	38	0.1	2.1
79	756034	6419159	30	4	18	4	38	0.1	2.1
80	755649	6418908	27	3	18	3	38	0.1	2.1
81	756220	6418906	32	3	18	4	38	0.1	2.1
82	756223	6418659	32	3	18	3	37	0.1	2.1
83	755832	6418444	29	3	17	3	37	0.1	2.1
84	756047	6418248	30	3	17	3	37	0.1	2.1
86	755506	6417818	26	2	17	3	37	0.1	2.1
87	755841	6418051	28	3	17	3	37	0.1	2.1
88	756043	6417724	27	2	17	3	37	0.1	2.1
89	755431	6417645	25	2	17	3	37	0.0	2.1
90	755337	6417501	25	2	17	2	36	0.0	2.1
91	755969	6417348	25	2	17	2	36	0.0	2.1
94	754900	6416785	21	2	16	2	36	0.0	2.1
95	755085	6416834	22	2	16	2	36	0.0	2.1
96	755183	6416867	22	2	16	2	36	0.0	2.1
97	755364	6416985	23	2	16	2	36	0.0	2.1
98	755440	6416783	22	2	16	2	36	0.0	2.1
99	755603	6416770	22	2	16	2	36	0.0	2.1
100	755992	6416832	22	2	16	2	36	0.0	2.1
101	755850	6416237	20	2	16	2	36	0.0	2.1
101a	755972	6416452	21	2	16	2	36	0.0	2.1
102	755530	6416189	20	2	16	2	36	0.0	2.1
103	755072	6416399	20	2	16	2	36	0.0	2.1
104	755112	6416116	19	2	16	2	36	0.0	2.1
105	755061	6416033	19	2	16	2	36	0.0	2.1
106	755558	6415823	18	2	16	2	35	0.0	2.1
107	755752	6415919	18	2	16	2	36	0.0	2.1
109	755410	6415494	17	1	16	2	35	0.0	2.1
110	755361	6415339	17	1	16	1	35	0.0	2.1
111	755052	6415789	18	2	16	2	35	0.0	2.1
112	755138	6415655	18	2	16	2	35	0.0	2.1
113	755269	6415661	18	2	16	2	35	0.0	2.1
119	755969	6416452	20	2	16	2	36	0.0	2.1
149	758457	6425165	37	8	23	9	45	0.8	2.9
151	757984	6425025	36	8	23	8	44	0.7	2.8
160	758350	6425029	38	8	23	9	45	0.8	2.9
162	758342	6425199	36	8	23	9	44	0.7	2.8
168	739469	6428623	4	0	14	1	34	0.0	2.0
170	755557	6421185	24	5	20	5	40	0.2	2.3

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	15	1	15	1	35	0.0	2.0
172	756058	6420779	25	5	20	5	40	0.2	2.3
175	755624	6420844	24	5	19	5	39	0.2	2.2
176	755585	6420625	23	4	19	5	39	0.2	2.2
177	755530	6420496	22	4	19	5	39	0.2	2.2
180	755292	6420111	22	4	19	4	38	0.1	2.2
181	755178	6420092	21	4	18	4	38	0.1	2.2
182	755049	6420016	20	4	18	4	38	0.1	2.2
183	754822	6419969	19	4	18	4	38	0.1	2.2
184	755093	6419504	22	3	18	4	38	0.1	2.1
185	754967	6419464	22	3	18	3	38	0.1	2.1
186	754674	6419437	20	3	18	3	37	0.1	2.1
187	754816	6419137	22	3	18	3	37	0.1	2.1
188	754577	6419073	21	3	17	3	37	0.1	2.1
189	754772	6418881	22	3	17	3	37	0.1	2.1
190	754488	6418711	21	3	17	3	37	0.1	2.1
191	754592	6418520	22	3	17	3	37	0.1	2.1
192	754649	6418328	22	3	17	3	37	0.1	2.1
194	754160	6418080	20	2	17	3	37	0.1	2.1
195	754583	6417973	22	2	17	3	37	0.1	2.1
196	754072	6417840	20	2	17	2	36	0.1	2.1
200	754141	6417241	20	2	16	2	36	0.0	2.1
201	754138	6417158	20	2	16	2	36	0.0	2.1
201	754311	6416962	20	2	16	2	36	0.0	2.1
202	754258	6416804	20	2	16	2	36	0.0	2.1
203	754462	6416639	20	2	16	2	36	0.0	2.1
204	754537	6416557	20	2	16	2	36	0.0	2.1
206	754394	6416192	19	2	16	2	36	0.0	2.1
207	754057	6415768	18	2	16	2	35	0.0	2.1
208	753938	6415612	17	2	16	2	35	0.0	2.1
209	753883	6415407	17	1	16	2	35	0.0	2.1
210	753873	6415226	16	1	16	1	35	0.0	2.0
217	754659	6415319	17	1	16	1	35	0.0	2.1
218	754550	6415117	16	1	16	1	35	0.0	2.0
219	754468	6415587	17	2	16	2	35	0.0	2.1
220	754258	6415351	17	1	16	2	35	0.0	2.1
222	754813	6415761	18	2	16	2	35	0.0	2.1
223	754921	6415935	19	2	16	2	35	0.0	2.1
224	754895	6417021	22	2	16	2	36	0.0	2.1
226	754812	6417270	22	2	17	2	36	0.0	2.1
227	755000	6417482	23	2	17	2	36	0.0	2.1
228	755021	6417572	23	2	17	2	36	0.0	2.1
229	755115	6417791	24	2	17	3	37	0.1	2.1
230	755229	6417879	25	2	17	3	37	0.1	2.1
231	755200	6418034	25	3	17	3	37	0.1	2.1
232	755121	6418197	24	3	17	3	37	0.1	2.1
233	755196	6418290	25	3	17	3	37	0.1	2.1
234	755157	6418405	24	3	17	3	37	0.1	2.1
235	755107	6418631	24	3	17	3	37	0.1	2.1
236	755165	6418738	24	3	17	3	37	0.1	2.1
237	755468	6418862	26	3	18	3	37	0.1	2.1
238	755497	6418969	26	3	18	3	38	0.1	2.1
239	755558	6419118	26	3	18	4	38	0.1	2.1
240	755694	6419408	26	4	18	4	38	0.1	2.2
241	755631	6419645	25	4	18	4	38	0.1	2.2
253	753840	6428415	13	1	20	1	40	0.1	2.4
254	754474	6426260	21	3	21	3	41	0.2	2.4
255	754922	6425602	20	3	21	4	41	0.2	2.4
256	754930	6425120	21	4	21	4	41	0.2	2.4
257	755429	6425331	23	4	22	4	42	0.3	2.4
258	755375	6425132	22	4	21	4	41	0.3	2.4
258	755230	6424872	22	4	21	4	41	0.3	2.4
300	755327	6421268	23	5	20	5	39	0.2	2.2
301	755336	6421121	23	5	19	5	39	0.2	2.2
302	755299	6420997	23	5	19	5	39	0.2	2.2
303	755327	6420850	23	4	19	5	39	0.2	2.2
305	755052	6420566	21	4	19	4	39	0.2	2.2
306	754978	6420431	20	4	19	4	38	0.1	2.2
307	754843	6420373	20	4	18	4	38	0.1	2.2

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	19	4	18	4	38	0.1	2.2
309	754219	6420817	18	4	18	4	38	0.1	2.2
310	754407	6420948	19	4	19	4	38	0.1	2.2
312	754239	6421215	20	4	19	4	38	0.2	2.2
313	753906	6421166	19	4	18	4	38	0.1	2.2
314	753997	6421486	20	4	19	4	38	0.2	2.2
315	754141	6421605	21	4	19	4	39	0.2	2.2
316	754210	6421744	22	4	19	4	39	0.2	2.2
317	754646	6421744	23	4	19	5	39	0.2	2.2
320	755059	6424522	22	4	20	4	41	0.3	2.4

7.2.2 Year 7

Tabulated model results for Year 7 are presented in **Table 7-2** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.2.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.8 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 7 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3 from the MCC alone.

The only privately owned residence predicted to experience maximum 24-hour average PM_{10} concentrations above the relevant criterion in Year 7 is Residence 5. It is noted that this residence is subject to acquisition by MCM upon written request from the landowner under Stage 1 Project Approval.

7.2.2.2 Predicted annual average PM_{10} concentrations

Figure G.9 shows the predicted annual average PM_{10} concentrations for Year 7 due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.12** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 7.

7.2.2.3 Predicted annual average TSP concentrations

Figure G.10 shows the predicted annual average TSP concentrations due to emissions from MCC alone in Year 7. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.13** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 7.

7.2.2.4 Predicted annual average dust deposition (insoluble solids)

Figure G.11 shows the predicted annual average dust deposition rate for Year 7 from MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 7.

Figure G.14 shows the predicted annual average dust deposition rate for Year 7 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 7.

Table 7-2: Modelling predictions Year 7

ID	Easting	Northing	PM_{10} 24hr ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)		TSP Annual ($\mu g/m^3$)		Dust Deposition ($g/m^2/month$)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	58	12	26	13	48	0.7	2.7
9	757478	6422930	45	8	23	9	43	0.5	2.5
11	765376	6431622	19	4	21	4	41	0.1	2.2
11	765265	6431931	16	3	20	3	40	0.0	2.1
11	764784	6431839	16	3	21	3	41	0.0	2.1
26	757430	6423741	36	7	22	8	42	0.5	2.5
30	758435	6416631	31	3	18	3	37	0.1	2.1
31	760008	6416123	29	2	17	2	37	0.0	2.1
32	763590	6413194	7	1	16	1	35	0.0	2.1
35	759021	6414840	25	2	16	2	36	0.0	2.1
37	756179	6417107	35	3	18	3	37	0.1	2.1
39	756038	6415288	25	2	16	2	36	0.0	2.1
40	756389	6416414	32	3	17	3	37	0.1	2.1
41	756863	6421212	35	7	21	7	41	0.3	2.3
41	756194	6415791	28	2	17	3	36	0.0	2.1
46B	758663	6425526	40	9	23	10	45	0.8	2.9
47	760293	6413734	12	1	16	1	35	0.0	2.1
58	756926	6419919	30	6	20	6	40	0.2	2.2
59	756886	6419210	36	5	20	6	40	0.1	2.2
60	756500	6418546	36	4	19	5	39	0.1	2.2
61	756375	6418755	33	5	19	5	39	0.1	2.2
63	756497	6420923	33	6	21	7	41	0.3	2.3
64	756262	6420946	32	6	21	7	41	0.2	2.3
70	756132	6420692	31	6	20	6	40	0.2	2.3
74	756021	6420067	28	5	20	6	40	0.2	2.2
75	756012	6419777	27	5	19	5	39	0.2	2.2
76	755920	6419546	25	5	19	5	39	0.1	2.2
77	756357	6419434	28	5	20	5	39	0.2	2.2
78	755750	6419149	24	4	19	5	39	0.1	2.2
79	756034	6419159	27	5	19	5	39	0.1	2.2
80	755649	6418908	25	4	19	4	38	0.1	2.2
81	756220	6418906	31	5	19	5	39	0.1	2.2
82	756223	6418659	32	4	19	5	39	0.1	2.2
83	755832	6418444	30	4	18	4	38	0.1	2.1
84	756047	6418248	33	4	18	4	38	0.1	2.1
86	755506	6417818	30	4	18	4	38	0.1	2.1
87	755841	6418051	32	4	18	4	38	0.1	2.1
88	756043	6417724	35	4	18	4	38	0.1	2.1
89	755431	6417645	30	3	18	4	38	0.1	2.1
90	755337	6417501	30	3	18	3	37	0.1	2.1
91	755969	6417348	34	3	18	4	37	0.1	2.1
94	754900	6416785	28	3	17	3	37	0.1	2.1
95	755085	6416834	29	3	17	3	37	0.1	2.1
96	755183	6416867	29	3	17	3	37	0.1	2.1
97	755364	6416985	31	3	17	3	37	0.1	2.1
98	755440	6416783	31	3	17	3	37	0.1	2.1
99	755603	6416770	32	3	17	3	37	0.1	2.1
100	755992	6416832	33	3	17	3	37	0.1	2.1
101	755850	6416237	30	3	17	3	37	0.0	2.1
101a	755972	6416452	31	3	17	3	37	0.1	2.1
102	755530	6416189	30	3	17	3	37	0.0	2.1
103	755072	6416399	29	3	17	3	37	0.1	2.1
104	755112	6416116	28	3	17	3	36	0.0	2.1
105	755061	6416033	28	3	17	3	36	0.0	2.1
106	755558	6415823	28	2	17	3	36	0.0	2.1
107	755752	6415919	29	3	17	3	36	0.0	2.1
109	755410	6415494	27	2	17	2	36	0.0	2.1
110	755361	6415339	26	2	16	2	36	0.0	2.1
111	755052	6415789	27	2	17	3	36	0.0	2.1
112	755138	6415655	27	2	17	2	36	0.0	2.1
113	755269	6415661	27	2	17	2	36	0.0	2.1
119	755969	6416452	32	3	17	3	37	0.1	2.1
149	758457	6425165	37	8	23	9	44	0.7	2.8
151	757984	6425025	34	8	23	8	44	0.6	2.7
160	758350	6425029	36	8	23	9	44	0.7	2.8
162	758342	6425199	37	8	23	9	44	0.7	2.8
168	739469	6428623	6	1	14	1	34	0.0	2.1
170	755557	6421185	29	6	20	6	40	0.2	2.3

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	22	2	16	2	36	0.0	2.1
172	756058	6420779	31	6	20	6	40	0.2	2.3
175	755624	6420844	29	5	20	6	40	0.2	2.2
176	755585	6420625	28	5	20	6	40	0.2	2.2
177	755530	6420496	28	5	20	5	40	0.2	2.2
180	755292	6420111	26	5	19	5	39	0.2	2.2
181	755178	6420092	25	5	19	5	39	0.2	2.2
182	755049	6420016	25	5	19	5	39	0.1	2.2
183	754822	6419969	24	4	19	5	39	0.1	2.2
184	755093	6419504	23	4	19	4	39	0.1	2.2
185	754967	6419464	22	4	19	4	38	0.1	2.2
186	754674	6419437	21	4	18	4	38	0.1	2.2
187	754816	6419137	20	4	18	4	38	0.1	2.2
188	754577	6419073	20	4	18	4	38	0.1	2.1
189	754772	6418881	20	4	18	4	38	0.1	2.1
190	754488	6418711	19	4	18	4	38	0.1	2.1
191	754592	6418520	20	4	18	4	38	0.1	2.1
192	754649	6418328	21	3	18	4	38	0.1	2.1
194	754160	6418080	20	3	18	3	37	0.1	2.1
195	754583	6417973	23	3	18	3	37	0.1	2.1
196	754072	6417840	20	3	17	3	37	0.1	2.1
200	754141	6417241	22	3	17	3	37	0.1	2.1
201	754138	6417158	23	3	17	3	37	0.1	2.1
201	754311	6416962	24	3	17	3	37	0.1	2.1
202	754258	6416804	24	3	17	3	37	0.1	2.1
203	754462	6416639	25	3	17	3	37	0.1	2.1
204	754537	6416557	26	3	17	3	37	0.1	2.1
206	754394	6416192	25	3	17	3	36	0.0	2.1
207	754057	6415768	24	2	16	2	36	0.0	2.1
208	753938	6415612	23	2	16	2	36	0.0	2.1
209	753883	6415407	23	2	16	2	36	0.0	2.1
210	753873	6415226	23	2	16	2	36	0.0	2.1
217	754659	6415319	25	2	16	2	36	0.0	2.1
218	754550	6415117	24	2	16	2	36	0.0	2.1
219	754468	6415587	25	2	16	2	36	0.0	2.1
220	754258	6415351	24	2	16	2	36	0.0	2.1
222	754813	6415761	27	2	17	2	36	0.0	2.1
223	754921	6415935	27	2	17	3	36	0.0	2.1
224	754895	6417021	27	3	17	3	37	0.1	2.1
226	754812	6417270	26	3	17	3	37	0.1	2.1
227	755000	6417482	27	3	18	3	37	0.1	2.1
228	755021	6417572	27	3	18	3	37	0.1	2.1
229	755115	6417791	27	3	18	4	37	0.1	2.1
230	755229	6417879	27	3	18	4	38	0.1	2.1
231	755200	6418034	26	4	18	4	38	0.1	2.1
232	755121	6418197	25	4	18	4	38	0.1	2.1
233	755196	6418290	25	4	18	4	38	0.1	2.1
234	755157	6418405	24	4	18	4	38	0.1	2.1
235	755107	6418631	23	4	18	4	38	0.1	2.1
236	755165	6418738	23	4	18	4	38	0.1	2.1
237	755468	6418862	24	4	19	4	38	0.1	2.2
238	755497	6418969	24	4	19	4	38	0.1	2.2
239	755558	6419118	23	4	19	5	39	0.1	2.2
240	755694	6419408	23	5	19	5	39	0.1	2.2
241	755631	6419645	25	5	19	5	39	0.1	2.2
253	753840	6428415	17	2	19	2	39	0.1	2.4
254	754474	6426260	25	3	21	4	41	0.2	2.4
255	754922	6425602	24	4	21	4	41	0.3	2.4
256	754930	6425120	22	4	20	5	41	0.3	2.4
257	755429	6425331	25	4	21	5	41	0.3	2.4
258	755375	6425132	24	5	21	5	41	0.3	2.4
258	755230	6424872	22	4	21	5	41	0.3	2.4
300	755327	6421268	28	5	20	6	40	0.2	2.3
301	755336	6421121	28	5	20	6	40	0.2	2.3
302	755299	6420997	27	5	20	6	40	0.2	2.2
303	755327	6420850	27	5	20	5	40	0.2	2.2
305	755052	6420566	26	5	19	5	39	0.2	2.2
306	754978	6420431	25	5	19	5	39	0.2	2.2
307	754843	6420373	25	5	19	5	39	0.2	2.2

ID	Easting	Northing	PM_{10} 24hr ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)		TSP Annual ($\mu g/m^3$)		Dust Deposition (g/m^2/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	24	4	19	5	39	0.2	2.2
309	754219	6420817	23	4	19	5	39	0.2	2.2
310	754407	6420948	24	5	19	5	39	0.2	2.2
312	754239	6421215	24	5	19	5	39	0.2	2.2
313	753906	6421166	23	4	19	5	39	0.2	2.2
314	753997	6421486	24	4	19	5	39	0.2	2.2
315	754141	6421605	25	5	19	5	39	0.2	2.2
316	754210	6421744	26	5	19	5	39	0.2	2.2
317	754646	6421744	28	5	20	5	40	0.2	2.2
320	755059	6424522	22	4	20	5	40	0.3	2.4

7.2.3 Year 12

Tabulated model results for Year 12 are presented in **Table 7-3** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.3.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.15 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 12 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3 from the MCC alone.

No residences are predicted to experience maximum 24-hour PM_{10} concentrations above 50 µg/m^3 in Year 12.

7.2.3.2 Predicted annual average PM_{10} concentrations

Figure G.16 shows the predicted annual average PM_{10} concentrations for Year 12 due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.19** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 12.

7.2.3.3 Predicted annual average TSP concentrations

Figure G.17 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 12. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.20** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 12.

7.2.3.4 Predicted annual average dust deposition (insoluble solids)

Figure G.18 shows the predicted annual average dust deposition rate for Year 12 for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 12.

Figure G.21 shows the predicted annual average dust deposition rate for Year 12 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 12.

Table 7-3: Modelling predictions Year 12

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	28	6	19	6	38	0.2	2.2
9	757478	6422930	30	6	20	6	40	0.3	2.3
11	765376	6431622	16	4	19	4	39	0.0	2.1
11	765265	6431931	14	3	18	3	38	0.0	2.1
11	764784	6431839	14	2	18	3	38	0.0	2.1
26	757430	6423741	34	6	20	7	41	0.3	2.4
30	758435	6416631	20	2	17	2	36	0.0	2.1
31	760008	6416123	18	2	17	2	36	0.0	2.1
32	763590	6413194	10	1	16	1	35	0.0	2.1
35	759021	6414840	14	1	16	1	36	0.0	2.1
37	756179	6417107	21	2	16	2	36	0.0	2.1
39	756038	6415288	18	2	16	2	35	0.0	2.1
40	756389	6416414	20	2	16	2	36	0.0	2.1
41	756863	6421212	22	4	19	5	38	0.2	2.2
41	756194	6415791	19	2	16	2	36	0.0	2.1
46B	758663	6425526	42	9	23	10	44	0.8	2.9
47	760293	6413734	17	1	16	1	35	0.0	2.1
58	756926	6419919	18	4	18	4	38	0.1	2.1
59	756886	6419210	20	3	17	3	37	0.1	2.1
60	756500	6418546	21	3	17	3	37	0.1	2.1
61	756375	6418755	19	3	17	3	37	0.1	2.1
63	756497	6420923	20	4	18	4	38	0.1	2.2
64	756262	6420946	20	4	18	4	38	0.1	2.2
70	756132	6420692	19	4	18	4	38	0.1	2.2
74	756021	6420067	17	3	18	3	37	0.1	2.1
75	756012	6419777	17	3	17	3	37	0.1	2.1
76	755920	6419546	16	3	17	3	37	0.1	2.1
77	756357	6419434	17	3	17	3	37	0.1	2.1
78	755750	6419149	16	3	17	3	37	0.1	2.1
79	756034	6419159	17	3	17	3	37	0.1	2.1
80	755649	6418908	16	3	17	3	37	0.1	2.1
81	756220	6418906	18	3	17	3	37	0.1	2.1
82	756223	6418659	19	3	17	3	37	0.1	2.1
83	755832	6418444	18	3	17	3	37	0.1	2.1
84	756047	6418248	19	3	17	3	37	0.1	2.1
86	755506	6417818	18	2	17	2	36	0.1	2.1
87	755841	6418051	19	2	17	3	36	0.1	2.1
88	756043	6417724	20	2	17	3	36	0.1	2.1
89	755431	6417645	18	2	16	2	36	0.0	2.1
90	755337	6417501	18	2	16	2	36	0.0	2.1
91	755969	6417348	20	2	17	2	36	0.0	2.1
94	754900	6416785	17	2	16	2	36	0.0	2.1
95	755085	6416834	18	2	16	2	36	0.0	2.1
96	755183	6416867	18	2	16	2	36	0.0	2.1
97	755364	6416985	19	2	16	2	36	0.0	2.1
98	755440	6416783	19	2	16	2	36	0.0	2.1
99	755603	6416770	19	2	16	2	36	0.0	2.1
100	755992	6416832	20	2	16	2	36	0.0	2.1
101	755850	6416237	20	2	16	2	36	0.0	2.1
101a	755972	6416452	20	2	16	2	36	0.0	2.1
102	755530	6416189	19	2	16	2	36	0.0	2.1
103	755072	6416399	18	2	16	2	36	0.0	2.1
104	755112	6416116	18	2	16	2	36	0.0	2.1
105	755061	6416033	18	2	16	2	36	0.0	2.1
106	755558	6415823	19	2	16	2	36	0.0	2.1
107	755752	6415919	19	2	16	2	36	0.0	2.1
109	755410	6415494	18	2	16	2	35	0.0	2.1
110	755361	6415339	18	2	16	2	35	0.0	2.1
111	755052	6415789	18	2	16	2	35	0.0	2.1
112	755138	6415655	18	2	16	2	35	0.0	2.1
113	755269	6415661	18	2	16	2	35	0.0	2.1
119	755969	6416452	20	2	16	2	36	0.0	2.1
149	758457	6425165	40	8	22	9	43	0.7	2.8
151	757984	6425025	37	7	22	8	42	0.6	2.6
160	758350	6425029	39	8	22	9	43	0.7	2.7
162	758342	6425199	39	8	22	9	43	0.7	2.7
168	739469	6428623	6	1	14	1	33	0.0	2.0
170	755557	6421185	19	4	18	4	38	0.1	2.2

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	15	1	15	2	35	0.0	2.0
172	756058	6420779	19	4	18	4	38	0.1	2.2
175	755624	6420844	19	4	18	4	37	0.1	2.2
176	755585	6420625	19	3	18	4	37	0.1	2.1
177	755530	6420496	18	3	18	4	37	0.1	2.1
180	755292	6420111	16	3	17	3	37	0.1	2.1
181	755178	6420092	16	3	17	3	37	0.1	2.1
182	755049	6420016	16	3	17	3	37	0.1	2.1
183	754822	6419969	15	3	17	3	37	0.1	2.1
184	755093	6419504	15	3	17	3	37	0.1	2.1
185	754967	6419464	14	3	17	3	37	0.1	2.1
186	754674	6419437	14	3	17	3	37	0.1	2.1
187	754816	6419137	14	3	17	3	36	0.1	2.1
188	754577	6419073	13	3	17	3	36	0.1	2.1
189	754772	6418881	13	3	17	3	36	0.1	2.1
190	754488	6418711	13	2	17	3	36	0.1	2.1
191	754592	6418520	13	2	17	2	36	0.1	2.1
192	754649	6418328	14	2	17	2	36	0.1	2.1
194	754160	6418080	13	2	16	2	36	0.1	2.1
195	754583	6417973	14	2	16	2	36	0.1	2.1
196	754072	6417840	13	2	16	2	36	0.0	2.1
200	754141	6417241	14	2	16	2	36	0.0	2.1
201	754138	6417158	14	2	16	2	36	0.0	2.1
201	754311	6416962	15	2	16	2	36	0.0	2.1
202	754258	6416804	15	2	16	2	36	0.0	2.1
203	754462	6416639	16	2	16	2	36	0.0	2.1
204	754537	6416557	16	2	16	2	36	0.0	2.1
206	754394	6416192	16	2	16	2	35	0.0	2.1
207	754057	6415768	15	2	16	2	35	0.0	2.1
208	753938	6415612	15	2	16	2	35	0.0	2.1
209	753883	6415407	15	2	16	2	35	0.0	2.1
210	753873	6415226	15	2	16	2	35	0.0	2.1
217	754659	6415319	17	2	16	2	35	0.0	2.1
218	754550	6415117	16	2	16	2	35	0.0	2.1
219	754468	6415587	16	2	16	2	35	0.0	2.1
220	754258	6415351	16	2	16	2	35	0.0	2.1
222	754813	6415761	17	2	16	2	35	0.0	2.1
223	754921	6415935	17	2	16	2	35	0.0	2.1
224	754895	6417021	17	2	16	2	36	0.0	2.1
226	754812	6417270	16	2	16	2	36	0.0	2.1
227	755000	6417482	17	2	16	2	36	0.0	2.1
228	755021	6417572	16	2	16	2	36	0.0	2.1
229	755115	6417791	16	2	16	2	36	0.0	2.1
230	755229	6417879	17	2	17	2	36	0.1	2.1
231	755200	6418034	16	2	17	2	36	0.1	2.1
232	755121	6418197	15	2	17	2	36	0.1	2.1
233	755196	6418290	15	2	17	3	36	0.1	2.1
234	755157	6418405	15	2	17	3	36	0.1	2.1
235	755107	6418631	15	3	17	3	36	0.1	2.1
236	755165	6418738	15	3	17	3	36	0.1	2.1
237	755468	6418862	15	3	17	3	37	0.1	2.1
238	755497	6418969	15	3	17	3	37	0.1	2.1
239	755558	6419118	15	3	17	3	37	0.1	2.1
240	755694	6419408	16	3	17	3	37	0.1	2.1
241	755631	6419645	16	3	17	3	37	0.1	2.1
253	753840	6428415	20	2	17	2	37	0.1	2.3
254	754474	6426260	24	3	18	3	38	0.2	2.3
255	754922	6425602	24	4	19	4	39	0.2	2.3
256	754930	6425120	23	4	19	4	39	0.2	2.3
257	755429	6425331	24	4	19	4	39	0.3	2.3
258	755375	6425132	24	4	19	4	39	0.3	2.3
258	755230	6424872	23	4	19	4	39	0.2	2.3
300	755327	6421268	19	4	18	4	38	0.1	2.2
301	755336	6421121	19	4	18	4	38	0.1	2.2
302	755299	6420997	19	4	18	4	37	0.1	2.2
303	755327	6420850	19	3	18	4	37	0.1	2.2
305	755052	6420566	18	3	17	3	37	0.1	2.1
306	754978	6420431	17	3	17	3	37	0.1	2.1
307	754843	6420373	17	3	17	3	37	0.1	2.1

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	17	3	17	3	37	0.1	2.1
309	754219	6420817	16	3	17	3	37	0.1	2.1
310	754407	6420948	17	3	17	3	37	0.1	2.1
312	754239	6421215	16	3	17	3	37	0.1	2.1
313	753906	6421166	16	3	17	3	37	0.1	2.1
314	753997	6421486	16	3	17	3	37	0.1	2.1
315	754141	6421605	17	3	17	3	37	0.1	2.1
316	754210	6421744	17	3	17	3	37	0.1	2.2
317	754646	6421744	18	3	18	4	37	0.1	2.2
320	755059	6424522	23	4	19	4	38	0.2	2.3

7.2.4 Year 16

Tabulated model results for Year 16 are presented in **Table 7-4** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.4.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.22 shows the predicted annual average PM_{10} concentrations for Year 16 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3.

No residences are predicted to experience maximum 24-hour PM_{10} concentrations above the 50 µg/m^3 in Year 16.

7.2.4.2 Predicted annual average PM_{10} concentrations

Figure G.23 shows the predicted annual average PM_{10} concentrations for Year 16 due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.26** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 16.

7.2.4.3 Predicted annual average TSP concentrations

Figure G.24 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 16. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.27** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 16.

7.2.4.4 Predicted annual average dust deposition (insoluble solids)

Figure G.25 shows the predicted annual average dust deposition rate for Year 16 for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 16.

Figure G.28 shows the predicted annual average dust deposition rate for Year 16 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 16.

Table 7-4: Modelling predictions Year 16

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	40	9	22	9	42	0.6	2.6
9	757478	6422930	24	6	19	6	39	0.3	2.3
11	765376	6431622	17	4	19	4	38	0.0	2.1
11	765265	6431931	15	3	18	3	38	0.0	2.1
11	764784	6431839	15	3	18	3	38	0.0	2.1
26	757430	6423741	26	6	20	6	40	0.3	2.3
30	758435	6416631	28	3	16	3	36	0.1	2.1
31	760008	6416123	29	3	16	3	35	0.0	2.1
32	763590	6413194	8	1	14	1	33	0.0	2.0
35	759021	6414840	20	2	15	2	35	0.0	2.0
37	756179	6417107	22	3	16	3	36	0.1	2.1
39	756038	6415288	21	2	15	2	35	0.0	2.0
40	756389	6416414	24	3	16	3	35	0.1	2.1
41	756863	6421212	25	5	18	5	38	0.2	2.2
41	756194	6415791	22	2	15	2	35	0.0	2.1
46B	758663	6425526	43	9	22	10	43	0.8	2.8
47	760293	6413734	16	1	14	1	34	0.0	2.0
58	756926	6419919	22	5	18	5	38	0.2	2.2
59	756886	6419210	20	4	17	5	37	0.2	2.2
60	756500	6418546	20	4	17	4	37	0.1	2.1
61	756375	6418755	18	4	17	4	37	0.1	2.1
63	756497	6420923	23	5	18	5	38	0.2	2.2
64	756262	6420946	22	5	18	5	38	0.2	2.2
70	756132	6420692	21	4	18	5	38	0.2	2.2
74	756021	6420067	19	4	17	4	37	0.2	2.2
75	756012	6419777	18	4	17	4	37	0.2	2.2
76	755920	6419546	18	4	17	4	37	0.2	2.2
77	756357	6419434	19	4	17	4	37	0.2	2.2
78	755750	6419149	17	4	17	4	37	0.1	2.1
79	756034	6419159	18	4	17	4	37	0.1	2.1
80	755649	6418908	17	3	17	4	36	0.1	2.1
81	756220	6418906	18	4	17	4	37	0.1	2.1
82	756223	6418659	18	4	17	4	37	0.1	2.1
83	755832	6418444	17	3	17	4	36	0.1	2.1
84	756047	6418248	18	3	17	4	36	0.1	2.1
86	755506	6417818	17	3	16	3	36	0.1	2.1
87	755841	6418051	18	3	16	3	36	0.1	2.1
88	756043	6417724	20	3	16	3	36	0.1	2.1
89	755431	6417645	17	3	16	3	36	0.1	2.1
90	755337	6417501	17	3	16	3	36	0.1	2.1
91	755969	6417348	21	3	16	3	36	0.1	2.1
94	754900	6416785	18	2	16	3	35	0.1	2.1
95	755085	6416834	18	2	16	3	35	0.1	2.1
96	755183	6416867	19	3	16	3	35	0.1	2.1
97	755364	6416985	19	3	16	3	35	0.1	2.1
98	755440	6416783	20	3	16	3	35	0.1	2.1
99	755603	6416770	21	3	16	3	35	0.1	2.1
100	755992	6416832	22	3	16	3	35	0.1	2.1
101	755850	6416237	22	2	16	3	35	0.1	2.1
101a	755972	6416452	22	3	16	3	35	0.1	2.1
102	755530	6416189	21	2	16	2	35	0.1	2.1
103	755072	6416399	19	2	16	2	35	0.1	2.1
104	755112	6416116	20	2	15	2	35	0.1	2.1
105	755061	6416033	20	2	15	2	35	0.0	2.1
106	755558	6415823	21	2	15	2	35	0.0	2.1
107	755752	6415919	22	2	15	2	35	0.1	2.1
109	755410	6415494	21	2	15	2	35	0.0	2.0
110	755361	6415339	20	2	15	2	35	0.0	2.0
111	755052	6415789	20	2	15	2	35	0.0	2.0
112	755138	6415655	20	2	15	2	35	0.0	2.0
113	755269	6415661	20	2	15	2	35	0.0	2.0
119	755969	6416452	22	3	16	3	35	0.1	2.1
149	758457	6425165	41	8	22	9	42	0.7	2.7
151	757984	6425025	37	7	21	8	41	0.5	2.6
160	758350	6425029	40	8	21	9	42	0.6	2.6
162	758342	6425199	40	8	22	9	42	0.6	2.7
168	739469	6428623	5	1	14	1	33	0.0	2.0
170	755557	6421185	21	4	18	4	37	0.2	2.2

ID	Easting	Northing	PM_{10} 24hr ($\mu g/m^3$)	PM_{10} Annual ($\mu g/m^3$)		TSP Annual ($\mu g/m^3$)		Dust Deposition ($g/m^2/month$)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	17	2	15	2	34	0.0	2.0
172	756058	6420779	21	4	18	5	38	0.2	2.2
175	755624	6420844	20	4	18	4	37	0.2	2.2
176	755585	6420625	19	4	17	4	37	0.2	2.2
177	755530	6420496	18	4	17	4	37	0.2	2.2
180	755292	6420111	17	4	17	4	37	0.1	2.2
181	755178	6420092	17	4	17	4	37	0.1	2.2
182	755049	6420016	16	4	17	4	37	0.1	2.1
183	754822	6419969	16	4	17	4	37	0.1	2.1
184	755093	6419504	16	3	17	4	37	0.1	2.1
185	754967	6419464	16	3	17	4	36	0.1	2.1
186	754674	6419437	15	3	17	3	36	0.1	2.1
187	754816	6419137	15	3	17	3	36	0.1	2.1
188	754577	6419073	15	3	16	3	36	0.1	2.1
189	754772	6418881	15	3	16	3	36	0.1	2.1
190	754488	6418711	14	3	16	3	36	0.1	2.1
191	754592	6418520	14	3	16	3	36	0.1	2.1
192	754649	6418328	14	3	16	3	36	0.1	2.1
194	754160	6418080	13	3	16	3	36	0.1	2.1
195	754583	6417973	14	3	16	3	36	0.1	2.1
196	754072	6417840	13	3	16	3	35	0.1	2.1
200	754141	6417241	14	2	16	3	35	0.1	2.1
201	754138	6417158	14	2	16	3	35	0.1	2.1
201	754311	6416962	15	2	16	2	35	0.1	2.1
202	754258	6416804	15	2	15	2	35	0.1	2.1
203	754462	6416639	16	2	15	2	35	0.1	2.1
204	754537	6416557	17	2	15	2	35	0.1	2.1
206	754394	6416192	17	2	15	2	35	0.0	2.1
207	754057	6415768	16	2	15	2	35	0.0	2.0
208	753938	6415612	16	2	15	2	35	0.0	2.0
209	753883	6415407	16	2	15	2	35	0.0	2.0
210	753873	6415226	16	2	15	2	35	0.0	2.0
217	754659	6415319	19	2	15	2	35	0.0	2.0
218	754550	6415117	18	2	15	2	35	0.0	2.0
219	754468	6415587	18	2	15	2	35	0.0	2.0
220	754258	6415351	18	2	15	2	35	0.0	2.0
222	754813	6415761	19	2	15	2	35	0.0	2.0
223	754921	6415935	19	2	15	2	35	0.0	2.1
224	754895	6417021	17	3	16	3	35	0.1	2.1
226	754812	6417270	16	3	16	3	35	0.1	2.1
227	755000	6417482	16	3	16	3	36	0.1	2.1
228	755021	6417572	16	3	16	3	36	0.1	2.1
229	755115	6417791	16	3	16	3	36	0.1	2.1
230	755229	6417879	16	3	16	3	36	0.1	2.1
231	755200	6418034	15	3	16	3	36	0.1	2.1
232	755121	6418197	15	3	16	3	36	0.1	2.1
233	755196	6418290	15	3	16	3	36	0.1	2.1
234	755157	6418405	15	3	16	3	36	0.1	2.1
235	755107	6418631	15	3	16	3	36	0.1	2.1
236	755165	6418738	15	3	16	3	36	0.1	2.1
237	755468	6418862	16	3	17	4	36	0.1	2.1
238	755497	6418969	16	3	17	4	36	0.1	2.1
239	755558	6419118	17	4	17	4	37	0.1	2.1
240	755694	6419408	17	4	17	4	37	0.1	2.1
241	755631	6419645	17	4	17	4	37	0.1	2.1
253	753840	6428415	16	1	17	2	37	0.1	2.2
254	754474	6426260	23	3	18	3	38	0.2	2.3
255	754922	6425602	21	3	18	4	38	0.2	2.3
256	754930	6425120	21	4	18	4	38	0.2	2.3
257	755429	6425331	23	4	19	4	39	0.2	2.3
258	755375	6425132	22	4	18	4	38	0.2	2.3
258	755230	6424872	20	4	18	4	38	0.2	2.3
300	755327	6421268	20	4	18	4	37	0.2	2.2
301	755336	6421121	20	4	17	4	37	0.2	2.2
302	755299	6420997	19	4	17	4	37	0.2	2.2
303	755327	6420850	19	4	17	4	37	0.2	2.2
305	755052	6420566	17	4	17	4	37	0.2	2.2
306	754978	6420431	17	4	17	4	37	0.1	2.2
307	754843	6420373	16	4	17	4	37	0.1	2.1

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	16	4	17	4	37	0.1	2.1
309	754219	6420817	16	3	17	4	37	0.1	2.1
310	754407	6420948	17	4	17	4	37	0.1	2.2
312	754239	6421215	17	3	17	4	37	0.1	2.2
313	753906	6421166	16	3	17	3	37	0.1	2.1
314	753997	6421486	17	3	17	4	37	0.1	2.1
315	754141	6421605	18	3	17	4	37	0.1	2.2
316	754210	6421744	18	3	17	4	37	0.2	2.2
317	754646	6421744	18	4	17	4	37	0.2	2.2
320	755059	6424522	19	4	18	4	38	0.2	2.3

7.2.5 Year 19

Tabulated model results for Year 19 are presented in **Table 7-5** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.5.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.29 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 19 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3.

No residences are predicted to experience maximum 24-hour PM_{10} concentrations above the 50 µg/m^3 in Year 19.

7.2.5.2 Predicted annual average PM_{10} concentrations

Figure G.30 shows the predicted annual average PM_{10} concentrations for Year 19 due to emissions from MCM Stage 2 MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.33** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 19.

7.2.5.3 Predicted annual average TSP concentrations

Figure G.31 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 19. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.34** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 19.

7.2.5.4 Predicted annual average dust deposition (insoluble solids)

Figure G.32 shows the predicted annual average dust deposition rate for Year 19 for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 19.

Figure G.35 shows the predicted annual average dust deposition rate for Year 19 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 19.

Table 7-5: Modelling predictions Year 19

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	31	6	19	6	39	0.3	2.3
9	757478	6422930	22	5	19	6	39	0.2	2.2
11	765376	6431622	17	4	19	4	38	0.0	2.1
11	765265	6431931	15	3	18	3	38	0.0	2.1
11	764784	6431839	15	2	18	3	38	0.0	2.1
26	757430	6423741	24	5	19	6	39	0.3	2.3
30	758435	6416631	21	3	16	3	35	0.1	2.1
31	760008	6416123	25	3	16	3	35	0.1	2.1
32	763590	6413194	12	1	14	1	33	0.0	2.0
35	759021	6414840	19	2	15	2	35	0.0	2.0
37	756179	6417107	17	2	16	3	35	0.1	2.1
39	756038	6415288	18	2	15	2	35	0.0	2.0
40	756389	6416414	18	2	15	2	35	0.1	2.1
41	756863	6421212	21	4	18	4	37	0.2	2.2
41	756194	6415791	18	2	15	2	35	0.0	2.0
46B	758663	6425526	47	9	23	10	43	0.7	2.8
47	760293	6413734	19	1	15	2	34	0.0	2.0
58	756926	6419919	18	4	17	4	37	0.1	2.1
59	756886	6419210	17	3	17	4	36	0.1	2.1
60	756500	6418546	16	3	16	3	36	0.1	2.1
61	756375	6418755	16	3	16	3	36	0.1	2.1
63	756497	6420923	18	4	17	4	37	0.1	2.1
64	756262	6420946	18	4	17	4	37	0.1	2.1
70	756132	6420692	16	4	17	4	37	0.1	2.1
74	756021	6420067	16	3	17	4	36	0.1	2.1
75	756012	6419777	15	3	17	4	36	0.1	2.1
76	755920	6419546	15	3	17	3	36	0.1	2.1
77	756357	6419434	16	3	17	4	36	0.1	2.1
78	755750	6419149	14	3	16	3	36	0.1	2.1
79	756034	6419159	15	3	16	3	36	0.1	2.1
80	755649	6418908	14	3	16	3	36	0.1	2.1
81	756220	6418906	15	3	16	3	36	0.1	2.1
82	756223	6418659	15	3	16	3	36	0.1	2.1
83	755832	6418444	14	3	16	3	36	0.1	2.1
84	756047	6418248	15	3	16	3	36	0.1	2.1
86	755506	6417818	14	3	16	3	35	0.1	2.1
87	755841	6418051	15	3	16	3	36	0.1	2.1
88	756043	6417724	16	3	16	3	35	0.1	2.1
89	755431	6417645	14	2	16	3	35	0.1	2.1
90	755337	6417501	14	2	16	3	35	0.1	2.1
91	755969	6417348	16	3	16	3	35	0.1	2.1
94	754900	6416785	14	2	15	2	35	0.1	2.1
95	755085	6416834	15	2	15	2	35	0.1	2.1
96	755183	6416867	15	2	15	2	35	0.1	2.1
97	755364	6416985	15	2	15	2	35	0.1	2.1
98	755440	6416783	16	2	15	2	35	0.1	2.1
99	755603	6416770	16	2	15	2	35	0.1	2.1
100	755992	6416832	17	2	16	2	35	0.1	2.1
101	755850	6416237	17	2	15	2	35	0.0	2.0
101a	755972	6416452	17	2	15	2	35	0.1	2.1
102	755530	6416189	17	2	15	2	35	0.0	2.0
103	755072	6416399	15	2	15	2	35	0.0	2.0
104	755112	6416116	16	2	15	2	35	0.0	2.0
105	755061	6416033	16	2	15	2	35	0.0	2.0
106	755558	6415823	17	2	15	2	35	0.0	2.0
107	755752	6415919	17	2	15	2	35	0.0	2.0
109	755410	6415494	17	2	15	2	35	0.0	2.0
110	755361	6415339	17	2	15	2	35	0.0	2.0
111	755052	6415789	16	2	15	2	35	0.0	2.0
112	755138	6415655	16	2	15	2	35	0.0	2.0
113	755269	6415661	17	2	15	2	35	0.0	2.0
119	755969	6416452	17	2	15	2	35	0.1	2.1
149	758457	6425165	43	8	22	9	42	0.6	2.6
151	757984	6425025	37	7	21	7	41	0.5	2.5
160	758350	6425029	40	7	21	8	42	0.5	2.6
162	758342	6425199	41	8	21	8	42	0.6	2.6
168	739469	6428623	5	1	14	1	33	0.0	2.0
170	755557	6421185	17	4	17	4	37	0.1	2.1

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	14	2	15	2	34	0.0	2.0
172	756058	6420779	17	4	17	4	37	0.1	2.1
175	755624	6420844	16	4	17	4	37	0.1	2.1
176	755585	6420625	16	3	17	4	37	0.1	2.1
177	755530	6420496	15	3	17	4	36	0.1	2.1
180	755292	6420111	15	3	17	3	36	0.1	2.1
181	755178	6420092	14	3	17	3	36	0.1	2.1
182	755049	6420016	14	3	16	3	36	0.1	2.1
183	754822	6419969	14	3	16	3	36	0.1	2.1
184	755093	6419504	14	3	16	3	36	0.1	2.1
185	754967	6419464	13	3	16	3	36	0.1	2.1
186	754674	6419437	13	3	16	3	36	0.1	2.1
187	754816	6419137	13	3	16	3	36	0.1	2.1
188	754577	6419073	13	3	16	3	36	0.1	2.1
189	754772	6418881	13	3	16	3	36	0.1	2.1
190	754488	6418711	12	3	16	3	36	0.1	2.1
191	754592	6418520	12	3	16	3	35	0.1	2.1
192	754649	6418328	12	3	16	3	35	0.1	2.1
194	754160	6418080	11	2	16	2	35	0.1	2.1
195	754583	6417973	12	2	16	3	35	0.1	2.1
196	754072	6417840	11	2	16	2	35	0.1	2.1
200	754141	6417241	12	2	15	2	35	0.1	2.1
201	754138	6417158	12	2	15	2	35	0.1	2.1
201	754311	6416962	12	2	15	2	35	0.1	2.1
202	754258	6416804	12	2	15	2	35	0.0	2.1
203	754462	6416639	13	2	15	2	35	0.0	2.1
204	754537	6416557	13	2	15	2	35	0.0	2.0
206	754394	6416192	14	2	15	2	35	0.0	2.0
207	754057	6415768	13	2	15	2	35	0.0	2.0
208	753938	6415612	13	2	15	2	35	0.0	2.0
209	753883	6415407	13	2	15	2	34	0.0	2.0
210	753873	6415226	13	2	15	2	34	0.0	2.0
217	754659	6415319	15	2	15	2	35	0.0	2.0
218	754550	6415117	15	2	15	2	34	0.0	2.0
219	754468	6415587	15	2	15	2	35	0.0	2.0
220	754258	6415351	14	2	15	2	34	0.0	2.0
222	754813	6415761	15	2	15	2	35	0.0	2.0
223	754921	6415935	15	2	15	2	35	0.0	2.0
224	754895	6417021	14	2	15	2	35	0.1	2.1
226	754812	6417270	13	2	15	2	35	0.1	2.1
227	755000	6417482	13	2	16	2	35	0.1	2.1
228	755021	6417572	13	2	16	3	35	0.1	2.1
229	755115	6417791	13	2	16	3	35	0.1	2.1
230	755229	6417879	13	3	16	3	35	0.1	2.1
231	755200	6418034	13	3	16	3	35	0.1	2.1
232	755121	6418197	13	3	16	3	35	0.1	2.1
233	755196	6418290	13	3	16	3	35	0.1	2.1
234	755157	6418405	13	3	16	3	36	0.1	2.1
235	755107	6418631	13	3	16	3	36	0.1	2.1
236	755165	6418738	13	3	16	3	36	0.1	2.1
237	755468	6418862	14	3	16	3	36	0.1	2.1
238	755497	6418969	14	3	16	3	36	0.1	2.1
239	755558	6419118	14	3	16	3	36	0.1	2.1
240	755694	6419408	14	3	16	3	36	0.1	2.1
241	755631	6419645	15	3	16	3	36	0.1	2.1
253	753840	6428415	18	2	17	2	37	0.1	2.3
254	754474	6426260	24	3	18	3	38	0.2	2.3
255	754922	6425602	21	3	18	4	38	0.2	2.3
256	754930	6425120	21	4	18	4	38	0.2	2.3
257	755429	6425331	23	4	19	4	39	0.2	2.3
258	755375	6425132	22	4	18	4	38	0.2	2.3
258	755230	6424872	20	4	18	4	38	0.2	2.3
300	755327	6421268	17	4	17	4	37	0.1	2.1
301	755336	6421121	16	4	17	4	37	0.1	2.1
302	755299	6420997	16	3	17	4	37	0.1	2.1
303	755327	6420850	16	3	17	4	37	0.1	2.1
305	755052	6420566	15	3	17	3	36	0.1	2.1
306	754978	6420431	15	3	17	3	36	0.1	2.1
307	754843	6420373	15	3	17	3	36	0.1	2.1

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	15	3	16	3	36	0.1	2.1
309	754219	6420817	14	3	16	3	36	0.1	2.1
310	754407	6420948	14	3	17	3	36	0.1	2.1
312	754239	6421215	15	3	17	3	36	0.1	2.1
313	753906	6421166	15	3	16	3	36	0.1	2.1
314	753997	6421486	15	3	17	3	36	0.1	2.1
315	754141	6421605	16	3	17	3	36	0.1	2.1
316	754210	6421744	16	3	17	3	36	0.1	2.1
317	754646	6421744	17	3	17	4	37	0.1	2.1
320	755059	6424522	19	4	18	4	38	0.2	2.2

7.2.6 Year 19 – Conveyor Option

Tabulated model results for Year 19 Conveyor Option are presented in **Table 7-6** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.6.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.36 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 19 Conveyor Option due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3.

No residences are predicted to experience maximum 24-hour PM_{10} concentrations above the 50 µg/m^3 in Year 19.

7.2.6.2 Predicted annual average PM_{10} concentrations

Figure G.37 shows the predicted annual average PM_{10} concentrations for Year 19 Conveyor Option due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.40** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 19 Conveyor Option.

7.2.6.3 Predicted annual average TSP concentrations

Figure G.38 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 19 Conveyor Option. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.41** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 19 Conveyor Option.

7.2.6.4 Predicted annual average dust deposition (insoluble solids)

Figure G.39 shows the predicted annual average dust deposition rate for Year 19 Conveyor Option for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 19 Conveyor Option.

Figure G.42 shows the predicted annual average dust deposition rate for Year 19 Conveyor Option for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 19 Conveyor Option.

Table 7-6: Modelling predictions Year 19 Conveyor Option

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	30	6	19	6	39	0.3	2.3
9	757478	6422930	22	5	19	5	38	0.2	2.2
11	765376	6431622	15	3	18	3	38	0.0	2.1
11	765265	6431931	13	3	18	3	37	0.0	2.1
11	764784	6431839	13	2	18	2	37	0.0	2.1
26	757430	6423741	23	5	19	6	39	0.3	2.3
30	758435	6416631	21	3	16	3	35	0.1	2.1
31	760008	6416123	25	3	16	3	35	0.1	2.1
32	763590	6413194	12	1	14	1	33	0.0	2.0
35	759021	6414840	19	2	15	2	35	0.0	2.0
37	756179	6417107	17	2	16	3	35	0.1	2.1
39	756038	6415288	18	2	15	2	35	0.0	2.0
40	756389	6416414	18	2	15	2	35	0.1	2.1
41	756863	6421212	21	4	17	4	37	0.2	2.2
41	756194	6415791	18	2	15	2	35	0.0	2.0
46B	758663	6425526	43	8	22	9	42	0.7	2.8
47	760293	6413734	19	1	15	2	34	0.0	2.0
58	756926	6419919	18	4	17	4	37	0.1	2.1
59	756886	6419210	16	3	17	4	36	0.1	2.1
60	756500	6418546	16	3	16	3	36	0.1	2.1
61	756375	6418755	15	3	16	3	36	0.1	2.1
63	756497	6420923	19	4	17	4	37	0.1	2.1
64	756262	6420946	18	4	17	4	37	0.1	2.1
70	756132	6420692	16	4	17	4	37	0.1	2.1
74	756021	6420067	16	3	17	4	36	0.1	2.1
75	756012	6419777	16	3	17	4	36	0.1	2.1
76	755920	6419546	15	3	16	3	36	0.1	2.1
77	756357	6419434	16	3	17	4	36	0.1	2.1
78	755750	6419149	15	3	16	3	36	0.1	2.1
79	756034	6419159	15	3	16	3	36	0.1	2.1
80	755649	6418908	14	3	16	3	36	0.1	2.1
81	756220	6418906	15	3	16	3	36	0.1	2.1
82	756223	6418659	15	3	16	3	36	0.1	2.1
83	755832	6418444	14	3	16	3	36	0.1	2.1
84	756047	6418248	15	3	16	3	36	0.1	2.1
86	755506	6417818	14	3	16	3	35	0.1	2.1
87	755841	6418051	15	3	16	3	36	0.1	2.1
88	756043	6417724	16	3	16	3	35	0.1	2.1
89	755431	6417645	14	2	16	3	35	0.1	2.1
90	755337	6417501	14	2	16	3	35	0.1	2.1
91	755969	6417348	16	2	16	3	35	0.1	2.1
94	754900	6416785	14	2	15	2	35	0.1	2.1
95	755085	6416834	14	2	15	2	35	0.1	2.1
96	755183	6416867	14	2	15	2	35	0.1	2.1
97	755364	6416985	15	2	15	2	35	0.1	2.1
98	755440	6416783	15	2	15	2	35	0.1	2.1
99	755603	6416770	16	2	15	2	35	0.1	2.1
100	755992	6416832	17	2	15	2	35	0.1	2.1
101	755850	6416237	17	2	15	2	35	0.0	2.0
101a	755972	6416452	17	2	15	2	35	0.1	2.1
102	755530	6416189	16	2	15	2	35	0.0	2.0
103	755072	6416399	15	2	15	2	35	0.0	2.0
104	755112	6416116	15	2	15	2	35	0.0	2.0
105	755061	6416033	15	2	15	2	35	0.0	2.0
106	755558	6415823	17	2	15	2	35	0.0	2.0
107	755752	6415919	17	2	15	2	35	0.0	2.0
109	755410	6415494	17	2	15	2	35	0.0	2.0
110	755361	6415339	17	2	15	2	35	0.0	2.0
111	755052	6415789	16	2	15	2	35	0.0	2.0
112	755138	6415655	16	2	15	2	35	0.0	2.0
113	755269	6415661	16	2	15	2	35	0.0	2.0
119	755969	6416452	17	2	15	2	35	0.1	2.1
149	758457	6425165	38	7	21	8	41	0.6	2.6
151	757984	6425025	33	6	20	7	41	0.5	2.5
160	758350	6425029	35	7	21	8	41	0.5	2.6
162	758342	6425199	37	7	21	8	41	0.6	2.6
168	739469	6428623	5	1	14	1	33	0.0	2.0
170	755557	6421185	17	4	17	4	37	0.1	2.1

ID	Easting	Northing	PM$_{10}$ 24hr (µg/m³)	PM$_{10}$ Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	14	2	15	2	34	0.0	2.0
172	756058	6420779	17	4	17	4	37	0.1	2.1
175	755624	6420844	16	3	17	4	37	0.1	2.1
176	755585	6420625	15	3	17	4	36	0.1	2.1
177	755530	6420496	15	3	17	4	36	0.1	2.1
180	755292	6420111	14	3	17	3	36	0.1	2.1
181	755178	6420092	14	3	16	3	36	0.1	2.1
182	755049	6420016	14	3	16	3	36	0.1	2.1
183	754822	6419969	14	3	16	3	36	0.1	2.1
184	755093	6419504	14	3	16	3	36	0.1	2.1
185	754967	6419464	14	3	16	3	36	0.1	2.1
186	754674	6419437	13	3	16	3	36	0.1	2.1
187	754816	6419137	13	3	16	3	36	0.1	2.1
188	754577	6419073	13	3	16	3	36	0.1	2.1
189	754772	6418881	13	3	16	3	36	0.1	2.1
190	754488	6418711	12	3	16	3	35	0.1	2.1
191	754592	6418520	12	3	16	3	35	0.1	2.1
192	754649	6418328	12	2	16	3	35	0.1	2.1
194	754160	6418080	11	2	16	2	35	0.1	2.1
195	754583	6417973	12	2	16	2	35	0.1	2.1
196	754072	6417840	11	2	15	2	35	0.1	2.1
200	754141	6417241	11	2	15	2	35	0.1	2.1
201	754138	6417158	11	2	15	2	35	0.1	2.1
201	754311	6416962	12	2	15	2	35	0.1	2.1
202	754258	6416804	12	2	15	2	35	0.0	2.1
203	754462	6416639	13	2	15	2	35	0.0	2.1
204	754537	6416557	13	2	15	2	35	0.0	2.0
206	754394	6416192	13	2	15	2	35	0.0	2.0
207	754057	6415768	13	2	15	2	35	0.0	2.0
208	753938	6415612	13	2	15	2	35	0.0	2.0
209	753883	6415407	13	2	15	2	34	0.0	2.0
210	753873	6415226	13	2	15	2	34	0.0	2.0
217	754659	6415319	15	2	15	2	35	0.0	2.0
218	754550	6415117	15	2	15	2	34	0.0	2.0
219	754468	6415587	14	2	15	2	35	0.0	2.0
220	754258	6415351	14	2	15	2	34	0.0	2.0
222	754813	6415761	15	2	15	2	35	0.0	2.0
223	754921	6415935	15	2	15	2	35	0.0	2.0
224	754895	6417021	13	2	15	2	35	0.1	2.1
226	754812	6417270	13	2	15	2	35	0.1	2.1
227	755000	6417482	13	2	16	2	35	0.1	2.1
228	755021	6417572	13	2	16	2	35	0.1	2.1
229	755115	6417791	13	2	16	3	35	0.1	2.1
230	755229	6417879	13	2	16	3	35	0.1	2.1
231	755200	6418034	13	3	16	3	35	0.1	2.1
232	755121	6418197	12	3	16	3	35	0.1	2.1
233	755196	6418290	13	3	16	3	35	0.1	2.1
234	755157	6418405	13	3	16	3	35	0.1	2.1
235	755107	6418631	13	3	16	3	36	0.1	2.1
236	755165	6418738	13	3	16	3	36	0.1	2.1
237	755468	6418862	14	3	16	3	36	0.1	2.1
238	755497	6418969	14	3	16	3	36	0.1	2.1
239	755558	6419118	14	3	16	3	36	0.1	2.1
240	755694	6419408	15	3	16	3	36	0.1	2.1
241	755631	6419645	15	3	16	3	36	0.1	2.1
253	753840	6428415	16	2	17	2	37	0.1	2.3
254	754474	6426260	22	3	18	3	38	0.2	2.3
255	754922	6425602	20	3	18	4	38	0.2	2.3
256	754930	6425120	19	3	18	4	38	0.2	2.3
257	755429	6425331	21	4	18	4	38	0.2	2.3
258	755375	6425132	20	4	18	4	38	0.2	2.3
258	755230	6424872	18	4	18	4	38	0.2	2.3
300	755327	6421268	17	3	17	4	37	0.1	2.1
301	755336	6421121	16	3	17	4	37	0.1	2.1
302	755299	6420997	16	3	17	4	37	0.1	2.1
303	755327	6420850	15	3	17	4	36	0.1	2.1
305	755052	6420566	15	3	17	3	36	0.1	2.1
306	754978	6420431	15	3	17	3	36	0.1	2.1
307	754843	6420373	14	3	16	3	36	0.1	2.1

ID	Easting	Northing	PM_{10} 24hr (μg/m³)	PM_{10} Annual (μg/m³)		TSP Annual (μg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	14	3	16	3	36	0.1	2.1
309	754219	6420817	14	3	16	3	36	0.1	2.1
310	754407	6420948	14	3	17	3	36	0.1	2.1
312	754239	6421215	15	3	17	3	36	0.1	2.1
313	753906	6421166	14	3	16	3	36	0.1	2.1
314	753997	6421486	15	3	17	3	36	0.1	2.1
315	754141	6421605	16	3	17	3	36	0.1	2.1
316	754210	6421744	16	3	17	3	36	0.1	2.1
317	754646	6421744	17	3	17	3	37	0.1	2.1
320	755059	6424522	18	3	18	4	38	0.2	2.2

7.2.7 Year 24

Tabulated model results for Year 24 are presented in **Table 7-7** below. Highlighted properties already have rights to acquisition upon request under the existing Stage 1 Project Approval.

7.2.7.1 Predicted maximum 24-hour average PM_{10} concentrations

Figure G.43 shows the maximum 24-hour annual average PM_{10} concentrations for Year 24 due to emissions from MCC alone. The relevant DoP acquisition criterion for maximum 24-hour average PM_{10} concentrations is 50 µg/m^3.

No residences are predicted to experience maximum 24-hour PM_{10} concentrations above the 50 µg/m^3 in Year 24.

7.2.7.2 Predicted annual average PM_{10} concentrations

Figure G.44 shows the predicted annual average PM_{10} concentrations for Year 24 due to emissions from MCC alone. The figure is provided for information only as the criterion of 30 µg/m^3 applies to total ambient levels. **Figure G.47** shows the predicted cumulative annual PM_{10} concentrations from MCC and other sources.

No residences are predicted to experience cumulative annual average PM_{10} concentrations above the 30 µg/m^3 in Year 24.

7.2.7.3 Predicted annual average TSP concentrations

Figure G.45 shows the predicted annual average TSP concentrations due to emissions from the proposed MCC alone in Year 24. The figure is provided for information only as the criterion of 90 µg/m^3 applies to total ambient levels. **Figure G.48** shows the predicted annual average TSP concentration for MCC and other sources.

No residences are predicted to experience cumulative annual average TSP concentrations above 90 µg/m^3 in Year 24.

7.2.7.4 Predicted annual average dust deposition (insoluble solids)

Figure G.46 shows the predicted annual average dust deposition rate for Year 24 for the proposed MCC alone. The assessment criterion is 2 g/m^2/month (annual average).

No residences are predicted to experience annual average dust deposition levels as a consequence of the proposed MCC that are above 2 g/m^2/month in Year 24.

Figure G.49 shows the predicted annual average dust deposition rate for Year 24 for the proposed MCC considered with other sources. The assessment criterion is 4 g/m^2/month (annual average).

No residences are predicted to experience cumulative annual average dust deposition levels due to the proposed MCC and other sources above 4 g/m^2/month in Year 24.

Table 7-7: Modelling predictions Year 24

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
5	759764	6420796	14	3	16	4	37	0.2	2.2
9	757478	6422930	13	2	15	3	35	0.1	2.1
11	765376	6431622	9	2	15	2	35	0.0	2.0
11	765265	6431931	7	2	15	2	34	0.0	2.0
11	764784	6431839	8	1	14	1	34	0.0	2.0
26	757430	6423741	12	3	16	3	35	0.1	2.1
30	758435	6416631	16	2	15	2	35	0.1	2.1
31	760008	6416123	41	4	17	5	37	0.3	2.3
32	763590	6413194	18	1	14	1	34	0.0	2.0
35	759021	6414840	20	3	16	3	36	0.2	2.2
37	756179	6417107	9	2	15	2	34	0.1	2.1
39	756038	6415288	10	2	15	2	34	0.1	2.1
40	756389	6416414	14	2	15	2	34	0.1	2.1
41	756863	6421212	13	2	15	2	34	0.1	2.1
41	756194	6415791	13	2	15	2	34	0.1	2.1
46B	758663	6425526	24	4	17	5	37	0.4	2.4
47	760293	6413734	32	4	17	4	36	0.1	2.1
58	756926	6419919	13	2	15	2	34	0.0	2.0
59	756886	6419210	12	1	14	2	34	0.0	2.0
60	756500	6418546	11	1	14	2	34	0.1	2.1
61	756375	6418755	11	1	14	2	34	0.0	2.0
63	756497	6420923	13	2	15	2	34	0.0	2.0
64	756262	6420946	12	2	15	2	34	0.0	2.0
70	756132	6420692	12	1	14	2	34	0.0	2.0
74	756021	6420067	11	1	14	1	34	0.0	2.0
75	756012	6419777	10	1	14	1	34	0.0	2.0
76	755920	6419546	10	1	14	1	34	0.0	2.0
77	756357	6419434	11	1	14	2	34	0.0	2.0
78	755750	6419149	10	1	14	1	34	0.0	2.0
79	756034	6419159	10	1	14	1	34	0.0	2.0
80	755649	6418908	9	1	14	1	34	0.0	2.0
81	756220	6418906	10	1	14	1	34	0.0	2.0
82	756223	6418659	10	1	14	1	34	0.0	2.0
83	755832	6418444	9	1	14	1	34	0.0	2.0
84	756047	6418248	10	1	14	1	34	0.1	2.1
86	755506	6417818	8	1	14	1	34	0.1	2.1
87	755841	6418051	10	1	14	1	34	0.1	2.1
88	756043	6417724	9	1	14	2	34	0.1	2.1
89	755431	6417645	7	1	14	1	34	0.1	2.1
90	755337	6417501	7	1	14	1	34	0.1	2.1
91	755969	6417348	7	1	14	2	34	0.1	2.1
94	754900	6416785	10	1	14	1	34	0.1	2.1
95	755085	6416834	10	1	14	1	34	0.1	2.1
96	755183	6416867	10	1	14	1	34	0.1	2.1
97	755364	6416985	10	1	14	1	34	0.1	2.1
98	755440	6416783	11	1	14	2	34	0.1	2.1
99	755603	6416770	11	1	14	2	34	0.1	2.1
100	755992	6416832	11	2	15	2	34	0.1	2.1
101	755850	6416237	13	2	15	2	34	0.1	2.1
101a	755972	6416452	13	2	15	2	34	0.1	2.1
102	755530	6416189	13	2	15	2	34	0.1	2.1
103	755072	6416399	12	1	14	1	34	0.1	2.1
104	755112	6416116	11	1	14	2	34	0.1	2.1
105	755061	6416033	11	1	14	2	34	0.1	2.1
106	755558	6415823	12	2	15	2	34	0.1	2.1
107	755752	6415919	12	2	15	2	34	0.1	2.1
109	755410	6415494	10	2	15	2	34	0.1	2.1
110	755361	6415339	9	2	15	2	34	0.1	2.1
111	755052	6415789	10	1	14	2	34	0.1	2.1
112	755138	6415655	10	1	14	2	34	0.1	2.1
113	755269	6415661	10	2	15	2	34	0.1	2.1
119	755969	6416452	13	2	15	2	34	0.1	2.1
149	758457	6425165	22	4	17	4	37	0.3	2.3
151	757984	6425025	19	3	16	4	36	0.2	2.2
160	758350	6425029	21	4	17	4	37	0.3	2.3
162	758342	6425199	22	4	17	4	37	0.3	2.3
168	739469	6428623	2	0	13	0	33	0.0	2.0
170	755557	6421185	10	1	14	2	34	0.0	2.0

ID	Easting	Northing	PM_{10} 24hr (µg/m³)	PM_{10} Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
171	753898	6414840	7	1	14	1	34	0.0	2.0
172	756058	6420779	12	1	14	2	34	0.0	2.0
175	755624	6420844	10	1	14	2	34	0.0	2.0
176	755585	6420625	10	1	14	1	34	0.0	2.0
177	755530	6420496	10	1	14	1	34	0.0	2.0
180	755292	6420111	9	1	14	1	34	0.0	2.0
181	755178	6420092	9	1	14	1	34	0.0	2.0
182	755049	6420016	9	1	14	1	34	0.0	2.0
183	754822	6419969	9	1	14	1	34	0.0	2.0
184	755093	6419504	9	1	14	1	34	0.0	2.0
185	754967	6419464	9	1	14	1	34	0.0	2.0
186	754674	6419437	9	1	14	1	34	0.0	2.0
187	754816	6419137	8	1	14	1	34	0.0	2.0
188	754577	6419073	8	1	14	1	34	0.0	2.0
189	754772	6418881	8	1	14	1	34	0.0	2.0
190	754488	6418711	8	1	14	1	34	0.0	2.0
191	754592	6418520	8	1	14	1	34	0.0	2.0
192	754649	6418328	8	1	14	1	34	0.0	2.0
194	754160	6418080	6	1	14	1	34	0.0	2.0
195	754583	6417973	7	1	14	1	34	0.0	2.0
196	754072	6417840	6	1	14	1	34	0.0	2.0
200	754141	6417241	8	1	14	1	34	0.0	2.0
201	754138	6417158	8	1	14	1	34	0.0	2.0
201	754311	6416962	9	1	14	1	34	0.0	2.0
202	754258	6416804	10	1	14	1	34	0.0	2.0
203	754462	6416639	10	1	14	1	34	0.0	2.0
204	754537	6416557	11	1	14	1	34	0.0	2.0
206	754394	6416192	10	1	14	1	34	0.0	2.0
207	754057	6415768	9	1	14	1	34	0.0	2.0
208	753938	6415612	8	1	14	1	34	0.0	2.0
209	753883	6415407	8	1	14	1	34	0.0	2.0
210	753873	6415226	7	1	14	1	34	0.0	2.0
217	754659	6415319	8	1	14	1	34	0.0	2.0
218	754550	6415117	8	1	14	1	34	0.0	2.0
219	754468	6415587	9	1	14	1	34	0.0	2.0
220	754258	6415351	8	1	14	1	34	0.0	2.0
222	754813	6415761	10	1	14	1	34	0.1	2.1
223	754921	6415935	11	1	14	2	34	0.1	2.1
224	754895	6417021	9	1	14	1	34	0.1	2.1
226	754812	6417270	8	1	14	1	34	0.0	2.0
227	755000	6417482	7	1	14	1	34	0.0	2.0
228	755021	6417572	6	1	14	1	34	0.0	2.0
229	755115	6417791	7	1	14	1	34	0.0	2.0
230	755229	6417879	8	1	14	1	34	0.0	2.0
231	755200	6418034	8	1	14	1	34	0.0	2.0
232	755121	6418197	8	1	14	1	34	0.0	2.0
233	755196	6418290	9	1	14	1	34	0.0	2.0
234	755157	6418405	9	1	14	1	34	0.0	2.0
235	755107	6418631	8	1	14	1	34	0.0	2.0
236	755165	6418738	8	1	14	1	34	0.0	2.0
237	755468	6418862	9	1	14	1	34	0.0	2.0
238	755497	6418969	9	1	14	1	34	0.0	2.0
239	755558	6419118	9	1	14	1	34	0.0	2.0
240	755694	6419408	10	1	14	1	34	0.0	2.0
241	755631	6419645	10	1	14	1	34	0.0	2.0
253	753840	6428415	7	1	14	1	33	0.1	2.1
254	754474	6426260	11	1	14	1	34	0.1	2.1
255	754922	6425602	10	2	15	2	34	0.1	2.1
256	754930	6425120	9	2	15	2	34	0.1	2.1
257	755429	6425331	11	2	15	2	34	0.1	2.1
258	755375	6425132	10	2	15	2	34	0.1	2.1
258	755230	6424872	10	2	15	2	34	0.1	2.1
300	755327	6421268	9	1	14	2	34	0.0	2.0
301	755336	6421121	9	1	14	1	34	0.0	2.0
302	755299	6420997	9	1	14	1	34	0.0	2.0
303	755327	6420850	10	1	14	1	34	0.0	2.0
305	755052	6420566	9	1	14	1	34	0.0	2.0
306	754978	6420431	9	1	14	1	34	0.0	2.0
307	754843	6420373	8	1	14	1	34	0.0	2.0

ID	Easting	Northing	PM10 24hr (µg/m³)	PM10 Annual (µg/m³)		TSP Annual (µg/m³)		Dust Deposition (g/m²/month)	
			Mine only	Mine only	Cumulative	Mine only	Cumulative	Mine only	Cumulative
			Assessment criteria						
			-	-	30	-	90	2	4
308	754605	6420402	8	1	14	1	34	0.0	2.0
309	754219	6420817	7	1	14	1	34	0.0	2.0
310	754407	6420948	7	1	14	1	34	0.0	2.0
312	754239	6421215	6	1	14	1	34	0.0	2.0
313	753906	6421166	6	1	14	1	34	0.0	2.0
314	753997	6421486	6	1	14	1	34	0.0	2.0
315	754141	6421605	6	1	14	1	34	0.0	2.0
316	754210	6421744	6	1	14	1	34	0.0	2.0
317	754646	6421744	7	1	14	1	34	0.0	2.0
320	755059	6424522	9	2	15	2	34	0.1	2.1

7.3 Cumulative 24-hour average PM_{10} concentrations

7.3.1 Introduction

It is difficult to accurately predict the cumulative 24-hour PM_{10} concentrations using dispersion modelling due to the difficulties in resolving (on a day to day basis) the varying intensity, duration and precise locations of activities at mine sites, the weather conditions at the time of the activity, or combination of activities.

The difficulties in predicting cumulative 24-hour impacts are compounded by the day to day variability in ambient dust levels and the spatial and temporal variation in any other anthropogenic activity e.g. agricultural activity, bushfires etc, including mining in the future. Experience shows that the worst-case 24-hour PM_{10} concentrations are strongly influenced by other sources in the area, such as bushfires and dust storms, which are essentially unpredictable. The variability in 24-hour average PM_{10} concentrations can be clearly seen in the data collected at the two HVAS monitors and three TEOM monitors located surrounding the mine (see **Figure 4-14** and **Figure 4-15** for monitor locations).

The DECCW's (2005) *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* describes two methods for assessing cumulative air quality effects (see Section 11.2 of the Approved Methods).

- A Level 1 assessment (suitable for a screening assessment) requires the highest predicted concentration from the proposal be added to the highest observed concentration in a data set which provides measurements of PM_{10} concentrations representative of conditions at the site being assessed. If this results in exceedences of the PM_{10} impact assessment criteria, a Level 2 assessment is required.
- A Level 2 assessment provides a more rigorous approach when background levels are elevated and requires (1) that the highest ten observed 24-hour PM_{10} concentrations (below criteria) are added to the predicted concentrations for the same days and (2) the ten highest predicted 24-hour PM_{10} concentrations are added to the observed concentrations for the same days.

7.3.2 Background ambient monitoring data

Both the Level 1 and Level 2 assessments assume that background ambient monitoring data exists that can provide information on 24-hour PM_{10} concentrations representative of the site being assessed.

The Level 2 assessment can work reasonably well when there are ambient monitoring data available for each day that coincide with the period of time of predicted impacts, and the data are representative of the site being assessed.

As MCM is currently operating under the Stage 1 approval, and Ulan and Wilpinjong coal mines are also active, there are no measurements of PM_{10} concentrations available in the MCC area that could be considered "background" (i.e. the ambient concentration due to all other sources in the absence of mining operations). In addition, the TEOM data collected by MCM did not begin until October 2008 and as such did not match with the meteorological data used in this assessment (these data covered the period July 2007 to June 2008). Therefore, the only contemporaneous data available are from HV01 located close to Ulan Village. There are only 47 days of valid data available from this site, insufficient to provide representative background concentrations. Hence a statistical approach (using a Monte Carlo Simulation) was taken in order to achieve the objectives of a Level 2 Approved Methods Assessment (see **Section 7.3.3**).

The cumulative assessment focuses on representative receptors in key areas in the vicinity of the mine. The receptors are located between the mine and groupings of private receptors. It can be assumed that receptors beyond (i.e. further from MCC dust sources) these points will experience lower dust concentration levels than predicted at the key receptor locations. The receptors chosen for this analysis are shown in **Figure 7-1**.

It is noted that Residence 5 is predicted to experience maximum 24-hour average PM_{10} concentrations above 50 µg/m^2 in Year 2 from the MCM alone. As this residence is subject to acquisition by MCM upon written request from the landowner under Stage 1 Project Approval, it has not been considered further in this analysis.

In addition Receptor 46b is a commercial property but is considered to be conservatively representative of Residences 151 and 162, both of which are further from MCM's operations and as a result are predicted to experience lower impacts.

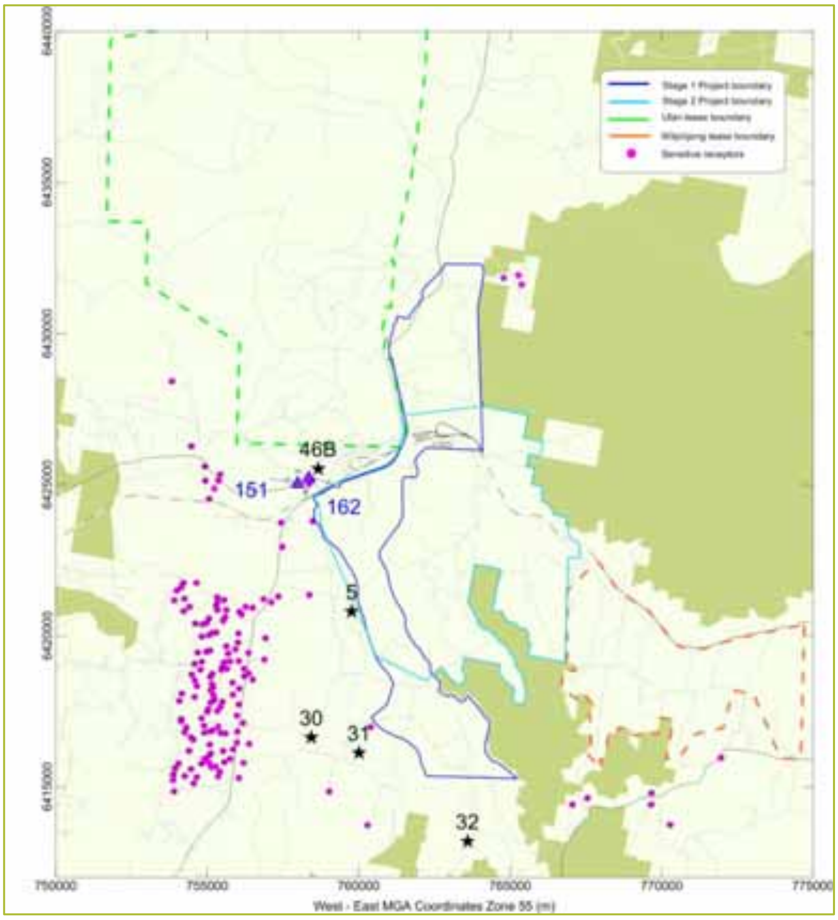


Figure 7-1: Receptor locations chosen for 24-hour average PM_{10} analysis

7.3.3 Level 2 Assessment Based on Monte Carlo Simulation

The approach taken for this assessment was to use all available 24-hour average PM_{10} monitoring data collected at HV01, HV02, TEOM01 and TEOM03 to characterise background 24-hour PM_{10}, which include the contributions of current mining operations at MCM, Ulan and Wilpinjong mining operations. These monitoring data are considered to provide a conservatively high indication of background for the receptors most influenced by the MCM, given the monitors' proximity to mining operations and the MCM boundary.

Monte Carlo Simulation is a term that applies to modelling that uses the statistical properties of a variable (such as 24-hour PM_{10} concentrations) and generates individual values that are taken randomly from the statistical distribution of the real data.

The reliability of Monte Carlo Simulation is presented in **Figure 7-2** which compares the *simulated* probability of exceeding certain 24-hour average PM_{10} concentrations with the *measured* probability. Close agreement between the measured and simulated probability of exceeding was achieved for this assessment, with a tendency for the simulated values to be very slightly overpredicted.

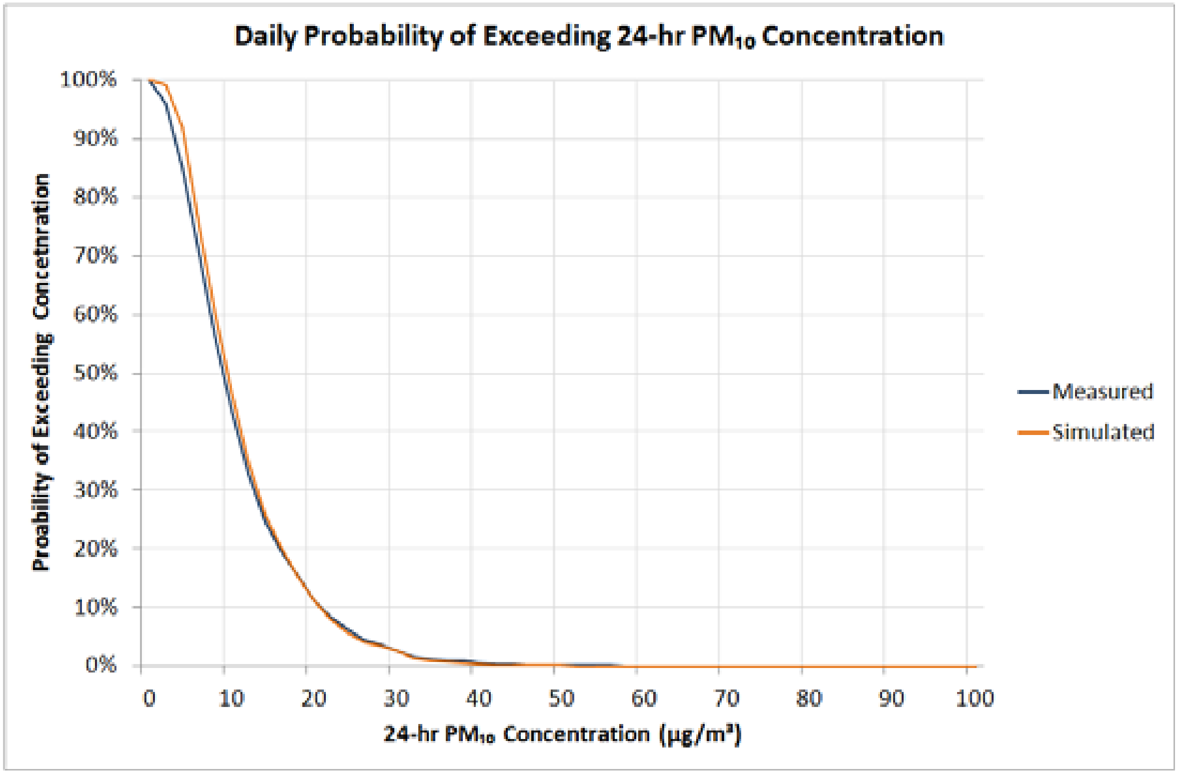


Figure 7-2: Comparison of Measured and Monte Carlo Simulated Background PM10 Concentrations

The Monte Carlo Simulation was applied to the all the available 24-hour PM_{10} monitored data. In total there were 2537 daily values of PM_{10} concentration available from the monitors, after removal of some questionable data (negative and zero data). All positive non-zero values were included. With so many data points available, it is assumed that the statistical distribution is a sound basis on which to estimate background values for modelling future conditions.

Modelled PM_{10} concentrations due to MCC activities at the selected receptors were available for one year (the 'model year'). These values are deterministic in nature, that is, they are values derived from the dispersion model's calculations based on emission rates and weather conditions listed in the input files.

For each receptor, for each day of the dispersion model results, a different background 24-hour PM_{10} value was randomly selected from the real background dataset. The process assumed that a randomly selected background value from the real dataset would have a chance equal to that of any other background value from the dataset of occurring on the given 'model day'. Over sufficient time this would yield a good statistical estimate of the combined and independent effects of varying background and MCC contributions to total PM_{10}.

To generate greater confidence in the statistical robustness of the results, the Monte Carlo Simulation was repeated ten times. In other words, the same 1-year set of predicted 24-hour PM_{10} concentrations due to MCC operations was added to 10 variations of daily simulated background concentrations at each representative receptor.

These results were analysed to compare the statistical properties of the *'background only'* concentrations and the *'background plus MCC'* concentrations. The results of this analysis are presented in **Figure 7-3** to **Figure 7-26**. These plots show the predicted probability of a given daily cumulative PM_{10} concentration being exceeded on any day at respective representative locations for a given mine year.

The plots are presented in the following sequence:

- Year 2: **Figure 7-3** to **Figure 7-6**;
- Year 7: **Figure 7-7** to **Figure 7-10**;
- Year 12: **Figure 7-11** to **Figure 7-14**;
- Year 16: **Figure 7-15** to **Figure 7-18**;
- Year 19: **Figure 7-19** to **Figure 7-22**; and
- Year 24: **Figure 7-23** to **Figure 7-26**.

The results show varying degrees of impact from the MCC emissions depending on location and year. At all sites, the statistics indicate some probability of some days per year with PM_{10} concentrations above 50 µg/m³, because the background data already include some values above this level. The actual number of exceedences per year cannot be predicted precisely and will depend on actual MCC activities, weather conditions and background levels in the future. The greatest increase above background is expected at Receptor 46b (which is conservatively representative of Residences 151 and 162) and shows that it is likely that PM_{10} will exceed 50 µg/m³ on a small number of days in most years.

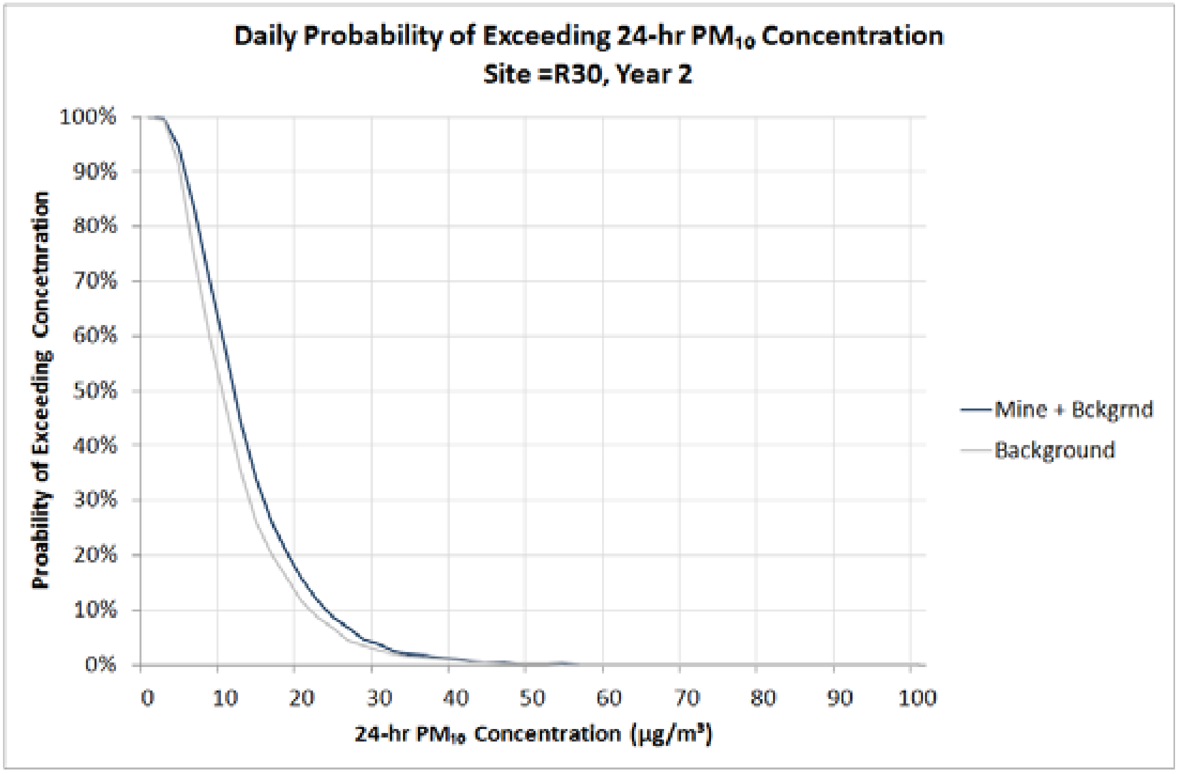


Figure 7-3: Year 2 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

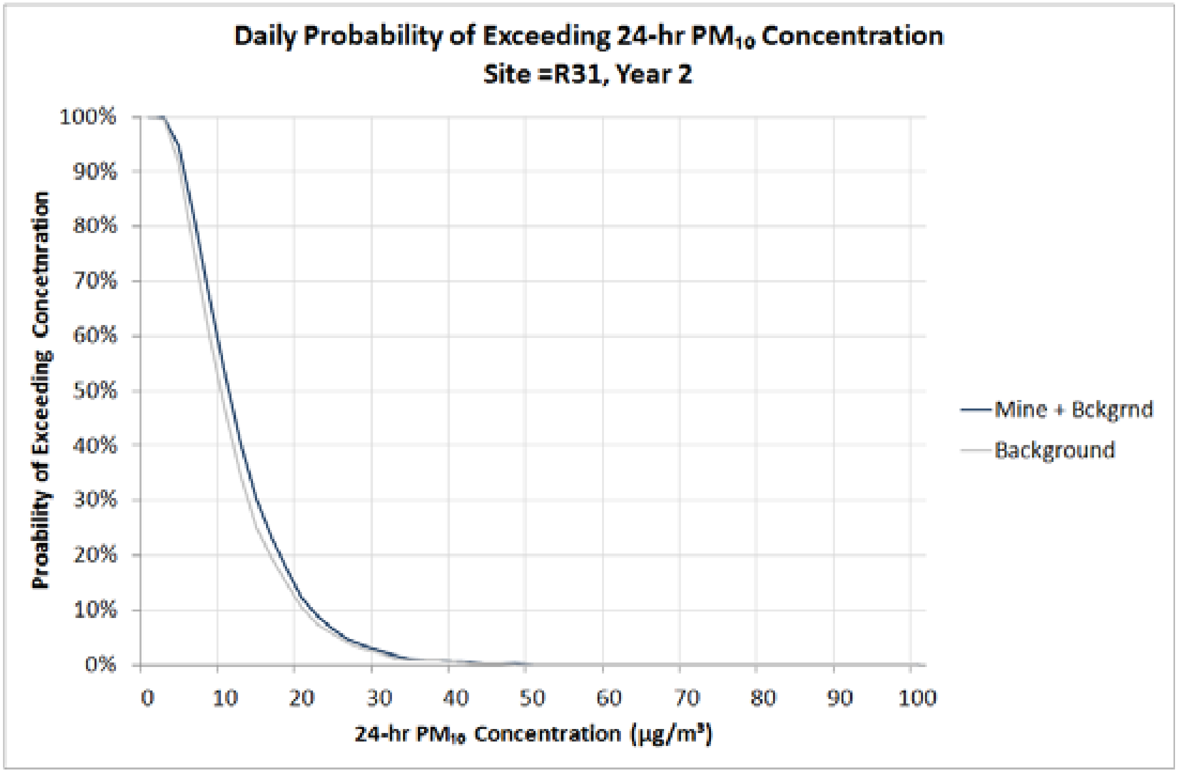


Figure 7-4: Year 2 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

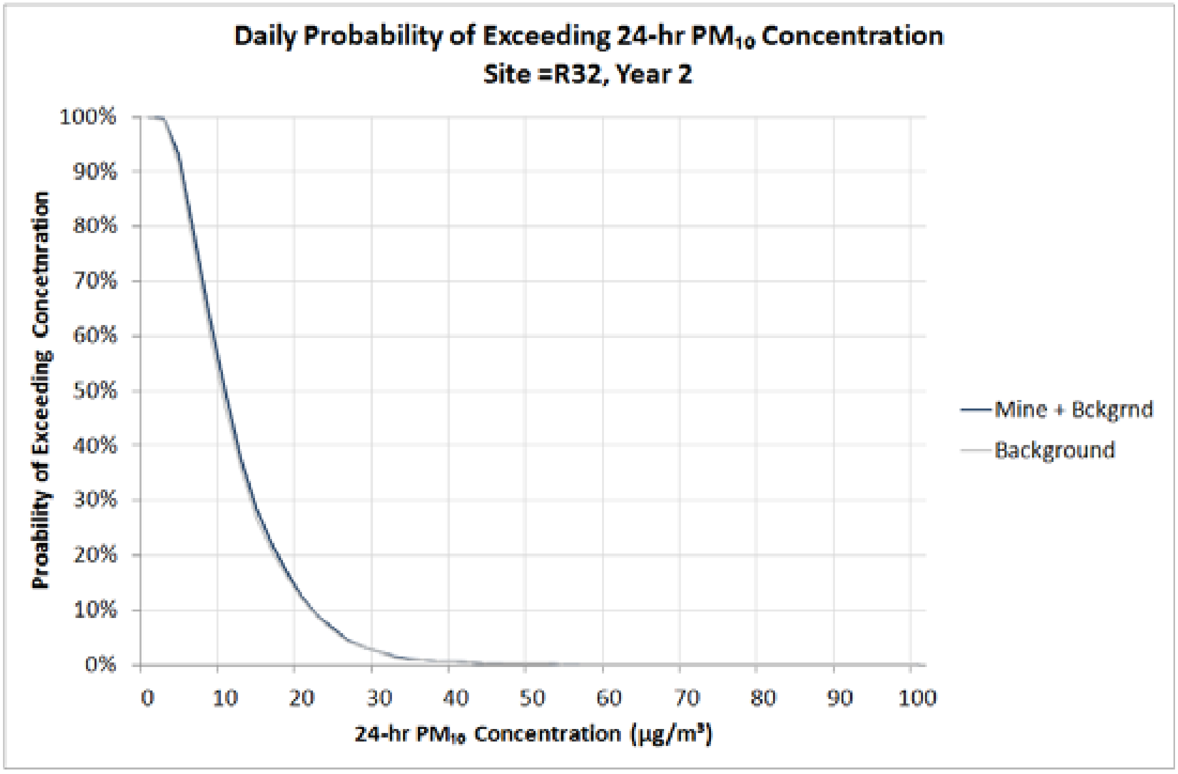


Figure 7-5: Year 2 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

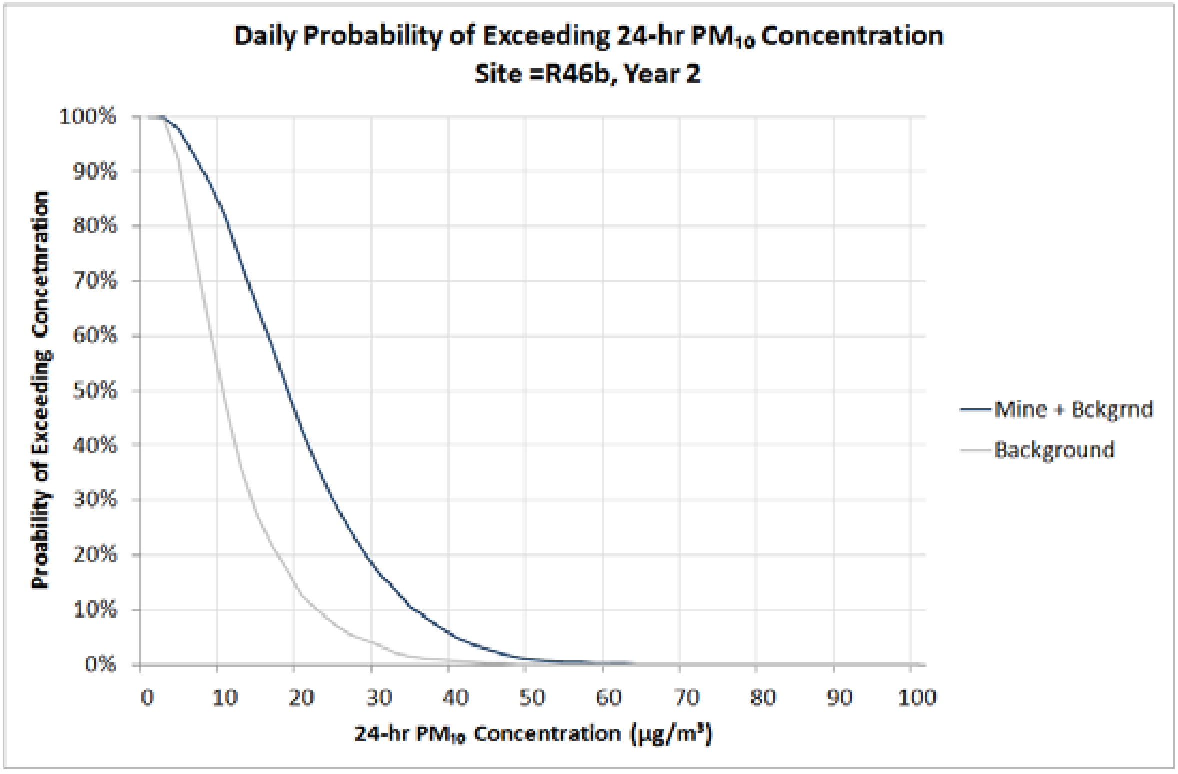


Figure 7-6: Year 2 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

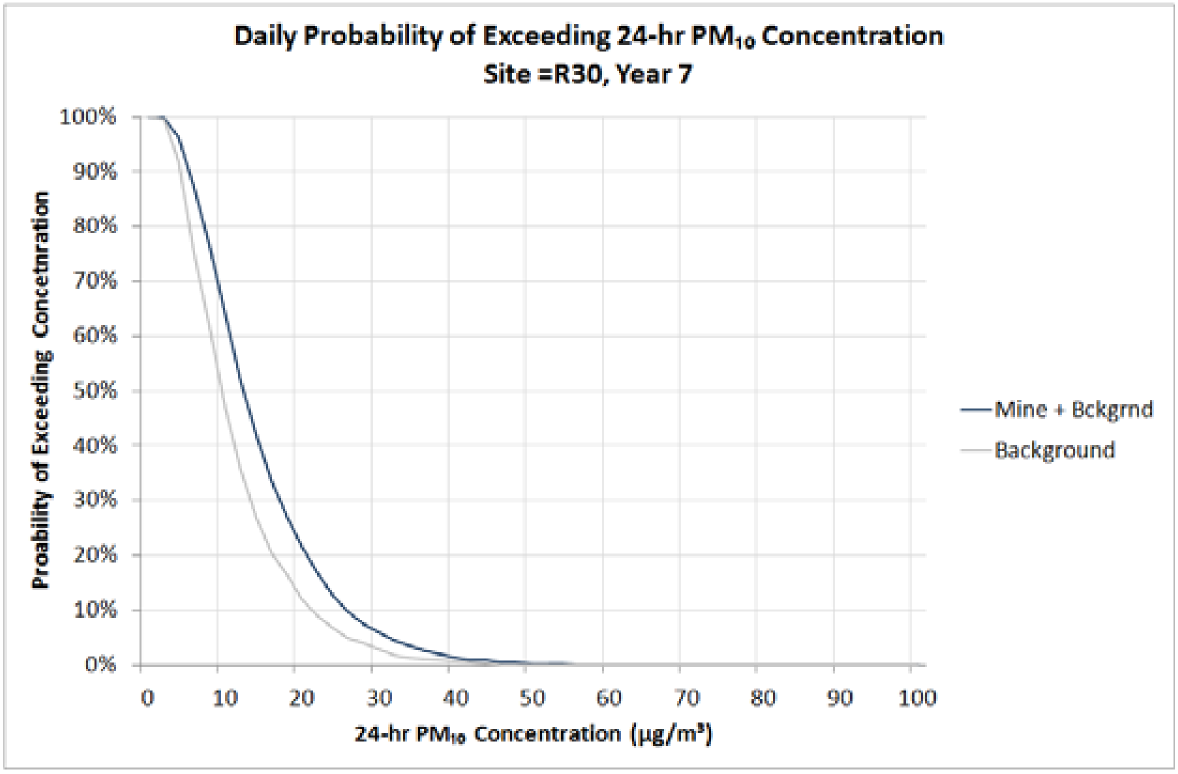


Figure 7-7: Year 7 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

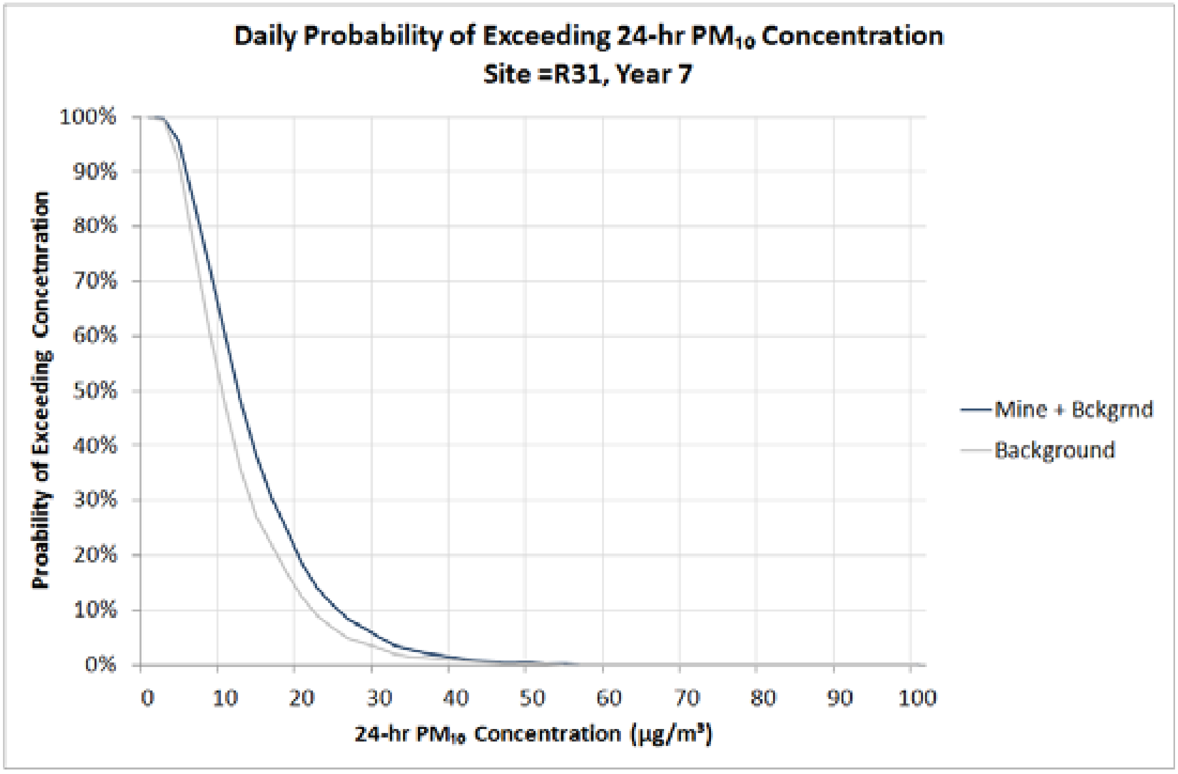


Figure 7-8: Year 7 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

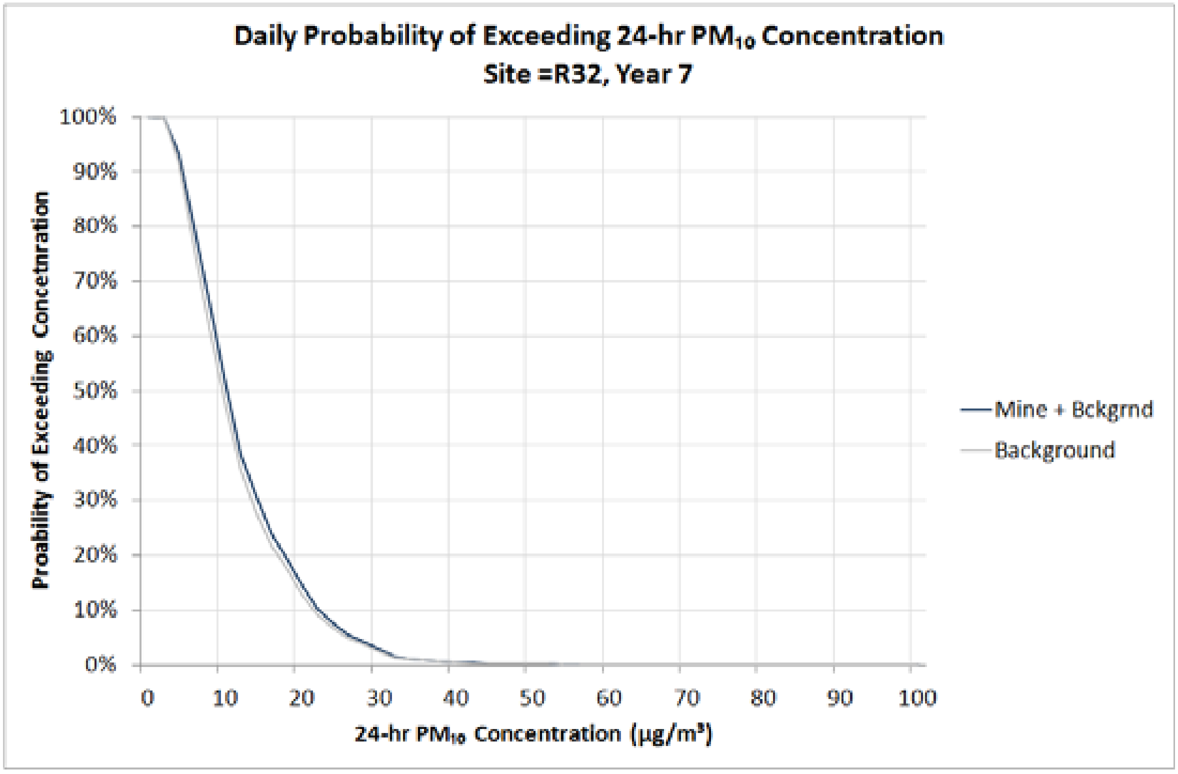


Figure 7-9: Year 7 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

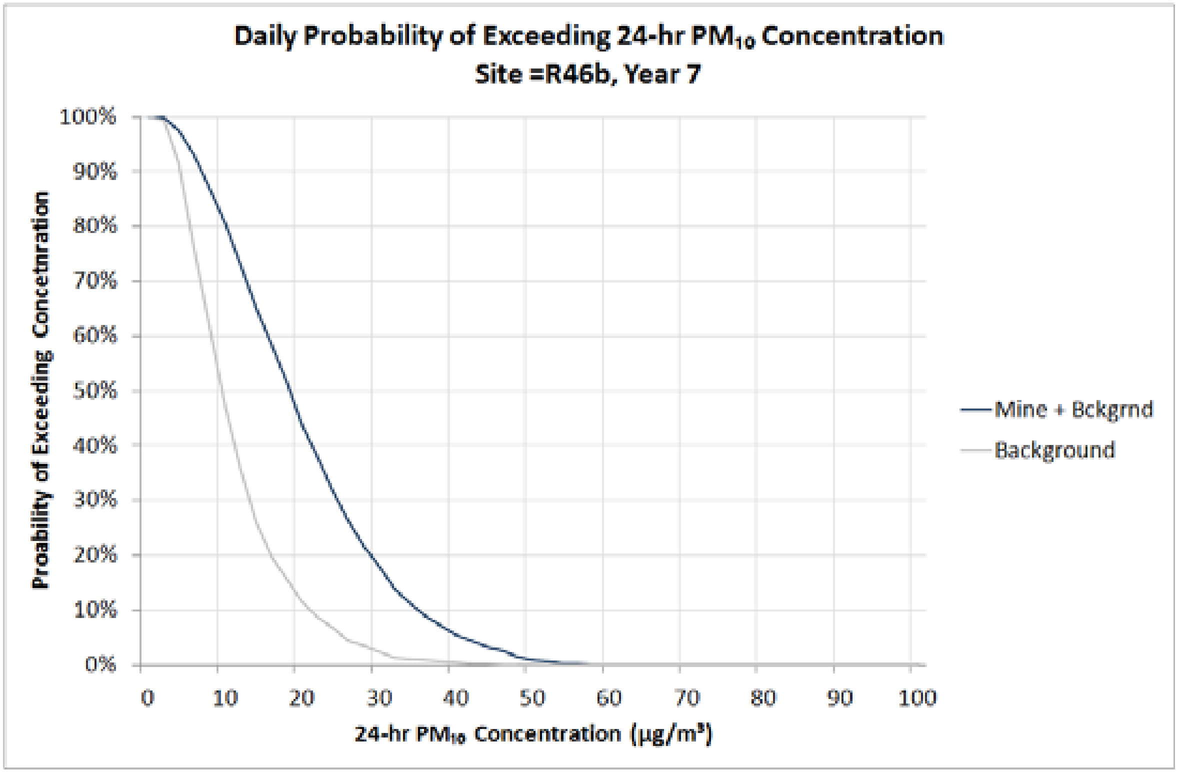


Figure 7-10: Year 7 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

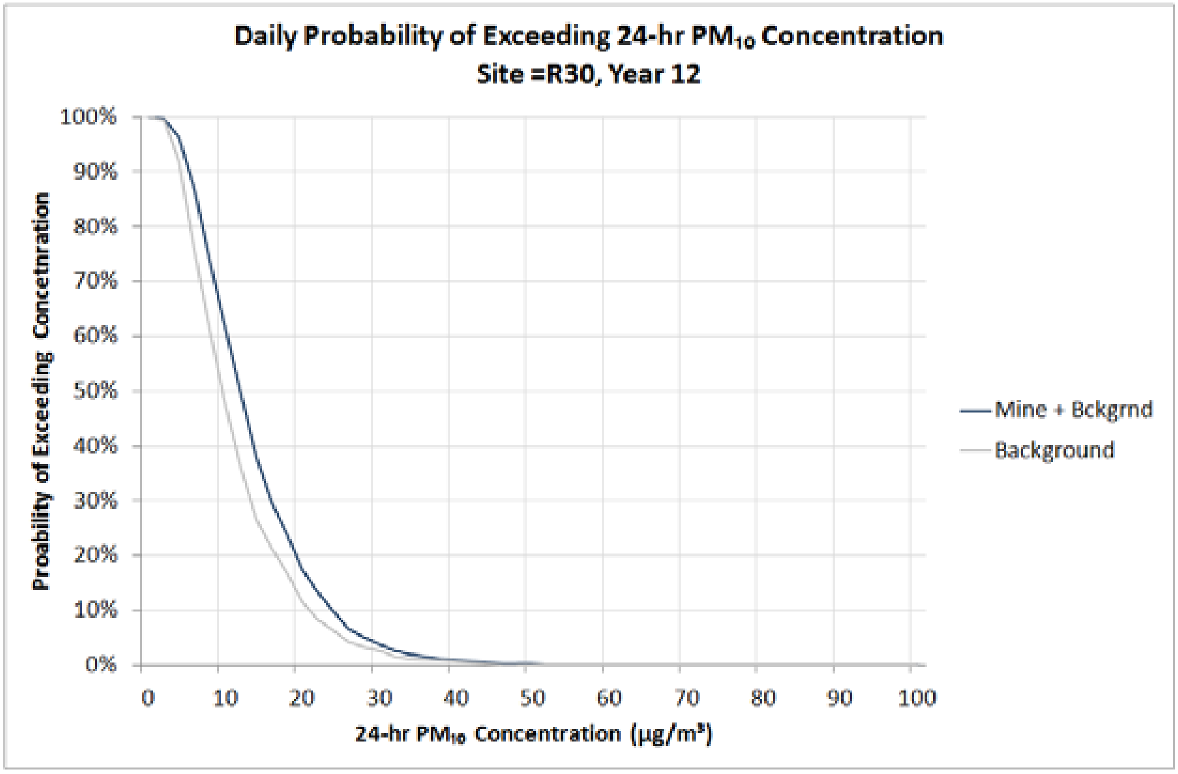


Figure 7-11: Year 12 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

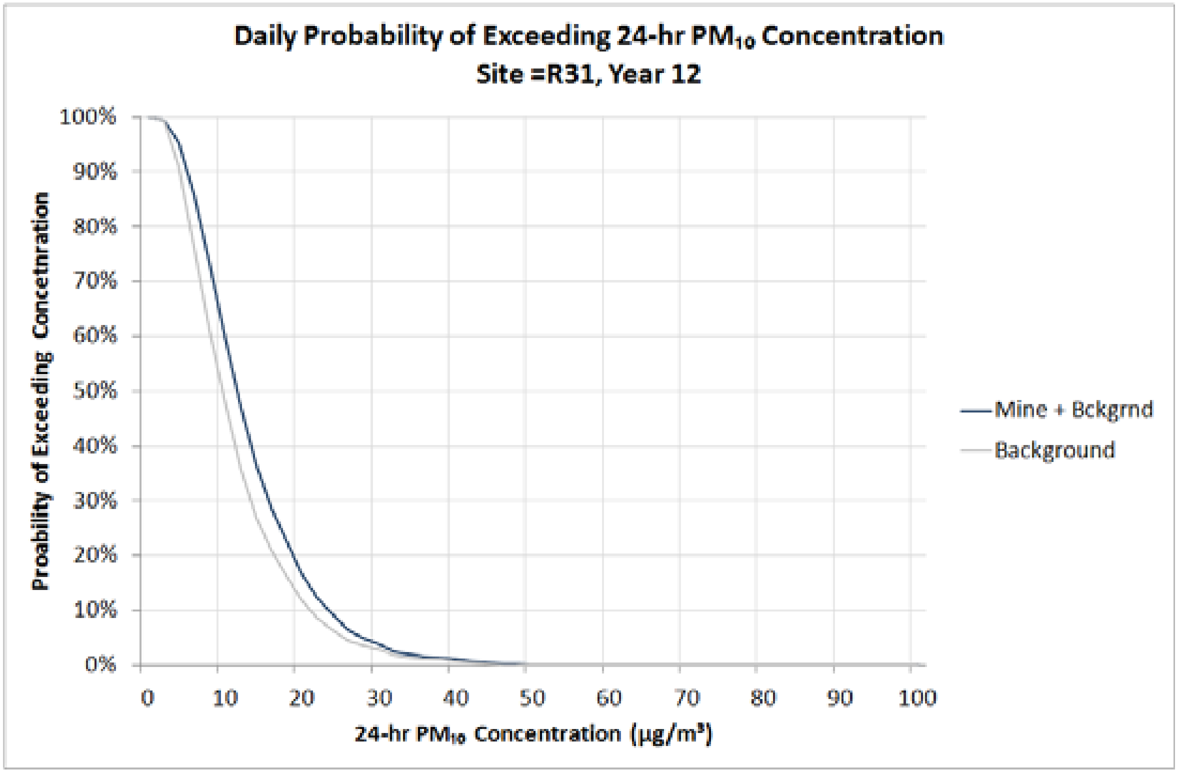


Figure 7-12: Year 12 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

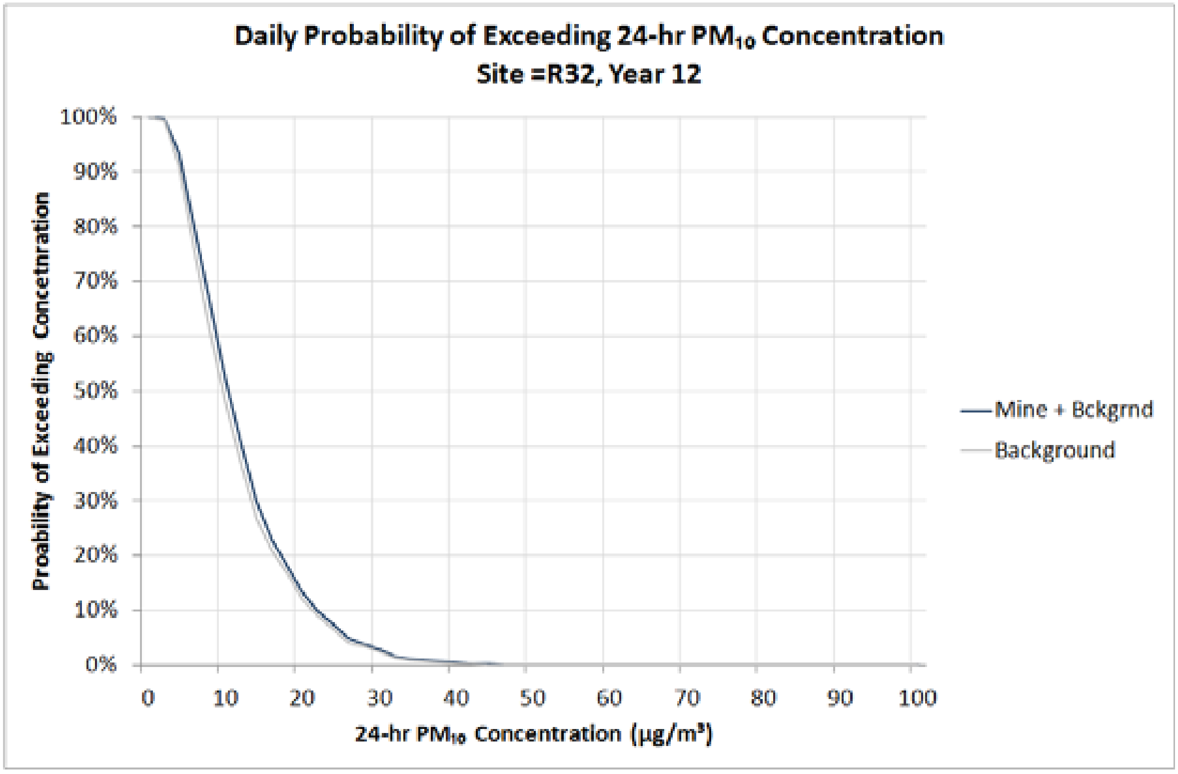


Figure 7-13: Year 12 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

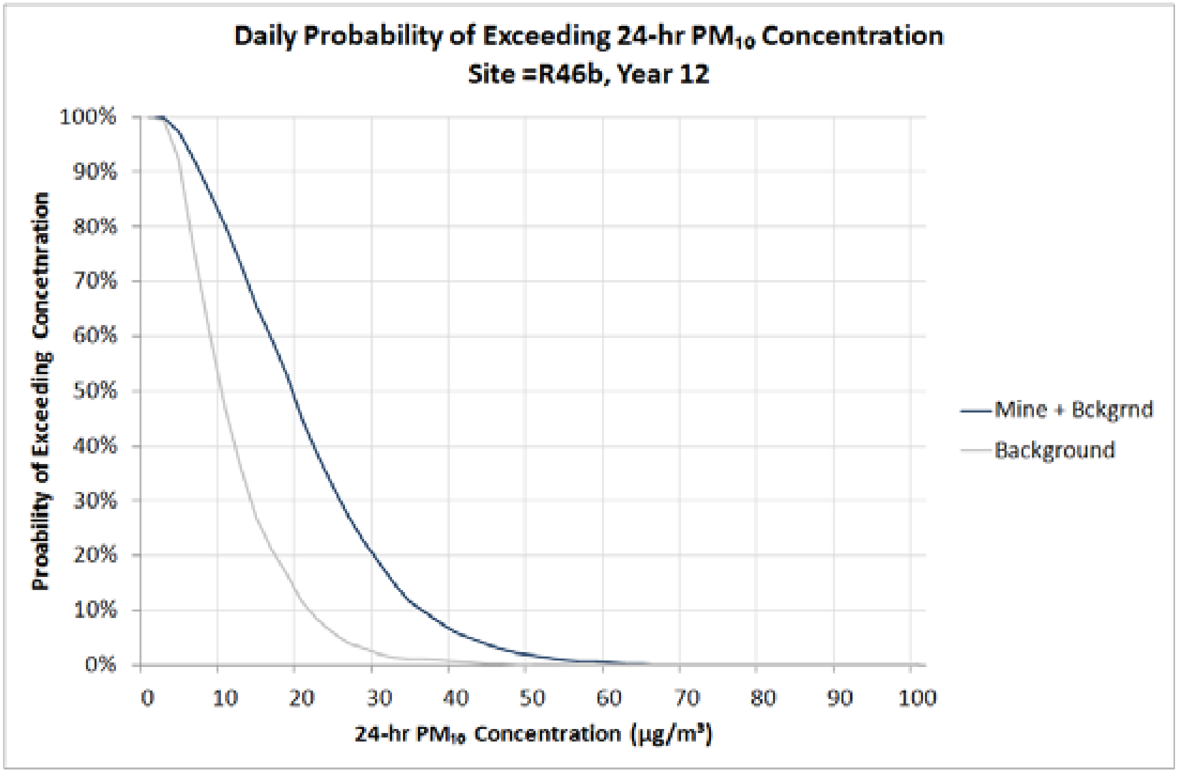


Figure 7-14: Year 12 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

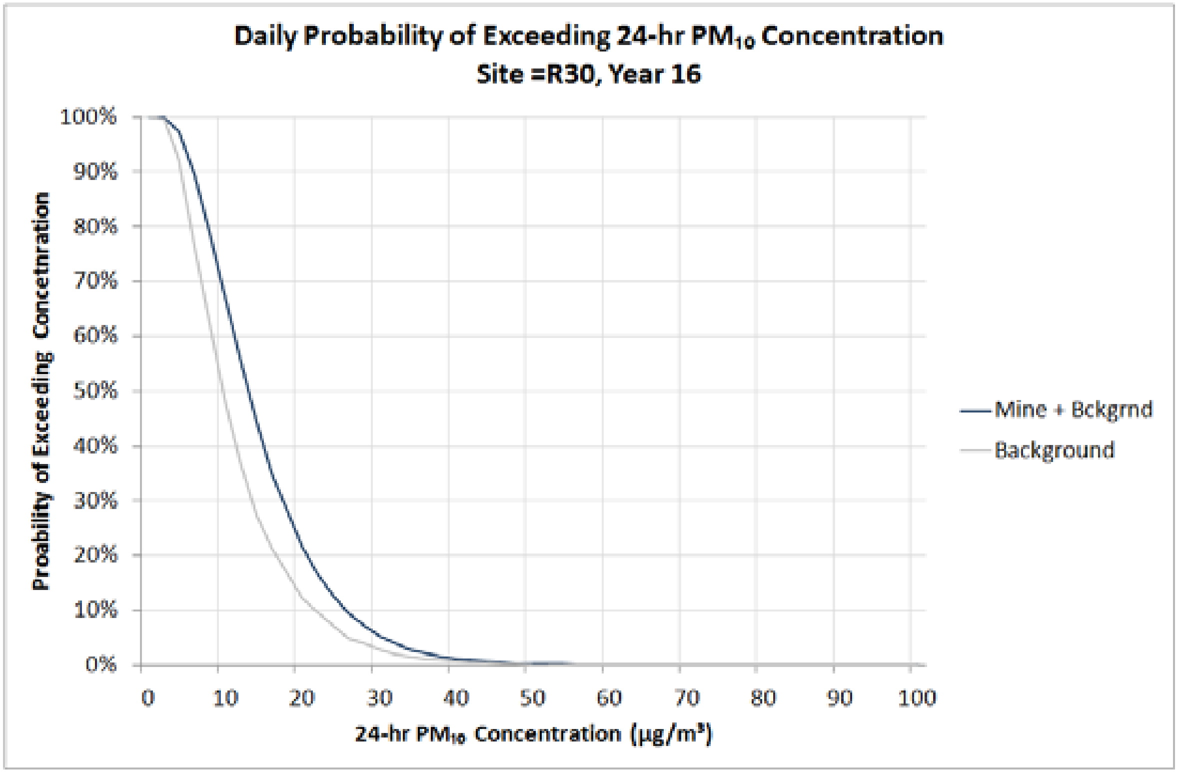


Figure 7-15: Year 16 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

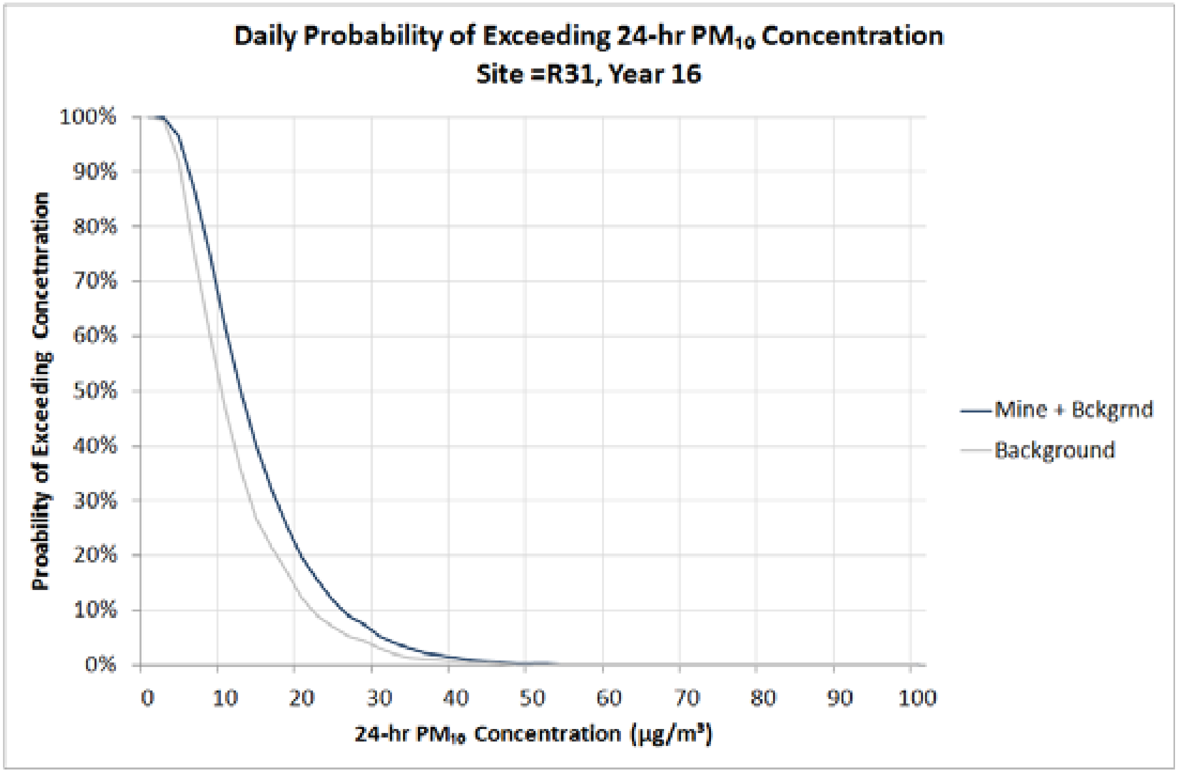


Figure 7-16: Year 16 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

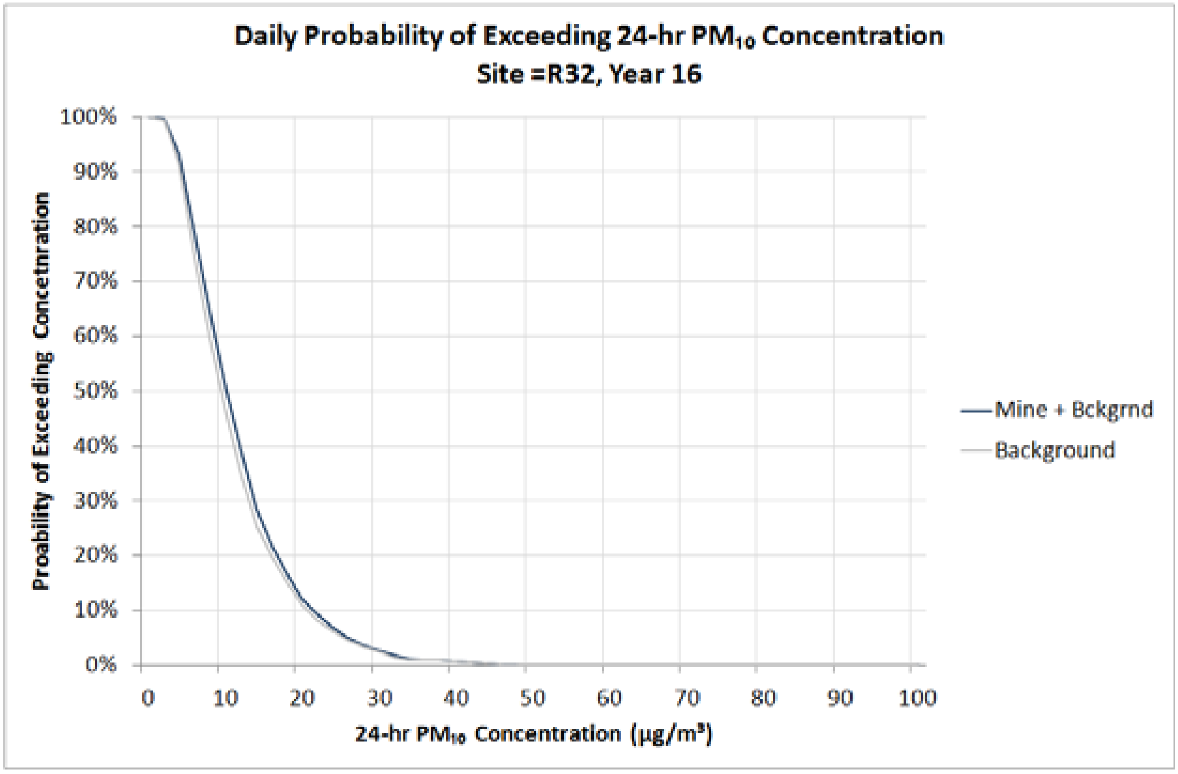


Figure 7-17: Year 16 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

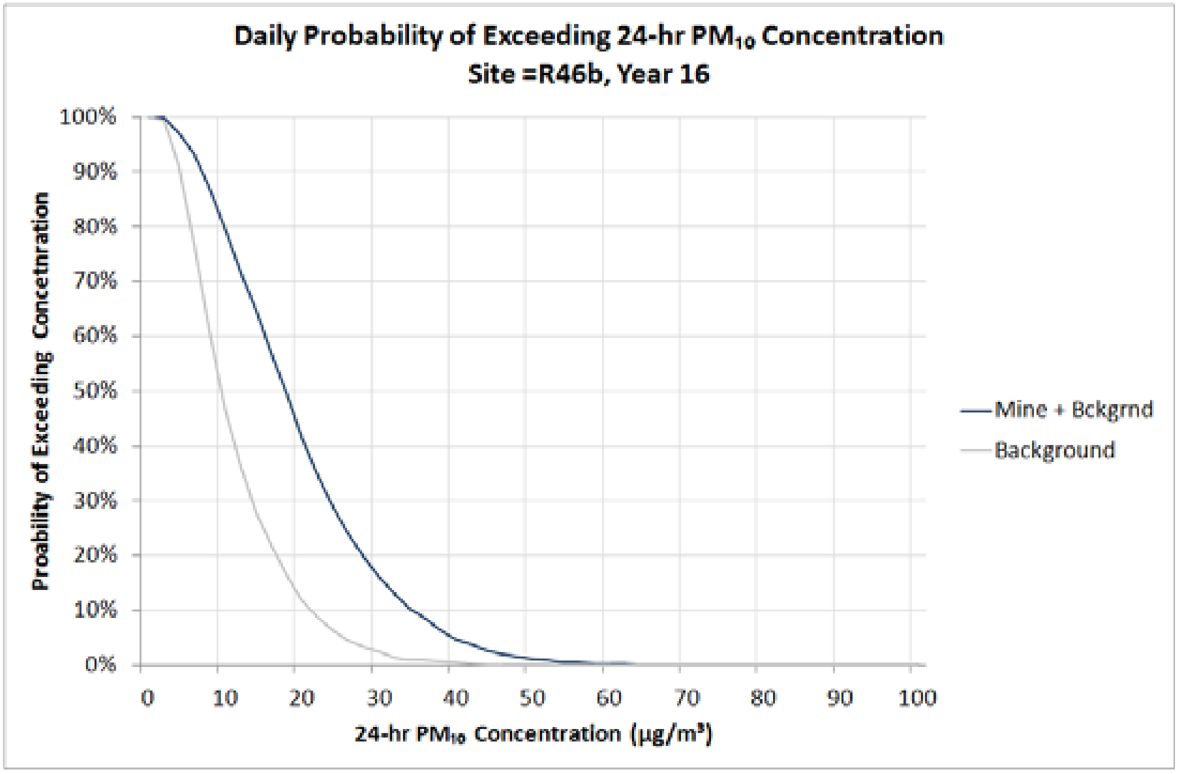


Figure 7-18: Year 16 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

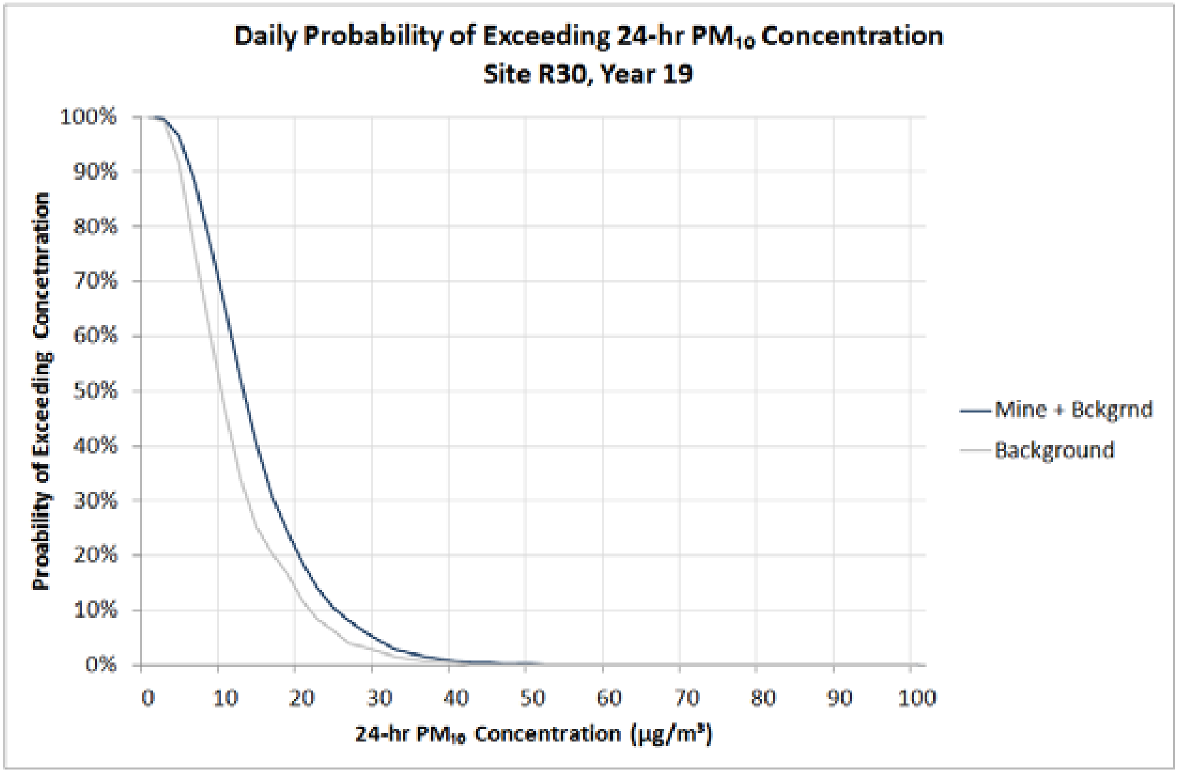


Figure 7-19: Year 19 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

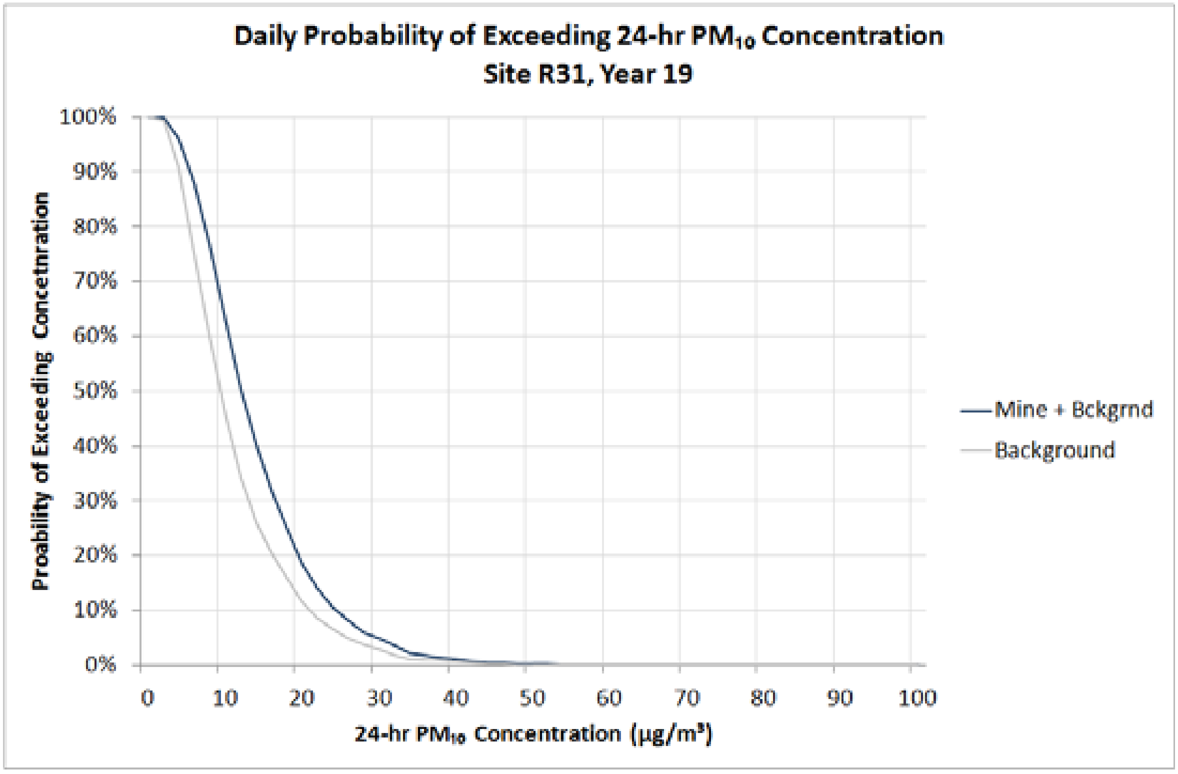


Figure 7-20: Year 19 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

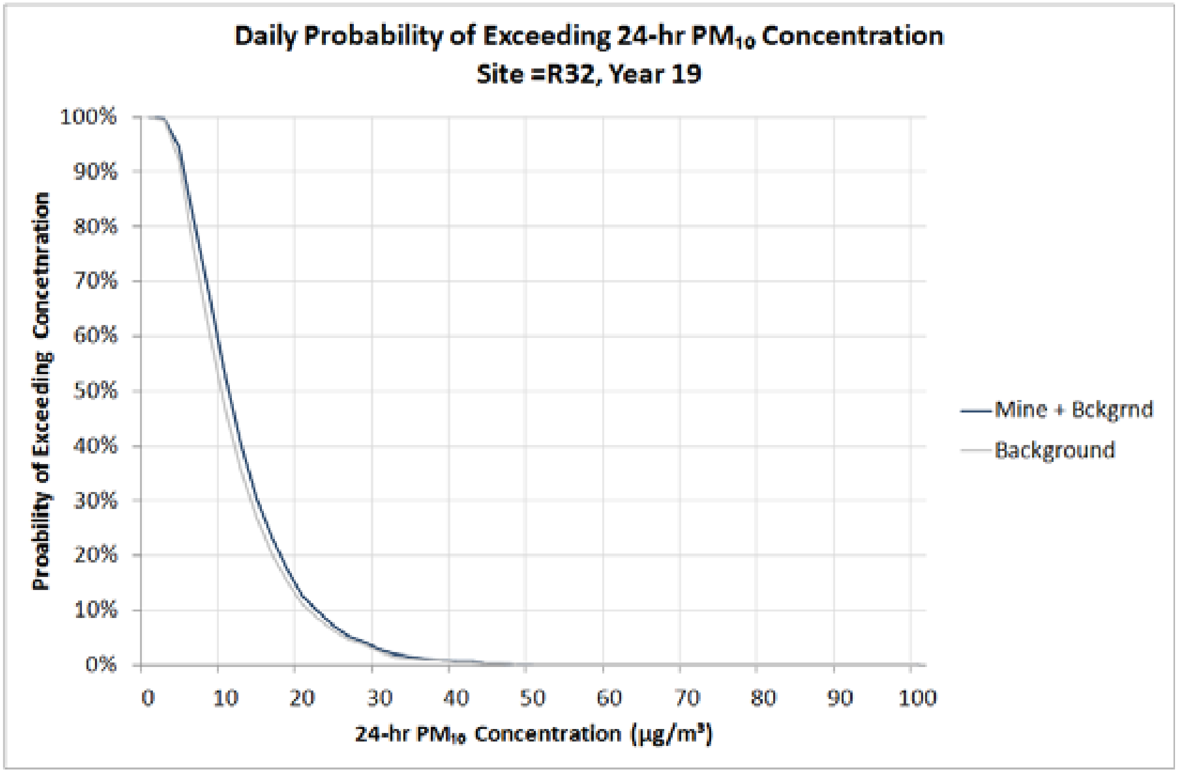


Figure 7-21: Year 19 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

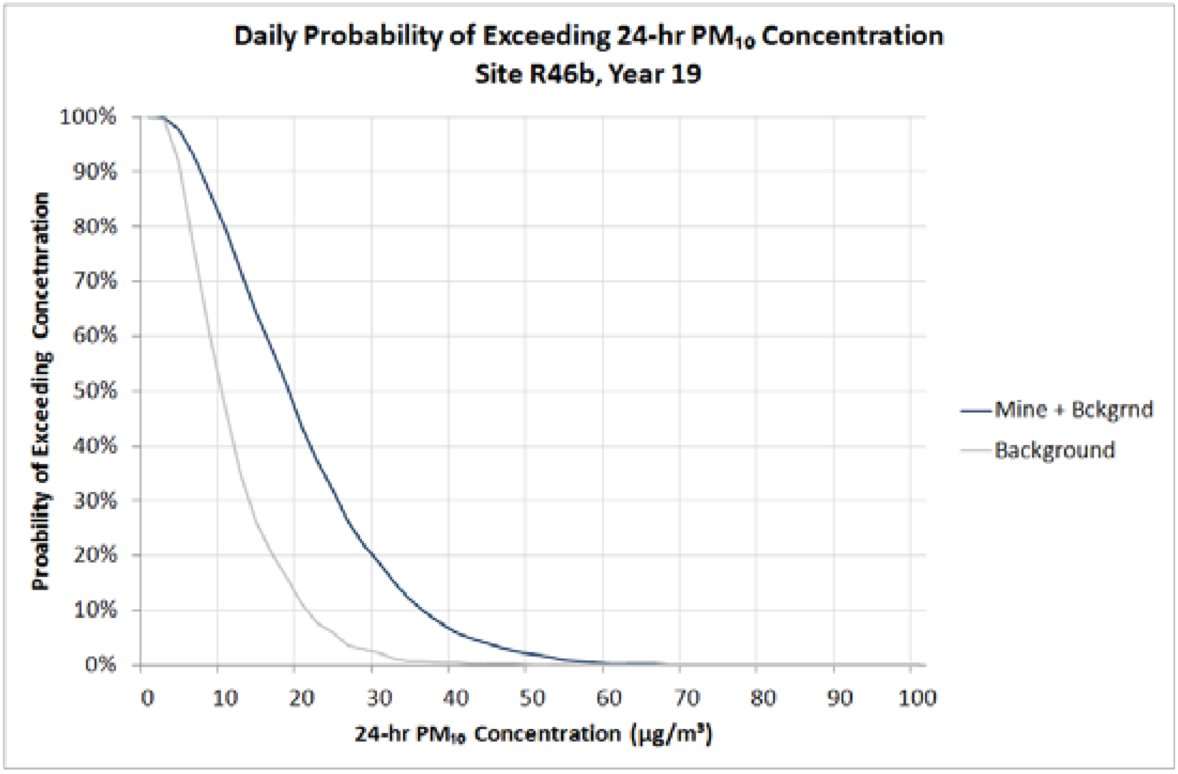


Figure 7-22: Year 19 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

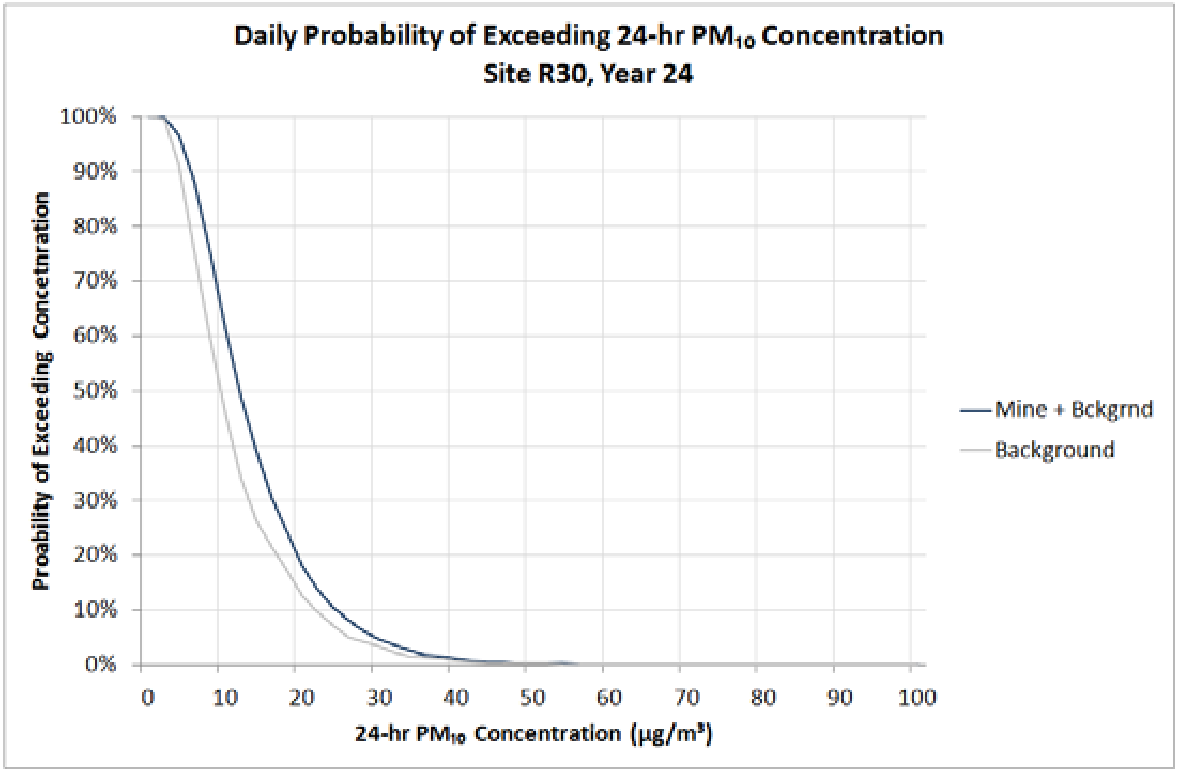


Figure 7-23: Year 24 – Residence 30 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

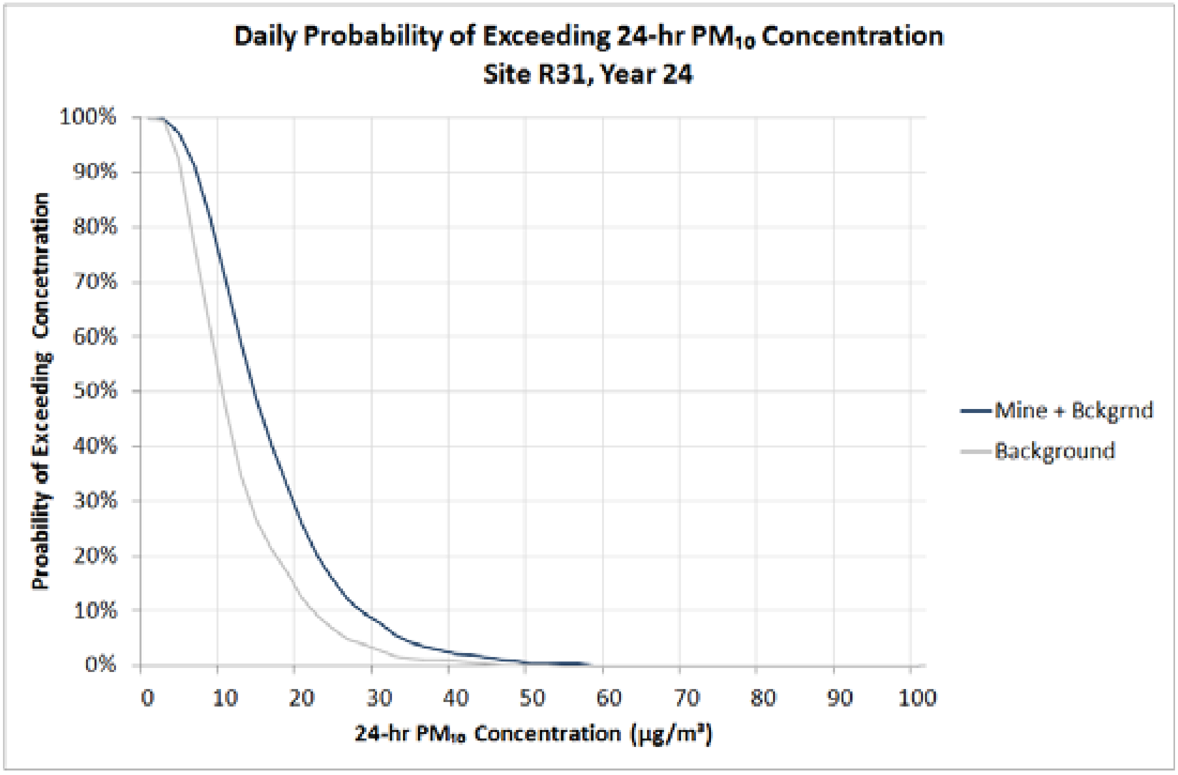


Figure 7-24: Year 24 – Residence 31 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

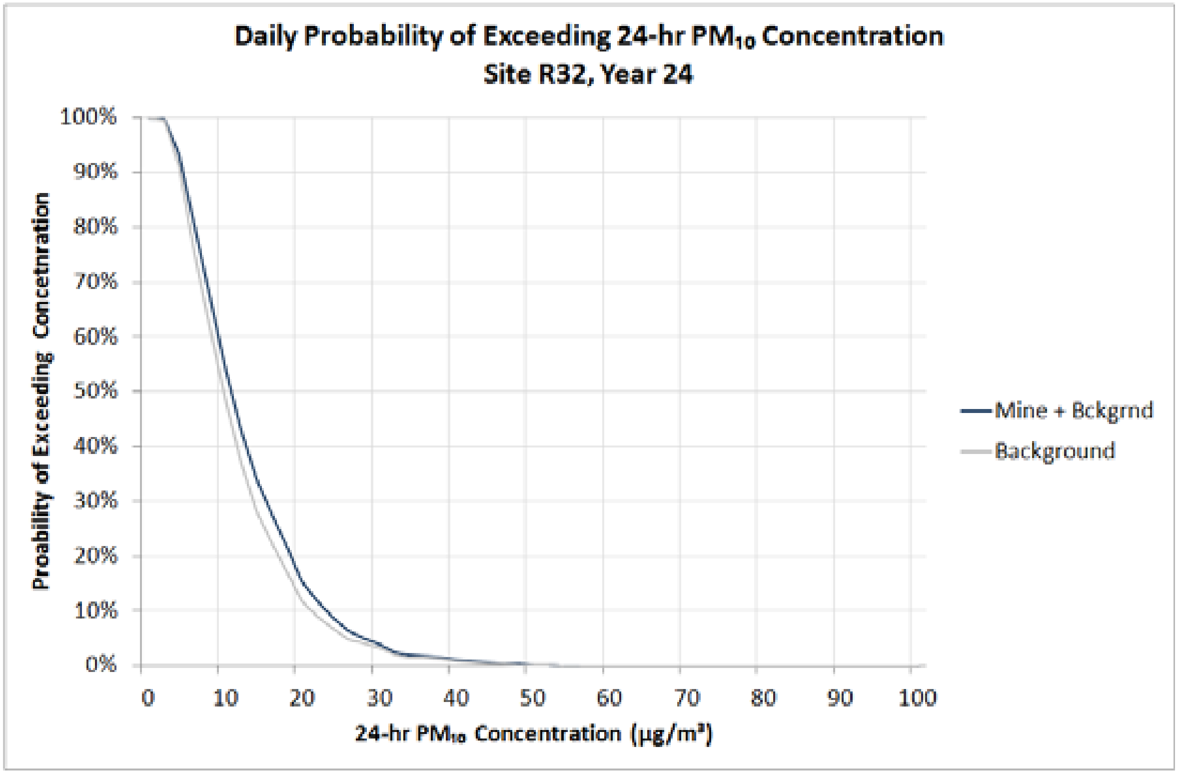


Figure 7-25: Year 24 – Residence 32 – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

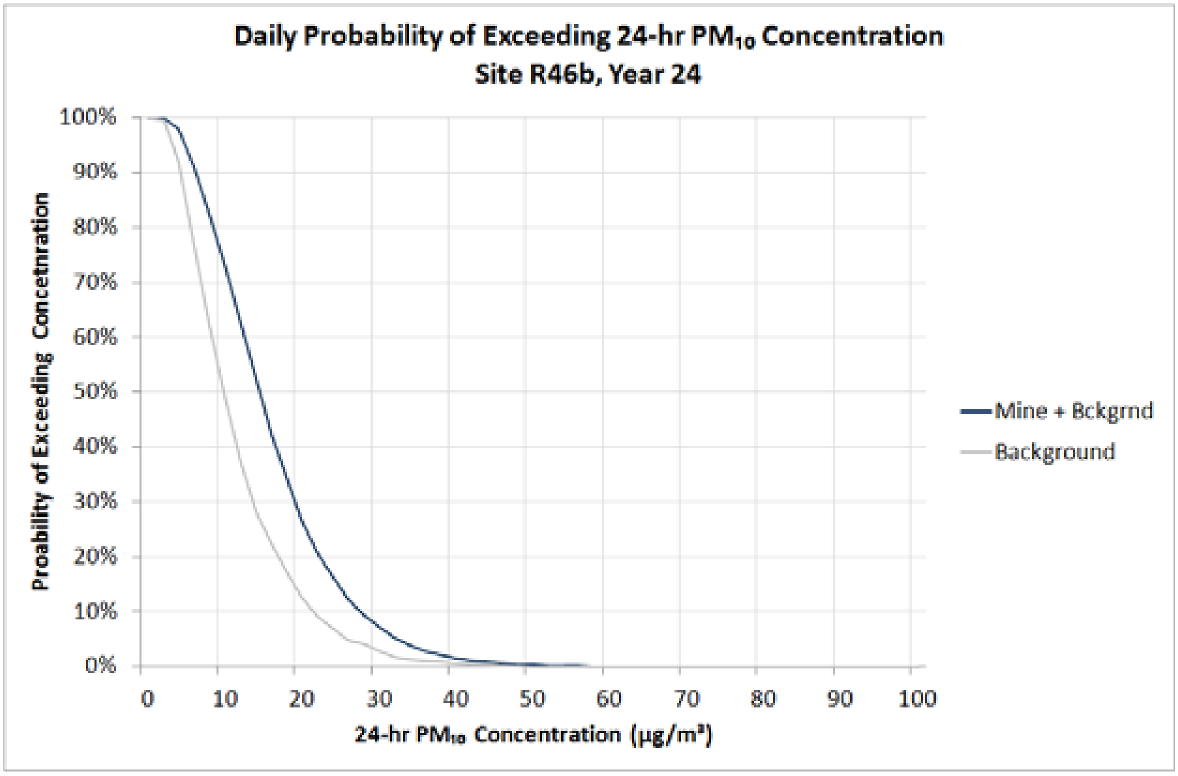


Figure 7-26: Year 24 – Residence 46b – Cumulative and background 24-hour average PM_{10} concentration ($\mu g/m^3$) statistics

7.4 Assessment of Impacts on Privately Owned Land

The DoP requires that projects demonstrate that no additional exceedences of the impact assessment criteria are caused at any residence or on more that 25 percent of privately owned land, including vacant land. This assessment is presented below.

Analysis of the impacted area is based on the combination of maximum predicted 24-hour average PM_{10} concentrations, annual average PM_{10} concentrations, annual average TSP concentrations and dust deposition criteria for all modelled years. This zone of impact is presented in **Figure 7-27** as the shaded area.

Blocks of land that have the same owner and are contiguous have been considered as a single area. For reference, the block numbers associated with each owner are provided in **Appendix A**.

The percentage of this privately owned land that is predicted to be impacted by dust levels above these criteria is presented in **Table 7-8**.

It can be seen from **Table 7-8** that there are 6 blocks of privately-owned land that are predicted to experience dust impacts on more than 25% of their land during the proposed life of the MCC. Properties 4, 5, 20, 36 and 135 listed below are currently entitled to acquisition upon request under the Stage 1 Project Approval. Property 30 is predicted to experience dust impacts on greater than 25% of their land.

Table 7-8: Privately-owned land area predicted to be impacted

Owner No.	Owner	Block ID
4	MJ Swords	ALL
5	MJ & PM Swords	ALL
20	AJ & NA Williamson	ALL
30	RB Cox	74, 68, 22, 102
36	DJ & Y Rayner	ALL
134	MJ & H Swords	ALL

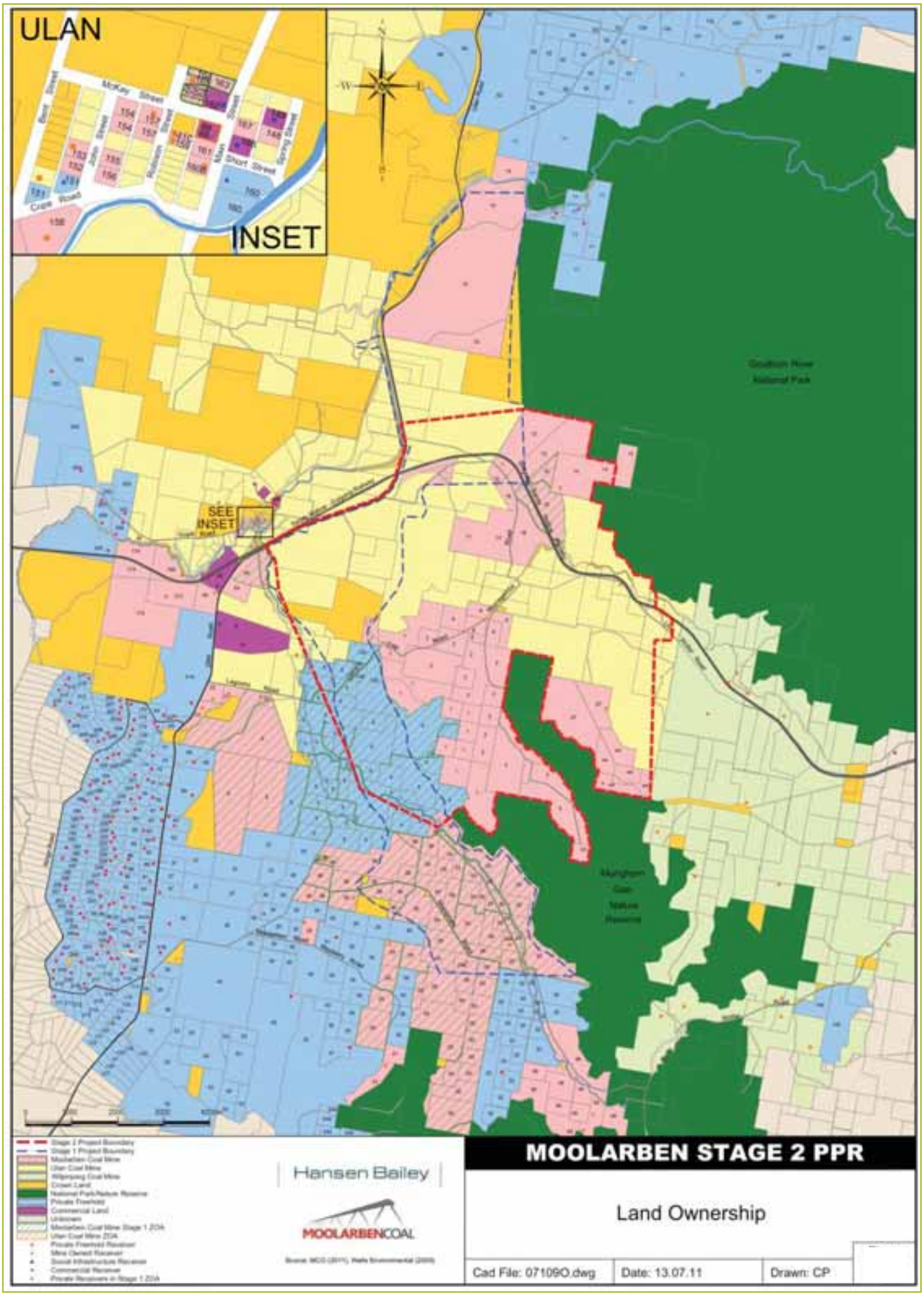


Figure 7-27: Maximum zone of impact for MCM

8 MITIGATION AND MONITORING

8.1 Introduction

The proposed mining activities will generate dust. It is therefore prudent to take reasonable and practicable measures to prevent or minimise dust impacts at surrounding receptors.

MCM currently has a dust emission management and control procedure in place. This section outlines the current mitigation controls and supplements with leading dust management practices that should be implemented by MCM.

8.2 Real-Time Proactive Dust Management

Dispersion modelling for the MCC indicates that the most significant source of dust emissions, in terms of short term 24-hour impacts, results from the hauling of overburden and ROM coal. The proposed real-time dust management system is therefore discussed in specific relation to this dust source; however it is equally applicable to controlling excessive dust emissions from any MCC source.

MCM would be able to respond to the potential for excessive dust impacts through the existing real-time dust monitors located around the mine site. The real-time monitors would continuously log short-term dust concentrations (15min, 30min and 1-hour averages) and report the data via GPS/GRSM modem to a web based recording system. When certain short-term trigger levels are reached / exceeded, a message is delivered to the appropriate personnel, alerting them to the high dust levels. The on-site weather station could also report wind conditions at the time, allowing appropriate personnel to determine the origin of the elevated dust levels.

The short-term trigger levels (say 1-hour average) would be derived based on a statistical analysis of appropriate peak to mean ratios and set at a level where a few consecutive readings at these high levels risk a breach of the 24-hour impact assessment criteria. During the life of the MCC, should more suitable technology become available, this system may be modified and enhanced if required.

8.3 Dust management and control procedures

The term "best practice" is frequently used in pollution control and pollution management. However, what constitutes "best practice" is difficult to define in practical situations. Environment Australia published a series of booklets in the 1990's to assist the mining industry with incorporating best practice environmental management through all phases of mineral production from exploration through construction and eventual closure. In the booklet for Dust Control (**Environment Australia, 1998**) they defined "best practice" as follows:

"Best Practice can be defined as the most practical and effective methodology that is currently in use or otherwise available. Best practice dust management can be achieved by appropriate planning in the case of new or expanding mining operations and by identifying and controlling dust sources during the active phases of all mining operations."

This document was been updated by the Department of Energy, Resources and Tourism (DERT) who published the handbook *Leading Practice Sustainable Development Program for the Mining Industry* (**DERT, 2009**). This new handbook introduces the term "leading practice", in which:

"...considers the latest and most appropriate technology applied in order to seek better financial, social and environmental outcomes for present stakeholders and future generations."

The implementation of a reactive or proactive dust management system, as described above, is considered best and leading practice and would apply leading technology to achieve the best possible outcomes currently available.

In December 2010, DECCW released the NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining, 2010, prepared by Katestone Environmental (**Katestone, 2010**). The document details specific best practice measures for control of dust emissions from coal mines in NSW.

Table 8-1 and **Table 8-2** list the different sources of wind-blown and mining-generated dust respectively and the proposed controls. It is anticipated that MCM would apply these control procedures where applicable.

Table 8-1: Best Practice Control Procedures for Wind-blown Dust

Source	DECCW Best Practice (Katestone, 2010)	Proposed for MCC
Wind Erosion of Exposed Materials and Stockpiles	Implementation of rehabilitation Use of suppressants on stockpiles	Disturb only the minimum area necessary for mining. Reshape, topsoil and rehabilitate completed overburden emplacement areas as soon as practicable after the completion of overburden tipping. Water carts on coal handling areas and stockpiles.
Overburden dumps	-	Minimise overburdens dump area to allow for increased rehabilitation. Designed to ensure rehabilitation of external faces is completed as soon as practical.
Rehabilitation	-	Complete as soon as practical after disturbance.

Table 8-2: Best Practice Controls for Mine-generated Dust

Source	DECCW Best Practice (Katestone, 2010)	Proposed for MCC
Haul Roads Within Disturbance Area	Application of dust suppressant on haul roads. Larger capacity trucks.	A control of level of 85% has been assumed to be attainable through application of water[7]. Largest practical truck size (220t) to be used. Well defined haul routes.
Topsoil Stripping		Access tracks used by topsoil stripping equipment during their loading and unloading cycle will be watered.
Blasting	Avoid unfavourable weather conditions Minimise blast area	Blasting, where practical, performed during daylight hours and favourable weather conditions. Minimise the area blasted.
Drilling	Air extraction to bag filter (NB: **Katestone 2010** notes that no mines currently use this practice) Acceptable alternatives: Water sprays Curtains	Down hole watering Use of dust curtains
Bulldozing	Minimise travel speed Application of water to travel routes	Minimise travel speed and distance Apply water to haul roads
Conveyors	-	All conveyors will have transfer points enclosed. Dust curtains are to be installed at transition points from transfer station.
Loading and dumping overburden	Minimise drop heights Application of water.	Drop heights will be minimised.
Loading and dumping ROM coal	Enclosure with of ROM hopper with air extraction to a fabric filter or other control device (NB: **Katestone 2010** notes that no mines currently use this practice). Application of water.	Automatic water sprays whilst dumping into ROM hopper. Water application by fixed sprays or water cart on ROM pad.

[7] **Buonicore and Davis (1992)** show the level of control that can be achieved through the application of water and / or chemical stabilisers. Controls of up to 95% can be achieved provided the moisture content of the surface material is maintained at 9%.

8.4 Monitoring

The locations of the current monitoring stations are shown on **Figure 4-13**. It is expected that the existing monitoring network would need only minor changes to allow the mine to manage dust emissions and verify environmental performance.

The proposed modifications to the existing network would be to:

- Relocate TEOM02 away from any dust generating activities. A suitable location would be near HV02 on Ridge Road.

Any new or relocated air quality monitors would be sited to avoid locations where nearby activities generate significant local dust; such as near dirt roads, exposed areas and active agricultural land.

9 GREENHOUSE GAS ASSESSMENT

The greenhouse gas assessment comprises:

- Qualitative assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the MCC;
- A qualitative assessment of the potential impacts of these emissions on the environment; and
- An assessment of all reasonable and feasible measures that could be implemented to minimise greenhouse gas emissions of the Preferred Project and ensure energy efficiency.

9.1 Introduction

Greenhouse gas emissions have been estimated based upon the methods outlined in the following documents:

- The World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol (**WBCSD**/**WRI 2004**);
- National Greenhouse and Energy Reporting (Measurement) Determination 2008; and
- The Australian Government Department of Climate Change and Energy Efficiency (DCCEE) National Greenhouse Accounts Factors 2010.

The Greenhouse Gas Protocol establishes an international standard for accounting and reporting of greenhouse gas emissions. The Greenhouse Gas Protocol has been adopted by the International Standard Organisation, endorsed by greenhouse gas initiatives (such as the Carbon Disclosure Project) and is compatible with existing greenhouse gas trading schemes.

Three 'scopes' of emissions (scope 1, scope 2 and scope 3) are defined for greenhouse gas accounting and reporting purposes. This terminology has been adopted in Australian greenhouse reporting and measurement methods and has been employed in this assessment. The 'scope' of an emission is relative to the reporting entity, indirect scope 2 and scope 3 emissions will be reportable as direct scope 1 emissions from another facility.

1) Scope 1: Direct Greenhouse Gas Emissions

Direct greenhouse gas emissions are defined as those emissions that occur from sources that are owned or controlled by the reporting entity. Direct greenhouse gas emissions are those emissions that are principally the result of the following types of activities undertaken by an entity:

- Generation of electricity, heat or steam. These emissions result from combustion of fuels in stationary sources, the principal source of greenhouse emissions associated with the operation of the MCC;
- Physical or chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials, e.g., the manufacture of cement, aluminium, etc;
- Transportation of materials, products, waste and employees. These emissions result from the combustion of fuels in entity owned/controlled mobile combustion sources (e.g. trucks, trains, ships, aeroplanes, buses and cars); and
- Fugitive emissions. These emissions result from intentional or unintentional releases (e.g. equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting); HFC emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

2) Scope 2: Energy Product Use Indirect Greenhouse Gas Emissions

Scope 2 emissions are a category of indirect emissions that account for greenhouse gas emissions from the generation of purchased energy products (principally, electricity, steam/heat and reduction materials used for smelting) by the entity.

Scope 2 in relation to the MCC covers purchased electricity, defined as electricity that is purchased or otherwise brought into the organisational boundary of the entity. Scope 2 emissions physically occur at the facility where electricity is generated. Entities report the emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations as scope 2.

3) Scope 3: Other Indirect Greenhouse Gas Emissions

Scope 3 emissions are defined as those emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity. Some examples of Scope 3 activities provided in the Greenhouse Gas Protocol are extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services.

In the case of this assessment, Scope 3 emissions will include emissions associated with fuel cycles, the transport and the combustion of product coal. The emissions from the burning of the product coal will be much larger than those associated with the extraction and processing of the coal. These indirect emissions (Scope 3) are from sources not owned or controlled by MCM, and therefore measures to minimise or reduce these emissions cannot be made by MCM. It would be fair to say that these emissions would still occur regardless of the MCC producing coal.

The Greenhouse Gas Protocol provides that reporting Scope 3 emissions is optional. If an organisation believes that Scope 3 emissions are a significant component of the total emissions inventory, these can be reported along with Scope 1 and Scope 2. However, the Greenhouse Gas Protocol notes that reporting Scope 3 emissions can result in double counting of emissions and can also make comparisons between organisations and/or products difficult because reporting is voluntary.

Double counting needs to be avoided when compiling national (country) inventories under the Kyoto Protocol. The Greenhouse Gas Protocol also recognises that compliance regimes are more likely to focus on the "point of release" of emissions (i.e. direct emissions) and/or indirect emissions from the purchase of electricity.

9.2 Greenhouse Gas Assessment Policy Summary

9.2.1 National Greenhouse and Energy Reporting Act

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) was passed in September 2007. The NGER Act establishes a mandatory corporate reporting system for greenhouse gas emissions, energy consumption and production. The NGER scheme consolidates existing greenhouse reporting schemes. The NGER Act is underpinned by a number of legislative instruments that provide greater detail about obligations, which in conjunction with the NGER Act, form the National Greenhouse and Energy Reporting System, as follows:

- The National Greenhouse and Energy Reporting Regulations 2008; and
- The National Greenhouse and Energy Reporting (Measurement) Determination 2008.

NGER is seen as an important first step in the establishment of a domestic emissions trading scheme. Companies must register and report if they emit greenhouse emissions or produce/consume energy at or above the following trigger thresholds:

- If they own facilities that emit greater than 25 kilotonnes (kt) greenhouse emissions (expressed as CO_2-e) or produce / consume greater than 100 terajoules (TJ) of energy; and
- If the corporate group emits greater than 125 kt of greenhouse emissions (expressed as CO_2-e) or produce / consume greater than 500 TJ of energy.

Scope 1 and Scope 2 greenhouse gas emissions are required to be reported under the NGER Act.

9.2.2 Carbon Pollution Reduction Scheme

A green paper detailing Australia's plans to implement a domestic emissions trading scheme was released on the 16 July 2008. A subsequent white paper was released in December 2008 (**DCC, 2008**) with the intent that a Carbon Pollution Reduction Scheme (CPRS) would commence in July 2010. The proposed CPRS is a 'cap and trade' emissions trading mechanism scheme whereby emitters of greenhouse gases greater than 25,000 t carbon dioxide-equivalent (CO_2-e) (Scope 1 only) are required to purchase a permit for every tonne of greenhouse gas that they emit.

Due to the global financial crisis, the proposed start date was deferred to July 2011. Legislation was introduced to Parliament in May 2009, and again in November 2009 but was voted down in the senate. On 27 April 2010, the Prime Minister announced that the Government has decided to delay the implementation of the CPRS until after the end of the current commitment period of the Kyoto Protocol and only when there is greater clarity on the action of other major economies including the US, China and India.

On 24 April 2011, the Prime Minister announced the climate change framework outlining the broad architecture for a carbon price mechanism which has been considered by the Multi-Party Climate Change Committee. Further detailed discussions will be required in relation to a starting price for the carbon price mechanism, assistance arrangements for households, communities and industry, and support for low emissions technology and innovation.

9.3 Greenhouse Gas Emission Estimates

Emissions of CO_2 and CH_4 will be the most significant greenhouse gases for the Project. These gases are formed and released during the combustion of fuels used on-site and from fugitive emissions occurring during the mining process, due to the fracturing of coal seams.

Inventories of greenhouse gas emissions can be calculated using published emission factors. Different gases have different greenhouse warming effects (referred to as global warming potentials) and emission factors take into account the global warming potentials of the gases created during combustion. The estimated emissions are referred to in terms of carbon dioxide equivalent or CO_2-equivalent (CO_2-e) emissions by applying the relevant global warming potential.

The greenhouse gas assessment has been conducted using the National Greenhouse Accounts (NGA) Factors, published by the Department of Climate Change and Energy Efficiency (**DCCEE, 2010**). Project-related greenhouse gas sources included in the assessment are as follows:

- Fuel consumption (diesel) during mining operations – Scope 1;
- Release of fugitive CH_4 during mining – Scope 1;
- Indirect emissions resulting from the consumption of purchased electricity - Scope 2;
- Indirect emissions associated with the production and transport of fuels – Scope 3;
- Indirect emissions associated with transmission and distribution losses from electricity supply – Scope 3;
- Emissions from coal transportation – Scope 3; and
- Emissions from the burning of the product coal – Scope 3.

9.3.1 On-site Fuel Consumption

Greenhouse gas emissions from fuel consumption were estimated using the following equation:

$$E_{CO_2-e} = \frac{Q \times EF}{1000}$$

where:

E_{CO2-e}	=	Emissions of GHG from diesel combustion	(t CO_2-e)
Q	=	Estimated combustion of diesel	(GJ)[1]
EF	=	Emission factor (Scope 1 or Scope 3)for diesel combustion	(kg CO_2-e/GJ)[2]

[1] GJ = giga joules
[2] kg CO_2-e/GJ = kilograms of carbon dioxide equivalents per gigajoule

The quantity of fuel consumed (Q) in each year is based on a derived fuel intensity rate (megalitres per million tonnes per annum of run of mine coal [ML/Mtpa ROM]) derived from the 2010 average fuel consumption as follows:

- Diesel (Transport) – 1.45 ML/Mtpa;
- Diesel (Stationary) – 0.04 ML/Mtpa; and
- Petrol (Transport) – 0.01 ML/Mtpa.

The quantity of fuel consumed in GJ is then calculated using an energy content factor for diesel of 38.6 gigajoules per kilolitre (GJ/kL). Greenhouse gas emission factors and energy content for diesel and petrol were sourced from the NGA Factors (**DCCEE, 2010**). The estimated annual and project total GHG emissions from diesel and petrol usage are presented in **Table 9-1**.

Table 9-1: Estimated CO_2-e (tonnes) for On-site Fuel Consumption

Year	ROM (Mtpa)	Diesel Transport Emission Factor (kg CO_2-e/GJ)		Diesel Stationary Emission Factor (kg CO_2-e/GJ)		Energy Content (GJ/kL)	Petrol Transport Emission Factor (kg CO_2-e/GJ)		Emissions (t CO_2-e)		Total (t CO_2-e)
		Scope 1	Scope 3	Scope 1	Scope 3		Scope 1	Scope 3	Scope 1	Scope 3	
Year 1	6.9	69.9	5.3	69.5	5.3	38.6	69.6	5.3	28,350	2,150	30,501
Year 2	12.2	69.9	5.3	69.5	5.3	38.6	69.6	5.3	50,102	3,800	53,902
Year 3	14.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	58,747	4,455	63,202
Year 4	15.4	69.9	5.3	69.5	5.3	38.6	69.6	5.3	63,106	4,786	67,892
Year 5	15.9	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,199	4,945	70,143
Year 6	15.9	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,169	4,942	70,111
Year 7	16.5	69.9	5.3	69.5	5.3	38.6	69.6	5.3	67,734	5,137	72,871
Year 8	15.8	69.9	5.3	69.5	5.3	38.6	69.6	5.3	64,575	4,897	69,472
Year 9	16.0	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,714	4,984	70,698
Year 10	15.8	69.9	5.3	69.5	5.3	38.6	69.6	5.3	64,869	4,920	69,789
Year 11	15.9	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,252	4,949	70,200
Year 12	15.9	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,238	4,948	70,185
Year 13	16.0	69.9	5.3	69.5	5.3	38.6	69.6	5.3	65,710	4,983	70,693
Year 14	16.8	69.9	5.3	69.5	5.3	38.6	69.6	5.3	68,867	5,223	74,090
Year 15	16.7	69.9	5.3	69.5	5.3	38.6	69.6	5.3	68,297	5,180	73,477
Year 16	15.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	62,574	4,746	67,319
Year 17	15.6	69.9	5.3	69.5	5.3	38.6	69.6	5.3	63,771	4,836	68,607
Year 18	15.8	69.9	5.3	69.5	5.3	38.6	69.6	5.3	64,921	4,924	69,845
Year 19	11.7	69.9	5.3	69.5	5.3	38.6	69.6	5.3	47,753	3,622	51,375
Year 20	9.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	37,972	2,880	40,852
Year 21	7.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	29,772	2,258	32,030
Year 22	7.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	29,772	2,258	32,030
Year 23	7.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	29,772	2,258	32,030
Year 24	7.3	69.9	5.3	69.5	5.3	38.6	69.6	5.3	29,772	2,258	32,030
Total	**322.8**	**-**	-	**-**	-	-	**-**	-	**1,323,009**	**100,336**	**1,423,345**

9.3.2 Electricity

Greenhouse gas emissions from electricity usage were estimated using the following equation:

$$E_{CO_2-e} = \frac{Q \times EF}{1000}$$

where:

E_{CO2-e}	=	Emissions of greenhouse gases from electricity usage	(tCO_2-e/annum)
Q	=	Estimated electricity usage	(kWh/annum)[1]
EF	=	Emission factor (Scope 2 or Scope 3) for electricity usage	($kgCO_2$-e/kWh)[2]

[1] kWh/annum = kilowatt hours per annum

[2] $kgCO_2$-e/kWh = kilograms of carbon dioxide equivalents per kilowatt hour

The quantity of electricity used each year is based on a derived intensity rate (megawatts per million tonnes per annum of run of mine coal [MW/Mtpa ROM]) derived from the 2010 annual electricity consumption as follows:

- Electricity – 3.6 MW/Mtpa.

Greenhouse gas emission factors were sourced from the NGA Factors (**DCCEE, 2010**). The estimated annual and project total GHG emissions from electricity usage are presented in **Table 9-2**.

Table 9-2: Estimated CO_2-e (tonnes) for On-site Electricity Use

Year	ROM (Mtpa)	Emission Factor (kg CO_2-e/kWh)		Emissions (t CO_2-e)		Total (t CO_2-e)
		Scope 2	Scope 3	Scope 2	Scope 3	
Year 1	6.9	0.89	0.18	22,466	4,544	27,010
Year 2	12.2	0.89	0.18	39,703	8,030	47,732
Year 3	14.3	0.89	0.18	46,553	9,415	55,968
Year 4	15.4	0.89	0.18	50,007	10,114	60,121
Year 5	15.9	0.89	0.18	51,666	10,449	62,115
Year 6	15.9	0.89	0.18	51,642	10,445	62,087
Year 7	16.5	0.89	0.18	53,675	10,856	64,531
Year 8	15.8	0.89	0.18	51,172	10,349	61,521
Year 9	16.0	0.89	0.18	52,074	10,532	62,606
Year 10	15.8	0.89	0.18	51,404	10,396	61,801
Year 11	15.9	0.89	0.18	51,708	10,458	62,165
Year 12	15.9	0.89	0.18	51,697	10,456	62,152
Year 13	16.0	0.89	0.18	52,071	10,531	62,602
Year 14	16.8	0.89	0.18	54,573	11,037	65,610
Year 15	16.7	0.89	0.18	54,121	10,946	65,067
Year 16	15.3	0.89	0.18	49,586	10,029	59,614
Year 17	15.6	0.89	0.18	50,534	10,220	60,755
Year 18	15.8	0.89	0.18	51,446	10,405	61,850
Year 19	11.7	0.89	0.18	37,841	7,653	45,495
Year 20	9.3	0.89	0.18	30,090	6,086	36,176
Year 21	7.3	0.89	0.18	23,593	4,772	28,364
Year 22	7.3	0.89	0.18	23,593	4,772	28,364
Year 23	7.3	0.89	0.18	23,593	4,772	28,364
Year 24	7.3	0.89	0.18	23,593	4,772	28,364
Total	**322.8**	-	-	**1,048,400**	**212,036**	**1,260,436**

9.3.3 *Fugitive Methane*

Emissions from fugitive CH_4 were estimated based on using the following equation:

$$E_{co2-e} = Q \times EF$$

where:

E_{CO2-e}	=	Emissions of greenhouse gases from fugitive CH_4	(t CO_2-e/annum)
Q	=	ROM coal extracted during the year	(t)
EF	=	Site Specific Emission Factor	(t CO_2-e/tonne)

A site specific emission factor for fugitive methane from the Open Cut (OC) mining operations has been derived based on measurements of gas content for boreholes samples taken by GeoGas (**GeoGAS, 2010**).

The measured gas content in m^3/t was converted to t CO_2-e / t using the measured % gas composition (reported for CH_4 and CO_2) and using the conversion factors reported in the NGERs Technical Guidelines (**DCC, 2009**) to convert from m^3 to CO_2-e tonnes, as follows:

- For methane – $6.784 \times 10^{-4} \times 21$
- For CO_2 – 1.861×10^{-3}

Emission factor for fugitive methane due to the underground (UG) mining operations have been sourced from the NGA Factors (**DCCEE, 2010**).

The derived site specific emission factor and estimated annual and project total GHG emissions from fugitive methane are presented in **Table 9-3**.

Table 9-3: Estimated CO_2-e (tonnes) for Fugitive Methane

Year	ROM (OC) (Mtpa)	ROM (UG) (Mtpa)	Site Specific EF (OC) (t CO_2-e/t)	Emission Factor (UG) (t CO_2-e/t)	Total Emission (OC) (t CO_2-e)	Total Emission (UG) (t CO_2-e)	Total Emission (t CO_2-e)
Year 1	6.9	-	0.002	0.008	13,211	0	13,211
Year 2	12.2	-	0.002	0.008	23,347	0	23,347
Year 3	10.3	4.0	0.002	0.008	19,736	32,000	51,736
Year 4	11.4	4.0	0.002	0.008	21,767	32,000	53,767
Year 5	11.9	4.0	0.002	0.008	22,743	32,000	54,743
Year 6	11.9	4.0	0.002	0.008	22,729	32,000	54,729
Year 7	12.5	4.0	0.002	0.008	23,924	32,000	55,924
Year 8	11.8	4.0	0.002	0.008	22,452	32,000	54,452
Year 9	12.0	4.0	0.002	0.008	22,983	32,000	54,983
Year 10	11.8	4.0	0.002	0.008	22,589	32,000	54,589
Year 11	11.9	4.0	0.002	0.008	22,767	32,000	54,767
Year 12	11.9	4.0	0.002	0.008	22,761	32,000	54,761
Year 13	12.0	4.0	0.002	0.008	22,981	32,000	54,981
Year 14	12.8	4.0	0.002	0.008	24,452	32,000	56,452
Year 15	12.7	4.0	0.002	0.008	24,187	32,000	56,187
Year 16	11.3	4.0	0.002	0.008	21,520	32,000	53,520
Year 17	11.6	4.0	0.002	0.008	22,077	32,000	54,077
Year 18	11.8	4.0	0.002	0.008	22,613	32,000	54,613
Year 19	7.7	4.0	0.002	0.008	14,613	32,000	46,613
Year 20	5.3	4.0	0.002	0.008	10,055	32,000	42,055
Year 21	3.3	4.0	0.002	0.008	6,234	32,000	38,234
Year 22	3.3	4.0	0.002	0.008	6,234	32,000	38,234
Year 23	3.3	4.0	0.002	0.008	6,234	32,000	38,234
Year 24	3.3	4.0	0.002	0.008	6,234	32,000	38,234
Total	**234.8**	**88.0**	-	-	**448,445**	**704,000**	**1,152,445**

9.3.4 Explosives

Emissions from explosive usage were estimated based on using the following equation:

$$E_{co2-e} = Q \times EF$$

where:

E_{CO2-e}	=	Emissions of greenhouse gases from explosives	(t CO_2-e/annum)
Q	=	Quantity of explosive used (assumed ANFO)	(t)
EF	=	Scope 1 emission factor	(t CO_2-e/tonne explosive)

Greenhouse gas emission factors were sourced from the Australian Greenhouse Office (AGO) Factors and Methods Workbook – December 2006. It is noted that the AGO Factors and Methods were replaced by the NGA Factors (**DCCEE, 2010**), however the emission factor for explosives was dropped from the latest version. Emissions from explosives do not have to be reported under NGERS.

The quantity of explosives used each year is based on a derived intensity rate (kilotonnes of explosive (ANFO) per million tonnes per annum of run of mine coal [t/Mtpa ROM]) derived from the 2010 annual explosives consumption as follows:

- Explosives (ANFO) – 0.2 kt/Mtpa.

The estimated annual and project total GHG emissions from explosive usage are presented in **Table 9-4**.

Table 9-4: Estimated CO_2-e (tonnes) for Explosive Use

Year	ROM (Mtpa) (Open Cut)	Emission factor (ANFO) (t CO_2-e/t)	Scope 1 Emissions (t CO_2-e)
Year 1	6.9	0.17	243
Year 2	12.2	0.17	430
Year 3	10.3	0.17	363
Year 4	11.4	0.17	400
Year 5	11.9	0.17	418
Year 6	11.9	0.17	418
Year 7	12.5	0.17	440
Year 8	11.8	0.17	413
Year 9	12.0	0.17	423
Year 10	11.8	0.17	416
Year 11	11.9	0.17	419
Year 12	11.9	0.17	419
Year 13	12.0	0.17	423
Year 14	12.8	0.17	450
Year 15	12.7	0.17	445
Year 16	11.3	0.17	396
Year 17	11.6	0.17	406
Year 18	11.8	0.17	416
Year 19	7.7	0.17	269
Year 20	5.3	0.17	185
Year 21	3.3	0.17	115
Year 22	3.3	0.17	115
Year 23	3.3	0.17	115
Year 24	3.3	0.17	115
Total	**234.8**	**-**	**8,250**

9.3.5 Other Scope 3 Emissions

9.3.5.1 Emissions from rail transportation

Emissions from coal transportation have been estimated based on all product coal being transported via rail to Newcastle for export. Emissions associated with product coal transportation have been estimated based on an emission factor for loaded trains of 12.3 g/net tonne-km (**QR Network Access, 2002**). Emission factors were not available for unloaded trains so the factor for loaded trains is conservatively applied for the return trip. The return rail trip to Newcastle is estimated to be 500 km, the amount of product coal delivered per trip estimated to be 7,200 tonnes.

The total estimated GHG emissions from rail transport are provided in **Table 9-5**.

Table 9-5: Estimated CO_2-e (tonnes) for coal rail transportation

Year	Total Product coal (Mtpa)	Emission Factor (kg CO_2-e/t)	Total CO_2-e from rail transport (t)
Year 1	4.2	0.012	25,524
Year 2	7.3	0.012	45,107
Year 3	10.2	0.012	62,731
Year 4	10.8	0.012	66,655
Year 5	11.1	0.012	68,539
Year 6	11.1	0.012	68,512
Year 7	11.5	0.012	70,822
Year 8	11.1	0.012	67,978
Year 9	11.2	0.012	69,003
Year 10	11.1	0.012	68,242
Year 11	11.2	0.012	68,587
Year 12	11.2	0.012	68,574
Year 13	11.2	0.012	68,999
Year 14	11.7	0.012	71,842
Year 15	11.6	0.012	71,329
Year 16	10.8	0.012	66,176
Year 17	10.9	0.012	67,253
Year 18	11.1	0.012	68,289
Year 19	8.6	0.012	52,833
Year 20	7.2	0.012	44,026
Year 21	6.0	0.012	36,644
Year 22	6.0	0.012	36,644
Year 23	6.0	0.012	36,644
Year 24	6.0	0.012	36,644
TOTAL	**228.9**	-	**1,407,599**

9.3.5.2 Emissions from ship transportation

There will also be emissions associated with the shipping of the product coal to overseas customers. It should be noted that the emission estimates presented in this section have been calculated based on data provided by the Proponent and assumptions of parameters obtained from publicly available information. There is a level of uncertainty in these estimates due to this as well as additional uncertainty from fluctuating export markets and the destination of product into the future and limited data on emission factors and /or fuel consumption for ocean going vessels.

Table 9-6 presents a summary of coal destinations and distribution of product provided by the Proponent. The approximate return distances have been obtained from another GHG assessment for a NSW coal mine (**PAEHolmes, 2009b**).

Table 9-6: Product coal destinations

Country	% of coal [(a)]	Return distance (km) [(b)]
Korea	75	16,760
China	12.5	16,938
Japan	12.5	16,130

Source: (a) MCM, (b) PAEHolmes, 2009b

Table 9-7 provides a summary of assumptions used to calculate potential emissions from the transportation of product coal by sea, based on information provided another GHG assessment for a NSW coal mine (**PAEHolmes, 2009b**).

Table 9-7: Summary of assumptions

Parameter	Assumption
Average capacity of bulk carrier	86,667 tonnes
Average speed of bulk carrier	14.2 Nautical miles / hour
Average fuel consumption of bulk carrier	42 tonnes / day
Density of fuel oil	1,010 kg/m^3
Energy content of fuel oil	39.7 GJ/kL
Total Scope 3 emission factor	73.6 kg CO_2-e/GJ

Source: PAEHolmes, 2009b

The estimated GHG emissions from the sea transportation of coal are presented in **Table 9-8**.

Table 9-8: Estimated CO_2-e (tonnes) for coal ship transportation

Year	Total Product coal (Mtpa)			Emission Factor (kg CO_2-e/t)	Energy Content (GJ/kL)	Total CO2-e from ship transport (t)
	Korea	China	Japan			
Year 1	3.1	0.5	0.5	73.6	39.7	310,400
Year 2	5.5	0.9	0.9	73.6	39.7	548,550
Year 3	7.7	1.3	1.3	73.6	39.7	762,865
Year 4	8.1	1.4	1.4	73.6	39.7	810,587
Year 5	8.4	1.4	1.4	73.6	39.7	833,501
Year 6	8.4	1.4	1.4	73.6	39.7	833,177
Year 7	8.6	1.4	1.4	73.6	39.7	861,264
Year 8	8.3	1.4	1.4	73.6	39.7	826,675
Year 9	8.4	1.4	1.4	73.6	39.7	839,142
Year 10	8.3	1.4	1.4	73.6	39.7	829,892
Year 11	8.4	1.4	1.4	73.6	39.7	834,081
Year 12	8.4	1.4	1.4	73.6	39.7	833,931
Year 13	8.4	1.4	1.4	73.6	39.7	839,099
Year 14	8.8	1.5	1.5	73.6	39.7	873,669
Year 15	8.7	1.4	1.4	73.6	39.7	867,428
Year 16	8.1	1.3	1.3	73.6	39.7	804,764
Year 17	8.2	1.4	1.4	73.6	39.7	817,868
Year 18	8.3	1.4	1.4	73.6	39.7	830,462
Year 19	6.4	1.1	1.1	73.6	39.7	642,499
Year 20	5.4	0.9	0.9	73.6	39.7	535,405
Year 21	4.5	0.7	0.7	73.6	39.7	445,632
Year 22	4.5	0.7	0.7	73.6	39.7	445,632
Year 23	4.5	0.7	0.7	73.6	39.7	445,632
Year 24	4.5	0.7	0.7	73.6	39.7	445,632
TOTAL	**171.7**	**28.6**	**28.6**	**-**	**-**	**17,117,786**

9.3.5.3 Burning Product Coal

It has been assumed that all product coal will be used in power stations. Greenhouse gas emissions from the burning of product coal were estimated using the following equation:

$$E_{CO_2-e} = \frac{Q \times EC \times EF}{1000}$$

Where:

E_{CO2-e}	=	Emissions of GHG from coal combustion	(t CO_2-e)
Q	=	Quantity of product coal burnt	(GJ)
EC	=	Energy Content Factor for black coal	(GJ/t)[1]
EF	=	Emission factor for coal combustion	(kg CO_2-e/GJ)

[1] GJ/t = gigajoules per tonne

The quantity of coal burnt in Mtpa is converted to GJ using an energy content factor for black coal of 27 GJ/t. The greenhouse gas emission factor and energy content for coal were sourced from the NGA Factors (**DCCEE, 2010**).

The emissions associated with burning of the product coal are presented in **Table 9-9.**

Table 9-9: Scope 3 Emissions for Product Coal

Year	Product Coal (Mtpa)	Energy Content (GJ/t)	Emission Factor (kg CO_2-e/GJ)	Scope 3 Emissions (t CO_2-e)
Year 1	4.2	27	88	9,909,259
Year 2	7.3	27	88	17,512,007
Year 3	10.2	27	88	24,353,821
Year 4	10.8	27	88	25,877,335
Year 5	11.1	27	88	26,608,832
Year 6	11.1	27	88	26,598,499
Year 7	11.5	27	88	27,495,141
Year 8	11.1	27	88	26,390,921
Year 9	11.2	27	88	26,788,926
Year 10	11.1	27	88	26,493,610
Year 11	11.2	27	88	26,627,348
Year 12	11.2	27	88	26,622,571
Year 13	11.2	27	88	26,787,545
Year 14	11.7	27	88	27,891,146
Year 15	11.6	27	88	27,691,912
Year 16	10.8	27	88	25,691,424
Year 17	10.9	27	88	26,109,751
Year 18	11.1	27	88	26,511,810
Year 19	8.6	27	88	20,511,258
Year 20	7.2	27	88	17,092,348
Year 21	6.0	27	88	14,226,423
Year 22	6.0	27	88	14,226,423
Year 23	6.0	27	88	14,226,423
Year 24	6.0	27	88	14,226,423
TOTAL	**228.9**	-	**-**	**546,471,153**

9.4 Summary of GHG Emissions

A summary of the total GHG emissions associated with MCC are presented in **Table 9-10**.

Table 9-10: Summary of GHG Emissions (t CO_2-e)

Emission Source	Scope 1	Scope 2	Scope 3	Total
	Average t CO_2-e/annum			
Fuel	55,125	-	4,181	**59,306**
Electricity	-	43,683	8,835	**52,518**
Explosives	344	-	-	**344**
Fugitive Methane	48,019	-	-	**48,019**
Coal Transportation	-	-	771,891	**771,891**
Coal Burning	-	-	22,769,631	**22,769,631**
Total – Annual	**103,488**	**43,683**	**23,554,538**	**23,701,709**
Total – Life of Mine	**2,483,704**	**1,048,400**	**565,308,911**	**568,841,015**

9.5 Assessment of Potential Impact on Environment

Australia ratified the Kyoto Protocol in December 2007, an international agreement under the United Nations Framework on Climate Change (UNFCCC) that was agreed in 1997. The aim of the Protocol is to reduce global greenhouse gas emissions by requiring developed countries to meet national targets for greenhouse gas emissions over the five year period from 2008 to 2012.

A comparison is therefore made with the baseline 1990 Australian emissions, which are reported under the Kyoto Protocol as 547.7 Mt CO_2-e (**DCC, 2009a**). The baseline is used to assign Australian target under the Kyoto Protocol, which is 108% of the 1990 level. Comparing the average annual Scope 1 emissions from the Project against the 1990 baseline indicates that the Project emissions are 0.019% of the 1990 levels.

The relationship between GHG emissions and global warming is not linear and there is no accepted method to determine the contribution that a given emission of GHGs might make to global warming.

The estimated quantity of carbon dioxide stored in the atmosphere now is approximately 3,000 Gigatonnes (Gt). The International Energy Agency estimates that in 2007, global emissions of CO_2 from burning fossil fuels were 28,962 Mt, of which Australia's emissions of CO_2 from burning fossil fuels were 396.3 Mt CO_2 (i.e. approximately 1.4% of the global anthropogenic, or human-related, total) (**IEA, 2009**).

At any point in time, it would be reasonably simple to compare the estimated emission of CO_2-e from the various activities with the 3,000 Gt of CO_2-e currently estimated to be stored in the atmosphere. On this basis, average annual emissions over the lifetime of the proposal from the mining and burning of coal (including mining, transporting the coal to the final destination and usage of the coal) are estimated to be 0.0008% of the current global CO_2–e atmospheric load. Thus, the Project could be considered to contribute 0.0008% to the increase in global temperatures caused by the increase in GHG emissions as they are currently. This invites the question as to what temperature rise might be attributed to the GHG emissions from the proposal.

Based on the IPPC estimate that a doubling of the CO_2-e concentration in the atmosphere would lead to a 2.5°C increase in global average temperature and that the current global CO_2–e load is approximately 3,000 Gt, it can be estimated that the annual average emissions (Scope 1, 2 and 3) during the life of proposal (including mining, transporting the coal to the final destination and usage of the coal) could lead to an annual increase in global temperature of 0.00002°C [0.0008% of 2.5°C]. Based on the above, there is not likely to be any measurable environmental effect due to the emissions of GHGs from the proposal, i.e. the contribution of the project to GHG emissions will be negligible. In practice, of course, the effects of global warming and associated climate change are the cumulative effect of many thousands of such sources.

9.6 Important additional considerations

While it is possible to assess the significance of these emissions by comparing them with other sources of greenhouse gases it is also important to note that the efficiency with which the coal is used also very important. All other things being equal[h] global CO_2-equivalent emissions could be halved if power station efficiencies were doubled, or halved if the efficiency by which end users' consumed electricity was doubled or waste was reduced and so on.

Different customers will use the coal in power plants of different thermal efficiencies. The Australian Coal Association provides some typical statistics for power station efficiencies on their web site (**ACA, 2006**).

The web site notes the following:

> "*Industry has continuously* striven to *increase efficiencies of conventional plant; for example, the average thermal efficiency of US power stations has increased from 5% in 1900, to around 35% currently. In China, most power plants are relatively small, average efficiency is about 28% compared to an OECD average of 38%. New conventional* [pulverised fuel] *PF power plants achieve above 40% efficiency.*
>
> *Advanced modern plants use specially developed high strength alloy steels, which enable the use of supercritical and ultra-supercritical steam (pressures >248 bar and temperatures >566°C) and can achieve, depending on location, close to 45% efficiency.*
>
> *Application of new advanced materials to PF power plant should enable efficiencies of 55% to be achieved in the future. This results in corresponding reductions in CO_2 emissions as less fuel is used per unit of electricity generated.*

MCC does not propose, nor does its application for approval, seek to burn any of the coal produced. It is noted that Scope 3 emissions from sources would still occur regardless of MCC. The product coal would be sourced from other coal suppliers, with the end result being the same.

9.7 GHG Emission Reduction Measures

MCM has plans and standards to minimise energy usage and GHG emissions from its operations. These plans include objectives, commitments, procedures and responsibilities for:

- Researching and promoting low emission coal technologies;
- Improving energy use and efficiency and reducing GHG emissions from the mining, processing and use of coal;
- Consideration of the use of alternative fuels where economically and practically feasible;

[a] Population remaining fixed and the per capita consumption of energy being fixed.

- Review of mining practices to minimise double handling of materials and ensuring that coal and overburden haulage is undertaken using the most efficient routes;
- Ongoing scheduled and preventative maintenance to ensure that diesel and electrically powered plant operate efficiently; and
- Develop targets for greenhouse gas emissions and energy use on-site and monitor and report against these.

10 CONCLUSIONS

This study assesses the potential impacts on air quality from the proposed MCC. Dispersion modelling was used to predict off-site dust concentrations and dust deposition levels that may arise due to the MCC. The modelling took account of local meteorology and terrain and used dust emission estimates of the proposed activities over six key mining years to predict dust levels at off-site receptors locations.

Predictions of air quality impacts considered the effects of surrounding mines as well as other non-mining and non-modelled sources of dust. Model predictions at privately-owned residential receptors were compared with applicable air quality criteria. Predictions equal to or below the criteria indicate an acceptable air quality impact.

Analysis of the dispersion modelling results indicates that the proposed MCC would exceed DECCW impact assessment criteria at one privately owned receptor for 24-hour average PM_{10} There are no predicted exceedence of annual average PM_{10}, TSP or dust deposition. However it is noted that this receptor is subject to acquisition by MCM upon written request from the landowner under Stage 1 Project Approval.

The dispersion modelling indicates that there would be no predicted dust impacts in Ulan village.

MCM would take steps to mitigate and manage potential dust impacts associated with the MCC through a range of controls and continued monitoring of air quality in the area surrounding the mine.

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Appendix A: Receptor details

Table A.1: Receptor details

ID	Easting	Northing	Owner
5	759764	6420796	MJ & PM Swords
9	757478	6422930	ICI Australia Operations Pty Limited
11	765376	6431622	JE Mullins & CD Imrie
11	765265	6431931	JE Mullins & CD Imrie
11	764784	6431839	JE Mullins & CD Imrie
26	757430	6423741	Forty North Pty Limited
30	758435	6416631	RB Cox
31	760008	6416123	MB Cox
32	763590	6413194	DJ & JG Stokes
35	759021	6414840	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny (Perpetual Lease)
37	756179	6417107	J Szymkarczuk
39	756038	6415288	RM & DJ Sprigg
40	756389	6416414	JM Devenish
41	756863	6421212	PP Libertis
41	756194	6415791	PP Libertis (Perpetual Lease)
46B	758663	6425526	North Eastern Wiradjuri Wilpinjong Community Fund Limited
47	760293	6413734	SF & MR Andrews
58	756926	6419919	ML & JLM Bevege
59	756886	6419210	G & GM Szymkarczuk
60	756500	6418546	CL Rayner & DM Mundey
61	756375	6418755	MA Miller
63	756497	6420923	BF & B Whiticker
64	756262	6420946	JW Goninan & TL Boland
70	756132	6420692	DJ & A Coventry
74	756021	6420067	LR Walsh
75	756012	6419777	P Ban
76	755920	6419546	SR & PC Carbone
77	756357	6419434	GJ & JM Mulholland
78	755750	6419149	B & FV Power
79	756034	6419159	PTJ & SE Nagle
80	755649	6418908	W & DI Sebelic
81	756220	6418906	TK Germent & CA McIntyre
82	756223	6418659	SC Hungerford & MC Clemens
83	755832	6418444	CF & CR Wall
84	756047	6418248	DS Sebelic
86	755506	6417818	NW Harris
87	755841	6418051	BJ & K Howe
88	756043	6417724	BC Meyers
89	755431	6417645	MV & HM Glover & E & BJ Tomlinson
90	755337	6417501	SA Powell
91	755969	6417348	HM Graham
94	754900	6416785	LK Mittermayer
95	755085	6416834	BJ Withington
96	755183	6416867	D Lazicic
97	755364	6416985	DJ & MD Smith
98	755440	6416783	ME & JJ Piper
99	755603	6416770	DE Jenner & WB Jensen
100	755992	6416832	A Kapista
101	755850	6416237	RD & DMZ Hull
101a	755972	6416452	PJ Kearns
102	755530	6416189	KA Roberts
103	755072	6416399	SB Burnett & SL Grant
104	755112	6416116	RA & LA Deeben
105	755061	6416033	DJ & N Katsikaris
106	755558	6415823	TB & JH Reid
107	755752	6415919	ZJ & M & AA Raso
109	755410	6415494	DA Evans
110	755361	6415339	JT Thompson & HT Evans
111	755052	6415789	GJ & NJ McEwan
112	755138	6415655	MJ & LM Croft
113	755269	6415661	CPG Ratcliff
119	755969	6416452	PJ Kearns
149	758457	6425165	Merriwa Council

ID	Easting	Northing	Owner
151	757984	6425025	AI Cunningham
160	758350	6425029	Minister for Education and Training
162	758342	6425199	DM Harrison
168	739469	6428623	PJL Constructions Management Co Pty Limited
170	755557	6421185	HW & CL Montgomery
171	753898	6414840	AD & SA McGreggor
172	756058	6420779	AJ & TM Kimber
175	755624	6420844	MG Vale
176	755585	6420625	VJ Wakefield
177	755530	6420496	PL & CM Mobbs
180	755292	6420111	CD & LL Barrett
181	755178	6420092	SM Forster
182	755049	6420016	J Dutoitcook
183	754822	6419969	R & EA Steines
184	755093	6419504	LA Stevenson
185	754967	6419464	LA Stevenson
186	754674	6419437	RW & IJ Adamson
187	754816	6419137	BT & KM Feeney
188	754577	6419073	KR & T Fielding
189	754772	6418881	MEH & DI & MT & AC Goggin & JR & AR & PA & RA Hyde
190	754488	6418711	T & LK Sahyoun
191	754592	6418520	BW & TS Lasham
192	754649	6418328	D Williams
194	754160	6418080	PM & K Potts
195	754583	6417973	R Cottam
196	754072	6417840	F Saxberg & M Weir
200	754141	6417241	VK Grimshaw
201	754138	6417158	KR & GM Towerton
201	754311	6416962	KR & GM Towerton
202	754258	6416804	H & VF Butler
203	754462	6416639	DJ Miller
204	754537	6416557	RB & JE Donnan
206	754394	6416192	CA Marshall & R Vella
207	754057	6415768	AA & DM Smith
208	753938	6415612	SA & CR Hasaart
209	753883	6415407	F Mawson
210	753873	6415226	JM & AM Tebbutt
217	754659	6415319	RP & JL Patterson
218	754550	6415117	GF & GEL Soady
219	754468	6415587	T & S Riger
220	754258	6415351	SJ Rusten & NJ Smith
222	754813	6415761	BJ Purtell
223	754921	6415935	EW Palmer & JM Stewart
224	754895	6417021	RS & PCC Dupond
226	754812	6417270	LAA & FC Muscat
227	755000	6417482	WP & JA Hughes
228	755021	6417572	PP Libertis
229	755115	6417791	JJ & BA Lowe
230	755229	6417879	DA Hoole & DT Rawlinson
231	755200	6418034	T Morrison & SM Benny
232	755121	6418197	L & JA Haaring
233	755196	6418290	TJ & LA Wilcox
234	755157	6418405	B Stammers & BJ Elphick
235	755107	6418631	LM & RS Wilson
236	755165	6418738	RG & CA Donovan
237	755468	6418862	A Puskaric
238	755497	6418969	BF Powell
239	755558	6419118	JE Delarue
240	755694	6419408	GJ & DM Hartley
241	755631	6419645	H & DL Danson
253	753840	6428415	SJ Highett
254	754474	6426260	W & MP Marshall
255	754922	6425602	HJ & H Schmitz
256	754930	6425120	RC Campbell

ID	Easting	Northing	Owner
257	755429	6425331	W & LG Cap
258	755375	6425132	PM & CD Elias
258	755230	6424872	PM & CD Elias
300	755327	6421268	CM Collins & CY Marshall
301	755336	6421121	AW & SC Stewart
302	755299	6420997	DJ & KS Hamilton
303	755327	6420850	HJ Ungaro
305	755052	6420566	L Barisic & M Aul
306	754978	6420431	E Armstrong
307	754843	6420373	M Chant & NK Young
308	754605	6420402	NA Dower
309	754219	6420817	GS Maher
310	754407	6420948	KI Death
312	754239	6421215	MS & JJ Ioannou
313	753906	6421166	NJ & BDE Pracy
314	753997	6421486	SL Ford
315	754141	6421605	WJ Richards & BJ Uzelac
316	754210	6421744	CR Vassel & CM Williams
317	754646	6421744	RJ Hore & V Bingham
320	755059	6424522	Dolores Clark

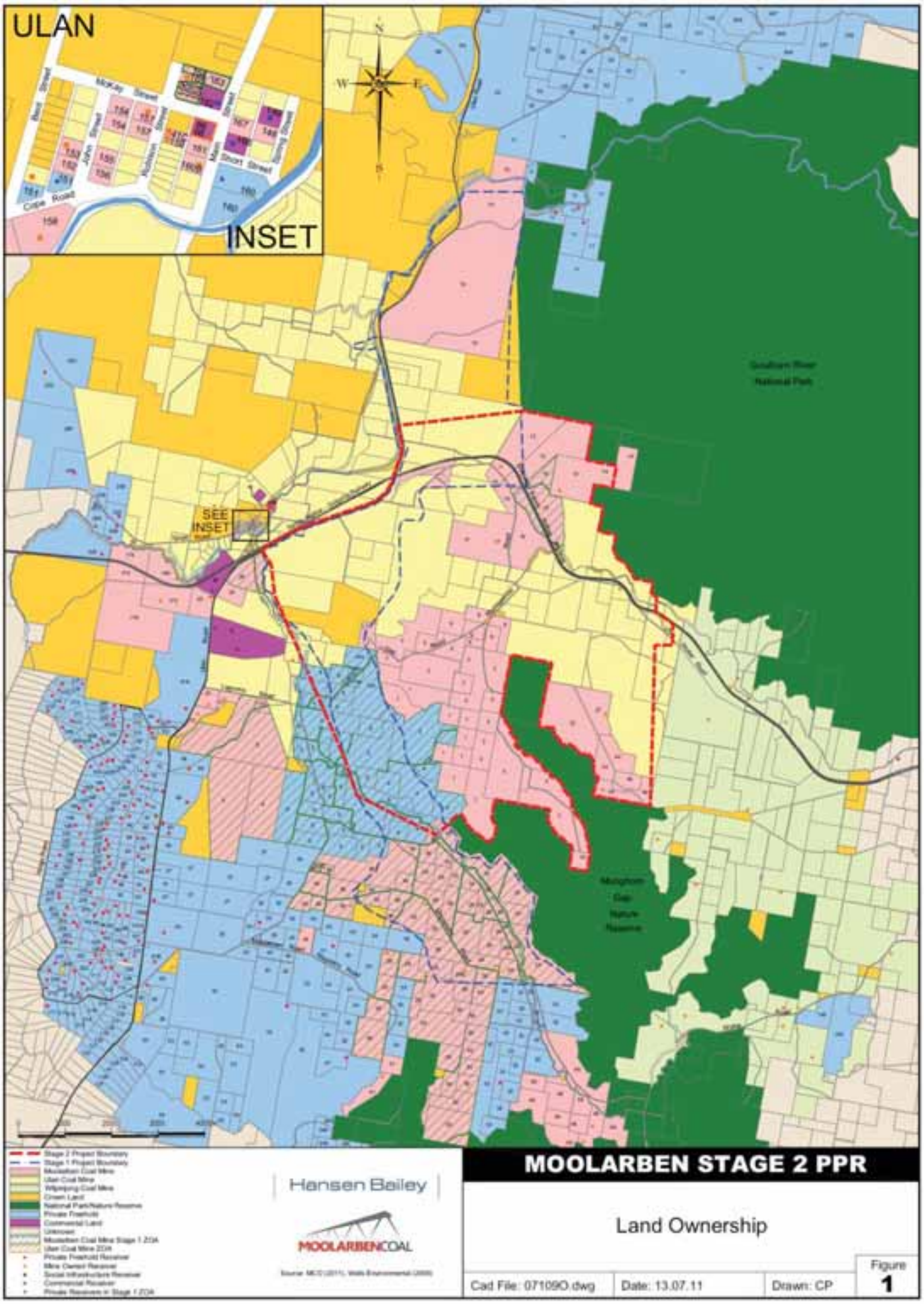


Figure A 1: Land Ownership

Appendix B: Joint wind speed, wind direction and stability class tables for Ulan Coal Mine meteorological station

STATISTICS FOR FILE: C:\Jobs\5576_Moolarben_Stage2_revision\Met Final\ulan0708_rev.isc
MONTHS: All
HOURS : All
OPTION: Frequency

PASQUILL STABILITY CLASS 'A'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.002354	0.003413	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.005767
NE	0.005297	0.004708	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.010005
ENE	0.003766	0.005297	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009063
E	0.002236	0.006121	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.008357
ESE	0.000942	0.002707	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003649
SE	0.000824	0.000353	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.001295
SSE	0.000589	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000824
S	0.000589	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001059
SSW	0.002825	0.001177	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004002
SW	0.003766	0.001766	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.005650
WSW	0.002119	0.003884	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.006121
W	0.001530	0.003531	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.005179
WNW	0.000942	0.001766	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.002943
NW	0.000824	0.001648	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002472
NNW	0.001177	0.001295	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002472
N	0.001648	0.002119	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003766
CALM									0.006827
TOTAL	0.031427	0.040490	0.000706	0.000000	0.000000	0.000000	0.000000	0.000000	0.079449

MEAN WIND SPEED (m/s) = 1.54
NUMBER OF OBSERVATIONS = 675

PASQUILL STABILITY CLASS 'B'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.000235	0.001177	0.000353	0.000000	0.000000	0.000000	0.000000	0.000000	0.001766
NE	0.001059	0.002707	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003766
ENE	0.002119	0.007886	0.002354	0.000118	0.000000	0.000000	0.000000	0.000000	0.012476
E	0.000706	0.008710	0.006238	0.000118	0.000000	0.000000	0.000000	0.000000	0.015772
ESE	0.000471	0.001177	0.003413	0.000000	0.000000	0.000000	0.000000	0.000000	0.005061
SE	0.000118	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000589
SSE	0.000235	0.000353	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000589
S	0.000000	0.000000	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.000118
SSW	0.000471	0.000471	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.001412
SW	0.002001	0.001177	0.000353	0.000000	0.000000	0.000000	0.000000	0.000000	0.003531
WSW	0.001059	0.001530	0.002354	0.000000	0.000000	0.000000	0.000000	0.000000	0.004944
W	0.000235	0.002119	0.001412	0.000000	0.000000	0.000000	0.000000	0.000000	0.003766
WNW	0.000235	0.001177	0.001766	0.000000	0.000000	0.000000	0.000000	0.000000	0.003178
NW	0.000000	0.001177	0.000824	0.000000	0.000000	0.000000	0.000000	0.000000	0.002001
NNW	0.000235	0.000706	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.001412
N	0.000118	0.001059	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.001648
CALM									0.000824
TOTAL	0.009298	0.031897	0.020598	0.000235	0.000000	0.000000	0.000000	0.000000	0.062853

MEAN WIND SPEED (m/s) = 2.51
NUMBER OF OBSERVATIONS = 534

PASQUILL STABILITY CLASS 'C'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.000235	0.001177	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.001648
NE	0.001295	0.002589	0.000824	0.000118	0.000000	0.000000	0.000000	0.000000	0.004826
ENE	0.001295	0.007180	0.007533	0.002354	0.000000	0.000000	0.000000	0.000000	0.018362
E	0.000706	0.005297	0.014242	0.008475	0.000000	0.000000	0.000000	0.000000	0.028719
ESE	0.000353	0.001883	0.009534	0.006003	0.000000	0.000000	0.000000	0.000000	0.017773
SE	0.000118	0.000589	0.000706	0.000000	0.000000	0.000000	0.000000	0.000000	0.001412
SSE	0.000000	0.000235	0.000353	0.000000	0.000000	0.000000	0.000000	0.000000	0.000589
S	0.000118	0.000118	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000471
SSW	0.000471	0.000589	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.001295
SW	0.001059	0.002707	0.001648	0.000471	0.000000	0.000000	0.000000	0.000000	0.005885
WSW	0.001177	0.002001	0.007651	0.002236	0.000000	0.000000	0.000000	0.000000	0.013065
W	0.000353	0.001530	0.005061	0.002472	0.000000	0.000000	0.000000	0.000000	0.009416
WNW	0.000118	0.001412	0.006238	0.001883	0.000000	0.000000	0.000000	0.000000	0.009652
NW	0.000000	0.000589	0.002707	0.001412	0.000000	0.000000	0.000000	0.000000	0.004708
NNW	0.000000	0.000589	0.000589	0.000942	0.000000	0.000000	0.000000	0.000000	0.002119
N	0.000353	0.000824	0.001059	0.000118	0.000000	0.000000	0.000000	0.000000	0.002354
CALM									0.000118
TOTAL	0.007651	0.029308	0.058851	0.026483	0.000000	0.000000	0.000000	0.000000	0.122411

MEAN WIND SPEED (m/s) = 3.52
NUMBER OF OBSERVATIONS = 1040

PASQUILL STABILITY CLASS 'D'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.002001	0.002707	0.001412	0.000471	0.000471	0.000000	0.000000	0.000000	0.007062
NE	0.004590	0.013536	0.002825	0.000118	0.000000	0.000000	0.000000	0.000000	0.021069
ENE	0.002943	0.015184	0.017185	0.008121	0.001648	0.000589	0.000000	0.000000	0.045669
E	0.001412	0.013771	0.029779	0.029661	0.010476	0.001177	0.000118	0.000000	0.086394
ESE	0.000471	0.003413	0.007180	0.009063	0.006003	0.002707	0.000235	0.000000	0.029073
SE	0.000706	0.000824	0.000942	0.000824	0.000353	0.000000	0.000000	0.000000	0.003649
SSE	0.000589	0.000471	0.000118	0.000118	0.000118	0.000118	0.000000	0.000000	0.001530
S	0.001059	0.000942	0.000353	0.000000	0.000000	0.000000	0.000000	0.000000	0.002354
SSW	0.005414	0.002119	0.000471	0.000000	0.000118	0.000000	0.000000	0.000000	0.008121
SW	0.024247	0.010358	0.003413	0.002119	0.000353	0.000235	0.000000	0.000000	0.040725
WSW	0.012712	0.013065	0.013418	0.015654	0.009534	0.002707	0.000118	0.000000	0.067208
W	0.002589	0.008121	0.014713	0.011417	0.009181	0.003060	0.000353	0.000000	0.049435
WNW	0.001295	0.002707	0.004237	0.002001	0.001412	0.000000	0.000000	0.000000	0.011653
NW	0.000589	0.002589	0.002825	0.000706	0.001295	0.000235	0.000000	0.000000	0.008239
NNW	0.000118	0.001059	0.001412	0.000471	0.000942	0.000118	0.000000	0.000000	0.004120
N	0.000824	0.001766	0.001059	0.000824	0.000118	0.000000	0.000000	0.000000	0.004590
CALM									0.004590
TOTAL	0.061558	0.092632	0.101342	0.081568	0.042020	0.010946	0.000824	0.000000	0.395480

MEAN WIND SPEED (m/s) = 3.66
NUMBER OF OBSERVATIONS = 3360

PASQUILL STABILITY CLASS 'E'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.002119	0.002001	0.000118	0.000118	0.000000	0.000000	0.000000	0.000000	0.004355
NE	0.004590	0.010240	0.002236	0.000235	0.000000	0.000000	0.000000	0.000000	0.017302
ENE	0.005885	0.012712	0.002943	0.000118	0.000000	0.000000	0.000000	0.000000	0.021657
E	0.004002	0.006709	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.011182
ESE	0.002001	0.002707	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.004826
SE	0.000824	0.000353	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.001412
SSE	0.000824	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001295
S	0.000589	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000824
SSW	0.006003	0.004120	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.010122
SW	0.028484	0.022599	0.002707	0.000000	0.000000	0.000000	0.000000	0.000000	0.053790
WSW	0.014477	0.016478	0.007180	0.001530	0.000000	0.000000	0.000000	0.000000	0.039666
W	0.002589	0.003766	0.002472	0.000235	0.000000	0.000000	0.000000	0.000000	0.009063
WNW	0.000706	0.001648	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.002589
NW	0.000942	0.000471	0.000471	0.000000	0.000000	0.000000	0.000000	0.000000	0.001883
NNW	0.000471	0.000353	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.000942
N	0.001412	0.000706	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.002236
CALM									0.012123
TOTAL	0.075918	0.085570	0.019421	0.002236	0.000000	0.000000	0.000000	0.000000	0.195268

MEAN WIND SPEED (m/s) = 1.77
NUMBER OF OBSERVATIONS = 1659

PASQUILL STABILITY CLASS 'F'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.004120	0.000824	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004944
NE	0.005650	0.000942	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.006591
ENE	0.007415	0.002236	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009652
E	0.006827	0.007298	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.014124
ESE	0.003649	0.000824	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004473
SE	0.001766	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001883
SSE	0.002119	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002354
S	0.002472	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002707
SSW	0.006356	0.000942	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.007298
SW	0.016361	0.013889	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.030250
WSW	0.008592	0.003413	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.012006
W	0.002354	0.000824	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003178
WNW	0.002119	0.000118	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002236
NW	0.001883	0.000589	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002472
NNW	0.001883	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002119
N	0.002119	0.000235	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002354
CALM									0.035899
TOTAL	0.075683	0.032957	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.144539

MEAN WIND SPEED (m/s) = 1.07
NUMBER OF OBSERVATIONS = 1228

ALL PASQUILL STABILITY CLASSES

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.011064	0.011299	0.002119	0.000589	0.000471	0.000000	0.000000	0.000000	0.025541
NE	0.022481	0.034722	0.005885	0.000471	0.000000	0.000000	0.000000	0.000000	0.063559
ENE	0.023423	0.050494	0.030014	0.010711	0.001648	0.000589	0.000000	0.000000	0.116879
E	0.015890	0.047905	0.050730	0.038253	0.010476	0.001177	0.000118	0.000000	0.164548
ESE	0.007886	0.012712	0.020245	0.015066	0.006003	0.002707	0.000235	0.000000	0.064854
SE	0.004355	0.002707	0.002001	0.000824	0.000353	0.000000	0.000000	0.000000	0.010240
SSE	0.004355	0.002001	0.000471	0.000118	0.000118	0.000118	0.000000	0.000000	0.007180
S	0.004826	0.002001	0.000706	0.000000	0.000000	0.000000	0.000000	0.000000	0.007533
SSW	0.021540	0.009416	0.001177	0.000000	0.000118	0.000000	0.000000	0.000000	0.032250
SW	0.075918	0.052495	0.008239	0.002589	0.000353	0.000235	0.000000	0.000000	0.139831
WSW	0.040137	0.040372	0.030720	0.019421	0.009534	0.002707	0.000118	0.000000	0.143008
W	0.009652	0.019892	0.023776	0.014124	0.009181	0.003060	0.000353	0.000000	0.080038
WNW	0.005414	0.008828	0.012712	0.003884	0.001412	0.000000	0.000000	0.000000	0.032250
NW	0.004237	0.007062	0.006827	0.002119	0.001295	0.000235	0.000000	0.000000	0.021775
NNW	0.003884	0.004237	0.002589	0.001412	0.000942	0.000118	0.000000	0.000000	0.013183
N	0.006474	0.006709	0.002707	0.000942	0.000118	0.000000	0.000000	0.000000	0.016949
CALM									0.060381
TOTAL	0.261535	0.312853	0.200918	0.110523	0.042020	0.010946	0.000824	0.000000	1.000000

MEAN WIND SPEED (m/s) = 2.66
NUMBER OF OBSERVATIONS = 8496

FREQUENCY OF OCCURENCE OF STABILITY CLASSES

A : 7.9%
B : 6.3%
C : 12.2%
D : 39.5%
E : 19.5%
F : 14.5%

STABILITY CLASS BY HOUR OF DAY

Hour	A	B	C	D	E	F
01	0000	0000	0000	0114	0142	0098
02	0000	0000	0000	0121	0130	0103
03	0000	0000	0000	0118	0124	0112
04	0000	0000	0000	0129	0130	0095
05	0000	0000	0000	0118	0117	0119
06	0003	0003	0007	0114	0121	0106
07	0035	0027	0043	0122	0067	0060
08	0075	0047	0074	0130	0014	0014
09	0092	0057	0083	0122	0000	0000
10	0076	0064	0098	0116	0000	0000
11	0079	0046	0119	0110	0000	0000
12	0070	0070	0107	0107	0000	0000
13	0075	0057	0112	0110	0000	0000
14	0079	0040	0113	0122	0000	0000
15	0049	0060	0107	0138	0000	0000
16	0026	0041	0102	0183	0000	0002
17	0014	0021	0062	0226	0023	0008
18	0002	0001	0013	0220	0092	0026
19	0000	0000	0000	0189	0118	0047
20	0000	0000	0000	0156	0124	0074
21	0000	0000	0000	0151	0123	0080
22	0000	0000	0000	0153	0114	0087
23	0000	0000	0000	0145	0108	0101
24	0000	0000	0000	0146	0112	0096

STABILITY CLASS BY MIXING HEIGHT

Mixing height	A	B	C	D	E	F
<=500 m	0161	0090	0127	0784	1619	1204
<=1000 m	0246	0186	0429	1128	0006	0006
<=1500 m	0268	0258	0484	1146	0034	0018
<=2000 m	0000	0000	0000	0224	0000	0000
<=3000 m	0000	0000	0000	0078	0000	0000
>3000 m	0000	0000	0000	0000	0000	0000

MIXING HEIGHT BY HOUR OF DAY

Hour	0000 to 0100	0100 to 0200	0200 to 0400	0400 to 0800	0800 to 1600	1600 to 3200	Greater than 3200
01	0102	0127	0030	0029	0053	0013	0000
02	0106	0117	0036	0032	0052	0011	0000
03	0114	0113	0042	0030	0048	0007	0000
04	0106	0115	0042	0034	0051	0006	0000
05	0138	0100	0039	0023	0047	0007	0000
06	0118	0131	0069	0012	0019	0005	0000
07	0102	0069	0115	0058	0007	0003	0000
08	0000	0079	0123	0152	0000	0000	0000
09	0000	0000	0110	0180	0064	0000	0000
10	0000	0000	0000	0241	0113	0000	0000
11	0000	0000	0000	0145	0209	0000	0000
12	0000	0000	0000	0091	0263	0000	0000
13	0000	0000	0000	0000	0354	0000	0000
14	0000	0000	0000	0000	0354	0000	0000
15	0000	0000	0000	0000	0354	0000	0000
16	0000	0000	0000	0000	0354	0000	0000
17	0000	0003	0003	0002	0339	0007	0000
18	0018	0045	0036	0022	0213	0020	0000
19	0043	0087	0039	0049	0100	0036	0000
20	0067	0108	0039	0037	0072	0031	0000
21	0072	0119	0031	0029	0073	0030	0000
22	0084	0092	0047	0040	0065	0026	0000
23	0102	0094	0039	0030	0065	0024	0000
24	0095	0106	0035	0041	0058	0019	0000

Appendix C: Dust deposition and particulate monitoring data

Table C.1: Monitored dust deposition (insoluble solids) levels from the MCM monitoring network – g/m²/month

Date	Sample Location	Total Insoluble Matter g/m²/mth	Ash g/m²/mth	Combustible Matter g/m²/mth	Total Solids g/m²/mth	Contamination ID
14-Jan-05	D1	1.5	1.1	0.4	3.3	0
14-Jan-05	D2	11.4	1.8	9.6	16.7	1,2,5
14-Jan-05	D3	1.8	1.1	0.7	2.9	0
14-Jan-05	D4	3.1	1.6	1.5	15.6	1
14-Jan-05	D5	1.3	0.9	0.4	7.2	0
14-Jan-05	D6	1.0	0.6	0.4	3.5	0
14-Jan-05	D7	4.1	1.1	3.0	7.8	1
14-Jan-05	D8	1.0	0.6	0.4	5.5	0
12-Feb-05	D1	3.0	1.6	1.4	5.7	1,2,4,5
12-Feb-05	D2	20.0	3.8	16.2	25.0	1,2,3
12-Feb-05	D3	2.1	1.2	0.9	2.6	0
12-Feb-05	D4	21.0	3.9	17.1	30.0	1,2,3,4,5
12-Feb-05	D5	2.2	1.3	0.9	3.5	0
12-Feb-05	D6	1.8	0.9	0.9	2.8	0
12-Feb-05	D7	25.0	5.9	19.1	31.0	1,2,4,5
12-Feb-05	D8	2.2	0.9	1.3	4.9	0
14-Mar-05	D1	4.0	1.4	2.6	4.4	1, 2, 5
14-Mar-05	D2	13.7	2.9	10.8	18.9	1, 5
14-Mar-05	D3	3.5	1.6	1.9	3.9	1, 5
14-Mar-05	D4	2.2	1.2	1.0	2.9	0
14-Mar-05	D5	1.6	0.7	0.9	2.7	0
14-Mar-05	D6	2.0	0.7	1.3	2.9	0
14-Mar-05	D7	2.0	1.1	0.9	7.9	1, 2, 5
14-Mar-05	D8	6.8	2.2	4.6	7.8	1, 5
15-Apr-05	D1 - Bobadeen	1.5	1.0	0.5	1.9	0
15-Apr-05	D2 - Hillview	1.9	1.0	0.9	2.3	0
15-Apr-05	D3 - Oakey Park	3.0	1.6	1.4	4.2	1, 5
15-Apr-05	D4 - Ulan Hotel	5.1	1.5	3.6	7.1	1, 5
15-Apr-05	D5 - Glenmoor	0.7	0.5	0.2	1.5	0
15-Apr-05	D6 - Barooo	0.4	0.3	0.1	2.3	0
15-Apr-05	D7 - Hillside	1.2	1.2	<0.1	3.0	0
15-Apr-05	D8 - Croyden	37.0	3.0	34.0	48.0	1, 2, 5
16-May-05	D1 - Bobadeen	0.8	0.5	0.3	2.2	0
16-May-05	D2 - Hillview	0.8	0.5	0.3	2.2	0
16-May-05	D3 - Oakey Park	1.5	1.0	0.5	3.5	1, 2, 4
16-May-05	D4 - Ulan Hotel	2.5	1.1	1.4	6.4	1, 2, 4, 5
16-May-05	D5 - Glenmoor	0.5	0.4	0.1	1.9	0
17-May-05	D6 - Barcoo	0.6	0.4	0.2	1.8	0
17-May-05	D7 - Hillside	2.4	0.9	1.5	6.8	2, 5
17-May-05	D8 - Croydon	1.0	0.7	0.3	2.9	0
15-Jun-05	D1 - Bobadeen	1.3	0.7	0.6	3.0	0
15-Jun-05	D2 - Hillview	1.0	0.4	0.6	1.4	0
15-Jun-05	D3 - Oakey Park	1.4	0.7	0.7	1.7	0
15-Jun-05	D4 - Ulan Hotel	1.6	0.6	1.0	2.5	0
15-Jun-05	D5 - Glenmoor	0.7	0.4	0.3	0.7	0
15-Jun-05	D6 - Barcoo	0.6	0.3	0.3	2.2	0
15-Jun-05	D7 - Hillside	0.7	0.2	0.5	2.0	0
15-Jun-05	D8 - Croydon	3.5	0.1	3.4	3.5	2, 5
13-Jul-05	D1 - Bobadeen	0.4	0.2	0.2	0.4	0
13-Jul-05	D2 - Hillview	0.8	0.1	0.7	1.0	0
13-Jul-05	D3 - Oakey Park	3.7	0.3	3.4	3.9	1, 5
13-Jul-05	D4 - Ulan Hotel	2.1	0.3	1.8	2.1	0
13-Jul-05	D5 - Glenmoor	1.3	0.2	1.1	1.3	0
13-Jul-05	D6 - Barcoo	1.1	0.1	1.0	1.1	0
13-Jul-05	D7 - Hillside	1.1	0.1	1.0	1.5	0
13-Jul-05	D8 - Croydon	6.1	0.9	5.2	6.6	1, 2, 5
12-Aug-05	D1 - Bobadeen	2.4	1.0	1.4	2.4	0
12-Aug-05	D2 - Hillview	2.8	0.9	1.9	2.8	0
12-Aug-05	D3 - Oakey Park	6.5	1.9	4.6	13.2	1, 2, 3
12-Aug-05	D4 - Ulan Hotel	1.8	0.7	1.1	2.1	0
12-Aug-05	D5 - Glenmoor	2.7	0.9	1.8	2.7	0
12-Aug-05	D6 - Barcoo	0.5	0.4	0.1	3.6	0
12-Aug-05	D7 - Hillside	1.8	0.3	1.5	1.9	0
12-Aug-05	D8 - Croydon	3.6	1.1	2.5	3.6	1, 2
15-Sep-05	D1 - Bobadeen	2.5	1.1	1.4	4.7	1,2,5

15-Sep-05	D2 - Hillview	1.1	0.5	0.6	1.8	0
15-Sep-05	D3 - Oakey Park	1.9	1.2	0.7	2.6	0
15-Sep-05	D4 - Ulan Hotel	2.0	0.9	1.1	2.5	0
15-Sep-05	D5 - Glenmoor	3.6	2.2	1.4	7.7	1,2
15-Sep-05	D6 - Barcoo	0.7	0.3	0.4	1.2	0
15-Sep-05	D7 - Hillside	0.7	0.3	0.4	0.8	0
15-Sep-05	D8 - Croydon	0.5	0.2	0.3	0.9	0
14-Oct-05	D1 - Bobadeen	4.1	2.0	2.1	6.8	1,2,5
14-Oct-05	D2 - Hillview	2.9	1.2	1.7	4.9	0
14-Oct-05	D3 - Oakey Park	13.6	3.3	10.3	26.0	1,2,5
14-Oct-05	D4 - Ulan Hotel	1.8	1.1	0.7	2.4	0
14-Oct-05	D5 - Glenmoor	2.9	1.3	1.6	4.5	0
14-Oct-05	D6 - Barcoo	1.0	0.5	0.5	2.5	0
14-Oct-05	D7 - Hillside	1.9	1.0	0.9	1.9	0
14-Oct-05	D8 - Croydon	0.8	0.4	0.4	1.4	0
15-Nov-05	D1 - Bobadeen	1.0	0.3	0.7	1.5	0
15-Nov-05	D2 - Hillview	2.1	0.6	1.5	2.2	0
15-Nov-05	D3 - Oakey Park	11.8	2.2	9.6	16.3	1, 2, 5
15-Nov-05	D4 - Ulan Hotel	4.7	1.4	3.3	6.2	1, 2, 3, 5
15-Nov-05	D5 - Glenmoor	1.5	0.7	0.8	3.1	0
15-Nov-05	D6 - Barcoo	1.8	0.8	1.0	2.4	0
15-Nov-05	D7 - Hillside	10.0	2.4	7.6	15.7	1, 2, 5
15-Nov-05	D8 - Croydon	1.0	0.4	0.6	3.1	0
15-Dec-05	D1 - Bobadeen	1.9	0.7	1.2	4.0	0
15-Dec-05	D2 - Hillview	8.2	1.7	6.5	17.7	1,2,5
15-Dec-05	D3 - Oakey Park	18.9	2.7	16.2	41.4	1,2,3,5
15-Dec-05	D4 - Ulan Hotel	9.1	1.9	7.2	15.3	1,2,5
15-Dec-05	D5 - Glenmoor	4.0	1.5	2.5	7.5	1,2,3
15-Dec-05	D6 - Barcoo	1.0	0.5	0.5	3.0	0
15-Dec-05	D7 - Hillside	5.4	1.2	4.2	8.4	1,2,5
15-Dec-05	D8 - Croydon	1.5	0.7	0.8	3.2	0
17-Jan-06	D1 - Bobadeen	0.8	0.3	0.5	2.5	0
17-Jan-06	D2 - Hillview	6.1	0.5	5.6	17.1	1,2
17-Jan-06	D3 - Oakey Park	8.6	1.0	7.6	25.0	1,2
17-Jan-06	D4 - Ulan Hotel	1.0	0.3	0.7	4.5	0
17-Jan-06	D5 - Glenmoor	0.7	0.2	0.5	2.9	0
17-Jan-06	D6 - Barcoo	0.8	0.6	0.2	1.9	0
17-Jan-06	D7 - Hillside	3.5	1.0	2.5	6.2	0
17-Jan-06	D8 - Croydon	1.3	0.6	0.7	2.8	0
15-Feb-06	D1 - Bobadeen	0.2	0.2	0.0	4.2	0
15-Feb-06	D2 - Hillview	3.2	1.2	2.0	6.6	1,2,5
15-Feb-06	D3 - Oakey Park	10.1	2.3	7.8	17.7	1,2,5
15-Feb-06	D4 - Ulan Hotel	1.7	0.8	0.9	5.3	0
15-Feb-06	D5 - Glenmoor	2.9	1.7	1.2	6.4	0
15-Feb-06	D6 - Barcoo	0.4	0.2	0.2	4.5	0
15-Feb-06	D7 - Hillside	1.1	0.6	0.5	4.2	0
15-Feb-06	D8 - Croydon	0.4	0.3	0.1	4.7	0
15-Mar-06	D1 - Bobadeen	1.0	0.7	0.3	1.8	0
15-Mar-06	D2 - Hillview	4.4	1.5	2.9	7.6	1, 2, 5
15-Mar-06	D3 - Oakey Park	5.8	1.5	4.3	8.9	1, 2, 5
15-Mar-06	D4 - Ulan Hotel	1.5	0.7	0.8	2.3	0
15-Mar-06	D5 - Glenmoor	1.3	0.6	0.7	1.6	0
15-Mar-06	D6 - Barcoo	1.3	0.8	0.5	4.2	0
15-Mar-06	D7 - Hillside	6.6	2.0	4.6	7.2	1, 2, 5
15-Mar-06	D8 - Croydon	1.1	0.7	0.4	1.6	0
13-Apr-06	D1 - Bobadeen	1.5	0.8	0.7	2.9	1, 2, 5
13-Apr-06	D2 - Hillview	4.0	2.0	2.0	5.3	2, 5
13-Apr-06	D3 - Oakey Park	1.7	1.0	0.7	2.4	2, 5
13-Apr-06	D4 - Ulan Hotel	4.0	2.0	2.0	5.9	2, 5
13-Apr-06	D5 - Glenmoor	1.1	0.5	0.6	1.8	1, 2, 5
13-Apr-06	D6 - Barcoo	0.7	0.5	0.2	1.6	1, 2, 5
13-Apr-06	D7 - Hillside	0.6	0.3	0.3	1.5	1, 2, 5
13-Apr-06	D8 - Croydon	0.6	0.3	0.3	1.3	1, 2, 5
12-May-06	D1 - Bobadeen	1.2	0.7	0.5	2.4	0
12-May-06	D2 - Hillview	8.3	1.9	6.4	10.7	1, 2, 5
12-May-06	D3 - Oakey Park	14.4	3.9	10.5	22.2	1, 2
12-May-06	D4 - Ulan Hotel	6.1	2.4	3.7	6.5	1, 2, 3, 5
12-May-06	D5 - Glenmoor	0.6	0.5	0.1	0.6	0
12-May-06	D6 - Barcoo	1.0	0.7	0.3	1.1	0
12-May-06	D7 - Hillside	0.7	0.5	0.2	1.2	0

12-May-06	D8 - Croydon	4.4	0.9	3.5	7.5	1, 2, 3, 5
14-Jun-06	D1 - Bobadeen	1.4	0.7	0.7	2.4	0
14-Jun-06	D2 - Hillview	2.4	1.1	1.3	3.3	0
14-Jun-06	D3 - Oakey Park	7.4	1.7	5.7	11.5	1, 2
14-Jun-06	D4 - Ulan Hotel	3.3	1.1	2.2	5.0	1, 2, 3
14-Jun-06	D5 - Glenmoor	9.7	1.8	7.9	14.4	1, 2, 3
14-Jun-06	D6 - Barcoo	3.2	1.2	2.0	4.4	1, 2, 5
14-Jun-06	D7 - Hillside	2.2	0.7	1.5	2.9	0
14-Jun-06	D8 - Croydon	1.5	0.5	1.0	2.0	0
13-Jul-06	D1 - Bobadeen	0.4	0.2	0.2	0.5	0
13-Jul-06	D2 - Hillview	0.6	0.3	0.3	1.4	0
13-Jul-06	D3 - Oakey Park	2.5	1.2	1.3	3.3	0
13-Jul-06	D4 - Ulan Hotel	3.7	1.6	2.1	6.4	1, 2, 5
13-Jul-06	D5 - Glenmoor	2.0	0.8	1.2	2.9	0
13-Jul-06	D6 - Barcoo	6.3	1.6	4.7	18.9	1, 2
13-Jul-06	D7 - Hillside	0.6	0.2	0.4	0.8	0
13-Jul-06	D8 - Croydon	0.3	0.1	0.2	1.3	0
15-Aug-06	D1 - Bobadeen	0.5	0.2	0.3	1.5	0
15-Aug-06	D2 - Hillview	0.7	0.3	0.4	1.7	0
15-Aug-06	D3 - Oakey Park	4.5	1.6	2.9	8.5	1, 2, 5
15-Aug-06	D4 - Ulan Hotel	1.1	0.4	0.7	1.7	0
15-Aug-06	D5 - Glenmoor	1.4	0.5	0.9	2.6	0
15-Aug-06	D6 - Barcoo	0.8	0.4	0.4	1.9	0
15-Aug-06	D7 - Hillside	0.6	0.2	0.4	1.5	0
15-Aug-06	D8 - Croydon	0.8	0.3	0.5	0.9	0
15-Sep-06	D1 - Bobadeen	0.3	0.2	0.1	2.4	0
15-Sep-06	D2 - Hillview	0.7	0.4	0.3	1.3	0
15-Sep-06	D3 - Oakey Park	13.3	3.1	10.2	25.0	1,2
15-Sep-06	D4 - Ulan Hotel	1.2	0.7	0.5	1.7	0
15-Sep-06	D5 - Glenmoor	6.6	1.5	5.1	8.5	1,2
15-Sep-06	D6 - Barcoo	0.8	0.4	0.4	1.0	0
15-Sep-06	D7 - Hillside	1.8	1.0	0.8	2.7	0
15-Sep-06	D8 - Croydon	1.1	0.5	0.6	1.3	0
17-Oct-06	D1 - Bobadeen	0.3	0.2	0.1	0.7	0
17-Oct-06	D2 - Hillview	0.2	0.1	0.1	1.0	0
17-Oct-06	D3 - Oakey Park	5.3	1.0	4.3	16.1	1, 2
17-Oct-06	D4 - Ulan Hotel	0.3	0.2	0.1	1.2	0
17-Oct-06	D5 - Glenmoor	0.5	0.3	0.2	1.4	0
17-Oct-06	D6 - Barcoo	0.2	0.2	<0.1	0.3	0
17-Oct-06	D7 - Hillside	0.2	0.1	0.1	0.6	0
17-Oct-06	D8 - Croydon	0.3	0.2	0.1	0.9	0
15-Nov-06	D1 - Bobadeen	1.9	1.3	0.6	4.7	0
15-Nov-06	D2 - Hillview	1.9	1.0	0.9	5.8	0
15-Nov-06	D3 - Oakey Park	3.4	1.3	2.1	7.2	1, 2, 3, 5
15-Nov-06	D4 - Ulan Hotel	1.2	0.8	0.4	2.3	0
15-Nov-06	D5 - Glenmoor	3.1	1.4	1.7	8.0	1, 2
15-Nov-06	D6 - Barcoo	1.0	0.5	0.5	3.1	0
15-Nov-06	D7 - Hillside	9.2	2.0	7.2	12.7	1, 2, 3, 5
15-Nov-06	D8 - Croydon	1.4	0.9	0.5	2.5	0
14-Dec-06	D1 - Bobadeen	1.5	0.8	0.7	3.5	0
14-Dec-06	D2 - Hillview	0.6	0.3	0.3	2.1	0
14-Dec-06	D3 - Oakey Park	1.2	0.4	0.8	4.3	0
14-Dec-06	D4 - Ulan Hotel	1.1	0.6	0.5	2.7	0
14-Dec-06	D5 - Glenmoor	4.0	0.9	3.1	6.2	1,2
14-Dec-06	D6 - Barcoo	0.8	0.5	0.3	2.4	0
14-Dec-06	D7 - Hillside	1.1	0.5	0.6	2.6	0
14-Dec-06	D8 - Croydon	0.5	0.4	0.1	0.5	0
16-Jan-07	D1 - Bobadeen	1.9	1.1	0.8	2.3	0
16-Jan-07	D2 - Hillview	1.8	1.2	0.6	2.0	0
16-Jan-07	D3 - Oakey Park	2.8	0.9	1.9	7.0	1,2,3,5
16-Jan-07	D4 - Ulan Hotel	10.7	3.4	7.3	10.7	1,2,3,5
16-Jan-07	D5 - Glenmoor	3.6	1.7	1.9	8.9	1,2,3,5
16-Jan-07	D6 - Barcoo	6.2	1.4	4.8	9.2	1,2,3,5
16-Jan-07	D7 - Hillside	2.6	1.3	1.3	2.6	0
16-Jan-07	D8 - Croydon	1.5	1.2	0.3	2.1	0
14-Feb-07	D1 - Bobadeen	1.9	1.4	0.5	2.8	0
14-Feb-07	D2 - Hillview	1.8	1.5	0.3	3.7	0
14-Feb-07	D3 - Oakey Park	4.6	2.1	2.5	6.8	1,2,3
14-Feb-07	D4 - Ulan Hotel	3.8	2.0	1.8	5.2	1,2,5
14-Feb-07	D5 - Glenmoor	2.6	1.7	0.9	6.3	0
14-Feb-07	D6 - Barcoo	1.3	0.9	0.4	4.8	0

14-Feb-07	D7 - Hillside	1.3	0.8	0.5	2.0	0
14-Feb-07	D8 - Croydon	2.5	1.8	0.7	2.6	0
15-Mar-07	D1 - Bobadeen	4.3	1.6	2.7	4.3	1, 2, 3, 5
15-Mar-07	D2 - Hillview	1.9	0.9	1.0	2.9	0
15-Mar-07	D3 - Oakey Park	8.0	3.5	4.5	9.0	1, 2, 3
15-Mar-07	D4 - Ulan Hotel	3.0	1.6	1.4	3.0	1, 2, 5
15-Mar-07	D5 - Glenmoor	1.3	0.4	0.9	1.3	0
15-Mar-07	D6 - Barcoo	1.0	0.6	0.4	1.0	0
15-Mar-07	D7 - Hillside	3.4	1.4	2.0	4.6	1, 2, 3, 5
15-Mar-07	D8 - Croydon	2.7	1.4	1.3	2.7	0
13-Apr-07	D1 - Bobadeen	2.2	1.1	1.1	4.1	0
13-Apr-07	D2 - Hillview	3.3	1.8	1.5	5.3	1, 2
13-Apr-07	D3 - Oakey Park	5.0	1.3	3.7	8.3	1, 2, 3
13-Apr-07	D4 - Ulan Hotel	1.3	0.7	0.6	3.4	0
13-Apr-07	D5 - Glenmoor	9.0	1.9	7.1	11.3	1, 2, 3
13-Apr-07	D6 - Barcoo	0.9	0.5	0.4	1.9	0
13-Apr-07	D7 - Hillside	9.9	2.0	7.9	12.2	1, 2, 3
13-Apr-07	D8 - Croydon	1.1	0.8	0.3	2.8	0
11-May-07	D1 - Bobadeen	0.9	0.6	0.3	1.9	0
11-May-07	D2 - Hillview	2.8	1.6	1.2	2.9	0
11-May-07	D3 - Oakey Park	2.1	1.1	1.0	2.1	0
11-May-07	D4 - Ulan Hotel	2.7	1.4	1.3	4.4	0
11-May-07	D5 - Glenmoor	1.0	0.6	0.4	2.1	0
11-May-07	D6 - Barcoo	3.2	0.5	2.7	3.2	1, 2, 5
11-May-07	D7 - Hillside	1.2	0.7	0.5	1.6	0
11-May-07	D8 - Croydon	1.6	0.9	0.7	2.4	0
13-Jun-07	D1 - Bobadeen	0.3	0.3	<0.1	0.5	0
13-Jun-07	D2 - Hillview	8.6	3.5	5.1	11.9	2
13-Jun-07	D3 - Oakey Park	4.5	1.8	2.7	5.1	2
13-Jun-07	D4 - Ulan Hotel	0.8	0.6	0.2	1.3	0
13-Jun-07	D5 - Glenmoor	0.6	0.4	0.2	3.1	0
13-Jun-07	D6 - Barcoo	0.8	0.5	0.3	3.4	0
13-Jun-07	D7 - Hillside	0.8	0.5	0.3	0.8	0
13-Jun-07	D8 - Croydon	2.3	1.3	1.0	5.2	0
12-Jul-07	D1 - Bobadeen	0.9	0.5	0.4	4.4	0
12-Jul-07	D2 - Hillview	2.9	1.3	1.6	7.0	0
12-Jul-07	D3 - Oakey Park	3.4	1.8	1.6	6.9	1, 2
12-Jul-07	D4 - Ulan Hotel	1.0	0.6	0.4	4.9	0
12-Jul-07	D5 - Glenmoor	1.3	0.7	0.6	5.1	0
12-Jul-07	D6 - Barcoo	6.8	1.9	4.9	8.9	1, 2, 5
12-Jul-07	D7 - Hillside	3.6	1.4	2.2	4.8	1, 2, 5
12-Jul-07	D8 - Croydon	2.5	1.3	1.2	6.4	0
14-Aug-07	D1 - Bobadeen	0.3	0.1	0.2	0.6	0
14-Aug-07	D2 - Hillview	1.6	0.8	0.8	2.2	0
14-Aug-07	D3 - Oakey Park	8.0	3.1	4.9	13.2	1, 2, 5
14-Aug-07	D4 - Ulan Hotel	2.5	1.0	1.5	19.5	0
14-Aug-07	D5 - Glenmoor	1.4	0.6	0.8	2.2	0
14-Aug-07	D6 - Barcoo	0.3	0.1	0.2	0.3	0
14-Aug-07	D7 - Hillside	45.9	27.7	18.2	66.1	1, 2, 3, 5
14-Aug-07	D8 - Croydon	0.4	0.3	0.1	0.4	0
13-Sep-07	D1 - Bobadeen	1.0	0.8	0.2	3.9	0
13-Sep-07	D2 - Hillview	2.0	1.2	0.8	4.6	0
13-Sep-07	D3 - Oakey Park	16.5	6.9	9.6	18.7	1, 2, 5
13-Sep-07	D4 - Ulan Hotel	0.9	0.5	0.4	4.1	0
13-Sep-07	D5 - Glenmoor	1.5	0.7	0.8	4.1	0
13-Sep-07	D6 - Barcoo	0.8	0.6	0.2	3.9	0
13-Sep-07	D7 - Hillside	1.7	1.3	0.4	4.7	0
13-Sep-07	D8 - Croydon	0.8	0.6	0.2	3.6	0
19-Oct-07	D1 - Bobadeen	0.2	0.2	<0.1	2.8	0
19-Oct-07	D2 - Hillview	2.1	1.2	0.9	2.2	0
19-Oct-07	D3 - Oakey Park	6.2	1.8	4.4	15.2	1, 2
19-Oct-07	D4 - Ulan Hotel	1.6	0.5	1.1	3.4	0
19-Oct-07	D5 - Glenmoor	2.1	0.8	1.3	4.0	0
19-Oct-07	D6 - Barcoo	0.2	0.2	<0.1	0.2	0
19-Oct-07	D7 - Hillside	0.3	0.1	0.2	2.6	0
19-Oct-07	D8 - Croydon	0.5	0.1	0.4	1.2	0
12-Nov-07	D1 - Bobadeen	0.7	0.7	<0.1	0.7	0
12-Nov-07	D2 - Hillview	1.1	0.3	0.8	1.5	0
12-Nov-07	D3 - Oakey Park	51.6	15.5	36.1	82.8	1, 2, 3
12-Nov-07	D4 - Ulan Hotel	4.1	1.7	2.4	4.4	1, 2
12-Nov-07	D5 - Glenmoor	3.5	1.6	1.9	7.6	1, 2, 3

12-Nov-07	D6 - Barcoo	1.4	0.8	0.6	1.8	0
12-Nov-07	D7 - Hillside	9.8	1.9	7.9	16.9	1, 2, 5
12-Nov-07	D8 - Croydon	0.9	0.9	<0.1	1.2	0
13-Dec-07	D1 - Bobadeen	0.9	0.5	0.4	4.0	0
13-Dec-07	D2 - Hillview	18.1	3.3	14.8	37.2	1, 2, 5
13-Dec-07	D3 - Oakey Park	23.5	3.2	20.3	40.7	1, 2
13-Dec-07	D4 - Ulan Hotel	2.9	1.1	1.8	2.9	0
13-Dec-07	D5 - Glenmoor	1.9	0.7	1.2	4.2	0
13-Dec-07	D6 - Barcoo	1.7	0.5	1.2	4.9	0
13-Dec-07	D7 - Hillside	3.4	0.6	2.8	7.4	1, 2, 5
13-Dec-07	D8 - Croydon	6.7	3.5	3.2	6.7	1, 2, 5
16-Jan-08	D1 - Bobadeen	0.4	0.4	<0.1	1.2	0
16-Jan-08	D2 - Hillview	13.1	4.1	9.0	20.6	1, 2
16-Jan-08	D3 - Oakey Park	28.8	4.2	24.6	61.1	1, 2
16-Jan-08	D4 - Ulan Hotel	5.6	1.2	4.4	6.0	1, 2
16-Jan-08	D5 - Glenmoor	2.3	0.8	1.5	2.3	0
16-Jan-08	D6 - Barcoo	8.1	4.0	4.1	11.5	1, 2, 5
16-Jan-08	D7 - Hillside	8.1	1.8	6.3	14.3	1, 2
16-Jan-08	D8 - Croydon	1.0	0.4	0.6	1.5	0
14-Feb-08	D1 - Bobadeen	4.4	1.1	3.3	5.9	1, 2, 3, 5
14-Feb-08	D2 - Hillview	10.4	2.4	8.0	12.3	1, 2, 3, 5
14-Feb-08	D3 - Oakey Park	29.0	2.9	26.1	52.8	1, 2, 3, 5
14-Feb-08	D4 - Ulan Hotel	3.3	1.1	2.2	2.6	1, 2, 3
14-Feb-08	D5 - Glenmoor	1.1	0.4	0.7	1.1	0
14-Feb-08	D6 - Barcoo	1.1	0.5	0.6	3.1	0
14-Feb-08	D7 - Hillside	33.6	4.3	29.3	40.5	1, 2, 3, 5
14-Feb-08	D8 - Croydon	1.5	0.8	0.7	1.8	0
14-Mar-08	D1 - Bobadeen	0.5	0.4	0.1	1.3	0
14-Mar-08	D2 - Hillview	15.2	4.1	11.1	30.0	2, 4, 5
14-Mar-08	D3 - Oakey Park	3.8	1.5	2.3	3.9	2, 5
14-Mar-08	D4 - Ulan Hotel	0.7	0.3	0.4	1.2	0
14-Mar-08	D5 - Glenmoor	6.8	1.4	5.4	7.2	2, 3
14-Mar-08	D6 - Barcoo	0.6	0.3	0.3	0.7	0
14-Mar-08	D7 - Hillside	8.1	3.3	4.8	11.8	2, 3, 5
14-Mar-08	D8 - Croydon	0.5	0.3	0.2	0.5	0
11-Apr-08	D1 - Bobadeen	0.5	0.3	0.2	0.5	0
11-Apr-08	D2 - Hillview	24.4	1.9	22.5	42.2	1, 3, 5
11-Apr-08	D3 - Oakey Park	6.7	1.7	5.0	14.1	1, 3, 5
11-Apr-08	D4 - Ulan Hotel	2.3	1.3	1.0	3.3	0
11-Apr-08	D5 - Glenmoor	1.3	0.7	0.6	1.3	0
11-Apr-08	D6 - Barcoo	0.6	0.3	0.3	0.9	0
11-Apr-08	D7 - Hillside	1.4	0.5	0.9	3.3	0
11-Apr-08	D8 - Croydon	1.1	0.7	0.4	1.4	0
16-May-08	D1 - Bobadeen	1.6	1.4	0.2	1.6	0
16-May-08	D2 - Hillview	16.9	3.2	13.7	26.5	1,2,3,5
16-May-08	D3 - Oakey Park	9.9	2.7	7.2	13.7	1,2,3,5
16-May-08	D4 - Ulan Hotel	2.9	1.9	1.0	3.4	0
16-May-08	D5 - Glenmoor	2.1	1.6	0.5	2.1	0
16-May-08	D6 - Barcoo	1.1	0.8	0.3	3.7	0
16-May-08	D7 - Hillside	1.9	1.5	0.4	5.3	0
16-May-08	D8 - Croydon	1.0	0.9	0.1	1.3	0
13-Jun-08	D1 - Bobadeen	0.6	0.6	<0.1	0.8	0
13-Jun-08	D2 - Hillview	27.8	3.7	24.1	46.1	1,2,3,5
13-Jun-08	D3 - Oakey Park	4.9	1.7	3.2	6.7	1,2,5
13-Jun-08	D4 - Ulan Hotel	0.7	0.5	0.2	1.7	0
13-Jun-08	D5 - Glenmoor	4.6	1.9	2.7	7.2	1,2,3
13-Jun-08	D6 - Barcoo	1.2	0.7	0.5	1.2	0
13-Jun-08	D7 - Hillside	4.2	1.7	2.5	5.2	1,2,5
13-Jun-08	D8 - Croydon	0.6	0.4	0.2	1.4	0
14-Jul-08	D1 - Bobadeen	0.3	0.3	<0.1	1.6	0
14-Jul-08	D2 - Hillview	3.0	0.9	2.1	4.7	1,2,3,5
14-Jul-08	D3 - Oakey Park	25.3	5.0	20.3	46.2	1,2,3
14-Jul-08	D4 - Ulan Hotel	3.2	2.0	1.2	4.4	1,2,3,5
14-Jul-08	D5 - Glenmoor	2.4	0.9	1.5	8.1	0
14-Jul-08	D6 - Barcoo	1.9	1.0	0.9	2.7	0
14-Jul-08	D7 - Hillside	5.4	2.0	3.4	8.4	1,2,3,5
14-Jul-08	D8 - Croydon	3.2	1.6	1.6	8.1	1,2,5
13-Aug-08	D1 - Bobadeen	2.4	1.6	0.8	2.4	0
13-Aug-08	D2 - Hillview	4.7	1.9	2.8	6.6	2,3,5
13-Aug-08	D3 - Oakey Park	12.7	2.3	10.4	22.4	1,2,3,5
13-Aug-08	D4 - Ulan Hotel	7.6	3.7	3.9	8.8	1,2,3,5

13-Aug-08	D5 - Glenmoor	15.9	5.7	10.2	25.2	1,2,3
13-Aug-08	D6 - Barcoo	0.8	0.5	0.3	0.8	0
13-Aug-08	D7 - Hillside	1.9	1.0	0.9	1.9	0
13-Aug-08	D8 - Croydon	7.9	3.0	4.9	9.3	1,2,3,5
11-Sep-08	D1 - Bobadeen	2.1	1.2	0.9	3.0	0
11-Sep-08	D2 - Hillview	29.7	11.2	18.5	46.1	1,2,3,5
11-Sep-08	D3 - Oakey Park	17.4	2.9	14.5	32.9	1,2,3,5
11-Sep-08	D4 - Ulan Hotel	1.2	0.5	0.7	1.8	0
11-Sep-08	D5 - Glenmoor	2.2	0.8	1.4	2.2	0
11-Sep-08	D6 - Barcoo	2.7	1.0	1.7	2.9	0
11-Sep-08	D7 - Hillside	10.8	2.2	8.6	16.0	1,2,3,5
11-Sep-08	D8 - Croydon	1.8	0.7	1.1	5.2	0
9-Oct-08	D1 - Bobadeen	3.1	1.5	1.6	4.9	1,2,3,5
9-Oct-08	D2 - Hillview	11.8	3.6	8.2	19.5	1,2,3,5
9-Oct-08	D3 - Oakey Park	24.1	4.0	20.1	46.6	1,2,3,5
9-Oct-08	D4 - Ulan Hotel	2.0	1.6	0.4	3.5	0
9-Oct-08	D5 - Glenmoor	3.2	1.5	1.7	7.4	1,2,3,5
9-Oct-08	D6 - Barcoo	4.1	2.0	2.1	4.2	1,2,5
9-Oct-08	D7 - Hillside	5.2	1.9	3.3	6.7	1,2,3,5
9-Oct-08	D8 - Croydon	2.3	1.2	1.1	4.4	0
27-Oct-08	D9 - Wilga	1.1	0.7	0.4	3.3	0
6-Nov-08	D1 - Bobadeen	2.1	1.0	1.1	2.1	0
6-Nov-08	D2 - Hillview	97.0	5.9	91.1	141	1,2,5
6-Nov-08	D3 - Oakey Park	9.5	2.1	7.4	25.2	1,2,5
6-Nov-08	D4 - Ulan Hotel	3.9	2.4	1.5	3.9	1,2,5
6-Nov-08	D5 - Glenmoor	4.1	1.5	2.6	5.0	1,2,5
6-Nov-08	D6 - Barcoo	4.6	1.6	3.0	6.2	1,2,5
6-Nov-08	D7 - Hillside	6.9	2.2	4.7	13.3	1,2,5
6-Nov-08	D8 - Croydon	1.4	0.5	0.9	2.0	0
28-Nov-08	D9 - Wilga	0.7	0.7	<0.1	3.2	0
4-Dec-08	D1 - Bobadeen	2.8	1.6	1.2	6.6	1,2,5
4-Dec-08	D2 - Hillview	8.5	2.3	6.2	11.7	1,2,5
4-Dec-08	D3 - Oakey Park	129.0	12.8	116.0	187	1,2,3,5
4-Dec-08	D4 - Ulan Hotel	2.8	1.8	1.0	2.8	1,2,5
4-Dec-08	D5 - Glenmoor	4.7	1.7	3.0	5.6	1,2,3,5
4-Dec-08	D6 - Barcoo	4.3	1.9	2.4	5.7	1,2,3,5
4-Dec-08	D7 - Hillside	10.4	3.1	7.3	12.3	1,2,3,5
4-Dec-08	D8 - Croydon	3.4	1.6	1.8	2.7	1,2,3,5
30-Dec-08	D9 - Wilga	1.2	1.1	0.1	1.8	2.5
2-Jan-09	D1 - Bobadeen	1.3	1.0	0.3	1.3	1,2,5
2-Jan-09	D2 - Hillview	32.1	6.3	25.8	49.6	3,5
2-Jan-09	D3 - Oakey Park	121.8	11.1	110.7	186.7	3,5
2-Jan-09	D4 - Ulan Hotel	1.4	1.1	0.3	4.3	1,2,5
2-Jan-09	D5 - Glenmoor	3.6	1.4	2.2	3.6	1,2,3
2-Jan-09	D6 - Barcoo	2.4	1.4	1.0	2.4	1,2,3,5
2-Jan-09	D7 - Hillside	9.3	2.0	7.3	11.3	1,2,3,5
2-Jan-09	D8 - Croydon	1.8	1.1	0.7	1.9	1,5
30-Jan-09	D1 - Bobadeen	0.4	0.4	<0.1	1.6	0
30-Jan-09	D2 - Hillview	7.0	1.3	5.7	17.1	1,2,5
30-Jan-09	D3 - Oakey Park	5.4	1.5	3.9	13.6	1,2
30-Jan-09	D4 - Ulan Hotel	2.2	1.3	0.9	3.0	1,2
30-Jan-09	D5 - Glenmoor	5.2	1.5	3.7	7.6	1,2
30-Jan-09	D6 - Barcoo	1.1	0.7	0.4	1.4	0
30-Jan-09	D7 - Hillside	5.2	1.3	3.9	7.7	1,2,3,5
30-Jan-09	D8 - Croydon	11.0	2.5	8.5	18.7	1,5
30-Jan-09	D9 - Wilga	0.9	0.6	0.3	1.2	0
2-Mar-09	D1 - Bobadeen	1.3	0.7	0.6	2.2	0
2-Mar-09	D2 - Hillview	9.2	2.1	7.1	11.9	1, 2, 3, 5
2-Mar-09	D3 - Oakey Park	2.2	0.7	1.5	2.2	0
2-Mar-09	D4 - Ulan Hotel	1.8	1.1	0.7	2.3	0
2-Mar-09	D5 - Glenmoor	5.0	1.1	3.9	5.0	1, 2, 3
2-Mar-09	D6 - Barcoo	2.0	1.1	0.9	2.3	0
2-Mar-09	D7 - Hillside	3.7	1.5	2.2	6.0	1, 2, 3, 5
2-Mar-09	D8 - Croydon	10.7	2.3	8.4	15.1	1, 2, 3, 5
2-Mar-09	D9 - Wilga	1.6	1.0	0.6	2.7	0
1-Apr-09	D1 - Bobadeen	1.1	0.9	0.2	1.1	0
1-Apr-09	D2 - Hillview	15.0	2.2	12.8	23.6	1, 2, 3
1-Apr-09	D3 - Oakey Park	1.7	1.0	0.7	1.7	0
1-Apr-09	D4 - Ulan Hotel	6.8	2.1	4.7	7.4	1, 2, 3, 5
1-Apr-09	D5 - Glenmoor	1.1	0.7	0.4	1.1	0
1-Apr-09	D6 - Barcoo	1.9	1.1	0.8	1.9	0

1-Apr-09	D7 - Hillside	1.7	1.0	0.7	1.7	0
1-Apr-09	D8 - Croydon	3.3	1.3	2.0	5.1	1, 2, 3, 5
1-Apr-09	D9 - Wilga	1.1	0.8	0.3	1.1	0
1-May-09	D1 - Bobadeen	1.0	0.6	0.4	1.0	1,5
1-May-09	D2 - Hillview	15.5	2.4	13.1	25.6	1,2,3,5
1-May-09	D3 - Oakey Park	8.8	2.6	6.2	12.6	1,2,3,5
1-May-09	D4 - Ulan Hotel	5.1	1.4	3.7	5.8	1,2,3
1-May-09	D5 - Glenmoor	6.2	1.9	4.3	8.1	1
1-May-09	D6 - Barcoo	11.2	8.3	2.9	11.2	1,2,5
1-May-09	D7 - Hillside	2.6	1.2	1.4	2.7	1,2,3,5
1-May-09	D8 - Croydon	3.5	1.6	1.9	4.4	1,2,5
1-May-09	D9 - Wilga	0.5	0.4	0.1	0.6	5
1-Jun-09	D1 - Bobadeen	0.5	0.5	<0.1	0.6	0
1-Jun-09	D2 - Hillview	22.8	3.6	19.2	38.3	1,2,3,5
1-Jun-09	D3 - Oakey Park	4.9	2.5	2.4	5.7	2,3,5
1-Jun-09	D4 - Ulan Hotel	1.7	1.0	0.7	1.9	0
1-Jun-09	D5 - Glenmoor	1.0	0.7	0.3	1.2	0
1-Jun-09	D6 - Barcoo	0.7	0.7	<0.1	0.7	0
1-Jun-09	D7 - Hillside	1.5	0.8	0.7	1.5	0
1-Jun-09	D8 - Croydon	0.9	0.6	0.3	0.7	0
1-Jun-09	D9 - Wilga	1.0	0.7	0.3	1.6	0
30-Jun-09	D1 - Bobadeen	0.3	0.3	<0.1	0.8	0
30-Jun-09	D2 - Hillview	21.1	4.0	17.1	33.8	1,2,3,5
30-Jun-09	D3 - Oakey Park	3.6	1.5	2.1	4.7	1,2,5
30-Jun-09	D4 - Ulan Hotel	2.3	1.5	0.8	2.4	0
30-Jun-09	D5 - Glenmoor	2.8	0.1	2.7	3.9	0
30-Jun-09	D6 - Barcoo	0.7	0.5	0.2	1.4	0
30-Jun-09	D7 - Hillside	0.8	0.3	0.5	1.0	0
30-Jun-09	D8 - Croydon	7.2	1.9	5.3	9.0	1,2,3,5
30-Jun-09	D9 - Wilga	0.7	0.4	0.3	0.7	0
3-Aug-09	D1 - Bobadeen	0.5	0.3	0.2	0.7	0
3-Aug-09	D2 - Hillview	45.7	4.6	41.1	76.6	2
3-Aug-09	D3 - Oakey Park	9.4	2.9	6.5	17.9	2,3,5
3-Aug-09	D4 - Ulan Hotel	6.5	4.8	1.7	6.9	1,2,3
3-Aug-09	D5 - Glenmoor	18.2	2.7	15.5	30.4	1,2,3,5
3-Aug-09	D6 - Barcoo	0.7	0.4	0.3	0.8	0
3-Aug-09	D7 - Hillside	1.3	0.6	0.7	1.4	0
3-Aug-09	D8 - Croydon	1.9	1.0	0.9	3.1	0
3-Aug-09	D9 - Wilga	0.6	0.3	0.3	0.8	0
31-Aug-09	D1 - Bobadeen	0.4	0.4	<0.1	0.4	0
31-Aug-09	D2 - Hillview	4.7	1.2	3.5	10.5	1,2,5
31-Aug-09	D3 - Oakey Park	1.4	1.0	0.4	1.4	0
31-Aug-09	D4 - Ulan Hotel	3.4	1.5	1.9	3.6	1,2,3
31-Aug-09	D5 - Glenmoor	2.2	1.2	1.0	3.2	0
31-Aug-09	D6 - Barcoo	0.9	0.6	0.3	0.9	0
31-Aug-09	D7 - Hillside	3.4	1.1	2.3	3.4	1,2,3,5
31-Aug-09	D8 - Croydon	1.0	0.6	0.4	1.0	0
31-Aug-09	D9 - Wilga	1.0	0.6	0.4	1.0	0
30-Sep-09	D1 - Bobadeen	4.5	3.8	0.7	4.9	1,5
30-Sep-09	D2 - Hillview	7.9	4.7	3.2	11.4	1,2,3,5
30-Sep-09	D3 - Oakey Park	4.7	3.7	1.0	5.4	1
30-Sep-09	D4 - Ulan Hotel	4.8	4.0	0.8	5.2	1
30-Sep-09	D5 - Glenmoor	3.7	2.8	0.9	4.4	1,5
30-Sep-09	D6 - Barcoo	3.7	2.9	0.8	4.3	1,3,5
30-Sep-09	D7 - Hillside	7.9	3.6	4.3	10.3	1,2,3,5
30-Sep-09	D8 - Croydon	2.7	2.0	0.7	3.3	1,3,5
30-Sep-09	D9 - Wilga	4.9	3.5	1.4	5.8	1,2,3,5
30-Oct-09	D1 - Bobadeen	4.1	3.2	0.9	4.7	1,5
30-Oct-09	D2 - Hillview	5.9	2.7	3.2	10.4	1,2,3,5
30-Oct-09	D3 - Oakey Park	3.5	2.8	0.7	4.6	1
30-Oct-09	D4 - Ulan Hotel	2.4	1.9	0.5	3.0	0
30-Oct-09	D5 - Glenmoor	2.8	2.1	0.7	3.2	0
30-Oct-09	D6 - Barcoo	2.3	1.8	0.5	2.9	0
30-Oct-09	D7 - Hillside	2.6	1.8	0.8	3.1	0
30-Oct-09	D8 - Croydon	5.1	3.1	2.0	6.4	1,2,5
30-Oct-09	D9 - Wilga	3.2	2.6	0.6	4.0	1,2,5
28-Nov-09	D1 - Bobadeen	2.6	1.6	1.0	3.6	0
28-Nov-09	D2 - Hillview	5.5	2.1	3.4	12.3	1,2,5
28-Nov-09	D3 - Oakey Park	1.8	1.2	0.6	1.8	0
28-Nov-09	D4 - Ulan Hotel	1.4	1.0	0.4	1.4	0
28-Nov-09	D5 - Glenmoor	7.1	1.9	5.2	10.8	1,2,5

28-Nov-09	D6 - Barcoo	1.8	0.8	1.0	1.9	0
28-Nov-09	D7 - Hillside	2.5	0.8	1.7	4.3	0
28-Nov-09	D8 - Croydon	1.9	1.2	0.7	2.5	0
28-Nov-09	D9 - Wilga	2.0	1.2	0.8	2.4	0
31-Dec-09	D1 - Bobadeen	1.2	0.7	0.5	1.6	0
31-Dec-09	D2 - Hillview	2.5	1.0	1.5	2.6	0
31-Dec-09	D3 - Oakey Park	3.1	1.5	1.6	5	1,2
31-Dec-09	D4 - Ulan Hotel	2.1	1.1	1.0	2.1	0
31-Dec-09	D5 - Glenmoor	4.2	1.5	2.7	5.9	1,2,5
31-Dec-09	D6 - Barcoo	2.5	1.3	1.2	2.9	0
31-Dec-09	D7 - Hillside	1.6	0.6	1.0	1.6	0
31-Dec-09	D8 - Croydon	2.0	1.0	1.0	2.1	0
31-Dec-09	D9 - Wilga	4.5	2.2	2.3	4.5	5,1
1-Feb-10	D1 - Bobadeen	1.4	0.8	0.6	1.8	0
1-Feb-10	D2 - Hillview	7.0	2.3	4.7	8	1, 2, 5
1-Feb-10	D3 - Oakey Park	1.1	0.6	0.5	1.1	0
1-Feb-10	D4 - Ulan Hotel	2.1	1.3	0.8	2.1	0
1-Feb-10	D5 - Glenmoor	27.0	3.8	23.2	47	1, 2, 3, 5
1-Feb-10	D6 - Barcoo	1.7	0.9	0.8	2	0
1-Feb-10	D7 - Hillside	1.1	0.5	0.6	1.1	0
1-Feb-10	D8 - Croydon	3.6	1.4	2.2	4.1	1, 2, 5
1-Feb-10	D9 - Wilga	1.9	0.9	1.0	1.9	0
1-Mar-10	D1 - Bobadeen	0.8	0.8	<0.1	2.3	0
1-Mar-10	D2 - Hillview	1.6	1.1	0.5	4.0	1,2,5
1-Mar-10	D3 - Oakey Park	0.7	0.7	<0.1	3.7	1
1-Mar-10	D4 - Ulan Hotel	0.5	0.5	<0.1	3.5	1
1-Mar-10	D5 - Glenmoor	12.5	3.0	9.5	20.5	1,2,3
1-Mar-10	D6 - Barcoo	1.7	1.4	0.3	1.9	0
1-Mar-10	D7 - Hillside	1.7	1.0	0.7	2.1	0
1-Mar-10	D8 - Croydon	0.9	0.5	0.4	0.9	0
1-Mar-10	D9 - Wilga	1.0	0.5	0.5	1.0	0
31-Mar-10	D1 - Bobadeen	1.9	1.2	0.7	4.5	1,2,3
31-Mar-10	D2 - Hillview	6.7	2.1	4.6	14	1,2,3
31-Mar-10	D3 - Oakey Park	0.4	0.4	<0.1	1.6	0
31-Mar-10	D4 - Ulan Hotel	3.1	1.7	1.4	5.1	1,2
31-Mar-10	D5 - Glenmoor	7.1	2.1	5	13.1	1,2,3
31-Mar-10	D6 - Barcoo	1.1	0.7	0.4	2.1	0
31-Mar-10	D7 - Hillside	1.7	0.8	0.9	3.4	0
31-Mar-10	D8 - Croydon	0.3	0.3	<0.1	1.6	0
31-Mar-10	D9 - Wilga	0.4	0.4	<0.1	2	0
30-Apr-10	DG01	1.0	0.3			
30-Apr-10	DG02	0.7	0.4			
30-Apr-10	DG03	0.8	0.4			
30-Apr-10	DG04	0.6	0.4			
30-Apr-10	DG05	3.5	0.6			
30-Apr-10	DG06	0.3	0.3			
30-Apr-10	DG07	0.4	0.3			
30-Apr-10	DG08	0.5	0.2			
30-Apr-10	DG09	0.1	0.1			
31-May-10	DG01	4.8	0.7			
31-May-10	DG02	3.3	0.4			
31-May-10	DG03	0.5	0.4			
31-May-10	DG04	0.9	0.7			
31-May-10	DG05	1.4	0.8			
31-May-10	DG06	1.0	0.4			
31-May-10	DG07	0.1	0.1			
31-May-10	DG08	0.7	0.5			
31-May-10	DG09	0.1	0.1			
30-Jun-10	DG01	0.5	0.3			
30-Jun-10	DG02	3.0	0.8			
30-Jun-10	DG03	0.4	0.2			
30-Jun-10	DG04	3.6	1.7			
30-Jun-10	DG05	2.2	0.7			
30-Jun-10	DG06	0.3	0.1			
30-Jun-10	DG07	2.2	1.0			
30-Jun-10	DG08	0.6	0.3			
30-Jun-10	DG09	0.2	0.1			
30-Jul-10	DG01	0.1	0.1			
30-Jul-10	DG02	2.9	1.1			
30-Jul-10	DG03	0.3	0.1			
30-Jul-10	DG04	0.9	0.5			

30-Jul-10	DG05	2.7	1.2			
30-Jul-10	DG06	0.2	0.1			
30-Jul-10	DG07	0.1	0.1			
30-Jul-10	DG08	2.8	0.9			
30-Jul-10	DG09	0.2	0.1			
31-Aug-10	DG01	0.2	0.1			
31-Aug-10	DG02	0.7	0.2			
31-Aug-10	DG03	0.3	0.1			
31-Aug-10	DG04	4.5	3.2			
31-Aug-10	DG05	1.9	0.7			
31-Aug-10	DG06	0.2	0.1			
31-Aug-10	DG07	0.2	0.1			
31-Aug-10	DG08	0.4	0.2			
31-Aug-10	DG09	0.1	0.1			
1-Oct-10	DG01	0.2	<0.1			
1-Oct-10	DG02	2.0	0.7			
1-Oct-10	DG03	0.9	0.2			
1-Oct-10	DG04	0.6	0.3			
1-Oct-10	DG05	0.6	0.4			
1-Oct-10	DG06	0.3	0.1			
1-Oct-10	DG07	0.3	0.1			
1-Oct-10	DG08	0.3	0.1			
1-Oct-10	DG09	0.1	0.1			
1-Nov-10	DG01	0.3	<0.1			
1-Nov-10	DG02	0.5	0.1			
1-Nov-10	DG03	0.6	0.2			
1-Nov-10	DG04	0.6	0.2			
1-Nov-10	DG05	1.6	0.5			
1-Nov-10	DG06	0.6	0.1			
1-Nov-10	DG07	0.5	0.1			
1-Nov-10	DG08	0.8	0.4			
1-Nov-10	DG09	0.3	0.1			
5-Dec-10	DG01	0.4	0.1			
5-Dec-10	DG02	1.1	0.3			
5-Dec-10	DG03	0.5	0.1			
5-Dec-10	DG04	3.6	1.5			
5-Dec-10	DG05	2.4	0.9			
5-Dec-10	DG06					
5-Dec-10	DG07	7.9	3.0			
5-Dec-10	DG08					
5-Dec-10	DG09	0.5	0.2			
7-Dec-10	DG08	0.6	0.1			

<u>Contamination ID</u>

1. Insects
2. Bird droppings
3. Vegetation/seeds
4. Farming activity
5. Grazing activity
6. Mine activity
7. Other
8. Road dust

Table 2.2: TEOM Monitoring data from the MCM monitoring network - $\mu g/m^3$

Date	TEOM01	TEOM02	TEOM03	Comment
17/10/08	8.1	4.1	5.4	
18/10/08	16.8	5.9	5.8	
19/10/08	8.6	7.3	7.2	
20/10/08	15.0	9.9	10.2	
21/10/08	11.4	10.0	9.2	
22/10/08	5.0	4.2	4.0	
23/10/08	4.6	5.2	2.1	
24/10/08	5.3	4.5	5.4	
25/10/08	8.0	7.8	7.9	
26/10/08	13.4	11.3	12.2	
27/10/08	21.6	17.7	17.0	
28/10/08	24.6	22.3	21.9	
29/10/08	6.9	5.1	4.2	
30/10/08	16.0	12.5	13.7	
31/10/08	31.1	25.1	23.1	
01/11/08	21.7	21.6	20.7	
02/11/08	10.5	7.6	9.3	
03/11/08	7.4	6.4	5.3	
04/11/08	9.1	8.6	7.3	
05/11/08	11.4	12.7	10.0	
06/11/08	10.6	11.2	6.9	
07/11/08	20.7	13.3	19.2	
08/11/08	9.7	8.7	9.8	
09/11/08	6.9	7.4	6.4	
10/11/08	17.3	10.3	11.7	
11/11/08	12.6	9.4	10.5	
12/11/08	8.4	8.6	6.1	
13/11/08	10.4	6.7	9.4	
14/11/08	16.9	12.2	13.2	
15/11/08	7.3	8.2	6.6	
16/11/08	11.2	9.6	9.9	
17/11/08	13.0	13.8	11.8	
18/11/08	4.7	4.2	4.1	
19/11/08	2.2	3.0	6.2	
20/11/08	4.5	4.7	4.2	
21/11/08	12.6	12.7	10.5	
22/11/08	9.2	9.0	8.0	
23/11/08	114.1	102.3	106.3	Regionally high dust levels
24/11/08	31.8	30.1	28.6	
25/11/08	17.7	17.0	16.4	
26/11/08	12.2	12.1	11.6	
27/11/08	9.7	8.1	8.7	
28/11/08	5.4	5.8	5.3	
29/11/08	4.1	4.5	3.4	
30/11/08	8.2	9.3	8.3	
01/12/08	8.9	8.9	7.6	
02/12/08	16.1	17.5	15.1	
03/12/08	13.8	12.7	13.1	
04/12/08	20.4	20.1	20.4	
05/12/08	13.6	13.5	13.1	
06/12/08	12.4	11.9	12.7	
07/12/08	8.0	7.3	7.7	
08/12/08	11.3	10.4	11.0	
09/12/08	8.5	5.0	6.2	
10/12/08	13.5	11.6	10.7	
11/12/08	10.7	8.4	8.6	
12/12/08	5.1	3.8	4.2	
13/12/08	21.4	20.7	21.5	
14/12/08	7.1	6.7	5.8	
15/12/08	5.4	4.1	3.9	
16/12/08	7.3	6.7	6.4	
17/12/08	8.8	5.9	7.0	
18/12/08	11.6	8.8	8.7	
19/12/08	6.8	6.4	6.0	
20/12/08	12.9	11.1	12.5	
21/12/08	10.2	9.4	5.8	
22/12/08	10.8	5.5	6.9	
23/12/08	12.0	9.4	8.8	
24/12/08	10.7	10.1	9.6	
25/12/08	11.6	12.0	11.1	
26/12/08	10.1	10.9	9.8	
27/12/08	5.6	6.5	4.9	
28/12/08		7.3	5.8	Power problems at Ulan School Monitor
29/12/08		7.8	7.9	
30/12/08		18.3	15.0	
31/12/08		29.7	28.4	

01/01/09		10.6	9.9	
02/01/09		16.7	17.9	
03/01/09		9.0	8.6	
04/01/09		12.1	13.4	
05/01/09		13.4	16.8	
06/01/09		13.4	14.8	
07/01/09		9.5	16.7	
08/01/09		12.1	12.7	
09/01/09		7.8	7.3	
10/01/09	11.2	10.4	11.0	
11/01/09		9.1	10.1	
12/01/09		12.8		
13/01/09		10.8		Power problems at Ulan School Monitor and Mobile Monitor
14/01/09		14.6		
15/01/09		14.8		
16/01/09		17.5		
17/01/09	15.4	14.0	12.9	
18/01/09	22.5	9.5	9.6	
19/01/09	63.3	12.9	14.6	High result at school due to a localised event
20/01/09	40.0	12.8	15.1	
21/01/09	25.2	8.2	7.1	
22/01/09	5.9	5.6	4.6	
23/01/09	10.8	5.4	2.6	
24/01/09	44.4	12.5	11.1	
25/01/09	17.5	16.1	15.5	
26/01/09	9.6	8.9	7.9	
27/01/09	12.1	5.6	5.2	
28/01/09	14.6	8.0	10.0	
29/01/09	17.1	10.8	17.3	
30/01/09	17.8	13.8	14.9	
31/01/09	16.5	13.4	14.0	
01/02/09	19.2	19.7	18.7	
02/02/09	53.6	16.8	15.8	Unlikely to be from Moolarben based on wind data
03/02/09	21.8	16.9		
04/02/09	13.7	12.4		
05/02/09	15.9	16.5		
06/02/09	20.2	21.5		
07/02/09	16.0	16.2		
08/02/09	18.6	16.1		Power problems at the Mobile Monitor
09/02/09	31.0	26.2		
10/02/09	8.7	9.2		
11/02/09	4.0	3.8		
12/02/09	6.1	5.3		
13/02/09	4.3	4.5		
14/02/09		1.0		Power problems at the Mobile Monitor
15/02/09		1.6		
16/02/09		5.4		
17/02/09		4.0		
18/02/09		3.5		
19/02/09		6.6		
20/02/09		18.2		
21/02/09		18.6		Power problems at the Mobile Monitor and at the School Monitor
22/02/09		12.5		
23/02/09		13.7		
24/02/09		11.3		
25/02/09		12.7		
26/02/09		19.6		
27/02/09		11.0		
28/02/09		17.4		
01/03/09	26.1	29.3		
02/03/09	19.3	17.1		Power problems at the Mobile Monitor
03/03/09	16.1	13.2		
04/03/09	54.7	56.0		Power problems at the Mobile Monitor. Regionally high dust levels at the Murragamba and School Monitors
05/03/09	64.9	68.0		
06/03/09	16.9	18.4		
07/03/09	10.0	10.9		
08/03/09	22.4	20.4		Power problems at the Mobile Monitor
09/03/09	14.8	14.4		
10/03/09	14.5	8.1		
11/03/09	8.0	6.5	6.2	
12/03/09	9.2	7.8	7.8	
13/03/09	8.7	9.0	6.7	
14/03/09	3.6	3.9	2.6	
15/03/09	11.9	11.4	11.5	
16/03/09	8.9	6.4	6.3	
17/03/09	9.2	5.8		Power problems at the Mobile Monitor. Monitor removed for repairs
18/03/09	17.8	12.5		

19/03/09	18.9	11.9		
20/03/09	15.8	14.8		
21/03/09	9.0	8.9		
22/03/09	6.2	4.4		
23/03/09	22.0	11.5		
24/03/09	19.0	11.9		
25/03/09	24.1	21.8		
26/03/09	21.7	19.8		
27/03/09	20.0	17.9		
28/03/09	33.8	29.7		
29/03/09	14.3	13.3		
30/03/09	13.8	10.3		
31/03/09	4.0			
01/04/09	4.0	1.8		
02/04/09	6.1	5.7		
03/04/09	6.2	4.7		
04/04/09	8.6	7.7		
05/04/09	10.4	9.7		
06/04/09	15.3	10.9		
07/04/09	0.8	12.2		
08/04/09	14.7	7.8		
09/04/09	11.2	5.5		
10/04/09	7.3	5.2		
11/04/09	5.2	5.0		
12/04/09	4.5	3.7		
13/04/09	6.2	5.9		
14/04/09	4.2	2.8		
15/04/09	6.8	6.6		
16/04/09	81.4	62.0		Power problems at the Mobile Monitor. Regionally high dust levels at the Murragamba and School Monitors
17/04/09	40.1	38.5		Power problems at the Mobile Monitor. Monitor removed for repairs
18/04/09	18.6	15.4		
19/04/09	7.5	8.4		
20/04/09	19.5	7.0		
21/04/09	10.6	5.2		
22/04/09	6.5	3.5		
23/04/09	7.4	4.2		
24/04/09	8.5	8.8		
25/04/09	119.4	99.7		Power problems at the Mobile Monitor. Regionally high dust levels at the Murragamba and School Monitors
26/04/09	12.9	11.8		Power problems at the Mobile Monitor. Monitor removed for repairs
27/04/09	23.7	26.7		
28/04/09	7.5	8.9		
29/04/09	9.1	6.1		
30/04/09				Power problems at all three sites
01/05/09		5.0		Power problems at the Mobile Monitor and at the School Monitor
02/05/09		10.4		
03/05/09		8.6		
04/05/09		7.7		
05/05/09		9.5		
06/05/09		9.5		
07/05/09		12.5		
08/05/09		16.1		
09/05/09		15.0		
10/05/09		11.7		
11/05/09		8.6	4.1	
12/05/09	17.5		22.3	Power problems at the Murragamba Monitor
13/05/09	9.2	26.8	28.7	
14/05/09	24.0	17.6	15.6	
15/05/09	19.5	15.5	13.1	
16/05/09	6.4	11.5	11.8	
17/05/09	11.0	9.5	11.9	
18/05/09	0.0	16.8	18.5	
19/05/09	0.0	11.7	13.1	
20/05/09	6.4	6.1	7.2	
21/05/09	10.1	8.3	7.6	
22/05/09	10.3	8.1	9.6	
23/05/09	12.2	10.9	11.6	
24/05/09	15.4	16.1	14.9	
25/05/09	13.8	11.3	14.9	
26/05/09	15.1	12.2	18.4	
27/05/09	11.2	9.1	8.5	
28/05/09	4.3	3.7	2.9	
29/05/09	11.5	7.0	6.3	
30/05/09		2.9	3.7	Power problems at the School Monitor
31/05/09		8.0	7.8	
01/06/09		10.0	9.1	
02/06/09		2.5	4.8	

03/06/09		4.9	4.1	
04/06/09	4.4	3.5	3.1	
05/06/09	3.4	0.8	0.3	
06/06/09		1.1	1.9	Power problems at the School Monitor
07/06/09	4.2	3.7	3.6	
08/06/09	2.2	1.9	1.5	
09/06/09	2.8	2.2	2.0	
10/06/09	4.8	4.2	2.5	
11/06/09	6.2	2.7	2.6	
12/06/09	8.1	3.7	3.2	
13/06/09		1.7	2.9	
14/06/09		5.8	4.2	Power problems at the School Monitor
15/06/09		7.1	4.3	
16/06/09	0.6	6.0	6.5	
17/06/09		6.1	5.7	
18/06/09		4.4	6.2	
19/06/09		4.8	6.0	Power problems at the School Monitor
20/06/09		4.5	4.3	
21/06/09		3.5	3.2	
22/06/09		1.6	2.1	
23/06/09			3.1	Power problems at the Murragamba Monitor and the School Monitor
24/06/09		2.2		Power problems at the Mobile Monitor and the School Monitor
25/06/09	7.5	3.6	2.4	
26/06/09	7.4	4.1	3.6	
27/06/09	3.2		2.0	Power problems at the Murragamba Monitor
28/06/09	2.3	5.9	0.8	
29/06/09	4.8	1.6	1.6	
30/06/09	4.6	2.2	1.6	
01/07/09	60.4	57.5	65.6	
02/07/09	17.6	9.4	15.9	
03/07/09	5.9	5.6	5.1	
04/07/09	3.2	6.8	2.8	
05/07/09	4.5	0.0	3.8	
06/07/09	8.2	6.2	7.8	
07/07/09	8.9	13.5	8.8	
08/07/09	9.9	5.6	8.9	
09/07/09	11.0	0.0	9.7	
10/07/09	8.8	3.6	5.8	
11/07/09	7.0	7.7	5.4	
12/07/09	7.6	0.3	6.0	
13/07/09	6.3	3.4	4.5	
14/07/09	3.3	8.5	2.3	
15/07/09	2.1	0.0	1.4	
16/07/09	2.4	0.4	1.0	
17/07/09	7.5	6.2	3.6	
18/07/09	6.0	6.8	2.7	
19/07/09	4.5	1.7	3.0	
20/07/09	7.8	3.6	3.9	
21/07/09	11.7	8.5	8.8	
22/07/09		6.6	6.2	
23/07/09	9.0	9.8	9.5	
24/07/09	7.4	2.4	2.3	
25/07/09	6.4	1.9	3.4	
26/07/09	5.9	4.3	3.9	
27/07/09	4.9	1.7	2.2	
28/07/09	9.3	3.7	2.6	
29/07/09	5.4	0.8	2.0	
30/07/09	4.7	0.9	1.5	
31/07/09	4.0	2.3	2.3	
01/08/09	4.9	4.2	2.0	
02/08/09	4.5	2.6	3.2	
03/08/09	12.6	5.6	4.6	
04/08/09	10.2		7.4	
05/08/09	12.6		10.6	Fault with Murragamba Station
06/08/09	11.9		9.4	
07/08/09	12.9	3.0	10.4	
08/08/09	7.2	7.0	6.5	
09/08/09	8.2	9.4	8.6	
10/08/09	18.2	11.9	13.6	
11/08/09	23.3		20.8	Fault with Murragamba Station
12/08/09	10.6	8.1	8.1	
13/08/09	17.2	13.3	14.8	
14/08/09	17.4	14.7	16.8	
15/08/09	9.3	8.9	10.7	
16/08/09	13.3	8.8	11.4	
17/08/09	23.6	21.5	24.7	
18/08/09	13.3	8.1	20.4	
19/08/09	19.4	14.6	26.3	

20/08/09	24.1	15.9	24.8	
21/08/09	24.6	24.5	21.0	
22/08/09	6.0	5.1	5.7	
23/08/09	8.5	6.5	8.3	
24/08/09	13.7	0.0	11.3	
25/08/09	0.0	29.9	38.5	
26/08/09	13.5	20.4	11.8	
27/08/09	14.8	12.2	18.3	
28/08/09	16.7	12.9	14.7	
29/08/09	18.8	21.5	17.7	
30/08/09	7.9	7.9	6.0	
31/08/09	10.7	0.0	5.8	
01/09/09	11.4	7.1	10.2	
02/09/09	19.6	15.4	16.6	
03/09/09	25.2	20.7	23.5	
04/09/09	6.5	5.3	4.8	
05/09/09	2.9	2.3	2.2	
06/09/09	5.0	3.7	3.7	
07/09/09	13.3	12.6	12.8	
08/09/09	7.6	4.1	3.9	
09/09/09	6.0	3.4	3.8	
10/09/09	8.0	6.5	7.0	
11/09/09	12.2	6.9	10.9	
12/09/09	14.5	11.9	11.3	
13/09/09	20.0	12.7	16.4	
14/09/09	28.8	24.3	25.6	
15/09/09	42.8	39.6	40.3	
16/09/09	32.4	30.8	33.5	
17/09/09	31.1	31.8	24.5	
18/09/09	12.7	9.5	8.5	
19/09/09	8.7	7.7	7.1	
20/09/09	8.8	8.8	7.2	
21/09/09	9.9	6.3	9.3	
22/09/09	17.4	13.2	11.6	
23/09/09	3035	2805	2853	Regional dust storm - removed from averages
24/09/09	10.8	7.2	8.8	
25/09/09	12.9	14.9	14.8	
26/09/09	112.2	104.0	100.0	Regional dust storm
27/09/09	9.4	12.6	10.0	
28/09/09	26.2	17.9	19.4	
29/09/09	17.9	6.6	11.3	
30/09/09	40.1	9.0	16.0	
01/10/09	42.1	22.6	49.0	
02/10/09	51.6	51.8	42.4	Regionally high dust levels
03/10/09	15.7	18.3	16.3	
04/10/09	6.8	6.8	6.7	
05/10/09	5.4	4.2	4.5	
06/10/09	12.3	5.0	5.0	
07/10/09	13.9	8.3	6.1	
08/10/09	11.6	4.6	4.7	
09/10/09	11.4	5.9	8.5	
10/10/09	10.3	5.8	8.3	
11/10/09	3.1	2.5	2.9	
12/10/09	22.3	11.0	11.9	
13/10/09	66.1	25.7	51.9	Strong W winds - not from MCM
14/10/09	117.5	115.8	101.4	Regional dust event
15/10/09	18.4	15.6	11.0	
16/10/09	13.0	9.2	7.9	
17/10/09	9.1	16.3	10.8	
18/10/09	15.6	12.6	13.5	
19/10/09	11.5	19.0	23.9	
20/10/09	11.7	19.2	26.1	
21/10/09	13.0	24.3	25.8	
22/10/09	18.1	33.6	36.3	
23/10/09	9.2	41.0	22.8	
24/10/09	7.0	42.0	56.1	W winds - not from MCM
25/10/09	18.3	20.1	19.0	
26/10/09	5.0	2.4	3.3	
27/10/09	10.0	4.2	4.8	
28/10/09		9.2	10.5	Air conditioner malfunction at the School resulted in missing data
29/10/09	8.3	10.4	11.7	
30/10/09	14.8	12.1	11.8	
31/10/09	13.7	11.8	12.4	
01/11/09	19.2	17.0	15.3	
02/11/09	29.6	28.6	28.7	
03/11/09	24.7	32.3	25.9	
04/11/09	30.7	28.6	28.2	

05/11/09				Data lost due to the annual calibration of the units
06/11/09	5.2	1.2	0.0	
07/11/09	7.7	6.9	5.3	
08/11/09	8.9	3.7	2.6	
09/11/09	26.3	6.4	6.8	
10/11/09	12.3	9.6	12.8	
11/11/09	25.6	19.6	25.5	
12/11/09	22.4	22.5	30.9	
13/11/09	25.2	17.0	26.8	
14/11/09	12.3	12.0	17.9	
15/11/09	29.3	24.9	27.3	
16/11/09	30.0	60.0	33.1	
17/11/09	46.3	40.9	51.8	
18/11/09	21.3	15.9	21.5	
19/11/09	35.7	38.3	40.5	
20/11/09	37.2	42.5	49.5	
21/11/09	40.7	48.4	48.8	
22/11/09	72.3	72.3	70.6	
23/11/09	48.2	34.4	47.5	
24/11/09	8.7	4.2	9.8	
25/11/09	17.7	13.1	15.5	
26/11/09	25.1	18.5	20.2	
27/11/09		22.8	34.1	Data was lost at Ulan School due to a problem with the filter. High results on 28-29/11/09 are attributable to raised dust levels across the region
28/11/09		82.5	88.8	
29/11/09		227.4	223.9	
30/11/09		11.1	14.3	
01/12/09		6.1	8.9	Data was lost at Ulan School due to a problem with the filter.
02/12/09	11.7	7.9	9.2	
03/12/09	25.7	13.8	11.2	
04/12/09	20.6	12.8	14.9	
05/12/09	6.6	20.4	22.7	
06/12/09	4.7	23.3	19.2	
07/12/09	12.6	11.6	23.3	
08/12/09	33.8	66.1	34.2	Contribution from MCM at Murragamba = 4.0
09/12/09	29.3	25.9	36.4	
10/12/09	30.2	45.4	33.0	
11/12/09	34.6	21.2	48.1	
12/12/09	18.9	13.8	19.6	
13/12/09	12.9	20.7	12.0	
14/12/09	31.9	18.7	21.8	
15/12/09	24.1	14.4	19.3	
16/12/09				Data lost due to the changeover of the units onto the Sentinex system
17/12/09				
18/12/09	24.8	22.6	22.2	
19/12/09	11.7	9.8	8.1	
20/12/09	18.9	17.3	19.2	
21/12/09	17.5	14.4	15.5	
22/12/09	2.1	3.9	4.6	
23/12/09	9.9	7.9	6.9	
24/12/09	11.0	7.9	9.8	
25/12/09	9.3	8.7	9.1	
26/12/09	1.9	1.0	1.1	
27/12/09	2.6	2.2	1.2	
28/12/09	4.0	2.8	2.9	
29/12/09	6.7	3.6	5.3	
30/12/09	8.6	7.5	9.7	
31/12/09	4.6	4.7	5.7	
01/01/10	3.5	2.9	3.4	
02/01/10	2.6	1.7	2.6	
03/01/10	6.9	5.1	9.5	
04/01/10	10.7	8.2	12.4	
05/01/10	10.9	8.3	9.2	
06/01/10	8.9	7.0	6.2	
07/01/10	18.5	13.9	15.6	
08/01/10	16.3	3.2	14.8	
09/01/10	12.5	10.1	9.9	
10/01/10	18.6	11.0	11.2	
11/01/10	26.2	21.7	25.1	
12/01/10	18.6	13.2	20.1	
13/01/10	20.0	15.6	20.1	
14/01/10	8.9	5.7	8.6	
15/01/10	10.4	6.9	7.9	
16/01/10	11.9	9.3	11.6	
17/01/10	10.5	10.9	8.0	
18/01/10	18.4	28.2	21.4	
19/01/10	13.9	13.7	16.3	
20/01/10	21.1	18.7	25.6	

21/01/10	20.3	18.3	30.1	
22/01/10	23.2	18.2	29.9	
23/01/10	20.3	16.3	19.4	
24/01/10	26.7	23.4	30.0	
25/01/10	31.1	25.2	25.2	
26/01/10	21.8	20.5	18.8	
27/01/10	23.3	24.1	24.7	
28/01/10	20.9	15.1	20.0	
29/01/10	16.4	11.6	9.5	
30/01/10	22.0	12.2	20.1	
31/01/10	16.8	5.7	9.3	
01/02/10	25.8	11.7	22.7	
02/02/10	30.2	7.9	29.0	
03/02/10	19.7	6.3	15.2	
04/02/10	7.9	6.1	15.1	
05/02/10	6.4	0.5	6.8	
06/02/10	2.6	2.5	2.2	
07/02/10	2.3	1.9	2.2	
08/02/10	10.9	6.7	6.6	
09/02/10	10.0	7.1	10.0	
10/02/10	10.9	8.3	10.1	
11/02/10	15.6	12.7	13.9	
12/02/10	10.5	11.4	8.5	
13/02/10	10.5	6.9	10.3	
14/02/10	6.8	5.8	6.7	
15/02/10	4.6	4.8	1.3	
16/02/10	10.3	6.9	7.5	
17/02/10	13.8	10.0	11.2	
18/02/10	20.7	8.4	10.8	
19/02/10	10.0	7.3	13.3	
20/02/10	10.4	7.5	11.3	
21/02/10	12.6	8.1	8.4	
22/02/10	13.8	8.4	11.8	
23/02/10	16.0	13.4	17.6	
24/02/10	19.7	16.1	18.4	
25/02/10	18.1	13.1	17.0	
26/02/10	14.4	9.2	13.6	
27/02/10	10.0	5.9	9.9	
28/02/10	10.8	10.3	10.2	
01/03/10	6.8	13.7	4.7	
02/03/10	10.4	30.7	5.8	
03/03/10	10.3	24.6	4.8	
04/03/10	5.2	14.7	14.1	
05/03/10	8.8	4.1	2.1	
06/03/10	5.0	5.5	4.9	
07/03/10	10.4	9.0	10.1	
08/03/10	3.4	8.9	7.0	
09/03/10	6.5	10.2	8.9	
10/03/10	6.6	8.2	2.2	
11/03/10	11.4	14.4	9.5	
12/03/10	14.8	14.4	7.9	
13/03/10	13.7	12.3	4.5	
14/03/10	4.9	5.7	2.1	
15/03/10	11.1	13.3	7.7	
16/03/10	15.0	7.2	9.8	
17/03/10	18.3	19.5	10.6	
18/03/10	18.3	17.9	7.8	
19/03/10	13.8	18.9	12.4	
20/03/10	32.3	17.7	15.3	
21/03/10	17.5	16.9	16.3	
22/03/10	25.1	22.7	18.5	
23/03/10	18.0	20.6	13.7	
24/03/10	30.8	22.7	16.9	
25/03/10	23.6	23.4	18.8	
26/03/10	23.1	20.5	15.9	
27/03/10	22.6	18.4	16.0	
28/03/10	26.5	25.3	22.6	
29/03/10	12.3	18.4	9.7	
30/03/10	2.8	4.5	0.2	
31/03/10	2.9	6.0	1.3	
01/04/10		2.0	4.0	No data was captured at the School due to power problems after a scheduled Country Energy power outage on 01/04/10
02/04/10		10.3	12.7	
03/04/10		7.2	10.1	
04/04/10		2.9	4.9	
05/04/10		5.4	8.0	
06/04/10		3.6	6.1	
07/04/10		5.2	6.0	
08/04/10	6.0	6.8	2.8	
09/04/10	9.8	13.0	7.6	

10/04/10	10.0	9.1	7.0	
11/04/10	5.7	5.2	3.6	
12/04/10	9.3	10.8	4.1	
13/04/10	13.6	8.6	11.4	
14/04/10	13.3	9.1	17.4	
15/04/10	14.6	11.7	25.5	
16/04/10	20.7	14.1	22.6	
17/04/10	11.3	9.2	12.2	
18/04/10	7.0	5.9	5.5	
19/04/10	18.2	5.1	9.2	
20/04/10	14.4	4.5	12.7	
21/04/10	13.9	5.9	14.0	
22/04/10	15.2	11.7	16.1	
23/04/10	13.7	11.5	15.1	
24/04/10	11.9	11.4	13.6	
25/04/10	3.9	3.1	0.0	
26/04/10	5.7	4.0	3.7	
27/04/10	6.9	5.9	4.9	
28/04/10	6.1	7.9	4.5	
29/04/10	8.7	9.4	6.0	
30/04/10	8.1	6.2	11.3	
01/05/10	10.6	7.7	9.4	
02/05/10	9.6	6.9	7.4	
03/05/10	16.4	10.1	17.6	
04/05/10	11.7	6.9	8.4	
05/05/10	3.9	4.3	0.0	
06/05/10	6.7	5.1	4.1	
07/05/10	6.9	5.6	3.9	
08/05/10	8.0	4.5	4.3	
09/05/10	7.7	6.4	7.3	
10/05/10	14.5	7.9	9.6	
11/05/10	13.0	19.8	10.0	
12/05/10	4.2	9.7	9.2	
13/05/10	5.5	6.8	2.6	
14/05/10	7.8	8.5	7.3	
15/05/10	8.0	6.9	6.2	
16/05/10	13.5	9.6	9.5	
17/05/10	13.3	9.3	10.5	
18/05/10	10.0	6.5	10.1	
19/05/10	12.4	6.9	14.4	
20/05/10	17.8	6.4	13.2	
21/05/10	13.6	2.0	17.4	
22/05/10	8.4	4.3	8.9	
23/05/10	8.8	4.0	9.2	
24/05/10	8.6	3.8	12.8	
25/05/10	5.6	6.0	5.6	
26/05/10	3.0	2.3	1.7	
27/05/10	11.1	4.8	7.1	
28/05/10	6.6	4.7	6.1	
29/05/10	3.3	2.7	3.1	
30/05/10	0.9	0.8	0.2	
31/05/10	5.2	4.0	3.3	
01/06/10	8.2	4.1	1.8	
02/06/10	9.6	4.3	7.6	
03/06/10	12.4	3.5	6.1	
04/06/10	5.1	3.2	3.2	
05/06/10	4.2	5.3	3.2	
06/06/10	6.8	6.2	6.1	
07/06/10	9.7	5.5	6.1	
08/06/10	9.2	6.0	7.5	
09/06/10	7.2	8.7	5.6	
10/06/10	6.2	7.0	4.7	
11/06/10	6.7	7.8	4.5	
12/06/10	4.2	3.5	4.9	
13/06/10	7.1	5.1	5.8	
14/06/10	11.5	8.0	10.2	
15/06/10	8.8	4.3	12.6	
16/06/10	12.1	4.7	12.9	
17/06/10	5.8	5.6	3.5	
18/06/10	10.5	10.9	8.2	
19/06/10	6.6	7.5	5.0	
20/06/10	3.9	3.3	3.4	
21/06/10	7.7	5.4	6.4	
22/06/10	4.7	4.2	6.3	
23/06/10	6.7	2.6	5.4	
24/06/10	5.4	2.7	5.6	
25/06/10	7.7	3.5	5.3	
26/06/10	2.3	1.4	1.0	
27/06/10	4.1	3.0	2.7	

28/06/10	6.9	6.7	4.9	
29/06/10	6.3	8.1	4.2	
30/06/10	6.8	8.4	4.0	
01/07/10	8.1	9.4	4.0	
02/07/10	4.9	10.3	3.0	
03/07/10	2.0	1.2	1.0	
04/07/10	4.2	2.8	2.6	
05/07/10	8.8	5.1	8.9	
06/07/10	6.0	6.1	4.8	
07/07/10	9.8	6.8	5.6	
08/07/10	11.1	4.6	7.1	
09/07/10	10.1	3.5	6.1	
10/07/10	6.8	3.3	4.8	
11/07/10	9.0	8.7	6.6	
12/07/10	5.2	2.8	4.6	
13/07/10	4.9	3.2	4.7	
14/07/10	2.5	3.1	1.9	
15/07/10	5.3	5.1	3.7	
16/07/10	9.0	4.0	5.5	
17/07/10	6.4	4.0	4.6	
18/07/10	5.6	5.4	4.2	
19/07/10	6.0	11.6	3.3	
20/07/10	6.7	10.2	3.2	
21/07/10	4.8	8.0	3.5	
22/07/10	5.7	7.5	4.3	
23/07/10	8.5	5.8	5.6	
24/07/10	6.3	3.8	4.4	
25/07/10	7.2	5.1	6.0	
26/07/10	10.9	5.9	7.7	
27/07/10	10.2	4.7	11.7	
28/07/10	3.5	1.9	4.2	
29/07/10	2.3	1.6	1.5	
30/07/10	2.8	2.7	1.3	
31/07/10	1.7	1.6	1.3	
01/08/10	2.9	2.8	2.2	
02/08/10	2.9	2.5	2.2	
03/08/10	5.9	5.3	3.2	
04/08/10	4.7	4.9	2.1	
05/08/10	5.4	7.4	2.7	
06/08/10	4.5	6.1	2.3	
07/08/10	5.6	5.2	3.6	
08/08/10	7.2	4.7	5.0	
09/08/10	17.8	8.7	15.9	
10/08/10	1.2	6.5	8.7	
11/08/10	1.7	2.3	0.5	
12/08/10	0.0	2.0	1.7	
13/08/10	3.3	3.3	2.3	
14/08/10	2.2	1.5	1.6	
15/08/10	6.0	8.5	6.0	
16/08/10	3.5	5.8	2.1	
17/08/10	6.3	2.6	3.8	
18/08/10	14.1	12.6	13.4	
19/08/10	6.3	6.1	5.0	
20/08/10	5.5	5.2	2.8	
21/08/10	4.6	4.2	3.1	
22/08/10	5.5	3.2	3.8	
23/08/10	2.6	2.5	2.8	
24/08/10	3.0	1.7	0.9	
25/08/10	4.0	4.6	1.7	
26/08/10	3.6	7.1	3.6	
27/08/10	4.5	4.1	4.0	
28/08/10	3.7	2.3	2.2	
29/08/10	2.8	5.9	5.8	
30/08/10	12.8	9.7	10.3	
31/08/10	10.9	11.6	9.3	
01/09/10	13.5	14.7	13.1	
02/09/10	4.4	14.1	8.7	
03/09/10	5.9	2.5	13.1	
04/09/10	2.4	1.6	1.8	
05/09/10	2.3	1.7	1.6	
06/09/10	4.7	5.6	2.1	
07/09/10	4.2	6.5	2.5	
08/09/10	9.9	4.9	8.9	
09/09/10	10.6	8.2	11.1	
10/09/10	4.2	3.1	2.2	
11/09/10	5.3	4.2	3.6	
12/09/10	4.3	3.9	3.4	
13/09/10	6.7	10.5	4.6	
14/09/10	4.6	4.2	4.5	

15/09/10	1.1	4.9	1.6	
16/09/10	1.5	6.4	0.5	
17/09/10	3.7	6.9	2.5	
18/09/10	8.6	10.1	8.3	
19/09/10	10.5	10.8	9.9	
20/09/10	15.5	14.9	14.6	
21/09/10	18.1	16.9	17.2	
22/09/10	15.0	11.9	17.0	
23/09/10	19.9	18.9	19.9	
24/09/10	12.7	11.7	13.3	
25/09/10	9.1	9.3	11.4	
26/09/10	9.0	6.7	10.3	
27/09/10	11.3	15.3	11.6	
28/09/10	9.0	16.0	10.2	
29/09/10	7.1	7.6	6.5	
30/09/10	10.6	8.8	15.4	
01/10/10	22.9	16.9	29.6	
02/10/10	14.3	12.1	15.5	
03/10/10	1.5	1.3	1.6	
04/10/10	3.2	2.1	2.8	
05/10/10	5.8	2.9	5.1	
06/10/10	8.0	3.5	8.4	
07/10/10	6.7	7.1	4.7	
08/10/10	12.1	13.9	12.5	
09/10/10	10.5	8.9	10.4	
10/10/10	13.0	8.3	10.8	
11/10/10	16.1	9.1	13.5	
12/10/10	13.6	5.6	12.6	
13/10/10	15.9	9.5	10.6	
14/10/10	7.3	7.7	6.2	
15/10/10	3.1	1.9	3.2	
16/10/10	4.0	4.1	3.8	
17/10/10	3.7	4.2	3.3	
18/10/10	5.9	5.2	2.8	
19/10/10	10.0	10.1	8.4	
20/10/10	11.9	10.0	13.9	
21/10/10	11.8	10.3	11.4	
22/10/10	5.6	7.7	4.4	
23/10/10	6.7	7.7	5.7	
24/10/10	1.5	1.1	1.3	
25/10/10	5.8	3.4	5.3	
26/10/10	8.5	7.3	8.1	
27/10/10	9.8	12.0	9.0	
28/10/10	15.8	11.1	14.3	
29/10/10	13.5	10.3	14.0	
30/10/10	14.7	11.9	13.8	
31/10/10	6.9	10.1	8.3	
01/11/10	5.8	8.5	6.7	
02/11/10	4.1	4.4	3.5	
03/11/10	6.0	8.3	4.7	
04/11/10	9.1	7.9	7.7	
05/11/10	11.8	4.5	8.5	
06/11/10	12.5	2.4	6.2	
07/11/10	7.7	3.9	7.0	
08/11/10	9.6	6.0	9.0	
09/11/10	3.9	7.0	7.3	
10/11/10	9.0	7.4	8.2	
11/11/10	7.1	5.8	5.6	
12/11/10	7.2	4.4	4.7	
13/11/10	11.4	9.1	8.9	
14/11/10	12.8	9.9	12.1	
15/11/10	6.6	8.2	5.9	
16/11/10	4.0	3.8	3.3	
17/11/10	9.6	7.2	8.1	
18/11/10	10.4	7.6	11.3	
19/11/10	12.5	8.8	12.3	
20/11/10	12.1	8.3	9.9	
21/11/10	13.8	10.2	12.9	
22/11/10	15.4	9.6	12.8	
23/11/10	13.8	9.5	13.1	
24/11/10	15.2	11.0	19.9	
25/11/10	15.5	11.4	27.8	
26/11/10	14.5	11.8	18.4	
27/11/10	14.2	13.0	14.1	
28/11/10	11.8	9.5	11.1	
29/11/10	7.0	4.7	6.8	
30/11/10	3.1	2.6	6.0	
01/12/10	1.7	1.4	1.6	
02/12/10	4.3	1.2	6.3	

03/12/10	3.2	3.3	3.1	
04/12/10	1.6	1.5	1.1	
05/12/10	5.2	5.4	5.9	
06/12/10	8.5	7.3	9.1	
07/12/10	10.3	8.4	15.0	
08/12/10	7.9	2.0	9.3	
09/12/10	8.6	7.4	7.5	
10/12/10	4.3	4.4	3.1	
11/12/10	5.2	4.9	3.3	
12/12/10	6.6	11.5	7.5	
13/12/10	8.0	9.1	8.0	
14/12/10	17.8	16.5	17.8	
15/12/10	10.1	10.2	13.8	
16/12/10	2.0	6.5	7.1	
17/12/10	11.5	12.5	9.4	
18/12/10	5.4	11.1	4.4	
19/12/10	4.6	4.7	3.5	
20/12/10	6.5	6.7	5.1	
21/12/10	7.5	9.8	6.1	
22/12/10	11.2	10.3	11.1	
23/12/10	15.8	12.9	15.3	
24/12/10	22.0	19.5	23.7	
25/12/10	10.9	10.5	10.7	
26/12/10	2.1	2.3	1.9	
27/12/10	4.5	4.3	4.3	
28/12/10	14.3	10.8	13.8	
29/12/10	8.1	7.5	10.3	
30/12/10	11.3	10.5	11.0	
31/12/10	15.9	15.3	17.0	

Table C.3: HVAS Monitoring data from the MCM monitoring network - µg/m³

Sample Date	HV01 - Ulan Village	Comment	Sample Date	HV02 - Ridge Road	Comment
28-Oct-05	10.1				
05-Nov-05	3.8				
11-Nov-05	10.0				
17-Nov-05	13.2				
25-Nov-05	8.6				
29-Nov-05	8.6				
05-Dec-05	6.4				
11-Dec-05	8.8				
17-Dec-05	13.5				
23-Dec-05	21.5				
29-Dec-05	22.1				
03-Feb-06	16.7				
09-Feb-06		Unit being repaired			
15-Feb-06		Unit being repaired			
21-Feb-06		Unit being repaired			
27-Feb-06		Unit being repaired			
05-Mar-06		Unit being repaired			
11-Mar-06		Unit being repaired			
17-Mar-06		Unit being repaired			
23-Mar-06		Unit being repaired			
01-Apr-06	20.4				
04-Apr-06	21.8				
10-Apr-06	31.1				
16-Apr-06	9.8				
22-Apr-06	13.7				
28-Apr-06	22.4				
04-May-06	16.3				
10-May-06	18.7				
16-May-06	34.3				
22-May-06	20.1				
28-May-06	15.9				
03-Jun-06	11.2				
09-Jun-06	24.9				
15-Jun-06	13.5				
21-Jun-06	12.7				
27-Jun-06	20.1				
03-Jul-06	7.6				
09-Jul-06	19.7				
15-Jul-06	4.6				
21-Jul-06	10.3				
27-Jul-06	13.7				
02-Aug-06	14.3				
08-Aug-06	20.9				
14-Aug-06	25.3				
20-Aug-06	19.6				
26-Aug-06	8.0				
01-Sep-06	15.9				
07-Sep-06	7.6				
13-Sep-06	13.2				
19-Sep-06	25.4				
25-Sep-06	22.8				
01-Oct-06	19.8				
07-Oct-06	32.9				
13-Oct-06	28.2				
19-Oct-06	26.0				
25-Oct-06	25.0				
31-Oct-06	36.8				
06-Nov-06	7.8				
12-Nov-06	14.9				
18-Nov-06	17.6				
24-Nov-06	37.2				
30-Nov-06	33.0				
06-Dec-06	24.5				
12-Dec-06	23.2				
18-Dec-06	31.5				
24-Dec-06	11.3				
30-Dec-06	9.2				
05-Jan-07	17.3				
11-Jan-07	31.1				
17-Jan-07	27.5				
23-Jan-07	20.3				
29-Jan-07	22.8				
04-Feb-07	32.4				
10-Feb-07	14.0				
18-Feb-07	15.4				
22-Feb-07	25.5				
28-Feb-07	16.6				
06-Mar-07	12.7				
12-Mar-07	25.7				

18-Mar-07	7.3				
24-Mar-07	17.5				
30-Mar-07	15.8				
05-Apr-07	16.5				
11-Apr-07	31.0				
17-Apr-07	30.5				
23-Apr-07	20.4				
29-Apr-07	9.0				
05-May-07	32.1				
11-May-07	18.8				
17-May-07	11.4				
23-May-07	10.1				
29-May-07	19.7				
04-Jun-07	11.1				
10-Jun-07	8.0				
16-Jun-07	4.9				
22-Jun-07	5.6				
28-Jun-07	2.5				
04-Jul-07	7.0				
10-Jul-07	13.1				
16-Jul-07	11.4				
22-Jul-07	11.3				
28-Jul-07	9.5				
03-Aug-07	5.9				
09-Aug-07	14.3				
15-Aug-07	18.1				
21-Aug-07	7.2				
27-Aug-07	10.8				
02-Sep-07	18.9				
08-Sep-07	8.3				
14-Sep-07	43.8				
20-Sep-07	26.8				
26-Sep-07	34.9				
02-Oct-07		Invalid run time			
05-Oct-07	23.2				
08-Oct-07	21.7				
14-Oct-07	13.1				
20-Oct-07	38.0				
26-Oct-07	8.1				
01-Nov-07		Invalid Sample - Part of HVAS filter paper missing.			
07-Nov-07	6.9				
13-Nov-07	18.2				
19-Nov-07	23.0				
25-Nov-07	13.3				
01-Dec-07		Invalid run time			
05-Dec-07	21.1				
07-Dec-07	15.8				
13-Dec-07	20.9				
19-Dec-07	22.4				
25-Dec-07	18.1				
31-Dec-07	31.1				
06-Jan-08	8.5				
12-Jan-08	26.9				
18-Jan-08	6.8				
25-Jan-08	15.3				
30-Jan-08	26.2				
05-Feb-08	10.3				
11-Feb-08	14.7				
17-Feb-08	14.8				
23-Feb-08	44.5				
29-Feb-08	9.5				
06-Mar-08	23.7				
12-Mar-08	18.9				
18-Mar-08	17.8				
24-Mar-08	14.3				
30-Mar-08		Unit away for service			
05-Apr-08		Unit away for service			
11-Apr-08		Unit away for service			
17-Apr-08		Unit away for service			
23-Apr-08		Unit away for service			
29-Apr-08		Unit away for service			
05-May-08		Unit away for service			
11-May-08		Unit away for repairs			
17-May-08	10.4				
23-May-08	14.4				
29-May-08	12.6				
04-Jun-08	3.9				
10-Jun-08	8.5				
16-Jun-08	12.3				
22-Jun-08	7.0				
28-Jun-08		No run / power failure			
04-Jul-08		No run / power failure			
05-Jul-08	12.3				
10-Jul-08	3.9				
16-Jul-08	11.4				
22-Jul-08	9.6				

28-Jul-08		Invalid run time			
30-Jul-08	8.6				
03-Aug-08	5.6				
09-Aug-08	5.6				
15-Aug-08	5.2				
21-Aug-08	15.3				
27-Aug-08	14.1				
02-Sep-08	8.0				
08-Sep-08	8.3				
14-Sep-08	1.2				
20-Sep-08	21.0				
26-Sep-08	10.6				
02-Oct-08	22.6				
08-Oct-08	6.7				
14-Oct-08	7.2				
20-Oct-08	18.5				
26-Oct-08	15.0				
01-Nov-08	25.2				
07-Nov-08	25.0				
13-Nov-08	19.7				
19-Nov-08	6.2				
25-Nov-08	20.7				
01-Dec-08	11.5				
07-Dec-08	11.7				
13-Dec-08	21.2				
19-Dec-08	9.1				
25-Dec-08	14.6				
31-Dec-08		Run time outside of specified limit of 24 hours ± 1 hours - power off at time of sampling			
03-Jan-09	13.4				
06-Jan-09	19.2				
12-Jan-09	16.0				
18-Jan-09	17.1				
24-Jan-09	20.7				
30-Jan-09	20.4				
05-Feb-09	20.2				
11-Feb-09	9.1				
17-Feb-09	6.5				
23-Feb-09	18.7				
01-Mar-09	28.1				
07-Mar-09	13.2				
13-Mar-09	11.4				
19-Mar-09	19.9				
25-Mar-09	30.4				
31-Mar-09	8.3				
06-Apr-09	21.9				
12-Apr-09	8.1				
18-Apr-09	18.1				
24-Apr-09	10.0				
30-Apr-09	12.6				
06-May-09	20.7				
12-May-09	28.4				
18-May-09	28.4				
24-May-09	17.1				
30-May-09	5.8		30-May-09	4.5	
05-Jun-09	3.4		05-Jun-09	4.9	
11-Jun-09	4.6		09-Jun-09		MUR 05/06 Unit did not run - plugs pulled out and broken
17-Jun-09	6.7		11-Jun-09		Unit did not run - power outage
23-Jun-09	3.6		15-Jun-09	8.0	MUR 11/06/09
29-Jun-09	2.2		17-Jun-09	5.6	
05-Jul-09	9.7		23-Jun-09	3.4	
11-Jul-09	8.3		29-Jun-09	2.3	
17-Jul-09	3.2		05-Jul-09	4.9	
23-Jul-09	7.9		11-Jul-09	6.7	
29-Jul-09	3.2		17-Jul-09	4.0	
04-Aug-09	6.5		23-Jul-09	8.5	
10-Aug-09	13.2		29-Jul-09	6.1	
16-Aug-09	11.4		04-Aug-09	10.1	
22-Aug-09	3.6		10-Aug-09	10.9	
28-Aug-09	15.4		16-Aug-09	10.9	
03-Sep-09	21.0		22-Aug-09	5.7	
09-Sep-09	4.3		28-Aug-09	9.8	
15-Sep-09	39.1		03-Sep-09	17.2	
21-Sep-09	6.7		09-Sep-09	4.7	
27-Sep-09	15.8		15-Sep-09	33.9	
03-Oct-09	15.7		21-Sep-09	8.4	
09-Oct-09	9.8		27-Sep-09	23.9	
15-Oct-09	9.5		03-Oct-09	17.6	
21-Oct-09	19.0		09-Oct-09	6.5	
27-Oct-09	9.1		15-Oct-09	10.7	
02-Nov-09	34.2		21-Oct-09	18.5	
08-Nov-09	10.8		27-Oct-09	7.1	
14-Nov-09	12.9		02-Nov-09	22.6	
20-Nov-09	31.2		08-Nov-09	6.9	
26-Nov-09	24.7		14-Nov-09	10.2	
02-Dec-09	13.9		20-Nov-09	31.5	

08-Dec-09	53.9		26-Nov-09	18.6	
14-Dec-09	35.8		02-Dec-09	13.7	
20-Dec-09	24.0		08-Dec-09	44.3	
26-Dec-09	5.5		14-Dec-09	24.4	
01-Jan-10	8.0		20-Dec-09	22.2	
07-Jan-10	20.9		26-Dec-09	8.0	
13-Jan-10	17.8		01-Jan-10	5.6	
19-Jan-10	13.2		07-Jan-10	18.1	
25-Jan-10	28.9		13-Jan-10	16.4	
31-Jan-10	20.7		19-Jan-10	14.2	
06-Feb-10	6.3		25-Jan-10	27.8	
12-Feb-10	12.0		31-Jan-10	14.5	
18-Feb-10	22.4		06-Feb-10	6.5	
24-Feb-10	26.3		12-Feb-10	9.8	
02-Mar-10	30.5		18-Feb-10	11.9	
08-Mar-10	10.0		24-Feb-10	23.9	
14-Mar-10	8.0		02-Mar-10	11.0	
20-Mar-10	16.5		08-Mar-10	8.0	
26-Mar-10	20.3		14-Mar-10	6.9	
31-Mar-10	6.3		20-Mar-10	17.2	
07-Apr-10	7.8		26-Mar-10	19.9	
13-Apr-10	15.1		31-Mar-10	5.1	
19-Apr-10	15.7		07-Apr-10	7.1	
25-Apr-10	5.0		13-Apr-10	12.3	
01-May-10	11.5		19-Apr-10	7.1	
07-May-10	6.3		25-Apr-10	7.3	
13-May-10	7.4		01-May-10	9.3	
19-May-10	10.5		07-May-10	4.5	
25-May-10	7.4		13-May-10	8.5	
31-May-10	3.3		19-May-10	8.3	
06-Jun-10	8.0		25-May-10	6.9	
12-Jun-10	4.2		31-May-10	5.0	
21-Jun-10	10.0		06-Jun-10	7.2	
24-Jun-10	6.1		12-Jun-10	4.6	
30-Jun-10	4.7		21-Jun-10	9.0	
06-Jul-10	5.7		24-Jun-10	4.9	
12-Jul-10	5.2		30-Jun-10	5.5	
18-Jul-10	5.2		06-Jul-10	4.9	
24-Jul-10	5.3		12-Jul-10	1.7	
30-Jul-10	2.1		18-Jul-10	7.5	
05-Aug-10	3.0		24-Jul-10	3.7	
11-Aug-10	1.6		30-Jul-10	1.8	
17-Aug-10	3.8		05-Aug-10	2.9	
23-Aug-10	3.2		11-Aug-10	2.9	
29-Aug-10	6.8		17-Aug-10	4.1	
04-Sep-10	3.5		23-Aug-10	3.0	
10-Sep-10	4.4		29-Aug-10	8.0	
16-Sep-10	4.8		04-Sep-10	3.6	
22-Sep-10	13.9		10-Sep-10	4.2	
28-Sep-10	8.0		16-Sep-10	3.2	
04-Oct-10	4.4		22-Sep-10	12.6	
10-Oct-10	12.6		28-Sep-10	9.9	
16-Oct-10	3.8		04-Oct-10	4.0	
22-Oct-10	6.6		10-Oct-10	11.0	
28-Oct-10	17.6		16-Oct-10	4.4	
03-Nov-10	8.7		22-Oct-10	7.6	
09-Nov-10	8.9		28-Oct-10	18.4	
15-Nov-10	6.1		03-Nov-10	10.3	
21-Nov-10	19.0		09-Nov-10	8.5	
27-Nov-10	17.6		15-Nov-10	2.4	
03-Dec-10	6.6		21-Nov-10	13.5	
09-Dec-10	10.4		27-Nov-10	18.1	
15-Dec-10	16.3		03-Dec-10	5.2	
21-Dec-10	10.4		09-Dec-10	9.6	
27-Dec-10	8.1		15-Dec-10	14.1	
			21-Dec-10	10.4	
			27-Dec-10	5.9	

Appendix D: Emission calculations

Moolarben Coal Complex

The dust emissions from the mine have been estimated from the operational description of the proposed mining activities provided by Hansen Bailey on behalf of the Proponent. Emission factor equations that relate the quantity of dust liberated from particular activities to the intensity of the activity and the properties of the material being handled and/or the prevailing meteorological conditions are used to estimate the emissions. Estimated emissions are presented for all significant dust generating activities associated with the operations. The relevant emission factors used for the study are described below.

Overburden

Stripping topsoil
Emissions of Total Suspended Particles (TSP) were estimated using the emission factor for top soil removal of 14 kg per scraper hour (**SPCC, 1983**).

Drilling overburden
Emissions from drilling operation were estimated using the emission factor for drilling of 0.59 kg/hole (**USEPA, 1985**)

Blasting overburden
Emissions from blasting overburden were estimated using the following emission factor equation (**USEPA, 1985**):

Equation 1

$$EF = 0.00022 \times A^{1.5}$$

where:

EF	=	Emission factor for TSP from blasting	(kg/blast)
A	=	Area to be blasted	(m^2)

Loading/emplacing overburden
Loading overburden to trucks will generate emissions of TSP. The rate of emission is dependent on the wind speed and the moisture content of the overburden. Emissions were estimated using the following emission factor equation (**USEPA, 1985**):

Equation 2

$$EF = k \times 0.0016 \times \left(\frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \right)$$

where:

EF	=	Emission factor for TSP from loading overburden to trucks	(kg/tonne)
k	=	Particulate size specific factor for batch loading operations (k_{TSP} = 0.74)	(kg/tonne)
U	=	Wind speed	(m/s)
M	=	Moisture content of material loaded	(%)

Hauling overburden on unsealed surfaces

The uncontrolled emission factor for vehicles travelling on unsealed roads is estimated to be 4.1767 kg/VKT. This value was calculated using Equation 3 below (**USEPA, 1985**).

Equation 3

$$EF = (0.4536/1.6093) \times ((S/12)^{0.7} \times 4.9) \times \left(M \times {}^{1.1023}/_{3}\right)^{0.45}$$

EF	=	Emission factor for TSP from hauling on unsealed surface	(kg/VKT)
S	=	Haul road silt content	(%)
M	=	Vehicle gross mass	(tonnes)

Haul road silt content was tested at MCM in accordance with AP-42 methods to collect and analyse samples. Sample results are presented in **Figures D.1** to **D.3**.

Vehicle gross mass was calculated from the average empty vehicle weight and gross vehicle weight of haul truck used.

Buonicore and Davis (1992) show the level of control that can be achieved through the application of water and / or chemical stabilisers. Controls of up to 95% can be achieved provided the moisture content of the surface material is maintained at 9%. For the current assessment a control of 85% has been assumed.

Dozers on overburden

Emissions from dozers on overburden have been calculated using the US EPA emission factor equation (**US EPA, 1985**). The equation is as follows:

Equation 4

$$EF = 2.6 \times \frac{S^{1.2}}{M^{1.3}}$$

EF	=	Emission factor for TSP from dozer operation on overburden	(kg/hour)
S	=	Silt content	(%)
M	=	Moisture content of material loaded	(%)

Coal

Drilling
Same as overburden drilling.

Blasting
Same as overburden blasting.

Dozers ripping on coal
Emissions from dozers on coal have been calculated using the US EPA emission factor equation (**US EPA, 1985**). The equation is as follows:

Equation 5

$$EF = 35.6 \times \frac{s^{1.2}}{M^{1.4}}$$

EF	=	Emission factor for TSP from dozer operation on overburden	(kg/hour)
S	=	Silt content	(%)
M	=	Moisture content of material loaded	(%)

Loading coal to trucks
Emissions from dozers on coal have been calculated using the US EPA emission factor equation (**US EPA, 1985**). The equation is as follows:

Equation 6

$$EF = \frac{0.580}{M^{1.2}}$$

EF	=	Emission factor for TSP from loading operation on coal	(kg/hour)
M	=	Moisture content of material loaded	(%)

Hauling coal on unsealed surface
Same as hauling overburden on unsealed surface.

Wind erosion/conveying coal
Emissions of TSP from wind erosion and conveying were estimated using the emission factor for exposed areas of 0.4 kg/ha/hr (**SPCC, 1983**).

Grading roads
Estimated TSP emissions from grading roads have been made using the US EPA (1985 and updates) emission factor equation:

Equation 7

$$EF = 0.0034 \times S^{2.5}$$

where,

EF	=	Emission factor for TSP from grading operation on overburden	(kg/VKT)
S	=	Speed of grader	(km/hr)

SGS Muswellbrook
3 Blakefield Rd
PO Box 748
Muswellbrook, NSW, 2333
Ph: (02) 6542 0000
Fax: (02) 6541 4966

ANALYTICAL REPORT

CARBON BASED ENVIRONMENTAL

ATT: Mr Colin Davies **MONTH:** Feb-11

OUR REF: HM10121 **DATE** 10-Feb-11

Sample Description: **Top Soil**
Mass Sample (a.r.): 1562.7 g
Total Moisture (a.r.): 1.1 %

SIZE ANALYSIS

Aperture (mm)		Fractional		Cumulative
(-)	(+)	Mass (g)	Mass (%)	Mass (%)
	8.0	39.50	10.0	10.0
8.0	**4.0**	74.90	18.9	28.8
4.0	**1.00**	115.80	29.2	58.0
1.00	**0.600**	49.30	12.4	70.4
0.600	**0.106**	102.10	25.7	96.2
0.106	**0.075**	6.18	1.6	97.7
0.075		9.04	2.3	100.0
	Total Mass (g)	396.82		

Sample Description: **Clay/Silty Clay**
Mass Sample (a.r.): 1198.3 g
Total Moisture (a.r.): 7.2 %

SIZE ANALYSIS

Aperture (mm)		Fractional		Cumulative
(-)	(+)	Mass (g)	Mass (%)	Mass (%)
	8.0	118.46	29.8	29.8
8.0	**4.0**	93.38	23.5	53.2
4.0	**1.00**	112.18	28.2	81.4
1.00	**0.600**	21.94	5.5	87.0
0.600	**0.106**	45.19	11.4	98.3
0.106	**0.075**	5.36	1.3	99.7
0.075		1.37	0.3	100.0
	Total Mass (g)	397.88		

Figure D.1: Silt sample results from Moolarben Coal Mine (Page 1)

SGS Muswellbrook
3 Blakefield Rd
PO Box 748
Muswellbrook, NSW, 2333
Ph: (02) 6542 0000
Fax: (02) 6541 4966

ANALYTICAL REPORT

CARBON BASED ENVIRONMENTAL

ATT: Mr Colin Davies **MONTH:** Feb-11

OUR REF: HM10121 **DATE** 10-Feb-11

Sample Description: **Overburden**
Mass Sample (a.r.): 1616.3 g
Total Moisture (a.r.): 0.9 %

SIZE ANALYSIS

Aperture (mm)		Fractional		Cumulative
(-)	(+)	Mass (g)	Mass (%)	Mass (%)
	8.0	152.70	38.2	38.2
8.0	**4.0**	64.09	16.1	54.3
4.0	**1.00**	88.27	22.1	76.4
1.00	**0.600**	21.11	5.3	81.7
0.600	**0.106**	56.70	14.2	95.9
0.106	**0.075**	13.17	3.3	99.2
0.075		3.21	0.8	100.0
	Total Mass (g)	399.25		

Sample Description: **Centre Ramp 1**
Mass Sample (a.r.): 839.9 g
Total Moisture (a.r.): 1.8 %

SIZE ANALYSIS

Aperture (mm)		Fractional		Cumulative
(-)	(+)	Mass (g)	Mass (%)	Mass (%)
	8.0	144.92	36.3	36.3
8.0	**4.0**	87.93	22.0	58.2
4.0	**1.00**	100.36	25.1	83.4
1.00	**0.600**	17.71	4.4	87.8
0.600	**0.106**	38.81	9.7	97.5
0.106	**0.075**	7.99	2.0	99.5
0.075		2.03	0.5	100.0
	Total Mass (g)	399.75		

Figure D.2: Silt sample results from Moolarben Coal Mine (Page 2)

SGS Muswellbrook
3 Blakefield Rd
PO Box 748
Muswellbrook, NSW, 2333
Ph: (02) 6542 0000
Fax: (02) 6541 4966

ANALYTICAL REPORT

CARBON BASED ENVIRONMENTAL

ATT: Mr Colin Davies **MONTH:** Feb-11

OUR REF: HM10121 **DATE** 10-Feb-11

Sample Description: **Centre Ramp 2**
Mass Sample (a.r.): 592.9 g
Total Moisture (a.r.): 1.9 %

SIZE ANALYSIS

Aperture (mm)		Fractional		Cumulative
(-)	**(+)**	**Mass (g)**	**Mass (%)**	**Mass (%)**
	8.0	87.54	21.9	21.9
8.0	**4.0**	139.60	34.9	56.7
4.0	**1.00**	131.83	32.9	89.6
1.00	**0.600**	13.14	3.3	92.9
0.600	**0.106**	21.89	5.5	98.4
0.106	**0.075**	4.97	1.2	99.6
0.075		1.56	0.4	100.0
	Total Mass (g)	400.53		

Figure D.3: Silt sample results from Moolarben Coal Mine (Page 3)

Appendix E: Emission inventories

ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	280	20	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	280	20	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	280	20	h/y	14.0	kg/h												
OB - Drilling - Pit 1	1,350	2,288	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	1,350	2,288	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	1,809	3,066	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	3,027	84	blasts/y	36	kg/blast	2994	Area of blast in square metres										
OB - Blasting - Pit 2	3,027	84	blasts/y	36	kg/blast	2994	Area of blast in square metres										
OB - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 4	4,696	84	blasts/y	56	kg/blast	4012	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	27,189	16,583,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	27,189	16,583,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	36,437	22,224,400	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	141,679	16,583,600	t/y	0.05696	kg/t	220	t/truck load	3	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	94,453	16,583,600	t/y	0.03797	kg/t	220	t/truck load	2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	221,515	22,224,400	t/y	0.06645	kg/t	220	t/truck load	3.5	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	27,189	16,583,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	27,189	16,583,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	36,437	22,224,400	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	232,705	13,905	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	232,705	13,905	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	279,262	16,687	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	46,541	2,781	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	46,541	2,781	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	46,541	2,781	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	991	1,679	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	1,309	2,219	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	1,190	2,017	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	3,394	52	blasts/y	65	kg/blast	4448	Area of blast in square metres										
CL - Blasting - Pit 2	5,157	52	blasts/y	99	kg/blast	5879	Area of blast in square metres										
CL - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 4	4,470	52	blasts/y	86	kg/blast	5345	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	234,383	3,469,606	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	309,779	4,585,698	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	281,624	4,168,919	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	65,212	3,469,606	t/y	0.12530	kg/t	220	t/truck load	6.6	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	169,768	4,585,698	t/y	0.24681	kg/t	220	t/truck load	13	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	132,968	4,168,919	t/y	0.21263	kg/t	220	t/truck load	11.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	234,383	3,469,606	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	309,779	4,585,698	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	281,624	4,168,919	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	-	0	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	289,025	4,278,478	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	25,829	73,345,342	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	4,889,690	t/y														
CL - Transporting rejects (nominal) back to Pit 1	26,085	1,387,843	t/y	0.12530	kg/t	220	t/truck load	6.6	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	67,907	1,834,279	t/y	0.24681	kg/t	220	t/truck load	13	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	53,187	1,667,568	t/y	0.21263	kg/t	220	t/truck load	11.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	4,889,690	t/y														
CL - Loading product coal stockpile	825,787	12,224,224	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	825,787	12,224,224	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	416,976	119	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	262,800	75	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	383,414	622,965	km	0.61547	kg/VKT	8	speed of graders in km/h										

Table E.4: Emission Inventory for MCC – Year 2

ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	280	20	h/y	14.0	kg/h												
OB - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	8,436	14,299	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 4	42,437	105	blasts/y	404	kg/blast	15000	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	169,938	103,653,000	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	1,517,228	103,653,000	t/y	0.09758	kg/t	220	t/truck load	5.14	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	169,938	103,653,000	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	930,853	55,622	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	186,164	11,124	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	3,575	6,060	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 4	23,281	52	blasts/y	448	kg/blast	16059	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	846,190	12,526,265	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	270,213	4,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	425,924	12,526,265	t/y	0.22668	kg/t	220	t/truck load	11.94	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	70,625	4,000,000	t/y	0.11771	kg/t	220	t/truck load	6.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	846,190	12,526,265	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	270,213	4,000,000	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	-	0	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	169,238	2,505,253	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	34,919	99,157,588	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	5,410,506	t/y														
CL - Transporting rejects (nominal) back to Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	170,369	5,010,506	t/y	0.22668	kg/t	220	t/truck load	11.94	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	7,062	400,000	t/y	0.11771	kg/t	220	t/truck load	6.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	5,410,506	t/y														
CL - Loading product coal stockpile	1,116,404	16,526,265	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	1,116,404	16,526,265	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	487,760	139	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	324,132	93	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	287,560	467,224	km	0.61547	kg/VKT	8	speed of graders in km/h										

Table E.5: Emission Inventory for MCC – Year 7

ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	560	40	h/y	14.0	kg/h												
OB - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	8,436	14,299	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 4	42,437	105	blasts/y	404	kg/blast	15000	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	169,938	103,653,000	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	867,831	103,653,000	t/y	0.05582	kg/t	220	t/truck load	2.94	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	169,938	103,653,000	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	930,853	55,622	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	186,164	11,124	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	3,402	5,766	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 4	21,604	52	blasts/y	415	kg/blast	15278	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	805,044	11,917,169	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	270,213	4,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	425,575	11,917,169	t/y	0.23807	kg/t	220	t/truck load	12.54	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	70,625	4,000,000	t/y	0.11771	kg/t	220	t/truck load	6.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	805,044	11,917,169	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	270,213	4,000,000	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	-	0	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	161,009	2,383,434	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	33,632	95,503,012	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	5,166,867	t/y														
CL - Transporting rejects (nominal) back to Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	170,230	4,766,867	t/y	0.23807	kg/t	220	t/truck load	12.54	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	7,062	400,000	t/y	0.11771	kg/t	220	t/truck load	6.2	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	5,166,867	t/y														
CL - Loading product coal stockpile	1,075,257	15,917,169	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	1,075,257	15,917,169	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	357,707	102	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	206,898	59	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	287,573	467,244	km	0.61547	kg/VKT	8	speed of graders in km/h										

Table E.6: Emission Inventory for MCC – Year 12

ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	560	40	h/y	14.0	kg/h												
OB - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	7,312	12,393	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 4	36,779	91	blasts/y	404	kg/blast	15000	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	147,279	89,832,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	741,375	89,832,600	t/y	0.05502	kg/t	220	t/truck load	2.898	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	147,279	89,832,600	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	930,853	55,622	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	186,164	11,124	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	3,216	5,451	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 4	19,861	52	blasts/y	382	kg/blast	14445	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	761,135	11,267,183	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	270,213	4,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	504,398	11,267,183	t/y	0.29845	kg/t	220	t/truck load	15.72	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	148,084	4,000,000	t/y	0.24681	kg/t	220	t/truck load	13	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	761,135	11,267,183	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	270,213	4,000,000	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	-	0	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	152,227	2,253,437	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	32,259	91,603,100	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	4,906,873	t/y														
CL - Transporting rejects (nominal) back to Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	201,759	4,506,873	t/y	0.29845	kg/t	220	t/truck load	15.72	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	14,808	400,000	t/y	0.24681	kg/t	220	t/truck load	13	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	4,906,873	t/y														
CL - Loading product coal stockpile	1,031,348	15,267,183	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	1,031,348	15,267,183	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	579,130	165	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	307,438	88	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	287,560	467,224	km	0.61547	kg/VKT	8	speed of graders in km/h										

Table E.7: Emission Inventory for MCC – Year 16

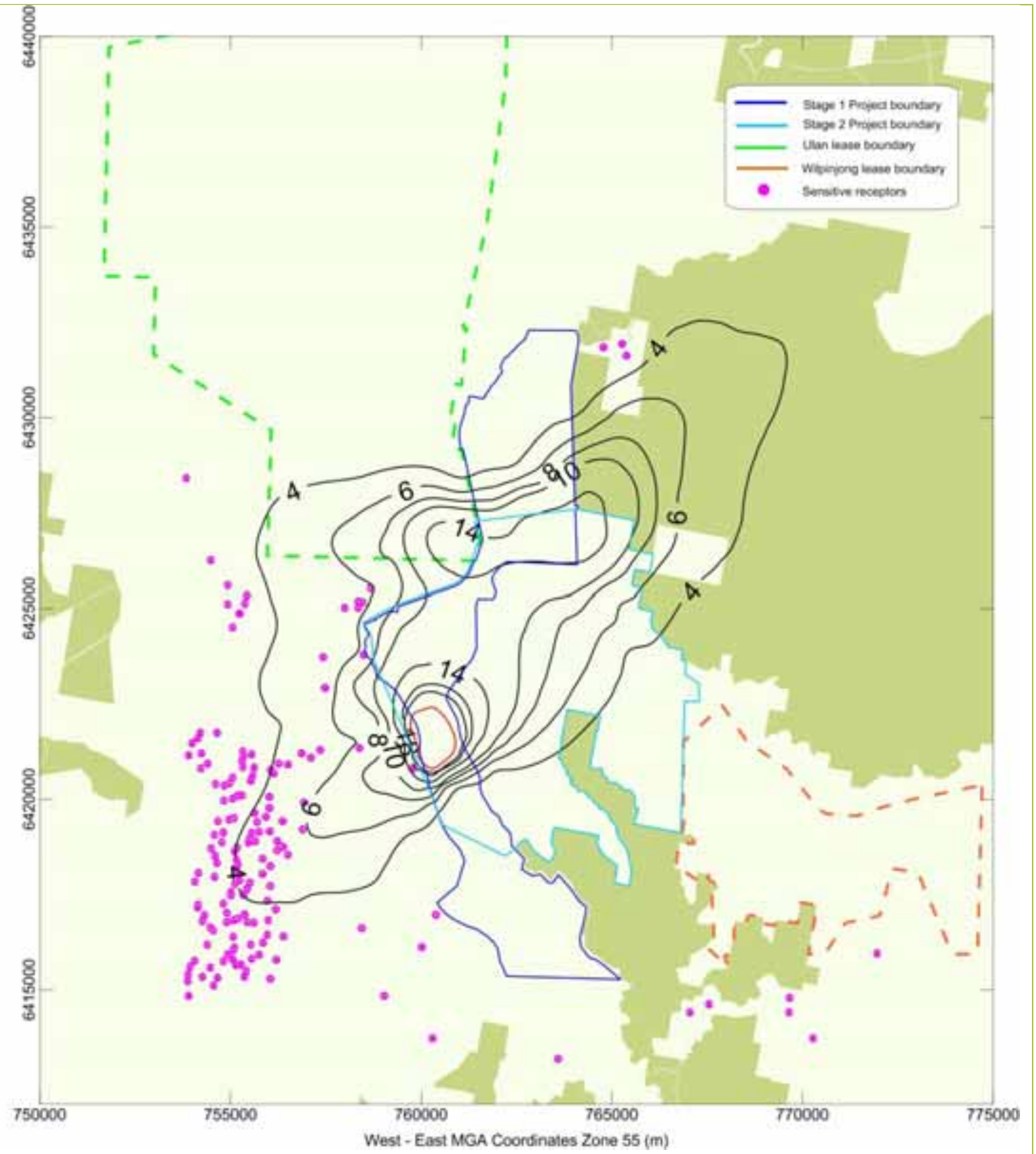
ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	560	40	h/y	14.0	kg/h												
OB - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	9,899	16,778	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 4	49,712	123	blasts/y	404	kg/blast	15000	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	199,395	121,620,400	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	1,026,574	121,620,400	t/y	0.05627	kg/t	220	t/truck load	2.964	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	199,395	121,620,400	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	930,853	55,622	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	186,164	11,124	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	3,426	5,806	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 3	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 4	21,831	52	blasts/y	420	kg/blast	15385	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	810,639	12,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	270,213	4,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	543,356	12,000,000	t/y	0.30186	kg/t	220	t/truck load	15.9	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	4,000,000	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	810,639	12,000,000	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	270,213	4,000,000	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	162,128	2,400,000	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	33,807	96,000,000	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	5,200,000	t/y														
CL - Transporting rejects (nominal) back to Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	217,342	4,800,000	t/y	0.30186	kg/t	220	t/truck load	15.9	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	400,000	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	5,200,000	t/y														
CL - Loading product coal stockpile	1,080,853	16,000,000	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	1,080,853	16,000,000	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	494,708	141	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	146,908	42	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	287,560	467,224	km	0.61547	kg/VKT	8	speed of graders in km/h										

Table E.8: Emission Inventory for MCC – Year 19

ACTIVITY	TSP emission/year	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units	Variable 3	units	Variable 4	units	Variable 5	units	Variable 6	units
OB - Stripping topsoil - Pit 1	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 2	-	0	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 3	560	40	h/y	14.0	kg/h												
OB - Stripping topsoil - Pit 4	-	0	h/y	14.0	kg/h												
OB - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
OB - Drilling - Pit 3	1,831	3,103	holes/y	0.59	kg/hole												
OB - Drilling - Pit 4	-	0	holes/y	0.59	kg/hole												
OB - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Blasting - Pit 3	10,508	26	blasts/y	404	kg/blast	15000	Area of blast in square metres										
OB - Blasting - Pit 4	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
OB - Sh/Ex/FELs loading - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 3	24,584	14,995,200	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Sh/Ex/FELs loading - Pit 4	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to emplacement - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 3	70,631	14,995,200	t/y	0.03140	kg/t	220	t/truck load	1.654	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Hauling to emplacement - Pit 4	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
OB - Emplacing at dumps - Pit 1	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 2	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 3	24,584	14,995,200	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dumps - Pit 4	-	0	t/y	0.00164	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on O/B - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 3	651,590	38,935	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on O/B - Pit 4	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 1	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 2	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 3	93,082	5,562	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on Rehabilitation - Pit 4	-	0	h/y	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - Pit 1	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 2	-	0	holes/y	0.59	kg/hole												
CL - Drilling - Pit 3	999	1,693	holes/y	0.59	kg/hole												
CL - Drilling - Pit 4	-	0	holes/y	0.59	kg/hole												
CL - Blasting - Pit 1	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 2	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Blasting - Pit 3	3,438	52	blasts/y	66	kg/blast	4487	Area of blast in square metres										
CL - Blasting - Pit 4	-	0	blasts/y	0	kg/blast	0	Area of blast in square metres										
CL - Loading ROM to trucks -Pit 1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 3	236,437	3,500,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -Pit 4	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG1	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG2	-	0	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Loading ROM to trucks -UG3	270,213	4,000,000	t/y	0.06755	kg/t	6	moisture content of coal in %										
CL - Hauling ROM coal to dump hopper - Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 3	275,633	3,500,000	t/y	0.52502	kg/t	220	t/truck load	27.654	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - Pit 4	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Hauling ROM coal to dump hopper - UG 3	-	4,000,000	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - unloading ROM coal at stockpile/hopper Pit 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 3	236,437	3,500,000	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper Pit 4	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 1	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 2	-	0	t/y	0.06755	kg/t												
CL - unloading ROM coal at stockpile/hopper UG 3	270,213	4,000,000	t/y	0.06755	kg/t												
CL - Rehandle ROM coal at stockpilepile/hopper	101,330	1,500,000	t/y	0.0676	kg/t												
CL - Handling coal at CHPP	15,847	45,000,000	t/y	0.00035	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	6	moisture content of coal in %								
CL - Dozers at CHPP	222,363	11,124	h/y	20.0	kg/h	5	silt content in %	6	moisture content in %								
CL - Loading rejects (too wet)	-	1,800,000	t/y														
CL - Transporting rejects (nominal) back to Pit 1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 3	110,253	1,400,000	t/y	0.52502	kg/t	220	t/truck load	27.654	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to Pit 4	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG1	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG2	-	0	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Transporting rejects (nominal) back to UG3	-	400,000	t/y	0.00000	kg/t	220	t/truck load	0	km/return trip	4.1767	kg/VKT	3	silt content in %	85	% control	275.024	Vehicle gross mass (tonnes)
CL - Unloading rejects (too wet)	-	1,800,000	t/y														
CL - Loading product coal stockpile	506,650	7,500,000	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
CL - Loading coal to trains	506,650	7,500,000	t/y	0.06755	kg/t	1.385	average of (wind speed/2.2)^1.3 in m/s	10	moisture content of coal in %								
WE - OB spoil area - All pits	144,596	41	ha	0.4000000	kg/ha/h	8760	hours										
WE - Open pit - All pits	51,996	15	ha	0.4000000	kg/ha/h	8760	hours										
WE - ROM stockpiles	7,008	2	ha	0.4000000	kg/ha/h	8760	hours										
WE - Product stockpiles	17,520	5	ha	0.4000000	kg/ha/h	8760	hours										
Grading roads	191,707	311,483	km	0.61547	kg/VKT	8	speed of graders in km/h										

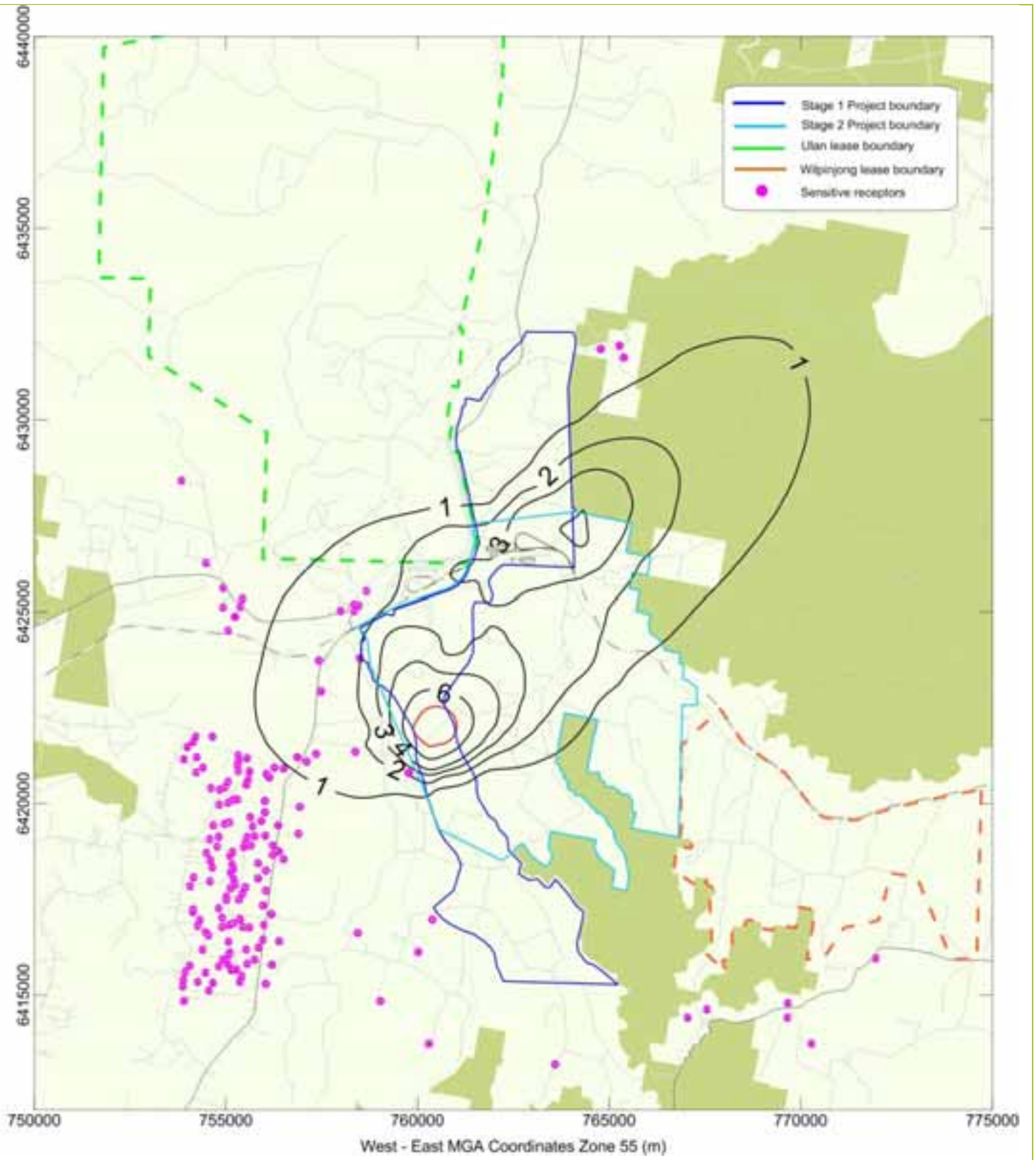
Table E.9: Emission Inventory for MCC – Year 24

Appendix F: Predicted $PM_{2.5}$ emissions from mining sources



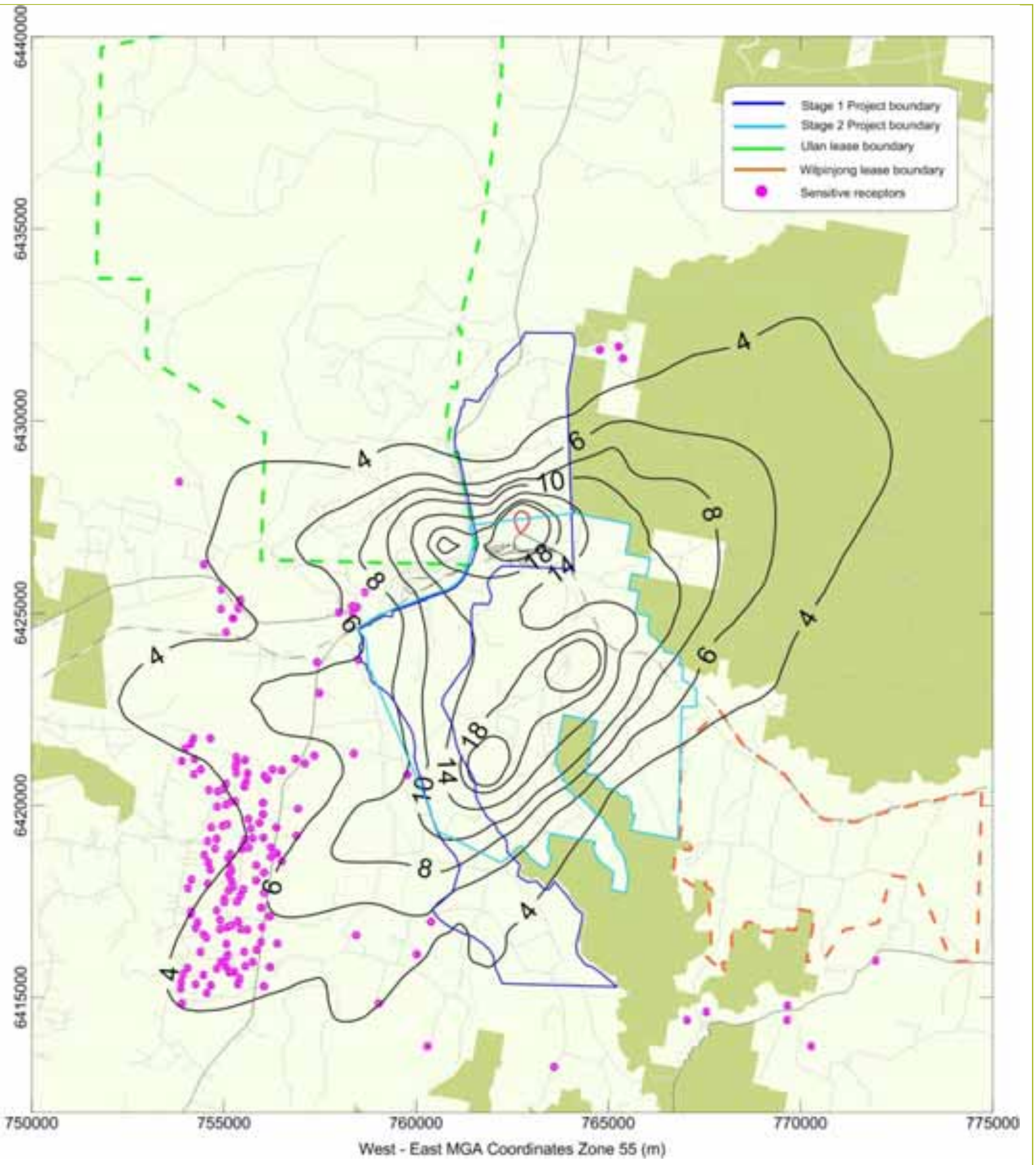
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 2	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.1: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 2



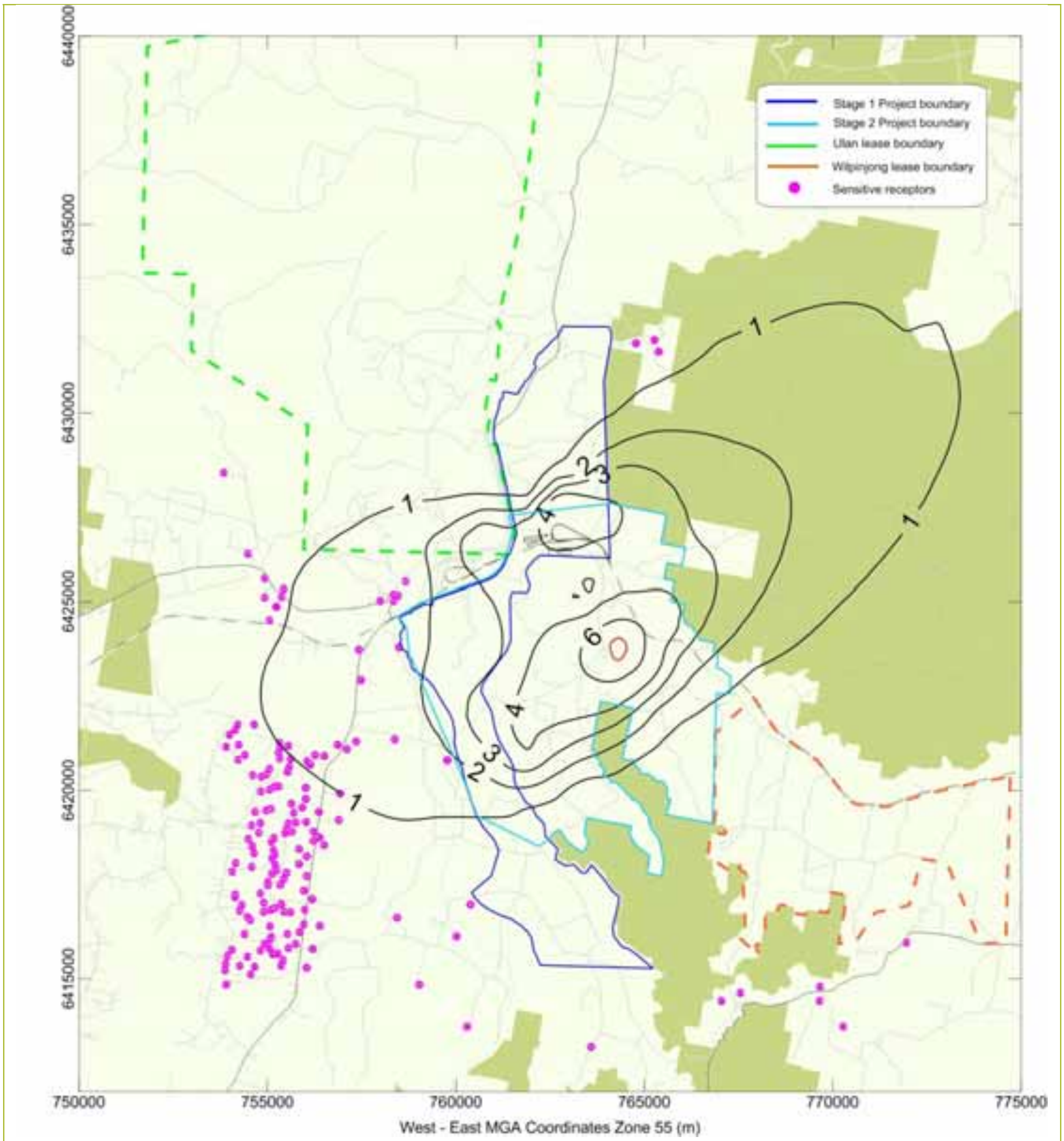
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 2	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 8 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from MCC in Year 2



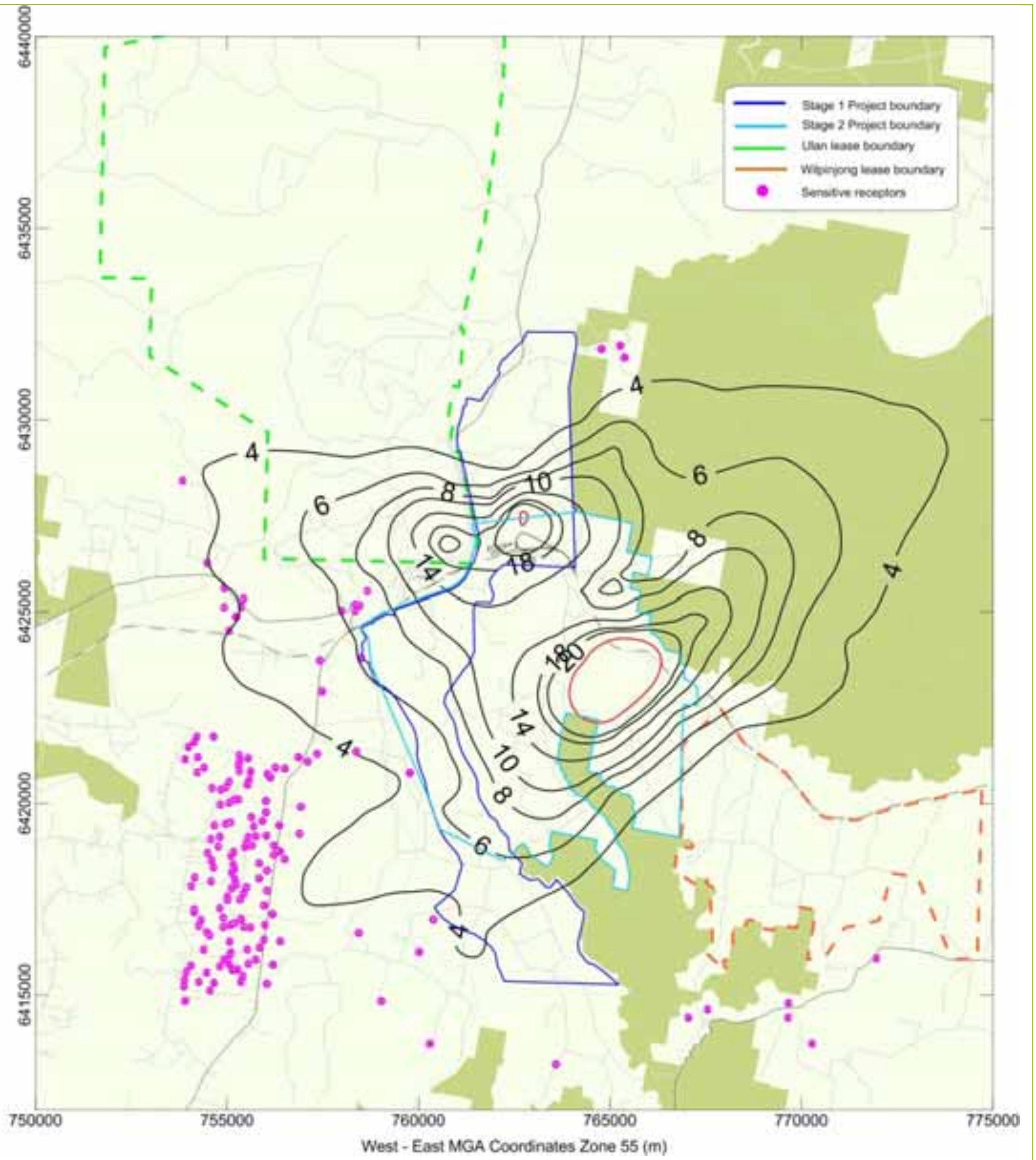
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 7	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.3: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 7



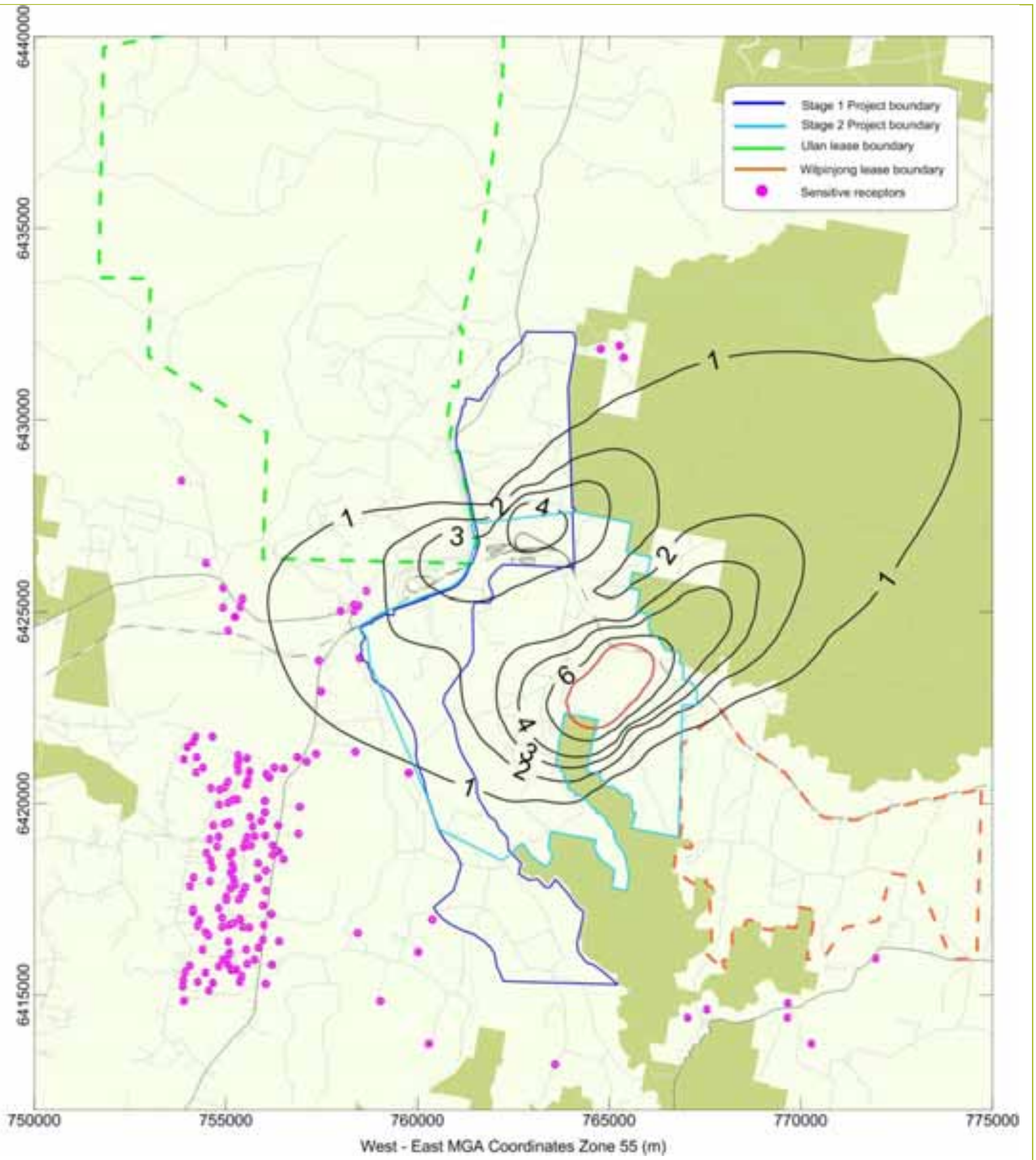
Species: PM$_{2.5}$	**Location:** Moolarben Coal Complex	**Scenario:** Year 7	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** NEPC = 8 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure F.4: Predicted annual average PM$_{2.5}$ concentrations due to emissions from MCC in Year 7



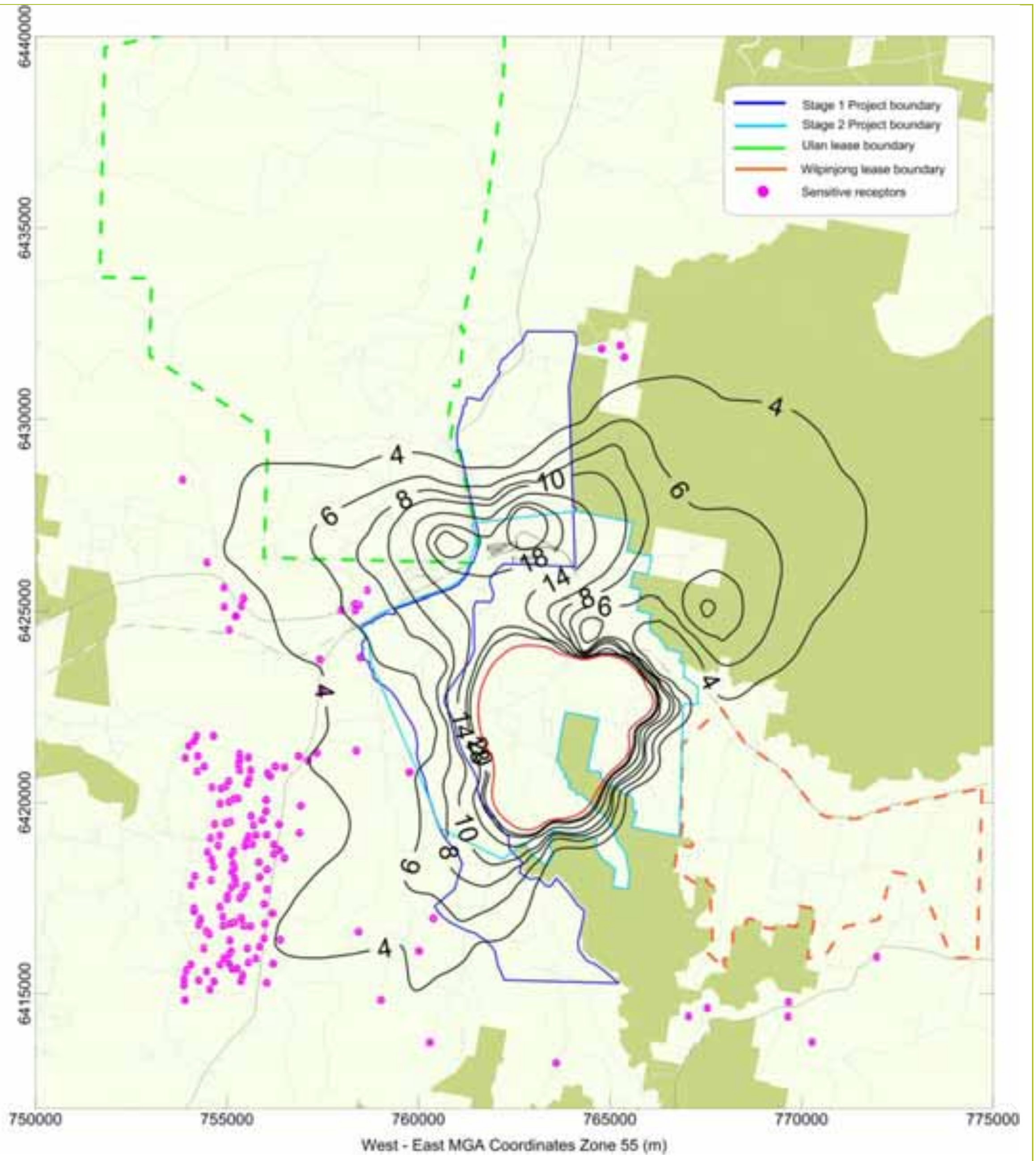
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 12	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.5: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 12



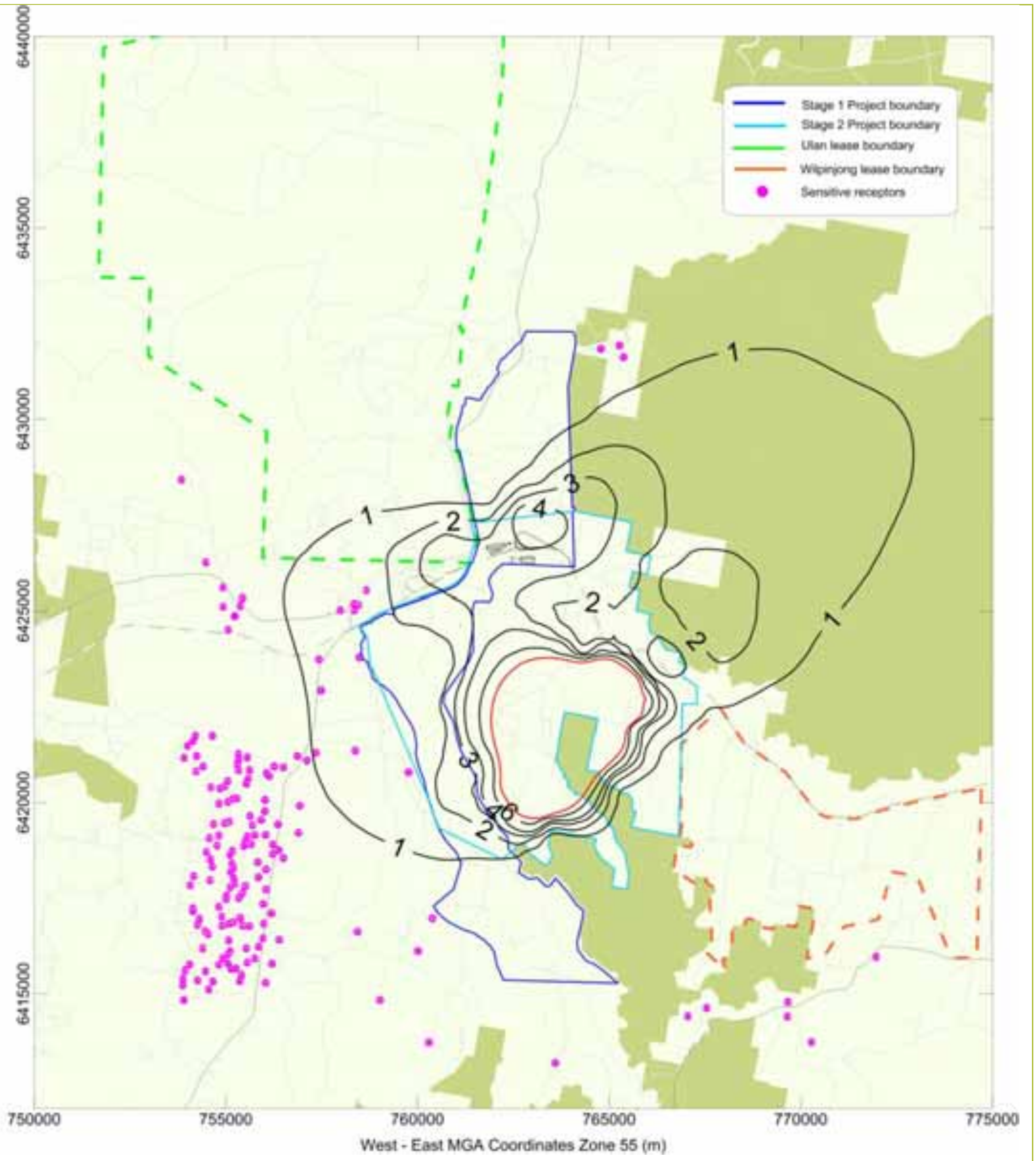
Species: PM2.5	**Location:** Moolarben Coal Complex	**Scenario:** Year 12	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** NEPC = 8 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure F.6: Predicted Annual average $PM_{2.5}$ concentrations due to emissions from MCC in Year 12



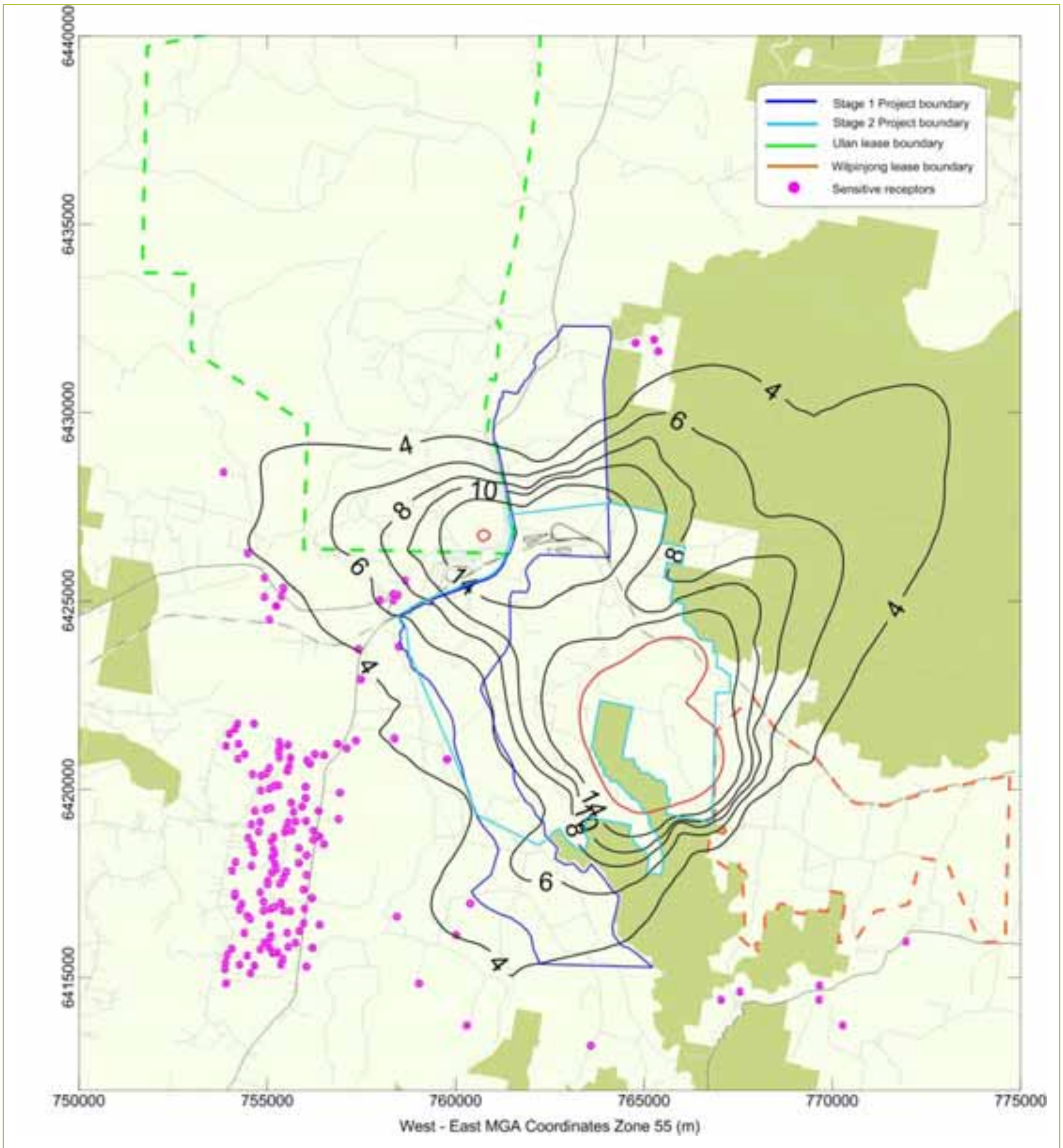
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 16	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.7: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 16



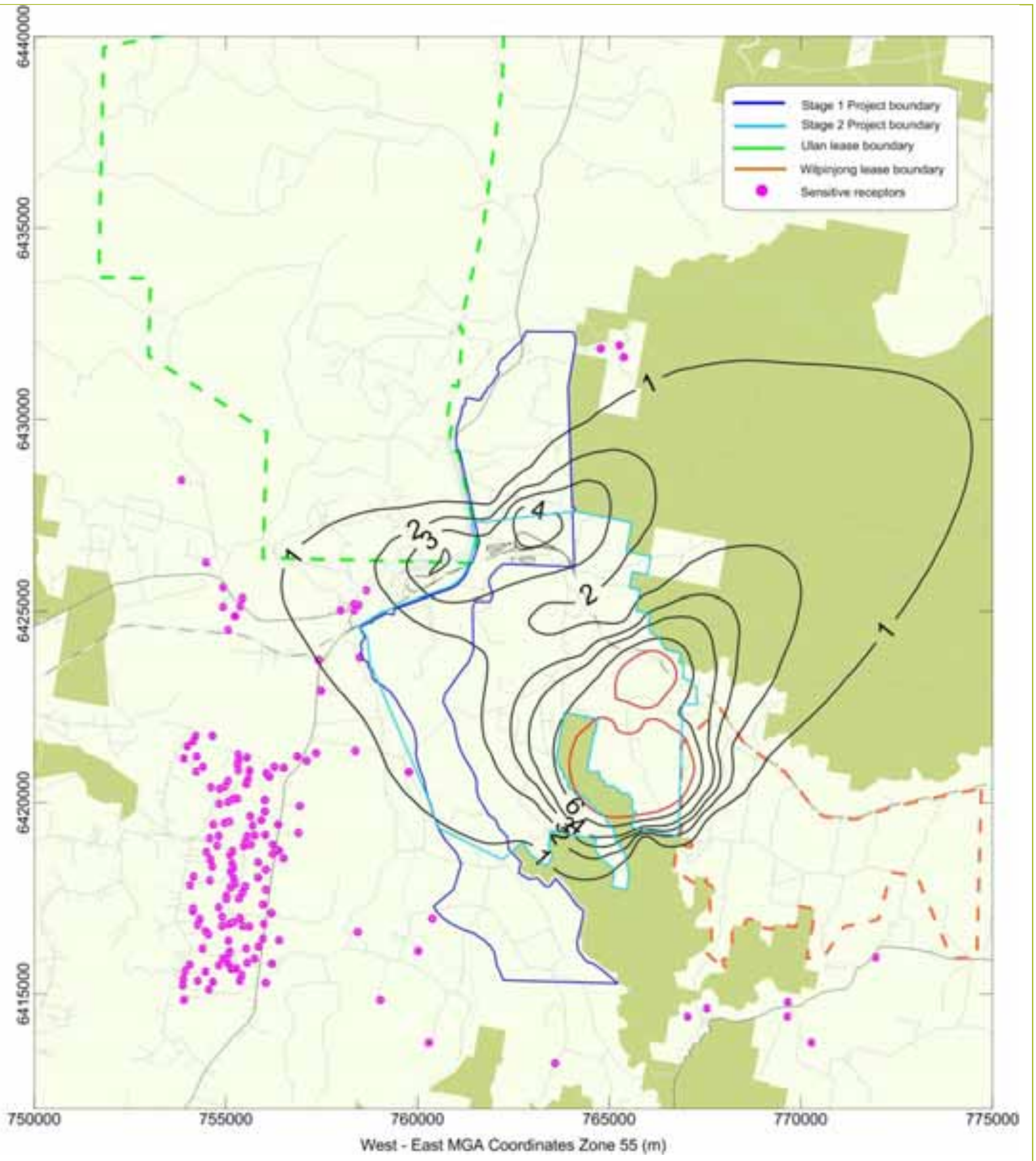
Species: PM$_{2.5}$	**Location:** Moolarben Coal Complex	**Scenario:** Year 16	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** NEPC = 8 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure F.8: Predicted Annual average PM$_{2.5}$ concentrations due to emissions from MCC in Year 16



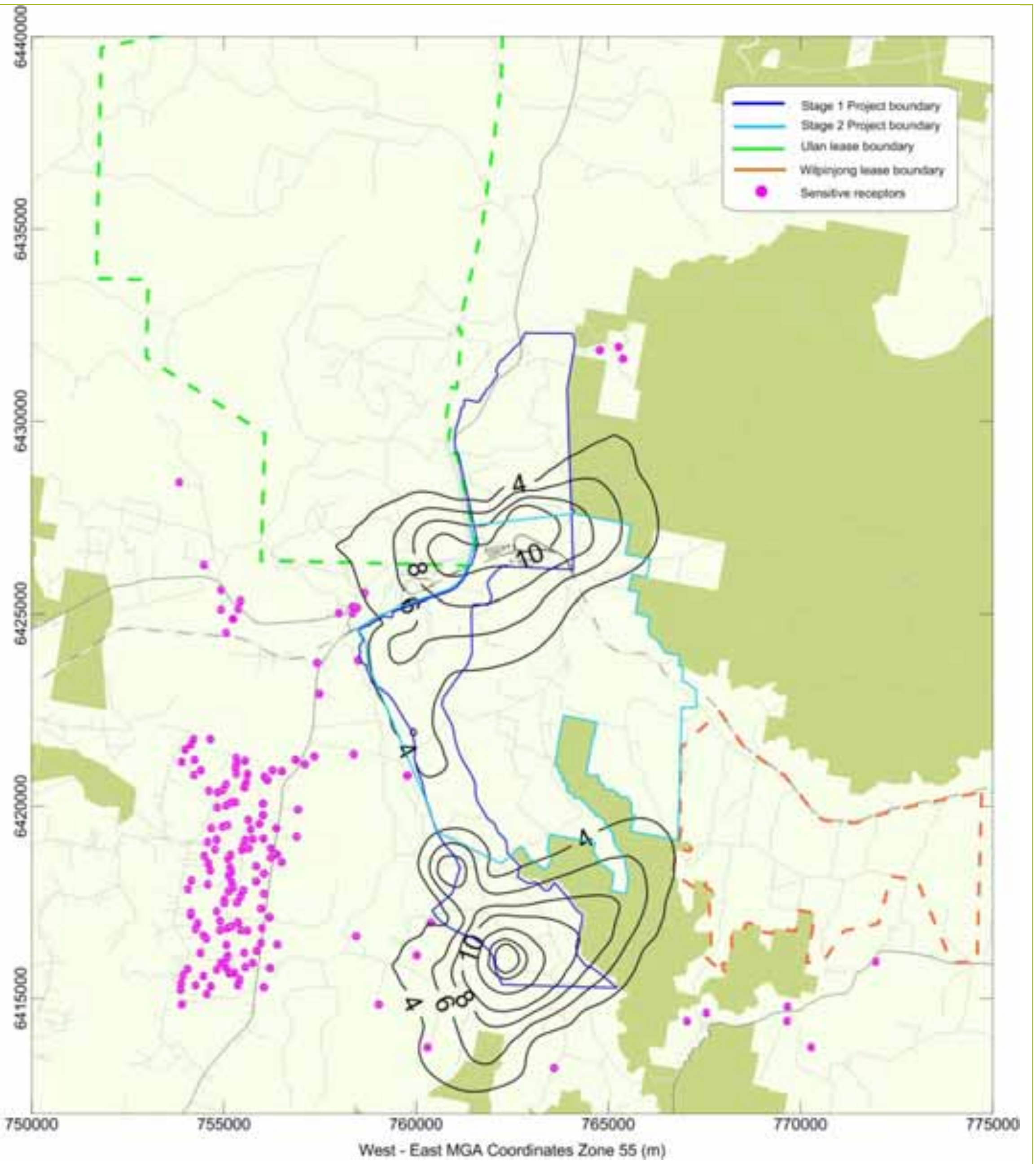
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 19	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.9: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 19



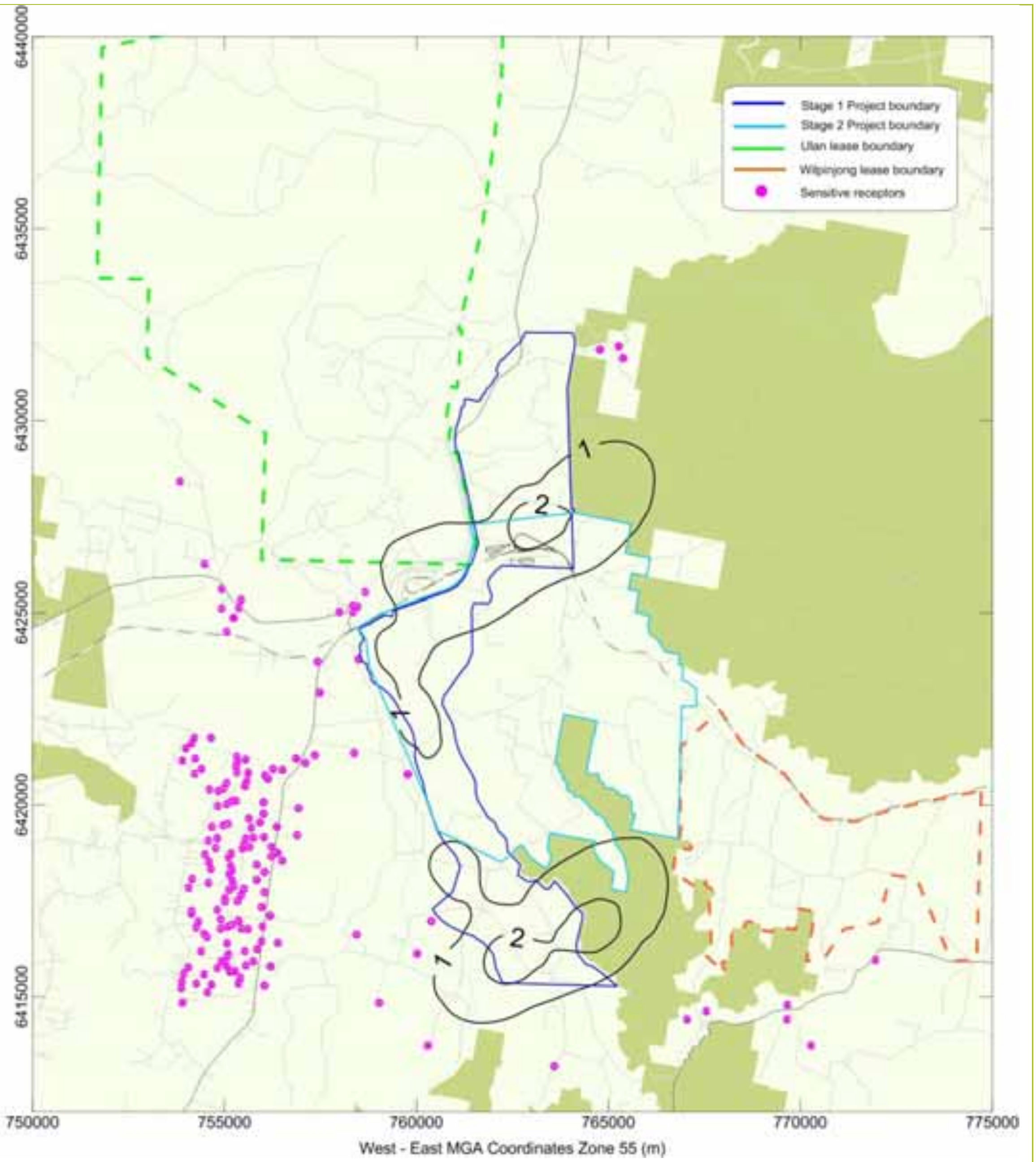
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 19	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 8 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure F.10: Predicted Annual average $PM_{2.5}$ concentrations due to emissions from MCC in Year 19



Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 24	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 25 µg/m³ (shown as a red line)	2007-2008	P. Henschke

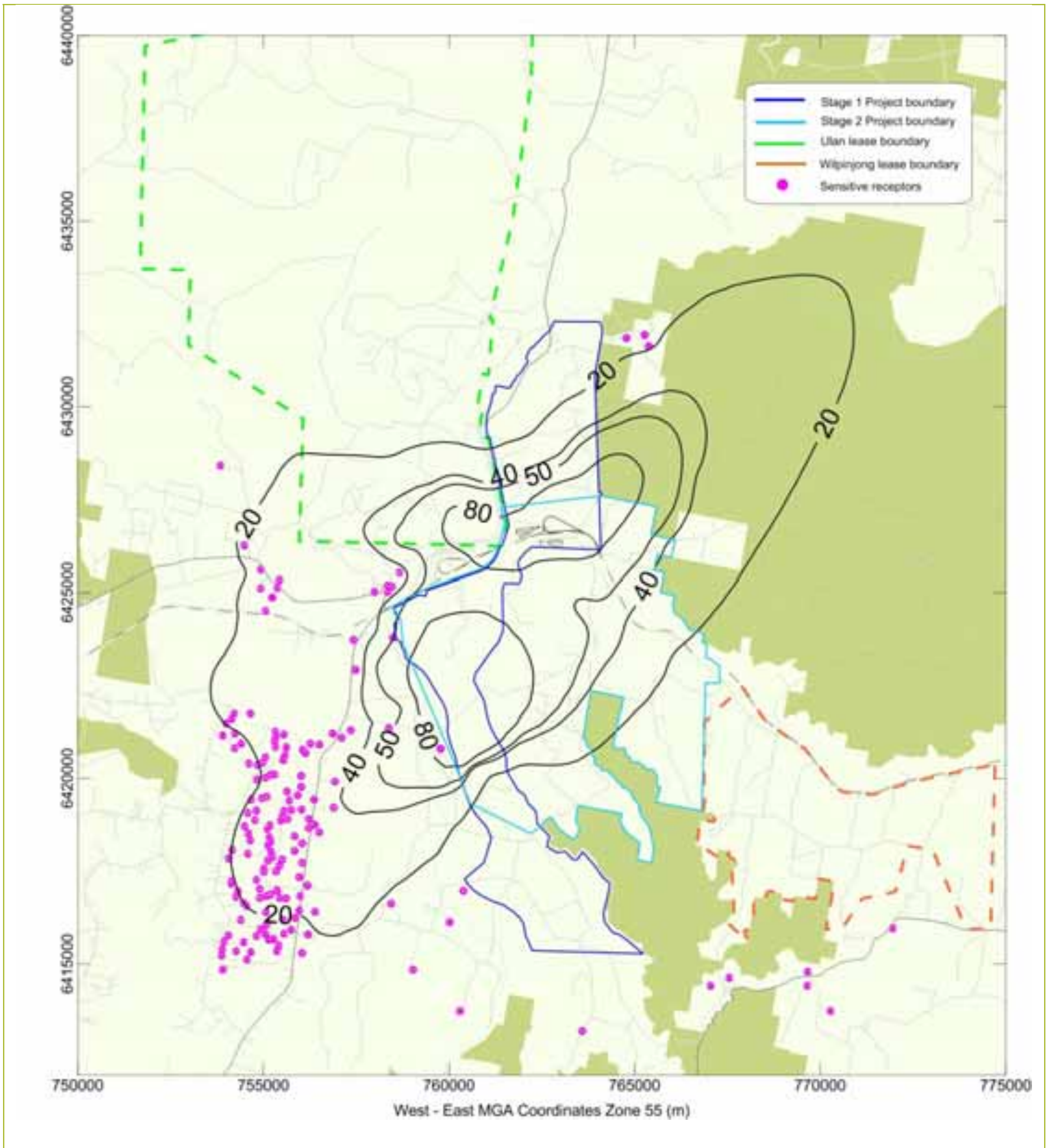
Figure F.11: Predicted 24-hour average $PM_{2.5}$ concentrations due to emissions from MCC in Year 24



Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
$PM_{2.5}$	Moolarben Coal Complex	Year 24	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	NEPC = 8 µg/m³ (shown as a red line)	2007-2008	P. Henschke

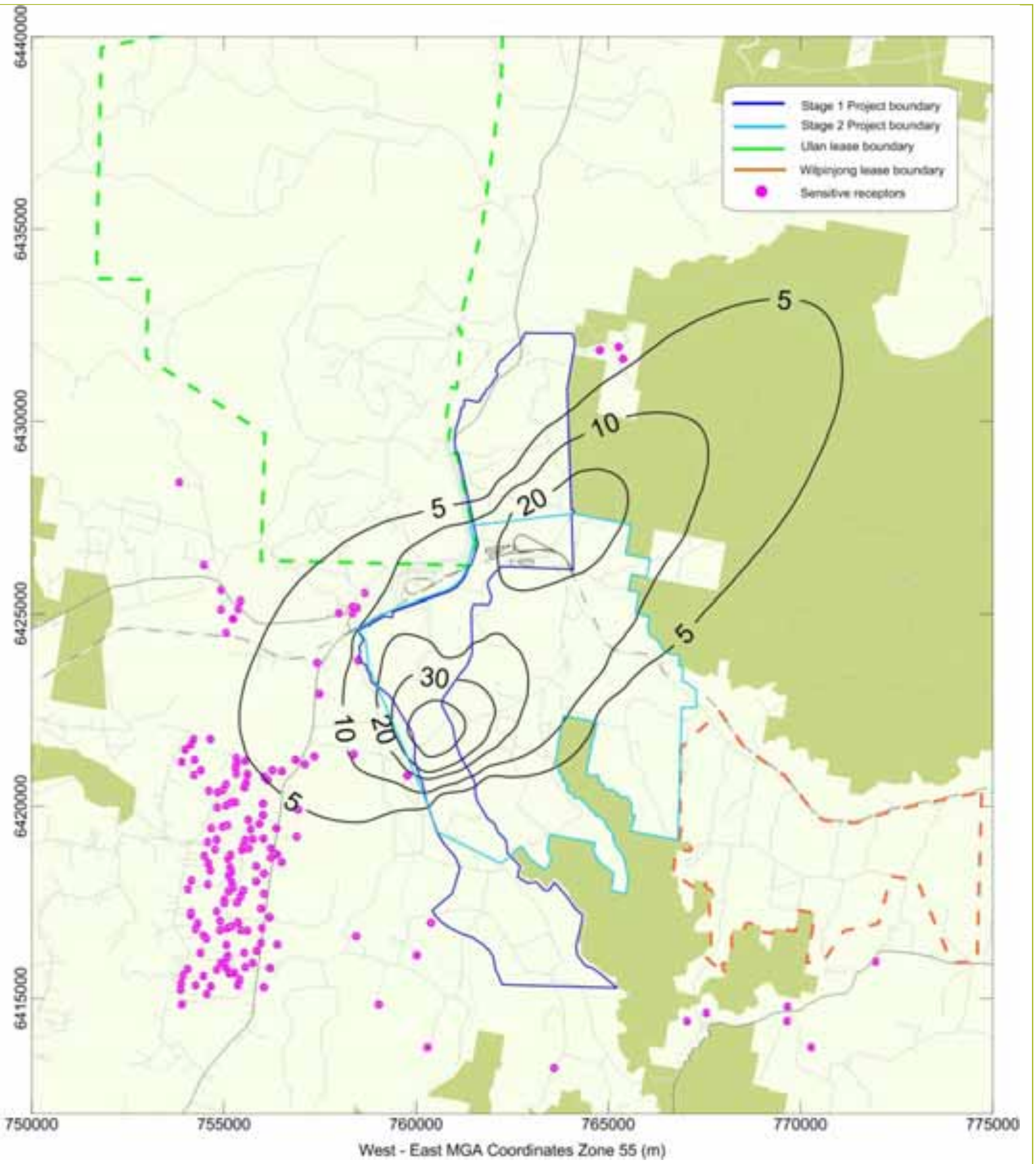
Figure F.12: Predicted Annual average $PM_{2.5}$ concentrations due to emissions from MCC in Year 24

Appendix G: Contour plots



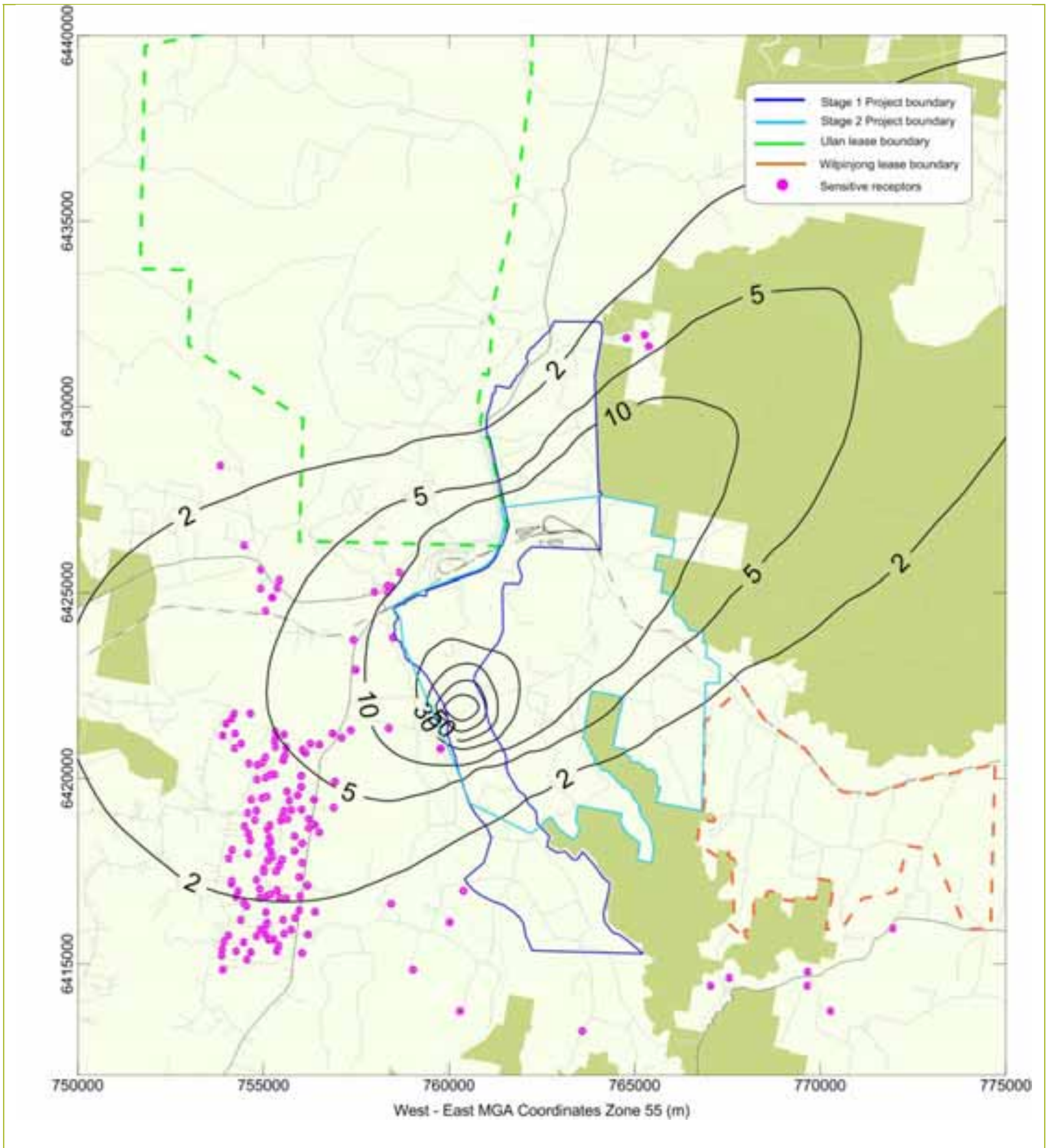
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 2 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.1: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 2



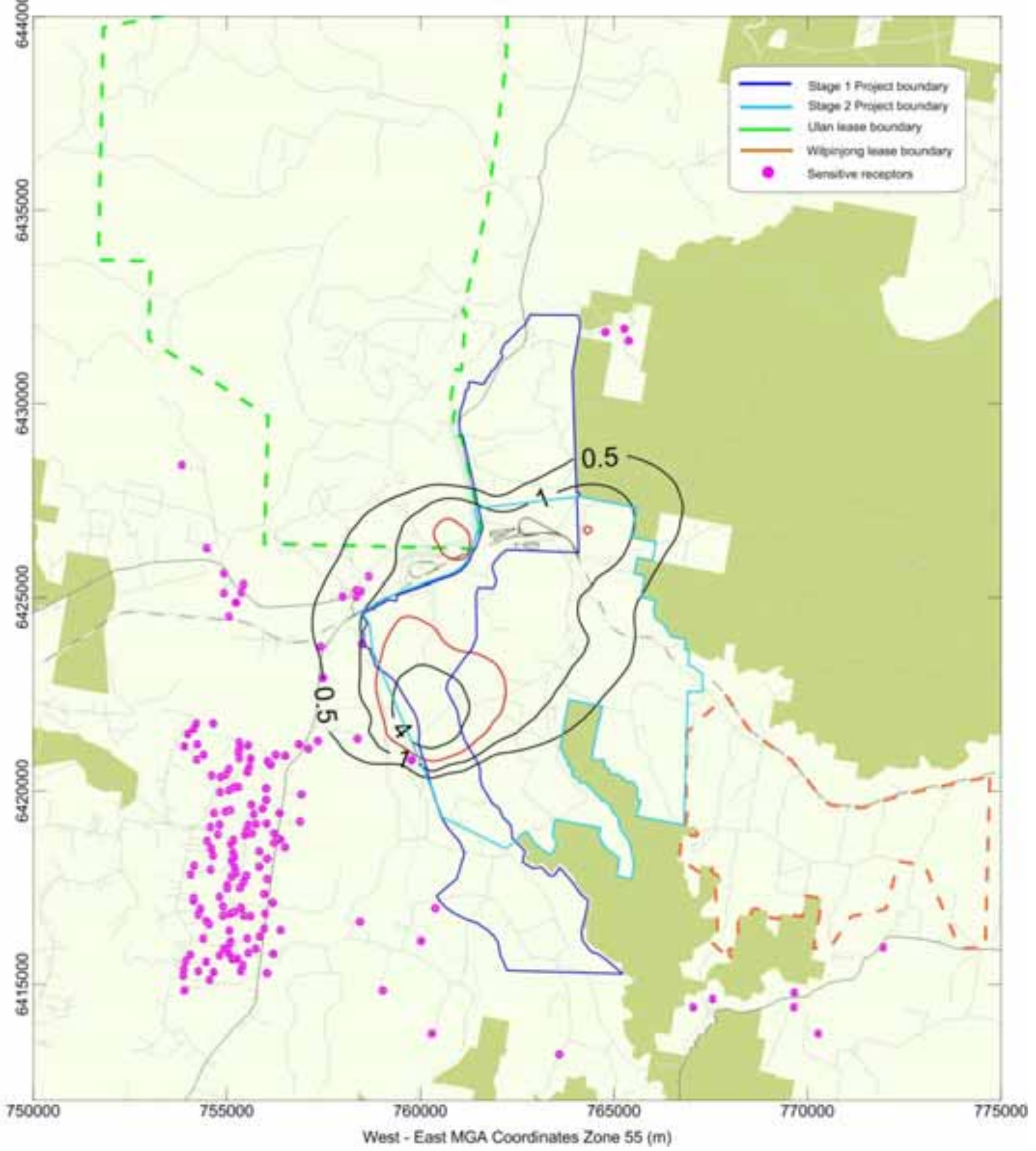
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 2 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.2: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 2



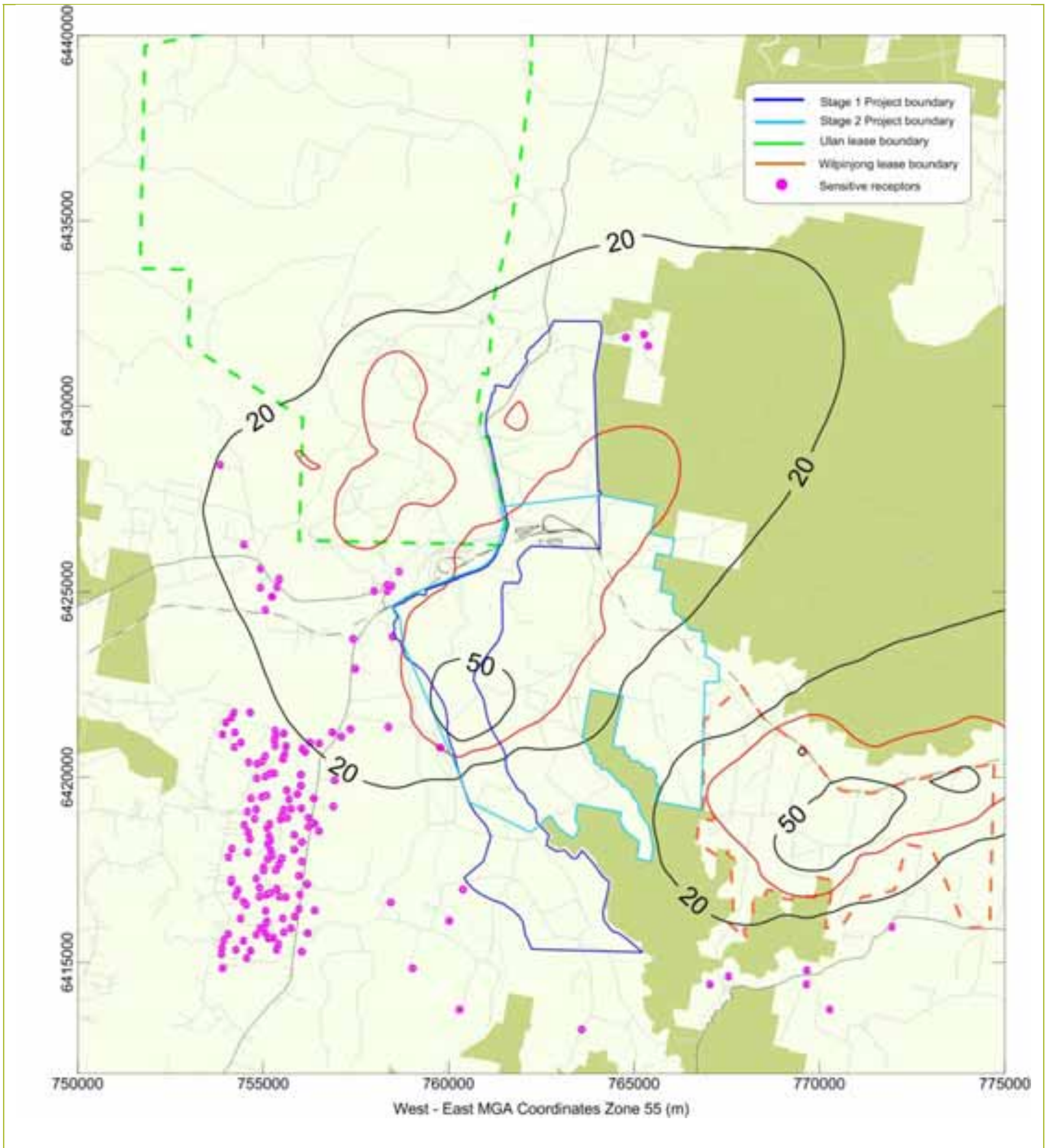
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 2 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.3: Predicted annual average TSP concentrations due to emissions from MCC in Year 2



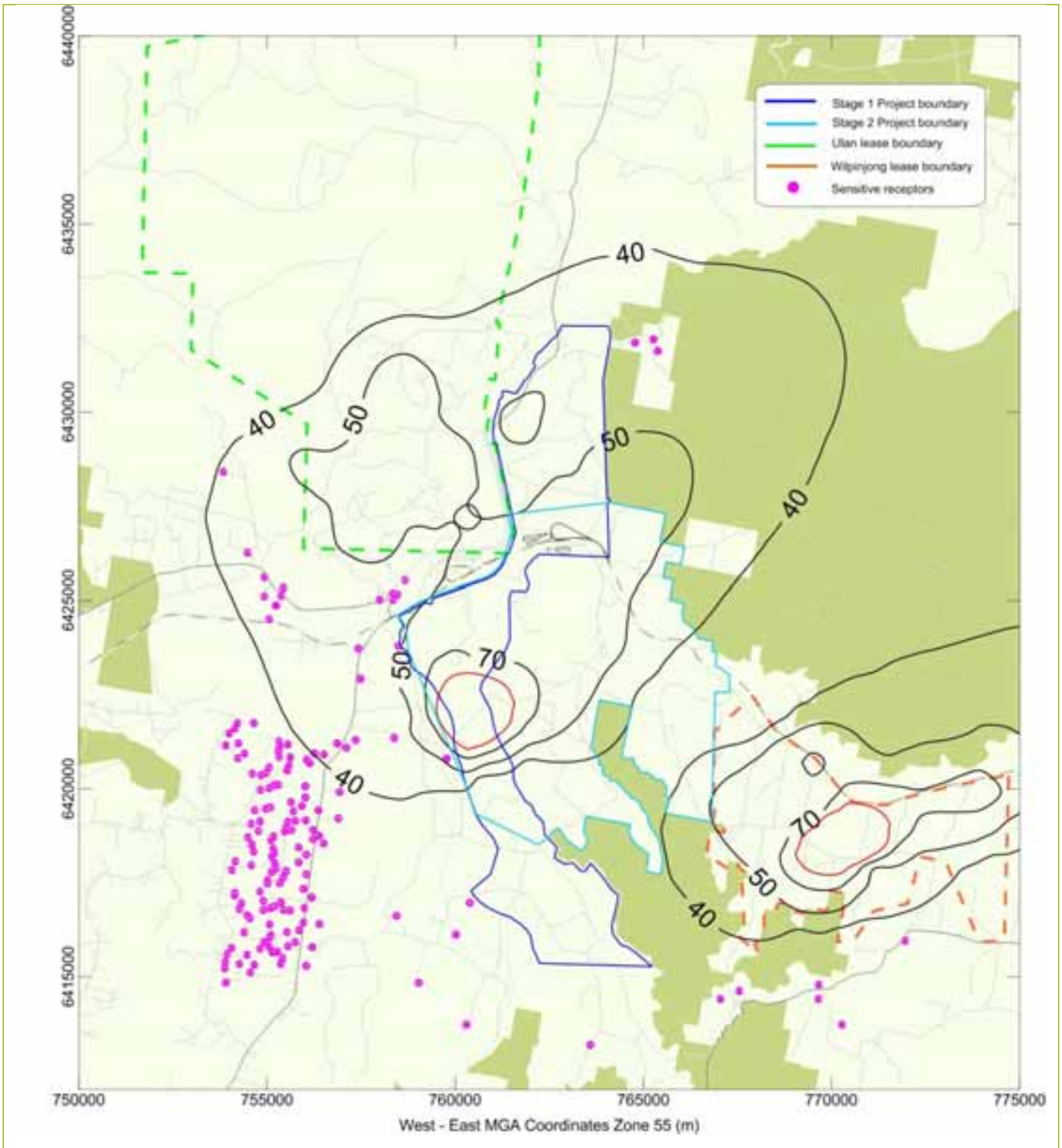
Species: DD	**Location:** Moolarben Coal Complex	**Scenario:** Year 2 Project only	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** g/m^2/month	**Guideline:** DECCW =2 g/m^2/month (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.4: Predicted annual average dust deposition levels due to emissions from MCC in Year 2



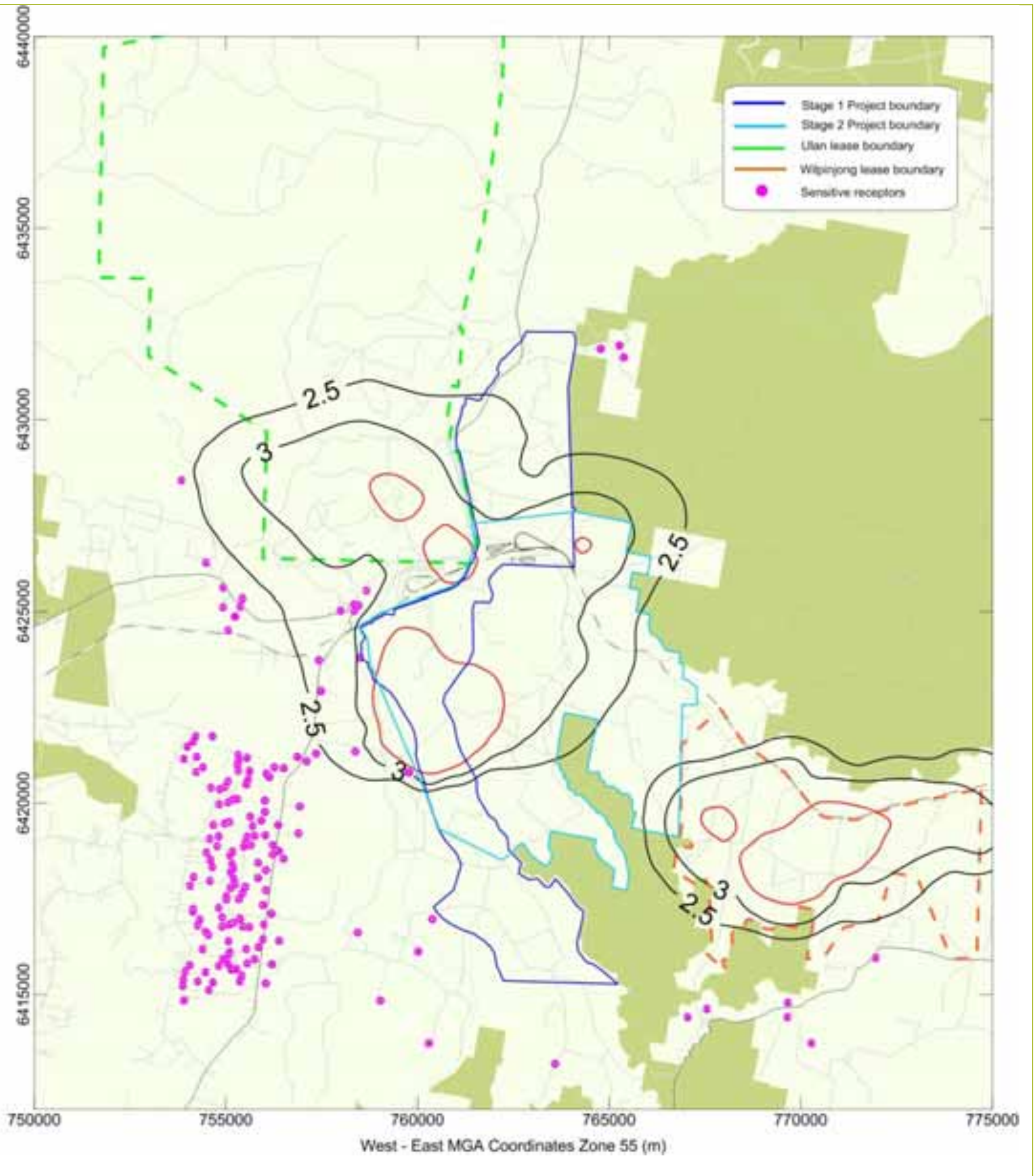
Species: PM_{10}	**Location:** Moolarben Coal Complex	**Scenario:** Year 2 Cumulative	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** DECCW = 30 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.5: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 2



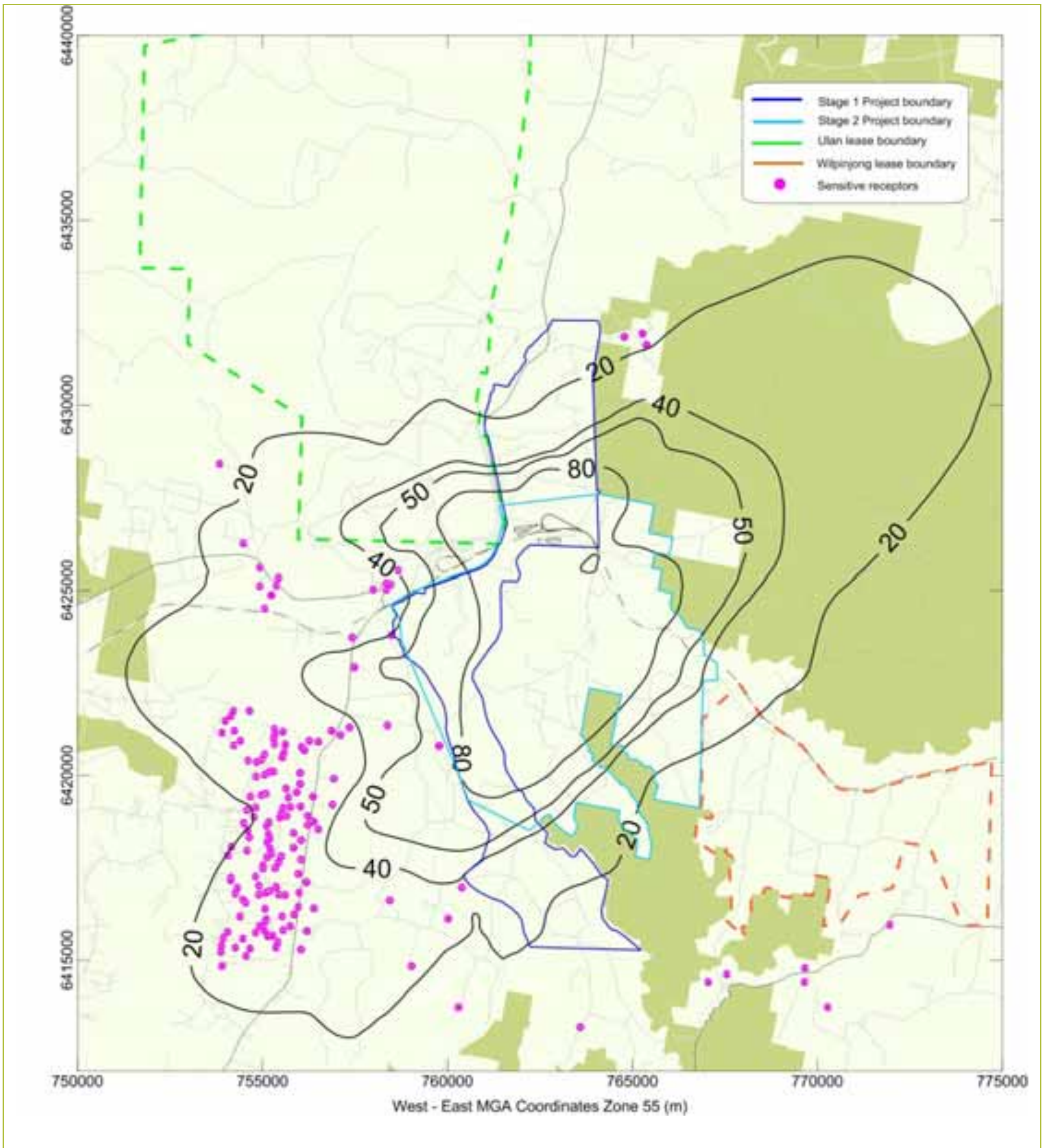
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 2 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.6: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 2



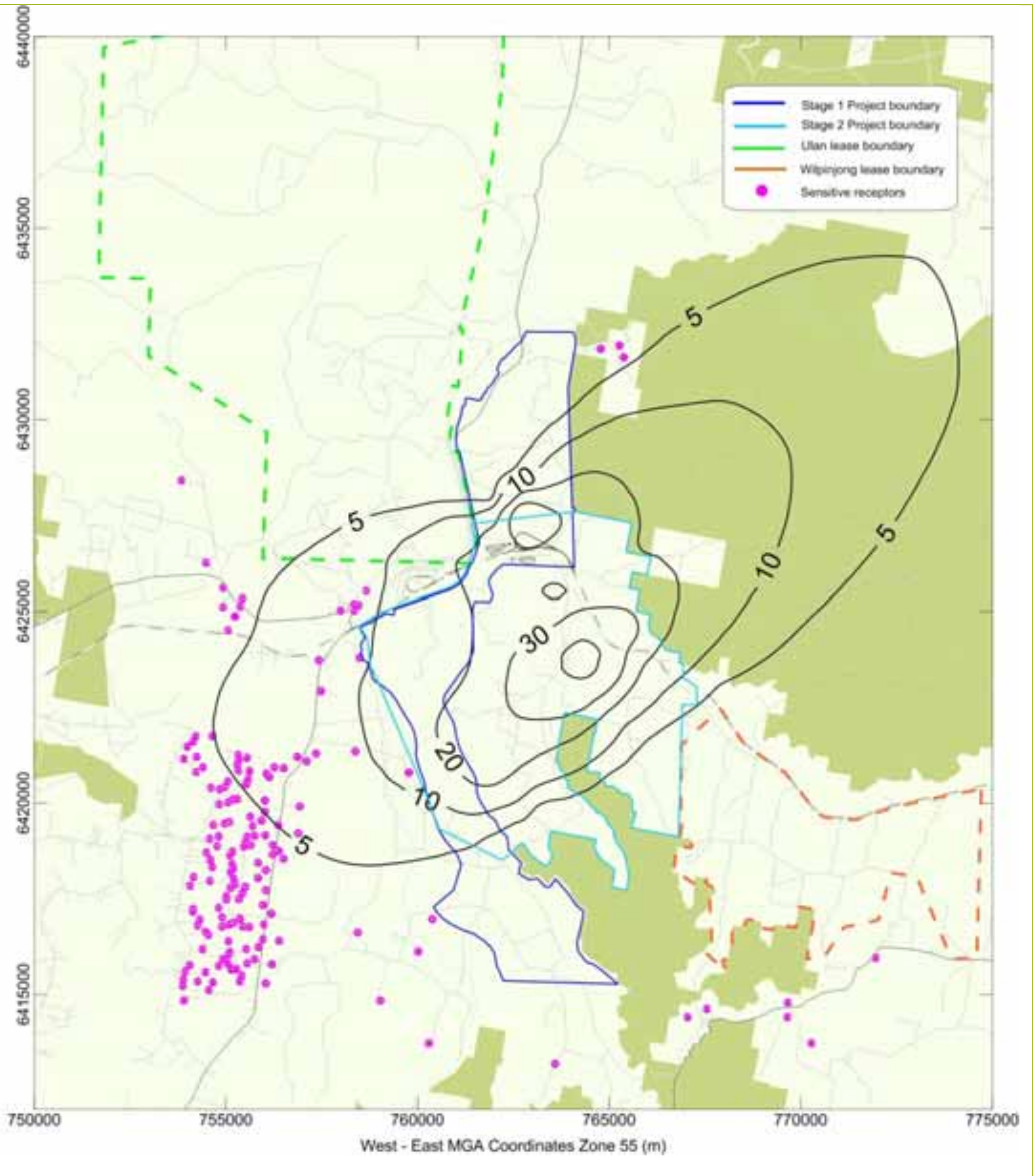
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 2 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW = 4 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.7: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 2



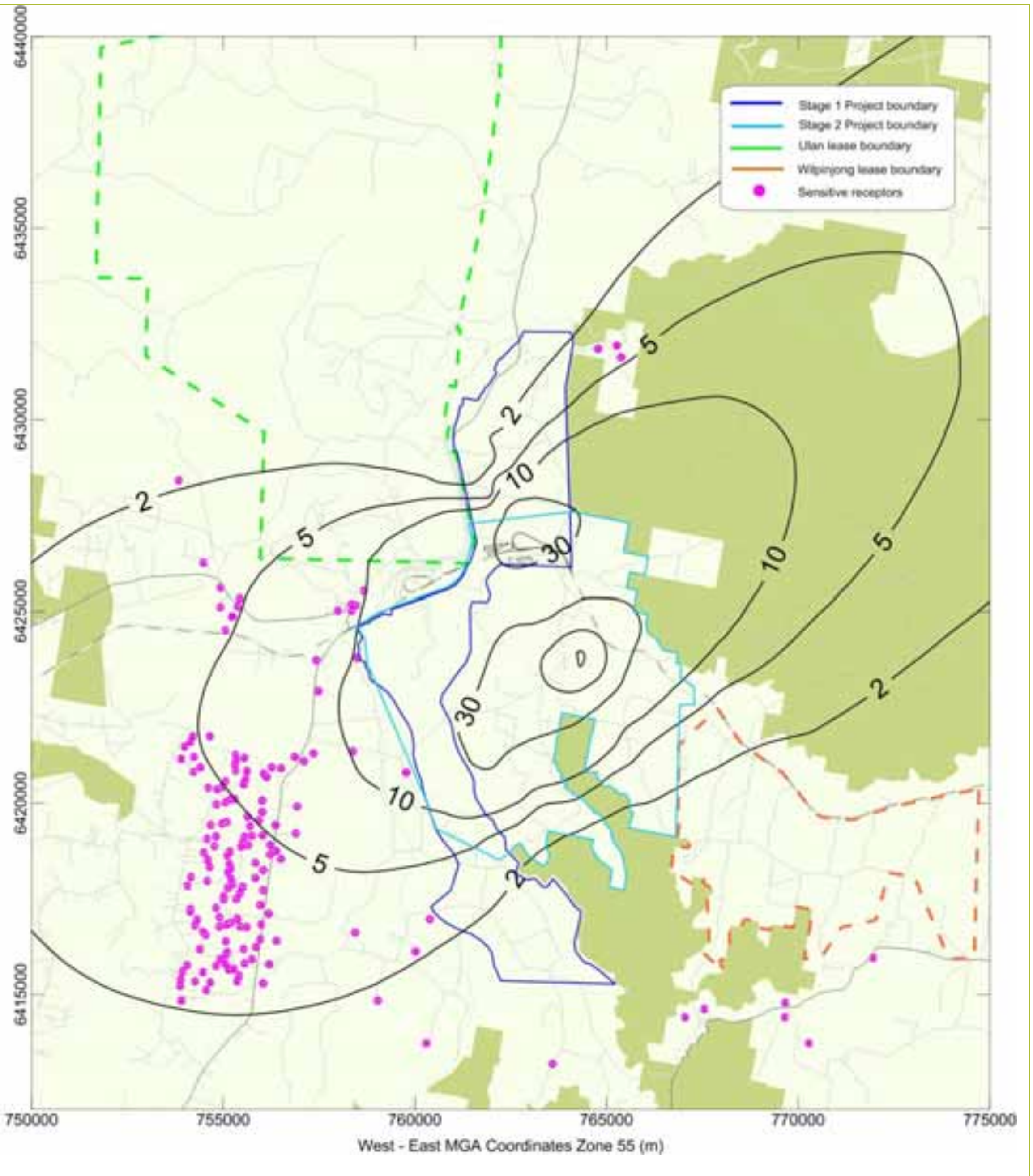
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 7 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.8: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 7



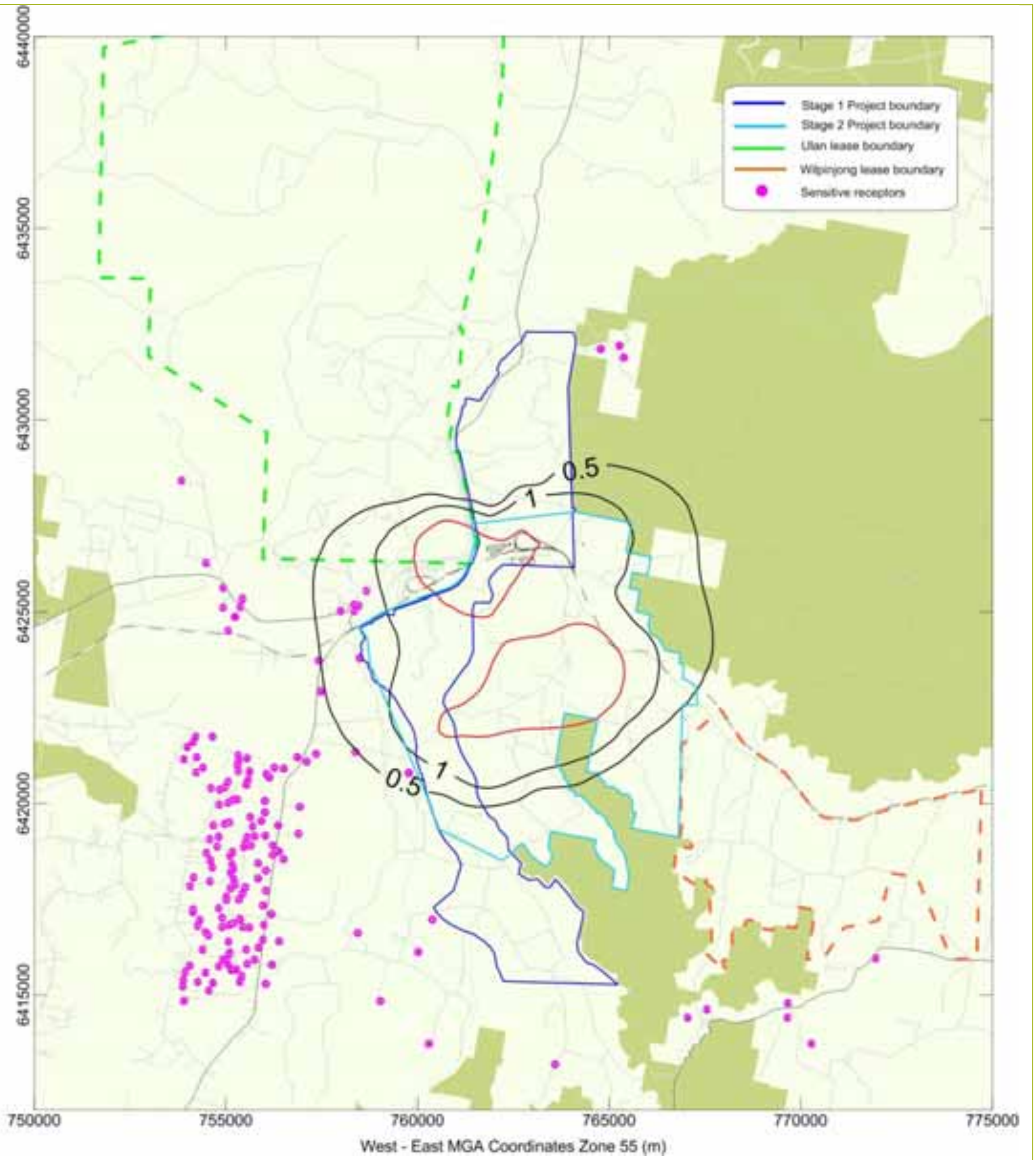
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 7 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.9: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 7



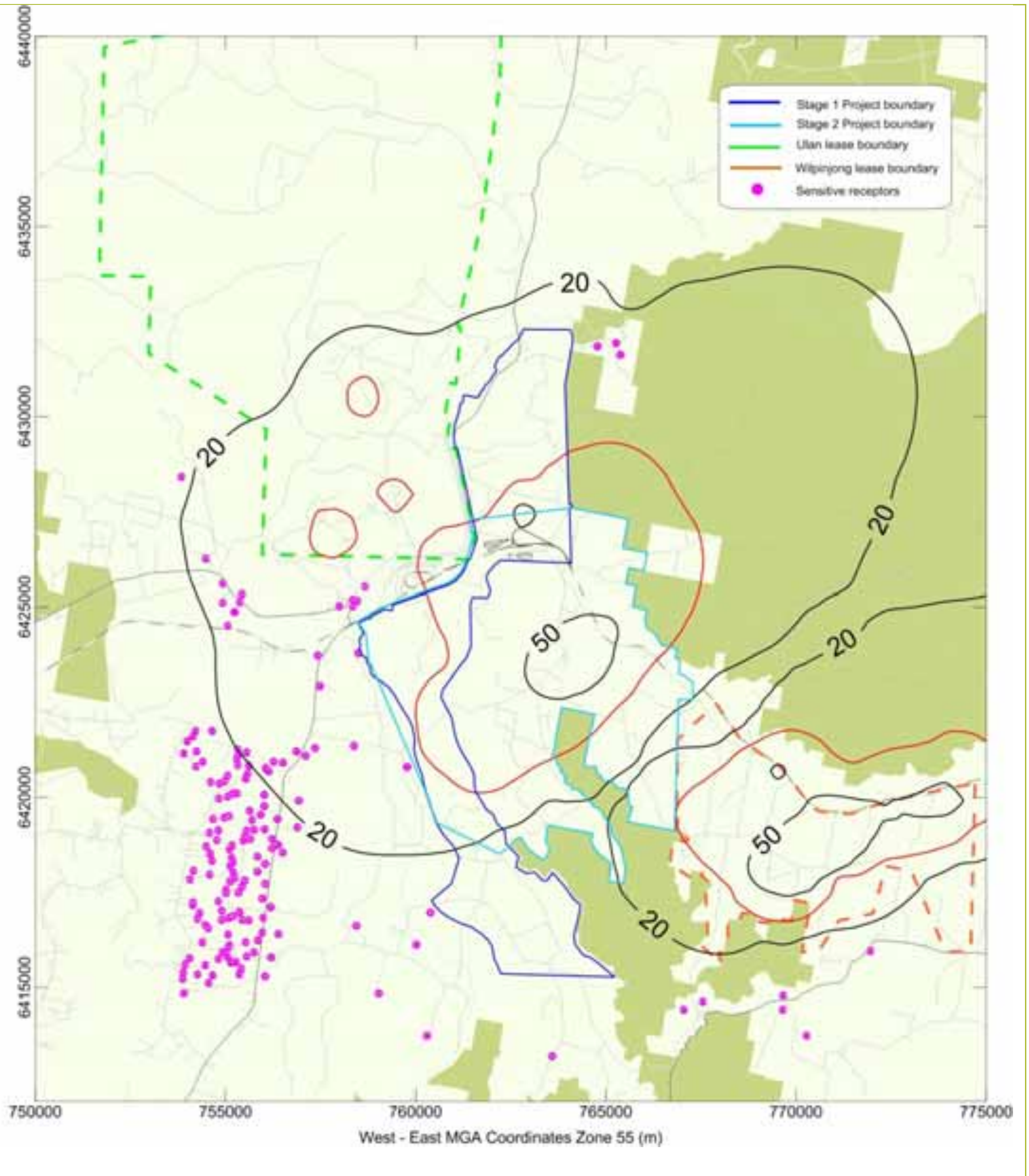
Species:	Location:	Scenario:	Percentile:	Averaging Time:
TSP	Moolarben Coal Complex	Year 7 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.10: Predicted annual average TSP concentrations due to emissions from MCC in Year 7



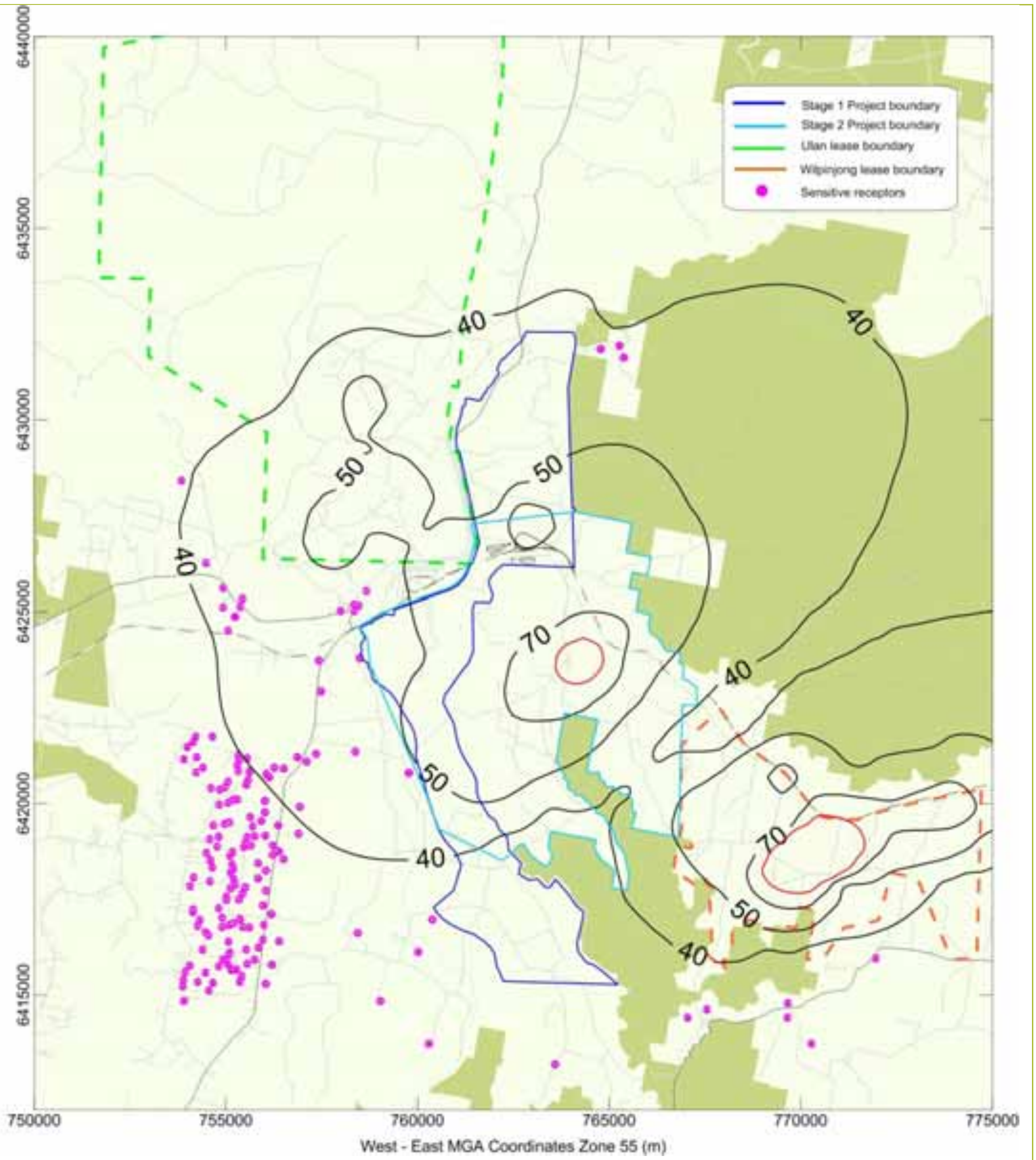
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 7 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW =2 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.11: Predicted annual average dust deposition levels due to emissions from MCC in Year 7



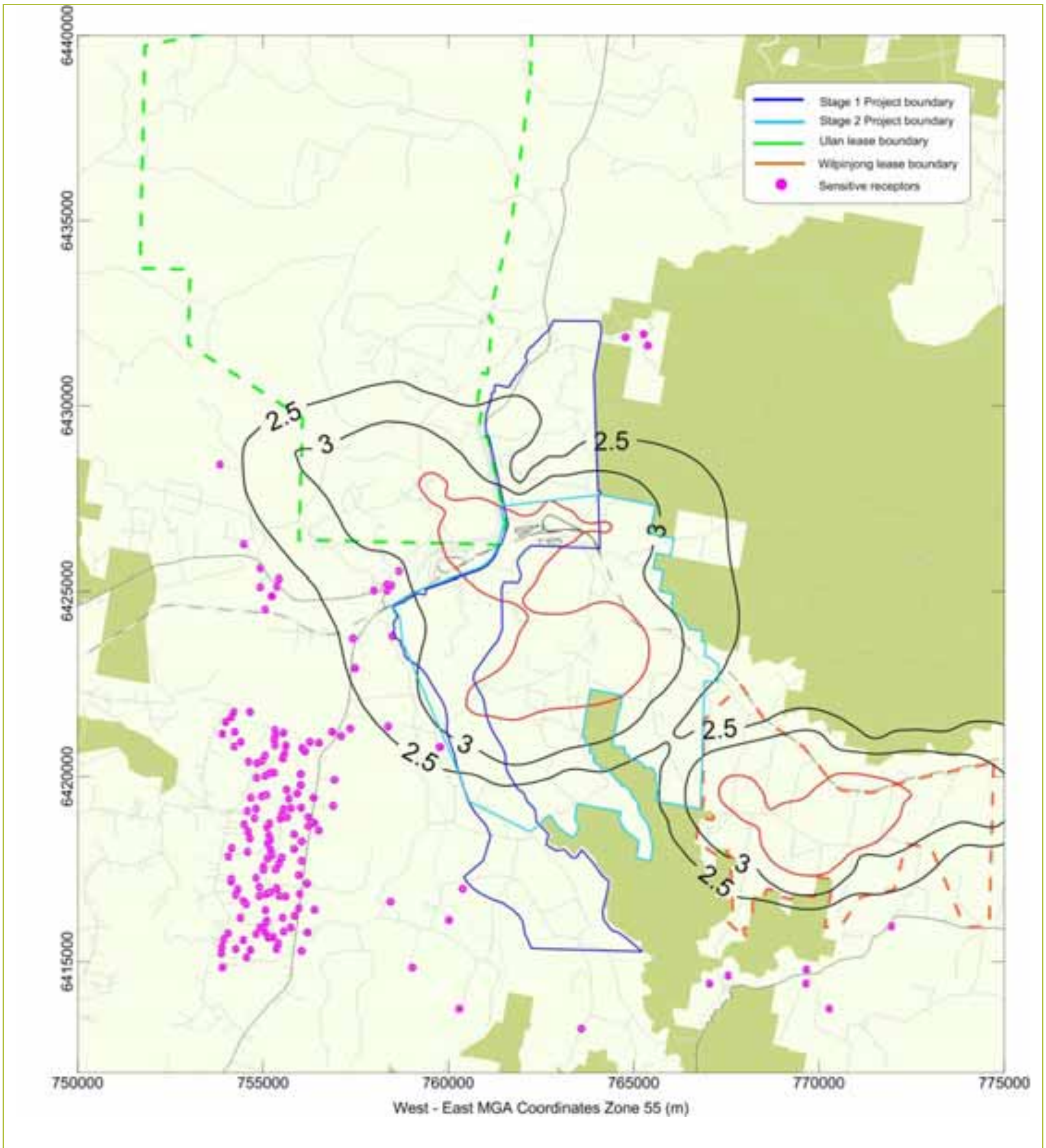
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 7 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 30 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.12: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 7



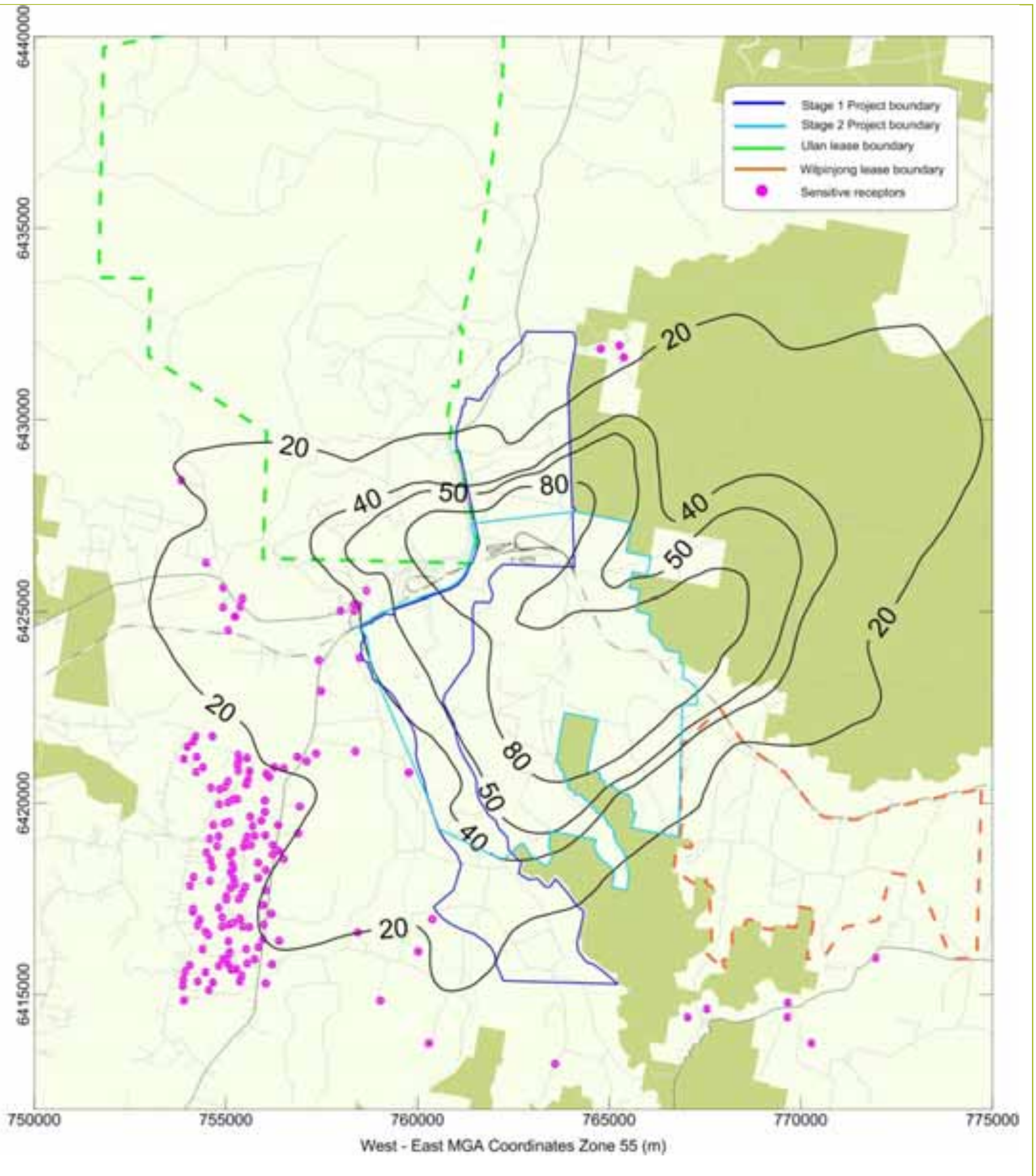
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 7 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.13: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 7



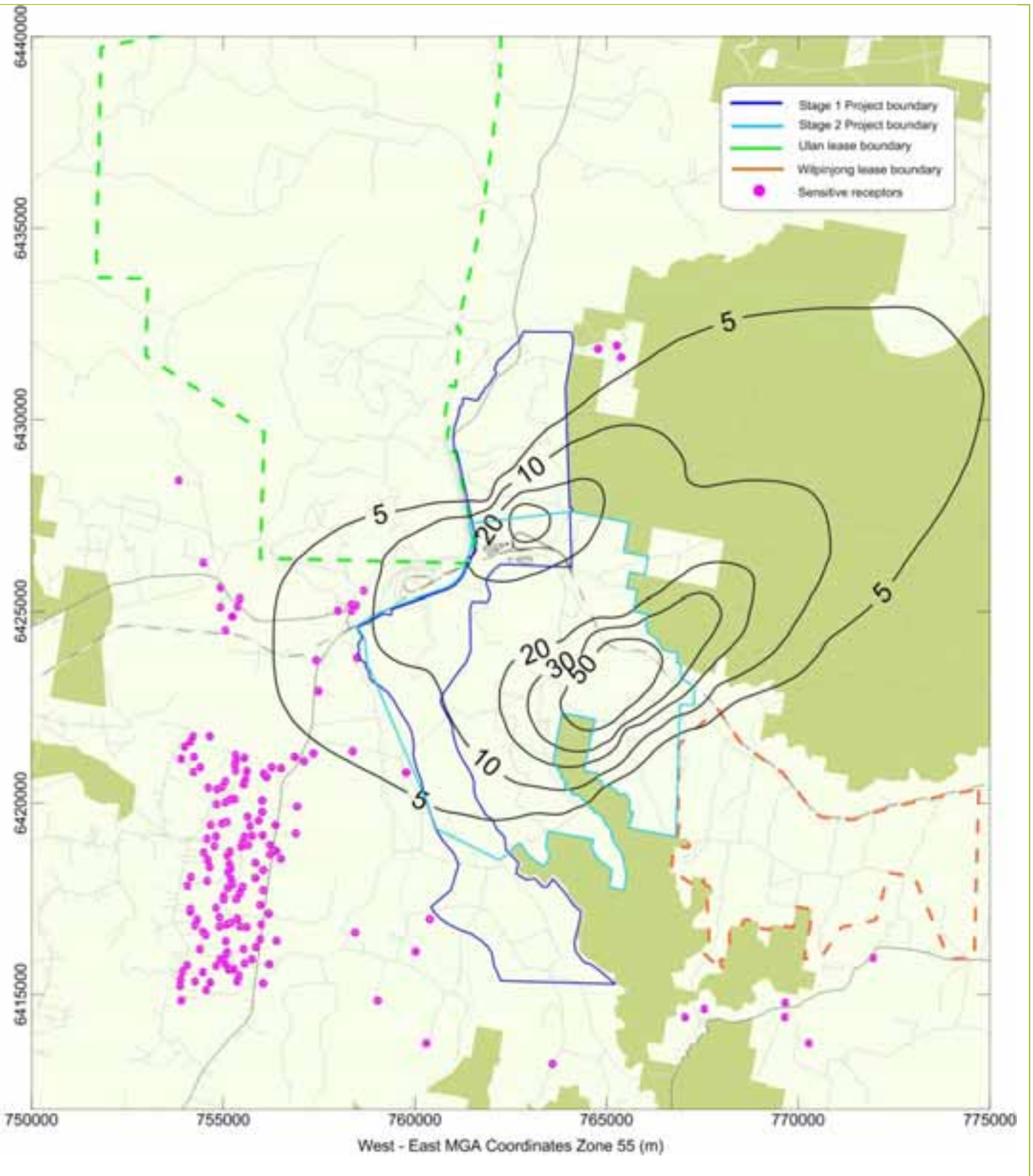
Species: DD	**Location:** Moolarben Coal Complex	**Scenario:** Year 7 Cumulative	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** g/m^2/month	**Guideline:** DECCW = 4 g/m^2/month (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.14: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 7



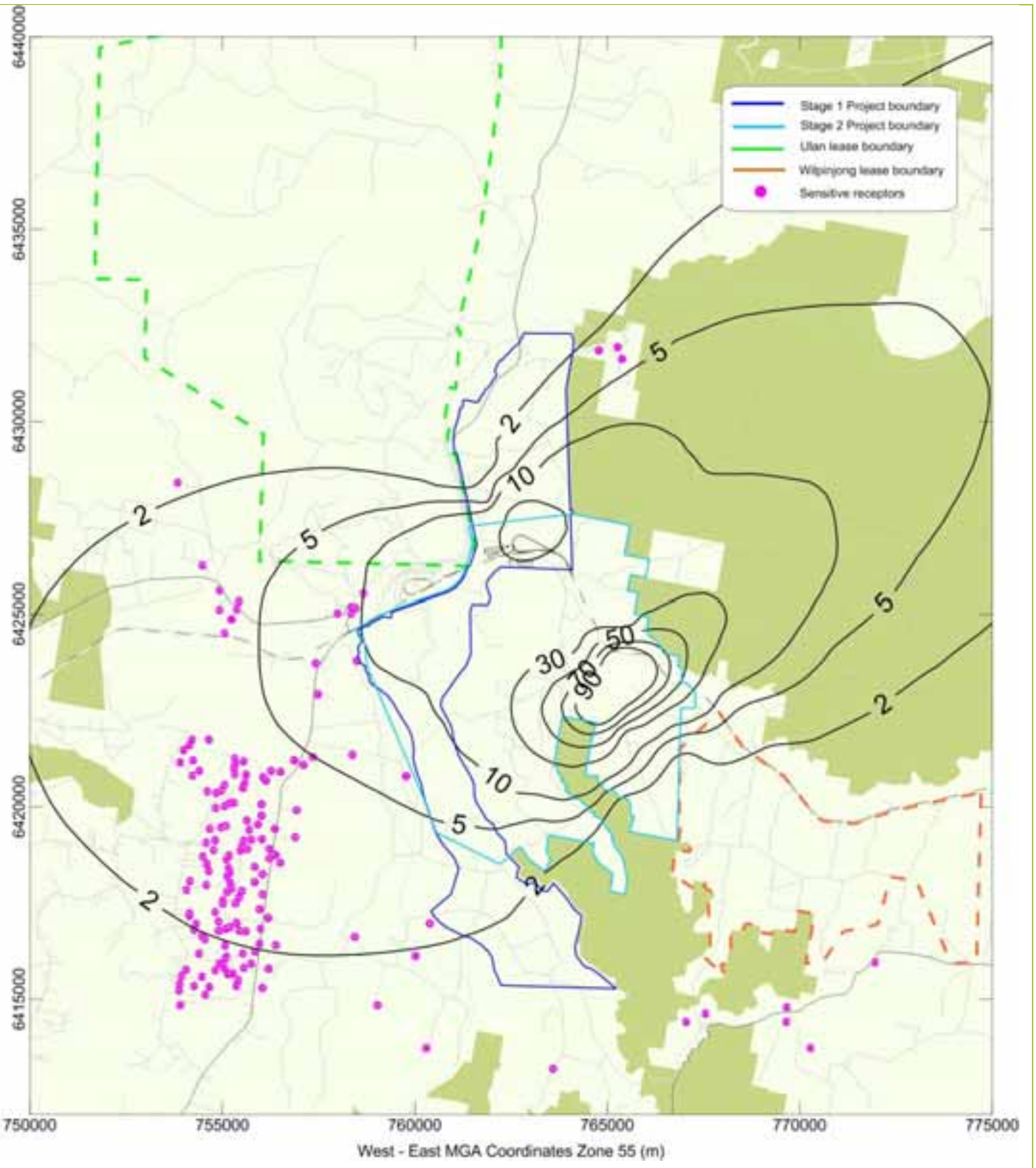
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 12 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.15: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 12



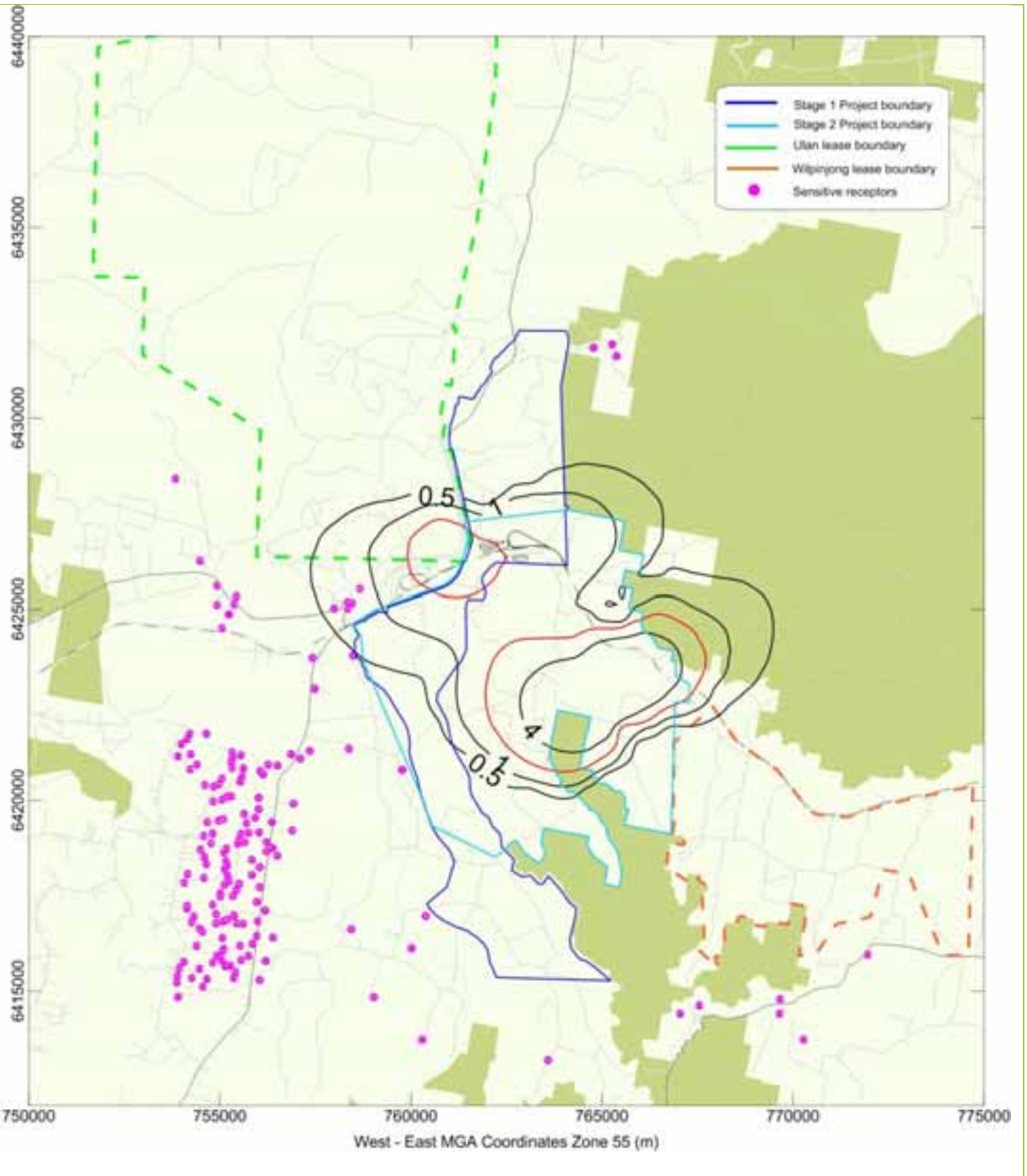
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 12 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.16: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 12



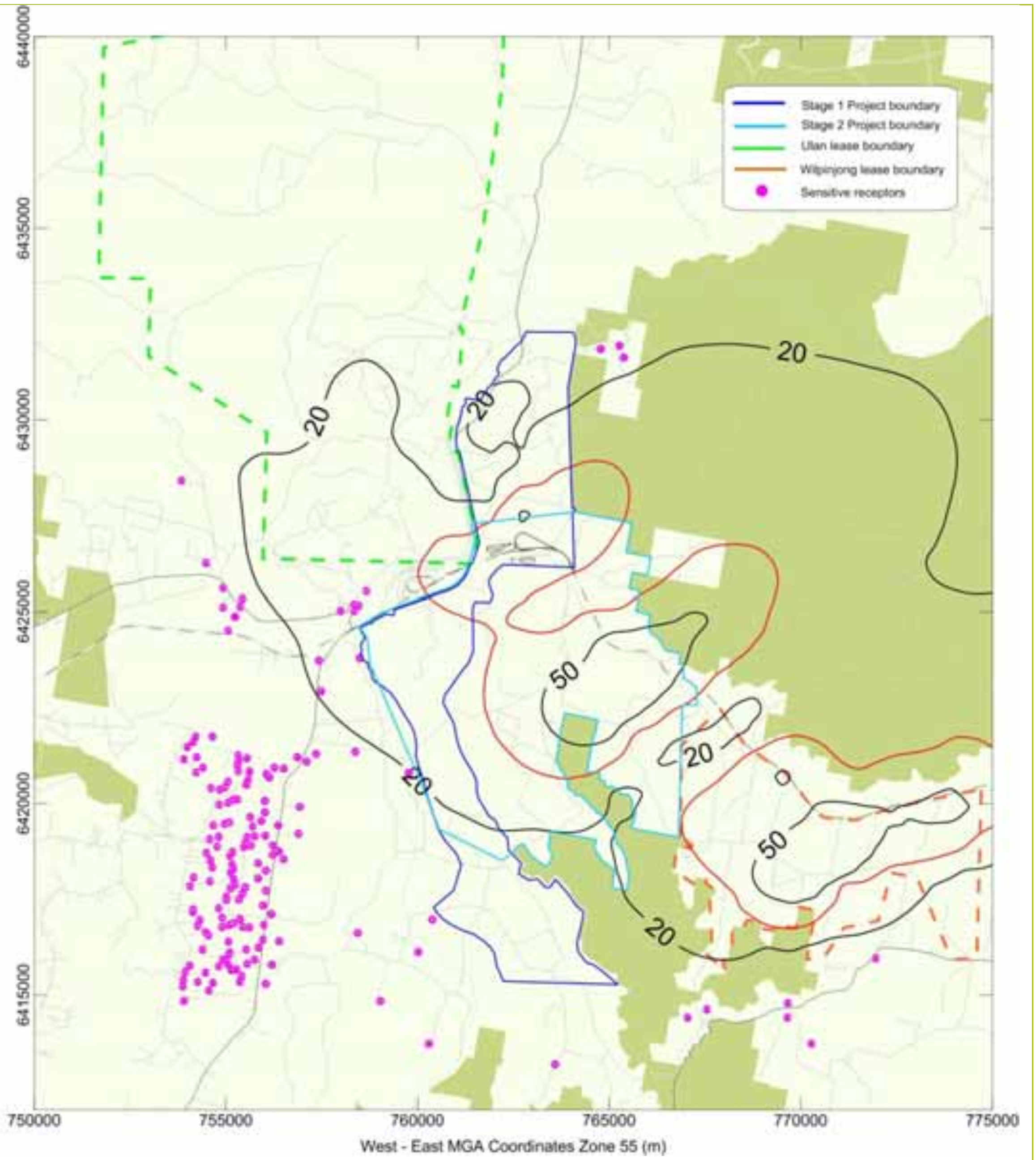
Species: TSP	**Location:** Moolarben Coal Complex	**Scenario:** Year 12 Project only	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** N/A	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.17: Predicted annual average TSP concentrations due to emissions from MCC in Year 12



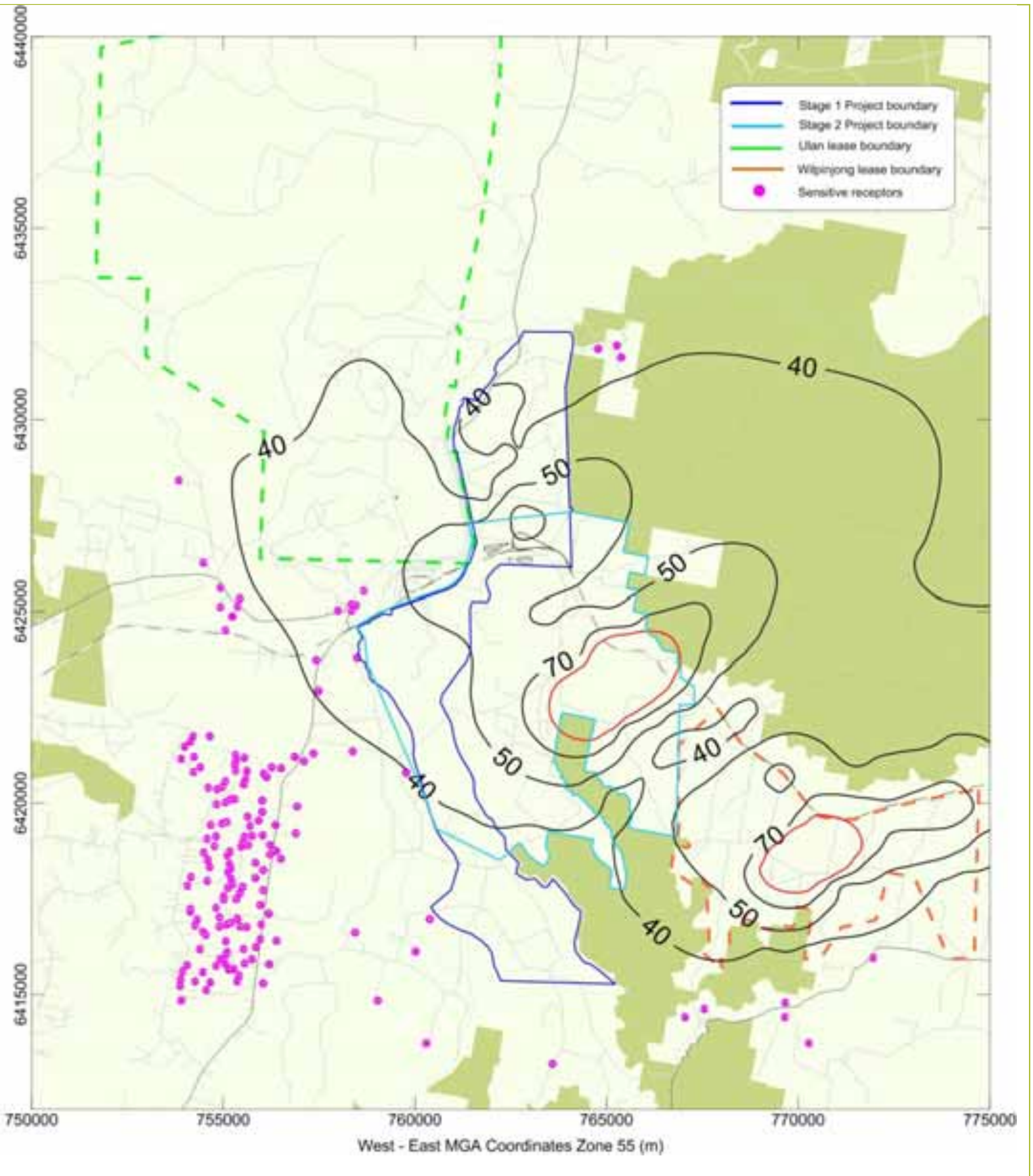
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 12 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	$g/m^2/month$	DECCW =2 $g/m^2/month$ (shown as a red line)	2007-2008	P. Henschke

Figure G.18: Predicted annual average dust deposition levels due to emissions from MCC in Year 12



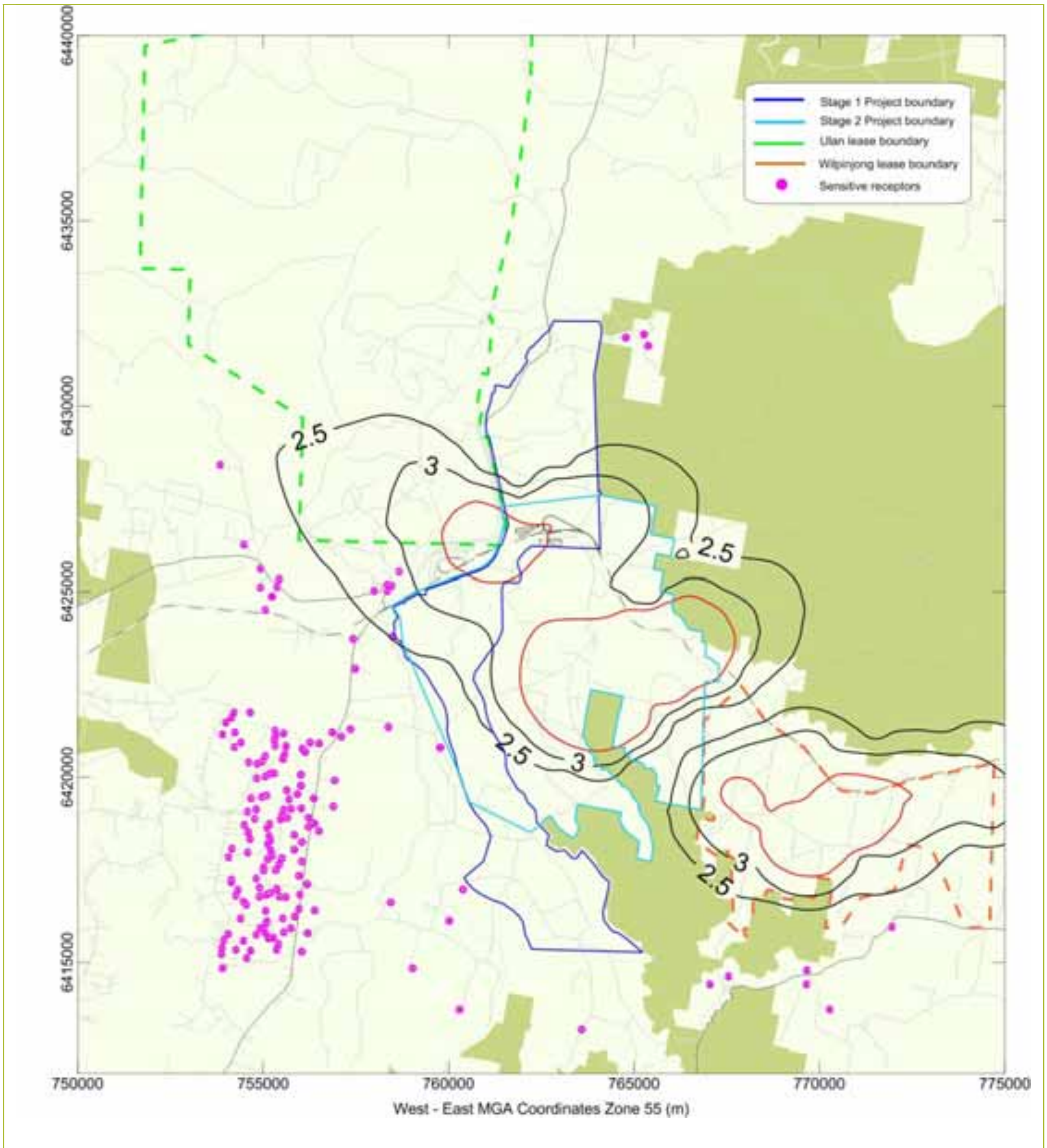
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 12 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 30 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.19: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 12



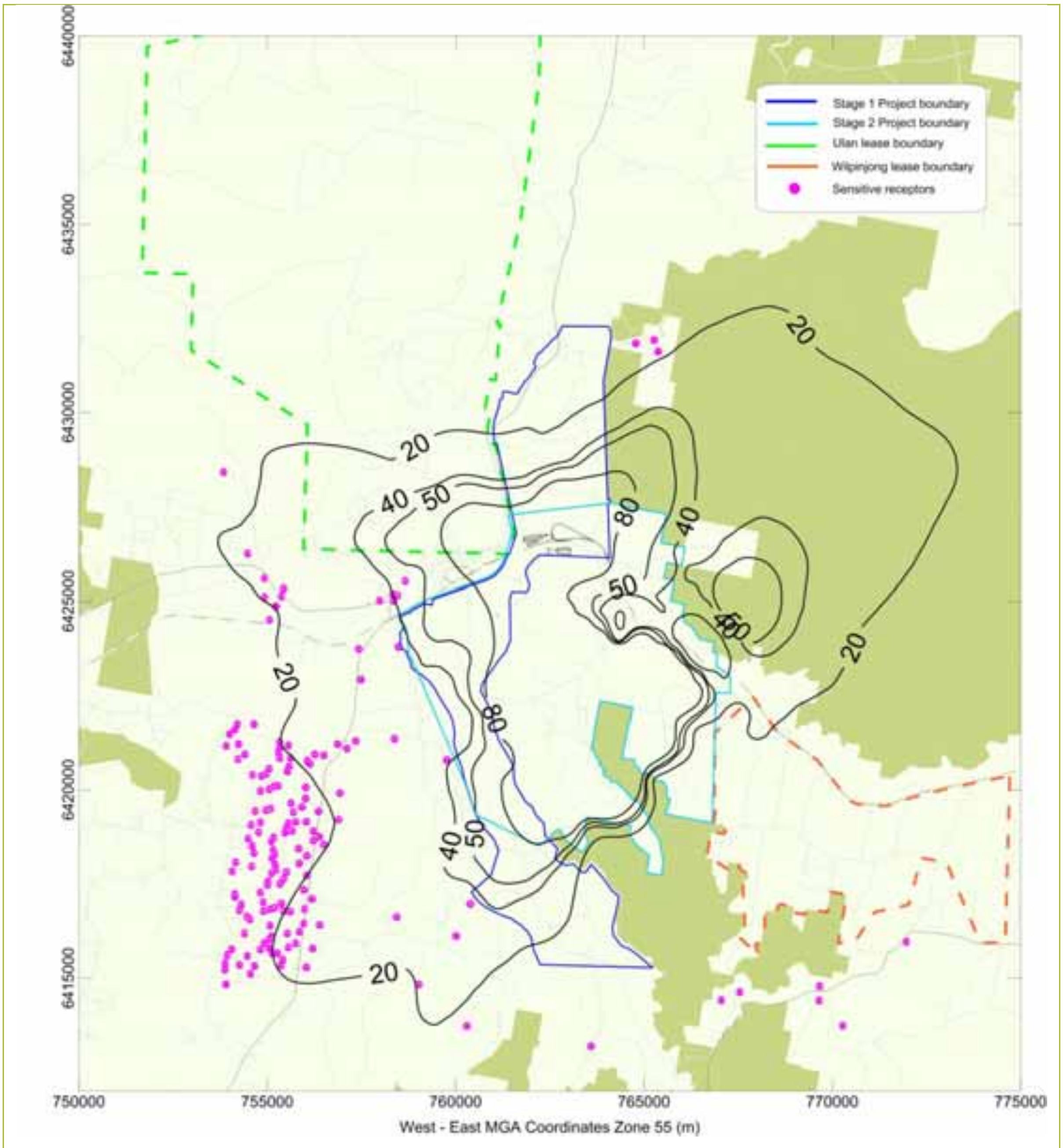
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 12 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.20: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 12



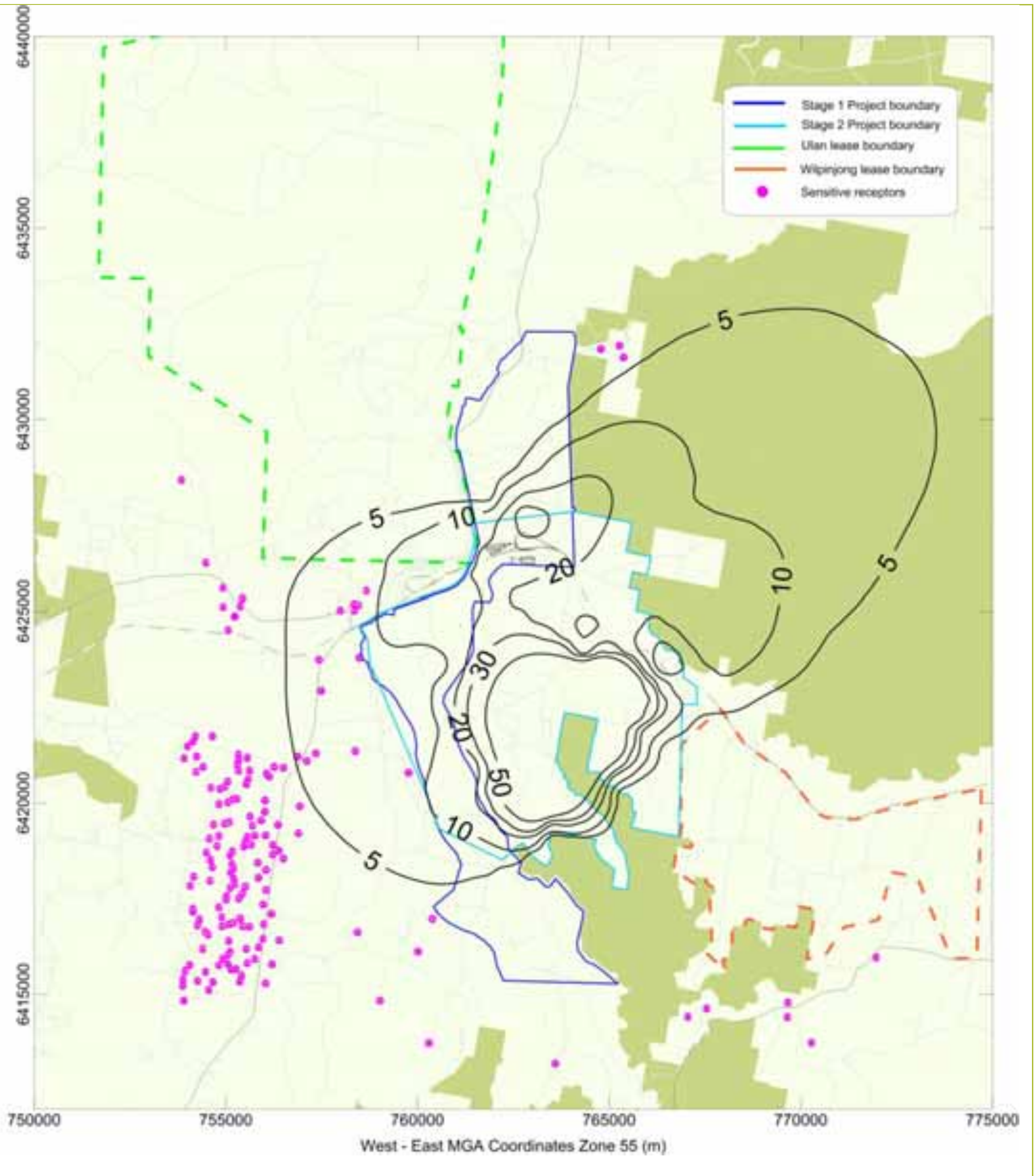
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 12 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW = 4 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.21: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 12



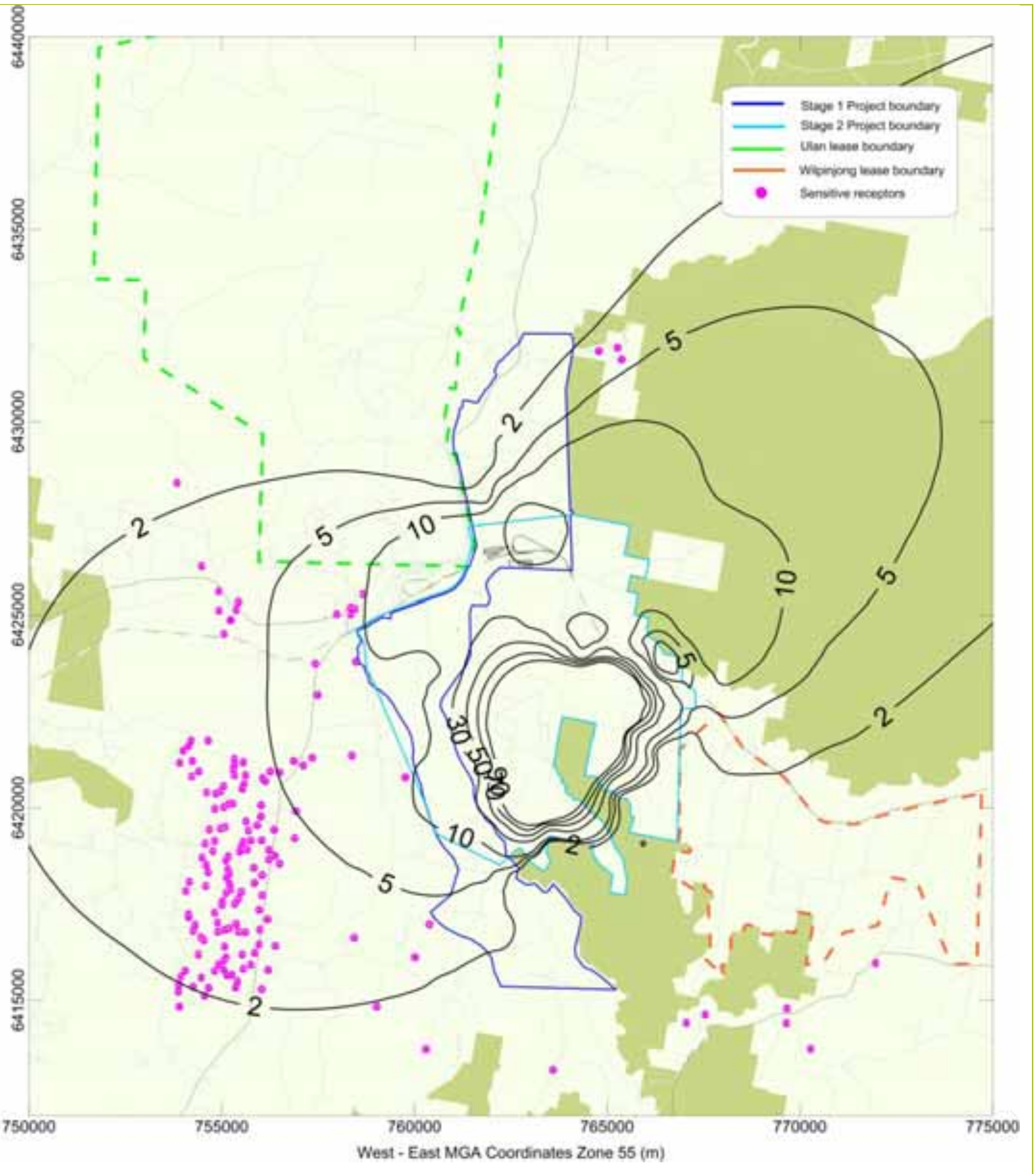
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 16 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.22: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 16



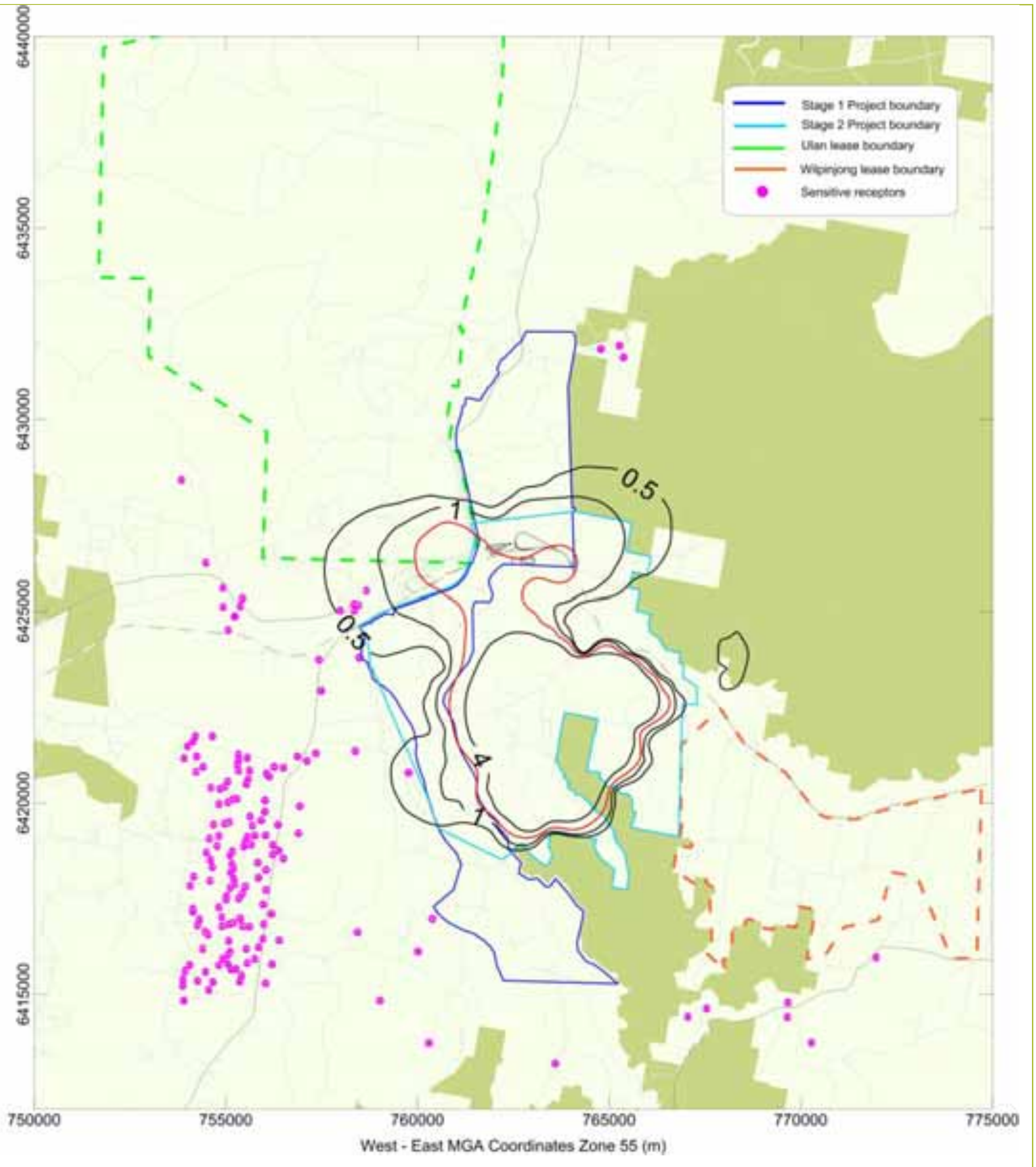
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 16 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.23: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 16



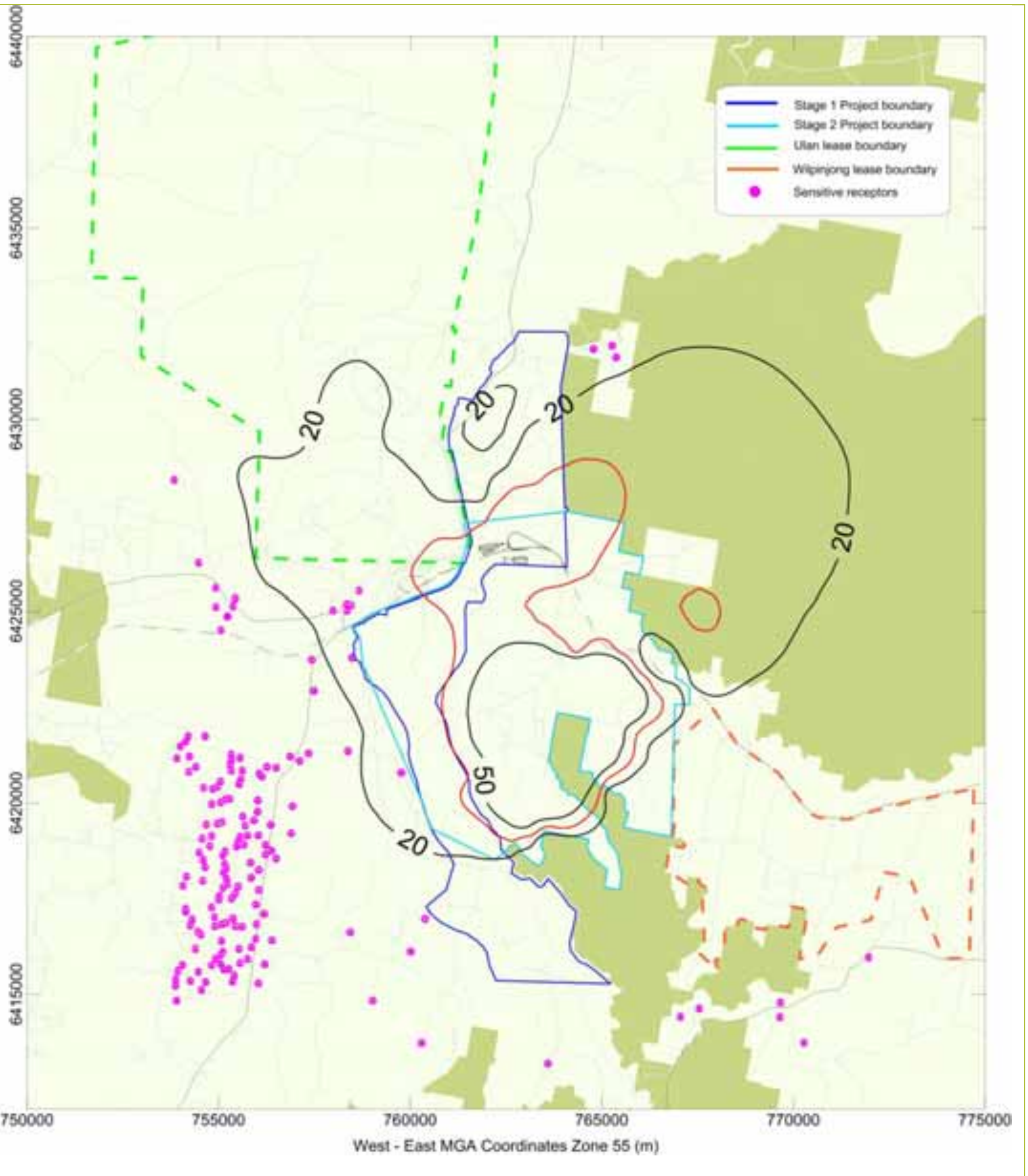
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 16 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.24: Predicted annual average TSP concentrations due to emissions from MCC in Year 16



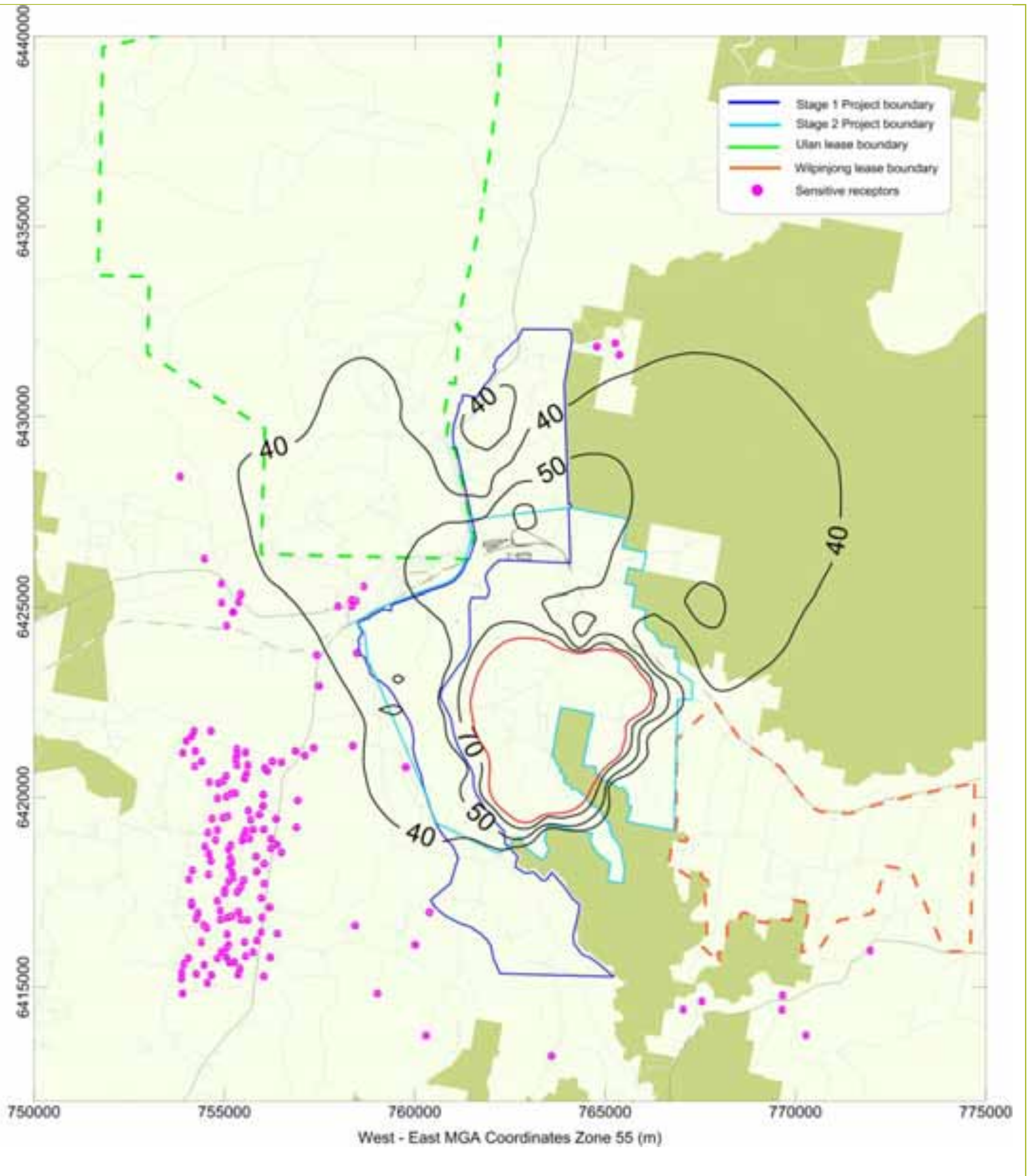
Species: DD	**Location:** Moolarben Coal Complex	**Scenario:** Year 16 Project only	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** g/m^2/month	**Guideline:** DECCW =2 g/m^2/month (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.25: Predicted annual average dust deposition levels due to emissions from MCC in Year 16



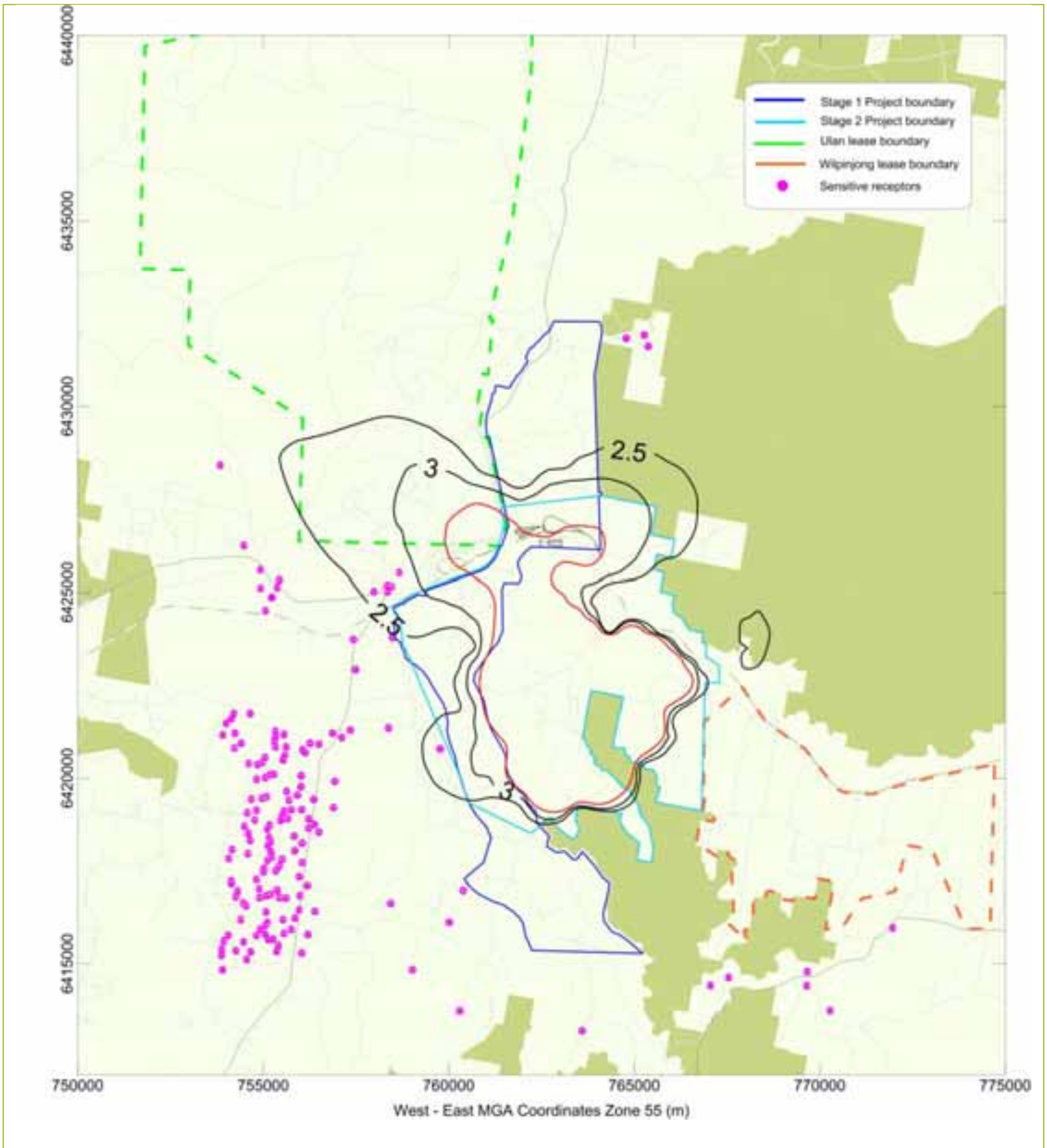
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 16 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 30 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.26: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 16



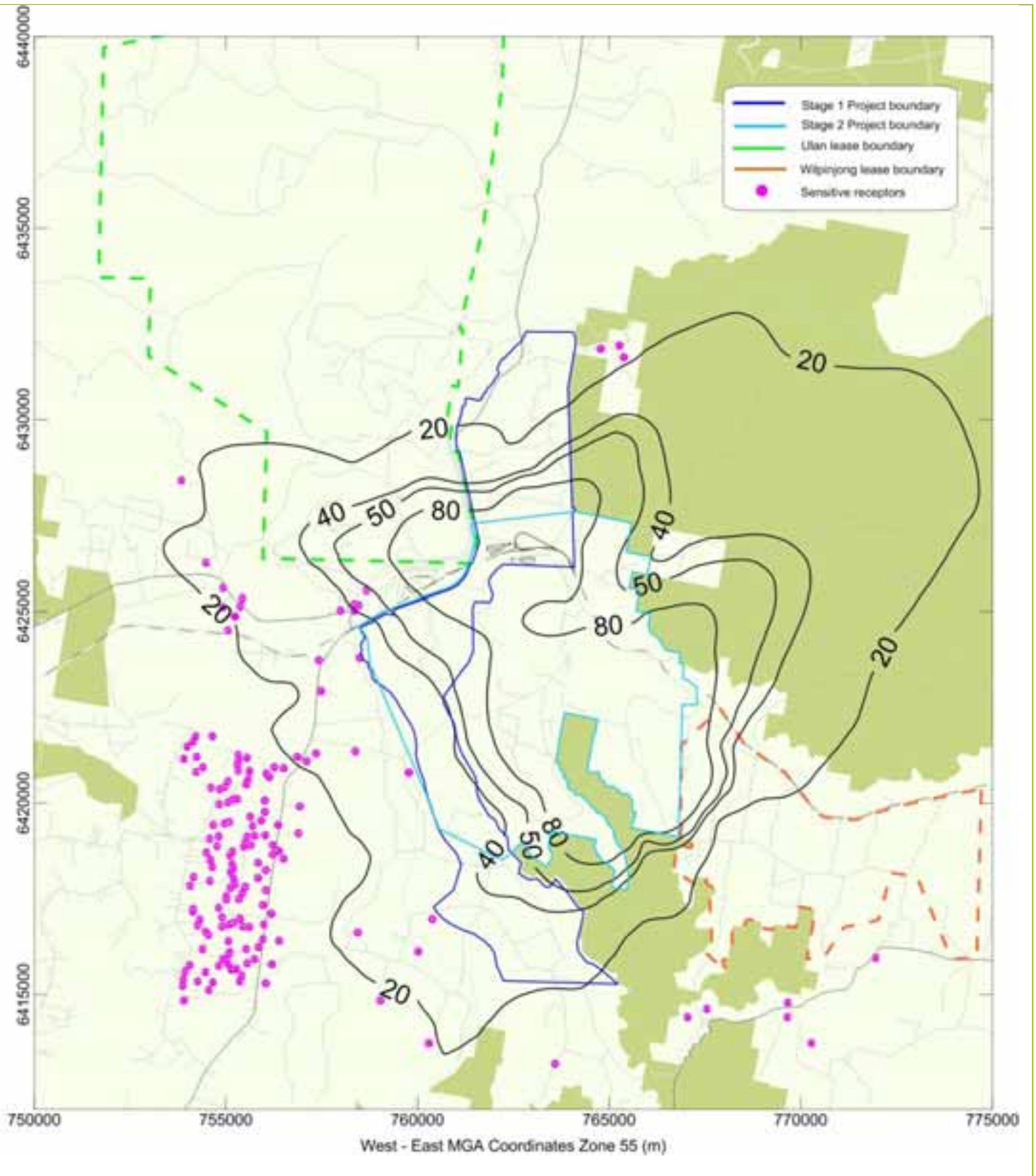
Species: TSP	**Location:** Moolarben Coal Complex	**Scenario:** Year 16 Cumulative	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** DECCW = 90 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.27: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 16



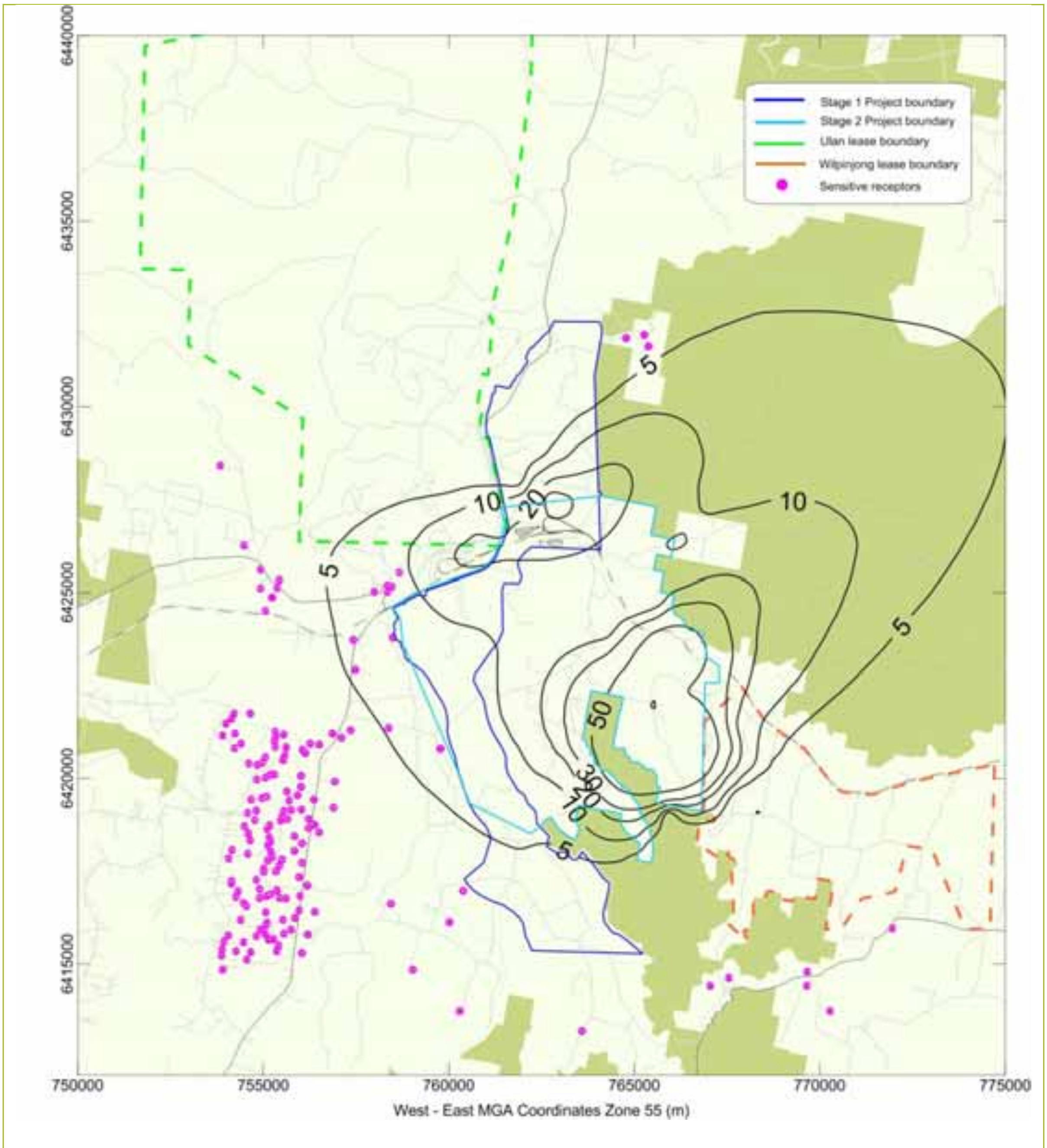
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 16 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW = 4 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.28: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 16



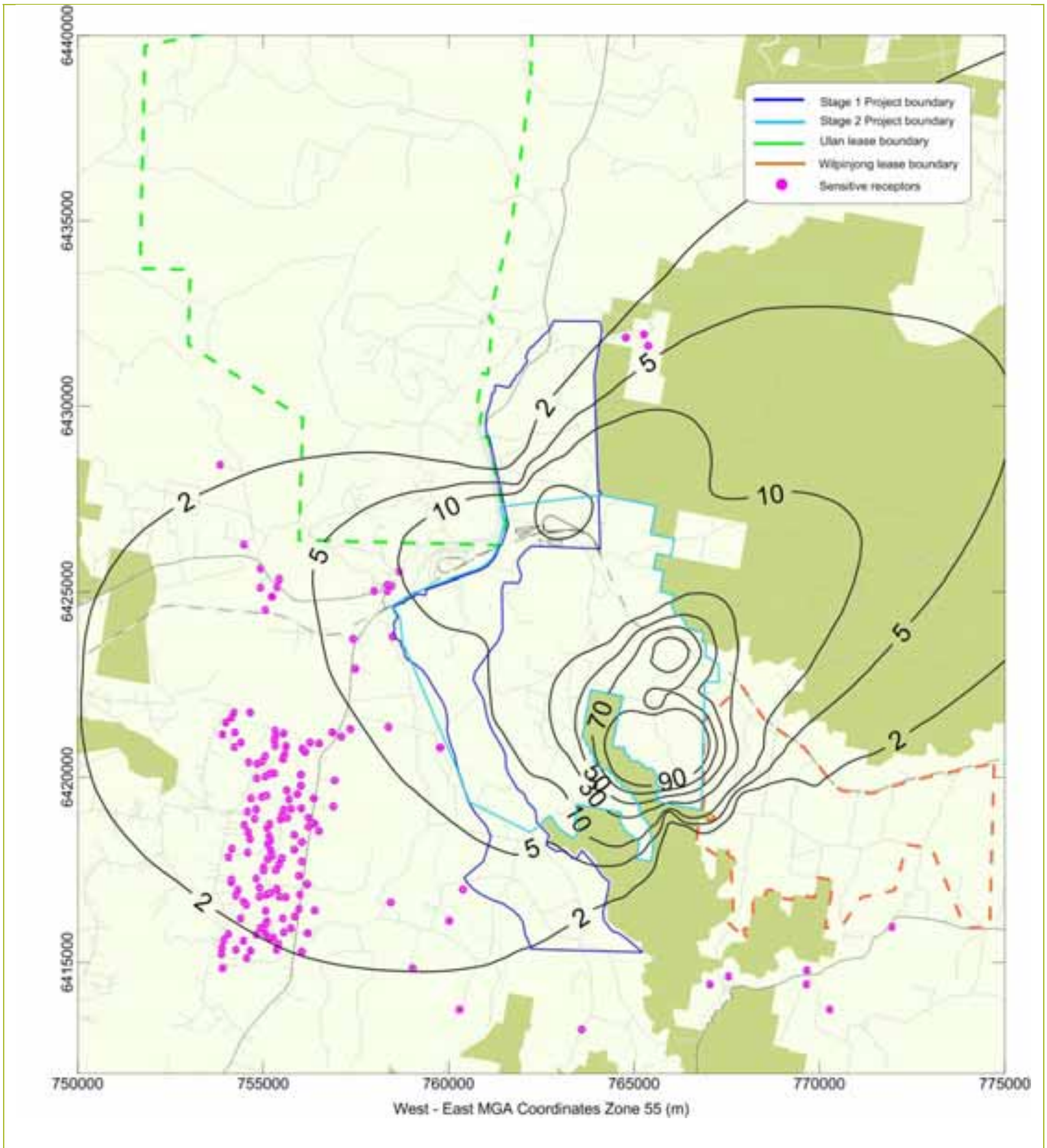
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 19 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.29: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 19



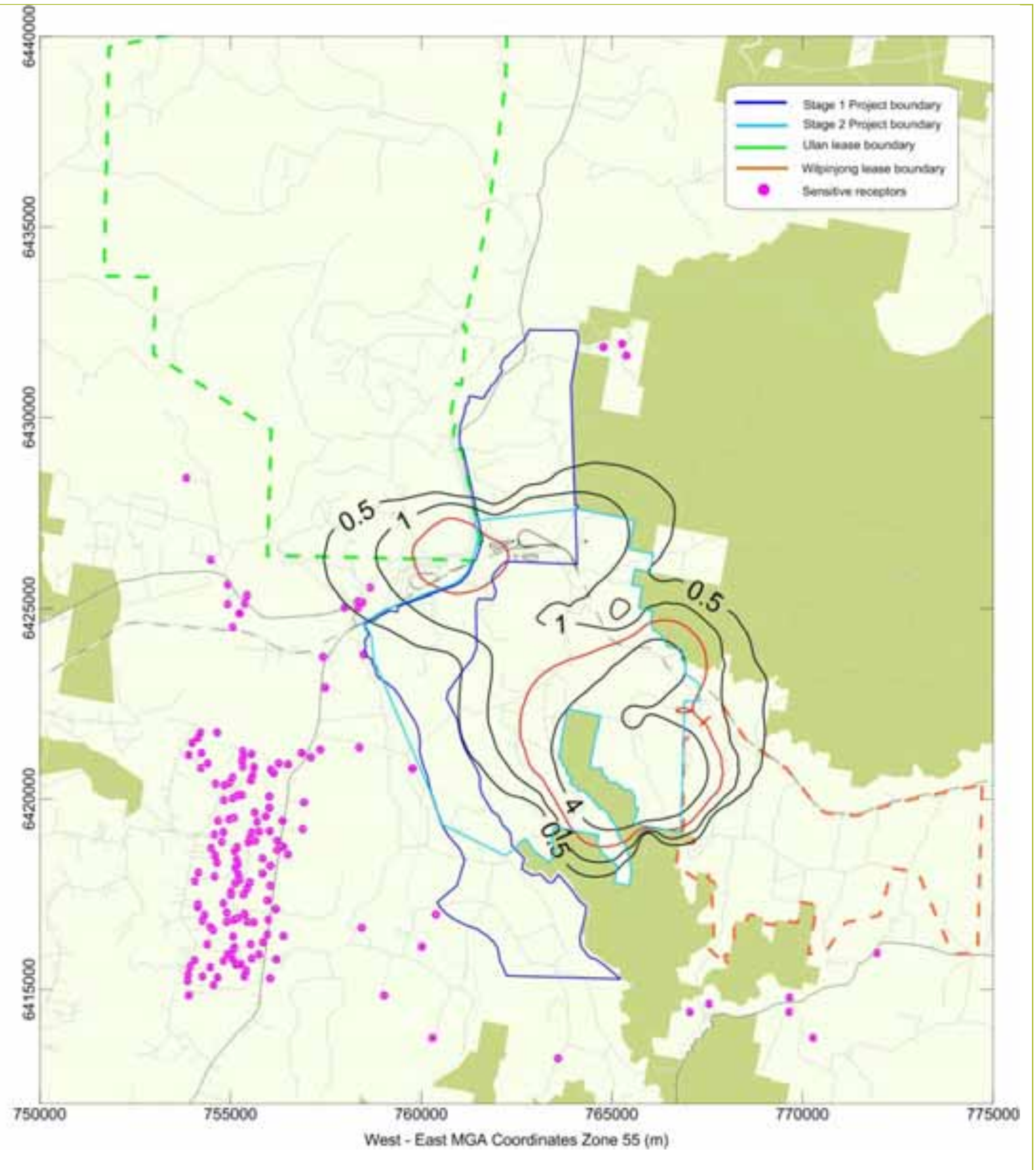
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 19 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.30: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 19



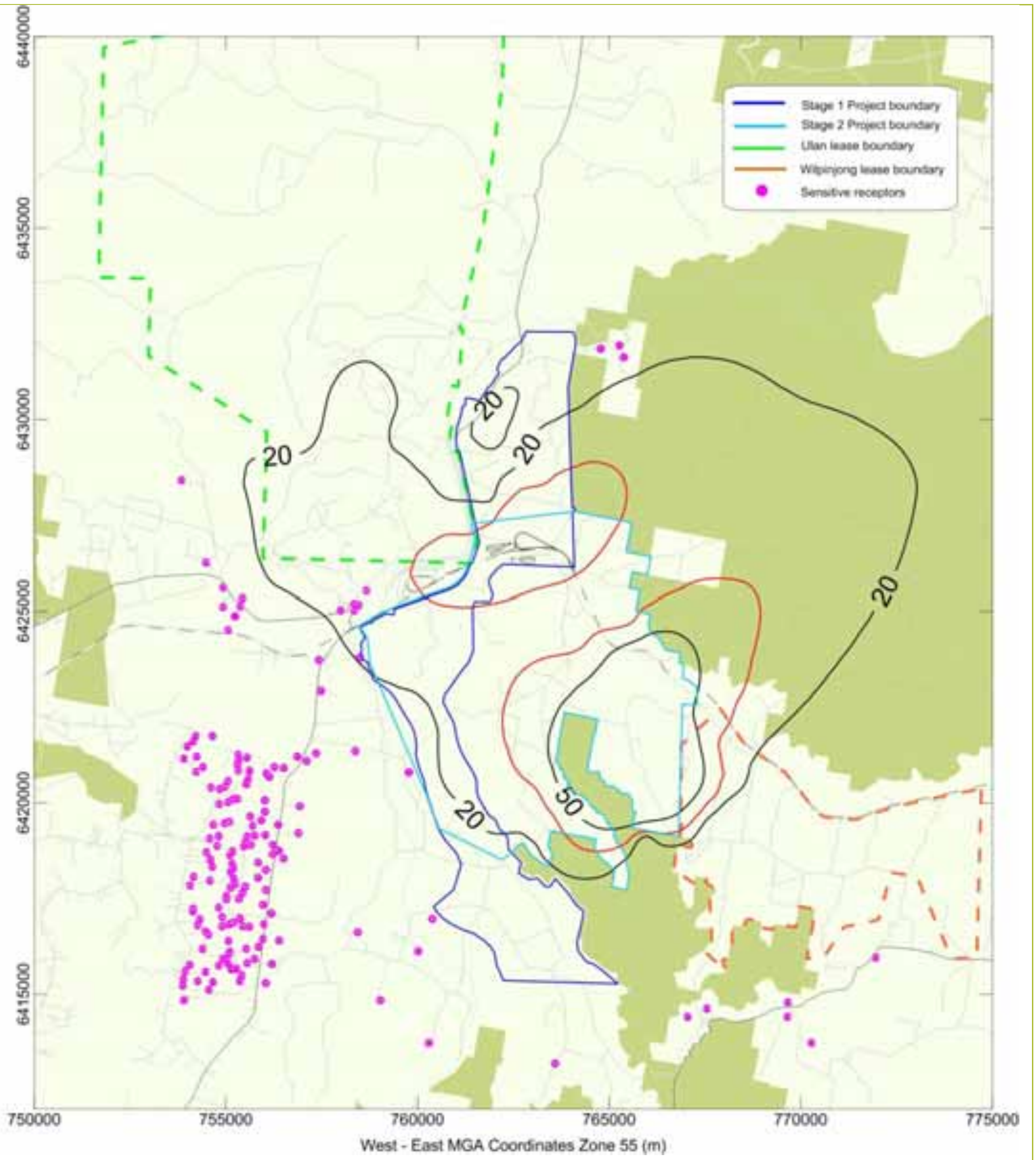
Species: TSP	**Location:** Moolarben Coal Complex	**Scenario:** Year 19 Project only	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** N/A	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.31: Predicted annual average TSP concentrations due to emissions from MCC in Year 19



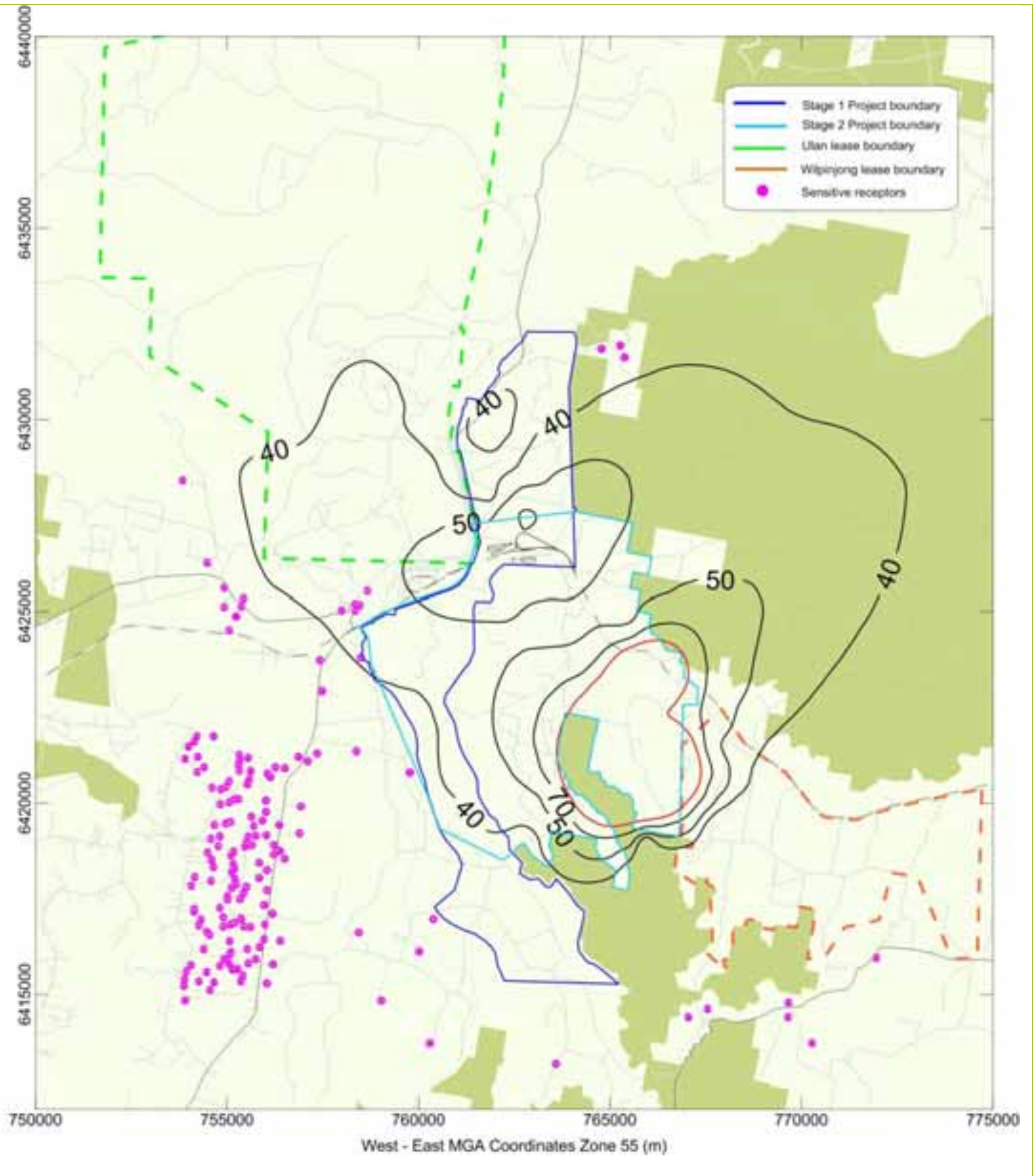
Species: DD	**Location:** Moolarben Coal Complex	**Scenario:** Year 19 Project only	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** g/m^2/month	**Guideline:** DECCW =2 g/m^2/month (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.32: Predicted annual average dust deposition levels due to emissions from MCC in Year 19



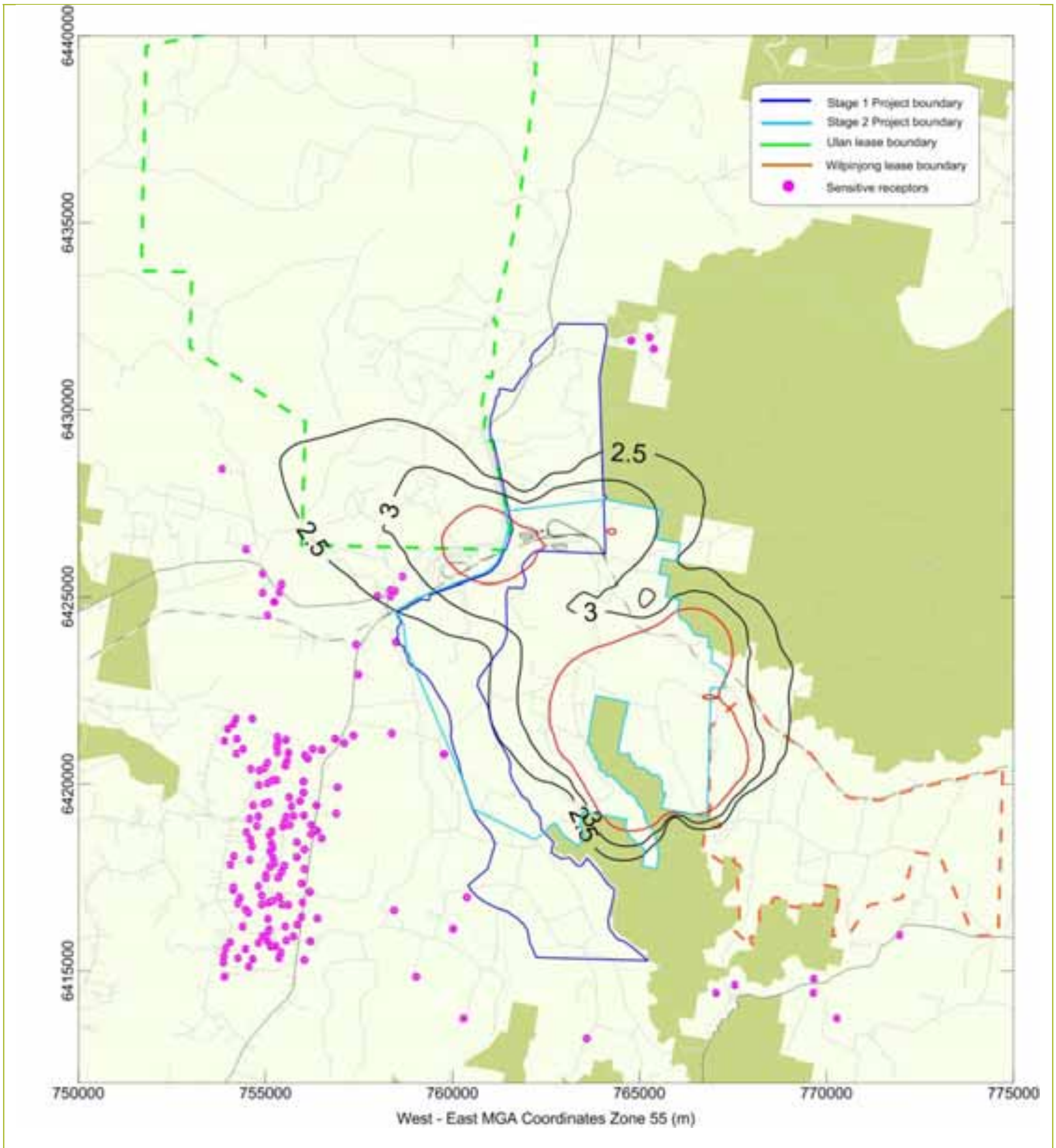
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 19 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 30 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.33: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 19



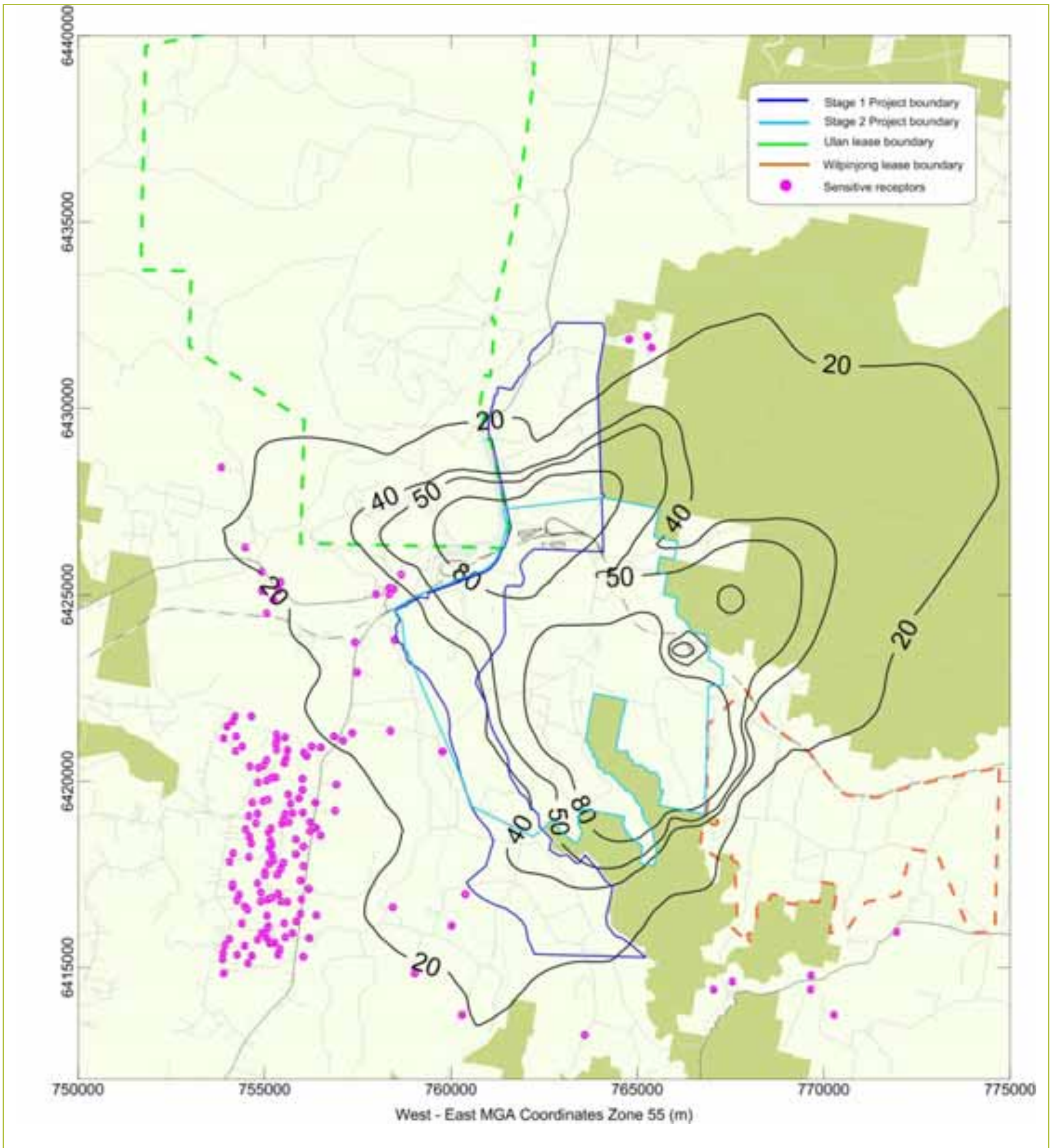
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 19 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.34: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 19



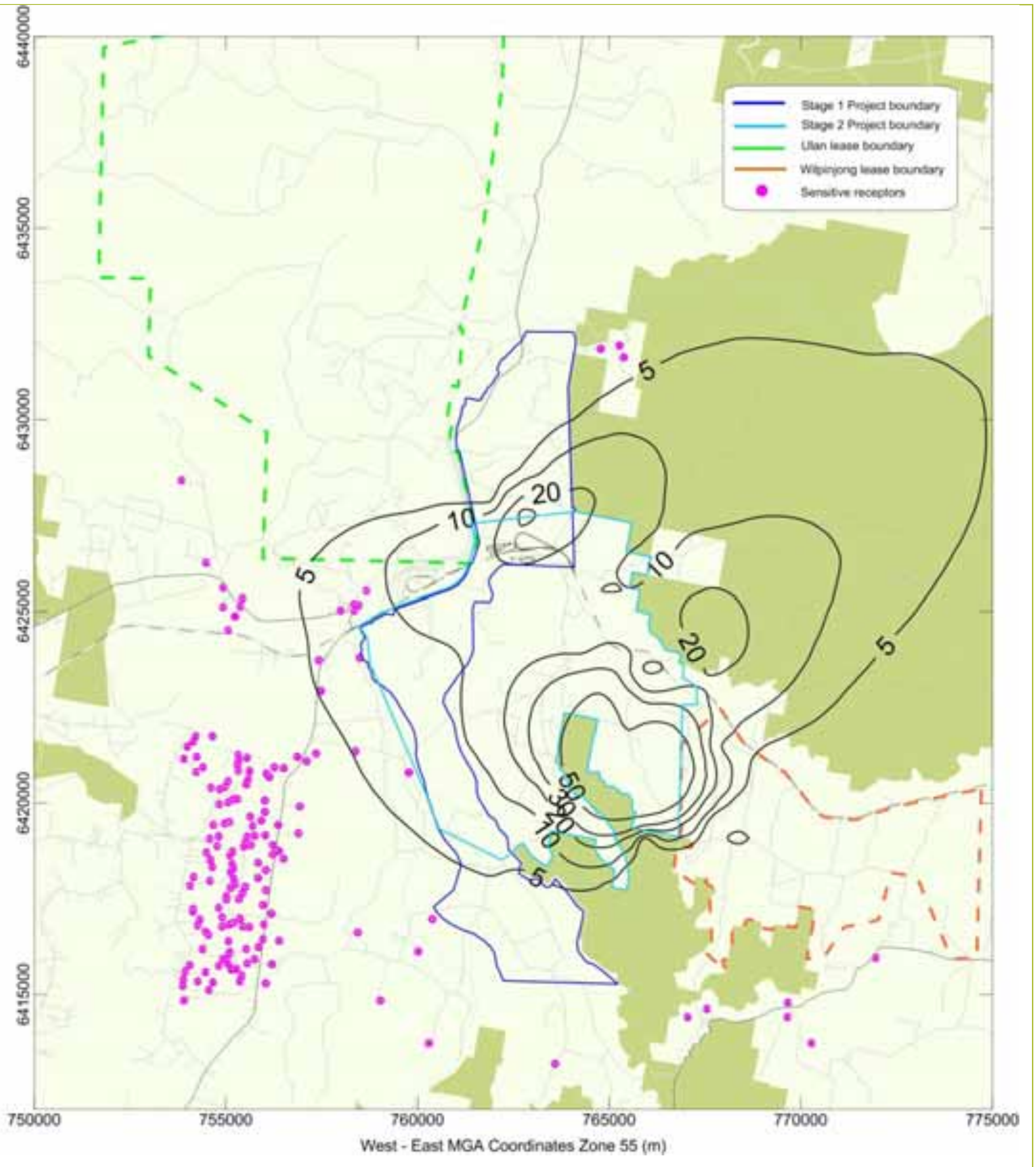
Species: DD	**Location:** Moolarben Coal Complex	**Scenario:** Year 19 Cumulative	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** g/m^2/month	**Guideline:** DECCW = 4 g/m^2/month (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.35: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 19



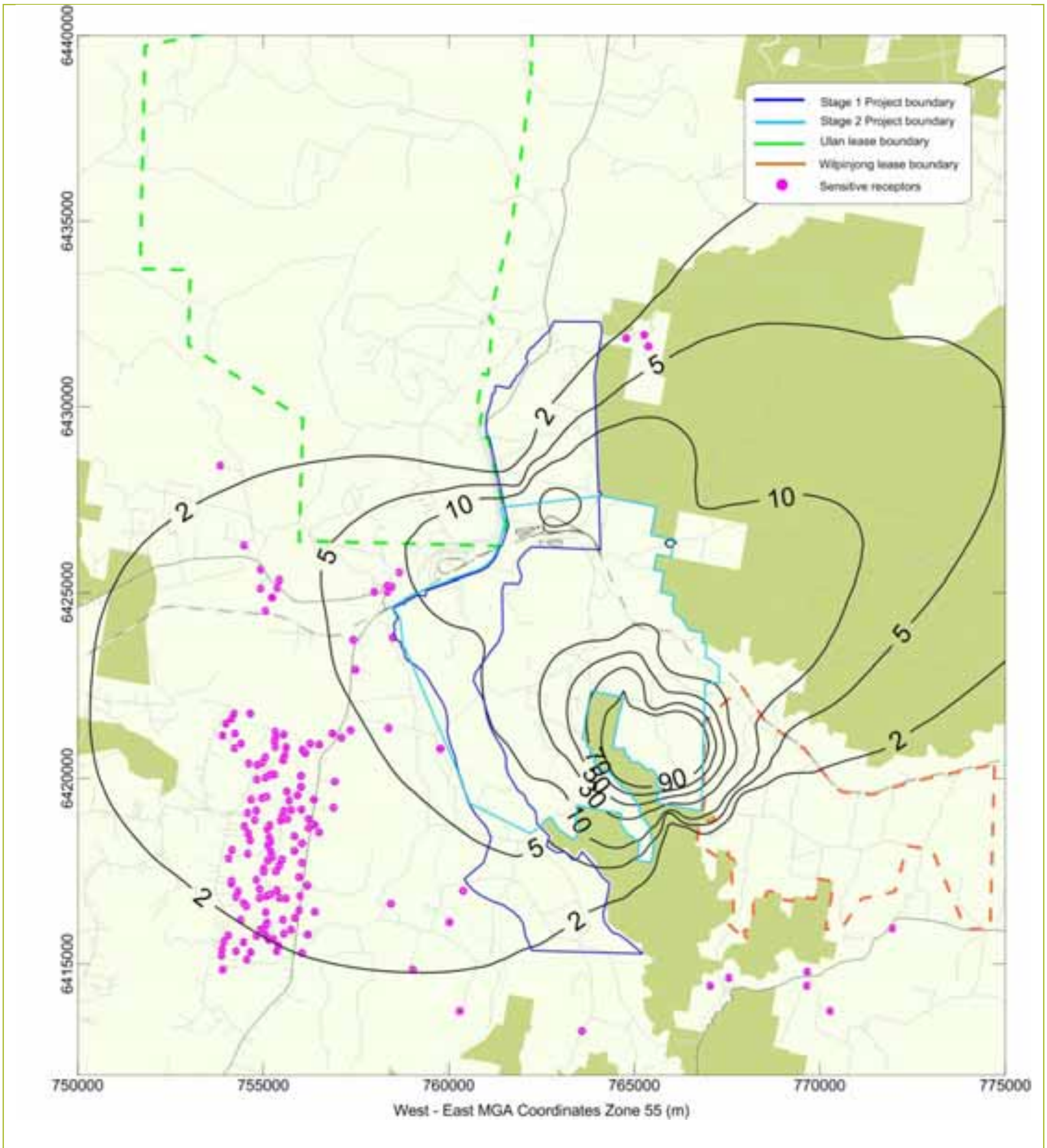
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 19 Conveyor Option Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.36: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 19 – Conveyor Option



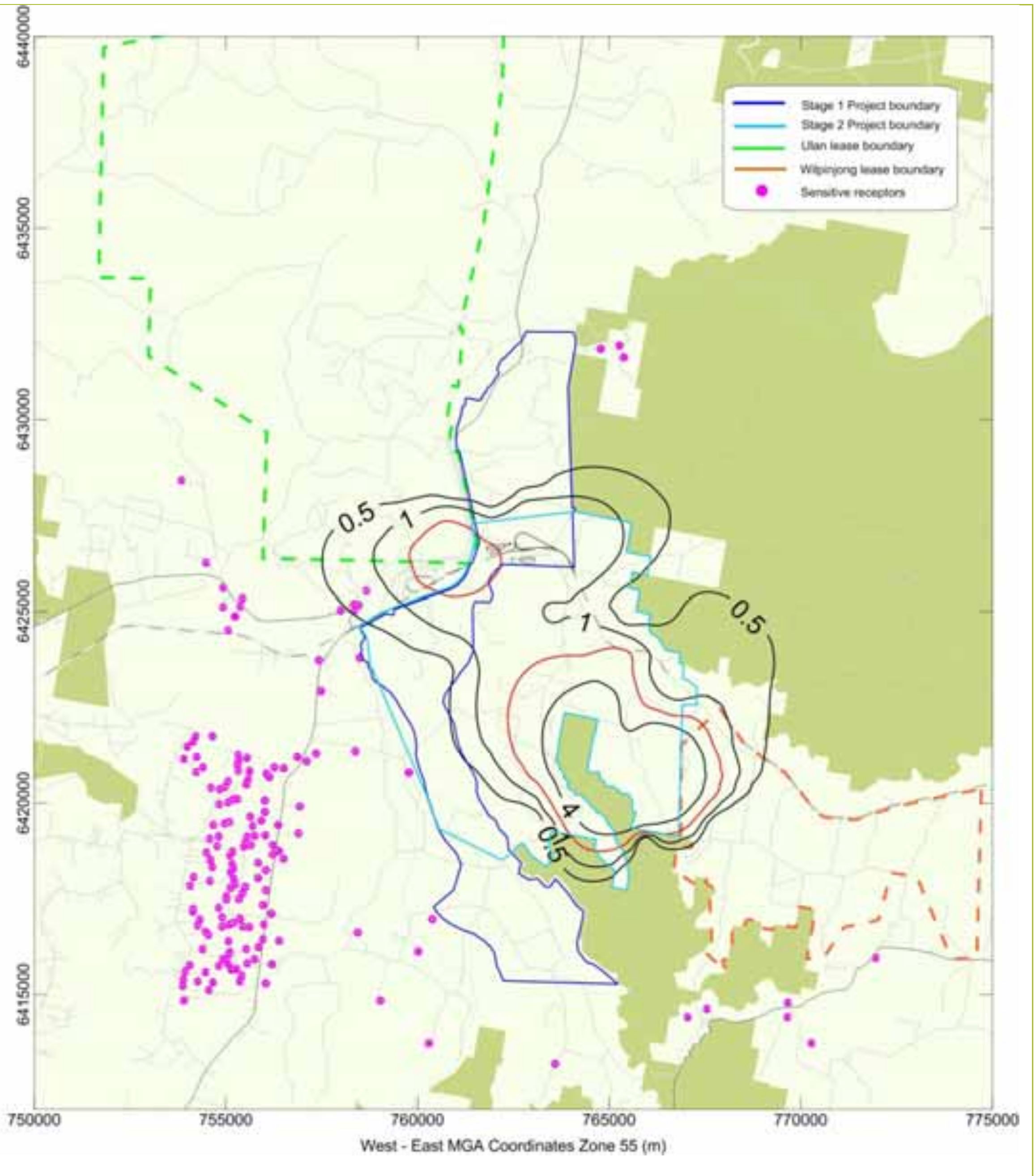
Species:	Location:	Scenario:	Percentile:	Averaging Time:
PM_{10}	Moolarben Coal Complex	Year 19 Conveyor Option Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.37: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 19 – Conveyor Option



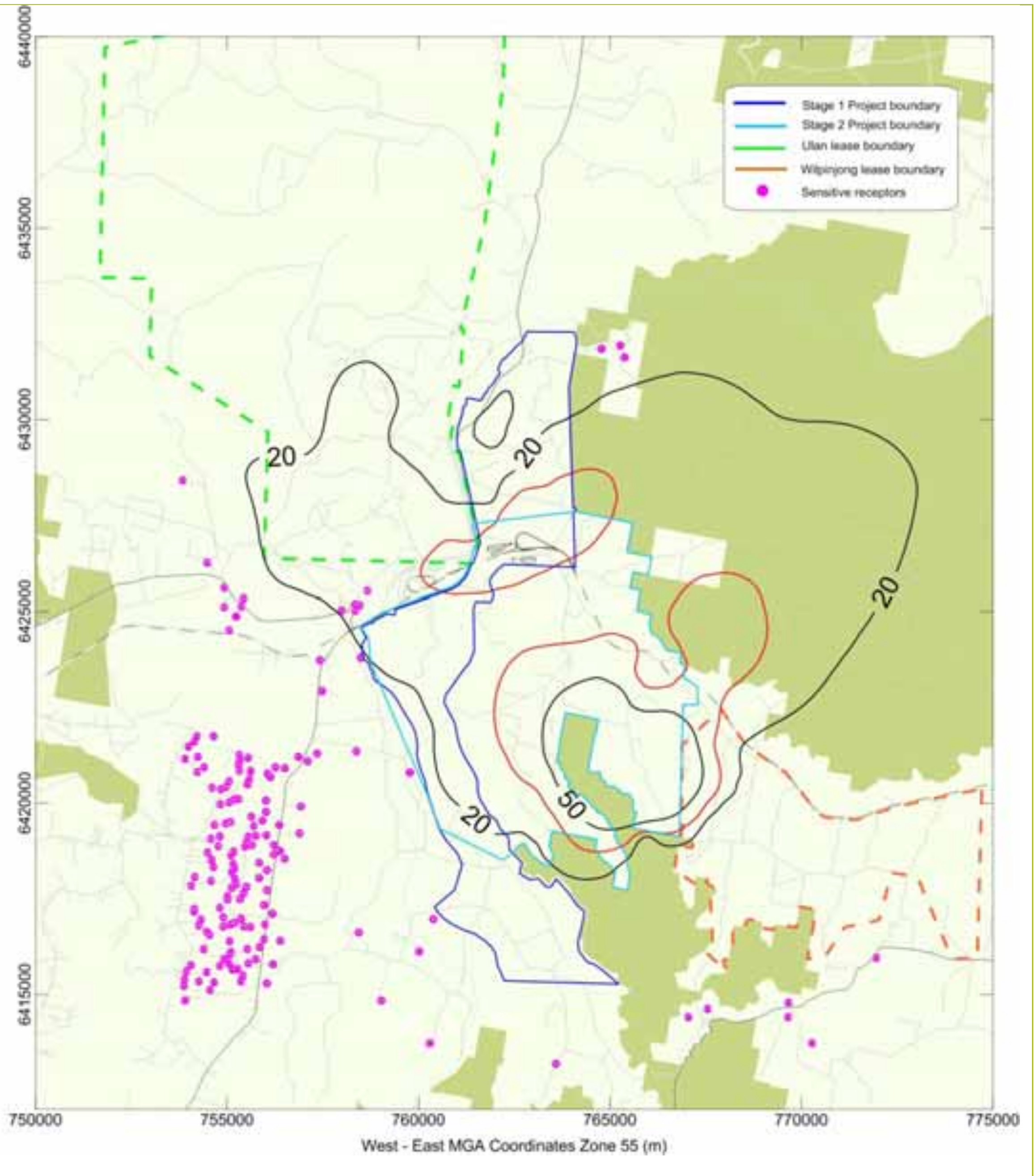
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 19 Conveyor Option Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.38: Predicted annual average TSP concentrations due to emissions from MCC in Year 19 – Conveyor Option



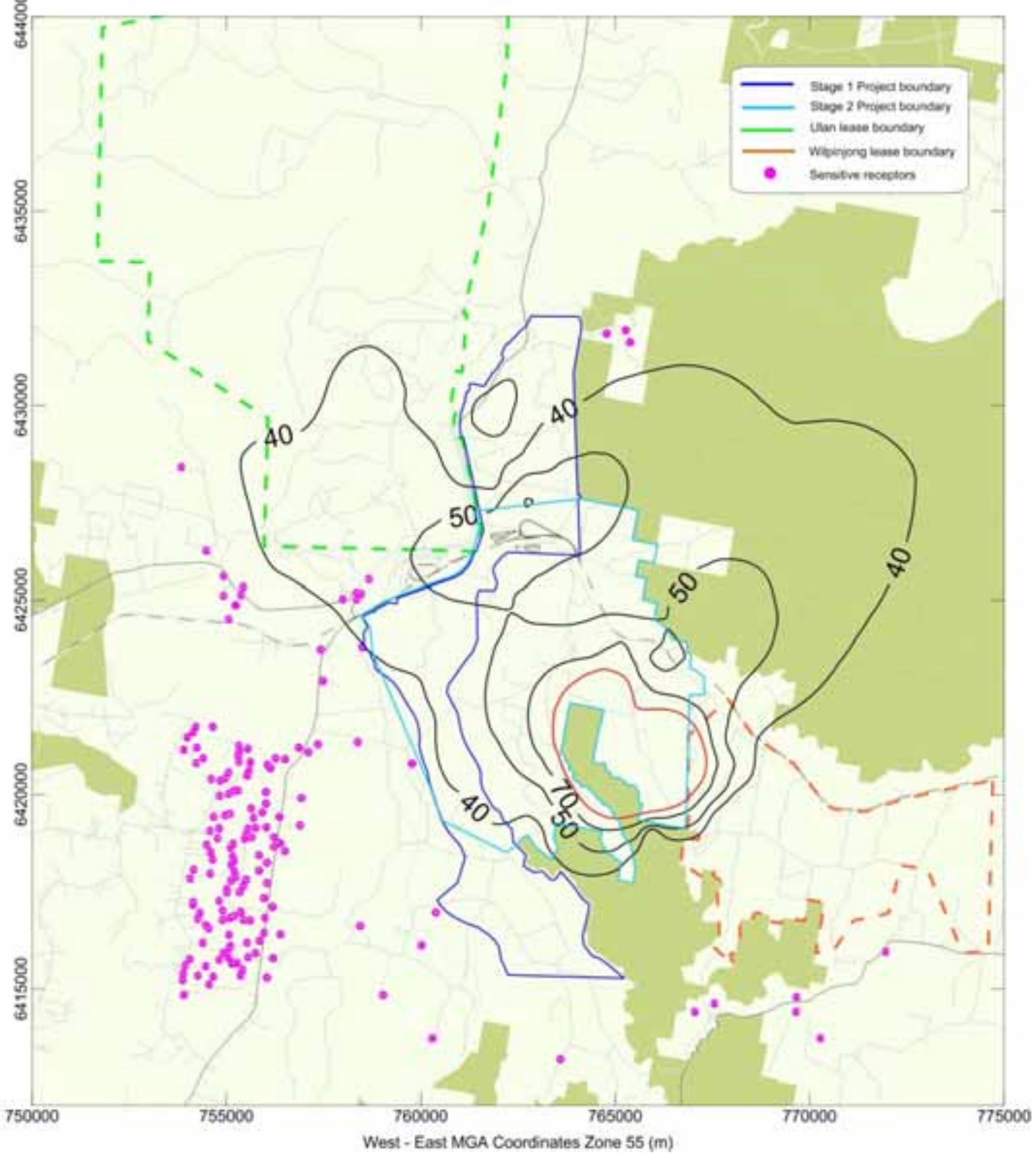
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 19 Conveyor Option Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW =2 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.39: Predicted annual average dust deposition levels due to emissions from MCC in Year 19 – Conveyor Option



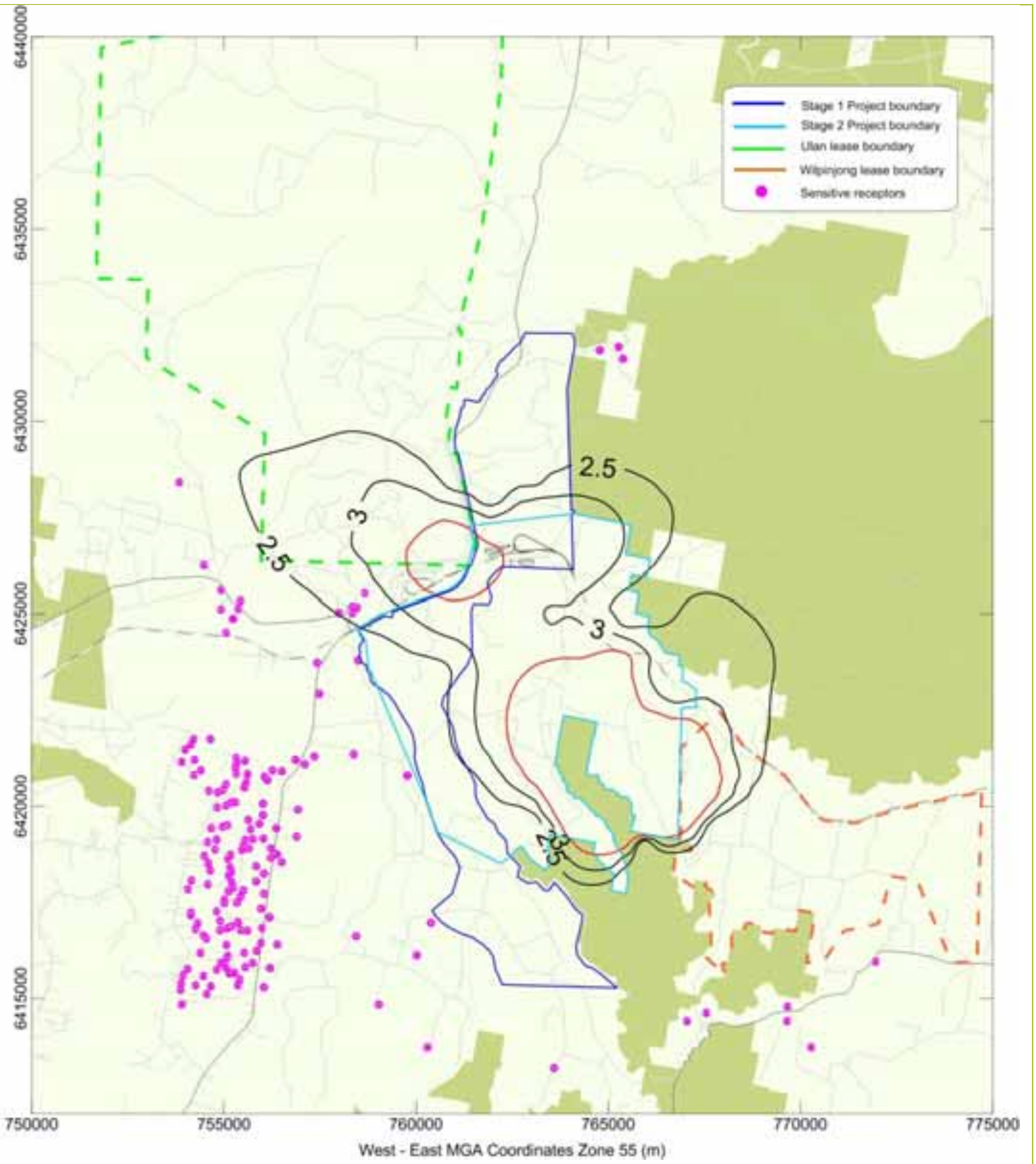
Species: PM$_{10}$	**Location:** Moolarben Coal Complex	**Scenario:** Year 19 Conveyor Option Cumulative	**Percentile:** Maximum	**Averaging Time:** Annual
Model Used: ISCMOD	**Units:** µg/m³	**Guideline:** DECCW = 30 µg/m³ (shown as a red line)	**Met Data:** 2007-2008	**Plot:** P. Henschke

Figure G.40: Predicted Annual average PM$_{10}$ concentrations due to emissions from MCC and other sources in Year 19 – Conveyor Option



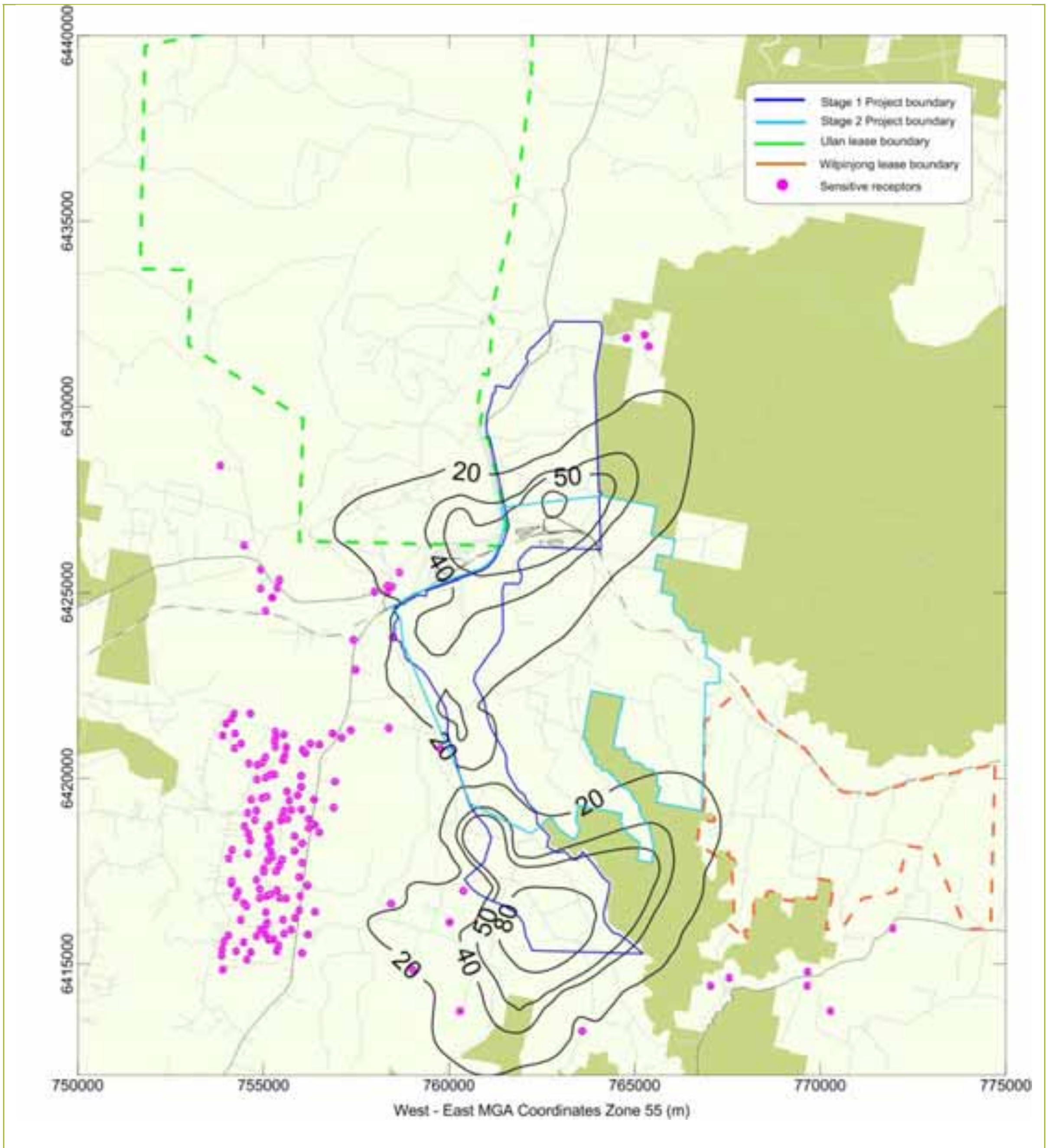
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 19 Conveyor Option Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.41: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 19 – Conveyor Option



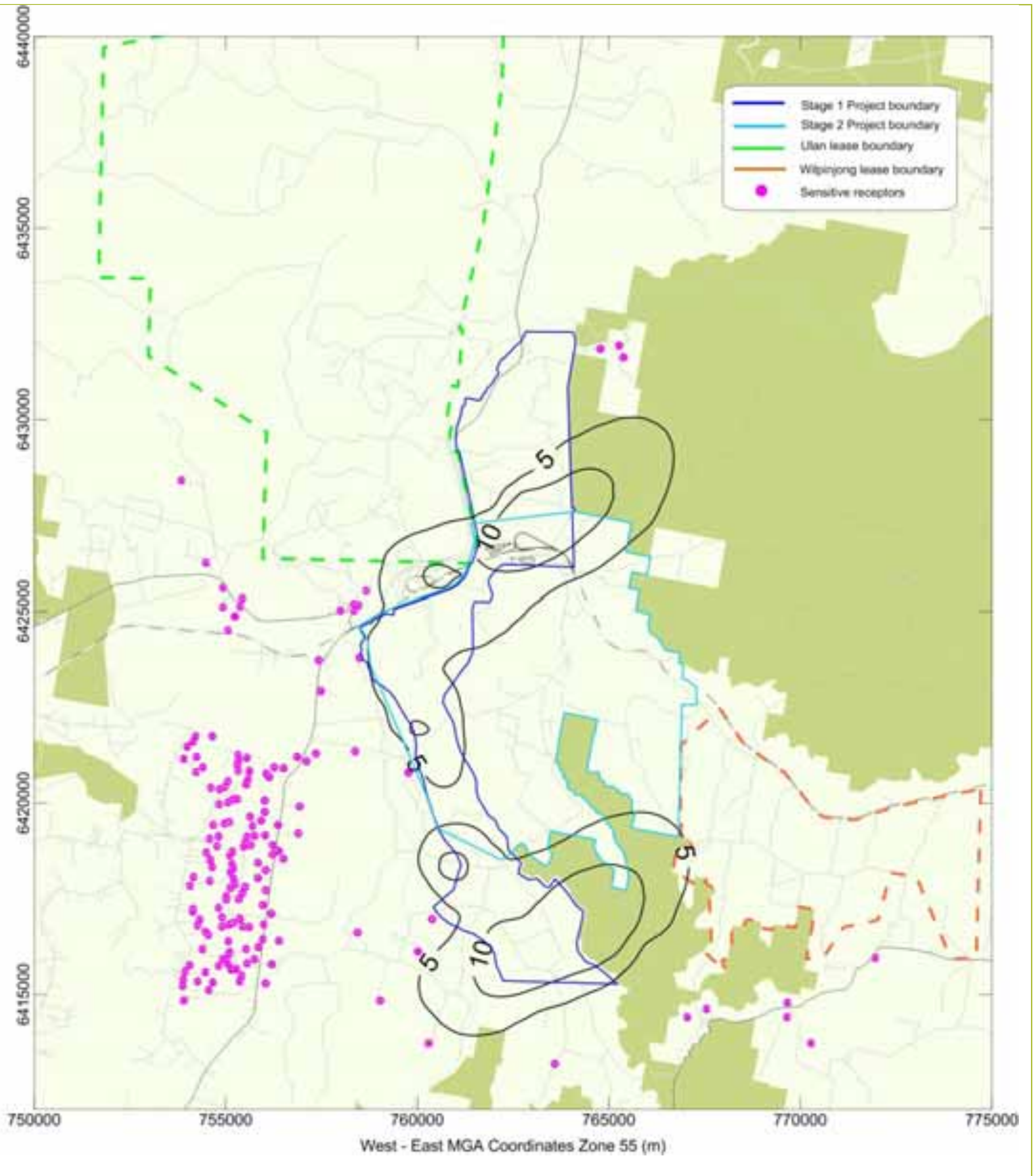
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 19 Conveyor Option Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	$g/m^2/month$	DECCW = 4 $g/m^2/month$ (shown as a red line)	2007-2008	P. Henschke

Figure G.42: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 19 – Conveyor Option



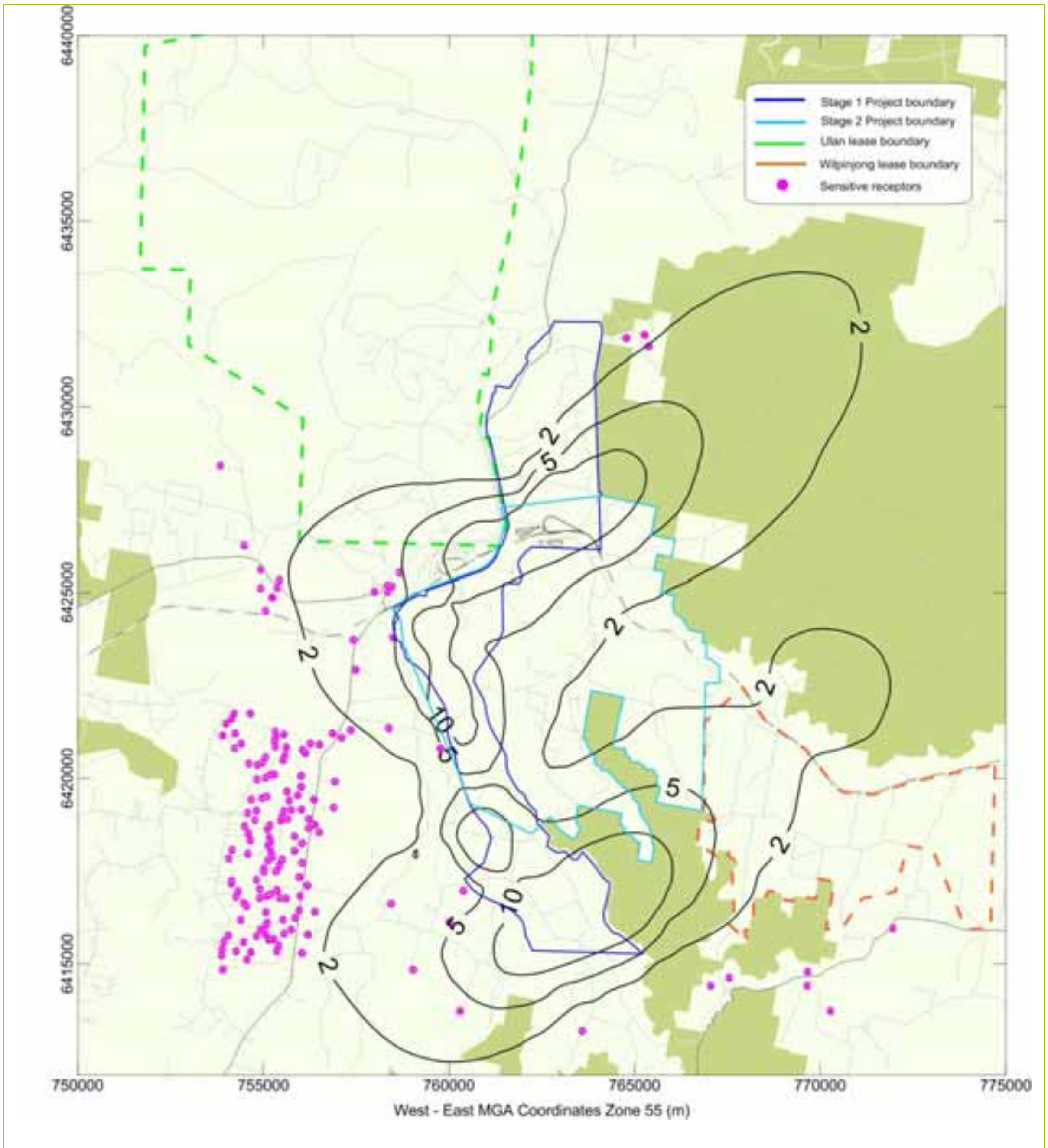
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 24 Project only	Maximum	24-hour
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.43: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from MCC in Year 24



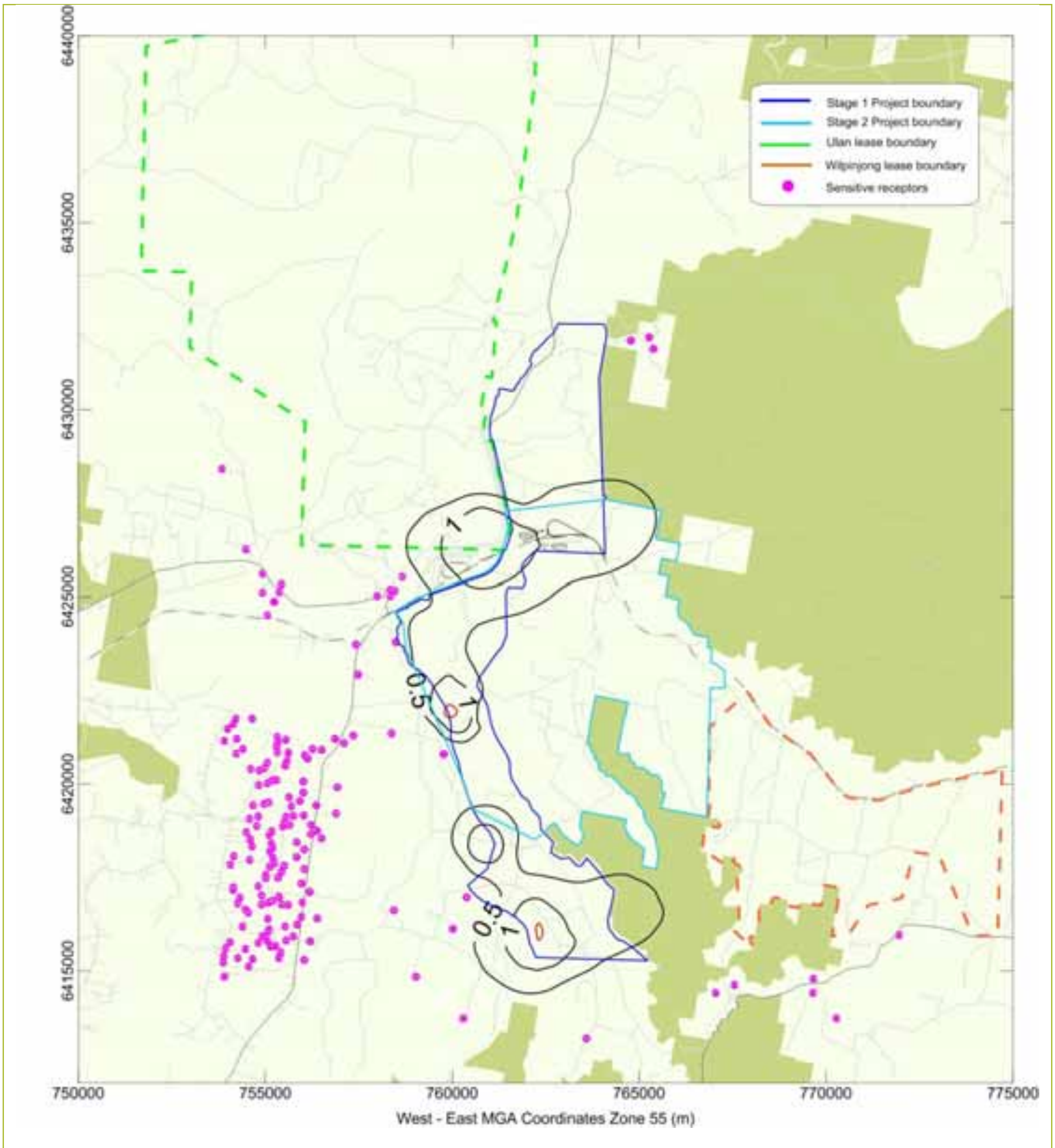
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
PM_{10}	Moolarben Coal Complex	Year 24 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.44: Predicted annual average PM_{10} concentrations due to emissions from MCC in Year 24



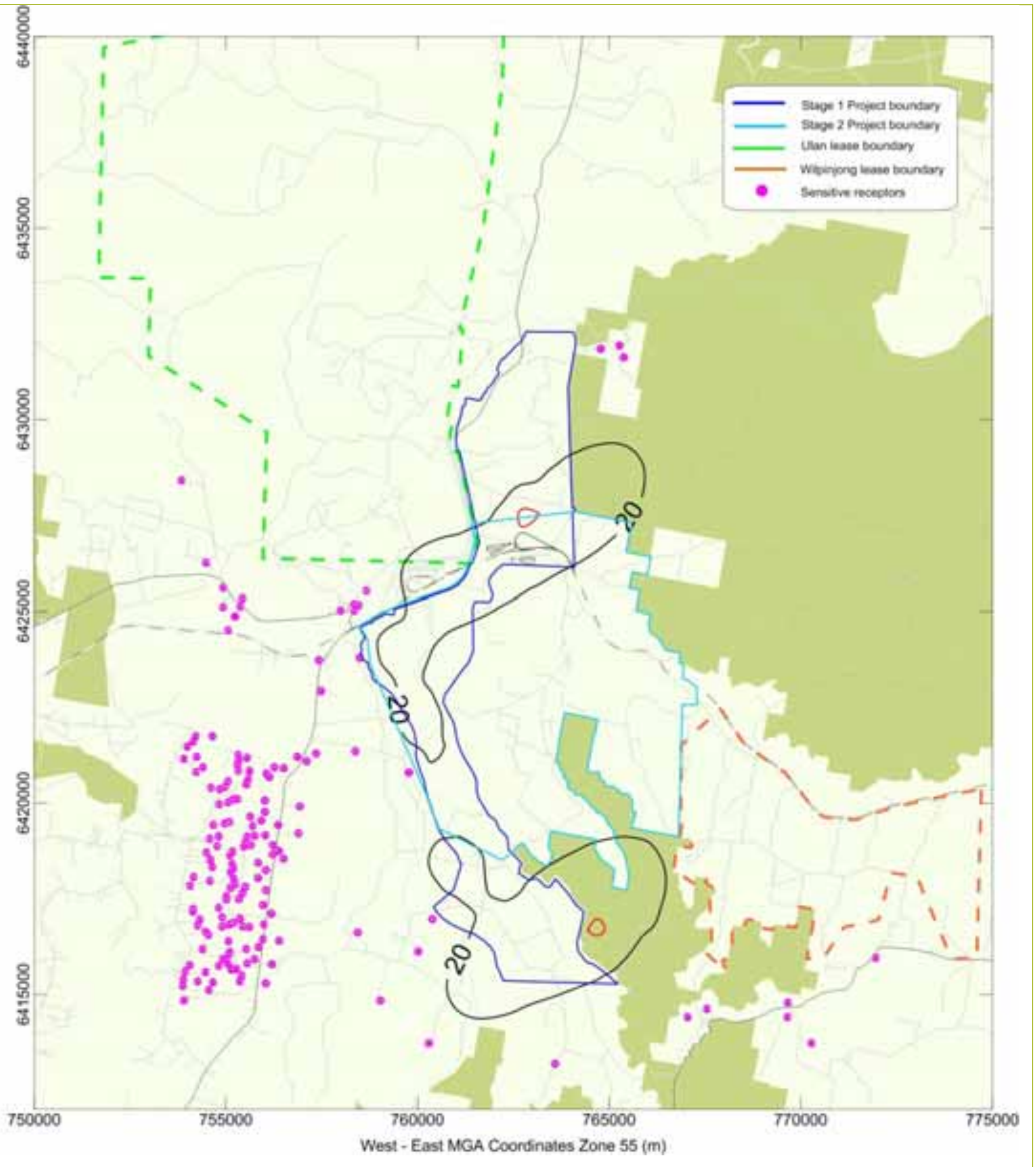
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 24 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	N/A	2007-2008	P. Henschke

Figure G.45: Predicted annual average TSP concentrations due to emissions from MCC in Year 24



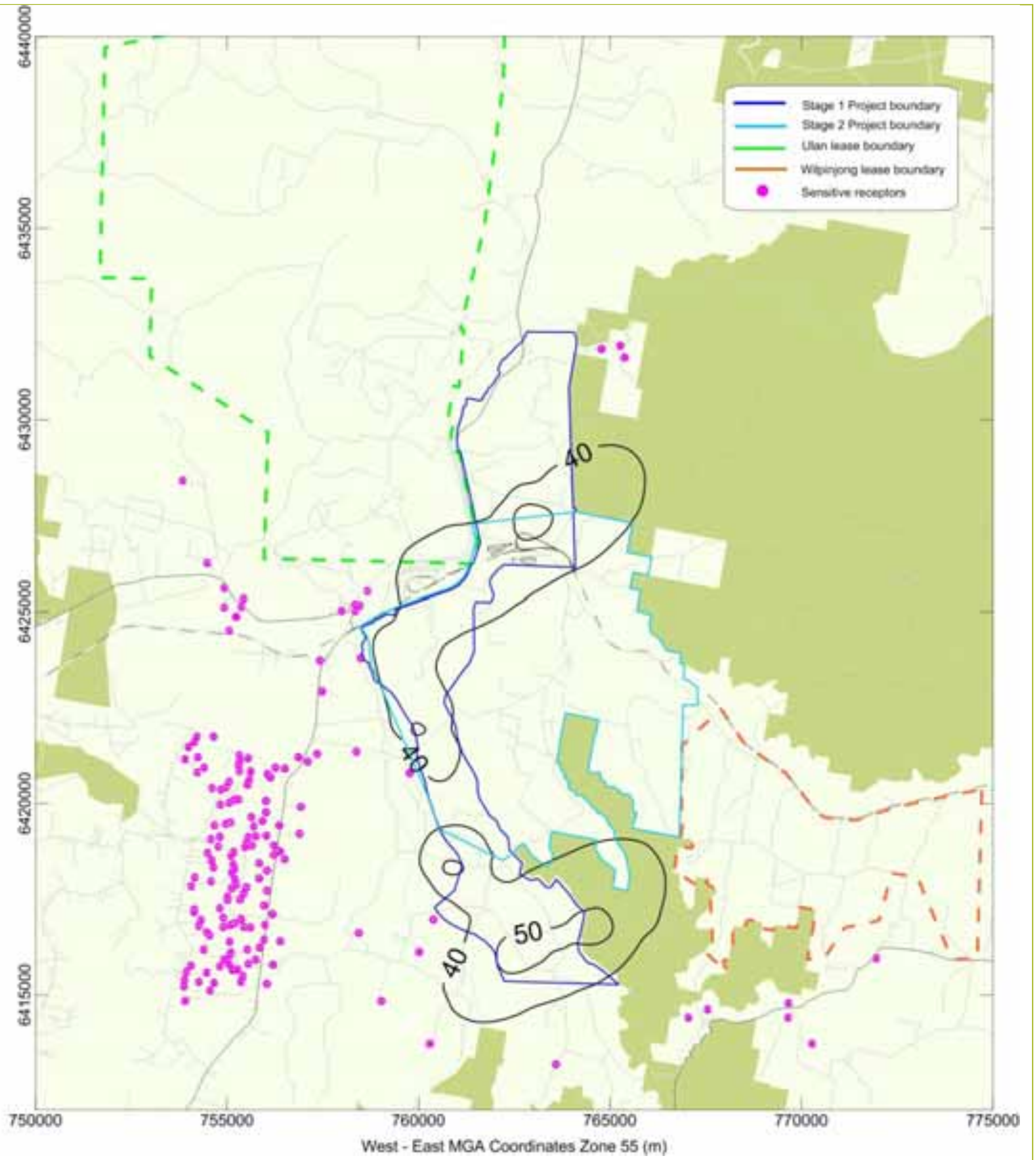
Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 24 Project only	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	g/m^2/month	DECCW =2 g/m^2/month (shown as a red line)	2007-2008	P. Henschke

Figure G.46: Predicted annual average dust deposition levels due to emissions from MCC in Year 24



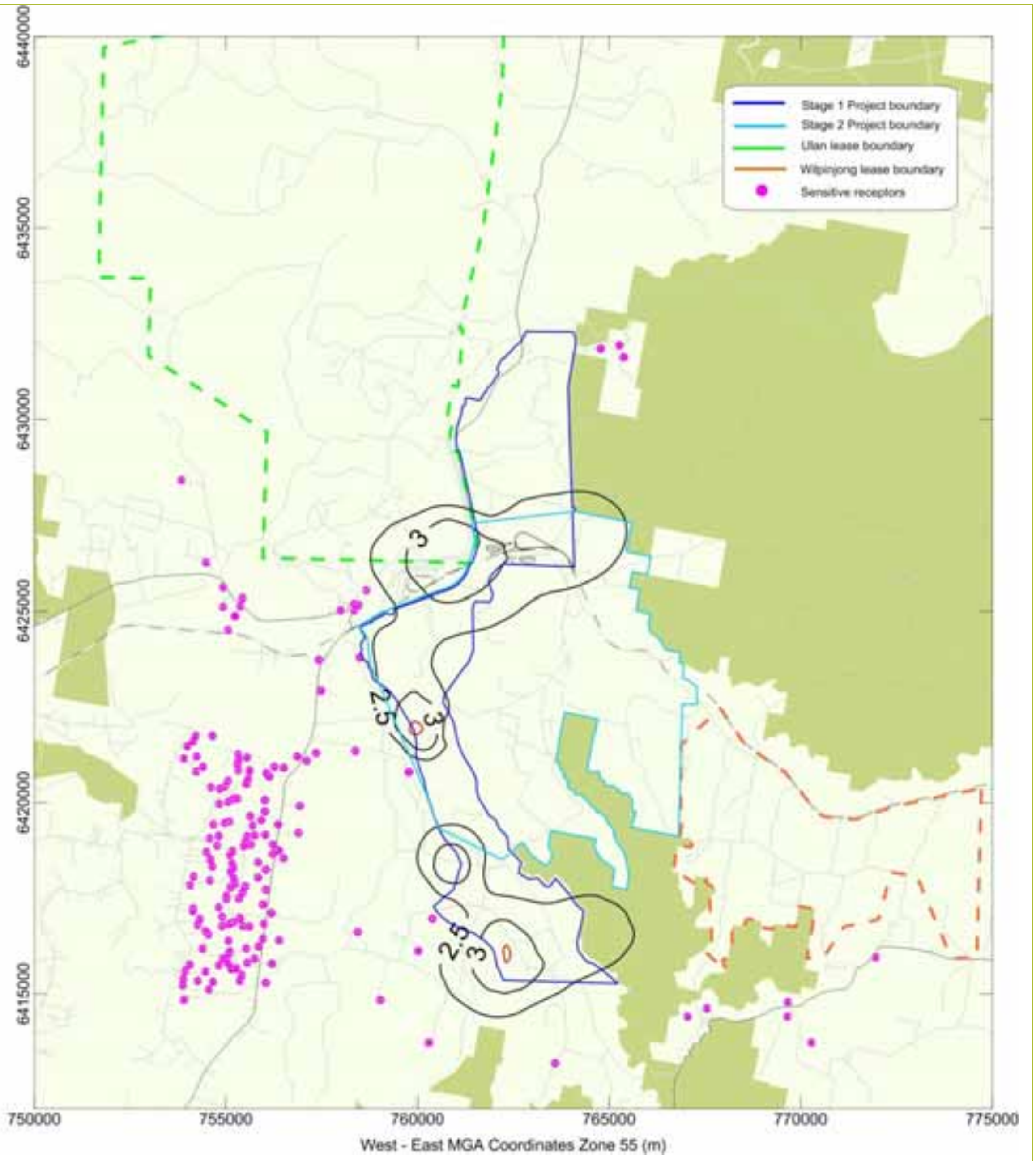
Species:	Location:	Scenario:	Percentile:	Averaging Time:
PM_{10}	Moolarben Coal Complex	Year 24 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 30 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.47: Predicted Annual average PM_{10} concentrations due to emissions from MCC and other sources in Year 24



Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
TSP	Moolarben Coal Complex	Year 24 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	µg/m³	DECCW = 90 µg/m³ (shown as a red line)	2007-2008	P. Henschke

Figure G.48: Predicted Annual average TSP concentrations due to emissions from MCC and other sources in Year 24



Species:	**Location:**	**Scenario:**	**Percentile:**	**Averaging Time:**
DD	Moolarben Coal Complex	Year 24 Cumulative	Maximum	Annual
Model Used:	**Units:**	**Guideline:**	**Met Data:**	**Plot:**
ISCMOD	$g/m^2/month$	DECCW = 4 $g/m^2/month$ (shown as a red line)	2007-2008	P. Henschke

Figure G.49: Predicted Annual average dust deposition concentrations due to emissions from MCC and other sources in Year 24