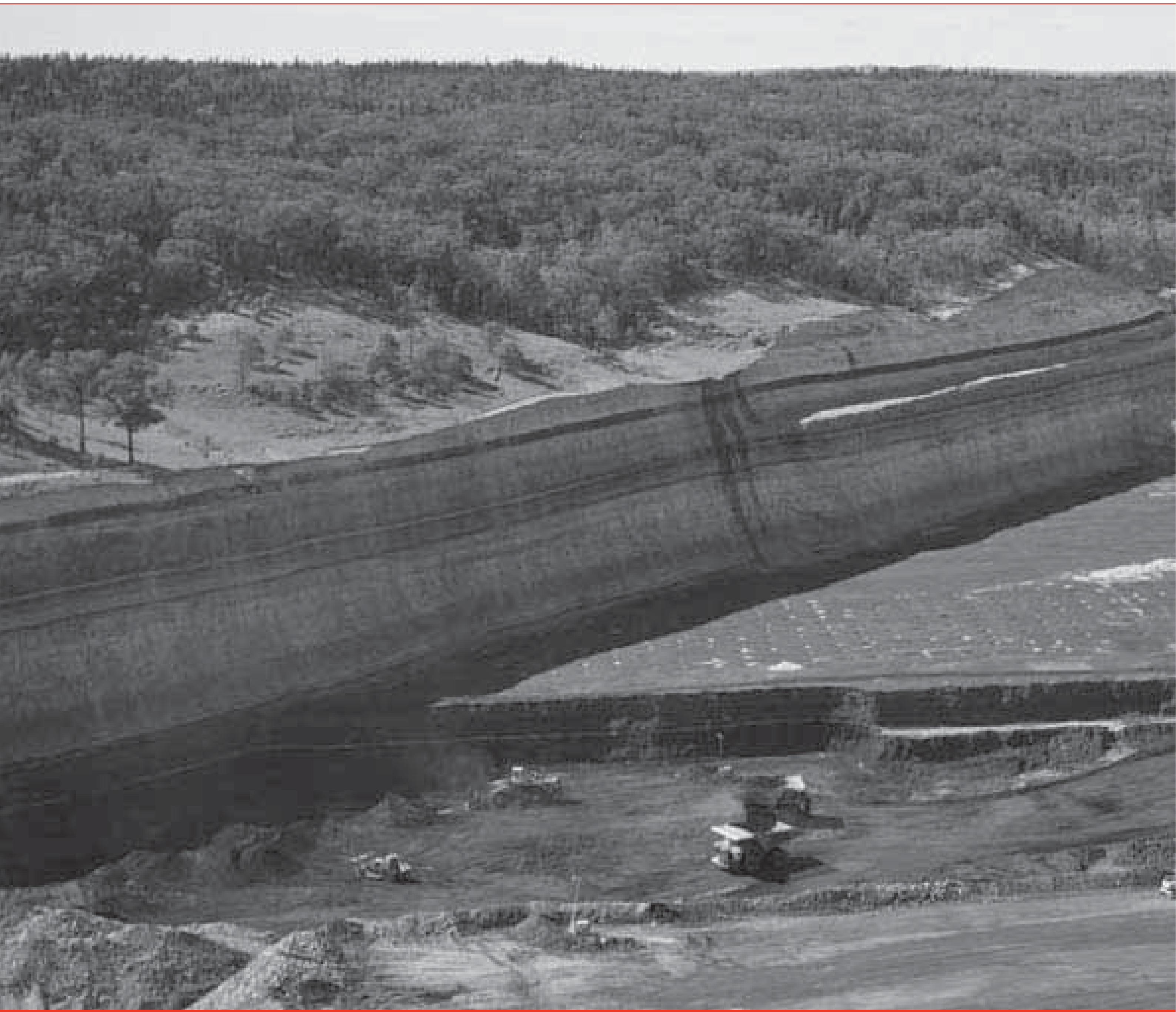
Appendix D

Air quality and greenhouse gas assessment

Moolarben Coal Project Stage 1 Optimisation Modification, Environmental Assessment – May 2013

MOOLARBENCOAL
PART OF THE YANCOAL AUSTRALIA GROUP

EMM
EMGA Mitchell McLennan



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MOOLARBEN COAL PROJECT

STAGE 1 OPTIMISATION MODIFICATION

AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

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Moolarben Coal Project

Stage 1 Optimisation Modification

Air Quality and Greenhouse Gas Assessment

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1 INTRODUCTION

Todoroski Air Sciences has been engaged by EMGA Mitchell McLennan Pty Limited on behalf of Moolarben Coal Operations Pty Limited (MCO) (hereafter referred to as the Proponent) to undertake an Air Quality Impact and Greenhouse Gas Assessment for the Moolarben Coal Project - Stage 1 Optimisation Modification (hereafter referred to as the proposed modification).

This report comprises of:

- a background to the project and description of the proposed operations;
- a review of the existing environment surrounding the project site;
- a description of the dispersion modelling approach used to assess potential impacts;
- the results of the dispersion modelling;
- a discussion of the potential air quality impacts as a result of the proposed modification;
- an estimation of the greenhouse gas emissions generated; and
- measures to avoid or mitigate potential air quality impacts

2 PROJECT BACKGROUND

The Moolarben Coal Project (MCP) Stage 1 Major Project Approval 05_0117 (MP 05_0117) was approved under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) in 2007. Since gaining approval, MP 05_0117 has been modified on seven occasions to make administrative changes, changes to infrastructure and allow the construction of a borefield. The main components of the MCP Stage 1, as modified, comprise:

- three open cut pits, referred to as Open Cuts 1, 2 and 3, which have an approved combined maximum extraction rate of 8 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal;
- one underground mine, referred to as Underground 4, which has an approved maximum extraction rate of 4Mtpa of ROM coal;
- coal handling, processing, rail loop, load-out and water management infrastructure; and
- associated facilities including offices, bathhouses, workshops and fuel storages.

To date, mining has occurred within Open Cut 1 only, commencing at the south-western perimeter and progressing in a north-easterly direction.

The current disturbance limit granted under MP 05_0117 is restricting the extraction of large quantities of the deposit which are economically viable in today's market. The proposed modification will extend the disturbance boundary enabling increased resource utilisation, a longer life for Open Cuts 1 and 2 and promote the continuity of Stage 1 operations. All of the elements of the proposed modification are listed in Section 2.1.

2.1 Overview of proposed modification

The elements of the proposed modification to MP 05_0117 comprise:

- the extension of mining within Open Cuts 1 and 2;
- the construction and operation of additional water management infrastructure; and

- a minor change to the rehabilitation sequencing and final landform.

The project approval period will be extended to accommodate the proposed modification.

No other changes are proposed in the modification: there will be no change to the maximum annual rate of coal production, mining methods, equipment, manning levels, coal handling and processing, external coal transport or operating hours.

The proposed modification elements are shown in **Figure 2-1**. They are all within the Stage 1 project approval boundary, which forms the "project area" for the proposed modification. Within the project area, Open Cut 1 and 2 extension areas are referred to collectively as the "proposed extension areas". It is noted that the proposed extension areas include a disturbance buffer of up to 50m that will enable the development of a services road and infrastructure if required, such as water pipelines. This ensures that all potential impacts associated with the proposed extension to mining have been assessed.

2.2 Relationship to other projects

A Major Project Application for Stage 2 of the MCP, MP 08_0135, is currently being assessed by the Department of Planning and Infrastructure (DP&I). If approved, Stage 2 will consist of one open cut pit, Open Cut 4, and two underground mines, Undergrounds 1 and 2, and associated additional infrastructure. This air quality impact and greenhouse gas assessment is based on the assumption that Stage 2 of the MCP will be approved, enabling potential worst case impacts to be assessed.

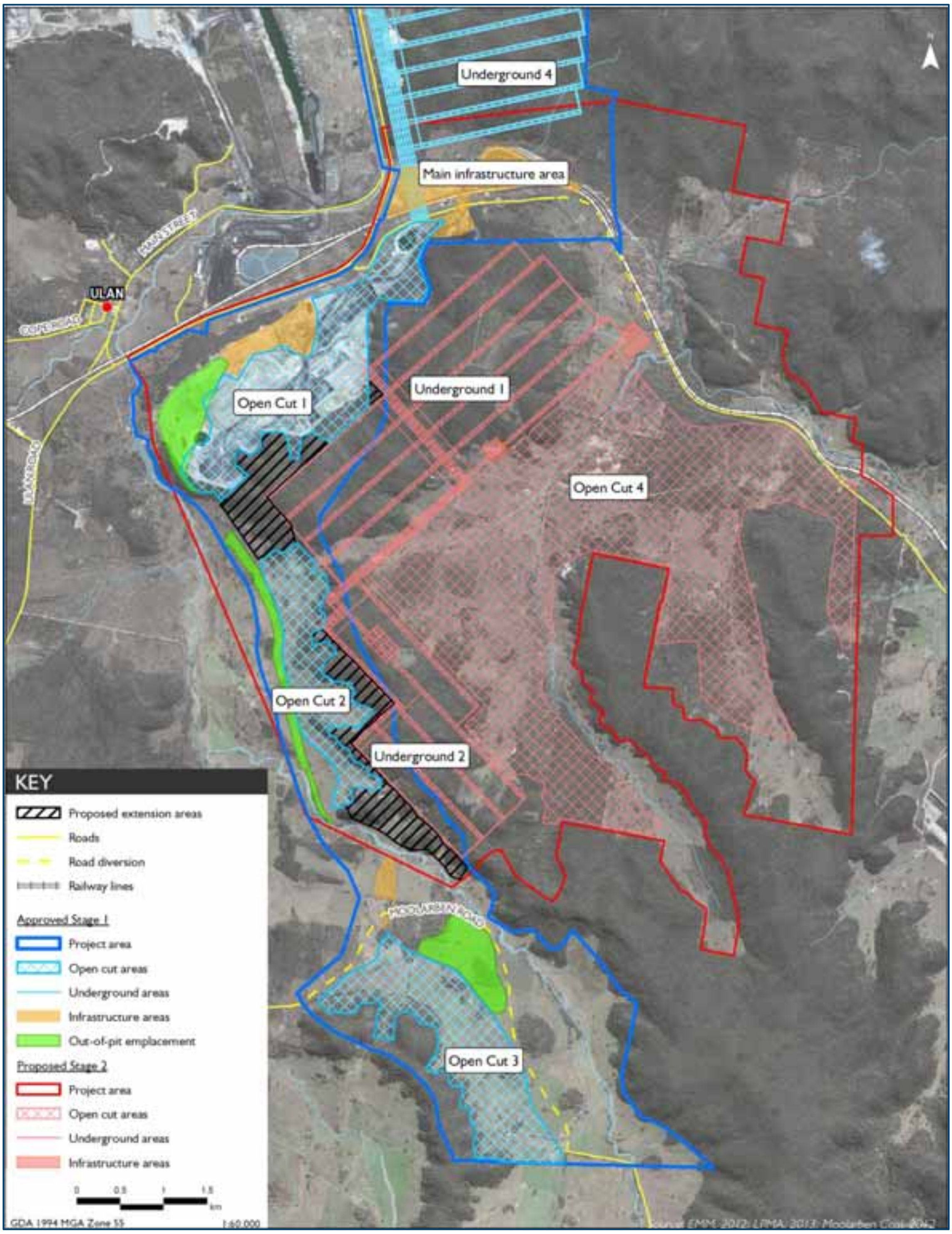

Figure 2-1: Project layout plan

3 LOCAL SETTING

The MCP is located at Moolarben in the Western Coalfields of NSW, approximately 40km north-east of Mudgee and approximately 25km east-northeast of Gulgong (see **Figure 3-1**). It is bordered by the Goulburn River to the north-west and privately owned grazing land to the north. To the east of MCP is the Goulburn River National Park, Wilpinjong Coal Mine and Munghorn Gap Nature Reserve. Privately-owned grazing land is located to the south and west, and Ulan settlement and Ulan Coal Mine also to the west.

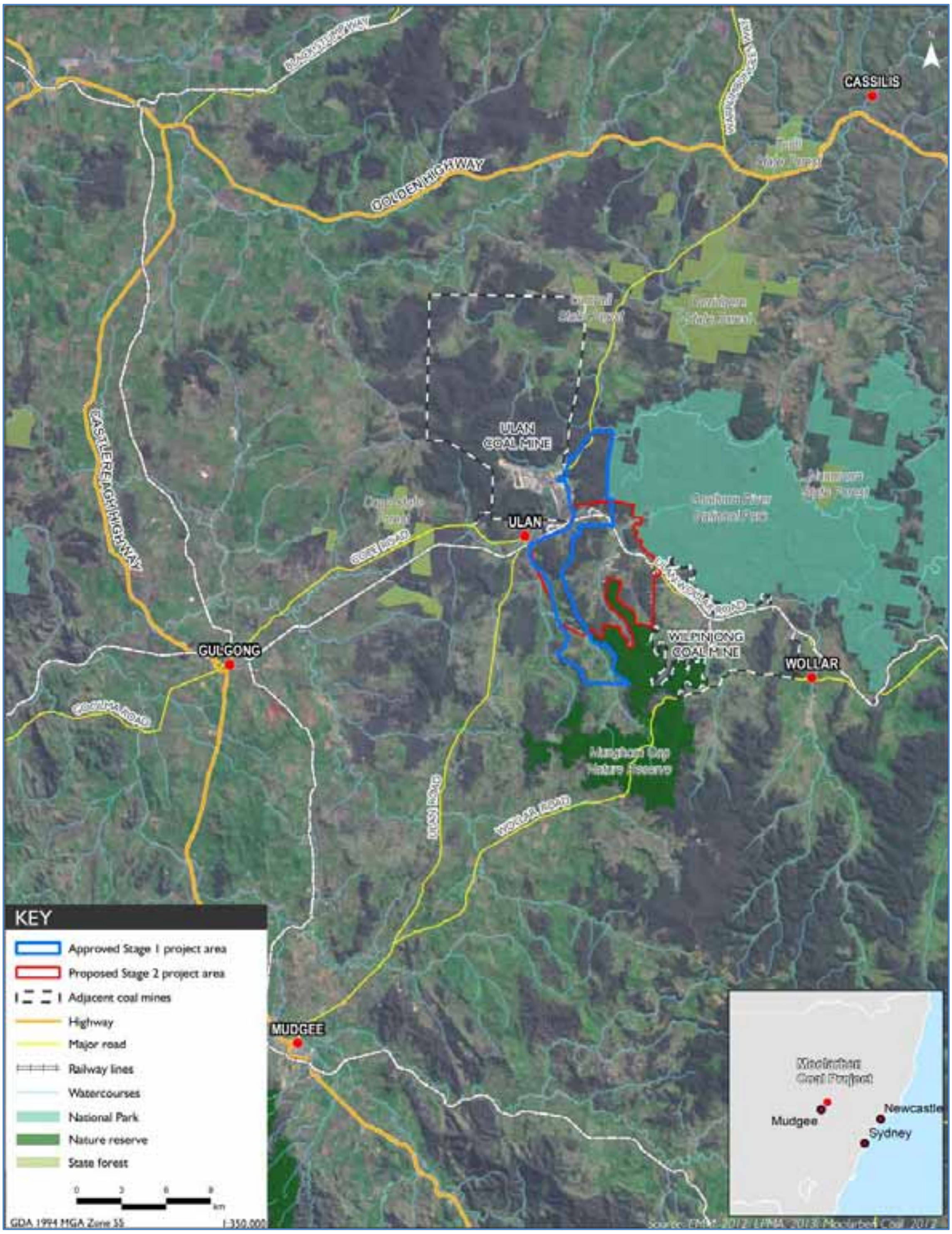

Figure 3-1: Proposed modification location

Figure 3-2 shows the locations of the sensitive receptors (including privately-owned and mine-owned receptors) of relevance to this assessment and other features surrounding the proposed modification site. **Appendix A** provides a detailed list of all the sensitive receptors assessed in this report.

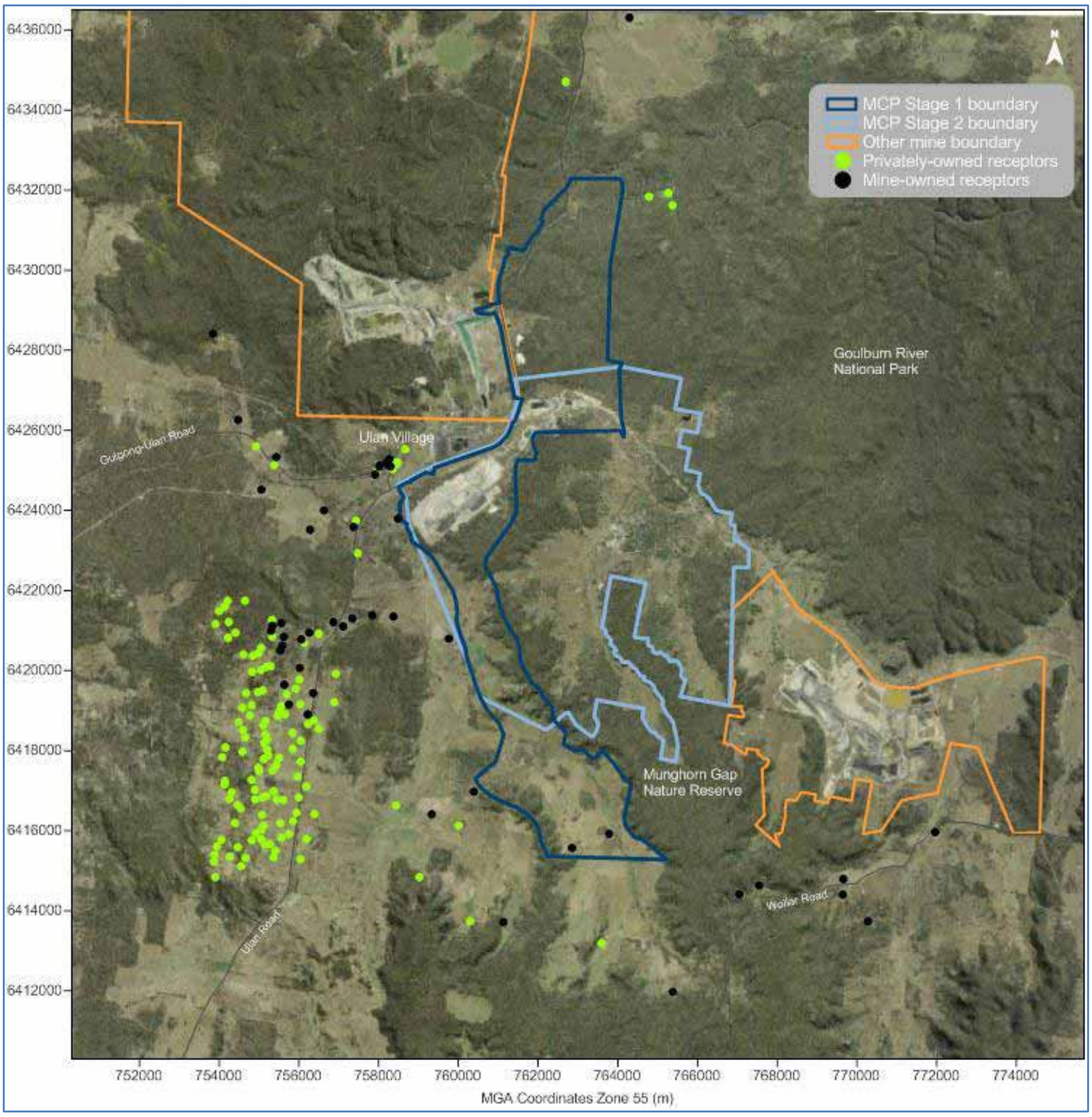

Figure 3-2: Sensitive receptors and other features surrounding the proposed modification site

Figure 3-3 presents a three-dimensional visualisation of the topography in the vicinity of the MCP prior to the commencement of mining operations. Complex hilly terrain with steep sided valleys and escarpments characterises the general topography of the area. The plateaus and step sided narrow valleys that characterise much of the surrounding terrain would affect the wind distribution patterns for the area.

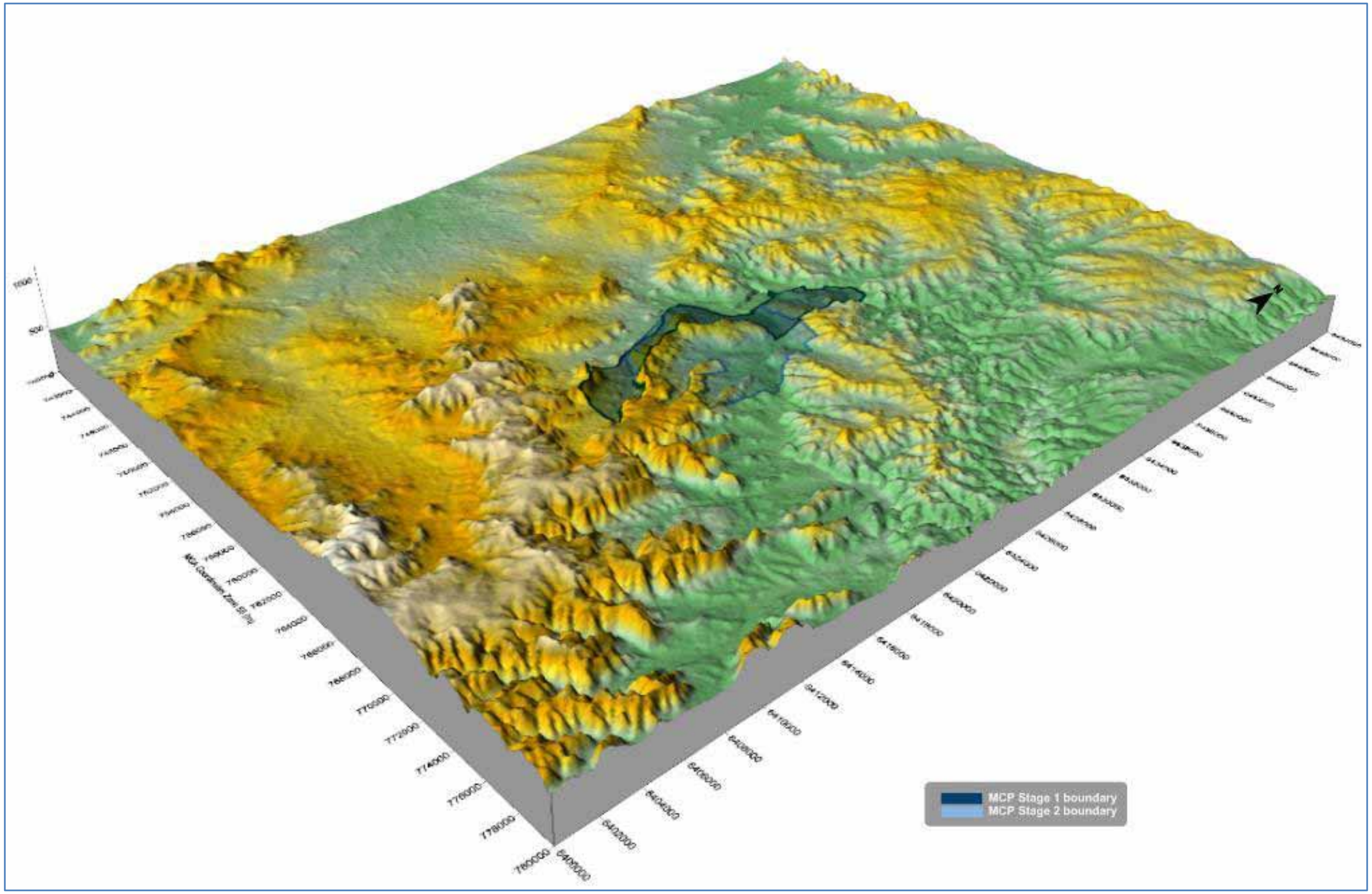

Figure 3-3: Topography surrounding the MCO location

4 AIR QUALITY ASSESSMENT CRITERIA

4.1 Preamble

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The sections below identify the potential air emissions generated by the proposed modification and the applicable air quality criteria.

4.2 Particulate matter

Particulate matter refers to particles of varying size and composition. The air quality goals relevant to this assessment refer to three classes of particulate matter based on the sizes of the particles. The first class is referred to as Total Suspended Particulate matter (TSP) which measures the total mass of all particles suspended in air. The upper size range for TSP is nominally taken to be 30 micrometres (µm) as in practice, particles larger than 30 to 50µm settle out of the atmosphere too quickly to be regarded as air pollutants.

The TSP is defined further into two sub-classes. They are PM_{10} particles, particulate matter with aerodynamic diameters of 10µm or less, and $PM_{2.5}$, particulate matter with aerodynamic diameters of 2.5µm or less.

Mining activities generate particles in all the above size categories. The great majority of the particles generated are due to the abrasion or crushing of rock and coal and general disturbance of dusty material. These particulate emissions will be generally larger than 2.5µm as these fine sub-2.5µm particles are usually generated through combustion processes or as secondary particles formed from chemical reactions rather than through mechanical processes that dominate emissions on mine sites.

Combustion particulates can be more harmful to human health as the particles have the ability to penetrate deep into the human respiratory system as they are small and can be comprised of acidic and carcinogenic substances.

A study of the distribution of particle sizes near mining dust sources in 1986 conducted by the State Pollution Control Commission (SPCC) found that the average of approximately 120 samples showed $PM_{2.5}$ comprised 4.7% of the TSP, and PM_{10} comprised 39.1% of the TSP in the samples (**SPCC, 1986**). The emissions of $PM_{2.5}$ occurring from mining activities are small in comparison to the total dust emissions and in practice, the concentrations of $PM_{2.5}$ in the vicinity of mining dust sources are likely to be low.

4.2.1 NSW Environment Protection Authority impact assessment criteria

Table 4-1 summarises the air quality goals that are relevant to this study as outlined in the New South Wales Environment Protection Authority (NSW EPA) document "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (**NSW DEC, 2005**). The air quality goals for total impact relate to the total dust burden in the air and not just the dust from the proposed modification. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 4-1: NSW EPA air quality impact assessment criteria

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	90µg/m³
PM_{10}	Annual	Total	30µg/m³
	24 hour	Total	50µg/m³

Deposited dust	Annual	Incremental	$2 g/m^2/month$
		Total	$4 g/m^2/month$

Source: **NSW DEC, 2005**

The criterion for 24-hour average PM_{10} originates from the National Environment Protection Measure (NEPM) goals (**NEPC, 1988**). These goals apply to the population as a whole, and are not recommended to be applied to "hot spots" such as locations near industry, busy roads or mining. However, in the absence of alternative measures, NSW EPA does apply the criteria to assess the potential for impacts to arise at such locations.

The NEPM permits five days annually above the 24-hour average PM_{10} criterion to allow for bush fires and similar events. Similarly, it is normally the case that on days where ambient dust levels are affected by such events they are excluded from assessment as per the NSW EPA criterion.

4.2.2 Department of Planning and Infrastructure acquisition criterion for particulate matter

While the NSW EPA applies the maximum 24-hour average PM_{10} level in any year to assess the potential for impacts from a project, the Department of Planning and Infrastructure (DP&I) in contemporary planning approvals have invoked requirements for acquisition and negotiated agreements if there are systemic exceedances of the NSW EPA criterion. In the context of impact assessments for approval of new projects and modifications to existing projects, this is interpreted to mean where the NSW EPA criterion is exceeded on more than five days in any year (a 98.6 percentile level of compliance). This DP&I criterion and other relevant criteria are outlined in **Table 4-2**.

Table 4-2: DP&I acquisition criteria for particulate matter

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	$90 \mu g/m^3$
PM_{10}	Annual	Total	$30 \mu g/m^3$
	24 hours	Incremental	$50 \mu g/m^3$
Deposited dust	Annual	Incremental	$2 g/m^2/month$
		Total	$4 g/m^2/month$

4.2.3 $PM_{2.5}$ concentrations

The NSW EPA currently does not have impact assessment criteria for $PM_{2.5}$ concentrations; however the National Environment Protection Council (NEPC) has released a variation to the NEPM (**NEPC, 2003**) to include advisory reporting standards for $PM_{2.5}$ (see **Table 4-3**).

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 $8 \mu g/m^3$, and as with the NEPM goals, apply to the average, or general exposure of a population, rather than to "hot spot" locations.

Predictions have been made as to the likely contribution that emissions from the proposed modification would make to ambient $PM_{2.5}$ concentrations and are presented in **Section 10** of this assessment.

Table 4-3: Advisory standard for $PM_{2.5}$ concentrations

Pollutant	Averaging Period	Criterion
$PM_{2.5}$	24 hours	$25 \mu g/m^3$
	Annual	$8 \mu g/m^3$

Source: **NEPC, 2003**

4.3 Other air pollutants

Emissions of other air pollutants will also potentially arise from mining operations with the source of these emissions generated from sources such as the diesel powered equipment used on-site. Emissions from diesel powered equipment generally include carbon monoxide (CO), nitrogen dioxide (NO_2) and other pollutants, such as sulphur dioxide (SO_2).

CO is colourless, odourless and tasteless and is generated from the incomplete combustion of fuels when carbon molecules are only partially oxidised. It can reduce the capacity of blood to transport oxygen in humans resulting in symptoms of headache, nausea and fatigue.

NO_2 is reddish-brown in colour (at high concentrations) with a characteristic odour and can irritate the lungs and lower resistance to respiratory infections such as influenza. NO_2 belongs to a family of reactive gases called nitrogen oxides (NOx). These gases form when fuel is burned at high temperatures, mainly from motor vehicles, power generators and industrial boilers (**USEPA 2011**). NO_x may also be generated by blasting activities. It is important to note that when formed, NO_2 is generally a small fraction of the total NO_x generated.

Sulphur dioxide (SO_2) is a colourless, toxic gas with a pungent and irritating smell. It commonly arises in industrial emissions due to the sulphur content of the fuel. SO_2 can have impacts upon human health and the habitability of the environment for flora and fauna. SO_2 emissions are a precursor to acid rain, which can be an issue in the northern hemisphere; however it is not known to have any widespread impact in NSW, and is generally only associated with large industrial activities. Due to its potential to impact on human health, sulphur is actively removed from fuel to prevent the release and formation of SO_2. The sulphur content of Australian diesel is controlled to a low level by national fuel standards and as such the emissions of SO_2 generated from diesel powered equipment at mine sites are generally considered to be too low.

Emissions of the pollutants generated from the exhaust emissions of diesel powered equipment and from blasting activities are considered to be too small, too infrequent or too widely distributed to generate any significant off-site pollutant concentrations. This is supported by monitoring data from other mines and previous Todoroski Air Sciences modelling assessments for coal mines which did not find any tangible level of impact. As such these pollutants have not been assessed further in this study.

5 EXISITING ENVIRONMENT

This section describes the existing climate and air quality in the area surrounding the proposed modification.

5.1 Local climate

Long-term climatic data from the closest Bureau of Meteorology weather station at Gulgong Post Office (Site No. 062013) were analysed to characterise the local climate in the proximity of the proposed modification. The Gulgong Post Office station is located approximately 20km west-southwest of the proposed modification.

Table 5-1 and **Figure 5-1** present a summary of data from the Gulgong Post Office weather station collected over an approximate 38-year period.

The data indicate that January is the hottest month with a mean maximum temperature of 30.9ºC and July as the coldest month with a mean minimum temperature of 2.6ºC.

Humidity levels exhibit variability over the day and seasonal fluctuations. Mean 9am humidity levels range from 61% in October to 84% in June and July. Mean 3pm humidity levels vary from 36% in December to 57% in June.

Rainfall peaks during the summer months and declines during winter. The data show January is the wettest month with an average rainfall of 70.5mm over 5.9 days and April is the driest month with an average rainfall of 44.2mm over 4.6 days.

During the colder months mean wind speeds are lower; however there is a greater relative difference between the 9am and 3pm wind speed conditions compared with the warmer months. The mean 9am wind speeds range from 4.4km/h in June to 9.1km/h in October and November. The mean 3pm wind speeds vary from 7.8km/h in April to 11.7km/h in August.

Table 5-1: Monthly climate statistics summary - Gulgong Post Office

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature												
Mean max. temperature (ºC)	30.9	29.7	27.3	23.4	19.1	15.4	14.7	16.5	19.6	23.4	26.6	29.6
Mean min. temperature (ºC)	16.7	16.3	13.7	9.8	6.3	3.6	2.6	3.4	6.1	9.3	12.3	14.8
Rainfall												
Rainfall (mm)	70.5	62.5	54.8	44.2	45.4	50.5	49.3	46.5	46.8	56.2	60.1	67.5
Mean No. of rain days (≥1mm)	5.9	5.5	5.2	4.6	5.7	7.2	7.6	6.9	6.7	6.7	6.3	6.3
9am conditions												
Mean temperature (ºC)	21.7	20.6	18.9	15.8	11.3	7.7	6.7	8.5	12.6	16.5	18.3	20.8
Mean relative humidity (%)	64	71	71	70	79	84	84	76	70	61	63	62
Mean wind speed (km/h)	8.2	6.7	6.2	5.9	5.0	4.4	4.9	6.1	7.7	9.1	9.1	8.9
3pm conditions												
Mean temperature (ºC)	29.5	28.4	26.2	22.3	18.0	14.3	13.5	15.3	18.5	22.1	25.1	28.2
Mean relative humidity (%)	37	42	41	42	49	57	54	46	44	40	39	36
Mean wind speed (km/h)	9.6	8.5	7.9	7.8	9.0	8.8	9.9	11.7	11.4	11.5	11.4	11.2

Source: **Bureau of Meteorology, 2013**

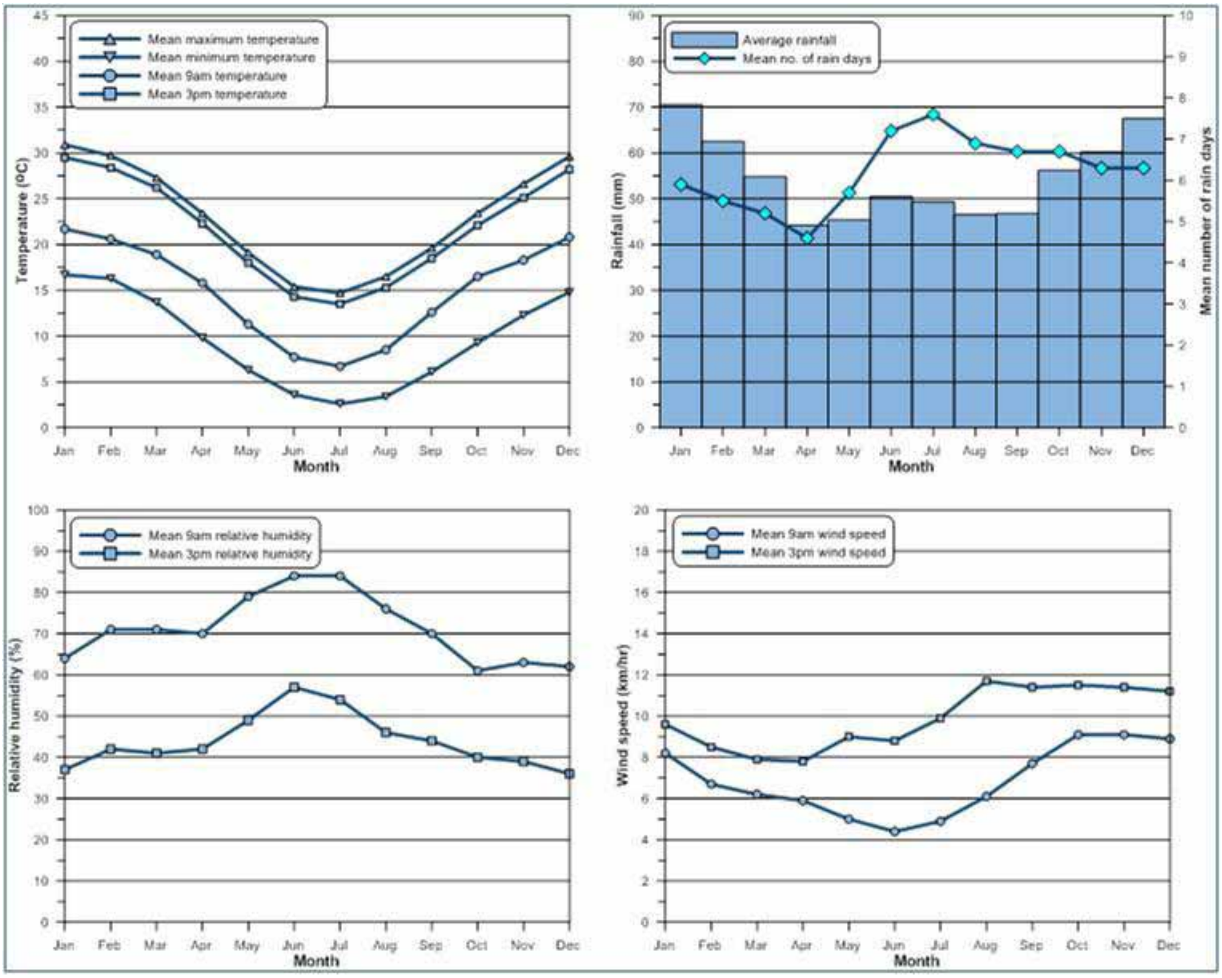

Figure 5-1: Monthly climate statistics summary - Gulgong Post Office

5.2 Local meteorological conditions

The climate in the vicinity of the project area is typical of temperate regions and is characterised by hot dry summers with some thunderstorms, and cold winters with frequent frosts. In accordance with Schedule 3, Condition 25 of MP 05_0117, MCO currently has two meteorological monitoring stations. One is located adjacent to MCO's administration office in the northern section of the project area and the other station is to the west of the project area. The latter is newly constructed and replaced a station that was found approximately 2km to the south-west of the proposed Open Cut 2 extension area, at the Property ID 60 (referred to as the Rayner weather station). Data from the no longer operational station were used in this EA (refer to **Section 8**). The location of these stations is shown in **Figure 5-2**.

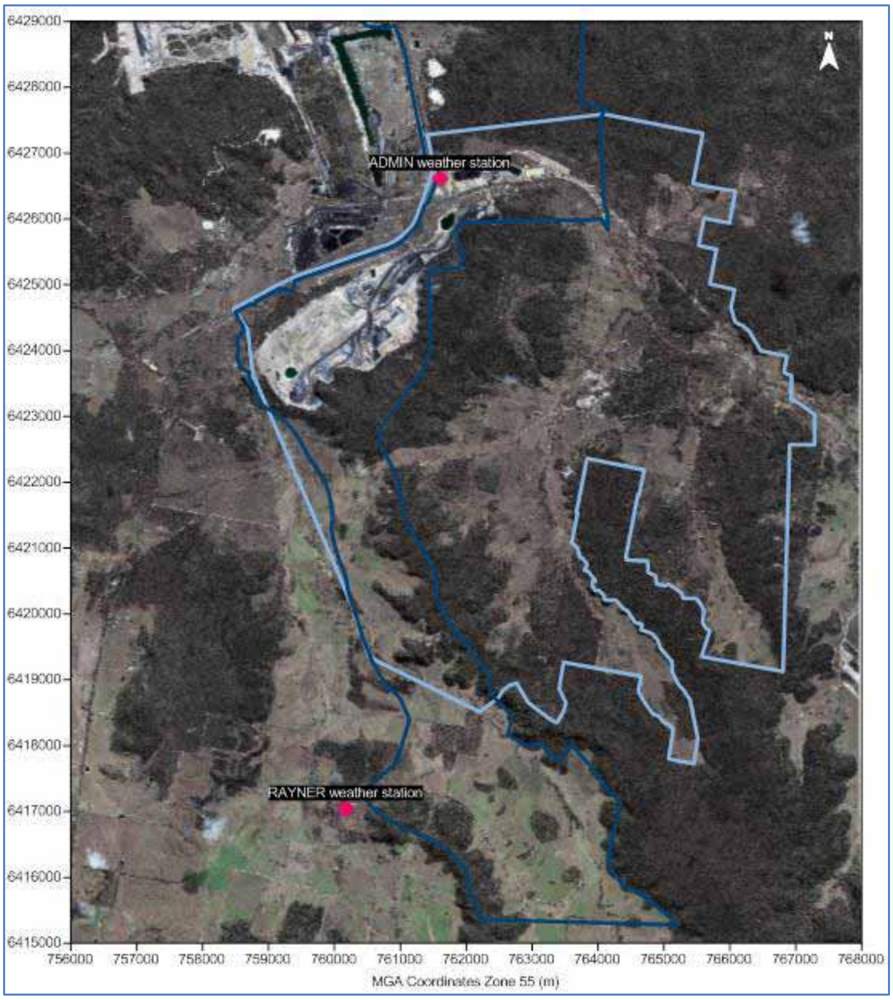

Figure 5-2: MCP meteorological stations

Annual and seasonal windroses prepared from data collected during 2011 from the weather stations are presented in **Figure 5-3** and **Figure 5-4** respectively. The pattern of wind distributions at the two monitoring locations is generally similar, and the differences are generally consistent with the expected variations that would arise due to the effects of the surrounding terrain.

Analysis of the northerly positioned Admin weather station windroses show the most common winds on an annual basis are from the east with very few winds originating from the north and south sectors. In the summertime the winds predominately occur from the east. The autumn and spring wind distribution pattern is similar to the annual distribution with winds from the east most predominate and a lesser portion of winds occurring from the west-southwest and east-northeast sectors. During winter, winds from the west-southwest dominate the distribution with other winds occurring from the west and east. On an annual basis the Rayner weather station indicates a similar wind distribution, but with more influence from south-westerly winds in winter and north-easterly winds in spring.

The pattern of low wind speeds is also notably different between the two sites, with predominantly north-easterly drainage winds in the cooler months at the Admin weather station and more widely spread north, north-east to southerly drainage flows at the Rayner station. This pattern well reflects the likely drainage flows due to the valleys in which the stations are positioned.

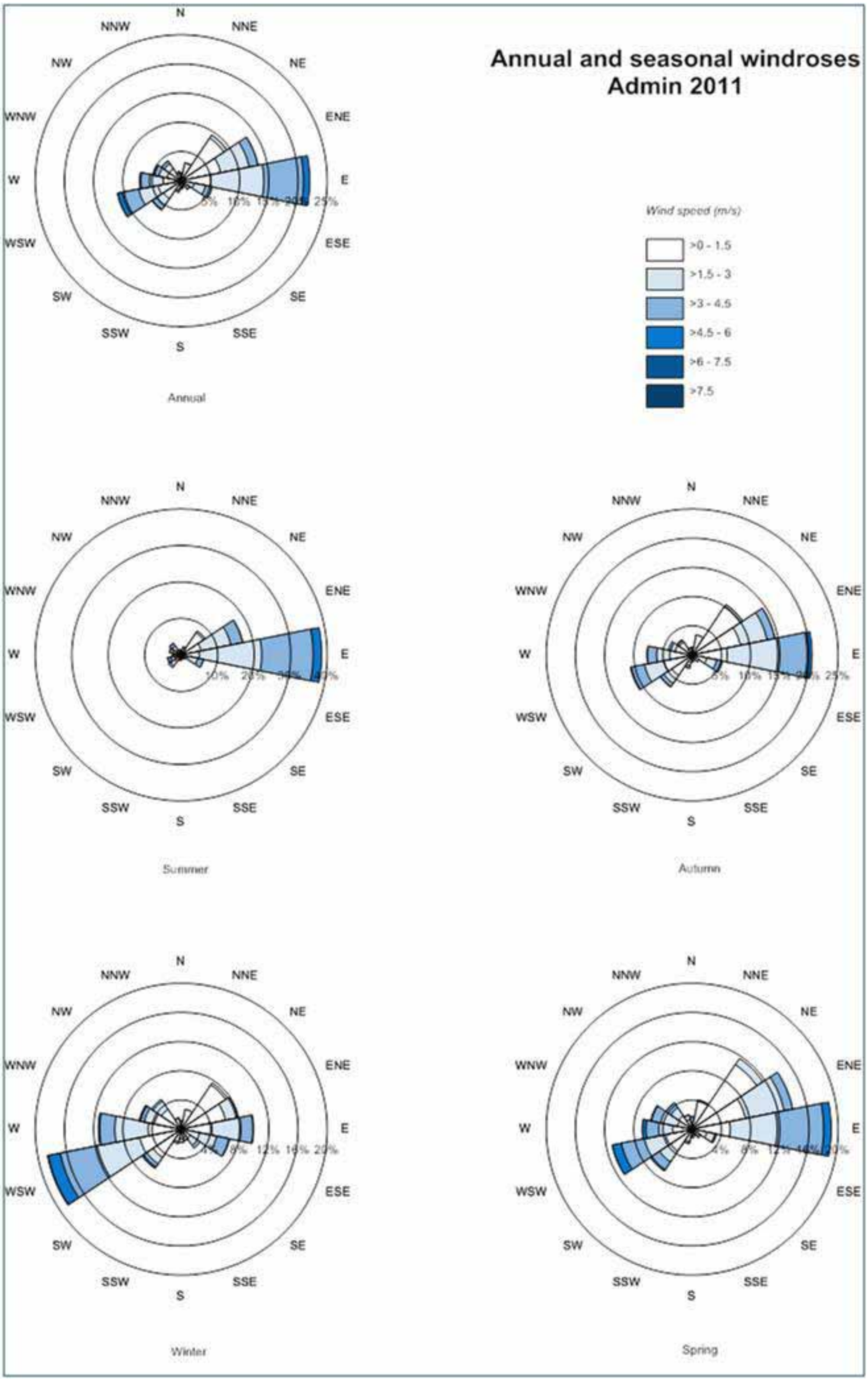

Figure 5-3: Annual and seasonal windroses for the Admin weather station (2011)

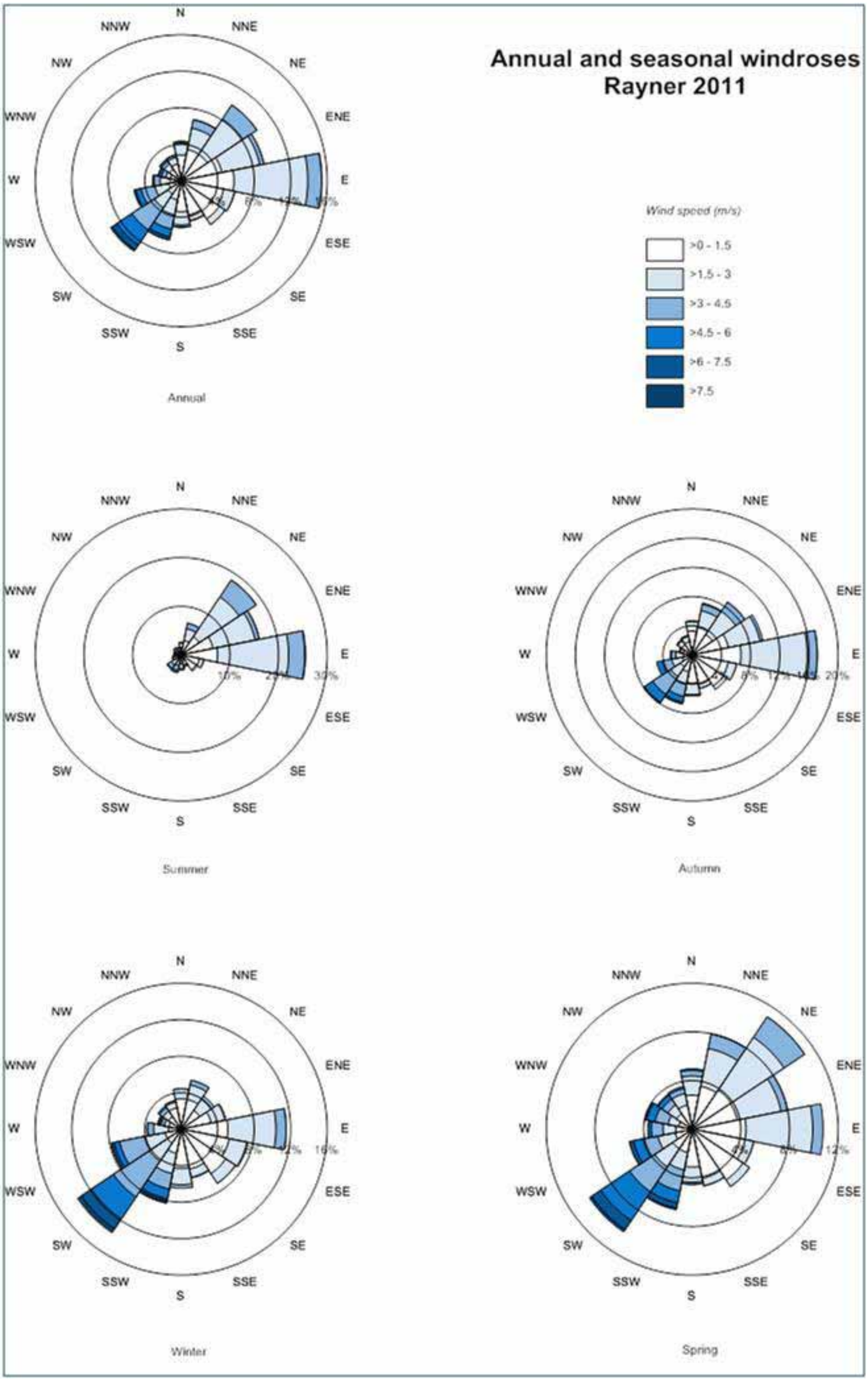

Figure 5-4: Annual and seasonal windroses for the Rayner weather station (2011)

5.3 Local air quality

The main sources of particulate matter in the surrounding area include emissions from mining, agriculture, and anthropogenic activity such as motor vehicles, wood heaters and commercial or industrial activities. This section reviews the data collected for MCP's ambient air quality monitoring program and the neighbouring Ulan Coal Mine's ambient air quality monitoring program between 2010 and 2012 to characterise the existing background levels of the area surrounding the proposed modification.

These data have been obtained from the Moolarben Coal Mine Annual Environmental Management Reports (**MCM, 2010**, **MCM, 2011** and **MCM, 2012a**), Moolarben Coal Monthly Environmental Monitoring Reports (**MCM, 2012b-e**) and the Ulan Coal Mine Environmental Monitoring Summaries (**UCM, 2010a-d**, **UCM, 2011a-b** and **UCM, 2012**).

MCP's air quality monitoring network consists of two High Volume Air Samplers (HVAS) measuring PM_{10}, three Tapered Element Oscillating Microbalances (TEOM) and nine dust deposition gauges sited in locations surrounding the mine. The Ulan Coal Mine's air quality monitoring network consists of two HVAS measuring TSP, one TEOM and eight dust deposition gauges sited in locations surrounding the mine. **Table 5-2** lists the monitoring stations operated by the Project.

Figure 5-5 shows the approximate location of the monitoring stations reviewed in this assessment. **Appendix B** provides a summary of all the monitoring data reviewed in the section.

Table 5-2: Summary of ambient monitoring stations

Monitoring site ID	Type	Monitoring data review period
TEOM01	TEOM	January 2010 - December 2012
TEOM02	TEOM	January 2010 - December 2012
TEOM03	TEOM	January 2010 - July 2011
TEOM04	TEOM	September 2011 - December 2012
TEOM (UCM)	TEOM	January 2010 - December 2011
PM01	HVAS - PM_{10}	January 2010 - December 2012
PM02	HVAS - PM_{10}	January 2010 - December 2012
HV1 (UCM)	HVAS - TSP	January 2010 - December 2011
HV2 (UCM)	HVAS - TSP	January 2010 - December 2011
DG01	Dust gauge	January 2010 - December 2012
DG02	Dust gauge	January 2010 - December 2012
DG03	Dust gauge	January 2010 - December 2012
DG04	Dust gauge	January 2010 - December 2012
DG05	Dust gauge	January 2010 - December 2012
DG06	Dust gauge	January 2010 - December 2012
DG07	Dust gauge	January 2010 - December 2012
DG08	Dust gauge	January 2010 - December 2012
DG09	Dust gauge	January 2010 - December 2012
DM1 (UCM)	Dust gauge	January 2010 - December 2011
DM4 (UCM)	Dust gauge	January 2010 - December 2011
DM5 (UCM)	Dust gauge	January 2010 - December 2011
DM8 (UCM)	Dust gauge	January 2010 - December 2011
DM9 (UCM)	Dust gauge	January 2010 - December 2011
DM11 (UCM)	Dust gauge	January 2010 - December 2011
DM12 (UCM)	Dust gauge	January 2010 - December 2011
DM13 (UCM)	Dust gauge	June 2011 - December 2011

UCM - Ulan Coal Mine

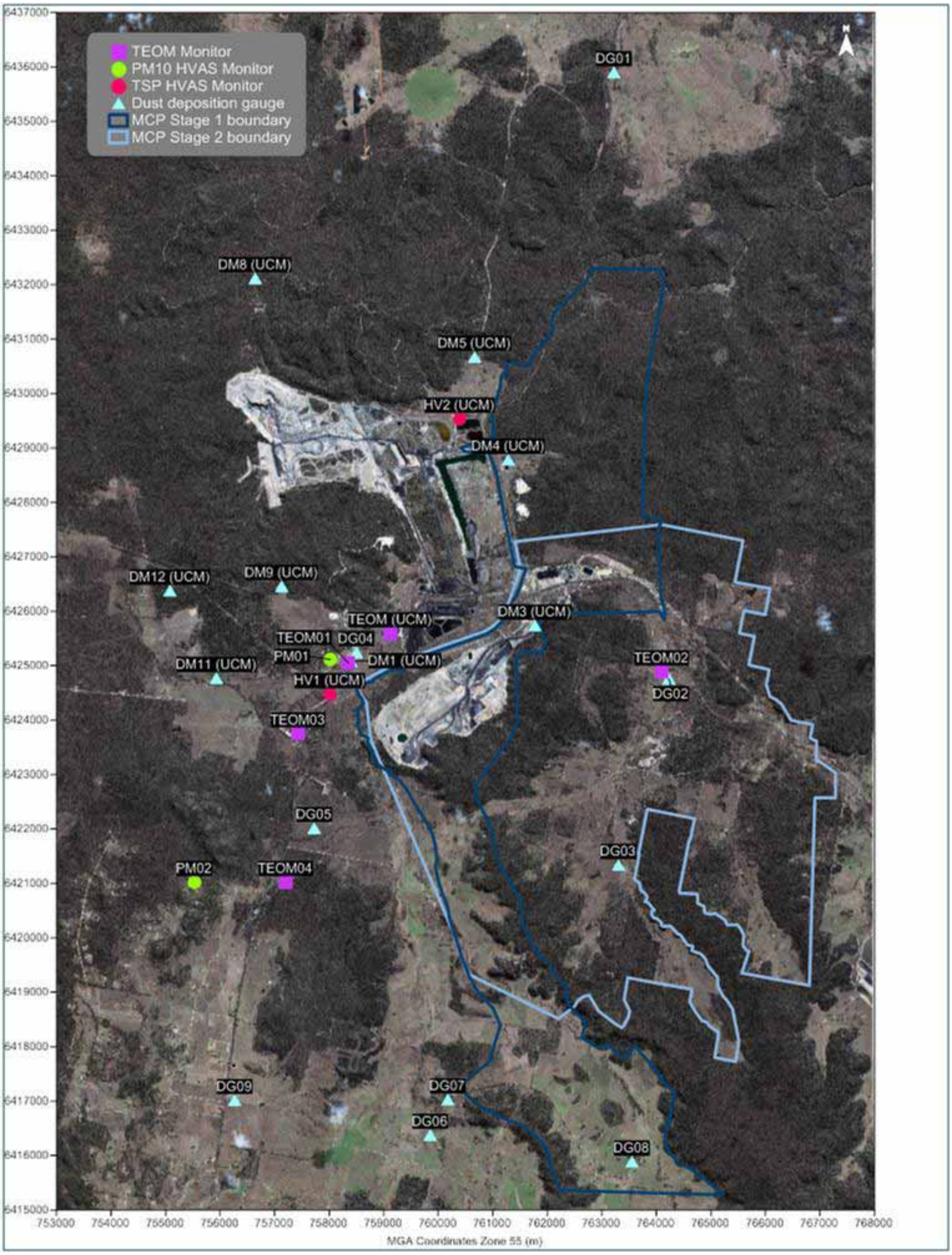

Figure 5-5: Monitoring locations

5.3.1 PM_{10} Monitoring

A summary of the measured PM_{10} levels from the four TEOM monitoring stations is presented in **Table 5-3** and **Figure 5-6**. Note that TEOM03 was moved from its location at Toole Road during July/August 2011 to a location on Ulan Road and since been renamed as TEOM04.

It can be seen from **Figure 5-6** that concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground and elevating the level of windblown dust, the occurrence of bushfires and pollen levels.

A review of **Table 5-3** indicates that the 24-hour average and annual average PM_{10} concentrations for each monitoring station were below the NSW EPA criteria of 50µg/m^3 and 30µg/m^3 respectively.

Table 5-3: Summary of PM_{10} levels from TEOM monitoring (µg/m^3)

Year	Annual average						Maximum 24-hour average					
	TEOM01	TEOM02	TEOM03	TEOM04	TEOM(1) (UCM)	Criteria	TEOM01	TEOM02	TEOM03	TEOM04	TEOM(1) (UCM)	Criteria
2010	9.8	8.2	8.7	-	13.7	**30**	32.3	30.7	30.1	-	37.5	**50**
2011	10.3	9.3	12.3(2)	9.2(2)	14.7	**30**	31.3	25.8	45.7(2)	26.3(2)	46.8	**50**
2012	11.3	10.3	-	9.0	-	**30**	40.7	41.6	-	41.9	-	**50**

(1)Data available till December 2011

(2)Note: TEOM03 relocated during July/August 2011 and since renamed TEOM04

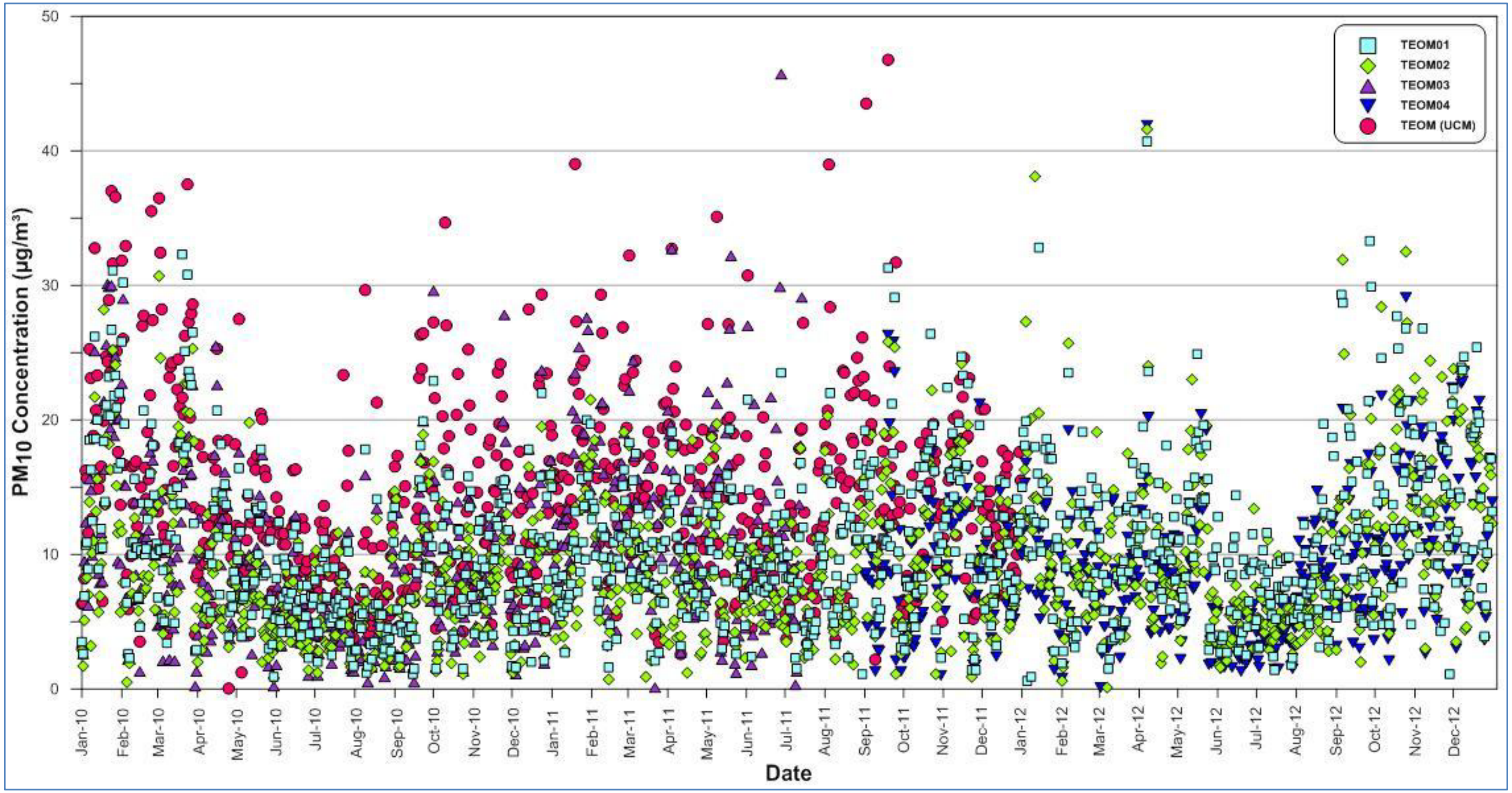

Figure 5-6: TEOM 24-hour average PM_{10} concentrations

A summary of the measured PM_{10} levels from the two HVAS monitoring stations are presented in **Table 5-4** and **Figure 5-7**. The monitoring results indicate that annual average PM_{10} levels from these monitors are below the annual average PM_{10} criteria of 30µg/m^3 and are comparable to the annual average PM_{10} TEOM results at the monitoring stations for the same period.

Figure 5-7 indicates that the measured 24-hour average PM_{10} level were less than 50µg/m^3 during the monitoring period.

Table 5-4: Summary of PM_{10} levels from HVAS monitoring (µg/m^3)

Year	Annual average			Maximum 24-hour average		
	PM01	PM02	Criteria	PM01	PM02	Criteria
2010	10.2	8.9	**30**	30.5	27.8	**50**
2011	12.4	10.5	**30**	33.4	30.0	**50**
2012	10.4	8.2	**30**	28.1	24.3	**50**

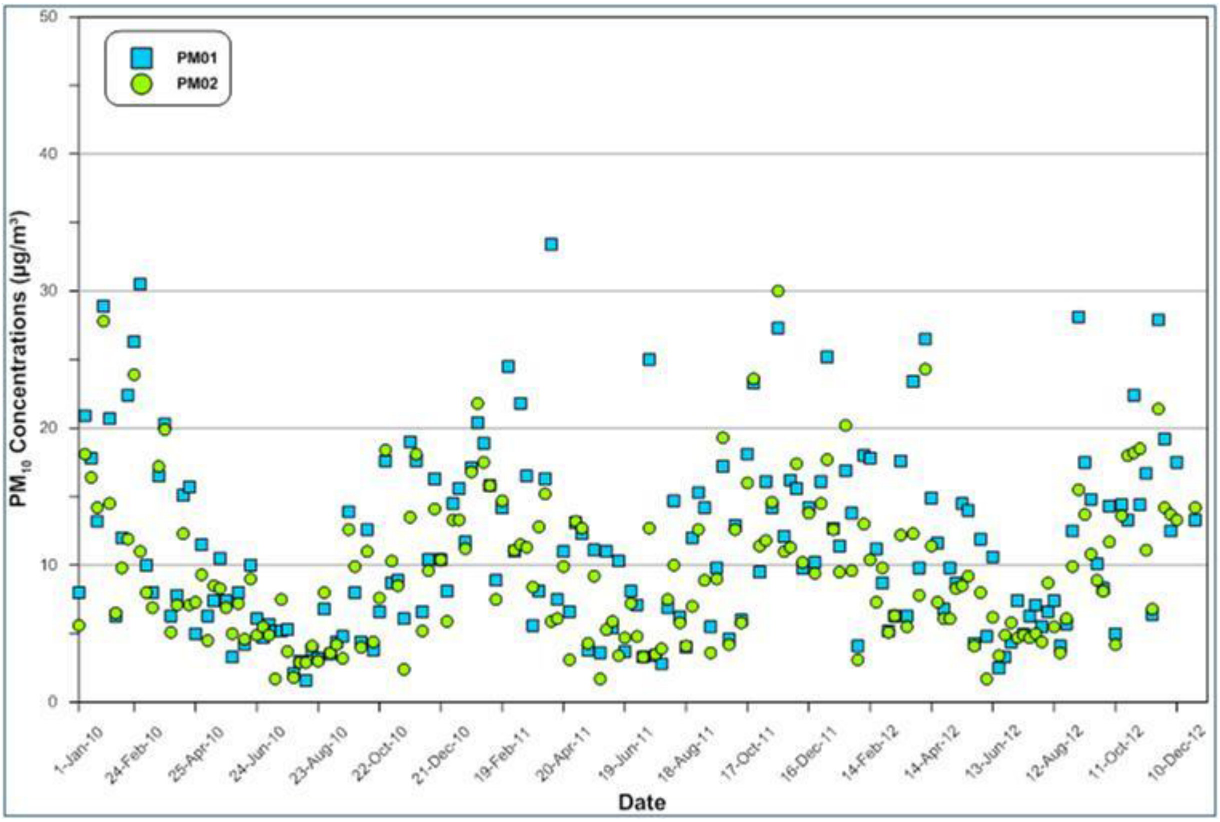

Figure 5-7: HVAS 24-hour average PM_{10} concentrations

5.3.2 TSP Monitoring

TSP monitoring data are available from two HVAS monitors operated by Ulan Coal Mine. A summary of the results collected between January 2010 and December 2011 at these stations is presented in **Table 5-5** and **Figure 5-8**.

The monitoring data presented in **Table 5-5** indicate that the annual average TSP concentrations for each monitoring station were less than the EPA criteria of 90µg/m^3. **Figure 5-8** shows that the recorded TSP concentrations were higher at the HV2 station than the HV1 station during the monitoring period.

Table 5-5: Summary of TSP levels from HVAS monitoring (µg/m^3)

Year	Annual average

	HV1 (UCM)	HV2 (UCM)	Criteria
2010	13.9	26.0	**90**
2011	20.3	31.3	**90**

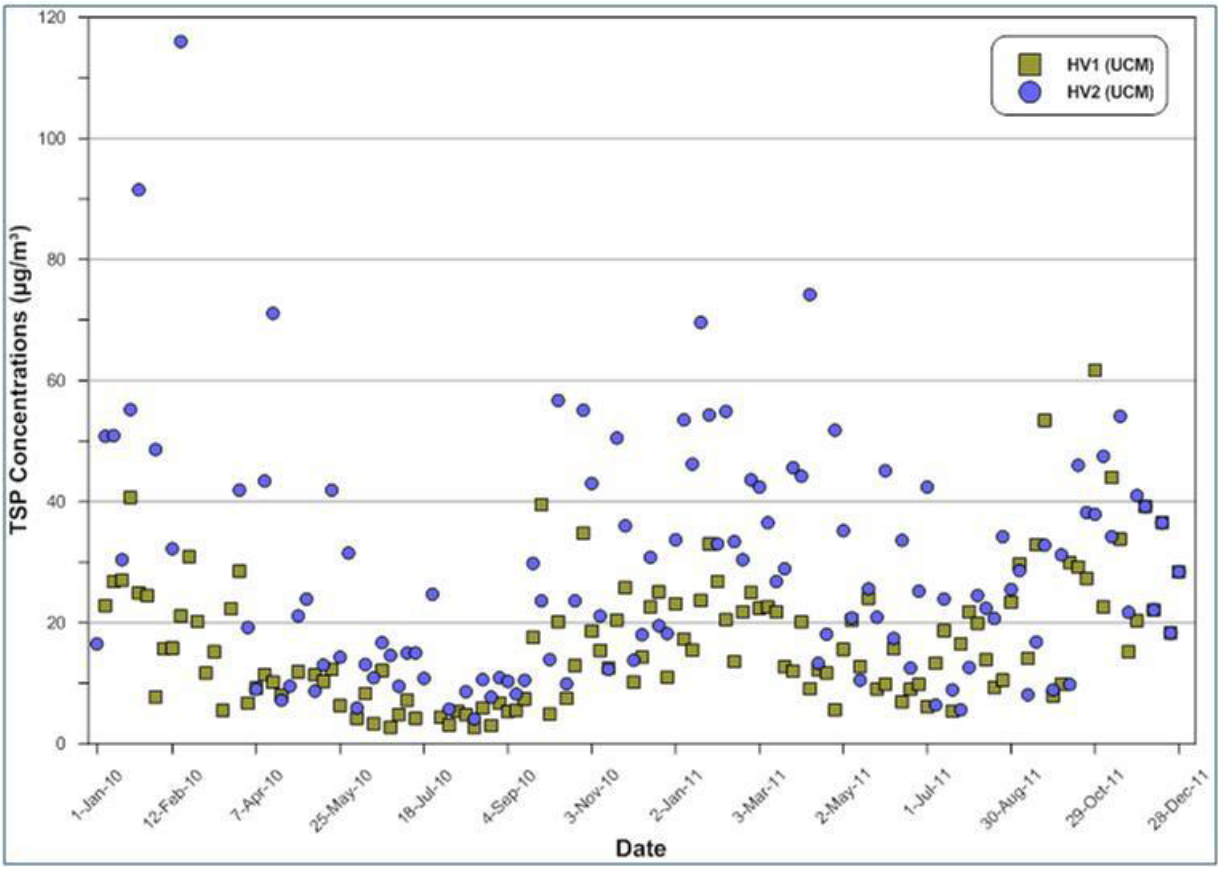

Figure 5-8: HVAS 24-hour average TSP concentrations

5.3.3 Dust Deposition Monitoring

The location of the dust deposition monitoring sites operated by the Ulan and Moolarben Coal Mines is shown in **Figure 5-5**. **Table 5-6** summarises the annual average deposition levels at each gauge during 2010 to 2012.

Field notes accompanying the monitoring indicate that some of the samples were contaminated with materials such as bird droppings, insects or plant matter. This is a relatively common occurrence for this type of monitoring, and accordingly, contaminated samples have been excluded from the reported annual average results.

All gauges recorded an annual average insoluble deposition level below the NSW EPA criterion of $4g/m^2$/month and in general, the air quality in terms of dust deposition is considered good.

Table 5-6: Annual average dust deposition (g/m^2/month)

Year	2010	2011	2012
DG01	0.7	0.4	0.3
DG02	1.7	1.6	1.7
DG03	0.7	1.0	0.6
DG04	1.4	1.1	1.4
DG05	2.0	1.5	0.8
DG06	0.7	0.6	0.3

Year	2010	2011	2012
DG07	0.8	0.7	0.7
DG08	1.0	0.8	1.5
DG09	0.4	0.5	0.3
DM1 (UCM) [(1)]	0.8	1.1	-
DM4 (UCM) [(1)]	0.4	0.8	-
DM5 (UCM) [(1)]	0.9	0.8	-
DM8 (UCM) [(1)]	0.4	0.3	-
DM9 (UCM) [(1)]	0.4	0.4	-
DM11 (UCM) [(1)]	0.6	0.8	-
DM12 (UCM) [(1)]	0.4	0.6	-
DM13 (UCM) [(2)]	-	1.3	-

[(1)] Data available till December 2011
[(2)] Data only available from June 2011 to December 2011

6 MODELLING SCENARIOS

The assessment considers four indicative mine plan years chosen to represent a range of potential impacts over the life of the Project by reference to the location of the operations and the potential to generate dust in each year. The scenarios assessed in the modelling have also taken into account the proposed Stage 2 operations (involving proposed Open Cut 4) and the combined potential of the proposed modification and approved Stage 1 operations to generate dust.

It is important to note that Stage 2 activity (involving Open Cut 4) does not form part of the proposed modification, but has been assessed together with the proposed modification to ensure that all potential emissions from the MCP have been addressed cumulatively.

The modelled Year 2 (see **Figure 6-1**), represents the early stage of mining with coal extraction occurring in Open Cut 1 at two ends of the pit. Mining gradually extends into the proposed extension areas and the separate Stage 2 project would see initial pit preparation occurring in Open Cut 4. In Year 6 (see **Figure 6-2**), mining continues in Open Cut 1 into the extension areas with the majority of previously mined areas rehabilitated. Operations in Open Cut 4 are well established and progressing per the Stage 2 plan. During Year 11 and Year 16 (see **Figure 6-3** and **Figure 6-4**), operations in Open Cut 2 have commenced with the mining progressing in a southerly direction and Open Cut 4 operations progressing in a south-easterly direction.

There are no proposed changes to the mining method or activity in Open Cut 3 as part of the proposed modification. Open Cut 3 activity occurs in the final years of the approved Project. The activity in Open Cut 3 may occur at a later year as a result of the proposed modification, however, as the approved operations on Open Cut 3 would not be altered by the proposed modification, the air quality impacts would remain as previously assessed in the EA for Moolarben Stage 1 (**HAS, 2006**).

Extracted ROM coal from the proposed modification is hauled to and processed at the Coal Handling and Preparation Plant (CHPP). Completed overburden emplacement areas are progressively rehabilitated commensurate with the mine progression.

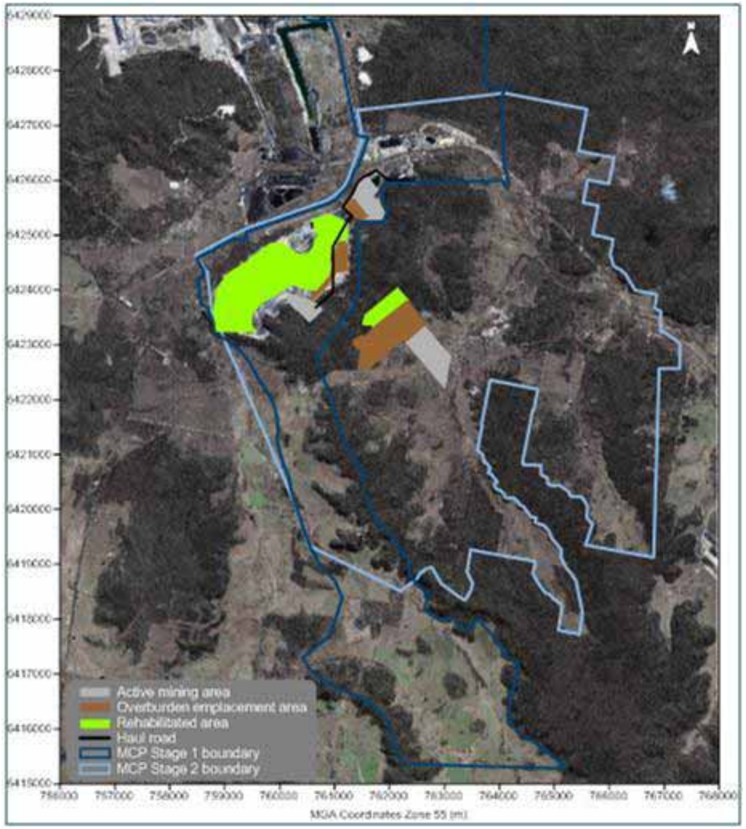

Figure 6-1: Indicative year 2 mine plan for the Project and Stage 2

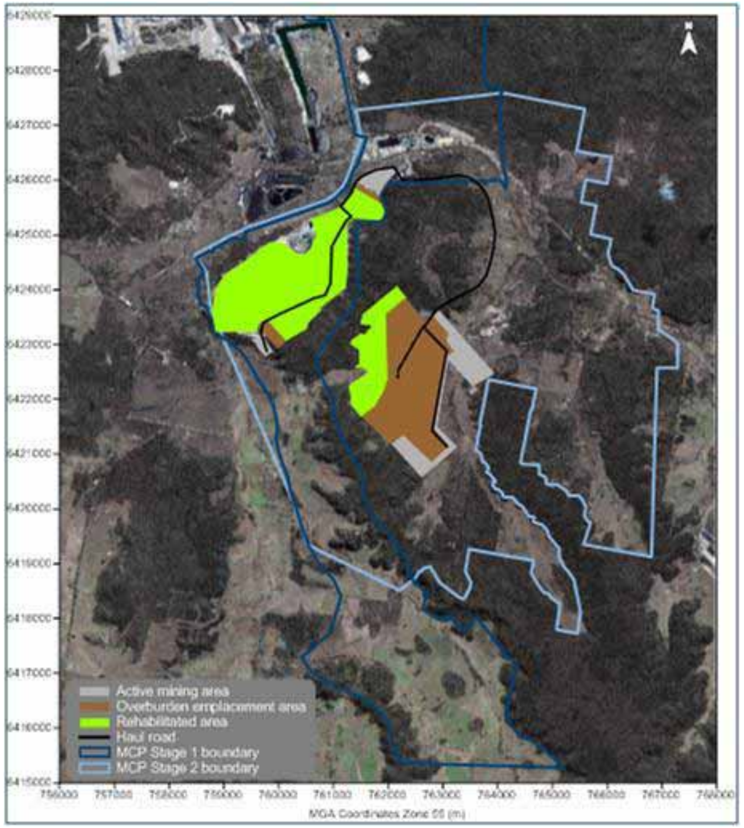

Figure 6-2: Indicative year 6 mine plan for the Project and Stage 2

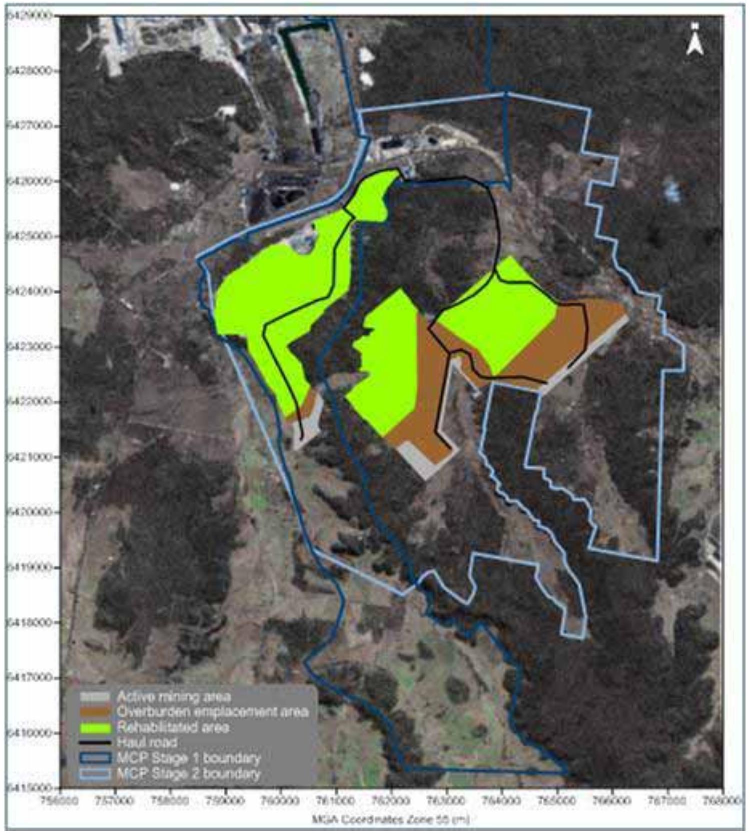

Figure 6-3: Indicative year 11 mine plan for the Project and Stage 2

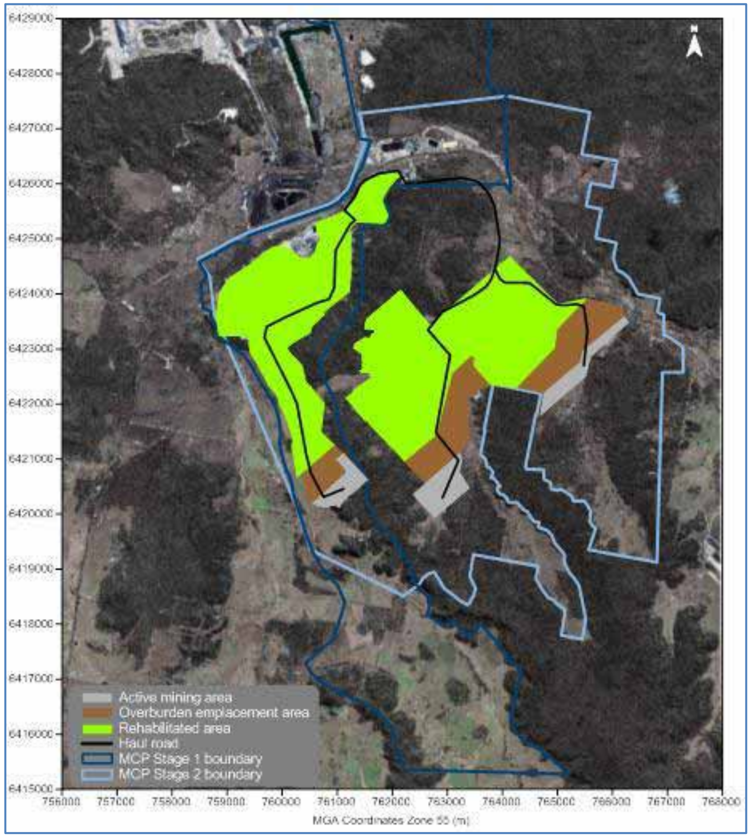

Figure 6-4: Indicative year 16 mine plan for the Project and Stage 2

6.1 Emission estimation

For each of the four indicative years selected to represent the key stages over the life of the proposed modification, the rate of dust emission has been calculated by analysing the various types of dust generating activities taking place in each year and applying suitable emission factors.

The emission factors applied are considered the most applicable and representative factor available for calculating the dust generation rates for the proposed activities. The emission factors were sourced mainly from studies supported by the US EPA and from local studies where possible. Total dust emissions from all significant dust generating activities for the proposed modification and Stage 2 (Open Cut 4) are presented in **Table 6-1**. Detailed emission inventories and emission estimation calculations are presented in **Appendix C**.

The estimated dust emissions presented in **Table 6-1** reflect the application of best practice dust mitigation currently being implemented at MCP in accordance with its Air Quality Management Plan (AQMP) and Pollution Reduction Program (PRP) (refer to **Section 7** and **Section 12**). The dust control measures are described in the following section.

Table 6-1: Estimated emissions for the proposed modification (kg of TSP)

Activity	Year 2	Year 6	Year 11	Year 16
OB - Stripping Topsoil - OC1	4,074	1,050	-	-
OB - Stripping Topsoil - OC2	-	-	1,050	1,050
OB - Stripping Topsoil - OC4	4,074	5,250	5,250	5,250
OB - Drilling - OC1	745	354	-	-
OB - Drilling - OC2	-	-	354	354
OB - Drilling - OC4	745	1,567	1,567	1,567
OB - Blasting - OC1	18,784	9,392	-	-
OB - Blasting - OC2	-	-	9,392	9,392
OB - Blasting - OC4	18,784	37,568	37,568	37,568
OB - Excavator loading OB to haul truck - OC1	39,369	14,979	-	-
OB - Excavator loading OB to haul truck - OC2	-	-	14,979	14,979
OB - Excavator loading OB to haul truck - OC4	11,055	92,182	92,182	92,182
OB - Hauling to dump - OC1	308,416	90,900	-	-
OB - Hauling to dump - OC2	-	-	83,395	168,934
OB - Hauling to dump - OC4	112,891	1,246,342	953,085	1,370,976
OB - Emplacing at dump - OC1	39,369	14,979	-	-
OB - Emplacing at dump - OC2	-	-	14,979	14,979
OB - Emplacing at dump - OC4	11,055	92,182	92,182	92,182
OB - Dozers on OB at dump - OC1	153,965	83,677	-	-
OB - Dozers on OB at dump - OC2	-	-	83,677	83,677
OB - Dozers on OB at dump - OC4	153,965	334,707	334,707	334,707
OB - Dozers on OB in pit - OC1	153,965	83,677	-	-
OB - Dozers on OB in pit - OC2	-	-	83,677	83,677
OB - Dozers on OB in pit - OC4	153,965	334,707	334,707	334,707
CL - Drilling - OC1	2,810	702	-	-
CL - Drilling - OC2	-	-	702	702
CL - Drilling - OC4	-	3,687	3,687	3,687
CL - Blasting - OC1	9,392	4,696	-	-
CL - Blasting - OC2	-	-	4,696	4,696
CL - Blasting - OC4	-	14,088	14,088	14,088
CL - Dozers ripping/pushing/clean-up - OC1	41,730	41,730	-	-
CL - Dozers ripping/pushing/clean-up - OC2	-	-	41,730	41,730
CL - Dozers ripping/pushing/clean-up - OC4	-	83,460	83,460	83,460

Activity	Year 2	Year 6	Year 11	Year 16
CL - Loading ROM coal to haul truck - OC1	420,184	109,910	-	-
CL - Loading ROM coal to haul truck - OC2	-	-	126,358	134,407
CL - Loading ROM coal to haul truck - OC4	-	540,433	536,427	538,910
CL - Loading ROM coal to haul truck - UG1	-	105,046	105,046	-
CL - Loading ROM coal to haul truck - UG2	-	-	-	105,046
CL - Hauling ROM to hopper - OC1	229,046	84,412	-	-
CL - Hauling ROM to hopper - OC2	-	-	128,186	164,806
CL - Hauling ROM to hopper - OC4	-	547,856	539,505	621,614
CL - Hauling ROM to hopper - UG1	-	94,698	94,698	-
CL - Hauling ROM to hopper - UG2	-	-	-	94,698
CHPP - Unloading ROM to hopper - OC1	63,028	16,486	-	-
CHPP - Unloading ROM to hopper - OC2	-	-	18,954	20,161
CHPP - Unloading ROM to hopper - OC3	-	-	-	-
CHPP - Unloading ROM to hopper - OC4	-	81,065	80,464	80,836
CHPP - Unloading ROM to hopper - UG1	-	31,514	31,514	-
CHPP - Unloading ROM to hopper - UG2	-	-	-	31,514
CHPP - Rehandle ROM at hopper	21,009	43,022	43,644	44,170
CHPP - Handling coal at CHPP	807	1,653	1,677	1,697
CHPP - Dozer pushing ROM coal	26,770	26,765	26,765	26,765
CHPP - Dozer pushing Product coal	71,811	112,205	112,205	112,205
CHPP - Loading Product coal to stockpile	549	1,124	1,140	1,154
CHPP - Loading Product coal to trains	137	281	285	288
CHPP - Loading rejects*	-	-	-	-
CHPP - Hauling rejects	73,295	279,121	283,360	346,626
CHPP - Unloading rejects*	-	-	-	-
WE - Overburden emplacement areas	265,984	773,879	1,017,611	783,542
WE - Open pit	290,287	379,312	330,545	459,881
WE - ROM stockpiles	5,471	5,471	5,471	5,471
WE - Product stockpiles	21,843	21,843	21,843	21,843
Grading roads	66,963	82,354	82,354	82,354
Total TSP emissions (kg/yr)	**2,796,337**	**5,930,324**	**5,879,163**	**6,472,532**

OB - overburden, CL - coal, CHPP - coal handling and preparation plant, WE - wind erosion
*The activity of handling rejects would result in low dust emissions due to high moisture content of this material and has not been considered in the emission estimation.

6.1.1 Other mining operations

In addition to the estimated dust emissions from the proposed modification, emissions from the proposed Stage 2 Project and from all nearby approved mining operations were also modelled, per their current consent, to assess potential cumulative dust effects. Emissions estimates from these sources were derived from information provided in air quality assessments available in the public domain at the time of modelling. These estimates are likely to be conservative, as in many cases, mines do not continually operate at the maximum extraction rates assessed in their respective environmental assessments. **Table 6-2** summarises the emissions adopted in this assessment for each of the nearby mining operations. Where there is no estimated annual TSP, it is assumed (as per the current consents) that the development consent has expired and the mine no longer operates.

Emissions from nearby mining operations would contribute to the background level of dust in the area surrounding the proposed modification, and these emissions were explicitly included in the modelling. Additionally, there would be numerous smaller or very distant sources that contribute to the total background dust level. Modelling these sources explicitly is impractical, however the residual level of dust due to all other such non-modelled sources has been included in the cumulative results, and the method for doing this is discussed further in **Section 9**.

Table 6-2: Estimated emissions from nearby mining operations (kg of TSP)

Mining Operation - Approved	Year 2	Year 6	Year 11	Year 16
Ulan Coal Mine(1)	4,393,393	2,842,032	1,282,153	1,280,276
Wilpinjong Coal Mine(2)	4,153,793	3,551,089	2,595,026	-

(1) PAEHolmes (2009)
(2) PAEHolmes (2010)

7 BEST PRACTICE MITIGATION MEASURES

MCO has carefully considered the possible range of air quality mitigation measures that are feasible and can be applied to achieve a standard of mine operation consistent with current best practice for the control of dust emissions from coal mines in NSW. The measures applied to the MCO reflect those outlined in the recent NSW EPA document, "*NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*", prepared by Katestone Environmental (**Katestone, 2010**).

The NSW EPA has also implemented a PRP at MCO which requires identification and assessment of the practicability of implementing further best practice measures. The best practice controls currently being implemented and proposed to be implemented based on the PRP were considered in this assessment.

A summary of the key dust controls applied to current operations and for the proposed modification and Stage 2 is shown in **Table 7-1**. Where applicable these controls have been applied in the dust emission estimates shown in **Table 6-1**. Further detail on the level of control applied is set out in **Appendix C**.

Table 7-1: Best practice dust mitigation measures

Activity	Dust Control
Drilling	Dust suppression systems (water sprays)
Hauling on unsealed roads	Watering of haul road surfaces
Unloading/rehandle ROM coal at stockpile/hopper	Water sprays on dump pad Enclosed hopper and water sprays
Dozers at CHPP	Travel routes moist
Loading coal to rains	Telescopic chute with water sprays
Wind erosion (exposed areas)	Vegetation cover
Wind erosion (stockpiles)	Water sprays

8 DISPERSION MODELLING APPROACH

8.1 Introduction

The following sections are included to provide the reader with an understanding of the model and modelling approach combined with the dust emission estimates for each of the assessed scenarios.

The approach applied in this assessment is generally consistent with that used in contemporary assessments of coal mines in NSW however the CALPUFF modelling suite was applied for dispersion modelling rather than ISCMOD. The CALPUFF model is an advanced "puff" model which can deal with the effects of complex local terrain on the dispersion meteorology over the entire modelling domain in a three-dimensional, hourly varying time step. This capability is particularly suited to this project area, given the complex surrounding terrain.

CALPUFF is an air dispersion model approved by NSW EPA for use in air quality impact assessments. The model setup used is in general accordance with methods provided in the NSW EPA document "*Generic Guidance and Optimum Model Setting for the CALPUFF Modeling System* *for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia*" (**TRC**, **2011**).

8.2 Modelling methodology

Modelling was undertaken using a combination of the CALPUFF Modelling System and TAPM. The CALPUFF Modelling System includes three main components: CALMET, CALPUFF and CALPOST and a large set of pre-processing programs designed to interface the model to standard, routinely available meteorological and geophysical datasets.

TAPM is a prognostic air model used to simulate the upper air data for CALMET input. The meteorological component of TAPM is an incompressible, non-hydrostatic, primitive equation model with a terrain-following vertical coordinate for three-dimensional simulations. The model predicts the flows important to local scale air pollution, such as sea breezes and terrain induced flows, against a background of larger scale meteorology provided by synoptic analysis.

CALMET is a meteorological model that uses the geophysical information and observed/simulated surface and upper air data as inputs and develops wind and temperature fields on a three-dimensional gridded modelling domain.

CALPUFF is a transport and dispersion model that advects "puffs" of material emitted from modelled sources, simulating dispersion processes along the way. It typically uses the three dimensional meteorological field generated by CALMET.

CALPOST is a post processor used to process the output of the CALPUFF model and produce tabulations that summarise the results of the simulation.

8.2.1 Meteorological modelling

The TAPM model was applied to the available data to generate a three dimensional upper air data file for use in CALMET. The centre of analysis for the TAPM modelling used is 32deg16.5min south and 149deg49min east. The simulation involved four nesting grids of 30km, 10km, 3km and 1km with 35 vertical grid levels.

CALMET modelling used a nested approach where the three dimensional wind field from the coarser grid outer domain is used as the initial (or starting) field for the finer grid inner domain. This approach has several advantages over modelling a single domain. Observed surface wind field data from the near field as well as from far field monitoring sites can be included in the model to generate a more representative three dimensional wind field for the modelled area. Off domain terrain features for the finer grid domain can be allowed to take effect within the finer domain, as would occur in reality, also the coarse scale wind flow fields give a better set of starting conditions with which to operate the finer grid run.

The coarser grid domain was run on a 100 x 100km area with a 2km grid resolution. The available meteorological data for January 2011 to December 2011 from six surrounding meteorological monitoring sites were included in this run.

Table 8-1 outlines the parameters used from each station. Three dimensional upper air data were sourced from TAPM output. The finer grid domain was run on a 30 x 30km grid with a 0.3km grid resolution for each modelled year. Local land use and detailed topographical information including proposed mine topography for each modelled year was included to produce realistic fine scale flow fields (such as terrain forced flows) in surrounding areas, as shown in **Figure 8-1**. Further detail regarding CALMET/CALPUFF input variables is provided in **Appendix D**.

Table 8-1: Surface observation stations

Weather station	Parameters
"Admin" - Moolarben Coal mine weather station	Wind speed, Wind direction, Temperature, Humidity
"Rayner" - Moolarben Coal mine weather station	Wind speed, Wind direction, Temperature, Humidity
Merriwa (Roscommon) Automatic Weather Station (BoM) (Station No. 061287)	Wind speed, Wind direction, Cloud height, Cloud Amount, Temperature, Humidity, Sea level pressure
Scone Airport Automatic Weather Station (BoM) (Station No. 061363)	Wind speed, Wind direction, Temperature, Humidity, Sea level pressure
Mudgee Airport Automatic Weather Station (BoM) (Station No. 062101)	Wind speed, Wind direction, Temperature, Humidity, Sea level pressure
Nullo Mountain Automatic Weather Station (BoM) (Station No. 062100)	Wind speed, Wind direction, Temperature, Humidity

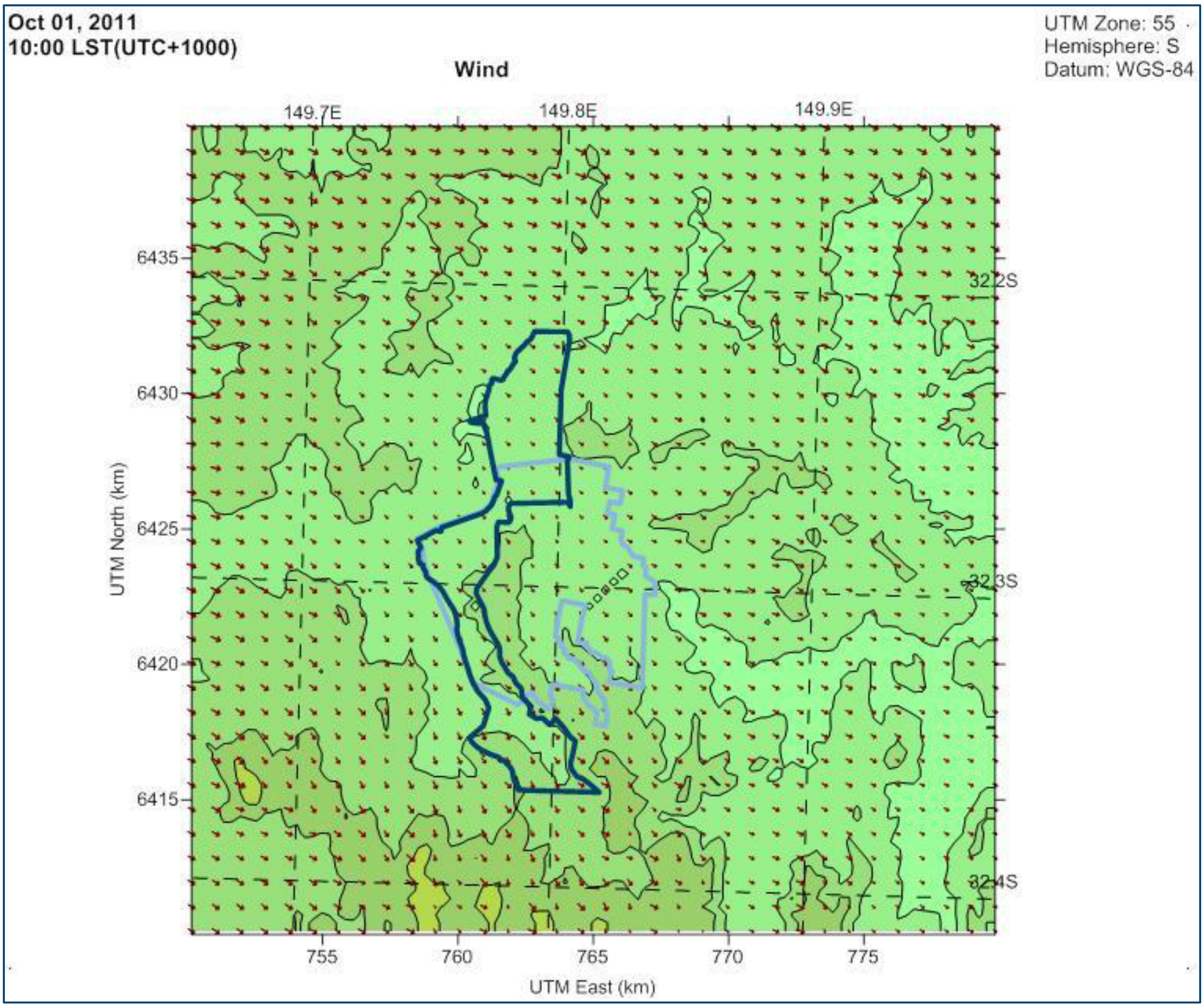

Figure 8-1: Representative snapshot of wind field for the proposed modification

CALMET generated meteorological data were extracted from a point within the CALMET domain and are graphically represented in **Figure 8-2** and **Figure 8-3**.

Figure 8-2 presents annual and seasonal windroses extracted from one point in the CALMET domain. On an annual basis, winds from the east are most frequent. During summer, winds from the east dominate the distribution. The seasons of autumn and spring have a fairly similar wind distribution to the annual windrose with spring experiencing a lower proportion of eastern winds compared to autumn. In winter, the wind distribution is varied with drainage flows from the northwest most dominant with winds from the east and east-southeast to west and west-southwest.

Overall the windroses generated in the CALMET modelling reflect the expected wind distribution patterns of the area as determined based on the available measured data and the expected terrain effects on the prevailing winds. This is evident as the windroses also compare well with the windroses generated with the measured data, as presented in **Figure 5-3** and **Figure 5-4**.

Figure 8-3 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows sensible trends considered to be representative of the area.

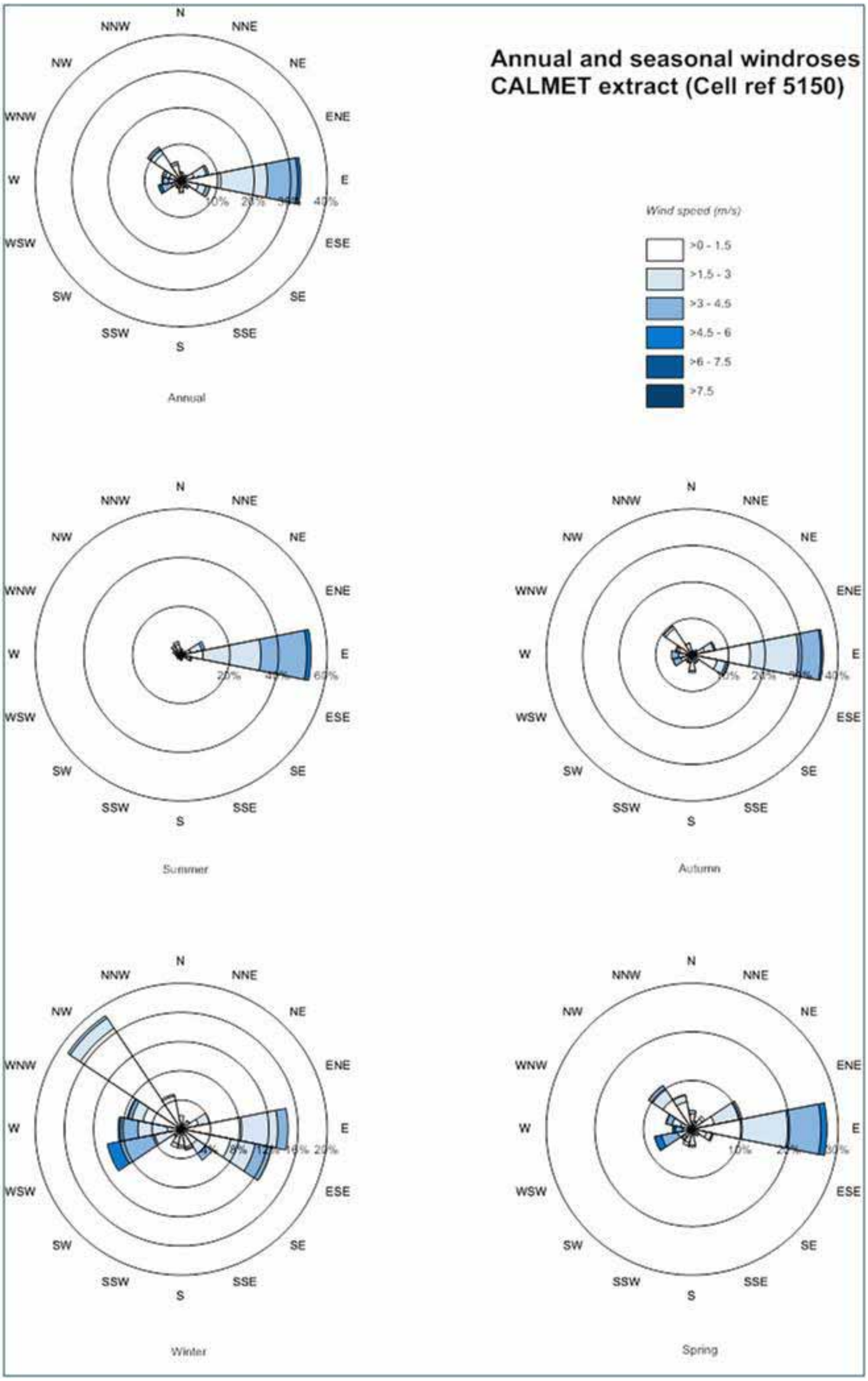

Figure 8-2: Windroses from CALMET extract (Cell ref 5150)

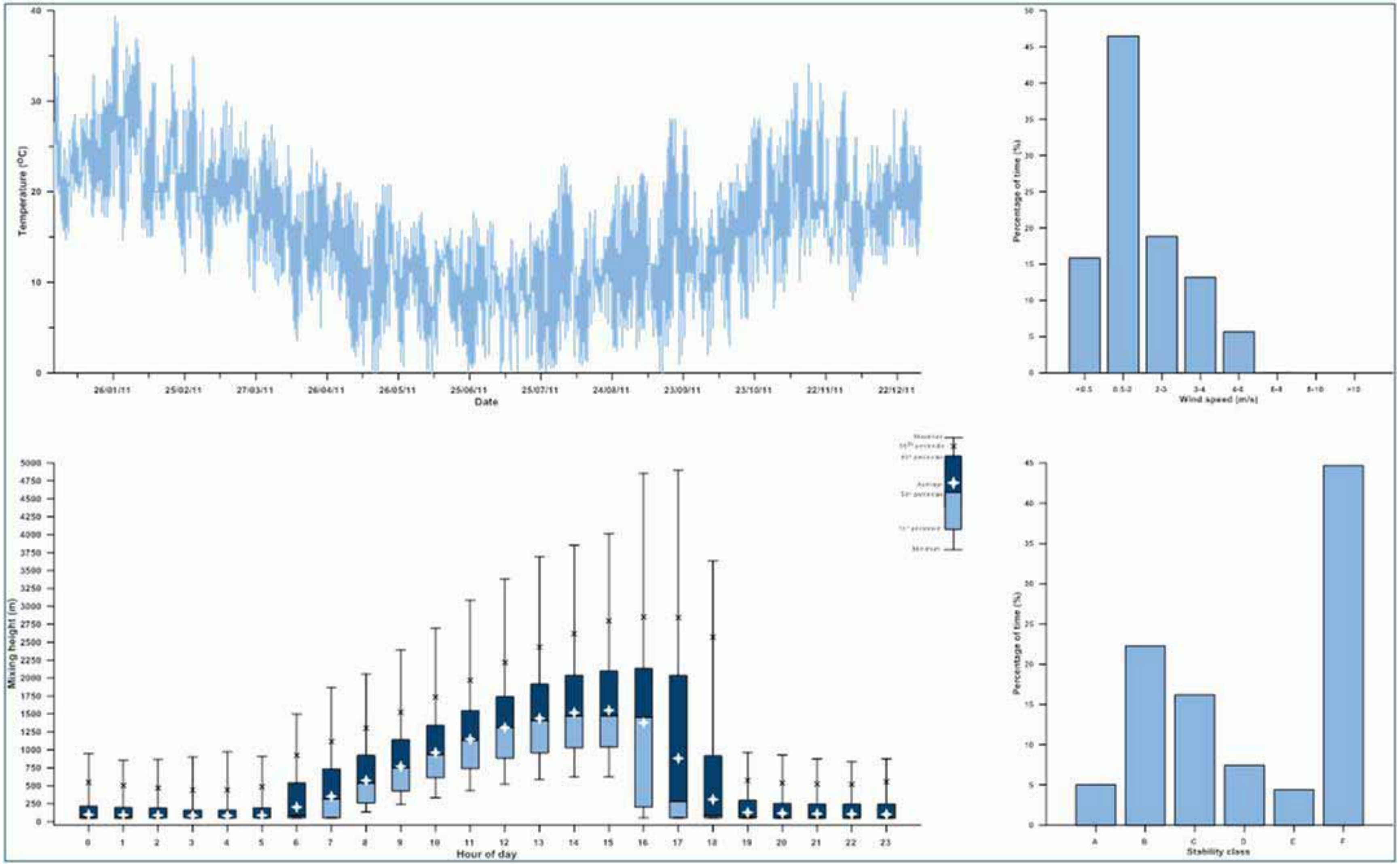

Figure 8-3: Meteorological analysis of CALMET extract (Cell Ref 5150)

8.2.2 Dispersion modelling

CALPUFF modelling is based on the application of three particle size categories Fine Particulates (FP), Coarse Matter (CM) and Rest (RE). The estimated emissions are presented in **Section 6.1**. The distribution of particles for each particle size category was derived from measurements in the **SPCC (1986)** study and is presented in **Table 8-2**.

Emissions from each activity in **Table 6-1** were represented by a series of volume sources and included in the CALPUFF model via an hourly varying emission file. Meteorological conditions associated with dust generation (such as wind speed) and levels of dust generating activity were considered in calculating the hourly varying emission rate for each source. It should be noted that as a conservative measure, the effect of the precipitation rate (rainfall) in reducing dust emissions has not been considered in this assessment.

Table 8-2: Distribution of particles

Particle category	Size range	Distribution
Fine particulates	0 to 2.5 µm	4.68% of TSP
Coarse matter	2.5 to 10 µm	34.4% of TSP
Rest	10 to 30 µm	60.92% of TSP

Each particle-size category is modelled separately and later combined to predict short-term and long-term average concentrations for $PM_{2.5}$, PM_{10}, and TSP. Dust deposition was predicted using the proven dry deposition algorithm within the CALPUFF model. Particle deposition is expressed in terms of atmospheric resistance through the surface layer, deposition layer resistance and gravitational settling (**Slinn and Slinn, 1980** and **Pleim et al., 1984**). Gravitational settling is a function of the particle size and density, simulated for spheres by the Stokes equation (**Gregory, 1973**).

CALPUFF is capable of tracking the mass balance of particles emitted into the modelling domain. For each hour CALPUFF tracks the mass emitted, the amount deposited, the amounts remaining in the surface mixed layer or the air above the mixed layer and the amount advected out of the modelling domain. The versatility to address both dispersion and deposition algorithms in CALPUFF, combined with the three-dimensional meteorological and land use field generally result in a more accurate model prediction compared to other Gaussian plume models (**Pfender et al 2006**).

9 ACCOUNTING FOR BACKGROUND DUST LEVELS

Other significant dust generating sources surrounding the proposed modification were included in the model, including Ulan and Wilpinjong Coal Mines. These mining operations are the nearest significant operations and contribute to particulate matter concentrations and deposition levels near the proposed modification. **Section 6** outlines how dust emissions from these sources have been accounted for in the modelling to assess cumulative effects.

Other dust generating activities in the surrounding area would also contribute to existing dust levels and an allowance for this contribution as well as contributions from other non-modelled dust sources is included in the assessment.

The contribution of other non-modelled dust sources to the prevailing background dust levels was estimated by modelling the mining activities (including Ulan and Wilpinjong Coal Mines) during January 2011 to December 2011 and comparing model predictions with the actual measured values from the monitoring stations near the proposed modification. The average positive difference between the measured and predicted PM_{10} dust levels from each of the monitoring points was considered to be the contribution from other non-modelled dust sources, and was added to the future predicted values to fully account for the background dust levels (not already in the model and due to the numerous non-modelled dust sources).

This approach is preferable to modelling the mine alone and adding a single constant background level at all points across the modelling domain to estimate cumulative impacts. This is because the approach includes modelling of other major sources (i.e. mines) that more reliably represent the higher dust levels near such sources, and also accounts for the seasonal and time varying changes in the background levels that arise from these major dust sources. Also, to account for any underestimation from not including every source (as it's not possible to do that reasonably), the relatively smaller contribution arising from the other non-modelled dust sources, as determined above, was added to the results to obtain the most accurate predictions of future cumulative impacts across the modelled domain.

Estimates of the background TSP and dust deposition levels have been calculated from the PM_{10} level obtained assuming the relationship that 40% of the TSP is PM_{10} and that 90µg/m³ of TSP is equivalent to 4g/m²/month of dust deposition. The relationship of TSP to PM_{10} is based on a study of co-located TSP and PM_{10} monitors conducted in the Hunter Valley (**NSW Minerals Council, 2000**). Measurements from these monitors indicated that dust generated from predominately coal mining sources tended to have this relationship between TSP and PM_{10} levels.

Using the approach described above, the estimated annual average contribution from other non-modelled dust sources for the area surrounding the proposed modification was found to be:

- PM_{10} - 5.4µg/m^3;
- TSP - 13.5µg/m^3; and,
- Deposited dust - 0.6g/m^2/month.

It is important that the above values are not confused with measured background levels, or background levels excluding only the Project, or the change in the Project as a result of the proposed modification. The values above are not background levels in that sense, but are the residual, small amount of the background dust that is not accounted for directly in the air dispersion modelling.

To account for background levels when assessing total (cumulative) 24-hour average PM_{10} impacts, the mine only incremental levels are added to the total measured ambient dust levels (per the NSW EPA contemporaneous assessment guidance). Further details regarding the total cumulative 24-hour average PM_{10} impacts are provided in **Section 10.5**.

Predicted incremental and total (cumulative) concentration and dust deposition levels for short and long term averaging periods are presented in tabular format as well as contour plots in the following section of this report.

10 DISPERSION MODELLING RESULTS

The dispersion model predictions for each of the assessed years are presented in this section. The results show the estimated maximum 24-hour average $PM_{2.5}$ concentrations, annual average $PM_{2.5}$ concentrations, maximum 24-hour average PM_{10} concentrations, annual average PM_{10} concentrations, annual average TSP concentrations and annual average dust (insoluble solids) deposition (DD) rates for the proposed modification operating in isolation (the incremental impact) and with other sources (the total (cumulative) impact).

It is important to note that when assessing impacts for a maximum 24-hour average PM_{10} concentration; the predictions show the highest modelled predicted 24-hour average PM_{10} concentrations that occur at each point within the modelling domain for the worst day (a 24-hour period) over the one year modelling period. When assessing the total (cumulative) 24-hour average PM_{10} impacts based on model predictions, challenges arise as the predicted impacts are often overestimated by the model's inability to consider spatial and temporal variability in reality. Furthermore, the difficulties associated with identification and quantification of emissions from non-modelled sources over the 24-hour period result in additional complications. The potential 24-hour average PM_{10} impacts need to be calculated differently to annual average impacts and therefore the predicted total (cumulative) impacts for maximum 24-hour average PM_{10} concentrations have been addressed specifically in **Section 10.7**.

Each of the potential receptors shown in **Figure 3-1** and listed in **Appendix A** were assessed individually as discrete receptors with the predicted results presented in tabular form for each of the assessed years. The receptor identification numbering system is consistent with previous environmental assessments and MP 05_0117.

For sources not explicitly included in the model, and to fully account for all cumulative dust levels, the unaccounted fractions of background dust levels (which arise from the other non-modelled sources), were added to the model predictions as described in **Section 9** with the results presented in the following sections for each of the assessed years.

Associated isopleth diagrams of the dispersion modelling results are presented in **Appendix E**.

10.1 Indicative Year 2

Table 10-1 presents the model predictions at each of the sensitive receptors, the values presented in bold indicate predicted values above the relevant criteria. **Table 10-2** presents the model predictions at each of the mine-owned receptors.

Figure E-1 to **Figure E-9** in **Appendix E** present isopleth diagrams of the predicted modelling results for each of the assessed pollutants in Year 2.

Table 10-1: Modelling predictions for Year 2 of the proposed modification (privately-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
9	2.6	0.8	18.0	5.8	8.7	0.20	13.5	25.8	0.9
11A	0.7	0.1	5.5	0.6	0.8	0.01	8.0	17.5	0.8
11B	0.8	0.1	5.6	0.5	0.7	0.01	7.7	17.0	0.7
11C	1.1	0.1	7.7	0.6	0.7	0.01	8.0	17.5	0.7
26	3.7	1.2	28.3	9.4	14.6	0.33	17.5	32.4	1.0
30	0.7	0.0	5.0	0.3	0.4	0.00	6.4	15.0	0.6
31	0.5	0.0	3.5	0.2	0.3	0.00	6.4	15.0	0.6
32	0.3	0.0	2.1	0.1	0.2	0.00	6.0	14.4	0.6
35	0.5	0.0	3.7	0.2	0.2	0.00	6.1	14.6	0.6
37	0.3	0.0	1.7	0.2	0.3	0.01	6.4	14.9	0.6
39	0.2	0.0	1.4	0.2	0.2	0.00	6.0	14.4	0.6
40	0.3	0.0	1.6	0.2	0.3	0.01	6.2	14.7	0.6
41B	0.3	0.0	1.5	0.2	0.2	0.00	6.1	14.5	0.6
46B	5.9	2.2	43.6	16.9	26.2	0.46	**31.5**	54.8	1.3

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
47	0.4	0.0	2.8	0.1	0.2	0.00	6.0	14.4	0.6
58	0.6	0.1	4.1	0.8	1.1	0.02	8.0	17.4	0.7
59	0.5	0.1	3.3	0.6	0.8	0.01	7.4	16.5	0.7
60	0.4	0.1	2.4	0.4	0.6	0.01	6.9	15.7	0.7
61	0.4	0.1	2.6	0.4	0.6	0.01	7.0	15.9	0.7
63	0.8	0.2	6.7	1.2	1.8	0.04	8.7	18.4	0.7
66	5.5	1.9	39.8	14.0	21.5	0.36	25.2	44.1	1.1
69	0.7	0.0	5.0	0.3	0.3	0.00	6.4	15.0	0.0
70	0.8	0.1	5.9	1.0	1.5	0.03	8.4	17.9	0.7
75	0.6	0.1	4.9	0.7	1.0	0.02	7.7	16.9	0.7
76	0.5	0.1	4.3	0.6	0.9	0.02	7.5	16.6	0.7
79	0.4	0.1	3.1	0.5	0.7	0.01	7.2	16.2	0.7
80	0.4	0.1	2.9	0.4	0.6	0.01	7.0	15.9	0.7
82	0.4	0.1	2.6	0.4	0.6	0.01	6.9	15.8	0.7
83	0.3	0.1	2.5	0.4	0.5	0.01	6.8	15.6	0.7
84	0.3	0.1	2.3	0.4	0.5	0.01	6.7	15.4	0.6
86	0.3	0.0	2.2	0.3	0.4	0.01	6.5	15.1	0.6
87	0.3	0.0	2.2	0.3	0.4	0.01	6.6	15.3	0.6
88	0.3	0.0	1.9	0.3	0.4	0.01	6.5	15.1	0.6
89	0.3	0.0	2.1	0.3	0.4	0.01	6.4	15.0	0.6
90	0.3	0.0	2.0	0.3	0.4	0.01	6.4	15.0	0.6
91	0.3	0.0	1.7	0.3	0.4	0.01	6.4	15.0	0.6
94	0.2	0.0	1.8	0.2	0.3	0.01	6.2	14.7	0.6
95	0.2	0.0	1.8	0.2	0.3	0.01	6.2	14.7	0.6
96	0.2	0.0	1.8	0.2	0.3	0.01	6.2	14.7	0.6
97	0.2	0.0	1.8	0.2	0.3	0.01	6.3	14.8	0.6
98	0.2	0.0	1.7	0.2	0.3	0.01	6.2	14.7	0.6
99	0.3	0.0	1.6	0.2	0.3	0.01	6.2	14.7	0.6
100	0.3	0.0	1.6	0.2	0.3	0.01	6.3	14.8	0.6
101	0.3	0.0	1.5	0.2	0.3	0.01	6.2	14.6	0.6
101A	0.3	0.0	1.5	0.2	0.3	0.01	6.2	14.7	0.0
102	0.2	0.0	1.4	0.2	0.3	0.01	6.1	14.6	0.6
103	0.2	0.0	1.6	0.2	0.3	0.01	6.1	14.6	0.6
104	0.2	0.0	1.5	0.2	0.2	0.01	6.1	14.5	0.6
105	0.2	0.0	1.5	0.2	0.2	0.01	6.1	14.5	0.6
106	0.2	0.0	1.4	0.2	0.2	0.00	6.1	14.5	0.6
107	0.2	0.0	1.4	0.2	0.2	0.00	6.1	14.5	0.6
109	0.2	0.0	1.3	0.2	0.2	0.00	6.0	14.4	0.6
110	0.2	0.0	1.3	0.2	0.2	0.00	6.0	14.4	0.6
111	0.2	0.0	1.4	0.2	0.2	0.00	6.0	14.4	0.6
112	0.2	0.0	1.4	0.2	0.2	0.00	6.0	14.4	0.6
113	0.2	0.0	1.3	0.2	0.2	0.00	6.0	14.4	0.6
149	5.6	1.9	40.4	14.4	22.1	0.38	25.7	44.7	1.1
151	5.1	1.7	37.2	12.8	19.6	0.31	23.6	41.7	1.0
160	5.6	1.9	40.4	14.0	21.3	0.35	24.7	43.0	1.1

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
162	5.6	1.9	40.9	14.5	22.3	0.37	26.3	45.9	1.1
168	5.8	2.0	41.8	14.7	22.4	0.37	26.0	45.3	0.5
171	0.2	0.0	1.3	0.1	0.2	0.00	5.9	14.2	0.6
180	0.6	0.1	4.6	0.7	1.0	0.02	7.7	16.9	0.7
181	0.6	0.1	4.4	0.7	1.0	0.02	7.7	16.9	0.7
182	0.5	0.1	4.2	0.7	0.9	0.02	7.6	16.7	0.7
183	0.5	0.1	3.9	0.6	0.9	0.02	7.5	16.6	0.7
184	0.6	0.1	4.6	0.5	0.8	0.02	7.3	16.3	0.7
185	0.6	0.1	4.5	0.5	0.8	0.02	7.2	16.2	0.7
186	0.5	0.1	4.2	0.5	0.7	0.02	7.2	16.1	0.7
187	0.5	0.1	4.3	0.5	0.7	0.02	7.0	15.9	0.7
188	0.5	0.1	4.1	0.4	0.6	0.02	7.0	15.8	0.7
189	0.5	0.1	3.9	0.4	0.6	0.01	6.9	15.7	0.7
190	0.5	0.1	3.7	0.4	0.6	0.01	6.8	15.5	0.7
191	0.4	0.1	3.2	0.4	0.5	0.01	6.7	15.4	0.7
192	0.4	0.0	2.6	0.3	0.5	0.01	6.6	15.3	0.7
194	0.3	0.0	2.6	0.3	0.4	0.01	6.5	15.1	0.6
195	0.3	0.0	2.5	0.3	0.4	0.01	6.5	15.1	0.6
196	0.3	0.0	2.4	0.3	0.4	0.01	6.4	15.0	0.6
200	0.3	0.0	2.1	0.2	0.3	0.01	6.2	14.7	0.6
201	0.3	0.0	2.1	0.2	0.3	0.01	6.2	14.7	0.6
201	0.3	0.0	2.0	0.2	0.3	0.01	6.2	14.7	0.6
202	0.3	0.0	2.0	0.2	0.3	0.01	6.2	14.6	0.6
203	0.3	0.0	1.9	0.2	0.3	0.01	6.1	14.6	0.6
204	0.2	0.0	1.8	0.2	0.3	0.01	6.1	14.6	0.6
206	0.2	0.0	1.7	0.2	0.2	0.01	6.1	14.5	0.6
207	0.2	0.0	1.6	0.2	0.2	0.00	6.0	14.4	0.6
208	0.2	0.0	1.6	0.1	0.2	0.00	6.0	14.3	0.6
209	0.2	0.0	1.5	0.1	0.2	0.00	5.9	14.3	0.6
210	0.2	0.0	1.5	0.1	0.2	0.00	5.9	14.3	0.6
217	0.2	0.0	1.4	0.1	0.2	0.00	6.0	14.3	0.6
218	0.2	0.0	1.3	0.1	0.2	0.00	5.9	14.3	0.6
219	0.2	0.0	1.5	0.2	0.2	0.00	6.0	14.4	0.6
220	0.2	0.0	1.4	0.1	0.2	0.00	6.0	14.3	0.6
222	0.2	0.0	1.5	0.2	0.2	0.00	6.0	14.4	0.6
223	0.2	0.0	1.5	0.2	0.2	0.00	6.1	14.5	0.6
224	0.3	0.0	1.9	0.2	0.3	0.01	6.2	14.7	0.6
226	0.3	0.0	2.1	0.2	0.3	0.01	6.3	14.8	0.6
227	0.3	0.0	2.1	0.3	0.4	0.01	6.4	14.9	0.6
228	0.3	0.0	2.2	0.3	0.4	0.01	6.4	15.0	0.0
229	0.3	0.0	2.3	0.3	0.4	0.01	6.5	15.1	0.6
230	0.3	0.0	2.3	0.3	0.4	0.01	6.5	15.1	0.6
231	0.3	0.0	2.4	0.3	0.4	0.01	6.6	15.2	0.6
232	0.3	0.0	2.5	0.3	0.5	0.01	6.6	15.3	0.6
233	0.3	0.0	2.5	0.3	0.5	0.01	6.7	15.4	0.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
234	0.4	0.1	2.6	0.4	0.5	0.01	6.7	15.4	0.7
235	0.4	0.1	2.8	0.4	0.5	0.01	6.8	15.6	0.7
236	0.4	0.1	3.1	0.4	0.6	0.01	6.9	15.7	0.7
237	0.4	0.1	2.9	0.4	0.6	0.01	7.0	15.8	0.7
238	0.4	0.1	3.2	0.5	0.6	0.01	7.0	15.9	0.7
239	0.4	0.1	3.6	0.5	0.7	0.02	7.1	16.1	0.7
240	0.5	0.1	4.2	0.6	0.8	0.02	7.3	16.4	0.7
255	2.1	0.6	16.4	4.5	7.0	0.16	14.1	27.0	0.9
258	2.3	0.7	18.1	5.5	8.7	0.19	14.6	27.9	0.9
300	0.7	0.2	5.7	1.2	1.8	0.05	8.4	18.0	0.7
303	0.6	0.1	5.0	1.0	1.4	0.03	8.1	17.6	0.7
305	0.6	0.1	4.5	0.8	1.2	0.03	7.9	17.2	0.7
306	0.6	0.1	4.4	0.8	1.1	0.03	7.8	17.1	0.7
307	0.6	0.1	4.3	0.7	1.0	0.03	7.7	16.9	0.7
308	0.5	0.1	4.2	0.7	1.0	0.03	7.7	16.9	0.7
309	0.5	0.1	4.1	0.8	1.2	0.03	7.8	17.0	0.7
310	0.6	0.1	4.4	0.9	1.3	0.04	7.9	17.2	0.7
312	0.6	0.1	4.8	1.0	1.4	0.04	8.0	17.4	0.7
313	0.6	0.1	4.6	0.9	1.3	0.04	7.9	17.2	0.7
314	0.6	0.1	5.0	1.1	1.6	0.05	8.0	17.5	0.7
315	0.7	0.2	5.2	1.2	1.8	0.05	8.2	17.6	0.7
316	0.7	0.2	5.5	1.3	1.9	0.06	8.3	17.8	0.7
317	0.8	0.2	5.8	1.4	2.1	0.06	8.4	18.1	0.7

* Advisory NEPM reporting standard applicable to the population as a whole

Table 10-2: Modelling predictions for Year 2 of the proposed modification (mine-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
5	1.9	0.2	12.7	1.7	2.3	0.03	10.3	20.8	0.8
20	1.6	0.3	11.1	2.3	3.2	0.05	10.3	20.8	0.7
21	1.3	0.3	9.1	2.1	3.0	0.06	10.0	20.3	0.7
22	1.1	0.3	8.5	1.8	2.6	0.05	9.5	19.6	0.7
23	1.0	0.2	7.8	1.5	2.2	0.04	9.1	19.1	0.7
25	7.3	2.3	**52.4**	17.3	26.7	0.60	25.7	44.8	1.3
28	0.6	0.0	4.6	0.3	0.3	0.00	6.5	15.0	0.6
29a	0.5	0.0	3.6	0.3	0.4	0.01	6.7	15.4	0.7
29b	0.4	0.0	3.0	0.2	0.3	0.01	6.5	15.1	0.6
36	0.6	0.0	3.8	0.3	0.4	0.01	6.7	15.4	0.6
41	1.0	0.2	7.5	1.6	2.3	0.05	9.1	19.0	0.7

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
41C	5.5	1.9	39.7	14.0	21.4	0.35	25.4	44.6	1.1
48	0.2	0.0	1.7	0.1	0.2	0.00	5.8	14.1	0.6
49	3.4	1.1	25.3	8.4	12.9	0.30	16.4	30.6	1.0
51	0.4	0.0	2.7	0.1	0.2	0.00	6.0	14.4	0.6
52	0.5	0.0	4.0	0.2	0.2	0.00	6.1	14.5	0.6
64	0.8	0.2	6.1	1.2	1.7	0.04	8.6	18.3	0.7
74	0.7	0.1	5.6	0.8	1.1	0.02	7.9	17.2	0.7
77	0.5	0.1	3.4	0.6	0.8	0.02	7.5	16.6	0.7
78	0.4	0.1	3.3	0.5	0.7	0.02	7.2	16.1	0.7
81	0.4	0.1	2.8	0.5	0.6	0.01	7.1	16.0	0.7
152	5.2	1.8	37.7	13.2	20.3	0.33	24.5	43.2	1.0
153	5.2	1.8	38.0	13.3	20.5	0.33	24.8	43.7	1.0
157	5.4	1.9	39.4	14.0	21.5	0.36	25.9	45.5	1.1
158	4.9	1.7	35.5	12.5	19.1	0.30	22.8	40.3	1.0
159	5.5	1.9	39.6	14.0	21.4	0.35	25.3	44.4	1.1
161	5.6	1.9	40.6	14.2	21.7	0.36	25.4	44.3	1.1
165	5.6	1.9	40.3	14.6	22.5	0.38	27.3	47.8	1.1
169	3.9	1.0	26.4	7.7	12.2	0.26	15.9	30.0	0.9
170	0.8	0.2	5.7	1.2	1.8	0.04	8.4	18.1	0.7
172	0.7	0.2	5.7	1.1	1.5	0.03	8.4	18.0	0.7
173	3.1	0.7	20.5	5.6	8.7	0.21	13.2	25.7	0.9
175	0.7	0.1	5.1	1.0	1.5	0.03	8.3	17.8	0.7
176	0.6	0.1	4.9	0.9	1.3	0.03	8.1	17.5	0.7
177	0.6	0.1	4.8	0.9	1.2	0.03	8.0	17.4	0.7
241	0.6	0.1	4.9	0.6	0.9	0.02	7.5	16.6	0.7
253	1.8	0.2	13.7	1.4	1.9	0.04	20.0	36.4	1.5
254	1.8	0.4	13.5	3.3	5.0	0.11	13.6	26.1	0.9
257	2.4	0.7	18.7	5.5	8.7	0.20	15.1	28.7	0.9
301	0.7	0.2	5.4	1.1	1.6	0.04	8.3	17.9	0.7
302	0.7	0.1	5.1	1.0	1.5	0.04	8.2	17.7	0.7
319	0.4	0.0	2.7	0.2	0.3	0.01	6.3	14.8	0.6
319	0.5	0.0	2.8	0.2	0.3	0.01	6.4	15.0	0.7
319	0.3	0.0	2.5	0.2	0.3	0.01	6.5	15.2	0.7
319	0.3	0.0	2.5	0.2	0.2	0.01	6.4	14.9	0.6
319	0.3	0.0	2.3	0.1	0.2	0.01	6.2	14.7	0.6
319	0.3	0.0	2.1	0.2	0.2	0.01	8.0	17.7	0.7
320	2.7	0.7	17.6	5.2	8.3	0.18	13.2	25.7	0.8

* Advisory NEPM reporting standard applicable to the population as a whole

10.1.1 Predicted maximum 24-hour and annual average $PM_{2.5}$ concentrations

Figure E-1 and **Figure E-2** show the predicted maximum 24-hour average and annual average $PM_{2.5}$ concentrations for Year 2 due to emissions from the proposed modification.

The results in **Table 10-1** indicate that all privately-owned receptors are predicted to experience a maximum 24-hour average and annual average concentrations below the advisory reporting standards of 25µg/m³ and 8µg/m³, respectively in Year 2.

The results in **Table 10-2** indicate the all mine-owned receptors are also predicted to experience levels below the maximum 24-hour average and annual average $PM_{2.5}$ advisory standards in Year 2.

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

Figure E-3 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 2 due to emissions from the proposed modification.

The results in **Table 10-1** indicate that all privately-owned receptors are predicted to experience maximum 24-hour average PM_{10} concentrations below the relevant criterion of 50µg/m³ in Year 2.

The results in **Table 10-2** indicate that all mine owned receptors, with the exception of receptor 25, are predicted to experience maximum 24-hour average concentrations below 50µg/m³ in Year 2.

Results for the total (cumulative) impact for maximum 24-hour average PM_{10} concentrations are discussed in **Section 10.7**.

10.1.3 Predicted annual average PM_{10} concentrations

Figure E-4 shows the predicted annual average PM_{10} concentrations for Year 2 due to emissions from the proposed modification. **Figure E-5** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-1** indicate that one privately-owned receptor; Receptor 46B, is predicted to experience annual average PM_{10} concentrations above the relevant criterion of 30µg/m³ in Year 2.

The results in **Table 10-2** indicate the all mine-owned receptors are predicted to experience levels below the annual average PM_{10} criterion of 30µg/m³ in Year 2.

10.1.4 Predicted annual average TSP concentrations

Figure E-6 shows the predicted annual average TSP concentrations for Year 2 due to emissions from the proposed modification. **Figure E-7** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-1** indicate that all privately-owned receptors are predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 2.

The results in **Table 10-2** indicate that all mine-owned receptors are also predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 2.

10.1.5 Predicted annual average dust deposition levels

Figure E-8 shows the predicted annual average dust deposition levels for Year 2 due to emissions from the proposed modification. **Figure E-9** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-1** indicate that all privately-owned receptors are predicted to experience incremental annual average dust deposition levels below the relevant criterion of 2g/m²/month in Year 2. All privately-owned receptors are also predicted to experience total annual average dust deposition levels below the relevant criterion of 4g/m²/month in Year 2 from the proposed modification and other sources.

The results in **Table 10-2** indicate that all mine-owned receptors are predicted to experience incremental annual average dust deposition levels and total annual average deposition levels below the relevant criterion in Year 2.

10.2 Indicative Year 6

Table 10-3 presents the model predictions at each of the privately-owned receptors, the values presented in bold indicate predicted values above the relevant criteria. **Table 10-4** presents the model predictions at each of the mine-owned receptors.

Figure E-10 to **Figure E-18** in **Appendix E** present isopleth diagrams of the predicted modelling results for each of the assessed pollutants in Year 6.

Table 10-3: Modelling predictions for Year 6 of the proposed modification (privately-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
9	6.0	1.7	48.9	13.2	21.7	0.5	20.8	38.5	1.2
11A	1.6	0.1	11.5	0.9	1.2	0.0	7.7	16.9	0.7
11B	1.5	0.1	10.8	0.8	1.0	0.0	7.4	16.5	0.7
11C	1.7	0.1	12.6	0.8	1.2	0.0	7.6	16.9	0.7
26	5.5	1.8	44.4	13.5	22.0	0.5	21.2	39.0	1.1
30	0.9	0.1	7.1	0.9	1.3	0.0	6.9	15.7	0.6
31	1.3	0.1	9.8	0.7	1.0	0.0	6.8	15.5	0.6
32	1.0	0.0	7.9	0.3	0.5	0.0	6.1	14.5	0.6
35	0.9	0.1	6.5	0.5	0.7	0.0	6.3	14.9	0.6
37	1.0	0.1	8.3	0.9	1.3	0.0	6.9	15.7	0.7
39	1.0	0.1	6.5	0.5	0.8	0.0	6.3	14.9	0.6
40	1.1	0.1	7.6	0.7	1.1	0.0	6.7	15.4	0.6
41B	1.1	0.1	7.2	0.6	0.9	0.0	6.5	15.1	0.6
46B	6.9	2.1	**52.8**	16.3	26.2	0.4	27.7	49.3	1.2
47	0.9	0.1	6.7	0.4	0.5	0.0	6.2	14.6	0.6
58	2.6	0.3	20.7	2.5	3.9	0.1	9.3	19.5	0.8
59	1.9	0.3	15.2	1.9	2.9	0.1	8.5	18.2	0.7
60	1.3	0.2	10.1	1.4	2.1	0.1	7.7	17.0	0.7
61	1.5	0.2	11.6	1.5	2.2	0.1	7.9	17.2	0.7
63	3.7	0.6	29.0	4.2	6.6	0.2	11.2	22.5	0.8
66	5.7	1.7	43.4	12.9	20.3	0.3	22.4	40.2	1.0
69	1.5	0.1	10.5	0.5	0.6	0.0	6.4	15.0	0.0
70	3.4	0.4	26.5	3.3	5.2	0.1	10.2	20.9	0.8
75	2.3	0.3	17.8	2.0	3.1	0.1	8.7	18.5	0.7
76	2.0	0.2	16.0	1.9	2.8	0.1	8.4	18.1	0.7
79	1.8	0.2	14.0	1.6	2.5	0.1	8.1	17.6	0.7
80	1.6	0.2	12.4	1.4	2.2	0.1	7.8	17.1	0.7
82	1.4	0.2	11.0	1.4	2.1	0.1	7.7	17.0	0.7
83	1.2	0.2	9.8	1.2	1.8	0.0	7.5	16.6	0.7
84	1.1	0.2	8.8	1.2	1.8	0.0	7.4	16.5	0.7
86	1.0	0.1	7.7	1.0	1.5	0.0	7.1	16.0	0.7
87	1.0	0.1	8.2	1.1	1.6	0.0	7.2	16.3	0.7

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
88	1.0	0.1	7.9	1.0	1.5	0.0	7.1	16.0	0.7
89	0.9	0.1	7.4	0.9	1.4	0.0	7.0	15.8	0.7
90	0.9	0.1	7.3	0.9	1.3	0.0	6.9	15.7	0.7
91	1.0	0.1	8.1	0.9	1.4	0.0	6.9	15.8	0.7
94	0.9	0.1	6.9	0.7	1.1	0.0	6.6	15.3	0.7
95	0.9	0.1	7.1	0.7	1.1	0.0	6.6	15.3	0.7
96	0.9	0.1	7.2	0.7	1.1	0.0	6.7	15.4	0.7
97	0.9	0.1	7.4	0.8	1.2	0.0	6.7	15.5	0.7
98	0.9	0.1	7.4	0.8	1.1	0.0	6.7	15.4	0.7
99	0.9	0.1	7.5	0.8	1.1	0.0	6.7	15.4	0.7
100	1.0	0.1	7.8	0.8	1.2	0.0	6.8	15.5	0.7
101	1.0	0.1	6.9	0.7	1.0	0.0	6.6	15.2	0.6
101A	1.0	0.1	6.9	0.7	1.1	0.0	6.6	15.3	0.0
102	1.0	0.1	6.4	0.7	1.0	0.0	6.5	15.2	0.6
103	0.8	0.1	6.4	0.7	1.0	0.0	6.5	15.2	0.6
104	0.9	0.1	5.9	0.6	0.9	0.0	6.5	15.1	0.6
105	0.9	0.1	5.9	0.6	0.9	0.0	6.4	15.0	0.6
106	1.0	0.1	6.6	0.6	0.9	0.0	6.4	15.0	0.6
107	1.0	0.1	6.8	0.6	0.9	0.0	6.5	15.1	0.6
109	0.9	0.1	6.3	0.5	0.8	0.0	6.3	14.9	0.6
110	0.9	0.1	6.2	0.5	0.8	0.0	6.3	14.8	0.6
111	0.9	0.1	6.0	0.6	0.9	0.0	6.4	14.9	0.6
112	0.9	0.1	6.1	0.6	0.8	0.0	6.3	14.9	0.6
113	0.9	0.1	6.2	0.6	0.8	0.0	6.4	14.9	0.6
149	5.8	1.8	43.5	13.2	20.8	0.3	22.7	40.7	1.0
151	5.4	1.6	41.5	12.1	18.9	0.3	21.3	38.5	1.0
160	5.6	1.7	43.1	12.8	19.9	0.3	21.9	39.3	1.0
162	5.9	1.8	44.2	13.5	21.2	0.3	23.2	41.6	1.0
168	5.9	1.8	44.5	13.4	21.0	0.3	23.0	41.1	0.4
171	0.7	0.1	4.8	0.4	0.6	0.0	6.1	14.6	0.6
180	2.5	0.3	19.8	2.1	3.2	0.1	8.7	18.6	0.7
181	2.5	0.3	19.4	2.0	3.1	0.1	8.7	18.5	0.7
182	2.4	0.3	18.5	1.9	3.0	0.1	8.5	18.2	0.7
183	2.3	0.2	17.7	1.8	2.8	0.1	8.4	18.0	0.7
184	1.9	0.2	14.8	1.6	2.5	0.1	8.1	17.6	0.7
185	1.8	0.2	14.4	1.6	2.4	0.1	8.0	17.5	0.7
186	1.8	0.2	14.0	1.5	2.3	0.1	7.9	17.3	0.7
187	1.6	0.2	12.5	1.4	2.1	0.1	7.8	17.0	0.7
188	1.6	0.2	12.1	1.3	2.0	0.1	7.6	16.9	0.7
189	1.5	0.2	11.4	1.3	1.9	0.1	7.6	16.8	0.7
190	1.4	0.2	10.5	1.2	1.8	0.1	7.4	16.5	0.7
191	1.3	0.1	9.8	1.1	1.7	0.0	7.3	16.4	0.7
192	1.2	0.1	9.1	1.0	1.6	0.0	7.2	16.2	0.7
194	1.0	0.1	8.1	0.9	1.4	0.0	7.0	15.9	0.7
195	1.0	0.1	7.9	0.9	1.4	0.0	7.0	15.9	0.7

Receptor ID	PM$_{2.5}$ (µg/m³)		PM$_{10}$ (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM$_{10}$ (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
196	0.9	0.1	7.4	0.8	1.3	0.0	6.9	15.7	0.7
200	0.8	0.1	6.5	0.7	1.1	0.0	6.6	15.3	0.7
201	0.8	0.1	6.4	0.7	1.1	0.0	6.6	15.3	0.7
201	0.8	0.1	6.4	0.7	1.0	0.0	6.6	15.2	0.7
202	0.8	0.1	6.3	0.7	1.0	0.0	6.5	15.2	0.7
203	0.8	0.1	6.4	0.7	1.0	0.0	6.5	15.2	0.6
204	0.8	0.1	6.4	0.6	1.0	0.0	6.5	15.1	0.6
206	0.8	0.1	5.8	0.6	0.9	0.0	6.4	15.0	0.6
207	0.8	0.1	5.0	0.5	0.8	0.0	6.3	14.8	0.6
208	0.7	0.1	4.9	0.5	0.7	0.0	6.2	14.7	0.6
209	0.7	0.1	4.9	0.5	0.7	0.0	6.2	14.7	0.6
210	0.7	0.1	4.9	0.5	0.7	0.0	6.2	14.6	0.6
217	0.8	0.1	5.6	0.5	0.7	0.0	6.2	14.8	0.6
218	0.8	0.1	5.4	0.5	0.7	0.0	6.2	14.7	0.6
219	0.8	0.1	5.4	0.5	0.8	0.0	6.3	14.8	0.6
220	0.8	0.1	5.2	0.5	0.7	0.0	6.2	14.7	0.6
222	0.9	0.1	5.7	0.6	0.8	0.0	6.3	14.9	0.6
223	0.9	0.1	5.8	0.6	0.9	0.0	6.4	15.0	0.6
224	0.9	0.1	6.9	0.7	1.1	0.0	6.7	15.4	0.7
226	0.9	0.1	6.9	0.8	1.2	0.0	6.7	15.5	0.7
227	0.9	0.1	7.1	0.8	1.3	0.0	6.8	15.6	0.7
228	0.9	0.1	7.2	0.9	1.3	0.0	6.9	15.7	0.1
229	0.9	0.1	7.6	0.9	1.4	0.0	7.0	15.9	0.7
230	1.0	0.1	7.8	1.0	1.4	0.0	7.1	16.0	0.7
231	1.0	0.1	8.2	1.0	1.5	0.0	7.1	16.1	0.7
232	1.1	0.1	8.8	1.0	1.6	0.0	7.2	16.2	0.7
233	1.1	0.1	9.2	1.1	1.6	0.0	7.3	16.3	0.7
234	1.2	0.2	9.7	1.1	1.7	0.0	7.3	16.4	0.7
235	1.4	0.2	10.6	1.2	1.9	0.1	7.5	16.6	0.7
236	1.4	0.2	11.1	1.3	1.9	0.1	7.6	16.8	0.7
237	1.5	0.2	12.0	1.4	2.1	0.1	7.7	17.0	0.7
238	1.6	0.2	12.4	1.4	2.2	0.1	7.8	17.1	0.7
239	1.7	0.2	13.2	1.5	2.3	0.1	8.0	17.4	0.7
240	1.9	0.2	14.9	1.7	2.6	0.1	8.2	17.8	0.7
255	3.2	0.8	24.8	5.7	9.0	0.2	14.1	26.9	0.9
258	3.3	0.9	25.4	6.5	10.3	0.2	14.5	27.8	0.9
300	2.9	0.6	22.5	4.2	6.7	0.2	11.1	22.5	0.9
303	3.0	0.4	23.3	3.2	5.1	0.2	10.0	20.7	0.8
305	2.8	0.3	21.7	2.6	4.0	0.1	9.3	19.4	0.8
306	2.7	0.3	21.0	2.3	3.6	0.1	9.0	19.0	0.8
307	2.6	0.3	20.2	2.2	3.5	0.1	8.9	18.8	0.8
308	2.5	0.3	19.8	2.2	3.4	0.1	8.8	18.7	0.8
309	2.6	0.4	20.0	2.7	4.2	0.1	9.3	19.5	0.8
310	2.6	0.4	20.2	3.0	4.7	0.2	9.7	20.1	0.8
312	2.5	0.4	19.5	3.4	5.3	0.2	10.1	20.8	0.9

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
313	2.5	0.4	19.6	3.1	4.9	0.2	9.8	20.3	0.8
314	2.4	0.5	18.4	3.7	5.9	0.2	10.5	21.4	0.9
315	2.4	0.5	19.5	4.0	6.4	0.2	10.8	21.9	0.9
316	2.5	0.6	20.5	4.3	6.8	0.3	11.1	22.3	0.9
317	2.7	0.6	22.3	4.6	7.4	0.3	11.5	23.1	0.9

* Advisory NEPM reporting standard applicable to the population as a whole

Table 10-4: Modelling predictions for Year 6 of the proposed modification (mine-owned receptors)

Receptor ID	PM2.5 (µg/m³)		PM10 (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM10 (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
5	7.5	1.2	**59.4**	9.4	15.3	0.44	17.1	32.4	1.1
20	4.8	1.2	38.2	9.2	15.0	0.35	16.8	31.8	1.0
21	4.4	1.0	35.3	8.0	12.9	0.31	15.4	29.5	1.0
22	4.2	0.9	32.7	6.6	10.7	0.26	13.9	27.0	0.9
23	4.1	0.7	31.7	5.4	8.7	0.22	12.6	24.9	0.9
25	7.0	2.4	**54.8**	18.4	29.6	0.58	26.4	47.1	1.2
28	1.2	0.1	8.8	0.8	1.1	0.02	6.8	15.6	0.6
29a	1.9	0.1	14.1	0.7	1.1	0.02	7.0	15.9	0.7
29b	1.9	0.1	14.0	0.6	0.9	0.01	6.8	15.5	0.6
36	1.5	0.1	11.5	0.9	1.3	0.02	7.2	16.1	0.7
41	3.9	0.7	30.5	5.6	9.1	0.22	12.8	25.2	0.9
41C	5.7	1.7	43.7	13.0	20.4	0.32	22.6	40.6	1.0
48	0.7	0.0	5.3	0.3	0.4	0.01	6.0	14.3	0.6
49	6.1	1.8	48.9	13.8	22.8	0.50	21.5	39.7	1.1
51	1.2	0.1	9.1	0.4	0.5	0.01	6.2	14.6	0.6
52	1.0	0.0	7.7	0.3	0.4	0.00	6.1	14.5	0.6
64	3.6	0.5	27.9	4.1	6.5	0.16	11.1	22.3	0.8
74	2.6	0.3	20.6	2.3	3.6	0.09	9.0	19.0	0.7
77	2.0	0.3	15.8	1.9	2.9	0.08	8.5	18.2	0.7
78	1.7	0.2	13.6	1.6	2.4	0.06	8.0	17.5	0.7
81	1.6	0.2	12.7	1.5	2.3	0.06	8.0	17.4	0.7
152	5.5	1.6	42.3	12.5	19.6	0.30	22.0	39.6	1.0
153	5.6	1.7	42.8	12.6	19.8	0.30	22.2	40.0	1.0
157	5.7	1.7	43.8	13.2	20.7	0.32	23.0	41.3	1.0
158	5.1	1.6	39.3	11.7	18.3	0.28	20.7	37.4	0.9
159	5.7	1.7	43.5	12.9	20.3	0.32	22.5	40.4	1.0
161	5.7	1.7	43.7	13.0	20.4	0.32	22.5	40.3	1.0
165	5.9	1.8	44.8	13.8	21.8	0.35	24.1	43.2	1.0
169	4.3	1.3	34.7	9.6	15.4	0.29	17.2	32.3	0.9
170	3.1	0.6	23.8	4.2	6.7	0.20	11.1	22.5	0.9

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
172	3.4	0.5	26.4	3.5	5.5	0.14	10.4	21.3	0.8
173	5.3	1.2	42.3	9.6	15.6	0.36	16.9	32.0	1.0
175	3.2	0.4	24.5	3.4	5.4	0.15	10.2	21.0	0.8
176	3.1	0.4	24.0	2.9	4.6	0.13	9.7	20.1	0.8
177	3.0	0.4	23.0	2.7	4.2	0.12	9.4	19.7	0.8
241	2.1	0.2	16.4	1.8	2.8	0.08	8.4	18.1	0.7
253	3.1	0.3	22.9	2.1	3.1	0.07	16.4	30.4	1.2
254	2.9	0.6	22.0	4.5	7.0	0.15	13.6	26.0	0.9
257	3.5	0.9	26.9	6.6	10.5	0.22	15.2	28.7	0.9
301	2.9	0.5	22.9	3.9	6.2	0.19	10.7	21.8	0.8
302	3.0	0.5	23.0	3.5	5.6	0.17	10.4	21.2	0.8
319	1.1	0.1	7.0	0.5	0.8	0.02	6.6	15.2	0.7
319	1.2	0.1	7.4	0.6	0.8	0.02	6.7	15.4	0.7
319	0.8	0.1	6.0	0.5	0.7	0.02	6.9	15.6	0.7
319	0.8	0.1	5.7	0.5	0.7	0.02	6.7	15.4	0.7
319	0.7	0.1	5.2	0.4	0.6	0.02	6.5	15.0	0.6
319	0.7	0.1	4.7	0.4	0.6	0.02	7.7	17.0	0.7
320	3.1	0.8	25.0	6.2	9.8	0.19	13.6	26.3	0.8

* Advisory NEPM reporting standard applicable to the population as a whole

10.2.1 Predicted maximum 24-hour and annual average $PM_{2.5}$ concentrations

Figure E-10 and **Figure E-11** show the predicted maximum 24-hour average and annual average $PM_{2.5}$ concentrations for Year 6 due to emissions from the proposed modification.

The results in **Table 10-3** indicate that all privately-owned receptors are predicted to experience maximum 24-hour average and annual average concentrations below the advisory reporting standards of 25µg/m³ and 8µg/m³, respectively in Year 6.

The results in **Table 10-4** indicate the all mine-owned receptors are also predicted to experience levels below the maximum 24-hour average and annual average $PM_{2.5}$ advisory standards in Year 6.

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

Figure E-12 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 6 due to emissions from the proposed modification. The results in **Table 10-3** indicate that one sensitive receptor; Receptor 46B, is predicted to experience maximum 24-hour average PM_{10} concentrations above the relevant criterion of 50µg/m³ in Year 6.

An analysis of the number of days that the DP&I acquisition criterion of 50µg/m³ would be exceeded at this receptor is presented in **Table 10-5**. The analysis indicates this receptor would experience systemic levels above the DP&I acquisition criterion (i.e. on more than 5 days).

Table 10-5: Analysis of maximum 24-hour average PM_{10} concentrations - Year 6

Receptor ID	Number of days over 50µg/m³
46B	1

The results in **Table 10-4** indicate that all mine-owned receptors, with the exception of Receptors 5 and 25, are predicted to experience maximum 24-hour average concentrations below 50µg/m³ in Year 6. It is noted that the dwelling at Receptor 5 is currently uninhabited.

Results for the total (cumulative) impact for maximum 24-hour average PM_{10} concentrations are discussed in **Section 10.7**.

10.2.3 Predicted annual average PM_{10} concentrations

Figure E-13 shows the predicted annual average PM_{10} concentrations for Year 6 due to emissions from the proposed modification. **Figure E-14** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-3** indicate that all privately-owned receptors are predicted to experience annual average PM_{10} concentrations below the relevant criterion of 30µg/m³ in Year 6.

The results in **Table 10-4** indicate that all mine-owned receptors are also predicted to experience annual average PM_{10} concentrations below the relevant criterion of 30µg/m³ in Year 6.

10.2.4 Predicted annual average TSP concentrations

Figure E-15 shows the predicted annual average TSP concentrations for Year 6 due to emissions from the proposed modification. **Figure E-16** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-3** indicate that all privately-owned receptors are predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 6.

The results in **Table 10-4** indicate that all mine-owned receptors are also predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 6.

10.2.5 Predicted annual average dust deposition levels

Figure E-17 shows the predicted annual average dust deposition levels for Year 6 due to emissions from the proposed modification. **Figure E-18** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-3** indicate that all privately-owned receptors are predicted to experience incremental annual average dust deposition levels below the relevant criterion of 2g/m²/month in Year 6. All privately-owned receptors are also predicted to experience total annual average dust deposition levels below the relevant criterion of 4g/m²/month in Year 6 from the proposed modification and other sources.

The results in **Table 10-4** indicate that all mine-owned receptors are predicted to experience incremental annual average dust deposition levels and total annual average deposition levels below the relevant criterion in Year 6.

10.3 Indicative Year 11

Table 10-6 presents the model predictions at each of the privately-owned receptors, the values presented in bold indicate predicted values above the relevant criteria. **Table 10-7** presents the model predications at each of the mine-owned receptors.

Figure E-19 to **Figure E-27** in **Appendix E** present isopleth diagrams of the predicted modelling results for each of the assessed pollutants in Year 11.

Table 10-6: Modelling predictions for Year 11 of the proposed modification (privately-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
9	4.7	1.4	38.5	10.5	17.1	0.4	17.3	32.7	1.0
11A	1.3	0.1	9.9	0.7	1.0	0.0	6.9	15.7	0.7
11B	1.2	0.1	8.8	0.6	0.9	0.0	6.7	15.4	0.7
11C	1.4	0.1	9.8	0.7	1.0	0.0	6.9	15.6	0.7
26	3.8	1.3	30.6	9.9	15.8	0.3	16.7	31.5	0.9
30	0.9	0.1	7.4	0.9	1.3	0.0	6.7	15.5	0.6
31	1.1	0.1	8.9	0.7	1.0	0.0	6.6	15.2	0.6
32	0.9	0.0	6.8	0.3	0.5	0.0	6.0	14.4	0.6
35	0.7	0.1	5.2	0.5	0.7	0.0	6.2	14.7	0.6
37	1.0	0.1	8.4	0.9	1.3	0.0	6.7	15.5	0.7
39	0.8	0.1	5.0	0.5	0.8	0.0	6.2	14.7	0.6
40	0.9	0.1	5.9	0.7	1.1	0.0	6.5	15.1	0.6
41B	0.9	0.1	5.6	0.6	0.9	0.0	6.3	14.9	0.6
46B	5.0	1.3	38.1	10.1	15.8	0.2	19.7	36.1	0.9
47	0.7	0.0	5.2	0.3	0.5	0.0	6.0	14.4	0.6
58	2.9	0.4	22.6	2.7	4.3	0.1	9.1	19.3	0.8
59	1.9	0.3	15.2	2.0	3.1	0.1	8.2	17.8	0.7
60	1.3	0.2	10.4	1.4	2.2	0.1	7.5	16.7	0.7
61	1.4	0.2	11.6	1.5	2.3	0.1	7.6	16.9	0.7
63	4.5	0.6	35.4	4.5	7.4	0.2	11.0	22.6	0.8
66	4.2	1.2	32.0	9.3	14.4	0.2	17.3	32.1	0.9
69	1.5	0.1	11.1	0.4	0.6	0.0	6.1	14.5	0.0
70	4.0	0.5	31.5	3.5	5.7	0.2	10.0	20.8	0.8
75	2.6	0.3	20.4	2.2	3.4	0.1	8.4	18.2	0.7
76	2.3	0.3	17.6	1.9	3.1	0.1	8.2	17.8	0.7
79	1.8	0.2	14.7	1.7	2.7	0.1	7.9	17.3	0.7
80	1.6	0.2	12.9	1.5	2.3	0.1	7.6	16.8	0.7
82	1.4	0.2	11.1	1.4	2.2	0.1	7.5	16.7	0.7
83	1.2	0.2	9.9	1.3	1.9	0.1	7.3	16.3	0.7
84	1.1	0.2	9.1	1.2	1.8	0.1	7.2	16.2	0.7
86	1.0	0.1	8.0	1.0	1.5	0.0	6.9	15.7	0.7
87	1.1	0.1	8.5	1.1	1.7	0.0	7.0	16.0	0.7
88	1.0	0.1	8.3	1.0	1.6	0.0	6.9	15.8	0.7
89	1.0	0.1	7.7	0.9	1.4	0.0	6.8	15.6	0.7
90	0.9	0.1	7.6	0.9	1.4	0.0	6.7	15.5	0.7
91	1.0	0.1	8.3	0.9	1.4	0.0	6.7	15.5	0.7
94	0.9	0.1	7.1	0.7	1.1	0.0	6.5	15.1	0.6
95	0.9	0.1	7.3	0.7	1.1	0.0	6.5	15.1	0.6
96	0.9	0.1	7.4	0.8	1.1	0.0	6.5	15.2	0.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
97	0.9	0.1	7.6	0.8	1.2	0.0	6.6	15.2	0.6
98	0.9	0.1	7.5	0.8	1.2	0.0	6.5	15.2	0.6
99	0.9	0.1	7.6	0.8	1.2	0.0	6.5	15.2	0.6
100	1.0	0.1	7.8	0.8	1.2	0.0	6.6	15.3	0.6
101	0.9	0.1	5.6	0.7	1.0	0.0	6.4	15.0	0.6
101A	0.9	0.1	6.5	0.7	1.1	0.0	6.5	15.1	0.0
102	0.8	0.1	5.8	0.7	1.0	0.0	6.4	15.0	0.6
103	0.8	0.1	6.6	0.7	1.0	0.0	6.4	15.0	0.6
104	0.8	0.1	5.8	0.6	0.9	0.0	6.3	14.9	0.6
105	0.8	0.1	5.6	0.6	0.9	0.0	6.3	14.8	0.6
106	0.8	0.1	5.1	0.6	0.9	0.0	6.3	14.8	0.6
107	0.8	0.1	5.3	0.6	0.9	0.0	6.3	14.9	0.6
109	0.8	0.1	4.9	0.5	0.8	0.0	6.2	14.7	0.6
110	0.8	0.1	4.8	0.5	0.8	0.0	6.2	14.6	0.6
111	0.8	0.1	4.8	0.6	0.9	0.0	6.2	14.8	0.6
112	0.8	0.1	4.8	0.5	0.8	0.0	6.2	14.7	0.6
113	0.8	0.1	4.9	0.6	0.8	0.0	6.2	14.7	0.6
149	0.0	1.2	31.8	9.3	14.5	0.2	17.4	32.2	0.9
151	0.0	1.2	31.3	9.0	13.9	0.2	16.8	31.3	0.9
160	0.0	1.2	32.3	9.4	14.6	0.2	17.2	31.9	0.9
162	0.0	1.3	32.4	9.4	14.7	0.2	17.7	32.7	0.9
168	4.3	1.3	32.8	9.6	14.8	0.2	17.7	32.7	0.3
171	0.6	0.1	3.9	0.4	0.6	0.0	6.0	14.4	0.6
180	3.0	0.3	23.5	2.2	3.5	0.1	8.4	18.3	0.7
181	2.9	0.3	23.1	2.1	3.4	0.1	8.4	18.1	0.7
182	2.8	0.3	22.1	2.0	3.2	0.1	8.2	17.9	0.7
183	2.7	0.3	21.3	1.9	3.0	0.1	8.1	17.7	0.7
184	2.2	0.2	17.3	1.7	2.6	0.1	7.8	17.3	0.7
185	2.2	0.2	16.9	1.6	2.6	0.1	7.8	17.1	0.7
186	2.1	0.2	16.6	1.5	2.4	0.1	7.6	17.0	0.7
187	1.8	0.2	14.0	1.4	2.2	0.1	7.5	16.7	0.7
188	1.7	0.2	13.5	1.4	2.1	0.1	7.4	16.6	0.7
189	1.5	0.2	12.2	1.3	2.0	0.1	7.3	16.5	0.7
190	1.4	0.2	11.1	1.2	1.9	0.1	7.2	16.2	0.7
191	1.3	0.2	10.3	1.1	1.8	0.1	7.1	16.1	0.7
192	1.2	0.1	9.5	1.1	1.7	0.1	7.0	15.9	0.7
194	1.0	0.1	8.4	0.9	1.4	0.0	6.8	15.6	0.7
195	1.0	0.1	8.1	0.9	1.5	0.0	6.8	15.6	0.7
196	1.0	0.1	7.6	0.9	1.3	0.0	6.7	15.4	0.7
200	0.8	0.1	6.7	0.7	1.1	0.0	6.5	15.1	0.7
201	0.8	0.1	6.6	0.7	1.1	0.0	6.5	15.1	0.7
201	0.8	0.1	6.6	0.7	1.1	0.0	6.4	15.1	0.6
202	0.8	0.1	6.5	0.7	1.0	0.0	6.4	15.0	0.6
203	0.8	0.1	6.6	0.7	1.0	0.0	6.4	15.0	0.6
204	0.8	0.1	6.6	0.7	1.0	0.0	6.4	15.0	0.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
206	0.8	0.1	6.0	0.6	0.9	0.0	6.3	14.8	0.6
207	0.7	0.1	5.0	0.5	0.8	0.0	6.2	14.7	0.6
208	0.7	0.1	4.7	0.5	0.8	0.0	6.1	14.6	0.6
209	0.6	0.1	4.1	0.5	0.7	0.0	6.1	14.5	0.6
210	0.6	0.1	4.0	0.4	0.7	0.0	6.1	14.5	0.6
217	0.7	0.1	4.4	0.5	0.7	0.0	6.1	14.6	0.6
218	0.7	0.1	4.3	0.5	0.7	0.0	6.1	14.5	0.6
219	0.7	0.1	4.5	0.5	0.8	0.0	6.2	14.6	0.6
220	0.7	0.1	4.3	0.5	0.7	0.0	6.1	14.6	0.6
222	0.7	0.1	4.8	0.6	0.8	0.0	6.2	14.7	0.6
223	0.7	0.1	5.3	0.6	0.9	0.0	6.3	14.8	0.6
224	0.9	0.1	7.2	0.8	1.1	0.0	6.5	15.2	0.6
226	0.9	0.1	7.1	0.8	1.2	0.0	6.6	15.3	0.7
227	0.9	0.1	7.4	0.9	1.3	0.0	6.7	15.4	0.7
228	1.5	0.1	11.1	0.4	0.6	0.0	6.1	14.5	0.0
229	1.0	0.1	7.8	0.9	1.4	0.0	6.8	15.6	0.7
230	1.0	0.1	8.0	1.0	1.5	0.0	6.9	15.7	0.7
231	1.0	0.1	8.4	1.0	1.6	0.0	6.9	15.8	0.7
232	1.1	0.1	8.9	1.1	1.7	0.0	7.0	15.9	0.7
233	1.2	0.1	9.3	1.1	1.7	0.0	7.1	16.0	0.7
234	1.2	0.2	9.9	1.2	1.8	0.1	7.1	16.1	0.7
235	1.4	0.2	11.1	1.2	1.9	0.1	7.2	16.3	0.7
236	1.5	0.2	11.7	1.3	2.0	0.1	7.3	16.5	0.7
237	1.6	0.2	12.5	1.4	2.2	0.1	7.5	16.7	0.7
238	1.6	0.2	13.2	1.5	2.3	0.1	7.6	16.8	0.7
239	1.8	0.2	14.1	1.6	2.5	0.1	7.7	17.0	0.7
240	2.1	0.2	16.3	1.8	2.8	0.1	8.0	17.5	0.7
255	2.5	0.6	19.8	4.3	6.8	0.1	11.5	23.0	0.8
258	2.8	0.7	22.2	5.1	8.0	0.2	12.1	24.0	0.8
300	3.3	0.6	26.4	4.6	7.7	0.3	11.1	22.7	0.9
303	3.5	0.4	27.4	3.4	5.5	0.2	9.8	20.5	0.8
305	3.3	0.4	25.4	2.7	4.3	0.1	9.0	19.2	0.8
306	3.1	0.3	24.6	2.5	3.9	0.1	8.7	18.7	0.8
307	3.1	0.3	23.9	2.3	3.7	0.1	8.6	18.5	0.8
308	3.0	0.3	23.4	2.3	3.7	0.1	8.5	18.4	0.8
309	3.0	0.4	23.7	2.8	4.5	0.2	9.1	19.3	0.8
310	3.1	0.4	23.9	3.1	5.1	0.2	9.4	19.9	0.8
312	2.9	0.5	22.6	3.7	6.0	0.2	10.0	20.9	0.9
313	2.9	0.4	22.7	3.4	5.5	0.2	9.7	20.3	0.9
314	3.0	0.5	24.2	4.2	6.9	0.3	10.5	21.8	0.9
315	3.3	0.6	27.1	4.6	7.6	0.3	11.0	22.5	1.0
316	3.6	0.6	29.6	5.0	8.3	0.3	11.4	23.2	1.0
317	4.0	0.7	32.8	5.4	9.1	0.3	11.8	24.1	1.0

* Advisory NEPM reporting standard applicable to the population as a whole

Table 10-7: Modelling predictions for Year 11 of the proposed modification (mine-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
5	15.0	2.7	**116.6**	21.0	35.0	0.72	28.1	51.1	1.4
20	7.7	1.7	**62.3**	13.4	23.2	0.57	20.3	38.9	1.2
21	6.7	1.3	**54.1**	10.4	17.8	0.46	17.2	33.4	1.1
22	5.7	1.0	45.9	8.0	13.5	0.35	14.6	28.9	1.0
23	5.2	0.8	41.3	6.2	10.4	0.27	12.8	25.7	0.9
25	4.5	1.7	35.2	13.3	20.9	0.41	20.2	36.9	1.0
28	1.0	0.1	7.5	0.8	1.2	0.02	6.7	15.4	0.6
29a	1.4	0.1	10.7	0.7	1.0	0.02	6.7	15.4	0.7
29b	1.3	0.1	9.8	0.6	0.8	0.01	6.5	15.1	0.6
36	1.3	0.1	9.6	1.0	1.4	0.02	7.0	15.8	0.6
41	5.0	0.8	39.4	6.4	10.8	0.27	13.0	26.1	0.9
41C	4.2	1.2	32.2	9.3	14.4	0.22	17.4	32.3	0.9
48	0.7	0.0	5.1	0.3	0.4	0.01	5.9	14.2	0.6
49	4.0	1.3	31.9	9.9	15.9	0.33	16.7	31.5	1.0
51	0.8	0.1	5.9	0.4	0.5	0.01	6.0	14.4	0.6
52	0.9	0.0	6.6	0.3	0.4	0.00	5.9	14.2	0.6
64	4.3	0.6	33.8	4.4	7.2	0.19	10.9	22.3	0.8
74	3.1	0.3	24.3	2.5	3.9	0.11	8.8	18.8	0.7
77	2.1	0.3	16.7	2.0	3.1	0.09	8.2	17.9	0.7
78	1.8	0.2	14.5	1.6	2.6	0.07	7.8	17.1	0.7
81	1.6	0.2	12.8	1.6	2.5	0.07	7.7	17.0	0.7
152	4.1	1.2	31.8	9.1	14.1	0.21	17.1	31.9	0.9
153	4.2	1.2	31.8	9.1	14.1	0.21	17.2	32.0	0.9
157	4.2	1.2	32.3	9.3	14.4	0.22	17.6	32.7	0.9
158	4.0	1.2	31.4	8.9	13.9	0.21	16.6	30.9	0.9
159	4.2	1.2	32.2	9.3	14.4	0.22	17.4	32.2	0.9
161	4.2	1.2	32.4	9.4	14.6	0.22	17.4	32.3	0.9
165	4.3	1.3	33.2	9.5	14.8	0.22	18.1	33.6	0.9
169	3.3	1.0	26.6	7.8	12.3	0.23	14.5	27.9	0.9
170	3.6	0.6	27.9	4.6	7.6	0.23	11.0	22.6	0.9
172	4.0	0.5	31.4	3.8	6.1	0.17	10.2	21.1	0.8
173	3.7	1.0	29.8	7.4	11.9	0.25	14.0	27.2	0.9
175	3.7	0.5	29.0	3.6	5.9	0.17	10.0	20.9	0.8
176	3.6	0.4	28.1	3.1	5.0	0.14	9.4	19.9	0.8
177	3.5	0.4	27.0	2.8	4.6	0.13	9.2	19.4	0.8
241	2.4	0.3	18.9	1.9	3.0	0.09	8.1	17.8	0.7
253	2.3	0.2	16.8	1.8	2.5	0.06	9.5	19.7	0.8
254	2.3	0.5	17.3	3.4	5.3	0.10	10.8	21.9	0.8
257	2.8	0.7	21.9	5.0	8.0	0.15	12.2	24.3	0.8
301	3.4	0.5	26.8	4.2	6.9	0.22	10.6	21.9	0.9
302	3.5	0.5	27.1	3.8	6.2	0.20	10.2	21.2	0.8
319	0.9	0.1	5.9	0.5	0.7	0.02	6.4	14.9	0.6

Receptor ID	$PM_{2.5}$ (μg/m³)		PM_{10} (μg/m³)		TSP (μg/m³)	DD (g/m²/month)	PM_{10} (μg/m³)	TSP (μg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
319	1.0	0.1	6.3	0.5	0.8	0.02	6.5	15.1	0.6
319	0.8	0.1	4.9	0.5	0.7	0.02	6.6	15.2	0.7
319	0.8	0.1	4.8	0.5	0.6	0.02	6.4	15.0	0.6
319	0.7	0.1	4.3	0.4	0.5	0.02	6.2	14.7	0.6
319	0.8	0.1	4.4	0.5	0.7	0.02	7.2	16.3	0.7
320	2.6	0.7	20.7	5.2	8.2	0.16	11.8	23.6	0.8

* Advisory NEPM reporting standard applicable to the population as a whole

10.3.1 Predicted maximum 24-hour and annual average $PM_{2.5}$ concentrations

Figure E-19 and **Figure E-20** show the predicted maximum 24-hour average and annual average $PM_{2.5}$ concentrations for Year 11 due to emissions from the proposed modification.

The results in **Table 10-6** indicate that all privately-owned receptors are predicted to experience a maximum 24-hour average and annual average concentrations below the advisory reporting standards of 25μg/m³ and 8μg/m³, respectively in Year 11.

The results in **Table 10-7** indicate the all mine-owned receptors are also predicted to experience levels below the maximum 24-hour average and annual average $PM_{2.5}$ advisory standards in Year 11.

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

Figure E-21 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 11 due to emissions from the proposed modification. The results in **Table 10-6** indicate that all privately-owned receptors are predicted to experience maximum 24-hour average PM_{10} concentrations below the relevant criterion of 50μg/m³ in Year 11.

The results in **Table 10-7** indicate that all mine-owned receptors, with the exception of Receptors 5, 20 and 21, are predicted to experience maximum 24-hour average concentrations below 50μg/m³ in Year 11.

Results for the total (cumulative) impact for maximum 24-hour average PM_{10} concentrations are discussed in **Section 10.7**.

10.3.3 Predicted annual average PM_{10} concentrations

Figure E-22 shows the predicted annual average PM_{10} concentrations for Year 11 due to emissions from the proposed modification. **Figure E-23** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-6** indicate that all privately-owned receptors are predicted to experience annual average PM_{10} concentrations below the relevant criterion of 30μg/m³ in Year 11.

The results in **Table 10-7** indicate that all mine-owned receptors are also predicted to experience annual average PM_{10} concentrations below the relevant criterion of 30μg/m³ in Year 11.

10.3.4 Predicted annual average TSP concentrations

Figure E-24 shows the predicted annual average TSP concentrations for Year 11 due to emissions from the proposed modification. **Figure E-25** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-6** indicate that all privately-owned receptors are predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 11.

The results in **Table 10-7** indicate that all mine-owned receptors are also predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 11.

10.3.5 Predicted annual average dust deposition levels

Figure E-26 shows the predicted annual average dust deposition levels for Year 11 due to emissions from the proposed modification. **Figure E-27** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-6** indicate that all privately-owned receptors are predicted to experience incremental annual average dust deposition levels below the relevant criterion of 2g/m²/month in Year 11.All privately-owned receptors are also predicted to experience total annual average dust deposition levels below the relevant criterion of 4g/m²/month in Year 11 from the proposed modification and other sources.

The results in **Table 10-7** indicate that all mine-owned receptors are also predicted to experience incremental annual average dust deposition levels and total annual average deposition levels below the relevant criterion in Year 11.

10.4 Indicative Year 16

Table 10-8 presents the model predictions at each of the privately-owned receptors, the values presented in bold indicate predicted values above the relevant criteria. **Table 10-9** presents the model predications at each of the mine-owned receptors.

Figure E-28 to **Figure E-36** in **Appendix E** present isopleth diagrams of the predicted modelling results for each of the assessed pollutants in Year 16.

Table 10-8: Modelling predictions for Year 16 of the proposed modification (privately-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
9	3.4	1.3	26.6	9.9	15.8	0.3	15.6	29.8	0.9
11A	1.5	0.1	11.0	0.8	1.1	0.0	6.8	15.5	0.7
11B	1.3	0.1	9.8	0.7	0.9	0.0	6.6	15.2	0.6
11C	1.5	0.1	10.6	0.8	1.0	0.0	6.7	15.5	0.7
26	3.4	1.2	25.6	9.4	14.8	0.3	15.3	29.0	0.9
30	1.5	0.2	10.4	1.3	2.0	0.0	6.8	15.6	0.6
31	1.4	0.1	10.6	1.1	1.5	0.0	6.5	15.1	0.6
32	0.9	0.1	7.1	0.4	0.6	0.0	5.9	14.2	0.6
35	0.8	0.1	6.1	0.7	1.0	0.0	6.1	14.5	0.6
37	1.5	0.2	11.8	1.2	1.9	0.1	6.7	15.5	0.7
39	1.4	0.1	8.8	0.8	1.1	0.0	6.2	14.7	0.6

Receptor ID	PM$_{2.5}$ (µg/m³)		PM$_{10}$ (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM$_{10}$ (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
40	1.2	0.1	9.2	1.1	1.6	0.0	6.5	15.2	0.6
41B	1.4	0.1	9.3	0.9	1.4	0.0	6.3	14.9	0.6
46B	5.1	1.5	38.7	11.5	18.1	0.3	20.3	37.2	0.9
47	0.8	0.1	6.4	0.5	0.7	0.0	5.9	14.2	0.6
58	4.4	0.7	35.0	5.1	8.5	0.2	10.6	22.1	0.8
59	3.6	0.4	28.5	3.1	4.9	0.1	8.5	18.5	0.7
60	2.4	0.3	18.9	2.1	3.3	0.1	7.5	16.8	0.7
61	2.6	0.3	20.9	2.2	3.5	0.1	7.6	17.0	0.7
63	6.1	1.1	49.4	8.5	14.4	0.3	14.0	28.0	0.9
66	4.2	1.4	31.4	10.2	16.0	0.2	17.5	32.5	0.9
69	1.7	0.1	12.5	0.5	0.6	0.0	6.0	14.4	0.0
70	4.9	0.9	40.4	7.2	12.1	0.3	12.6	25.7	0.9
75	3.6	0.5	28.4	3.6	5.9	0.2	9.1	19.5	0.8
76	3.4	0.4	27.2	3.0	4.9	0.1	8.5	18.4	0.7
79	3.1	0.3	24.8	2.5	3.9	0.1	7.9	17.5	0.7
80	2.8	0.3	21.7	2.1	3.3	0.1	7.5	16.8	0.7
82	2.5	0.3	19.6	2.0	3.2	0.1	7.5	16.8	0.7
83	2.2	0.2	17.5	1.8	2.8	0.1	7.2	16.3	0.7
84	2.0	0.2	15.9	1.7	2.7	0.1	7.2	16.2	0.7
86	1.6	0.2	12.9	1.4	2.2	0.1	6.8	15.7	0.7
87	1.8	0.2	14.5	1.6	2.4	0.1	7.0	16.0	0.7
88	1.5	0.2	12.0	1.5	2.3	0.1	6.9	15.8	0.7
89	1.5	0.2	11.8	1.3	2.0	0.1	6.7	15.6	0.7
90	1.4	0.2	10.9	1.2	1.9	0.1	6.7	15.5	0.7
91	1.4	0.2	11.6	1.3	2.0	0.1	6.7	15.6	0.7
94	1.2	0.1	9.7	1.0	1.5	0.0	6.4	15.0	0.6
95	1.2	0.1	10.0	1.0	1.6	0.0	6.4	15.1	0.6
96	1.3	0.1	10.1	1.0	1.6	0.0	6.5	15.1	0.6
97	1.3	0.1	10.4	1.1	1.7	0.0	6.5	15.2	0.6
98	1.3	0.1	10.5	1.0	1.6	0.0	6.5	15.1	0.6
99	1.3	0.1	10.7	1.1	1.6	0.0	6.5	15.2	0.6
100	1.4	0.2	11.2	1.1	1.7	0.0	6.6	15.3	0.6
101	1.1	0.1	9.0	1.0	1.5	0.0	6.4	15.0	0.6
101A	1.2	0.1	9.9	1.0	1.6	0.0	6.4	15.1	0.0
102	1.1	0.1	9.0	0.9	1.4	0.0	6.3	14.9	0.6
103	1.2	0.1	9.6	0.9	1.4	0.0	6.3	14.9	0.6
104	1.1	0.1	8.8	0.9	1.3	0.0	6.3	14.8	0.6
105	1.1	0.1	8.5	0.8	1.3	0.0	6.3	14.8	0.6
106	1.2	0.1	7.5	0.8	1.3	0.0	6.3	14.8	0.6
107	1.2	0.1	7.8	0.9	1.3	0.0	6.3	14.9	0.6
109	1.2	0.1	7.6	0.8	1.2	0.0	6.2	14.7	0.6
110	1.2	0.1	7.6	0.7	1.1	0.0	6.1	14.6	0.6
111	1.0	0.1	7.5	0.8	1.2	0.0	6.2	14.7	0.6
112	1.1	0.1	6.9	0.8	1.2	0.0	6.2	14.7	0.6
113	1.1	0.1	7.1	0.8	1.2	0.0	6.2	14.7	0.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
149	4.2	1.4	32.1	10.4	16.2	0.2	17.7	32.7	0.9
151	4.1	1.3	30.4	9.7	15.0	0.2	16.7	31.2	0.8
160	4.2	1.4	31.4	10.3	16.1	0.2	17.3	32.1	0.9
162	4.3	1.4	32.7	10.5	16.4	0.2	18.0	33.3	0.9
168	4.4	1.4	32.5	10.6	16.6	0.2	18.0	33.2	0.3
171	0.9	0.1	5.7	0.6	0.8	0.0	6.0	14.4	0.6
180	3.2	0.5	25.0	4.0	6.7	0.2	9.5	20.3	0.8
181	3.1	0.5	24.6	3.9	6.4	0.2	9.3	20.0	0.8
182	3.1	0.5	24.2	3.6	5.8	0.2	9.0	19.4	0.8
183	3.0	0.4	23.4	3.3	5.4	0.2	8.8	18.9	0.8
184	3.0	0.3	23.7	2.5	4.1	0.1	8.0	17.7	0.7
185	2.9	0.3	23.1	2.4	3.9	0.1	7.9	17.5	0.7
186	2.8	0.3	22.1	2.3	3.6	0.1	7.7	17.2	0.7
187	2.7	0.3	21.4	2.0	3.2	0.1	7.5	16.8	0.7
188	2.6	0.2	20.4	1.9	3.0	0.1	7.3	16.5	0.7
189	2.5	0.2	19.9	1.8	2.8	0.1	7.2	16.4	0.7
190	2.3	0.2	18.3	1.6	2.5	0.1	7.0	16.1	0.7
191	2.2	0.2	17.3	1.5	2.4	0.1	7.0	15.9	0.7
192	2.0	0.2	16.1	1.4	2.2	0.1	6.9	15.8	0.7
194	1.7	0.2	13.7	1.2	1.9	0.1	6.7	15.5	0.7
195	1.7	0.2	13.6	1.3	2.0	0.1	6.7	15.5	0.7
196	1.5	0.2	12.1	1.1	1.8	0.1	6.6	15.3	0.7
200	1.1	0.1	8.9	1.0	1.5	0.0	6.4	15.1	0.6
201	1.1	0.1	8.8	1.0	1.5	0.0	6.4	15.0	0.6
201	1.1	0.1	8.9	0.9	1.4	0.0	6.4	15.0	0.6
202	1.1	0.1	8.8	0.9	1.4	0.0	6.3	14.9	0.6
203	1.1	0.1	9.1	0.9	1.4	0.0	6.3	14.9	0.6
204	1.1	0.1	9.2	0.9	1.4	0.0	6.3	14.9	0.6
206	1.1	0.1	8.7	0.8	1.2	0.0	6.2	14.8	0.6
207	0.9	0.1	7.6	0.7	1.1	0.0	6.1	14.6	0.6
208	0.9	0.1	7.1	0.7	1.0	0.0	6.1	14.5	0.6
209	0.9	0.1	6.4	0.6	1.0	0.0	6.1	14.5	0.6
210	0.9	0.1	5.7	0.6	0.9	0.0	6.0	14.5	0.6
217	1.0	0.1	6.4	0.7	1.0	0.0	6.1	14.6	0.6
218	1.0	0.1	6.4	0.6	1.0	0.0	6.1	14.5	0.6
219	0.9	0.1	6.9	0.7	1.1	0.0	6.1	14.6	0.6
220	0.9	0.1	6.1	0.7	1.0	0.0	6.1	14.5	0.6
222	1.0	0.1	7.5	0.8	1.2	0.0	6.2	14.7	0.6
223	1.0	0.1	8.2	0.8	1.2	0.0	6.2	14.8	0.6
224	1.2	0.1	9.8	1.0	1.6	0.0	6.5	15.1	0.6
226	1.2	0.1	9.7	1.1	1.7	0.0	6.5	15.2	0.7
227	1.4	0.2	10.8	1.2	1.8	0.1	6.6	15.4	0.7
228	1.4	0.2	11.3	1.2	1.9	0.1	6.6	15.4	0.1
229	1.6	0.2	12.7	1.3	2.0	0.1	6.7	15.6	0.7
230	1.7	0.2	13.3	1.4	2.1	0.1	6.8	15.7	0.7

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
231	1.8	0.2	14.4	1.4	2.2	0.1	6.9	15.8	0.7
232	2.0	0.2	15.5	1.5	2.3	0.1	6.9	15.9	0.7
233	2.1	0.2	16.2	1.5	2.4	0.1	7.0	16.0	0.7
234	2.2	0.2	17.1	1.6	2.5	0.1	7.0	16.0	0.7
235	2.4	0.2	18.8	1.7	2.7	0.1	7.1	16.2	0.7
236	2.5	0.2	19.7	1.8	2.8	0.1	7.2	16.4	0.7
237	2.7	0.3	21.0	2.0	3.1	0.1	7.4	16.7	0.7
238	2.8	0.3	22.0	2.1	3.3	0.1	7.5	16.8	0.7
239	2.9	0.3	23.3	2.2	3.6	0.1	7.7	17.1	0.7
240	3.2	0.3	25.6	2.7	4.3	0.1	8.1	17.8	0.7
255	2.4	0.6	18.3	4.6	7.1	0.1	11.2	22.6	0.8
258	2.6	0.7	19.7	5.3	8.3	0.2	11.7	23.4	0.8
300	4.9	0.8	39.5	6.5	10.9	0.3	12.0	24.5	0.9
303	4.5	0.8	37.0	6.2	10.3	0.3	11.7	23.9	0.9
305	3.6	0.7	29.8	5.2	8.6	0.3	10.6	22.2	0.9
306	3.2	0.6	25.9	4.7	7.8	0.2	10.2	21.4	0.8
307	2.9	0.6	23.4	4.4	7.2	0.2	9.9	20.8	0.8
308	2.8	0.5	22.7	4.2	7.0	0.2	9.7	20.6	0.8
309	3.4	0.6	27.4	4.8	7.9	0.3	10.3	21.5	0.9
310	3.7	0.7	30.3	5.2	8.5	0.3	10.7	22.1	0.9
312	4.0	0.7	32.4	5.3	8.6	0.3	10.8	22.3	0.9
313	3.7	0.6	29.7	5.0	8.1	0.3	10.4	21.7	0.9
314	3.7	0.7	29.7	5.2	8.4	0.3	10.7	22.1	0.9
315	3.5	0.7	28.4	5.3	8.6	0.3	10.8	22.3	0.9
316	3.2	0.7	26.0	5.4	8.7	0.3	10.9	22.4	0.9
317	3.3	0.7	26.6	5.8	9.4	0.3	11.3	23.1	0.9

* Advisory NEPM reporting standard applicable to the population as a whole

Table 10-9: Modelling predictions for Year 16 of the proposed modification (mine-owned receptors)

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
5	12.5	4.3	**101.6**	33.9	59.3	1.63	**39.5**	72.9	2.2
20	6.0	2.0	48.2	15.6	26.6	0.55	21.1	40.4	1.2
21	5.6	1.6	45.6	12.6	21.3	0.47	18.1	35.1	1.1
22	5.7	1.4	45.7	10.8	18.4	0.43	16.4	32.1	1.0
23	6.1	1.3	49.7	10.1	17.2	0.41	15.6	30.9	1.0
25	4.4	1.6	32.7	12.4	19.4	0.36	18.4	33.7	1.0
28	1.2	0.2	8.8	1.2	1.8	0.04	6.7	15.4	0.6
29a	1.5	0.1	11.6	1.0	1.4	0.03	6.5	15.0	0.6
29b	1.4	0.1	10.9	0.8	1.2	0.02	6.3	14.8	0.6

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD (g/m²/month)	PM_{10} (µg/m³)	TSP (µg/m³)	DD (g/m²/month)
	Incremental impact						Total impact		
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	Annual average	Annual average	Annual average
	Advisory*		Air quality impact criteria						
	25	8	50	-	-	2	30	90	4
36	1.7	0.2	13.3	1.6	2.3	0.04	7.0	15.9	0.6
41	5.7	1.2	46.7	9.6	16.4	0.37	15.2	30.1	1.0
41C	4.2	1.4	31.6	10.2	16.0	0.23	17.6	32.7	0.9
48	0.8	0.1	6.3	0.4	0.5	0.01	5.8	14.0	0.6
49	3.3	1.2	25.6	9.4	14.8	0.28	15.2	29.0	0.9
51	1.0	0.1	7.2	0.5	0.7	0.01	5.9	14.2	0.6
52	1.0	0.0	7.3	0.3	0.4	0.00	5.8	14.1	0.6
64	5.9	1.0	47.9	8.0	13.6	0.32	13.5	27.2	0.9
74	3.6	0.6	28.6	4.6	7.6	0.19	10.1	21.2	0.8
77	3.6	0.4	28.4	3.1	4.9	0.13	8.5	18.5	0.7
78	3.0	0.3	24.0	2.3	3.7	0.10	7.8	17.3	0.7
81	2.8	0.3	22.4	2.3	3.6	0.10	7.7	17.2	0.7
152	4.1	1.3	30.9	9.9	15.4	0.22	17.1	31.9	0.9
153	4.2	1.3	31.0	9.9	15.5	0.22	17.3	32.1	0.9
157	4.3	1.4	32.1	10.2	16.0	0.23	17.8	33.0	0.9
158	4.0	1.3	29.7	9.5	14.7	0.22	16.3	30.5	0.8
159	4.2	1.4	31.5	10.2	16.0	0.23	17.6	32.6	0.9
161	4.3	1.4	31.8	10.4	16.2	0.24	17.6	32.6	0.9
165	4.5	1.4	33.7	10.5	16.5	0.24	18.4	34.1	0.9
169	3.0	1.0	22.5	7.6	11.9	0.21	13.5	26.2	0.8
170	5.1	0.9	41.5	6.9	11.5	0.33	12.4	25.1	0.9
172	5.2	0.9	42.2	7.2	12.2	0.30	12.7	25.8	0.9
173	2.9	1.0	21.7	7.2	11.5	0.22	13.0	25.5	0.8
175	4.9	0.8	40.2	6.6	11.1	0.30	12.1	24.7	0.9
176	4.3	0.8	35.1	6.0	10.1	0.27	11.5	23.7	0.9
177	3.8	0.7	31.0	5.6	9.3	0.25	11.0	22.9	0.9
241	3.3	0.4	26.2	3.1	5.0	0.13	8.5	18.6	0.7
253	2.3	0.3	16.8	1.9	2.7	0.06	9.3	19.3	0.8
254	2.3	0.5	17.5	3.7	5.6	0.11	10.6	21.5	0.8
257	2.6	0.7	19.8	5.3	8.2	0.16	11.9	23.7	0.8
301	4.9	0.8	39.7	6.5	10.8	0.33	12.0	24.4	0.9
302	4.8	0.8	39.2	6.3	10.6	0.32	11.8	24.2	0.9
319	1.2	0.1	7.7	0.7	1.0	0.03	6.1	14.5	0.6
319	1.2	0.1	8.1	0.7	1.0	0.03	6.2	14.6	0.6
319	1.0	0.1	7.1	0.6	0.9	0.03	6.0	14.4	0.6
319	0.9	0.1	6.8	0.6	0.8	0.02	6.0	14.4	0.6
319	0.8	0.1	5.9	0.5	0.7	0.02	5.9	14.3	0.6
319	0.8	0.1	5.0	0.6	0.8	0.02	6.0	14.4	0.6
320	2.5	0.7	18.3	5.4	8.4	0.16	11.3	22.8	0.8

* Advisory NEPM reporting standard applicable to the population as a whole

10.4.1 Predicted maximum 24-hour and annual average $PM_{2.5}$ concentrations

Figure E-28 and **Figure E-29** show the predicted maximum 24-hour average and annual average $PM_{2.5}$ concentrations for Year 16 due to emissions from the proposed modification.

The results in **Table 10-8** indicate that all privately-owned receptors are predicted to experience maximum 24-hour average and annual average concentrations below the advisory reporting standards of 25µg/m³ and 8µg/m³, respectively in Year 16.

The results in **Table 10-9** indicate the all mine-owned receptors are also predicted to experience levels below the maximum 24-hour average and annual average $PM_{2.5}$ advisory standards in Year 16.

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

Figure E-30 shows the predicted maximum 24-hour average PM_{10} concentrations for Year 16 due to emissions from the proposed modification. The results in **Table 10-8** indicate that all privately-owned receptors are predicted to experience maximum 24-hour average PM_{10} concentrations below the relevant criterion of 50µg/m³ in Year 16.

The results in **Table 10-9** indicate that all mine-owned receptors, with the exception of Receptor 5, are predicted to experience maximum 24-hour average concentrations below 50µg/m³ in Year 16.

Results for the total (cumulative) impact for maximum 24-hour average PM10 concentrations are discussed in **Section 10.7**

10.4.3 Predicted annual average PM_{10} concentrations

Figure E-31 shows the predicted annual average PM_{10} concentrations for Year 16 due to emissions from the proposed modification. **Figure E-32** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-8** indicate that all privately-owned receptors are predicted to experience total annual average PM_{10} concentrations below the relevant criterion of 30µg/m³ in Year 16.

The results in **Table 10-9** indicate that all mine-owned receptors, with the exception of Receptor 5, are predicted to experience annual average PM_{10} concentrations below 30µg/m³ in Year 16.

10.4.4 Predicted annual average TSP concentrations

Figure E-33 shows the predicted annual average TSP concentrations for Year 16 due to emissions from the proposed modification. **Figure E-34** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-8** indicate that all privately-owned receptors are predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 16.

The results in **Table 10-9** indicate that all mine-owned receptors are also predicted to experience annual average TSP concentrations below the relevant criterion of 90µg/m³ in Year 16.

10.4.5 Predicted annual average dust deposition levels

Figure E-35 shows the predicted annual average dust deposition levels for Year 16 due to emissions from the proposed modification. **Figure E-36** shows the predicted total impact from the proposed modification and other sources.

The results in **Table 10-8** indicate that all privately-owned receptors are predicted to experience incremental annual average dust deposition levels below the relevant criterion of 2g/m²/month in Year 16. All privately-owned receptors are also predicted to experience total annual average dust deposition levels below the relevant criterion of 4g/m²/month in Year 16 from the proposed modification and other sources.

The results in **Table 10-9** indicate that all mine-owned receptors are also predicted to experience incremental annual average dust deposition levels and total annual average deposition levels below the relevant criterion in Year 16.

10.5 Summary of results

Table 10-10 summarises the privately-owned receptors where impacts are predicted to exceed relevant assessment criteria.

Table 10-10: Summary of modelled predictions where predicted impacts exceed assessment criteria

Receptor ID	PM10			TSP	DD	
	Incremental 24-hour average		Total annual average	Total annual average	Incremental 24-hour average	Total annual average
	Criterion 50µg/m³		Criterion 30µg/m³	Criterion 90µg/m³	Criterion 2g/m²/month	Criterion 4g/m²/month
	Year of impact (level)	No. of days above 50µg/m³	Year of impact (level of impact)			
46B*	Year 6 (52.8)	1	Year 2 (31.5)	-	-	-

*Receptor 46B is a commercial property and is generally only occupied during day-time hours.

10.6 Assessment of total (cumulative) 24-hour average PM_{10} concentrations

10.6.1 Introduction

The NSW EPA contemporaneous assessment method was applied to examine the potential maximum (cumulative) 24-hour average PM_{10} impacts for the proposed modification.

The analysis described in this section focused on locations that were chosen to represent the privately-owned receptors surrounding the proposed modification. The chosen locations are located at each of the four monitoring stations where suitable ambient monitoring data is available. The monitoring data collected at these sites cover the contemporaneous modelling period. Note that TEOM03 was relocated closer to the majority of receptors in July/ August of the modelled year and was re-named TEOM04. The assessment of cumulative impacts uses the monitoring data from the closest monitor.

Figure 10-1 shows the location of each of these monitors in relation to the proposed modification and surrounding privately-owned receptors.

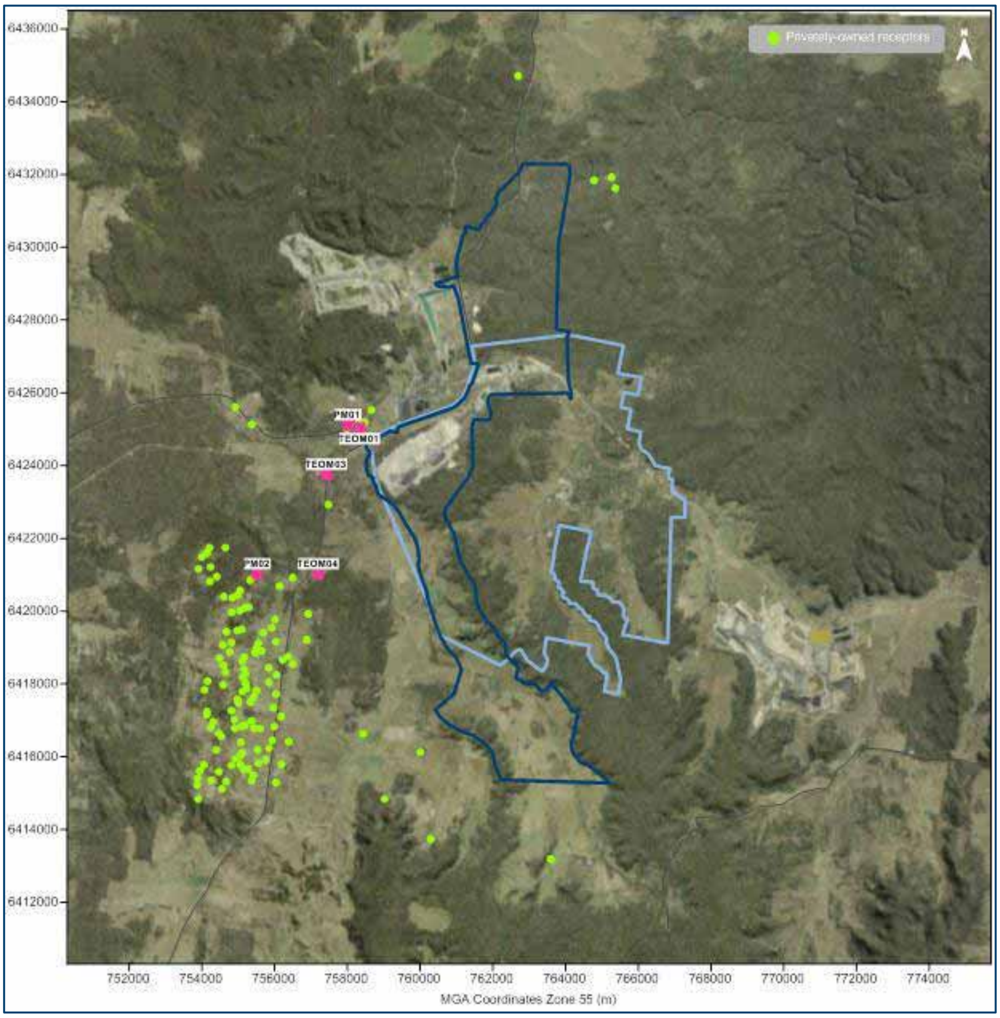

Figure 10-1: Locations available for contemporaneous cumulative impact assessment

10.6.2 Assessment per NSW EPA Approved Methods

An assessment of cumulative 24-hour average PM_{10} impacts was undertaken in accordance with the methods outlined in Section 11.2 of the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW DEC**, **2005**). The "Level 2 assessment - Contemporaneous impact and background approach" was applied to assess potential impacts.

As shown in **Section 5**, maximum background levels have in the past reached levels near to the 24-hour average PM_{10} criterion level (depending on the monitoring location and time). As a result, the first-pass Level 1 NSW EPA approach of adding maximum background levels to maximum predicted mine only levels may show levels above the criterion.

In such situations, the NSW EPA approach applies a more thorough Level 2 assessment whereby the measured background level on a given day is added contemporaneously with the corresponding proposed modification only level predicted using the same day's weather data. This method factors in to a significant degree the spatial and temporal variation in background levels affected by the weather and existing sources of dust in the area on a given day. However, even with a detailed Level 2 approach, any air dispersion modelling has limitations (as described previously) in predicting short term impacts that may arise many years into the future, and these limitations need to be understood when interpreting the results.

Ambient (background) dust concentration data for January 2011 to December 2011 from the TEOM stations and HVAS stations have been applied in the Level 2 contemporaneous 24-hour average PM_{10} assessment and represent the prevailing background levels in the vicinity of the proposed modification and surrounding privately-owned receptors.

As the existing mine was operational during this period, it would have contributed to the measured levels of dust in the area on some occasions. Due to this it is important to account for these existing MCP activities in the cumulative assessment. Modelling of the actual mining scenario for the Project for the 2011 period (of weather and background dust data) was conducted to determine the existing MCP contribution to the measured levels of dust. The results were applied in the cumulative assessment to minimise potential double counting of existing mine emissions (as they would occur in both the measured data and in the predicted levels), and thus to make a more reliable prediction of the likely cumulative total dust level.

Table 10-11 provides a summary of the findings of the contemporaneous assessment at each monitoring location. Detailed tables of the full assessment results are provided in **Appendix F**.

Table 10-11: NSW EPA contemporaneous assessment - maximum number of days above 24-hour average criterion depending on background level at monitoring sites

Location	Year 2	Year 6	Year 11	Year 16
TEOM01	0	0	0	0
TEOM03/TEOM04*	0	1	0	0
PM01	0	0	0	0
PM02	0	0	0	0

*Note that TEOM03 was relocated closer to the majority of the receptors and was renamed TEOM04.

The results in **Table 10-11** indicate that it is unlikely that cumulative impacts would arise at the receptors near the monitoring locations TEOM01, PM01 and PM02 during the years assessed.

There is potential for cumulative impacts near TEOM03/TEOM04, during the first half of the year, in Year 6 as a result of activity occurring close to this monitor during these periods. We note however the potential risk of cumulative impacts at this monitor is relatively low with only one day of predicted impact above the relevant criterion. This day contains a period lasting several hours where a wind with low dispersion potential is directed with little variation directly across the MCP activity and towards the receptors. In reality, the locations of trucks and equipment would move over this period and hence the actual emissions picked up by this wind would not be focused so much on one place. Also such wind conditions appear to be rare, with only this one occurrence in the year assessed.

The contemporaneous assessment thus indicates only low potential for any cumulative 24-hour average PM_{10} impacts to occur at the monitoring locations. The monitoring locations are considered to represent areas where the highest cumulative impacts are most likely to occur, i.e. near human activity near Ulan village and at locations closest to the proposed modification. Given these locations show little potential for any significant impact to occur, it can be inferred that there would also be little prospect of any significant impact to occur at all other receptor locations.

11 GREENHOUSE GAS ASSESSMENT

11.1 Introduction

Dynamic interactions between the atmosphere and surface of the earth create the unique climate that enables life on earth. Solar radiation from the sun provides the heat energy necessary for this interaction to take place, with the atmosphere acting to regulate the complex equilibrium. A large part of this regulation occurs from the "greenhouse effect" with the absorption and reflection of the solar radiation dependent on the composition of specific greenhouse gases in the atmosphere.

Over the last century, the composition and concentration of greenhouse gases in the atmosphere has increased due to increased anthropogenic activity. Climatic observations indicate that the average pattern of global weather is changing as a result. The measured increase in global average surface temperatures indicate an unfavourable and unknown outcome if the rate of release of greenhouse gas emissions remain at the current rate.

This assessment aims to estimate the predicted emissions of greenhouse gases (GHG) emitted to the atmosphere due to significant activity associated with all of the activity associated with the proposed modification and to provide a comparison of the direct emissions from the proposed modification at the national level.

A comparison is also made between the total GHG emissions calculated for all activity associated with the proposed modification to the total GHG emission for the approved Stage 1 Project.

11.2 Greenhouse gas inventory

The National Greenhouse Accounts (NGA) Factors document published by the Department of Climate Change and Energy Efficiency (DCCEE) defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from the proposed modification defined as:

"...from sources within the boundary of an organisation as a result of that organisation's activities" (**DCCEE, 2012**).

Scope 2 and 3 emissions occur due to the indirect sources from the proposed modification as:

"...emissions generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation" (**DCCEE, 2012**).

For the purpose of this assessment, emissions generated in all three scopes defined above provide a suitable approximation of the total GHG emissions generated from the proposed modification.

Scope 3 emissions can often result in a significant component of the total emissions inventory; however these emissions are often not directly controlled by the proposed modification. These emissions are understood to be considered in the Scope 1 emissions from other various organisations related to the proposed modification. The primary contribution of the Scope 3 emissions from the proposed modification occurs from the transportation of the product coal and from the end use of the product coal.

Scope 3 emissions also have the potential to arise from a greater number of sources associated with the operation of the proposed modification, but as these are often difficult to quantify due to the diversity of sources and relatively minor individual contributions, they have not been considered in this assessment.

11.2.1 Emission sources

Scope 1 and 2 GHG emission sources identified from the operation of the proposed modification are the on-site combustion of diesel fuel, petrol fuel, petroleum based greases and oils, emissions of methane from the exposed coal seams and on-site consumption of electricity. Scope 3 emissions have been identified as resulting from the purchase of diesel and electricity for use on-site, the transport of product to its final destination and the final use of the product.

Estimated quantities of materials that have the potential to emit GHG emissions associated with Scope 1 and 2 emissions for the proposed modification have been summarised in **Table 11-1** below. These estimates are based on information obtained from the projected production schedule provided by the Proponent and provide a reasonable approximation for the purpose of this assessment.

Table 11-1: Summary of quantities of materials estimated for the proposed modification

Year	OC ROM coal (tonnes)	UG ROM coal (tonnes)	Diesel (kL)	Petrol (kL)	Grease/oils/lubes (kL)	Electricity (kWh)
1	7,864,607	-	15,802	121	234	42,058,479
2	7,957,901	-	15,990	123	237	42,557,398
3	6,749,414	4,000,000	21,599	166	320	57,485,898
4	10,977,431	4,000,000	30,094	231	446	80,096,559
5	10,291,838	4,000,000	28,717	221	426	76,430,134
6	12,382,041	4,000,000	32,916	253	488	87,608,157
7	12,754,395	4,000,000	33,665	259	499	89,599,438
8	12,871,692	4,000,000	33,900	260	503	90,226,720
9	12,998,063	4,000,000	34,154	262	507	90,902,529
10	12,536,626	4,000,000	33,227	255	493	88,434,849
11	12,618,930	4,000,000	33,392	257	495	88,874,996
12	12,847,198	4,000,000	33,851	260	502	90,095,731
13	12,741,035	4,000,000	33,638	258	499	89,527,991
14	12,783,141	4,000,000	33,722	259	500	89,753,166
15	12,815,442	4,000,000	33,787	260	501	89,925,906
16	12,819,460	4,000,000	33,795	260	501	89,947,393
17	14,499,628	4,000,000	37,171	286	552	98,932,624
18	15,436,308	4,000,000	39,053	300	579	103,941,817
19	15,171,482	4,000,000	38,521	296	572	102,525,576
20	13,018,165	4,000,000	34,195	263	507	91,010,031
21	1,907,310	4,000,000	11,870	91	176	31,591,213

Scope 3 emissions for the transport and final use of the coal may have the potential to vary in the future depending on the market situation at the time. These assumptions include emission factors for the transport modes of rail and shipping and the associated average weighted distance travelled for the export coal.

11.2.2 Emission factors

To quantify the amount of carbon dioxide equivalent (CO_2-e) material generated from the proposed modification, emission factors obtained from the National Greenhouse Accounts (NGA) Factors (**DCCEE, 2012**) and other sources are required and are summarised in **Table 11-2.**

Table 11-2: Summary of emission factors

Type	Energy content factor	Emission factor			Units	Scope	Source
		CO_2	CH_4	N_2O			
Diesel	38.6	69.2	0.2	0.5	kg CO_2-e/GJ	1	Table 4 (**DCCEE, 2012**)
		5.3				3	Table 39 (**DCCEE, 2012**)

Petrol	34.2	66.7	0.6	2.3	kg CO_2-e/GJ	1	Table 4 (**DCCEE, 2012**)
		5.3				3	Table 39 (**DCCEE, 2012**)
Grease/oils/lubes	38.8	27.9			kg CO_2-e/GJ	1	Table 3 (**DCCEE, 2012**)
		5.3				3	Table 39 (**DCCEE, 2012**)
Electricity		0.88			kg CO_2-e/kWh	2	Table 5 (**DCCEE, 2012**)
Fugitive emissions		0.23			kg CO_2-e/t ROM	1	Holmes Air Sciences, 2008
Rail		0.0123			kg CO_2-e/t-km	3	QR Network Access, 2002
Ship		3.657			t CO_2-e/Mt-km	3	PAEHolmes, 2010
Thermal coal	29	88.2	0.03	0.2	kg CO_2-e/GJ	3	Table 1 (**DCCEE, 2012**)

The emission factor based on the release of methane from the coal seams at the proposed modification is taken to be 0.23 kg of CO_2-e per tonne of ROM. This emission factor has been calculated based on actual testing of the methane gas from the coal seams at the MCP (**Holmes Air Sciences, 2008**). This emission factor is lower than the default factor provided in the National Greenhouse Accounts (NGA) Factors document and compares with other mining operations in the area.

Emissions associated with the transport of coal to customers will occur via rail and shipping. The emission factor associated with the rail transport activity is taken to be 0.0123 kg CO_2-e/tonne-km (**QR Network Access, 2002**). Product coal is transported to the Port of Newcastle by rail and then transferred before being shipped to its final destination. The approximate rail distance is taken to be 560km (return distance). The emission factor associated with the shipping transport activity is taken to be 3.657 tonnes of CO_2-e/Mt-km (**PAEHolmes, 2010**) and assumes an approximate return distance of 16,000km based predominately on destinations in the Asian market.

The emissions generated from the end use of coal produced by the proposed modification have assumed that all product coal is consumed as thermal coal in power stations. As it is difficult to estimate emissions from power stations in other countries, this assessment has assumed the emissions generated would be equivalent to those generated from a power station in NSW. The emission factor provided in the National Greenhouse Accounts (NGA) Factors document used is 88.43kg CO_2-e/GJ and energy content factor 29GJ/t assuming the type of coal is anthracite (**DCCEE, 2012**).

11.3 Summary of greenhouse gas emissions

Table 11-3 summarises the estimated annual CO_2-e emissions due to the operation of the proposed modification.

Table 11-3: Summary of CO2-e emissions for the proposed modification (t CO_2-e)

Year	Fugitive emissions	Diesel		Petrol		Grease/oil/lubes		Electricity		Transport via rail	Transport via ship	Final use of product
	Scope 1	Scope 1	Scope 3	Scope 1	Scope 3	Scope 1	Scope 3	Scope 2	Scope 3	Scope 3	Scope 3	Scope 3
1	1,809	42,637	3,233	289	42	254	48	37,011	7,571	36,837	312,918	13,714,613
2	1,830	43,143	3,271	292	43	257	49	37,451	7,660	37,274	316,630	13,877,303
3	2,472	58,277	4,419	395	58	347	66	50,588	10,347	50,349	427,699	18,745,254
4	3,445	81,198	6,157	550	81	483	92	70,485	14,417	70,152	595,924	26,118,237
5	3,287	77,481	5,875	525	77	461	88	67,259	13,757	66,941	568,646	24,922,673
6	3,768	88,813	6,734	602	89	529	100	77,095	15,769	76,731	651,811	28,567,652
7	3,854	90,832	6,887	616	91	541	103	78,848	16,128	78,475	666,627	29,216,977
8	3,880	91,468	6,935	620	91	544	103	79,400	16,241	79,024	671,294	29,421,525
9	3,910	92,153	6,987	625	92	549	104	79,994	16,362	79,616	676,322	29,641,895
10	3,803	89,651	6,798	608	89	534	101	77,823	15,918	77,455	657,962	28,837,223
11	3,822	90,097	6,831	611	90	536	102	78,210	15,997	77,840	661,237	28,980,748
12	3,875	91,335	6,925	619	91	544	103	79,284	16,217	78,910	670,319	29,378,811
13	3,850	90,759	6,882	615	90	540	103	78,785	16,115	78,412	666,095	29,193,680
14	3,860	90,988	6,899	617	91	542	103	78,983	16,156	78,610	667,770	29,267,106
15	3,868	91,163	6,912	618	91	543	103	79,135	16,187	78,761	669,055	29,323,434
16	3,868	91,185	6,914	618	91	543	103	79,154	16,191	78,780	669,215	29,330,440
17	4,255	100,293	7,605	680	100	597	113	87,061	17,808	86,649	736,066	32,260,384
18	4,470	105,371	7,990	714	105	627	119	91,469	18,710	91,037	773,335	33,893,804
19	4,409	103,936	7,881	704	104	619	118	90,223	18,455	89,796	762,798	33,431,990
20	3,914	92,262	6,996	625	92	549	104	80,089	16,382	79,710	677,121	29,676,950
21	1,359	32,026	2,428	217	32	191	36	27,800	5,686	27,669	235,041	10,301,401

11.4 Contribution of greenhouse gas emissions

Table 11-4 summarises the emissions associated with the proposed modification based on Scopes 1, 2 and 3.

Table 11-4: Summary of CO2-e emissions per scope (t CO_2-e)

Year	Scope 1	Scope 2	Scope 3
1	44,989	37,011	14,075,262
2	45,522	37,451	14,242,230
3	61,491	50,588	19,238,192
4	85,677	70,485	26,805,060
5	81,755	67,259	25,578,057
6	93,712	77,095	29,318,886
7	95,842	78,848	29,985,287
8	96,513	79,400	30,195,213
9	97,235	79,994	30,421,379
10	94,596	77,823	29,595,547
11	95,067	78,210	29,742,846
12	96,372	79,284	30,151,376
13	95,765	78,785	29,961,377
14	96,006	78,983	30,036,734
15	96,191	79,135	30,094,543
16	96,214	79,154	30,101,734
17	105,825	87,061	33,108,725
18	111,183	91,469	34,785,098
19	109,668	90,223	34,311,140
20	97,350	80,089	30,457,356
21	33,792	27,800	10,572,294
Total	**1,830,764**	**1,506,143**	**572,778,336**

The estimated annual greenhouse emissions for Australia for the period October 2011 to September 2012 were 546.1 Mt CO_2-e (**DCCEE, 2013**). In comparison, the estimated annual average greenhouse emission over the 21 year life of the proposed modification is 0.09Mt CO_2-e (Scope 1). Therefore, the annual contribution of greenhouse emissions from the proposed modification in comparison to the Australian greenhouse emissions for the period October 2011 to September 2012 is estimated to be approximately 0.016%.

The estimated Greenhouse gas emissions generated in all three scopes defined are based on approximated quantities of materials and where applicable generic emission factors. Therefore the estimated emissions for the proposed modification are considered conservative.

The estimated annual average Scope 1 greenhouse emissions for proposed project are approximately 4.2 times lower that the equivalent GHG emissions estimated for the approved Moolarben Stage 1 Project (**HAS, 2006**) which are 0.38Mt CO_2-e. The difference appears to be largely attributable to two key factors: the required calculation procedure (including the emissions factor values) has changed since 2006; and, more accurate estimates of the actual energy usage are now available.

In comparison to the annual average Scope 1 GHG emissions from the Moolarben Stage 2 Preferred Project (**PAEHolmes, 2011**) which are 0.1Mt CO_2-e, the equivalent emissions from the proposed modification are similar, at 0.09Mt CO_2-e.

This shows that the proposed modification may result in a small decrease in the projected GHG emissions of 0.01 Mt CO_2-e compared to previously reported data.

11.5 Greenhouse gas management

The proposed modification will continue to utilise various mitigation measures to minimise the overall generation of greenhouse gas emissions.

The MCP's greenhouse gas management system will provide the basis for identifying and implementing mitigation measures for various on-site activities. Some examples of actions from which energy efficiency opportunities may arise include:

- Monitoring fuel efficiency of diesel equipment;
- Optimising conditions for fleet operations to minimise double handling and utilisation of efficient routes;
- Develop targets for greenhouse gas emissions generated from site operations; and,
- Consideration of alternative renewable energy sources where economically and practically feasible.

12 DUST MITIGATION AND MANAGEMENT

The proposed modifications to the mining activities at the proposed modification will generate dust. To ensure these activities have a minimal affect on the surrounding environment and sensitive receptors, it is required that all reasonable and practicable dust mitigation measures are utilised.

Moolarben currently have suitable dust emissions management and control procedures in place as well as an air quality monitoring network to monitor actual dust levels in the area between the mine and receptors. This section provides comments and recommendations to supplement the existing procedures based on the findings of this assessment.

12.1 Dust management

The MCP's air quality management plan covers a variety of aspects necessary for effective dust mitigation and management. These aspects include the provision of guidance to employees on dust management measures for specific sources and activities and the use of real-time monitoring systems that detect adverse dust and meteorological conditions.

The Project has also implemented dust management practices at its operations to further reduce and manage any dust impacts. These practices are based on current best practice measures that would be implemented for this Project and have been summarised in **Section 7** of this report.

It is considered that the dust management measures employed at the Project would be commensurate with all reasonable and feasible measures appropriate for managing dust emissions from the proposed modification. These measures are an integral component of the Project.

12.2 Monitoring network

The location of the current air quality monitoring network at the proposed modification is shown in **Figure 5-5**. The monitoring locations are representative of the area's nearby sensitive receptors.

Based on the predicted impacts presented in this assessment, some improvements to the existing network are recommended to enhance the ability of the Project to manage dust impacts and to verify the environmental performance over the life of the mine.

The recommended modifications are:

- Addition or re-location of a TEOM to the southwest of the operation at the mid to late lifetime of the mine. This would be used to ensure compliance at receptors to the south as the mine progresses into the southern areas of Open Cut 2 and Open Cut 3 locations.
- In the event that measured dust impacts begin to occur, for example due to increased dust levels arising due to prolonged drought, installation of an upwind TEOM monitor to the north east of the site (if possible) is suggested in order to provide the Project, EPA and Community with the ability to evaluate background dust levels and mine related dust levels separately. However whilst ever dust levels at the existing monitoring locations remain low, this additional layer of monitoring would not be warranted.

13 SUMMARY AND CONCLUSIONS

The study has identified the potential air quality impacts that may arise from the proposed modifications to the Project. The assessment utilises air dispersion modelling and focuses on potential dust impacts from MCO activities (proposed modification and Stage 2) in isolation (incrementally) and cumulatively with other nearby mines and background levels of dust.

The results show that only one privately-owned receptor; Receptor 46B was predicted to experience one day on which impacts due to MCO activities would be at a level above the 24-hour average criteria of 50µg/m^3 (52.8µg/m^3 in Year 6).

Receptor 46B was also predicted to be the only receptor to experience any cumulative annual average impact (31.5µg/m^3 in Year 2, which is above the criteria of 30µg/m^3).

The assessment of cumulative 24-hour average PM_{10} impacts found that impacts of one additional day above the EPA cumulative impact assessment criteria for 24-hour average PM_{10} of 50 µg/m^3 may arise in the vicinity of TEOM03/TEOM04, which is located in close proximity to the west of the existing (and proposed modified) mine. For the 2011 year of meteorological data modelled, it is apparent that there was one day of dominant easterly winds, which when applied in the model produced significantly extended levels of dust towards the west (and receptors).

When it is applied in the air dispersion modelling, this one day during which there was a prolonged period of steady, easterly flowing winds with low dispersion potential, leads to the highest predicted level of 24-hour average PM_{10} impact at locations to the west, in each of the scenarios modelled. In reality whether such a day may occur again in practice is not known, but based on the available monitoring data it would appear unlikely to be a frequent event.

Even though this one day of unusually high impacting winds affects the results at all other monitoring locations, in all other scenarios modelled, the assessment found that no additional days above the EPA criteria were predicted to arise at the other monitoring locations, which are located in areas representative of the nearest receptors to the mine. This indicates a low potential risk for cumulative 24-hour average PM_{10} impacts to arise.

An indicative cumulative 24-hour average $PM_{2.5}$ assessment can be made by observing that the isopleth figures show that the Project (Stage 1 and Stage 2 combined) would result in an increase in maximum 24-hour average $PM_{2.5}$ levels of approximately 5µg/m^3 for the residences predominantly clustered to the west of the site. For these residences this level of maximum impact from the Project represents approximately 20% of the criterion level, and when considered in the context of the low existing levels of fine dust in this area, supports the finding that the Project has only a low potential for any significant dust and particle impacts to arise at receptor locations.

The estimated annual average greenhouse emission over the 21 year life of the proposed modification is 0.09Mt CO_2-e for Scope 1 emissions. In comparison, the annual average contribution of greenhouse emissions from the proposed modification in comparison to the Australian greenhouse emissions for the period October 2011 to September 2012 is estimated to be approximately 0.016%.

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Appendix A
Sensitive Receptors

Table A-1: List of sensitive receptors assessed in this study

ID	Easting	Northing	Type	Owner
9	757478	6422930	Commercial	ICI Australia Operations Pty Limited
11	765376	6431622	Commercial	JE Mullins & CD Imrie
11	765265	6431931	Private	JE Mullins & CD Imrie
11	764784	6431839	Commercial	JE Mullins & CD Imrie
26	757430	6423741	Commercial	Forty North Pty Limited
30	758435	6416631	Private	RB Cox
31	760008	6416123	Private	MB Cox
32	763590	6413194	Private	DJ & JG Stokes
35	759021	6414840	Private	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny
37	756179	6417107	Private	J Szymkarczuk
39	756038	6415288	Private	RM & DJ Sprigg
40	756389	6416414	Private	JM Devenish
41B	756194	6415791	Private	PP Libertis (Perpetual Lease)
46B	758663	6425526	Commercial	North Eastern Wiradjuri Wilpinjong Community Fund Limited
47	760293	6413734	Private	SF & MR Andrews
58	756926	6419919	Private	ML & JLM Bevege
59	756886	6419210	Private	G & GM Szymkarczuk
60	756500	6418546	Private	CL Rayner and DM Mundey
61	756375	6418755	Private	MA Miller
63	756497	6420923	Private	BF & B Whiticker
66	758310	6425130	Commercial	ROSTHERNE PTY LIMITED
69	762690	6434710	Private	Elward
70	756132	6420692	Private	DJ & A Coventry
75	756012	6419777	Private	P Ban
76	755920	6419546	Private	SR & Pc Carbone
79	756034	6419159	Private	PTJ & SE Nagle
80	755649	6418908	Private	W & DI Sebelic
82	756223	6418659	Private	SC Hungerford & MC Clemens
83	755832	6418444	Private	CF & CR Wall
84	756047	6418248	Private	DS Sebelic
86	755506	6417818	Private	NW Harris
87	755841	6418051	Private	BJ & K Howe
88	756043	6417724	Private	BC Meyers
89	755431	6417645	Private	MV & HM Glover & E & BJ Tomlinson
90	755337	6417501	Private	SA Powell
91	755969	6417348	Private	HM Graham
94	754900	6416785	Private	LK Mittermayer
95	755085	6416834	Private	BJ Withington
96	755183	6416867	Private	D Lazicic
97	755364	6416985	Private	DJ & MD Smith
98	755440	6416783	Private	ME & JJ Piper
99	755603	6416770	Private	DE Jenner & WB Jensen
100	755992	6416832	Private	A Kapista
101	755850	6416237	Private	PJ Kearns
101A	755937	6416447	Private	Kearns
102	755530	6416189	Private	KA Roberts
103	755072	6416399	Private	SB Burnett & SL Grant
104	755112	6416116	Private	RA & LA Deeben
105	755061	6416033	Private	DJ & N Katsikaris
106	755558	6415823	Private	TB & JH Reid
107	755752	6415919	Private	ZJ & M & AA Raso
109	755410	6415494	Private	DA Evans
110	755361	6415339	Private	JT Thompson & HT Evans
111	755052	6415789	Private	GJ & NJ McEwan
112	755138	6415655	Private	MJ & LM Croft
113	755269	6415661	Private	CPG Ratcliff
149	758457	6425165	Commercial	Mid Western Regional Council

ID	Easting	Northing	Type	Owner
151	757984	6425025	Church	Al Cunningham (Catholic Church)
160	758350	6425029	School	Minister for Education and Training
162	758342	6425199	Commercial	Rowmint Pty Ltd
168	758386	6425136	Church	PJL CONSTRUCTION COMPLETE MINE SERVICE AND SOLUTION P/L
171	753898	6414840	Private	AD &SA McGreggor
180	755292	6420111	Private	CD & LL Barrett
181	755178	6420092	Private	SM Forster
182	755049	6420016	Private	J Dutoitcook
183	754822	6419969	Private	R & EA Steines
184	755093	6419504	Private	LA Stevenson
185	754967	6419464	Private	LA Stevenson
186	754674	6419437	Private	RW & IJ Adamson
187	754816	6419137	Private	BT & KM Feeney
188	754577	6419073	Private	KR & T Fielding
189	754772	6418881	Private	Goggin, Hyde
190	754488	6418711	Private	T & LK Sahyoun
191	754592	6418520	Private	BW & TS Lasham
192	754649	6418328	Private	D Williams
194	754160	6418080	Private	PM & K Potts
195	754583	6417973	Private	R Cottam
196	754072	6417840	Private	F Saxberg & M Weir
200	754141	6417241	Private	VK Grimshaw
201	754138	6417158	Private	KR & GM Towerton
201	754311	6416962	Private	KR & GM Towerton
202	754258	6416804	Private	H & VF Butler
203	754462	6416639	Private	DJ Miller
204	754537	6416557	Private	RB & JE Donnan
206	754394	6416192	Private	CA Marshall & R Vella
207	754057	6415768	Private	AA & DM Smith
208	753938	6415612	Private	SA & CR Hasaart
209	753883	6415407	Private	F Mawson
210	753873	6415226	Private	JM & AM Tebbutt
217	754659	6415319	Private	RP & JL Patterson
218	754550	6415117	Private	GF & GEL Soady
219	754468	6415587	Private	T & S Riger
220	754258	6415351	Private	SJ Rusten & NJ Smith
222	754813	6415761	Private	BJ Purtell
223	754921	6415935	Private	EW Palmer & JM Stewart
224	754895	6417021	Private	RS & PCC Dupond
226	754812	6417270	Private	LAA & FC Muscat
227	755000	6417482	Private	WP & JA Hughes
228	754978	6417572	Private	LIBERTIS
229	755115	6417791	Private	JJ & BA Lowe
230	755229	6417879	Private	DA Hoole & DT Rawlinson
231	755200	6418034	Private	T Morrison & SM Benny
232	755121	6418197	Private	L & JA Haaring
233	755196	6418290	Private	D & K Boal
234	755157	6418405	Private	D & L Gaw
235	755107	6418631	Private	LM & RS Wilson
236	755165	6418738	Private	RG & CA Donovan
237	755468	6418862	Private	A Puskaric
238	755497	6418969	Private	BF Powell
239	755558	6419118	Private	JE Delarue
240	755694	6419408	Private	GJ & DM Hartely
255	754922	6425602	Private	HJ & H Schmitz
258	755375	6425132	Private	PM & CD Elias
300	755327	6421268	Private	CM Collins & CY Marshall
303	755327	6420850	Private	HJ Ungaro

ID	Easting	Northing	Type	Owner
305	755052	6420566	Private	L Barisic & M Aul
306	754978	6420431	Private	E Armstrong
307	754843	6420373	Private	M Chant & NK Young
308	754605	6420402	Private	NA Dower
309	754219	6420817	Private	GS Maher
310	754407	6420948	Private	KI Death
312	754239	6421215	Private	MS & JJ Ioannou
313	753906	6421166	Private	NJ & BDE Pracy
314	753997	6421486	Private	SL Ford
315	754141	6421605	Private	WJ Richards & BJ Uzelac
316	754210	6421744	Private	CR Vassel & CM Williams
317	754646	6421744	Private	RJ Hore & V Bingham
5	759764	6420796	Mine	MCO owned
20	758370	6421350	Mine	MCO owned
21	757840	6421380	Mine	MCO owned
22	757342	6421298	Mine	MCO owned
23	757110	6421102	Mine	MCO owned
25	758484	6423794	Mine	MCO owned
28	759330	6416410	Mine	MCO owned
29a	763780	6415920	Mine	MCO owned
29b	762850	6415570	Mine	MCO owned
36	760388	6416975	Mine	MCO owned
41	756863	6421212	Mine	MCO owned
41C	758241	6425152	Mine	MCO owned
48	765380	6411970	Mine	MCO owned
49	757370	6423590	Mine	MCO owned
51	761130	6413720	Mine	MCO owned
52	764290	6436310	Mine	MCO owned
64	756262	6420946	Mine	MCO owned
74	756021	6420067	Mine	MCO owned
77	756357	6419434	Mine	MCO owned
78	755750	6419149	Mine	MCO owned
81	756220	6418906	Mine	MCO owned
152	758019	6425090	Mine	MCO owned
153	758029	6425124	Mine	MCO owned
157	758195	6425198	Mine	MCO owned
158	757911	6424895	Mine	MCO owned
159	758237	6425137	Mine	MCO owned
161	758298	6425100	Mine	MCO owned
165	758268	6425287	Mine	MCO owned
169	756630	6424000	Mine	MCO owned
170	755557	6421185	Mine	MCO owned
172	756058	6420779	Mine	MCO owned
173	756280	6423520	Mine	MCO owned
175	755624	6420844	Mine	MCO owned
176	755585	6420625	Mine	MCO owned
177	755530	6420496	Mine	MCO owned
241	755631	6419645	Mine	MCO owned
253	753840	6428415	Mine	Ulan Coal Mines Limited
254	754474	6426260	Mine	Ulan Coal Mines Limited
257	755429	6425331	Mine	Ulan Coal Mines Limited
301	755336	6421121	Mine	MCO owned
302	755299	6420997	Mine	MCO owned
319	767049	6414413	Mine	Wilpinjong Coal PTY Limited
319	767545	6414629	Mine	Wilpinjong Coal PTY Limited
319	769659	6414795	Mine	Wilpinjong Coal PTY Limited
319	769645	6414405	Mine	Wilpinjong Coal PTY Limited
319	770276	6413737	Mine	Wilpinjong Coal PTY Limited

ID	Easting	Northing	Type	Owner
319	771960	6415964	Mine	Wilpinjong Coal PTY Limited
320	755059	6424522	Mine	MCO owned

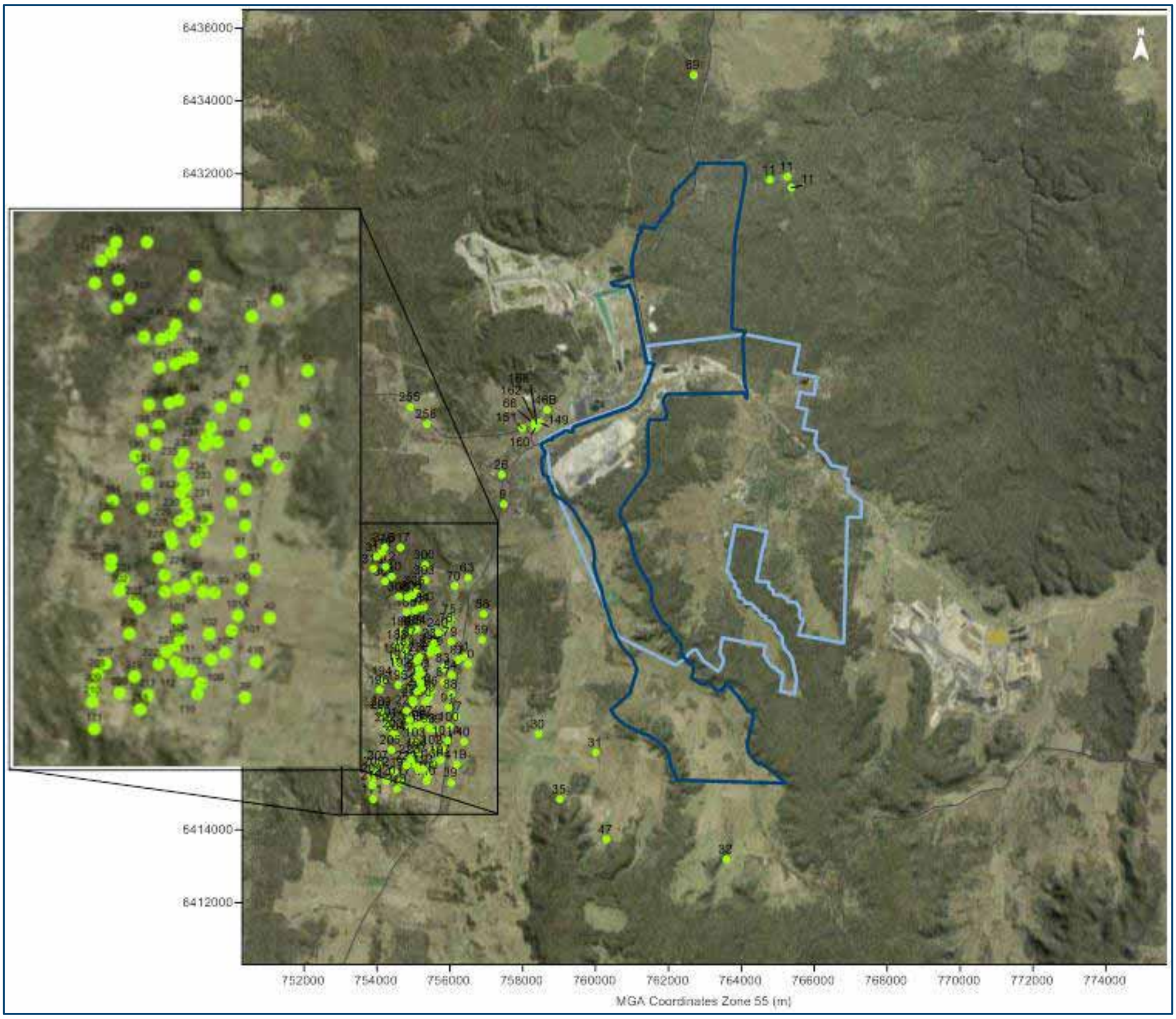

Figure A-1: Location of privately-owned receptors assessed in this study

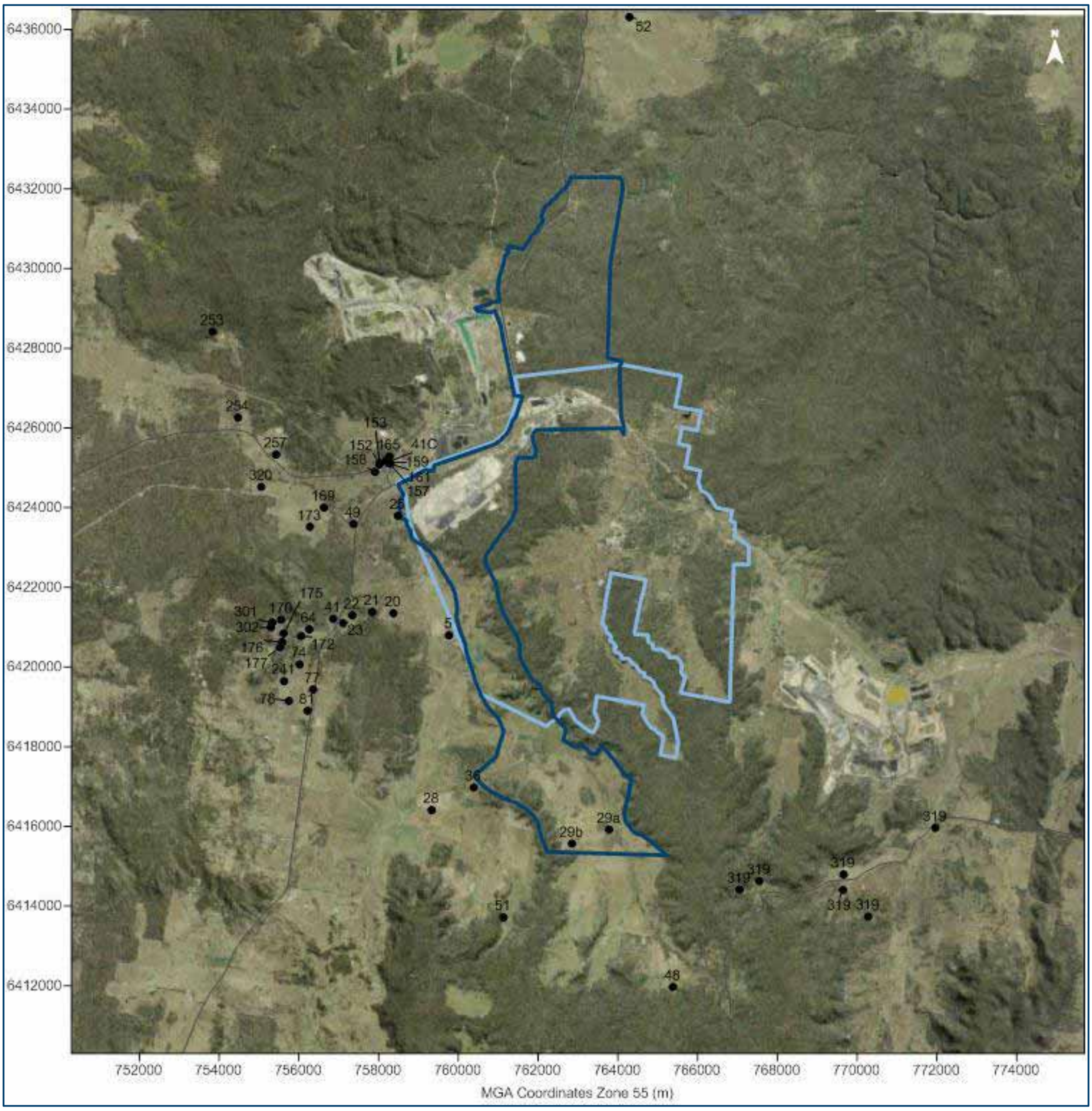

Figure A-2: Location of mine-owned receptors assessed in this study

Appendix B
Monitoring Data

Table B-1: TEOM monitoring data

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
1/01/2010	3.5	2.9	3.4	ND	6.3	3/07/2011	9.9	4.3	9.2	ND	4.6
2/01/2010	2.6	1.7	2.6	ND	6.4	4/07/2011	8.3	6.0	5.6	ND	6.4
3/01/2010	6.9	5.1	9.5	ND	8.2	5/07/2011	5.9	12.5	5.4	ND	13.6
4/01/2010	10.7	8.2	12.4	ND	16.2	6/07/2011	8.2	12.3	7.0	ND	13.0
5/01/2010	10.9	8.3	9.2	ND	15.7	7/07/2011	7.3	7.9	5.3	ND	8.5
6/01/2010	8.9	7.0	6.2	ND	11.6	8/07/2011	4.5	8.8	5.1	ND	8.9
7/01/2010	18.5	13.9	15.6	ND	25.3	9/07/2011	2.3	6.7	0.3	ND	6.8
8/01/2010	16.3	3.2	14.8	ND	23.1	10/07/2011	1.5	10.2	1.3	ND	11.5
9/01/2010	12.5	10.1	9.9	ND	12.7	11/07/2011	7.9	11.4	9.2	ND	11.8
10/01/2010	18.6	11.0	11.2	ND	18.8	12/07/2011	11.3	16.7	13.7	ND	17.9
11/01/2010	26.2	21.7	25.1	ND	32.8	13/07/2011	16.8	17.9	18.1	ND	19.2
12/01/2010	18.6	13.2	20.1	ND	20.7	14/07/2011	14.9	9.1	29.1	ND	19.4
13/01/2010	20.0	15.6	20.1	ND	23.3	15/07/2011	12.0	7.3	ND	ND	27.2
14/01/2010	8.9	5.7	8.6	ND	14.9	16/07/2011	4.7	2.3	ND	ND	13.1
15/01/2010	10.4	6.9	7.9	ND	15.7	17/07/2011	4.3	2.8	ND	ND	7.0
16/01/2010	11.9	9.3	11.6	ND	16.5	18/07/2011	3.3	5.9	ND	ND	3.4
17/01/2010	10.5	10.9	8.0	ND	6.5	19/07/2011	2.5	3.4	ND	ND	5.3
18/01/2010	18.4	28.2	21.4	ND	19.9	20/07/2011	5.6	2.9	ND	ND	8.2
19/01/2010	13.9	13.7	16.3	ND	13.7	21/07/2011	4.1	5.2	ND	ND	9.2
20/01/2010	21.1	18.7	25.6	ND	24.7	22/07/2011	4.6	6.9	ND	ND	11.1
21/01/2010	20.3	18.3	30.1	ND	24.3	23/07/2011	4.0	2.9	ND	ND	7.3
22/01/2010	23.2	18.2	29.9	ND	28.9	24/07/2011	4.4	4.1	ND	ND	5.6
23/01/2010	20.3	16.3	19.4	ND	23.5	25/07/2011	5.0	11.2	ND	ND	6.7
24/01/2010	26.7	23.4	30.0	ND	37.0	26/07/2011	7.7	8.4	ND	ND	11.8
25/01/2010	31.1	25.2	25.2	ND	31.6	27/07/2011	10.6	7.9	ND	ND	16.2
26/01/2010	21.8	20.5	18.8	ND	20.4	28/07/2011	11.3	11.4	ND	ND	16.8
27/01/2010	23.3	24.1	24.7	ND	36.6	29/07/2011	10.4	8.7	ND	ND	9.7
28/01/2010	20.9	15.1	20.0	ND	25.1	30/07/2011	9.2	8.3	ND	ND	11.8
29/01/2010	16.4	11.6	9.5	ND	17.6	31/07/2011	9.9	11.1	ND	ND	12.5
30/01/2010	22.0	12.2	20.1	ND	21.6	1/08/2011	12.8	17.7	ND	ND	19.7
31/01/2010	16.8	5.7	9.3	ND	13.7	2/08/2011	6.3	15.6	ND	ND	18.0
1/02/2010	25.8	11.7	22.7	ND	31.8	3/08/2011	16.3	20.3	ND	ND	20.7
2/02/2010	30.2	7.9	29.0	ND	26.0	4/08/2011	7.2	13.0	ND	ND	39.0
3/02/2010	19.7	6.3	15.2	ND	16.7	5/08/2011	22.0	15.4	ND	ND	28.4
4/02/2010	7.9	6.1	15.1	ND	32.9	6/08/2011	15.3	10.1	ND	ND	17.8
5/02/2010	6.4	0.5	6.8	ND	8.5	7/08/2011	5.4	4.5	ND	ND	6.7
6/02/2010	2.6	2.5	2.2	ND	5.9	8/08/2011	4.9	4.2	ND	ND	4.7
7/02/2010	2.3	1.9	2.2	ND	6.8	9/08/2011	3.3	2.2	ND	ND	3.7
8/02/2010	10.9	6.7	6.6	ND	9.9	10/08/2011	8.4	4.6	ND	ND	13.8
9/02/2010	10.0	7.1	10.0	ND	16.5	11/08/2011	6.0	7.2	ND	ND	7.0
10/02/2010	10.9	8.3	10.1	ND	13.8	12/08/2011	9.6	6.5	ND	ND	16.1
11/02/2010	15.6	12.7	13.9	ND	16.6	13/08/2011	11.5	6.9	ND	ND	17.1
12/02/2010	10.5	11.4	8.5	ND	16.9	14/08/2011	11.9	7.3	ND	ND	15.7
13/02/2010	10.5	6.9	10.3	ND	12.1	15/08/2011	11.6	5.0	ND	ND	23.7
14/02/2010	6.8	5.8	6.7	ND	11.3	16/08/2011	13.5	5.4	ND	ND	23.5
15/02/2010	4.6	4.8	1.3	ND	3.5	17/08/2011	7.7	5.8	ND	ND	15.0
16/02/2010	10.3	6.9	7.5	ND	15.0	18/08/2011	5.5	5.2	ND	ND	6.8
17/02/2010	13.8	10.0	11.2	ND	27.0	19/08/2011	2.3	2.4	ND	ND	5.5
18/02/2010	20.7	8.4	10.8	ND	27.8	20/08/2011	12.2	4.7	ND	ND	15.4
19/02/2010	10.0	7.3	13.3	ND	16.5	21/08/2011	12.8	5.6	ND	ND	21.8
20/02/2010	10.4	7.5	11.3	ND	14.1	22/08/2011	8.2	4.4	ND	ND	18.6
21/02/2010	12.6	8.1	8.4	ND	19.1	23/08/2011	6.4	1.8	ND	ND	18.3
22/02/2010	13.8	8.4	11.8	ND	15.6	24/08/2011	12.0	5.0	ND	ND	22.0

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
23/02/2010	16.0	13.4	17.6	ND	21.8	25/08/2011	11.0	10.1	ND	ND	12.5
24/02/2010	19.7	16.1	18.4	ND	35.5	26/08/2011	11.1	8.9	ND	ND	24.6
25/02/2010	18.1	13.1	17.0	ND	27.4	27/08/2011	16.7	13.7	ND	ND	22.9
26/02/2010	14.4	9.2	13.6	ND	18.1	28/08/2011	12.0	10.6	ND	ND	15.1
27/02/2010	10.0	5.9	9.9	ND	10.4	29/08/2011	17.4	15.4	ND	ND	14.0
28/02/2010	10.8	10.3	10.2	ND	13.9	30/08/2011	1.1	12.3	ND	ND	26.1
1/03/2010	6.8	13.7	4.7	ND	13.2	31/08/2011	15.2	12.9	ND	ND	23.2
2/03/2010	10.4	30.7	5.8	ND	36.5	1/09/2011	19.2	15.7	ND	8.4	21.8
3/03/2010	10.3	24.6	4.8	ND	32.4	2/09/2011	16.3	11.0	ND	8.6	43.5
4/03/2010	5.2	14.7	14.1	ND	28.2	3/09/2011	11.1	5.3	ND	4.6	18.5
5/03/2010	8.8	4.1	2.1	ND	12.1	4/09/2011	14.4	10.7	ND	8.1	16.1
6/03/2010	5.0	5.5	4.9	ND	11.4	5/09/2011	16.0	13.6	ND	11.0	19.1
7/03/2010	10.4	9.0	10.1	ND	14.8	6/09/2011	16.6	18.9	ND	10.0	19.7
8/03/2010	3.4	8.9	7.0	ND	4.0	7/09/2011	10.5	12.3	ND	7.8	10.6
9/03/2010	6.5	10.2	8.9	ND	10.8	8/09/2011	16.9	10.6	ND	9.1	21.4
10/03/2010	6.6	8.2	2.2	ND	23.2	9/09/2011	4.1	3.9	ND	1.3	2.2
11/03/2010	11.4	14.4	9.5	ND	24.0	10/09/2011	6.4	9.5	ND	4.7	10.4
12/03/2010	14.8	14.4	7.9	ND	24.3	11/09/2011	5.4	10.1	ND	2.9	10.6
13/03/2010	13.7	12.3	4.5	ND	16.6	12/09/2011	5.3	7.8	ND	2.8	9.0
14/03/2010	4.9	5.7	2.1	ND	15.3	13/09/2011	5.9	12.5	ND	4.2	13.0
15/03/2010	11.1	13.3	7.7	ND	18.0	14/09/2011	8.5	14.8	ND	8.1	16.1
16/03/2010	15.0	7.2	9.8	ND	22.3	15/09/2011	11.2	15.8	ND	8.7	17.7
17/03/2010	18.3	19.5	10.6	ND	24.5	16/09/2011	11.1	19.0	ND	9.2	13.4
18/03/2010	18.3	17.9	7.8	ND	21.0	17/09/2011	10.7	16.8	ND	8.7	12.2
19/03/2010	13.8	18.9	12.4	ND	18.6	18/09/2011	11.0	16.2	ND	11.8	18.8
20/03/2010	32.3	17.7	15.3	ND	21.7	19/09/2011	31.3	25.8	ND	26.3	46.8
21/03/2010	17.5	16.9	16.3	ND	20.4	20/09/2011	12.2	12.0	ND	19.7	24.0
22/03/2010	25.1	22.7	18.5	ND	26.3	21/09/2011	10.6	15.3	ND	8.5	16.5
23/03/2010	18.0	20.6	13.7	ND	16.9	22/09/2011	21.2	12.1	ND	14.3	12.9
24/03/2010	30.8	22.7	16.9	ND	37.5	23/09/2011	17.5	19.1	ND	25.8	12.2
25/03/2010	23.6	23.4	18.8	ND	27.3	24/09/2011	29.1	25.4	ND	23.5	15.1
26/03/2010	23.1	20.5	15.9	ND	20.2	25/09/2011	4.2	1.1	ND	2.1	31.7
27/03/2010	22.6	18.4	16.0	ND	27.9	26/09/2011	8.9	4.8	ND	4.5	5.0
28/03/2010	26.5	25.3	22.6	ND	28.6	27/09/2011	10.2	5.5	ND	6.5	13.1
29/03/2010	12.3	18.4	9.7	ND	13.5	28/09/2011	14.8	9.9	ND	11.8	13.9
30/03/2010	2.8	4.5	0.2	ND	4.1	29/09/2011	3.1	2.6	ND	1.3	18.0
31/03/2010	2.9	6.0	1.3	ND	8.3	30/09/2011	4.6	4.9	ND	3.0	6.1
1/04/2010	ND	2.0	4.0	ND	8.6	1/10/2011	3.7	3.1	ND	2.3	6.6
2/04/2010	ND	10.3	12.7	ND	18.2	2/10/2011	2.9	3.4	ND	2.3	6.5
3/04/2010	ND	7.2	10.1	ND	13.2	3/10/2011	8.0	3.5	ND	3.7	5.6
4/04/2010	ND	2.9	4.9	ND	9.2	4/10/2011	7.6	3.9	ND	4.0	8.4
5/04/2010	ND	5.4	8.0	ND	17.2	5/10/2011	11.7	6.7	ND	8.1	7.9
6/04/2010	ND	3.6	6.1	ND	10.8	6/10/2011	7.6	6.0	ND	5.8	13.4
7/04/2010	ND	5.2	6.0	ND	9.4	7/10/2011	14.5	11.2	ND	10.8	11.1
8/04/2010	6.0	6.8	2.8	ND	4.9	8/10/2011	5.2	4.7	ND	3.2	15.9
9/04/2010	9.8	13.0	7.6	ND	12.1	9/10/2011	5.3	9.2	ND	3.1	7.5
10/04/2010	10.0	9.1	7.0	ND	10.6	10/10/2011	4.6	7.8	ND	3.6	6.8
11/04/2010	5.7	5.2	3.6	ND	5.3	11/10/2011	7.1	9.1	ND	4.8	6.5
12/04/2010	9.3	10.8	4.1	ND	6.1	12/10/2011	8.3	9.6	ND	6.8	6.9
13/04/2010	13.6	8.6	11.4	ND	17.2	13/10/2011	16.5	11.6	ND	11.6	8.7
14/04/2010	13.3	9.1	17.4	ND	12.8	14/10/2011	15.1	7.2	ND	9.1	18.3
15/04/2010	14.6	11.7	25.5	ND	16.3	15/10/2011	8.3	7.0	ND	5.3	15.0
16/04/2010	20.7	14.1	22.6	ND	25.3	16/10/2011	7.4	9.2	ND	5.7	10.0
17/04/2010	11.3	9.2	12.2	ND	18.4	17/10/2011	16.5	13.3	ND	13.0	9.6

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
18/04/2010	7.0	5.9	5.5	ND	12.3	18/10/2011	17.3	12.9	ND	12.8	17.6
19/04/2010	18.2	5.1	9.2	ND	14.6	19/10/2011	14.7	8.4	ND	9.5	19.0
20/04/2010	14.4	4.5	12.7	ND	13.0	20/10/2011	17.8	13.0	ND	14.0	17.0
21/04/2010	13.9	5.9	14.0	ND	13.4	21/10/2011	18.3	17.0	ND	12.0	15.3
22/04/2010	15.2	11.7	16.1	ND	12.6	22/10/2011	26.4	16.6	ND	12.7	14.7
23/04/2010	13.7	11.5	15.1	ND	12.6	23/10/2011	18.5	22.2	ND	17.5	17.8
24/04/2010	11.9	11.4	13.6	ND	18.5	24/10/2011	19.6	16.4	ND	13.8	19.7
25/04/2010	3.9	3.1	ND	ND	0.0	25/10/2011	16.2	16.1	ND	10.5	16.9
26/04/2010	5.7	4.0	3.7	ND	6.0	26/10/2011	4.4	1.1	ND	3.4	17.6
27/04/2010	6.9	5.9	4.9	ND	9.8	27/10/2011	9.5	6.1	ND	7.4	9.0
28/04/2010	6.1	7.9	4.5	ND	7.9	28/10/2011	11.3	7.1	ND	8.5	12.7
29/04/2010	8.7	9.4	6.0	ND	10.5	29/10/2011	10.3	8.6	ND	8.4	13.7
30/04/2010	8.1	6.2	11.3	ND	18.2	30/10/2011	2.3	2.7	ND	1.0	13.0
1/05/2010	10.6	7.7	9.4	ND	12.1	31/10/2011	10.8	6.9	ND	6.7	5.0
2/05/2010	9.6	6.9	7.4	ND	9.4	1/11/2011	12.1	10.6	ND	8.3	11.2
3/05/2010	16.4	10.1	17.6	ND	27.5	2/11/2011	8.1	13.5	ND	5.8	13.7
4/05/2010	11.7	6.9	8.4	ND	12.0	3/11/2011	12.7	10.2	ND	8.8	8.7
5/05/2010	3.9	4.3	ND	ND	1.2	4/11/2011	22.4	9.0	ND	9.2	12.8
6/05/2010	6.7	5.1	4.1	ND	6.7	5/11/2011	13.9	10.2	ND	13.0	15.5
7/05/2010	6.9	5.6	3.9	ND	8.8	6/11/2011	16.1	17.4	ND	14.2	16.1
8/05/2010	8.0	4.5	4.3	ND	9.6	7/11/2011	15.7	2.8	ND	12.1	18.2
9/05/2010	7.7	6.4	7.3	ND	11.1	8/11/2011	19.0	16.0	ND	15.5	17.6
10/05/2010	14.5	7.9	9.6	ND	14.3	9/11/2011	14.3	17.6	ND	12.3	20.1
11/05/2010	13.0	19.8	10.0	ND	4.0	10/11/2011	10.2	11.5	ND	8.1	16.4
12/05/2010	4.2	9.7	9.2	ND	12.4	11/11/2011	16.8	16.5	ND	13.9	11.4
13/05/2010	5.5	6.8	2.6	ND	12.8	12/11/2011	15.9	13.4	ND	13.3	20.3
14/05/2010	7.8	8.5	7.3	ND	16.9	13/11/2011	19.8	18.4	ND	18.3	18.4
15/05/2010	8.0	6.9	6.2	ND	9.5	14/11/2011	15.5	17.7	ND	12.8	23.0
16/05/2010	13.5	9.6	9.5	ND	16.3	15/11/2011	24.7	24.2	ND	18.2	18.6
17/05/2010	13.3	9.3	10.5	ND	17.4	16/11/2011	23.3	18.3	ND	16.4	21.7
18/05/2010	10.0	6.5	10.1	ND	11.9	17/11/2011	5.2	3.9	ND	3.8	24.6
19/05/2010	12.4	6.9	14.4	ND	13.2	18/11/2011	16.4	13.7	ND	13.2	8.2
20/05/2010	17.8	6.4	13.2	ND	20.5	19/11/2011	16.6	13.9	ND	14.9	18.6
21/05/2010	13.6	2.0	17.4	ND	20.1	20/11/2011	22.7	19.6	ND	16.3	18.8
22/05/2010	8.4	4.3	8.9	ND	11.3	21/11/2011	9.3	7.3	ND	6.9	23.1
23/05/2010	8.8	4.0	9.2	ND	16.2	22/11/2011	9.7	7.5	ND	ND	13.6
24/05/2010	8.6	3.8	12.8	ND	15.8	23/11/2011	1.4	0.9	ND	ND	11.9
25/05/2010	5.6	6.0	5.6	ND	11.0	24/11/2011	3.8	2.9	ND	1.8	5.2
26/05/2010	3.0	2.3	1.7	ND	6.4	25/11/2011	2.2	2.4	ND	ND	6.8
27/05/2010	11.1	4.8	7.1	ND	12.4	26/11/2011	1.4	3.6	ND	1.8	5.6
28/05/2010	6.6	4.7	6.1	ND	11.6	27/11/2011	8.2	9.5	ND	7.0	5.6
29/05/2010	3.3	2.7	3.1	ND	7.3	28/11/2011	13.9	9.5	ND	8.7	9.3
30/05/2010	0.9	0.8	0.2	ND	5.2	29/11/2011	19.6	14.9	ND	21.2	15.7
31/05/2010	5.2	4.0	3.3	ND	ND	30/11/2011	14.3	12.6	ND	10.3	20.8
1/06/2010	8.2	4.1	1.8	ND	14.2	1/12/2011	8.2	10.4	ND	9.7	16.9
2/06/2010	9.6	4.3	7.6	ND	12.3	2/12/2011	9.4	6.4	ND	8.8	13.3
3/06/2010	12.4	3.5	6.1	ND	13.2	3/12/2011	5.9	5.3	ND	8.2	20.8
4/06/2010	5.1	3.2	3.2	ND	11.5	4/12/2011	9.6	11.6	ND	10.7	14.7
5/06/2010	4.2	5.3	3.2	ND	7.0	5/12/2011	11.7	6.6	ND	9.6	11.4
6/06/2010	6.8	6.2	6.1	ND	10.8	6/12/2011	9.0	6.1	ND	9.5	13.7
7/06/2010	9.7	5.5	6.1	ND	11.6	7/12/2011	9.4	5.4	ND	6.5	14.7
8/06/2010	9.2	6.0	7.5	ND	10.7	8/12/2011	4.7	3.6	ND	3.8	12.9
9/06/2010	7.2	8.7	5.6	ND	9.2	9/12/2011	8.4	6.9	ND	6.7	12.8
10/06/2010	6.2	7.0	4.7	ND	8.4	10/12/2011	6.4	5.0	ND	5.5	8.6

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
11/06/2010	6.7	7.8	4.5	ND	8.6	11/12/2011	7.4	6.6	ND	6.6	12.0
12/06/2010	4.2	3.5	4.9	ND	8.1	12/12/2011	3.2	3.7	ND	2.4	10.5
13/06/2010	7.1	5.1	5.8	ND	12.0	13/12/2011	9.4	8.6	ND	8.4	9.8
14/06/2010	11.5	8.0	10.2	ND	16.2	14/12/2011	12.9	10.6	ND	9.9	7.0
15/06/2010	8.8	4.3	12.6	ND	12.5	15/12/2011	15.5	14.0	ND	14.7	11.4
16/06/2010	12.1	4.7	12.9	ND	16.3	16/12/2011	10.0	7.7	ND	9.3	13.7
17/06/2010	5.8	5.6	3.5	ND	8.6	17/12/2011	12.8	10.0	ND	10.4	17.7
18/06/2010	10.5	10.9	8.2	ND	11.9	18/12/2011	12.8	11.6	ND	12.5	13.4
19/06/2010	6.6	7.5	5.0	ND	9.6	19/12/2011	15.3	11.0	ND	12.3	15.9
20/06/2010	3.9	3.3	3.4	ND	5.5	20/12/2011	7.8	7.0	ND	6.3	16.5
21/06/2010	7.7	5.4	6.4	ND	12.6	21/12/2011	10.8	13.9	ND	12.0	17.3
22/06/2010	4.7	4.2	6.3	ND	8.8	22/12/2011	8.5	4.5	ND	8.3	11.7
23/06/2010	6.7	2.6	5.4	ND	12.0	23/12/2011	5.5	4.8	ND	4.8	13.0
24/06/2010	5.4	2.7	5.6	ND	8.9	24/12/2011	7.3	7.2	ND	7.6	8.4
25/06/2010	7.7	3.5	5.3	ND	9.5	25/12/2011	6.5	6.6	ND	5.6	9.0
26/06/2010	2.3	1.4	1.0	ND	4.7	26/12/2011	6.7	6.2	ND	5.2	11.5
27/06/2010	4.1	3.0	2.7	ND	6.0	27/12/2011	8.1	7.1	ND	6.4	8.6
28/06/2010	6.9	6.7	4.9	ND	8.2	28/12/2011	14.1	12.6	ND	12.7	10.0
29/06/2010	6.3	8.1	4.2	ND	7.2	29/12/2011	11.7	10.7	ND	10.6	11.0
30/06/2010	6.8	8.4	4.0	ND	7.8	30/12/2011	12.7	12.0	ND	11.6	17.6
1/07/2010	8.1	9.4	4.0	ND	9.8	31/12/2011	12.3	7.7	ND	10.3	15.5
2/07/2010	4.9	10.3	3.0	ND	7.8	1/01/2012	15.0	11.1	ND	9.9	ND
3/07/2010	2.0	1.2	1.0	ND	3.9	2/01/2012	19.1	13.1	ND	11.8	ND
4/07/2010	4.2	2.8	2.6	ND	7.2	3/01/2012	18.1	16.3	ND	15.3	ND
5/07/2010	8.8	5.1	8.9	ND	12.4	4/01/2012	19.9	27.3	ND	16.8	ND
6/07/2010	6.0	6.1	4.8	ND	8.5	5/01/2012	0.6	17.6	ND	17.7	ND
7/07/2010	9.8	6.8	5.6	ND	11.7	6/01/2012	10.2	9.8	ND	7.4	ND
8/07/2010	11.1	4.6	7.1	ND	13.6	7/01/2012	13.3	12.6	ND	12.8	ND
9/07/2010	10.1	3.5	6.1	ND	12.4	8/01/2012	0.9	20.1	ND	ND	ND
10/07/2010	6.8	3.3	4.8	ND	10.8	9/01/2012	9.9	11.8	ND	ND	ND
11/07/2010	9.0	8.7	6.6	ND	11.1	10/01/2012	12.7	14.2	ND	ND	ND
12/07/2010	5.2	2.8	4.6	ND	8.5	11/01/2012	18.0	38.1	ND	ND	ND
13/07/2010	4.9	3.2	4.7	ND	8.4	12/01/2012	12.4	14.3	ND	7.0	ND
14/07/2010	2.5	3.1	1.9	ND	4.7	13/01/2012	16.0	14.1	ND	11.0	ND
15/07/2010	5.3	5.1	3.7	ND	6.7	14/01/2012	32.8	20.5	ND	11.9	ND
16/07/2010	9.0	4.0	5.5	ND	9.5	15/01/2012	10.6	8.2	ND	5.2	ND
17/07/2010	6.4	4.0	4.6	ND	11.5	16/01/2012	10.2	7.7	ND	7.2	ND
18/07/2010	5.6	5.4	4.2	ND	7.1	17/01/2012	15.3	12.5	ND	12.0	ND
19/07/2010	6.0	11.6	3.3	ND	6.5	18/01/2012	12.3	5.9	ND	6.6	ND
20/07/2010	6.7	10.2	3.2	ND	8.1	19/01/2012	17.8	15.5	ND	13.5	ND
21/07/2010	4.8	8.0	3.5	ND	9.0	20/01/2012	18.6	15.6	ND	13.8	ND
22/07/2010	5.7	7.5	4.3	ND	7.1	21/01/2012	14.7	10.0	ND	10.7	ND
23/07/2010	8.5	5.8	5.6	ND	23.3	22/01/2012	17.1	7.7	ND	7.9	ND
24/07/2010	6.3	3.8	4.4	ND	8.6	23/01/2012	17.9	8.5	ND	8.7	ND
25/07/2010	7.2	5.1	6.0	ND	10.8	24/01/2012	17.1	9.3	ND	8.5	ND
26/07/2010	10.9	5.9	7.7	ND	15.1	25/01/2012	5.2	2.8	ND	2.7	ND
27/07/2010	10.2	4.7	11.7	ND	17.7	26/01/2012	2.8	2.1	ND	1.4	ND
28/07/2010	3.5	1.9	4.2	ND	6.4	27/01/2012	10.5	6.3	ND	6.1	ND
29/07/2010	2.3	1.6	1.5	ND	5.2	28/01/2012	11.2	6.2	ND	7.2	ND
30/07/2010	2.8	2.7	1.3	ND	4.7	29/01/2012	10.5	6.8	ND	7.1	ND
31/07/2010	1.7	1.6	1.3	ND	3.8	30/01/2012	7.2	4.9	ND	4.0	ND
1/08/2010	2.9	2.8	2.2	ND	5.0	31/01/2012	12.9	10.9	ND	9.9	ND
2/08/2010	2.9	2.5	2.2	ND	4.9	1/02/2012	1.9	0.6	ND	0.8	ND
3/08/2010	5.9	5.3	3.2	ND	6.0	2/02/2012	2.8	1.6	ND	1.7	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
4/08/2010	4.7	4.9	2.1	ND	4.7	3/02/2012	4.8	3.7	ND	3.7	ND
5/08/2010	5.4	7.4	2.7	ND	6.0	4/02/2012	9.0	9.5	ND	6.2	ND
6/08/2010	4.5	6.1	2.3	ND	6.9	5/02/2012	12.3	12.0	ND	8.7	ND
7/08/2010	5.6	5.2	3.6	ND	7.4	6/02/2012	23.5	25.7	ND	19.2	ND
8/08/2010	7.2	4.7	5.0	ND	10.8	7/02/2012	ND	5.6	ND	5.7	ND
9/08/2010	17.8	8.7	15.9	ND	29.7	8/02/2012	4.6	10.8	ND	12.5	ND
10/08/2010	1.2	6.5	8.7	ND	11.6	9/02/2012	5.0	13.8	ND	14.6	ND
11/08/2010	1.7	2.3	0.5	ND	3.5	10/02/2012	3.5	7.7	ND	8.5	ND
12/08/2010	ND	2.0	1.7	ND	4.2	11/02/2012	3.1	4.2	ND	5.0	ND
13/08/2010	3.3	3.3	2.3	ND	4.8	12/02/2012	3.9	8.8	ND	8.7	ND
14/08/2010	2.2	1.5	1.6	ND	4.7	13/02/2012	5.0	9.0	ND	10.8	ND
15/08/2010	6.0	8.5	6.0	ND	10.5	14/02/2012	13.0	8.4	ND	8.8	ND
16/08/2010	3.5	5.8	2.1	ND	5.5	15/02/2012	13.8	7.8	ND	7.5	ND
17/08/2010	6.3	2.6	3.8	ND	7.2	16/02/2012	14.7	7.6	ND	7.2	ND
18/08/2010	14.1	12.6	13.4	ND	21.3	17/02/2012	19.1	13.2	ND	9.3	ND
19/08/2010	6.3	6.1	5.0	ND	8.2	18/02/2012	ND	12.1	ND	9.0	ND
20/08/2010	5.5	5.2	2.8	ND	5.7	19/02/2012	13.0	ND	ND	9.9	ND
21/08/2010	4.6	4.2	3.1	ND	6.8	20/02/2012	7.1	5.5	ND	4.3	ND
22/08/2010	5.5	3.2	3.8	ND	10.6	21/02/2012	7.6	5.3	ND	5.1	ND
23/08/2010	2.6	2.5	2.8	ND	6.6	22/02/2012	12.4	8.9	ND	8.4	ND
24/08/2010	3.0	1.7	0.9	ND	4.1	23/02/2012	12.1	8.0	ND	13.2	ND
25/08/2010	4.0	4.6	1.7	ND	4.8	24/02/2012	15.7	10.6	ND	10.1	ND
26/08/2010	3.6	7.1	3.6	ND	7.6	25/02/2012	10.5	7.3	ND	8.5	ND
27/08/2010	4.5	4.1	4.0	ND	7.0	26/02/2012	6.9	5.5	ND	5.9	ND
28/08/2010	3.7	2.3	2.2	ND	5.5	27/02/2012	8.6	6.3	ND	6.8	ND
29/08/2010	2.8	5.9	5.8	ND	9.8	28/02/2012	14.9	19.1	ND	11.6	ND
30/08/2010	12.8	9.7	10.3	ND	12.0	29/02/2012	13.6	14.6	ND	9.0	ND
31/08/2010	10.9	11.6	9.3	ND	14.5	1/03/2012	11.2	10.1	ND	7.0	ND
1/09/2010	13.5	14.7	13.1	ND	16.5	2/03/2012	ND	ND	ND	0.1	ND
2/09/2010	4.4	14.1	8.7	ND	14.1	3/03/2012	3.0	3.0	ND	2.6	ND
3/09/2010	5.9	2.5	13.1	ND	17.3	4/03/2012	8.5	5.9	ND	7.0	ND
4/09/2010	2.4	1.6	1.8	ND	4.6	5/03/2012	5.8	3.4	ND	4.6	ND
5/09/2010	2.3	1.7	1.6	ND	4.6	6/03/2012	14.3	9.7	ND	9.5	ND
6/09/2010	4.7	5.6	2.1	ND	6.5	7/03/2012	7.9	0.1	ND	3.2	ND
7/09/2010	4.2	6.5	2.5	ND	7.3	8/03/2012	1.5	7.4	ND	3.0	ND
8/09/2010	9.9	4.9	8.9	ND	13.9	9/03/2012	2.2	12.1	ND	5.8	ND
9/09/2010	10.6	8.2	11.1	ND	15.1	10/03/2012	3.6	11.6	ND	8.3	ND
10/09/2010	4.2	3.1	2.2	ND	5.3	11/03/2012	3.6	12.7	ND	13.9	ND
11/09/2010	5.3	4.2	3.6	ND	7.1	12/03/2012	4.9	14.8	ND	14.1	ND
12/09/2010	4.3	3.9	3.4	ND	7.3	13/03/2012	3.8	8.7	ND	8.9	ND
13/09/2010	6.7	10.5	4.6	ND	8.9	14/03/2012	ND	ND	ND	ND	ND
14/09/2010	4.6	4.2	4.5	ND	10.2	15/03/2012	8.4	5.1	ND	4.2	ND
15/09/2010	1.1	4.9	1.6	ND	7.2	16/03/2012	13.2	9.7	ND	7.6	ND
16/09/2010	1.5	6.4	0.5	ND	6.5	17/03/2012	4.0	3.7	ND	2.3	ND
17/09/2010	3.7	6.9	2.5	ND	7.6	18/03/2012	8.7	8.0	ND	5.7	ND
18/09/2010	8.6	10.1	8.3	ND	12.6	19/03/2012	8.1	4.9	ND	4.2	ND
19/09/2010	10.5	10.8	9.9	ND	13.4	20/03/2012	9.5	7.6	ND	6.5	ND
20/09/2010	15.5	14.9	14.6	ND	23.1	21/03/2012	5.0	3.9	ND	4.7	ND
21/09/2010	18.1	16.9	17.2	ND	26.3	22/03/2012	13.3	13.3	ND	8.3	ND
22/09/2010	15.0	11.9	17.0	ND	23.8	23/03/2012	13.5	17.5	ND	11.3	ND
23/09/2010	19.9	18.9	19.9	ND	26.4	24/03/2012	8.7	9.3	ND	6.6	ND
24/09/2010	12.7	11.7	13.3	ND	16.8	25/03/2012	10.9	9.2	ND	8.5	ND
25/09/2010	9.1	9.3	11.4	ND	11.5	26/03/2012	14.3	9.3	ND	9.7	ND
26/09/2010	9.0	6.7	10.3	ND	10.9	27/03/2012	16.8	12.2	ND	10.0	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
27/09/2010	11.3	15.3	11.6	ND	15.5	28/03/2012	13.2	7.7	ND	7.9	ND
28/09/2010	9.0	16.0	10.2	ND	12.1	29/03/2012	10.3	7.7	ND	6.8	ND
29/09/2010	7.1	7.6	6.5	ND	9.1	30/03/2012	12.1	10.6	ND	8.8	ND
30/09/2010	10.6	8.8	15.4	ND	14.8	31/03/2012	10.1	6.6	ND	13.3	ND
1/10/2010	22.9	16.9	29.6	ND	27.3	1/04/2012	11.2	11.6	ND	8.3	ND
2/10/2010	14.3	12.1	15.5	ND	21.6	2/04/2012	16.0	6.3	ND	11.7	ND
3/10/2010	1.5	1.3	1.6	ND	4.5	3/04/2012	12.1	14.7	ND	13.3	ND
4/10/2010	3.2	2.1	2.8	ND	6.3	4/04/2012	19.5	14.5	ND	14.9	ND
5/10/2010	5.8	2.9	5.1	ND	8.7	5/04/2012	16.4	11.9	ND	9.9	ND
6/10/2010	8.0	3.5	8.4	ND	13.4	6/04/2012	13.0	7.8	ND	15.7	ND
7/10/2010	6.7	7.1	4.7	ND	8.0	7/04/2012	40.7	41.6	ND	41.9	ND
8/10/2010	12.1	13.9	12.5	ND	20.3	8/04/2012	23.6	24.0	ND	20.2	ND
9/10/2010	10.5	8.9	10.4	ND	17.9	9/04/2012	9.4	15.5	ND	7.3	ND
10/10/2010	13.0	8.3	10.8	ND	34.7	10/04/2012	7.6	6.8	ND	4.1	ND
11/10/2010	16.1	9.1	13.5	ND	27.0	11/04/2012	10.0	5.1	ND	4.3	ND
12/10/2010	13.6	5.6	12.6	ND	16.3	12/04/2012	8.9	5.3	ND	5.8	ND
13/10/2010	15.9	9.5	10.6	ND	18.8	13/04/2012	9.9	4.5	ND	7.6	ND
14/10/2010	7.3	7.7	6.2	ND	9.4	14/04/2012	11.5	8.9	ND	9.3	ND
15/10/2010	3.1	1.9	3.2	ND	6.0	15/04/2012	12.7	12.7	ND	8.7	ND
16/10/2010	4.0	4.1	3.8	ND	6.5	16/04/2012	15.3	11.9	ND	9.1	ND
17/10/2010	3.7	4.2	3.3	ND	6.5	17/04/2012	10.2	8.6	ND	4.2	ND
18/10/2010	5.9	5.2	2.8	ND	7.2	18/04/2012	7.2	1.9	ND	ND	ND
19/10/2010	10.0	10.1	8.4	ND	20.4	19/04/2012	6.7	2.4	ND	5.1	ND
20/10/2010	11.9	10.0	13.9	ND	23.4	20/04/2012	10.9	8.1	ND	8.9	ND
21/10/2010	11.8	10.3	11.4	ND	15.0	21/04/2012	9.6	7.8	ND	8.6	ND
22/10/2010	5.6	7.7	4.4	ND	8.1	22/04/2012	18.1	15.0	ND	11.2	ND
23/10/2010	6.7	7.7	5.7	ND	9.0	23/04/2012	10.9	10.2	ND	8.4	ND
24/10/2010	1.5	1.1	1.3	ND	4.3	24/04/2012	10.0	7.1	ND	4.4	ND
25/10/2010	5.8	3.4	5.3	ND	9.2	25/04/2012	5.9	7.8	ND	4.5	ND
26/10/2010	8.5	7.3	8.1	ND	10.1	26/04/2012	9.6	8.0	ND	5.6	ND
27/10/2010	9.8	12.0	9.0	ND	13.2	27/04/2012	11.2	7.0	ND	8.6	ND
28/10/2010	15.8	11.1	14.3	ND	25.2	28/04/2012	12.8	9.5	ND	11.4	ND
29/10/2010	13.5	10.3	14.0	ND	21.1	29/04/2012	8.1	8.2	ND	7.0	ND
30/10/2010	14.7	11.9	13.8	ND	19.3	30/04/2012	14.1	9.4	ND	8.2	ND
31/10/2010	6.9	10.1	8.3	ND	9.0	1/05/2012	10.9	4.8	ND	11.3	ND
1/11/2010	5.8	8.5	6.7	ND	5.9	2/05/2012	11.1	6.8	ND	5.6	ND
2/11/2010	4.1	4.4	3.5	ND	7.6	3/05/2012	5.1	3.6	ND	2.2	ND
3/11/2010	6.0	8.3	4.7	ND	8.1	4/05/2012	7.2	7.8	ND	3.5	ND
4/11/2010	9.1	7.9	7.7	ND	14.6	5/05/2012	6.8	8.8	ND	5.0	ND
5/11/2010	11.8	4.5	8.5	ND	16.8	6/05/2012	6.0	8.3	ND	5.0	ND
6/11/2010	12.5	2.4	6.2	ND	11.8	7/05/2012	8.3	10.2	ND	5.6	ND
7/11/2010	7.7	3.9	7.0	ND	11.9	8/05/2012	12.6	13.0	ND	8.5	ND
8/11/2010	9.6	6.0	9.0	ND	12.6	9/05/2012	15.1	17.8	ND	9.8	ND
9/11/2010	3.9	7.0	7.3	ND	9.1	10/05/2012	13.8	13.8	ND	13.8	ND
10/11/2010	9.0	7.4	8.2	ND	10.9	11/05/2012	12.5	19.2	ND	9.3	ND
11/11/2010	7.1	5.8	5.6	ND	10.8	12/05/2012	11.1	23.0	ND	9.7	ND
12/11/2010	7.2	4.4	4.7	ND	13.5	13/05/2012	9.8	15.2	ND	7.4	ND
13/11/2010	11.4	9.1	8.9	ND	18.2	14/05/2012	15.7	9.3	ND	7.6	ND
14/11/2010	12.8	9.9	12.1	ND	18.5	15/05/2012	18.4	10.0	ND	11.8	ND
15/11/2010	6.6	8.2	5.9	ND	4.8	16/05/2012	24.9	8.7	ND	11.7	ND
16/11/2010	4.0	3.8	3.3	ND	10.4	17/05/2012	19.1	10.9	ND	13.4	ND
17/11/2010	9.6	7.2	8.1	ND	14.8	18/05/2012	17.9	12.2	ND	17.6	ND
18/11/2010	10.4	7.6	11.3	ND	14.6	19/05/2012	14.1	17.4	ND	20.4	ND
19/11/2010	12.5	8.8	12.3	ND	17.4	20/05/2012	13.9	14.3	ND	13.3	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
20/11/2010	12.1	8.3	9.9	ND	23.5	21/05/2012	19.6	8.7	ND	14.2	ND
21/11/2010	13.8	10.2	12.9	ND	19.7	22/05/2012	14.1	15.4	ND	15.4	ND
22/11/2010	15.4	9.6	12.8	ND	24.1	23/05/2012	18.1	19.6	ND	19.2	ND
23/11/2010	13.8	9.5	13.1	ND	21.8	24/05/2012	15.6	11.9	ND	8.3	ND
24/11/2010	15.2	11.0	19.9	ND	19.5	25/05/2012	2.9	3.5	ND	1.8	ND
25/11/2010	15.5	11.4	27.8	ND	15.5	26/05/2012	4.5	6.9	ND	3.6	ND
26/11/2010	14.5	11.8	18.4	ND	16.7	27/05/2012	3.8	4.1	ND	1.9	ND
27/11/2010	14.2	13.0	14.1	ND	16.6	28/05/2012	9.8	7.2	ND	6.0	ND
28/11/2010	11.8	9.5	11.1	ND	11.1	29/05/2012	9.0	5.1	ND	3.5	ND
29/11/2010	7.0	4.7	6.8	ND	11.4	30/05/2012	8.8	3.5	ND	3.3	ND
30/11/2010	3.1	2.6	6.0	ND	8.7	31/05/2012	10.5	5.7	ND	5.9	ND
1/12/2010	1.7	1.4	1.6	ND	5.4	1/06/2012	12.8	6.5	ND	5.7	ND
2/12/2010	4.3	1.2	6.3	ND	8.3	2/06/2012	4.0	1.8	ND	1.7	ND
3/12/2010	3.2	3.3	3.1	ND	7.2	3/06/2012	2.7	1.6	ND	1.5	ND
4/12/2010	1.6	1.5	1.1	ND	5.4	4/06/2012	3.6	3.2	ND	1.6	ND
5/12/2010	5.2	5.4	5.9	ND	9.3	5/06/2012	3.9	3.9	ND	2.0	ND
6/12/2010	8.5	7.3	9.1	ND	13.1	6/06/2012	ND	2.9	ND	1.6	ND
7/12/2010	10.3	8.4	15.0	ND	17.6	7/06/2012	ND	3.1	ND	ND	ND
8/12/2010	7.9	2.0	9.3	ND	14.6	8/06/2012	2.7	2.1	ND	ND	ND
9/12/2010	8.6	7.4	7.5	ND	13.4	9/06/2012	9.4	3.9	ND	ND	ND
10/12/2010	4.3	4.4	3.1	ND	6.4	10/06/2012	8.3	5.5	ND	ND	ND
11/12/2010	5.2	4.9	3.3	ND	8.0	11/06/2012	5.8	3.4	ND	ND	ND
12/12/2010	6.6	11.5	7.5	ND	10.9	12/06/2012	8.5	3.7	ND	1.6	ND
13/12/2010	8.0	9.1	8.0	ND	14.3	13/06/2012	10.5	5.2	ND	4.3	ND
14/12/2010	17.8	16.5	17.8	ND	28.2	14/06/2012	11.3	6.5	ND	6.1	ND
15/12/2010	10.1	10.2	13.8	ND	15.9	15/06/2012	14.4	7.7	ND	5.2	ND
16/12/2010	2.0	6.5	7.1	ND	10.7	16/06/2012	5.5	6.0	ND	2.5	ND
17/12/2010	11.5	12.5	9.4	ND	14.5	17/06/2012	2.8	6.4	ND	2.8	ND
18/12/2010	5.4	11.1	4.4	ND	8.5	18/06/2012	4.3	3.4	ND	2.2	ND
19/12/2010	4.6	4.7	3.5	ND	6.9	19/06/2012	3.6	4.7	ND	1.3	ND
20/12/2010	6.5	6.7	5.1	ND	8.6	20/06/2012	4.2	6.1	ND	2.2	ND
21/12/2010	7.5	9.8	6.1	ND	11.0	21/06/2012	9.6	6.9	ND	5.5	ND
22/12/2010	11.2	10.3	11.1	ND	22.6	22/06/2012	8.5	6.3	ND	4.2	ND
23/12/2010	15.8	12.9	15.3	ND	23.3	23/06/2012	2.5	5.8	ND	1.9	ND
24/12/2010	22.0	19.5	23.7	ND	29.3	24/06/2012	4.6	5.7	ND	2.1	ND
25/12/2010	10.9	10.5	10.7	ND	15.9	25/06/2012	6.5	9.0	ND	2.4	ND
26/12/2010	2.1	2.3	1.9	ND	5.0	26/06/2012	8.9	5.2	ND	3.1	ND
27/12/2010	4.5	4.3	4.3	ND	6.4	27/06/2012	8.8	4.7	ND	5.6	ND
28/12/2010	14.3	10.8	13.8	ND	23.5	28/06/2012	11.5	3.0	ND	3.2	ND
29/12/2010	8.1	7.5	10.3	ND	13.1	29/06/2012	9.4	13.4	ND	6.3	ND
30/12/2010	11.3	10.5	11.0	ND	16.9	30/06/2012	4.7	7.6	ND	4.7	ND
31/12/2010	15.9	15.3	17.0	ND	19.5	1/07/2012	5.1	9.4	ND	4.2	ND
1/01/2011	15.0	16.1	16.2	ND	18.9	2/07/2012	3.0	5.3	ND	2.1	ND
2/01/2011	10.7	5.9	6.4	ND	15.3	3/07/2012	3.1	5.2	ND	1.6	ND
3/01/2011	8.7	6.7	9.3	ND	16.0	4/07/2012	7.2	7.4	ND	4.3	ND
4/01/2011	5.9	3.7	4.8	ND	10.5	5/07/2012	9.2	6.7	ND	3.3	ND
5/01/2011	8.2	9.7	12.3	ND	14.8	6/07/2012	10.3	4.8	ND	3.9	ND
6/01/2011	7.3	5.6	8.2	ND	13.4	7/07/2012	8.9	4.2	ND	4.8	ND
7/01/2011	5.4	5.3	8.1	ND	15.8	8/07/2012	7.9	4.8	ND	6.8	ND
8/01/2011	6.3	6.5	10.7	ND	13.2	9/07/2012	11.6	5.9	ND	5.9	ND
9/01/2011	8.4	4.9	12.2	ND	17.1	10/07/2012	8.7	11.1	ND	3.7	ND
10/01/2011	5.7	3.9	12.6	ND	15.9	11/07/2012	7.0	2.9	ND	3.0	ND
11/01/2011	2.7	2.9	10.6	ND	8.4	12/07/2012	6.3	3.6	ND	3.6	ND
12/01/2011	7.0	8.2	12.7	ND	12.8	13/07/2012	5.5	4.8	ND	3.3	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
13/01/2011	6.1	6.7	13.4	ND	17.0	14/07/2012	2.4	3.6	ND	2.6	ND
14/01/2011	6.7	6.1	11.2	ND	15.5	15/07/2012	1.4	4.3	ND	1.5	ND
15/01/2011	7.0	10.2	9.5	ND	13.7	16/07/2012	5.2	4.0	ND	3.0	ND
16/01/2011	7.8	6.8	9.2	ND	14.1	17/07/2012	9.3	5.5	ND	4.3	ND
17/01/2011	10.6	8.9	20.7	ND	12.3	18/07/2012	7.6	9.9	ND	1.5	ND
18/01/2011	11.0	11.5	17.5	ND	23.0	19/07/2012	6.7	5.7	ND	4.5	ND
19/01/2011	13.2	13.5	23.5	ND	39.0	20/07/2012	9.5	7.4	ND	6.2	ND
20/01/2011	10.2	4.7	20.1	ND	27.3	21/07/2012	7.6	7.5	ND	3.6	ND
21/01/2011	7.2	5.8	13.3	ND	19.2	22/07/2012	6.7	4.7	ND	4.1	ND
22/01/2011	9.7	10.7	25.4	ND	21.9	23/07/2012	7.6	5.2	ND	4.3	ND
23/01/2011	8.7	7.9	16.5	ND	16.5	24/07/2012	9.7	5.1	ND	3.7	ND
24/01/2011	15.6	13.4	18.9	ND	24.1	25/07/2012	8.0	5.2	ND	6.5	ND
25/01/2011	10.9	14.1	19.1	ND	18.4	26/07/2012	9.8	6.0	ND	5.0	ND
26/01/2011	13.6	17.2	19.0	ND	24.4	27/07/2012	5.1	5.3	ND	3.4	ND
27/01/2011	9.6	14.8	13.5	ND	15.4	28/07/2012	1.8	3.8	ND	1.7	ND
28/01/2011	20.0	13.9	27.6	ND	ND	29/07/2012	2.3	2.6	ND	1.5	ND
29/01/2011	15.8	16.4	26.7	ND	ND	30/07/2012	5.2	5.8	ND	3.1	ND
30/01/2011	14.4	16.7	16.4	ND	ND	31/07/2012	6.7	3.5	ND	4.5	ND
31/01/2011	19.7	21.5	14.8	ND	ND	1/08/2012	8.0	3.3	ND	6.3	ND
1/02/2011	12.6	17.4	16.7	ND	ND	2/08/2012	5.6	3.4	ND	6.8	ND
2/02/2011	13.8	13.1	18.1	ND	ND	3/08/2012	6.2	4.7	ND	11.0	ND
3/02/2011	13.4	18.5	16.7	ND	ND	4/08/2012	6.6	6.3	ND	9.1	ND
4/02/2011	9.9	11.3	10.9	ND	ND	5/08/2012	5.3	3.6	ND	8.5	ND
5/02/2011	8.0	11.5	10.4	ND	15.7	6/08/2012	7.9	6.5	ND	12.4	ND
6/02/2011	5.8	7.8	7.7	ND	10.7	7/08/2012	12.2	5.6	ND	7.6	ND
7/02/2011	6.5	5.1	18.5	ND	19.4	8/08/2012	10.1	5.8	ND	10.3	ND
8/02/2011	11.6	9.7	21.2	ND	29.3	9/08/2012	7.1	5.0	ND	8.2	ND
9/02/2011	12.0	9.5	21.3	ND	26.5	10/08/2012	5.2	4.1	ND	5.9	ND
10/02/2011	9.8	7.1	16.0	ND	20.8	11/08/2012	4.8	4.6	ND	5.1	ND
11/02/2011	11.3	13.9	14.5	ND	16.7	12/08/2012	7.4	5.9	ND	6.7	ND
12/02/2011	9.0	14.4	11.8	ND	15.8	13/08/2012	7.8	7.6	ND	8.9	ND
13/02/2011	3.2	3.2	5.9	ND	7.1	14/08/2012	9.8	6.9	ND	10.8	ND
14/02/2011	1.6	0.7	5.1	ND	8.0	15/08/2012	8.9	5.8	ND	12.2	ND
15/02/2011	4.8	4.2	8.3	ND	10.9	16/08/2012	10.9	8.5	ND	12.5	ND
16/02/2011	8.1	7.0	10.0	ND	16.4	17/08/2012	11.2	7.9	ND	14.7	ND
17/02/2011	9.7	9.1	9.2	ND	13.9	18/08/2012	5.9	5.0	ND	8.6	ND
18/02/2011	10.9	10.9	15.0	ND	18.2	19/08/2012	3.1	4.3	ND	5.7	ND
19/02/2011	12.8	13.6	15.5	ND	17.8	20/08/2012	ND	5.7	ND	9.4	ND
20/02/2011	3.7	5.8	4.3	ND	5.5	21/08/2012	14.1	11.7	ND	10.3	ND
21/02/2011	9.6	7.4	9.2	ND	12.2	22/08/2012	19.7	12.9	ND	12.7	ND
22/02/2011	11.4	ND	12.2	ND	16.7	23/08/2012	13.1	7.4	ND	8.3	ND
23/02/2011	9.1	6.4	9.0	ND	15.1	24/08/2012	7.0	3.8	ND	8.0	ND
24/02/2011	11.3	10.4	16.8	ND	15.5	25/08/2012	5.5	4.3	ND	8.8	ND
25/02/2011	15.1	13.5	15.8	ND	26.9	26/08/2012	3.6	2.8	ND	4.1	ND
26/02/2011	16.3	19.1	19.0	ND	22.5	27/08/2012	7.7	6.7	ND	5.8	ND
27/02/2011	14.0	15.2	15.1	ND	23.0	28/08/2012	12.9	12.9	ND	9.0	ND
28/02/2011	12.2	11.9	12.8	ND	19.4	29/08/2012	18.7	11.6	ND	12.1	ND
1/03/2011	10.9	7.5	13.8	ND	13.0	30/08/2012	17.3	8.1	ND	12.8	ND
2/03/2011	18.3	18.1	22.2	ND	32.2	31/08/2012	10.4	6.4	ND	10.1	ND
3/03/2011	8.2	11.7	9.2	ND	10.0	1/09/2012	5.3	2.9	ND	3.2	ND
4/03/2011	8.7	10.2	10.1	ND	14.2	2/09/2012	7.0	7.2	ND	6.3	ND
5/03/2011	15.5	12.1	24.4	ND	23.5	3/09/2012	10.0	13.5	ND	7.0	ND
6/03/2011	11.6	7.7	17.3	ND	17.0	4/09/2012	11.0	14.1	ND	5.9	ND
7/03/2011	17.5	7.0	13.9	ND	24.4	5/09/2012	29.3	14.2	ND	14.0	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
8/03/2011	6.7	4.1	11.4	ND	13.5	6/09/2012	28.7	31.9	ND	20.8	ND
9/03/2011	13.4	10.9	15.6	ND	17.3	7/09/2012	14.4	24.9	ND	11.4	ND
10/03/2011	10.3	12.0	11.1	ND	14.3	8/09/2012	9.6	11.8	ND	8.2	ND
11/03/2011	8.2	7.4	9.0	ND	13.8	9/09/2012	6.1	7.4	ND	7.1	ND
12/03/2011	10.5	10.0	9.3	ND	14.9	10/09/2012	20.8	14.2	ND	14.7	ND
13/03/2011	10.5	9.9	10.3	ND	13.7	11/09/2012	19.4	16.4	ND	14.0	ND
14/03/2011	9.1	9.1	7.6	ND	14.2	12/09/2012	18.8	20.4	ND	16.7	ND
15/03/2011	7.9	0.9	8.2	ND	15.1	13/09/2012	15.4	12.7	ND	9.7	ND
16/03/2011	10.6	8.5	8.9	ND	15.1	14/09/2012	8.1	6.2	ND	3.4	ND
17/03/2011	13.0	12.1	16.4	ND	19.1	15/09/2012	11.3	11.3	ND	6.6	ND
18/03/2011	9.5	9.4	13.6	ND	17.4	16/09/2012	13.0	11.3	ND	10.0	ND
19/03/2011	2.5	2.1	5.9	ND	9.1	17/09/2012	16.9	12.9	ND	10.6	ND
20/03/2011	10.9	4.5	7.9	ND	16.5	18/09/2012	11.9	7.7	ND	5.8	ND
21/03/2011	7.7	6.3	14.3	ND	18.3	19/09/2012	5.3	4.4	ND	3.0	ND
22/03/2011	2.1	4.8	0.1	ND	4.0	20/09/2012	5.1	2.0	ND	6.7	ND
23/03/2011	4.9	10.5	7.5	ND	7.5	21/09/2012	8.7	10.1	ND	5.4	ND
24/03/2011	7.4	10.8	12.3	ND	12.1	22/09/2012	4.9	8.9	ND	5.4	ND
25/03/2011	2.7	4.8	2.7	ND	3.5	23/09/2012	8.3	12.9	ND	5.9	ND
26/03/2011	6.5	6.8	10.9	ND	14.0	24/09/2012	12.4	16.7	ND	10.1	ND
27/03/2011	10.5	6.8	9.8	ND	14.8	25/09/2012	16.0	11.9	ND	11.2	ND
28/03/2011	8.9	4.4	13.9	ND	19.4	26/09/2012	21.4	12.9	ND	17.4	ND
29/03/2011	6.4	3.6	10.6	ND	21.2	27/09/2012	33.3	16.7	ND	21.3	ND
30/03/2011	11.0	7.9	13.0	ND	13.6	28/09/2012	29.9	20.1	ND	16.1	ND
31/03/2011	14.1	13.4	16.3	ND	21.3	29/09/2012	6.5	8.0	ND	5.8	ND
1/04/2011	14.0	12.5	20.7	ND	19.3	30/09/2012	4.7	5.5	ND	3.6	ND
2/04/2011	13.1	3.3	18.9	ND	19.7	1/10/2012	10.3	10.7	ND	8.5	ND
3/04/2011	14.4	12.4	19.6	ND	18.1	2/10/2012	7.2	7.1	ND	11.1	ND
4/04/2011	19.1	17.6	32.7	ND	32.7	3/10/2012	13.9	12.1	ND	10.9	ND
5/04/2011	18.1	4.7	16.2	ND	22.3	4/10/2012	15.1	17.4	ND	10.8	ND
6/04/2011	14.0	5.1	9.5	ND	20.6	5/10/2012	17.7	17.9	ND	13.6	ND
7/04/2011	15.6	8.3	15.6	ND	24.0	6/10/2012	24.6	28.4	ND	21.8	ND
8/04/2011	11.3	3.8	11.4	ND	18.1	7/10/2012	4.8	6.9	ND	5.4	ND
9/04/2011	8.1	7.2	11.5	ND	10.5	8/10/2012	14.5	14.0	ND	11.6	ND
10/04/2011	10.4	10.2	9.0	ND	14.7	9/10/2012	10.2	12.0	ND	8.8	ND
11/04/2011	3.2	3.9	2.7	ND	2.6	10/10/2012	10.3	10.5	ND	9.2	ND
12/04/2011	5.6	6.2	6.6	ND	7.7	11/10/2012	5.5	5.9	ND	3.7	ND
13/04/2011	7.4	10.1	8.5	ND	11.6	12/10/2012	4.8	4.1	ND	2.1	ND
14/04/2011	8.3	8.5	9.7	ND	17.8	13/10/2012	6.0	5.6	ND	4.1	ND
15/04/2011	12.5	9.6	13.3	ND	19.6	14/10/2012	7.5	7.7	ND	8.2	ND
16/04/2011	5.3	1.2	5.6	ND	10.4	15/10/2012	13.7	12.8	ND	8.5	ND
17/04/2011	7.5	7.4	8.1	ND	10.6	16/10/2012	11.9	21.5	ND	7.6	ND
18/04/2011	16.3	6.7	9.6	ND	15.6	17/10/2012	17.1	17.9	ND	11.2	ND
19/04/2011	10.4	12.5	14.1	ND	13.0	18/10/2012	27.7	19.3	ND	21.2	ND
20/04/2011	12.5	18.5	11.2	ND	17.9	19/10/2012	25.3	22.2	ND	16.2	ND
21/04/2011	7.1	8.6	5.3	ND	7.4	20/10/2012	20.6	21.9	ND	17.5	ND
22/04/2011	6.0	9.8	5.5	ND	9.1	21/10/2012	11.9	20.9	ND	9.1	ND
23/04/2011	6.2	8.2	8.1	ND	12.3	22/10/2012	7.9	10.7	ND	5.6	ND
24/04/2011	13.2	12.7	15.0	ND	18.3	23/10/2012	15.4	12.3	ND	11.4	ND
25/04/2011	8.5	7.7	9.3	ND	15.2	24/10/2012	16.1	12.4	ND	16.4	ND
26/04/2011	5.7	2.5	7.6	ND	11.0	25/10/2012	26.8	32.5	ND	29.1	ND
27/04/2011	8.5	2.7	8.2	ND	16.4	26/10/2012	21.4	27.2	ND	19.5	ND
28/04/2011	8.7	6.1	6.5	ND	19.3	27/10/2012	10.0	10.0	ND	9.6	ND
29/04/2011	5.4	4.0	7.8	ND	10.4	28/10/2012	19.0	16.3	ND	17.3	ND
30/04/2011	6.9	4.1	6.6	ND	14.5	29/10/2012	4.8	13.6	ND	21.4	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
1/05/2011	7.1	3.5	11.7	ND	11.2	30/10/2012	20.0	14.0	ND	14.1	ND
2/05/2011	13.7	12.3	22.1	ND	27.1	31/10/2012	12.1	15.8	ND	11.7	ND
3/05/2011	10.9	17.0	15.0	ND	14.5	1/11/2012	18.9	23.1	ND	16.1	ND
4/05/2011	10.3	8.4	7.3	ND	9.1	2/11/2012	14.0	14.9	ND	11.9	ND
5/05/2011	10.3	18.7	13.2	ND	18.8	3/11/2012	15.1	11.6	ND	11.7	ND
6/05/2011	13.1	11.4	19.5	ND	17.2	4/11/2012	17.0	13.2	ND	15.5	ND
7/05/2011	8.8	8.4	11.5	ND	12.8	5/11/2012	10.5	17.2	ND	17.0	ND
8/05/2011	12.2	17.9	15.7	ND	15.3	6/11/2012	16.6	21.5	ND	19.4	ND
9/05/2011	14.2	19.7	21.2	ND	35.1	7/11/2012	26.8	22.0	ND	18.7	ND
10/05/2011	10.0	13.7	16.3	ND	10.8	8/11/2012	7.4	8.5	ND	5.7	ND
11/05/2011	15.0	12.8	15.6	ND	15.8	9/11/2012	6.4	3.0	ND	2.6	ND
12/05/2011	4.9	6.4	2.8	ND	5.6	10/11/2012	13.1	14.1	ND	10.8	ND
13/05/2011	3.0	5.0	2.2	ND	6.3	11/11/2012	15.7	9.3	ND	9.2	ND
14/05/2011	4.2	5.7	4.2	ND	3.5	12/11/2012	13.2	10.6	ND	10.2	ND
15/05/2011	4.7	5.3	4.5	ND	8.5	13/11/2012	16.0	24.4	ND	12.0	ND
16/05/2011	8.0	11.2	19.0	ND	14.3	14/11/2012	19.5	17.0	ND	16.2	ND
17/05/2011	15.9	14.7	22.8	ND	20.0	15/11/2012	ND	13.6	ND	11.0	ND
18/05/2011	14.7	10.0	16.7	ND	27.1	16/11/2012	6.1	12.8	ND	6.8	ND
19/05/2011	19.3	19.3	26.8	ND	20.2	17/11/2012	9.3	6.9	ND	7.4	ND
20/05/2011	14.9	19.2	32.2	ND	14.1	18/11/2012	7.4	5.9	ND	5.1	ND
21/05/2011	10.9	10.4	14.3	ND	16.6	19/11/2012	9.2	10.6	ND	7.3	ND
22/05/2011	14.1	8.2	11.8	ND	19.0	20/11/2012	12.1	9.0	ND	9.3	ND
23/05/2011	3.5	4.2	1.9	ND	6.0	21/11/2012	4.3	14.0	ND	18.2	ND
24/05/2011	2.6	3.2	1.2	ND	6.3	22/11/2012	18.0	23.2	ND	18.7	ND
25/05/2011	7.9	5.6	5.2	ND	10.5	23/11/2012	17.9	15.6	ND	17.2	ND
26/05/2011	10.2	9.9	3.9	ND	17.0	24/11/2012	4.9	14.0	ND	15.2	ND
27/05/2011	10.5	5.7	9.5	ND	11.5	25/11/2012	15.1	14.2	ND	13.4	ND
28/05/2011	8.8	6.7	8.9	ND	14.2	26/11/2012	17.7	19.9	ND	16.7	ND
29/05/2011	9.0	8.0	9.3	ND	12.7	27/11/2012	10.6	10.3	ND	8.5	ND
30/05/2011	6.9	8.5	6.9	ND	7.5	28/11/2012	1.1	12.2	ND	12.4	ND
31/05/2011	4.7	2.3	4.5	ND	7.0	29/11/2012	14.5	10.9	ND	11.1	ND
1/06/2011	8.5	5.7	10.5	ND	18.8	30/11/2012	21.2	21.4	ND	22.4	ND
2/06/2011	21.5	4.8	27.0	ND	30.7	1/12/2012	22.3	23.8	ND	19.9	ND
3/06/2011	14.8	6.5	6.7	ND	12.4	2/12/2012	11.2	13.7	ND	10.4	ND
4/06/2011	9.5	10.4	7.9	ND	7.6	3/12/2012	7.9	3.5	ND	3.0	ND
5/06/2011	2.4	7.4	1.8	ND	4.5	4/12/2012	11.7	11.6	ND	8.9	ND
6/06/2011	7.4	10.5	4.0	ND	8.8	5/12/2012	14.6	20.5	ND	15.6	ND
7/06/2011	9.4	5.8	21.2	ND	11.8	6/12/2012	14.2	19.9	ND	14.2	ND
8/06/2011	9.3	10.0	11.6	ND	8.7	7/12/2012	23.9	23.5	ND	22.7	ND
9/06/2011	7.6	9.3	9.5	ND	8.0	8/12/2012	23.7	20.8	ND	22.9	ND
10/06/2011	11.6	7.5	12.6	ND	13.4	9/12/2012	24.7	23.8	ND	23.6	ND
11/06/2011	9.6	7.9	8.2	ND	14.5	10/12/2012	10.5	4.4	ND	7.8	ND
12/06/2011	7.3	6.1	9.0	ND	10.7	11/12/2012	8.0	4.6	ND	6.3	ND
13/06/2011	8.3	4.8	2.7	ND	10.8	12/12/2012	9.6	6.0	ND	8.5	ND
14/06/2011	8.1	9.2	5.8	ND	20.2	13/12/2012	6.9	7.1	ND	8.2	ND
15/06/2011	7.2	6.3	4.4	ND	16.5	14/12/2012	19.0	6.3	ND	16.8	ND
16/06/2011	11.0	4.6	14.0	ND	17.5	15/12/2012	18.7	19.5	ND	16.6	ND
17/06/2011	9.1	11.4	10.5	ND	11.9	16/12/2012	10.3	13.7	ND	9.8	ND
18/06/2011	7.6	11.1	7.2	ND	9.6	17/12/2012	19.0	18.3	ND	13.7	ND
19/06/2011	5.5	9.5	4.9	ND	9.4	18/12/2012	19.4	18.7	ND	15.7	ND
20/06/2011	9.1	10.9	21.7	ND	11.3	19/12/2012	25.4	19.0	ND	20.6	ND
21/06/2011	8.1	9.9	7.7	ND	10.7	20/12/2012	20.4	17.8	ND	20.3	ND
22/06/2011	12.3	7.0	10.1	ND	8.4	21/12/2012	19.8	17.2	ND	21.4	ND
23/06/2011	8.1	6.4	5.2	ND	7.0	22/12/2012	14.2	13.5	ND	14.4	ND

Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)	Date	TEOM01	TEOM02	TEOM03	TEOM04	TEOM (UCM)
24/06/2011	12.9	6.6	19.4	ND	ND	23/12/2012	7.5	9.2	ND	6.1	ND
25/06/2011	11.0	5.9	15.5	ND	ND	24/12/2012	10.7	14.9	ND	9.0	ND
26/06/2011	10.4	10.7	11.5	ND	ND	25/12/2012	3.9	3.8	ND	3.6	ND
27/06/2011	14.5	4.8	29.9	ND	ND	26/12/2012	6.2	5.9	ND	5.3	ND
28/06/2011	23.5	12.4	45.7	ND	ND	27/12/2012	10.1	9.9	ND	11.3	ND
29/06/2011	9.0	7.2	9.6	ND	ND	28/12/2012	12.0	12.6	ND	12.4	ND
30/06/2011	9.8	4.6	11.4	ND	ND	29/12/2012	17.2	16.4	ND	16.9	ND
1/07/2011	13.0	5.2	12.1	ND	5.6	30/12/2012	17.1	15.9	ND	16.9	ND
2/07/2011	8.2	3.5	10.2	ND	3.7	31/12/2012	13.2	12.3	ND	13.9	ND

ND - No data

Table B-2: PM_{10} HVAS monitoring data

Date	PM01	PM02	Date	PM01	PM02
1/01/2010	8.0	5.6	7/07/2011	3.3	3.3
7/01/2010	20.9	18.1	13/07/2011	25.0	12.7
13/01/2010	17.8	16.4	19/07/2011	3.4	3.5
19/01/2010	13.2	14.2	25/07/2011	2.8	3.9
25/01/2010	28.9	27.8	31/07/2011	6.9	7.5
31/01/2010	20.7	14.5	6/08/2011	14.7	10.0
6/02/2010	6.3	6.5	12/08/2011	6.2	5.8
12/02/2010	12.0	9.8	18/08/2011	4.0	4.1
18/02/2010	22.4	11.9	24/08/2011	12.0	7.0
24/02/2010	26.3	23.9	30/08/2011	15.3	12.6
2/03/2010	30.5	11.0	5/09/2011	14.2	8.9
8/03/2010	10.0	8.0	13/09/2011	5.5	3.6
14/03/2010	8.0	6.9	17/09/2011	9.8	9.0
20/03/2010	16.5	17.2	23/09/2011	17.2	19.3
26/03/2010	20.3	19.9	29/09/2011	4.6	4.2
31/03/2010	6.3	5.1	5/10/2011	12.9	12.6
7/04/2010	7.8	7.1	11/10/2011	6.0	5.8
13/04/2010	15.1	12.3	17/10/2011	18.1	16.0
19/04/2010	15.7	7.1	23/10/2011	23.3	23.6
25/04/2010	5.0	7.3	29/10/2011	9.5	11.4
1/05/2010	11.5	9.3	4/11/2011	16.1	11.8
7/05/2010	6.3	4.5	10/11/2011	14.2	14.6
13/05/2010	7.4	8.5	16/11/2011	27.3	30.0
19/05/2010	10.5	8.3	22/11/2011	12.1	11.0
25/05/2010	7.4	6.9	28/11/2011	16.2	11.3
31/05/2010	3.3	5.0	4/12/2011	15.6	17.4
6/06/2010	8.0	7.2	10/12/2011	9.8	10.2
12/06/2010	4.2	4.6	16/12/2011	14.2	13.8
21/06/2010	10.0	9.0	22/12/2011	10.2	9.4
24/06/2010	6.1	4.9	28/12/2011	16.1	14.5
30/06/2010	4.7	5.5	3/01/2012	25.2	17.7
6/07/2010	5.7	4.9	9/01/2012	12.7	12.6
12/07/2010	5.2	1.7	15/01/2012	11.4	9.5
18/07/2010	5.2	7.5	21/01/2012	16.9	20.2
24/07/2010	5.3	3.7	27/01/2012	13.8	9.6
30/07/2010	2.1	1.8	2/02/2012	4.1	3.1
5/08/2010	3.0	2.9	8/02/2012	18.0	13.0
11/08/2010	1.6	2.9	14/02/2012	17.8	10.4
17/08/2010	3.8	4.1	20/02/2012	11.2	7.3
23/08/2010	3.2	3.0	26/02/2012	8.7	9.8
29/08/2010	6.8	8.0	3/03/2012	5.2	5.1

Date	PM01	PM02	Date	PM01	PM02
4/09/2010	3.5	3.6	9/03/2012	6.3	6.3
10/09/2010	4.4	4.2	15/03/2012	17.6	12.2
16/09/2010	4.8	3.2	21/03/2012	6.3	5.5
22/09/2010	13.9	12.6	27/03/2012	23.4	12.3
28/09/2010	8.0	9.9	2/04/2012	9.8	7.8
4/10/2010	4.4	4.0	8/04/2012	26.5	24.3
10/10/2010	12.6	11.0	14/04/2012	14.9	11.4
16/10/2010	3.8	4.4	20/04/2012	11.6	7.3
22/10/2010	6.6	7.6	26/04/2012	6.8	6.1
28/10/2010	17.6	18.4	2/05/2012	9.8	6.1
3/11/2010	8.7	10.3	8/05/2012	8.7	8.3
9/11/2010	8.9	8.5	14/05/2012	14.5	8.5
15/11/2010	6.1	2.4	20/05/2012	14.0	9.2
21/11/2010	19.0	13.5	26/05/2012	4.3	4.1
27/11/2010	17.6	18.1	1/06/2012	11.9	8.0
3/12/2010	6.6	5.2	7/06/2012	4.8	1.7
9/12/2010	10.4	9.6	13/06/2012	10.6	6.2
15/12/2010	16.3	14.1	19/06/2012	2.5	3.4
21/12/2010	10.4	10.4	25/06/2012	3.3	4.9
27/12/2010	8.1	5.9	1/07/2012	4.4	5.8
2/01/2011	14.5	13.3	7/07/2012	7.4	4.7
8/01/2011	15.6	13.3	13/07/2012	5.0	4.9
14/01/2011	11.7	11.2	19/07/2012	6.3	4.7
20/01/2011	17.1	16.8	25/07/2012	7.1	5.0
26/01/2011	20.4	21.8	31/07/2012	5.5	4.4
1/02/2011	18.9	17.5	6/08/2012	6.6	8.7
7/02/2011	15.8	15.8	12/08/2012	7.4	5.5
13/02/2011	8.9	7.5	18/08/2012	4.1	3.6
19/02/2011	14.2	14.7	24/08/2012	5.7	6.1
25/02/2011	24.5	ND	30/08/2012	12.5	9.9
3/03/2011	11.0	11.1	5/09/2012	28.1	15.5
9/03/2011	21.8	11.5	11/09/2012	17.5	13.7
15/03/2011	16.5	11.3	17/09/2012	14.8	10.8
21/03/2011	5.6	8.4	23/09/2012	10.1	8.9
27/03/2011	8.1	12.8	29/09/2012	8.3	8.1
2/04/2011	16.3	15.2	5/10/2012	14.3	11.7
8/04/2011	33.4	5.9	11/10/2012	5.0	4.2
14/04/2011	7.5	6.1	17/10/2012	14.4	13.6
20/04/2011	11.0	9.9	23/10/2012	13.3	18.0
26/04/2011	6.6	3.1	29/10/2012	22.4	18.2
2/05/2011	13.1	13.2	4/11/2012	14.4	18.5
8/05/2011	12.3	12.7	10/11/2012	16.7	11.1
14/05/2011	3.8	4.3	16/11/2012	6.4	6.8
20/05/2011	11.1	9.2	22/11/2012	27.9	21.4
26/05/2011	3.6	1.7	28/11/2012	19.2	14.2
1/06/2011	11.0	5.3	4/12/2012	12.5	13.7
9/06/2011	5.4	5.9	10/12/2012	17.5	13.3
13/06/2011	10.3	3.4	16/12/2012	ND	ND
19/06/2011	3.7	4.7	22/12/2012	ND	ND
25/06/2011	8.1	7.2	28/12/2012	13.3	14.2
1/07/2011	7.1	4.8			

ND - No data

Table B-3: TSP HVAS monitoring data

Date	HV1	HV2	Date	HV1	HV2
1/01/2010	ND	16.5	9/12/2010	14.3	18.0
7/01/2010	22.8	50.8	15/12/2010	22.6	30.8
13/01/2010	26.8	50.9	21/12/2010	25.1	19.5

Date	HV1	HV2	Date	HV1	HV2
19/01/2010	27.0	30.4	27/12/2010	11.0	18.2
25/01/2010	40.7	55.2	2/01/2011	23.1	33.7
31/01/2010	24.9	91.5	8/01/2011	17.3	53.5
2/02/2010	24.5	ND	14/01/2011	15.5	46.2
6/02/2010	7.7	48.6	20/01/2011	23.7	69.6
10/02/2010	15.7	ND	26/01/2011	33.0	54.3
12/02/2010	15.8	32.2	1/02/2011	26.8	33.0
18/02/2010	21.1	116.0	7/02/2011	20.5	54.9
24/02/2010	30.9	ND	13/02/2011	13.6	33.4
28/02/2010	20.2	ND	19/02/2011	21.8	30.4
2/03/2010	11.7	ND	25/02/2011	25.0	43.6
8/03/2010	15.2	ND	3/03/2011	22.4	42.4
14/03/2010	5.5	ND	9/03/2011	22.6	36.5
20/03/2010	22.3	ND	15/03/2011	21.8	26.8
26/03/2010	28.5	41.9	21/03/2011	12.7	28.9
1/04/2010	6.7	19.2	27/03/2011	12.0	45.6
7/04/2010	9.2	9.0	2/04/2011	20.1	44.2
13/04/2010	11.4	43.4	8/04/2011	9.1	74.2
19/04/2010	10.2	71.1	14/04/2011	12.2	13.3
25/04/2010	8.0	7.2	20/04/2011	11.7	18.1
27/04/2010	ND	9.5	26/04/2011	5.6	51.8
1/05/2010	11.9	21.1	2/05/2011	15.6	35.2
4/05/2010	ND	23.9	8/05/2011	20.4	20.8
7/05/2010	11.4	8.7	14/05/2011	12.7	10.5
13/05/2010	10.3	13.0	20/05/2011	24.0	25.6
19/05/2010	12.3	41.9	26/05/2011	9.0	20.9
25/05/2010	6.3	14.3	1/06/2011	9.8	45.1
27/05/2010	ND	31.5	7/06/2011	15.7	17.4
31/05/2010	4.2	5.9	13/06/2011	6.9	33.6
6/06/2010	8.3	13.1	19/06/2011	9.0	12.5
12/06/2010	3.3	10.9	25/06/2011	9.8	25.2
18/06/2010	12.1	16.7	1/07/2011	6.1	42.4
24/06/2010	2.7	14.6	7/07/2011	13.3	6.4
30/06/2010	4.8	9.5	13/07/2011	18.7	23.9
6/07/2010	7.2	15.0	19/07/2011	5.4	8.9
12/07/2010	4.2	15.0	25/07/2011	16.5	5.6
18/07/2010	ND	10.8	31/07/2011	21.8	12.6
24/07/2010	ND	24.7	6/08/2011	19.9	24.5
28/07/2010	4.4	ND	12/08/2011	13.9	22.4
30/07/2010	3.1	5.7	18/08/2011	9.3	20.7
3/08/2010	5.4	ND	24/08/2011	10.5	34.2
5/08/2010	4.8	8.6	30/08/2011	23.4	25.5
11/08/2010	2.7	4.1	5/09/2011	29.7	28.6
17/08/2010	5.9	10.6	11/09/2011	14.1	8.1
23/08/2010	3.0	7.7	17/09/2011	32.9	16.8
29/08/2010	6.7	10.9	23/09/2011	53.4	32.8
4/09/2010	5.3	10.3	29/09/2011	7.9	8.9
10/09/2010	5.5	8.2	5/10/2011	9.8	31.2
16/09/2010	7.4	10.5	11/10/2011	29.9	9.8
22/09/2010	17.6	29.8	17/10/2011	29.2	46.0
28/09/2010	39.5	23.6	23/10/2011	27.3	38.2
4/10/2010	4.9	13.9	29/10/2011	61.7	37.9
10/10/2010	20.1	56.7	4/11/2011	22.6	47.5
16/10/2010	7.5	9.9	10/11/2011	44.0	34.2
22/10/2010	12.9	23.6	16/11/2011	33.8	54.1
28/10/2010	34.8	55.1	22/11/2011	15.2	21.7
3/11/2010	18.6	43.0	28/11/2011	20.3	41.0
9/11/2010	15.4	21.1	4/12/2011	39.2	39.2

Date	HV1	HV2	Date	HV1	HV2
15/11/2010	12.5	12.3	10/12/2011	22.1	22.1
21/11/2010	20.4	50.5	16/12/2011	36.5	36.5
27/11/2010	25.8	36.0	22/12/2011	18.3	18.3
3/12/2010	10.2	13.8	28/12/2011	28.4	28.4

Table B-3: Dust deposition monitoring data

	DG01	DG02	DG03	DG04	DG05	DG06	DG07	DG08	DG09	DM1	DM4	DM5	DM8	DM9	DM11	DM12	DM13
Jan-10	1.4	C	1.1	2.1	C	1.7	1.1	C	0.9	1.2	1.2	C	1	1	1.1	1.1	
Feb-10	0.8	1.6	0.7	0.5	C	1.7	1.7	0.9	1	0.7	0.7	0.7	0.4	0.4	C	0.4	
Mar-10	1.9	C	0.4	3.1	C	1.1	1.7	0.3	0.4	1.4	0.2	0.4	0.3	0.7	1.8	0.8	
Apr-10	1	0.7	0.8	0.6	3.5	0.3	0.4	0.5	0.1	0.7	0.8	1.2	0.9	0.1	0.4	0.1	
May-10	C	3.3	0.4	0.9	1.4	1	0.1	0.7	0.1	0.8	0.1	C	0.3	0.2	0.4	0.1	
Jun-10	0.5	3	0.4	C	C	0.3	2.2	0.6	0.2	1.3	0.5	C	0.3	0.4	0.7	0.4	
Jul-10	0.1	2.9	0.3	0.9	2.7	0.2	0.1	2.8	0.2	0.6	0.3	1.1	0.1	0.1	0.4	0.1	
Aug-10	0.2	0.7	0.3	C	1.9	0.2	0.2	0.4	0.1	0.6	0.2	1.2	0.2	C	0.5	0.2	
Sep-10	0.2	2	0.9	0.6	0.6	0.3	0.3	0.3	0.1	0.5	0.5	C	0.3	0.2	0.3	C	
Oct-10	0.3	0.5	0.6	0.6	1.6	0.6	0.5	0.8	0.3	0.8	0.5	C	0.6	0.6	0.7	0.8	
Nov-10	0.4	1.1	0.5	3.6	2.4	ND	C	0.6	0.5	0.4	0.2	0.3	ND	0.4	0.4	0.4	
Dec-10	0.4	1.6	1.6	0.7	C	0.7	0.8	2.9	0.6	0.4	0.1	1.2	0.4	0.4	0.4	0.3	
Jan-11	0.4	2.6	1.3	1.8	3	0.4	0.7	2.3	1.1	1	0.5	0.5	0.2	0.2	0.4	0.3	
Feb-11	0.3	1	0.8	0.8	2	0.4	0.6	0.7	0.4	1.3	0.8	C	0.6	0.8	1.3	1.4	
Mar-11	0.4	2.8	3.6	1.8	3.9	0.2	0.6	2.2	0.4	1.2	0.7	C	0.41	0.4	0.8	0.3	
Apr-11	0.5	ND	C	C	2.4	0.5	0.3	1.7	0.3	1.6	1.9	0.8	0.3	C	1.2	0.6	
May-11	0.3	2.2	0.4	1.3	1.5	0.2	0.2	0.3	0.6	1.1	0.6	0.8	0.2	0.6	0.5	0.4	
Jun-11	0.2	C	0.3	0.8	0.9	2.2	2	0.3	0.1	0.9	0.4	C	0.1	0.2	0.5	0.3	0.7
Jul-11	0.2	1	0.4	0.6	1.1	0.2	0.3	0.3	0.5	0.9	0.7	C	0.2	0.2	0.3	0.2	0.6
Aug-11	0.2	0.5	0.4	1	0.3	0.2	0.2	0.2	0.2	0.9	0.5	C	0.2	0.2	0.3	0.3	1.3
Sep-11	0.4	0.8	C	0.8	0.7	0.8	0.6	0.6	0.5	1.1	0.9	C	0.7	0.6	0.5	0.6	0.7
Oct-11	0.3	0.7	0.6	1.2	0.2	0.3	0.5	0.3	0.2	0.9	0.9	0.3	0.3	0.3	0.3	1.9	0.5
Nov-11	0.9	2.5	1.1	1.2	0.8	1	1.8	0.5	0.9	1.3	1.5	0.8	0.8	0.7	2.5	1	0.8
Dec-11	0.2	1.6	0.6	0.8	1	0.3	0.6	0.4	0.3	1.1	0.2	1.7	0.1	0.3	0.5	0.3	4.3
Jan-12	0.5	1.2	1.6	2.1	1.1	0.6	0.8	0.8	0.6								
Feb-12	0.4	1.8	C	0.8	0.3	0.2	0.4	0.3	0.4								
Mar-12	0.2	1	0.6	0.4	0.1	0.1	0.2	2.2	0.3								
Apr-12	0.2	C	0.7	3	0.8	0.5	2.3	0.4	0.4								
May-12	0.3	1.7	0.4	0.8	0.3	0.3	1.4	0.2	0.3								
Jun-12	0.1	3.3	0.3	0.5	0.2	<0.1	0.1	6.2	0.1								
Jul-12	0.1	C	0.3	3.1	2.5	0.2	0.4	1.2	0.1								
Aug-12	0.3	1.3	0.5	0.6	1.2	0.4	0.3	0.6	0.2								
Sep-12	0.4	1.5	1.8	0.7	0.5	0.5	0.4	0.8	0.5								
Oct-12	0.1	2.7	0.7	1.7	1	0.3	1.1	0.6	0.5								
Nov-12	0.5	2.4	2.8	1.2	0.9	0.9	1.8	0.4	0.6								
Dec-12	0.5	C	2.9	0.9	C	0.7	0.4	0.5	0.4								

Appendix C
Emission Calculation

Moolarben Project - Emission Calculation

The mining schedule and mine plan designs provided by the Proponent have been combined with emissions factor equations that relate to the quantity of dust emitted from particular activities based on intensity, the prevailing meteorological conditions and composition of the material being handled.

Emission factors and associated controls have been sourced from the US EPA AP42 Emission Factors (**US EPA, 1985 and Updates**), the State Pollution Control Commission document "*Air Pollution from Coal Mining and Related Developments*" (**SPCC, 1983**) and the OEH document, "*NSW Coal Mining Benchmarking Study: International Best Practise Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*", prepared by Katestone Environmental (**Katestone, 2010**).

The emission factor equations used for each dust generating activity are outlined in **Table C-1** below. Detailed emission inventories for each modelled year are presented in **Table C-2** to **Table C-6**.

Table C-1: Emission factor equations

Activity	Emission factor equation	Variables	Control	Source
Drilling (overburden/coal)	$EF = 0.59\ kg/hole$	-	70% - water sprays	US EPA, 1985 NPI, 2012
Blasting (overburden/coal)	$EF = 0.00022 \times A^{1.5}\ kg/blast$	A = area to be blasted (m²)	-	US EPA, 1985
Loading / emplacing overburden	$EF = k \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} \Big/ \frac{M}{2}^{1.4}\right)\ kg/tonne$	Ktsp = 0.74 U = wind speed (m/s) M = moisture content (%)	-	US EPA, 1985
Hauling on unsealed surfaces	$EF = \left(\frac{0.4536}{1.6093}\right) \times k \times (s/12)^{0.7} \times (1.1023 \times M/3)^{0.45}\ kg/VKT$	S = silt content (%) M = average vehicle gross mass (tonnes)	80% - watering of trafficked areas	US EPA, 1985
Dozers on overburden	$EF = 2.6 \times \frac{s^{1.2}}{M^{1.3}}\ kg/hour$	S = silt content (%) M = moisture content (%)	-	US EPA, 1985
Dozers on coal	$EF = 35.6 \times \frac{s^{1.2}}{M^{1.4}}\ kg/hour$	S = silt content (%) M = moisture content (%)	-	US EPA, 1985
Loading / emplacing coal	$EF = \frac{0.58}{M^{1.2}}\ kg/tonne$	M = moisture content (%)	85% - enclosed dump hopper and water sprays	US EPA, 1985
Loading product coal to stockpile / train	$EF = k \times 0.0016 \times \left(\frac{U}{2.2}^{1.3} \Big/ \frac{M}{2}^{1.4}\right)\ kg/tonne$	Ktsp = 0.74 U = wind speed (m/s) M = moisture content (%)	75% - telescopic chute with water sprays	US EPA, 1985
Wind erosion on exposed areas / stockpiles	$EF = 0.4\ kg/ha/hour$	-	21% - vegetation on 30% of area / 50% - water sprays	SPCC, 1983
Grading roads	$EF = 0.0034 \times s^{2.5}\ kg/VKT$	S = speed of grader (km/hr)	-	US EPA, 1985

Table C-2: Emission Inventory - Year 2

ACTIVITY	TSP emission (kg/y)	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 - OC1	4,074	291	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC2	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC3	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC4	4,074	291	hours/year	14.0	kg/h												
OB - Drilling - OC1	745	4,210	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC2	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC4	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Blasting - OC1	18,784	100	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC2	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC3	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC4	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Excavator loading OB to haul truck - OC1	39,369	41,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC2	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC4	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to dump - OC1	308,416	41,000,000	tonnes/year	0.038	kg/t	240	tonnes/load	2.0	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC2	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC4	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Emplacing at dump - OC1	39,369	41,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC2	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC4	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on OB at dump - OC1	153,965	9,200	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC2	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC4	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC1	153,965	9,200	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC2	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC4	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - OC1	2,810	15,873	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC2	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC4	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Blasting - OC1	9,392	50	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC2	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC3	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC4	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Dozers ripping/pushing/clean-up - OC1	41,730	5,600	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC2	-		hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC3	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC4	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Loading ROM coal to haul truck - OC1	420,184	8,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC4	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - UG1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Hauling ROM to hopper - OC1	229,046	8,000,000	tonnes/year	0.143	kg/t	240	tonnes/load	7.5	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC2	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC4	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG2	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading ROM to hopper - OC1	63,028	8,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC4	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Rehandle ROM at hopper	21,009	800,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CHPP - Handling coal at CHPP	807	8,000,000	tonnes/year	0.00010	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Dozer pushing ROM coal	26,770	2,738	hours/year	9.8	kg/h	5	silt content in %	10	moisture content in %								
CHPP - Dozer pushing Product coal	71,811	9,600	hours/year	7.5	kg/h	4	silt content in %	10	moisture content in %								
CHPP - Loading Product coal to stockpile	549	5,440,000	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Loading Product coal to trains	137	5,440,000	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %							75	% Control
CHPP - Loading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
CHPP - Hauling rejects	73,295	2,560,000	tonnes/year	0.143	kg/t	240	tonnes/load	7.5	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
WE - Overburden emplacement areas	380,143	137.3	ha	0.40	kg/ha/hour	8,760	hours									21	% Control
WE - Open pit	145,785	41.6	ha	0.40	kg/ha/hour	8,760	hours										
WE - ROM stockpiles	5,471	3.1	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
WE - Product stockpiles	21,843	12.5	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
Grading roads	66,963	108,800	km	0.62	kg/VKT	8	speed of graders in km/h										
Total TSP emissions (kg/yr)	**2,303,534**																

Table C-3: Emission Inventory - Year 6

ACTIVITY	TSP emission (kg/y)	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 - OC1	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC2	1,050	75	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC3	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC4	5,250	375	hours/year	14.0	kg/h												
OB - Drilling - OC1	-		holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC2	354	2,000	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC4	1,567	8,855	holes/year	0.59	kg/hole											70	% Control
OB - Blasting - OC1	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC2	9,392	50	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC3	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC4	37,568	200	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Excavator loading OB to haul truck - OC1	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to dump - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC2	90,900	15,600,000	tonnes/year	0.029	kg/t	240	tonnes/load	1.5	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC4	1,246,342	96,000,000	tonnes/year	0.065	kg/t	240	tonnes/load	3.4	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Emplacing at dump - OC1	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on OB at dump - OC1	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC1	-		hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - OC1	-		holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC2	702	3,968	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC4	3,687	20,833	holes/year	0.59	kg/hole											70	% Control
CL - Blasting - OC1	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC2	4,696	25	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC3	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC4	14,088	75	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Dozers ripping/pushing/clean-up - OC1	-		hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC2	41,730	5,600	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC3	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC4	83,460	11,200	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Loading ROM coal to haul truck - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC2	109,910	2,092,603	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC4	540,433	10,289,438	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - UG1	105,046	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Hauling ROM to hopper - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC2	84,412	2,092,603	tonnes/year	0.202	kg/t	240	tonnes/load	10.6	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC4	547,856	10,289,438	tonnes/year	0.266	kg/t	240	tonnes/load	13.9	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG1	94,698	4,000,000	tonnes/year	0.118	kg/t	240	tonnes/load	6.2	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG2	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading ROM to hopper - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC2	16,486	2,092,603	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC4	81,065	10,289,438	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG1	31,514	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG3	-		tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Rehandle ROM at hopper	43,022	1,638,204	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CHPP - Handling coal at CHPP	1,653	16,382,041	tonnes/year	0.00010	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Dozer pushing ROM coal	26,765	2,738	hours/year	9.8	kg/h	5	silt content in %	10	moisture content in %								
CHPP - Dozer pushing Product coal	112,205	15,000	hours/year	7.5	kg/h	4	silt content in %	10	moisture content in %								
CHPP - Loading Product coal to stockpile	1,124	11,139,788	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Loading Product coal to trains	281	11,139,788	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %							75	% Control
CHPP - Loading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
CHPP - Hauling rejects	279,121	5,242,253	tonnes/year	0.266	kg/t	240	tonnes/load	13.9	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
WE - Overburden emplacement areas	773,879	279.6	ha	0.40	kg/ha/hour	8,760	hours									21	% Control
WE - Open pit	379,312	108.3	ha	0.40	kg/ha/hour	8,760	hours										
WE - ROM stockpiles	5,471	3.1	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
WE - Product stockpiles	21,843	12.5	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
Grading roads	82,354	133,808	km	0.62	kg/VKT	8	speed of graders in km/h										
Total TSP emissions (kg/yr)	**5,930,324**																

Table C-4: Emission Inventory - Year 11

ACTIVITY	TSP emission (kg/y)	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 - OC1	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC2	1,050	75	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC3	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC4	5,250	375	hours/year	14.0	kg/h												
OB - Drilling - OC1	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC2	354	2,000	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC4	1,567	8,855	holes/year	0.59	kg/hole											70	% Control
OB - Blasting - OC1	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC2	9,392	50	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC3	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC4	37,568	200	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Excavator loading OB to haul truck - OC1	-		tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to dump - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC2	83,395	15,600,000	tonnes/year	0.027	kg/t	240	tonnes/load	1.4	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC4	953,085	96,000,000	tonnes/year	0.050	kg/t	240	tonnes/load	2.6	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Emplacing at dump - OC1	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on OB at dump - OC1	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC1	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - OC1	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC2	702	3,968	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC4	3,687	20,833	holes/year	0.59	kg/hole											70	% Control
CL - Blasting - OC1	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC2	4,696	25	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC3	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC4	14,088	75	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Dozers ripping/pushing/clean-up - OC1	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC2	41,730	5,600	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC3	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC4	83,460	11,200	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Loading ROM coal to haul truck - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC2	126,358	2,405,766	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC4	536,427	10,213,164	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - UG1	105,046	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Hauling ROM to hopper - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC2	128,186	2,405,766	tonnes/year	0.266	kg/t	240	tonnes/load	14.0	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC4	539,505	10,213,164	tonnes/year	0.264	kg/t	240	tonnes/load	13.8	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG1	94,698	4,000,000	tonnes/year	0.118	kg/t	240	tonnes/load	6.2	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG2	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading ROM to hopper - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC2	18,954	2,405,766	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC4	80,464	10,213,164	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG1	31,514	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG2	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Rehandle ROM at hopper	43,644	1,661,893	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CHPP - Handling coal at CHPP	1,677	16,618,930	tonnes/year	0.00010	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Dozer pushing ROM coal	26,765	2,738	hours/year	9.8	kg/h	5	silt content in %	10	moisture content in %								
CHPP - Dozer pushing Product coal	112,205	15,000	hours/year	7.5	kg/h	4	silt content in %	10	moisture content in %								
CHPP - Loading Product coal to stockpile	1,140	11,300,872	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Loading Product coal to trains	285	11,300,872	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %							75	% Control
CHPP - Loading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
CHPP - Hauling rejects	283,360	5,318,058	tonnes/year	0.266	kg/t	240	tonnes/load	14.0	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
WE - Overburden emplacement areas	1,017,611	367.6	ha	0.40	kg/ha/hour	8,760	hours									21	% Control
WE - Open pit	330,545	94.3	ha	0.40	kg/ha/hour	8,760	hours										
WE - ROM stockpiles	5,471	3.1	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
WE - Product stockpiles	21,843	12.5	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
Grading roads	82,354	133,808	km	0.62	kg/VKT	8	speed of graders in km/h										
Total TSP emissions (kg/yr)	**5,879,163**																

Table C-5: Emission Inventory - Year 16

ACTIVITY	TSP emission (kg/y)	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 - OC1	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC2	1,050	75	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC3	-	-	hours/year	14.0	kg/h												
OB - Stripping Topsoil - OC4	5,250	375	hours/year	14.0	kg/h												
OB - Drilling - OC1	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC2	354	2,000	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
OB - Drilling - OC4	1,567	8,855	holes/year	0.59	kg/hole											70	% Control
OB - Blasting - OC1	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC2	9,392	50	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC3	-	-	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Blasting - OC4	37,568	200	blasts/year	188	kg/blast	9,000	Area of blast in square metres										
OB - Excavator loading OB to haul truck - OC1	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to dump - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC2	168,934	15,600,000	tonnes/year	0.054	kg/t	240	tonnes/load	2.8	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Hauling to dump - OC4	1,370,976	96,000,000	tonnes/year	0.071	kg/t	240	tonnes/load	3.7	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
OB - Emplacing at dump - OC1	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC2	14,979	15,600,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC3	-	-	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC4	92,182	96,000,000	tonnes/year	0.001	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on OB at dump - OC1	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC1	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC2	83,677	5,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC3	-	-	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC4	334,707	20,000	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - OC1	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC2	702	3,968	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC3	-	-	holes/year	0.59	kg/hole											70	% Control
CL - Drilling - OC4	3,687	20,833	holes/year	0.59	kg/hole											70	% Control
CL - Blasting - OC1	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC2	4,696	25	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC3	-	-	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Blasting - OC4	14,088	75	blasts / year	188	kg/blast	9,000	Area of blast in square metres										
CL - Dozers ripping/pushing/clean-up - OC1	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC2	41,730	5,600	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC3	-	-	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC4	83,460	11,200	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Loading ROM coal to haul truck - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC2	134,407	2,559,019	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC4	538,910	10,260,441	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - UG1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG2	105,046	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Loading ROM coal to haul truck - UG3	-		tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Hauling ROM to hopper - OC1	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC2	164,806	2,559,019	tonnes/year	0.322	kg/t	240	tonnes/load	16.9	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC3	-	-	tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - OC4	621,614	10,260,441	tonnes/year	0.303	kg/t	240	tonnes/load	15.9	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG1	-		tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG2	94,698	4,000,000	tonnes/year	0.118	kg/t	240	tonnes/load	6.2	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CL - Hauling ROM to hopper - UG3	-		tonnes/year	0.000	kg/t	240	tonnes/load	-	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading ROM to hopper - OC1	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC2	20,161	2,559,019	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC3	-	-	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC4	80,836	10,260,441	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG1	-		tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG2	31,514	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG3	-		tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Rehandle ROM at hopper	44,170	1,681,946	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CHPP - Handling coal at CHPP	1,697	16,819,460	tonnes/year	0.00010	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Dozer pushing ROM coal	26,765	2,738	hours/year	9.8	kg/h	5	silt content in %	10	moisture content in %								
CHPP - Dozer pushing Product coal	112,205	15,000	hours/year	7.5	kg/h	4	silt content in %	10	moisture content in %								
CHPP - Loading Product coal to stockpile	1,154	11,437,233	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Loading Product coal to trains	288	11,437,233	tonnes/year	0.000	kg/t	0.811	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %							75	% Control
CHPP - Loading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
CHPP - Hauling rejects	346,626	5,382,227	tonnes/year	0.322	kg/t	240	tonnes/load	16.9	km/return trip	4.6	kg/VKT	3.5	% silt c	266	Ave GMV (ton	80	% Control
CHPP - Unloading rejects	-	-	tonnes/year	0.016	kg/t	20	moisture content in %										
WE - Overburden emplacement areas	783,542	283.1	ha	0.40	kg/ha/hour	8,760	hours									21	% Control
WE - Open pit	459,881	131.2	ha	0.40	kg/ha/hour	8,760	hours										
WE - ROM stockpiles	5,471	3.1	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
WE - Product stockpiles	21,843	12.5	ha	0.40	kg/ha/hour	8,760	hours									50	% Control
Grading roads	82,354	133,808	km	0.62	kg/VKT	8	speed of graders in km/h										
Total TSP emissions (kg/yr)	**6,472,532**																

Appendix D

CALMET/CALPUFF Input Variables

Table D-1: CALMET input variables

Parameter	Value
Terrain radius of influence (TERRAD)	10km
Vertical extrapolation of surface wind observations (IEXTRP)	-4
Layer dependent weighting factor of surface vs. upper air wind observations (BIAS [NZ])	-1,-0.5,-0.25,0,0,0,0,0
Weighting parameter for Step 1 wind field vs. Observations	R1 = 0.5km, R2 = 0.5km
Maximum radius of influence for meteorological stations in Layer 1 and layers aloft	RMAX1=1.0km, RMAX2=1.0km

Table D-2: CALPUFF input variables

Parameter	Used option	Value
Aqueous phase transformation modelled?	No	0
Boundary conditions modelled?	No	0
CGRUP (Species groups)	PM2.5, PM10 and TSP	-
Chemical transformation	Not modelled	0
Dry deposition modelled?	Yes	1
Gravitational settling (plume tilt) modelled?	No	0
Horizontal size of puff (m) beyond which time-dependent dispersion equations (Heffter) are used to determine sigma-y and sigma-z	Default	550
Individual source conditions saved?	No	0
Maximum length of a slug (met. grid units)	Default	1
Maximum mixing height	Default	3000
Maximum number of sampling steps for one puff/slug during one time step	-	60
Maximum number of slugs/puffs release from one source during one time step	-	60
Maximum sigma z allowed to avoid numerical problem in calculating virtual time or distance	Default	5.00E+06
Maximum travel distance of a puff/slug during one sampling step	Default	1
Method used to compute dispersion coefficients?	Internally calculated sigma v, sigma w using micrometeorological variables	2
Method used for lagrangian timescale for Sigma-y	Draxler default 617.284	0
Method used to compute turbulence sigma-v & sigma-w using micrometeorological variables	Standard CALPUFF subroutines	1
Minimum mixing height	Default	50
Minimum sigma y for a new puff/slug	Default	1
Minimum sigma z for a new puff/slug	Default	1
Minimum turbulence velocities sigma-v and sigma-w for each stability class over land and over water	Default	-
Near-field puffs modelled as elongated slugs?	No	0
Plume path coefficients for each stability class	Default	-
Potential temperature gradient for stable classes E, F	Default	-
Puff splitting allowed?	No	0
Range of land use categories for which urban dispersion is assumed	Default	-
Slug - to - puff transition criterion factor	Default	10
Stability class used to determine plume growth rates for puffs above the boundary layer	Default	5
Sub grid-scale complex terrain	Not Modelled	0
Switch for using Heffter equation for sigma-z	Default(Not use Heffter)	0
Terrain adjustment method	Default(Partial plume path adjustment)	3
Vegetation state in unirrigated areas	Default(Active and unstressed)	1
Vertical dispersion constant for stable conditions	Default	0.01
Vertical distribution used in the near field	Default (Gaussian)	1
Wet removal modelled?	No	0
Wind speed classes	Default	-
Wind speed profile power-law exponents for stabilities	Default	-

Appendix E
Isopleth Diagrams

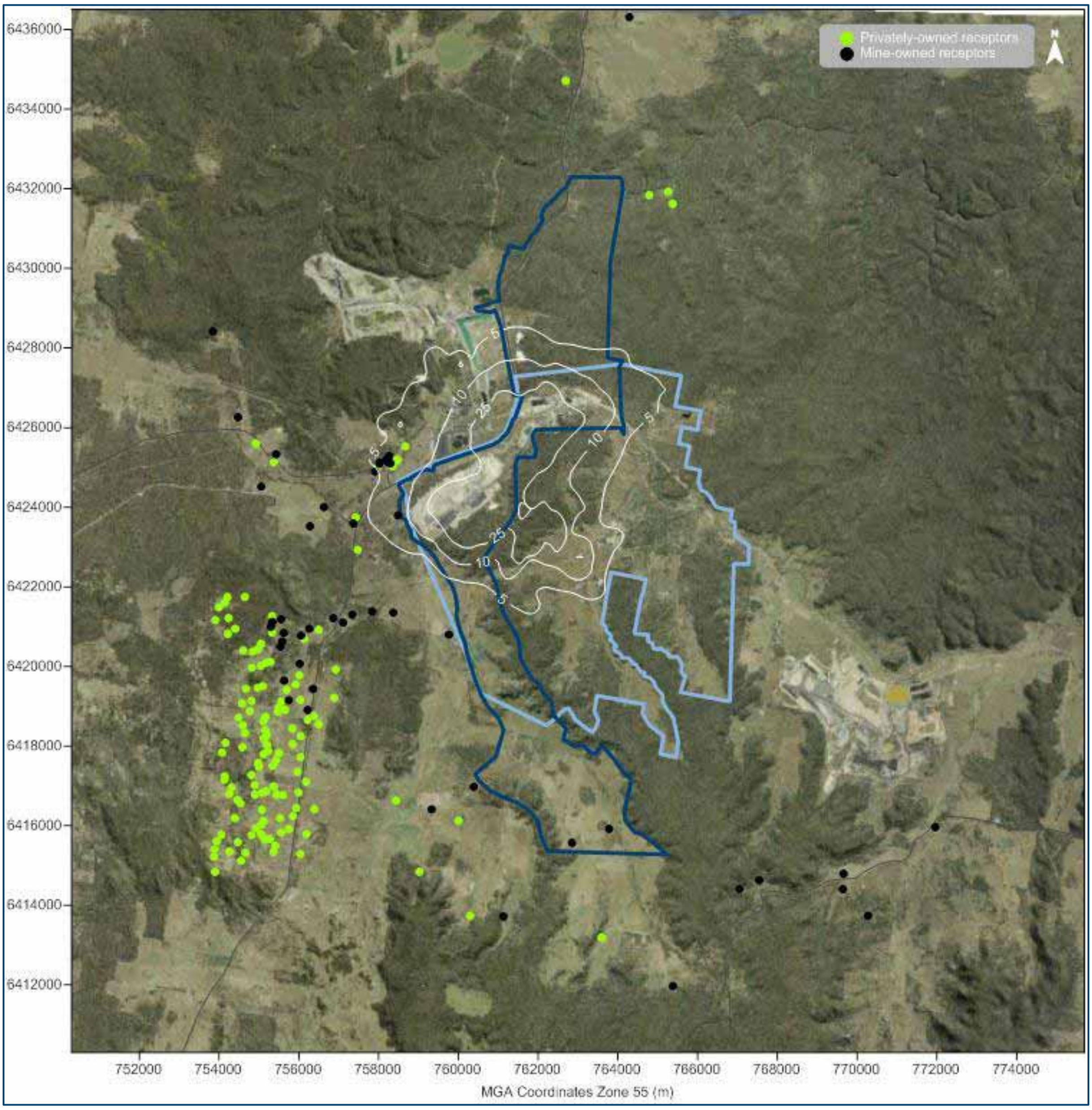

Figure E-1: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Year 2 (µg/m³)

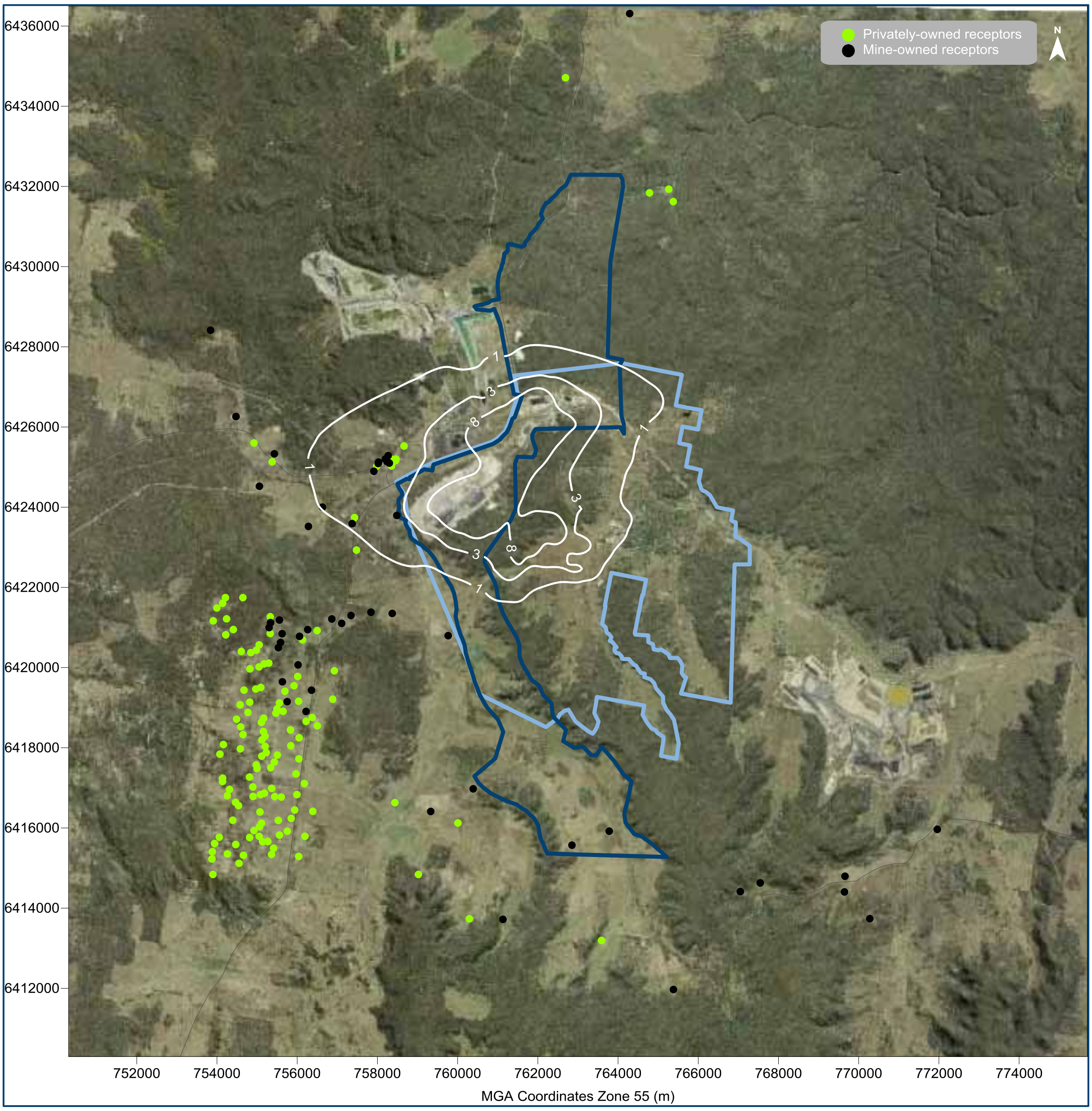

Figure E-2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Year 2 (µg/m³)

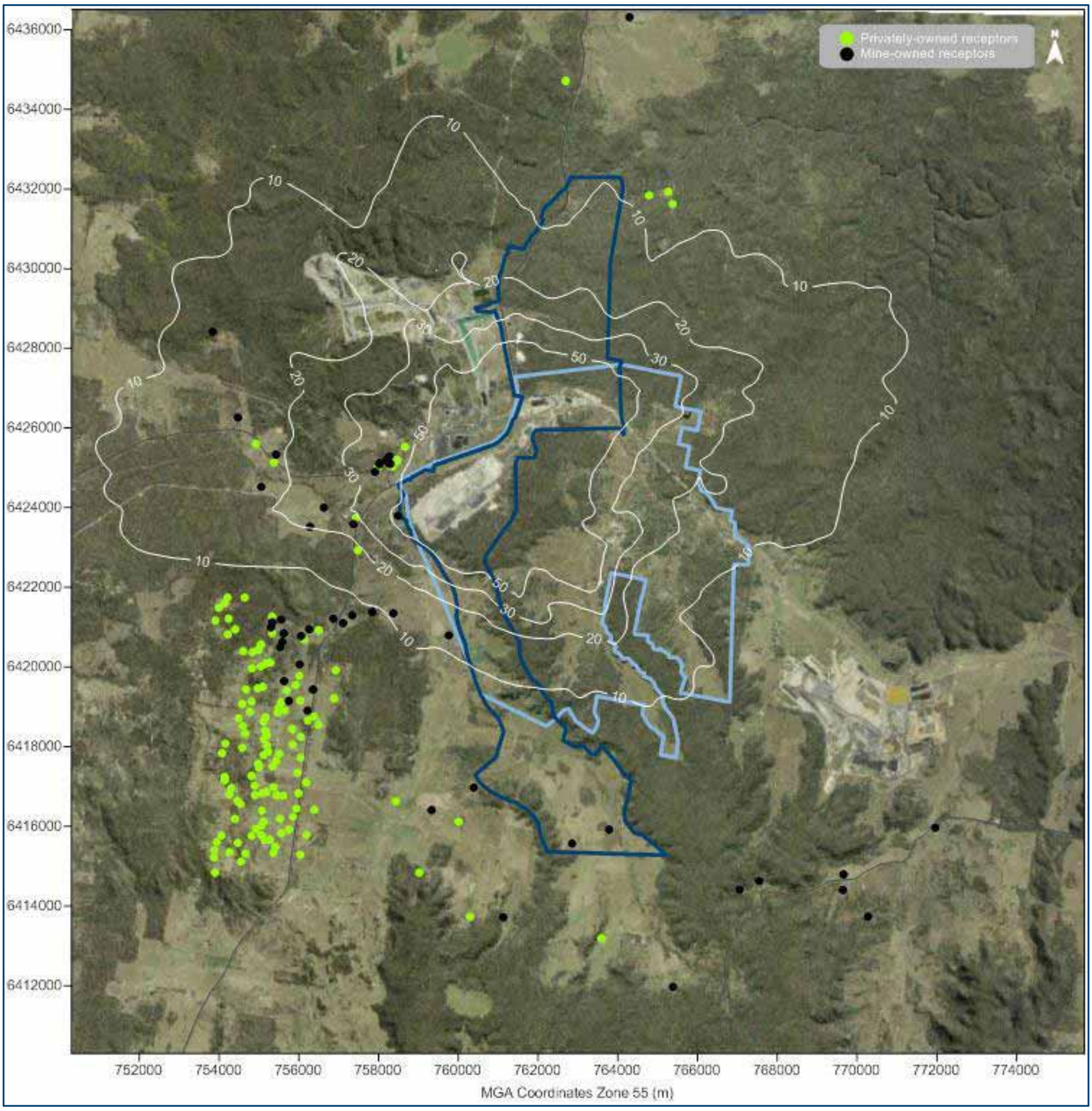

Figure E-3: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Year 2 (µg/m³)

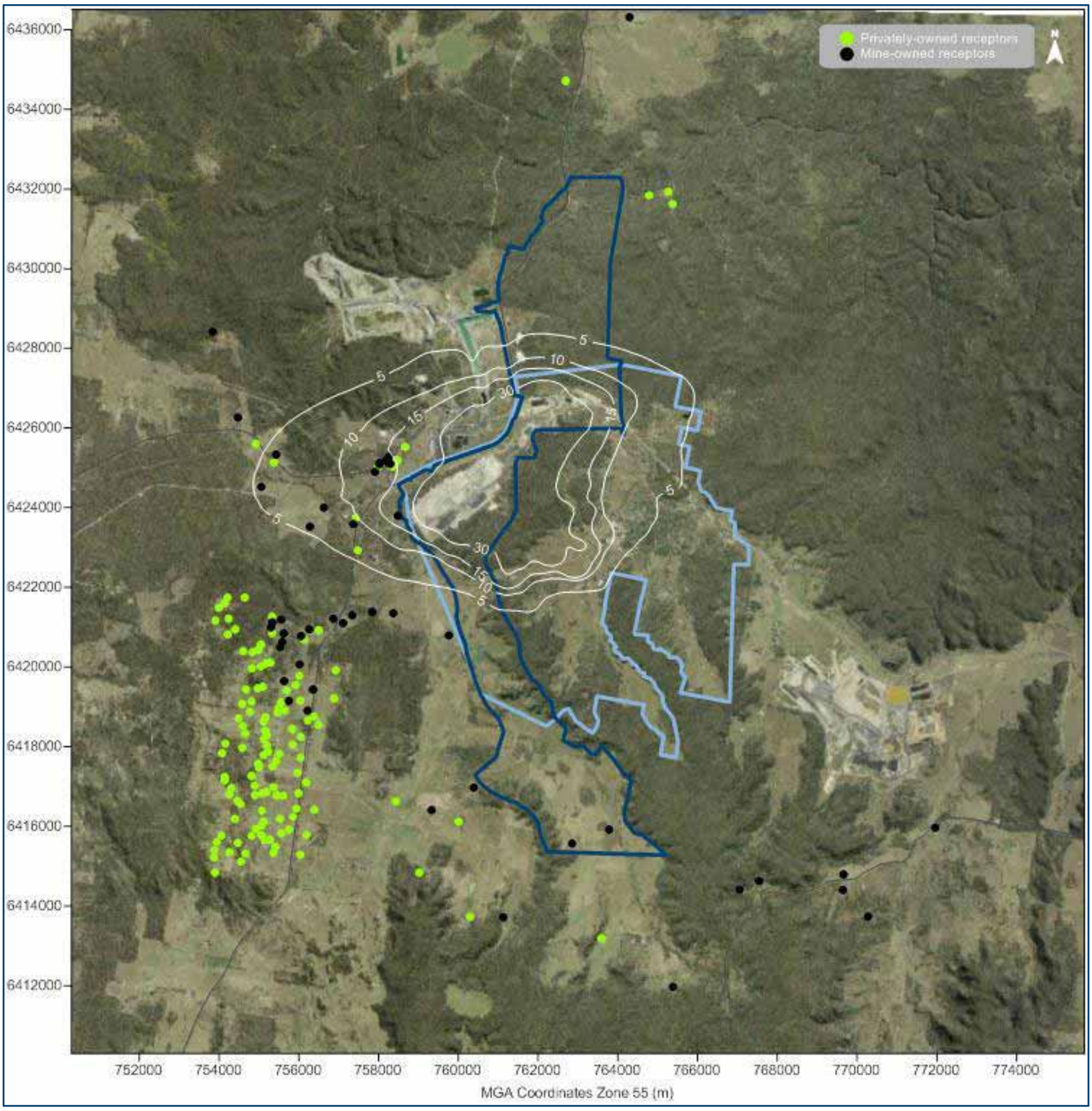

Figure E-4: Predicted annual average PM_{10} concentrations due to emissions from the Project in Year 2 (µg/m³)

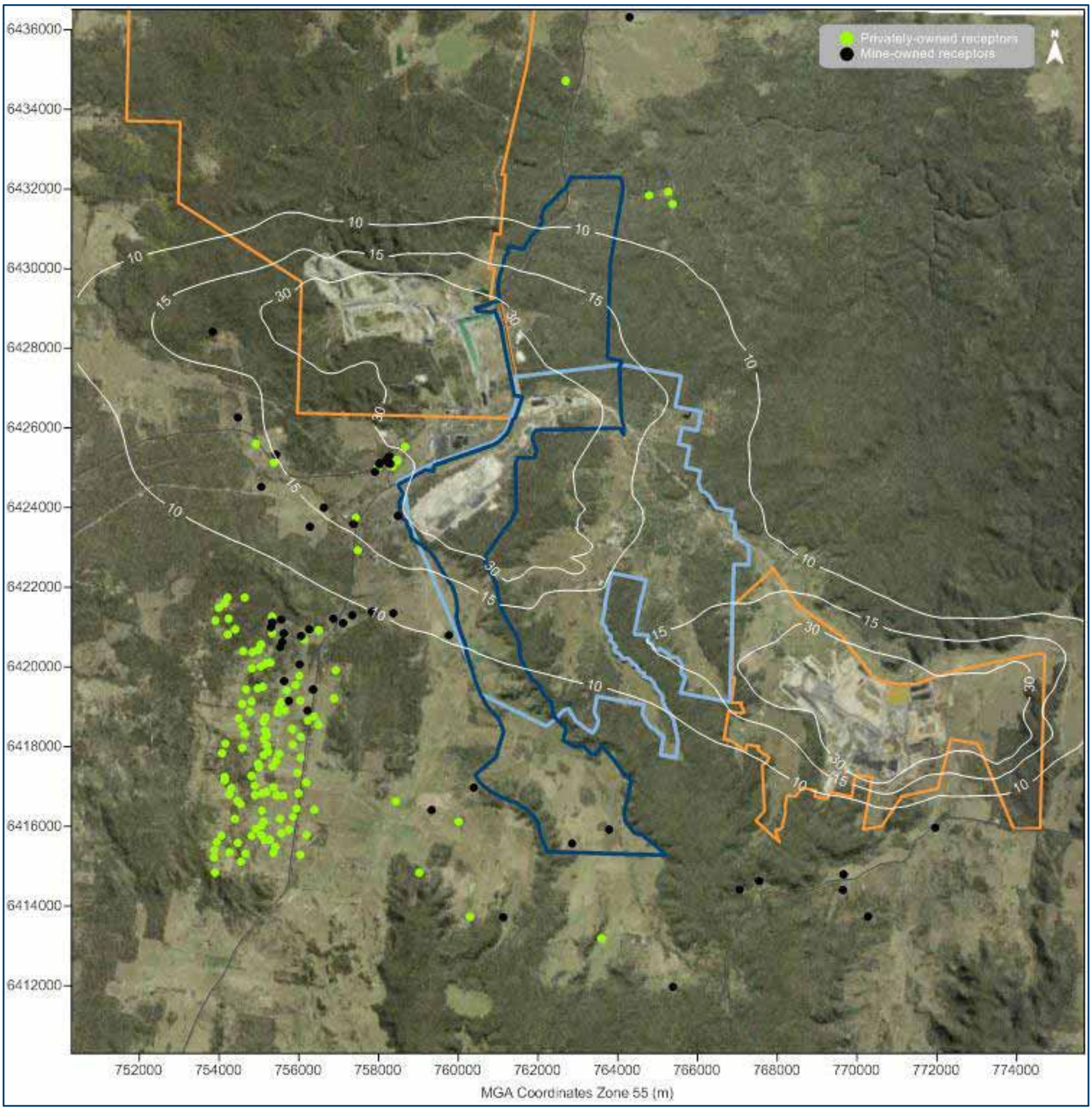

Figure E-5: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Year 2 (µg/m³)

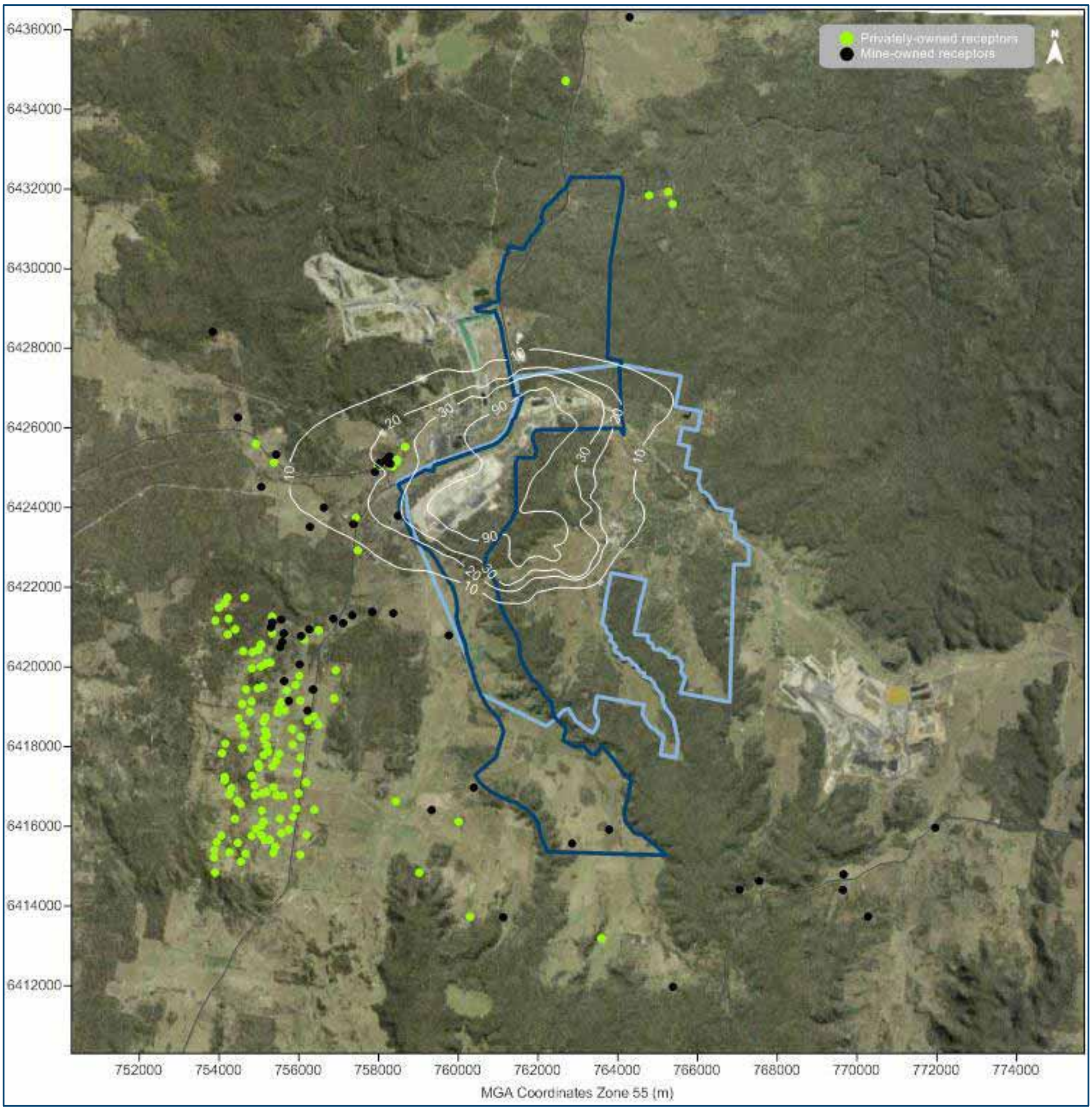

Figure E-6: Predicted annual average TSP concentrations due to emissions from the Project in Year 2 (µg/m³)

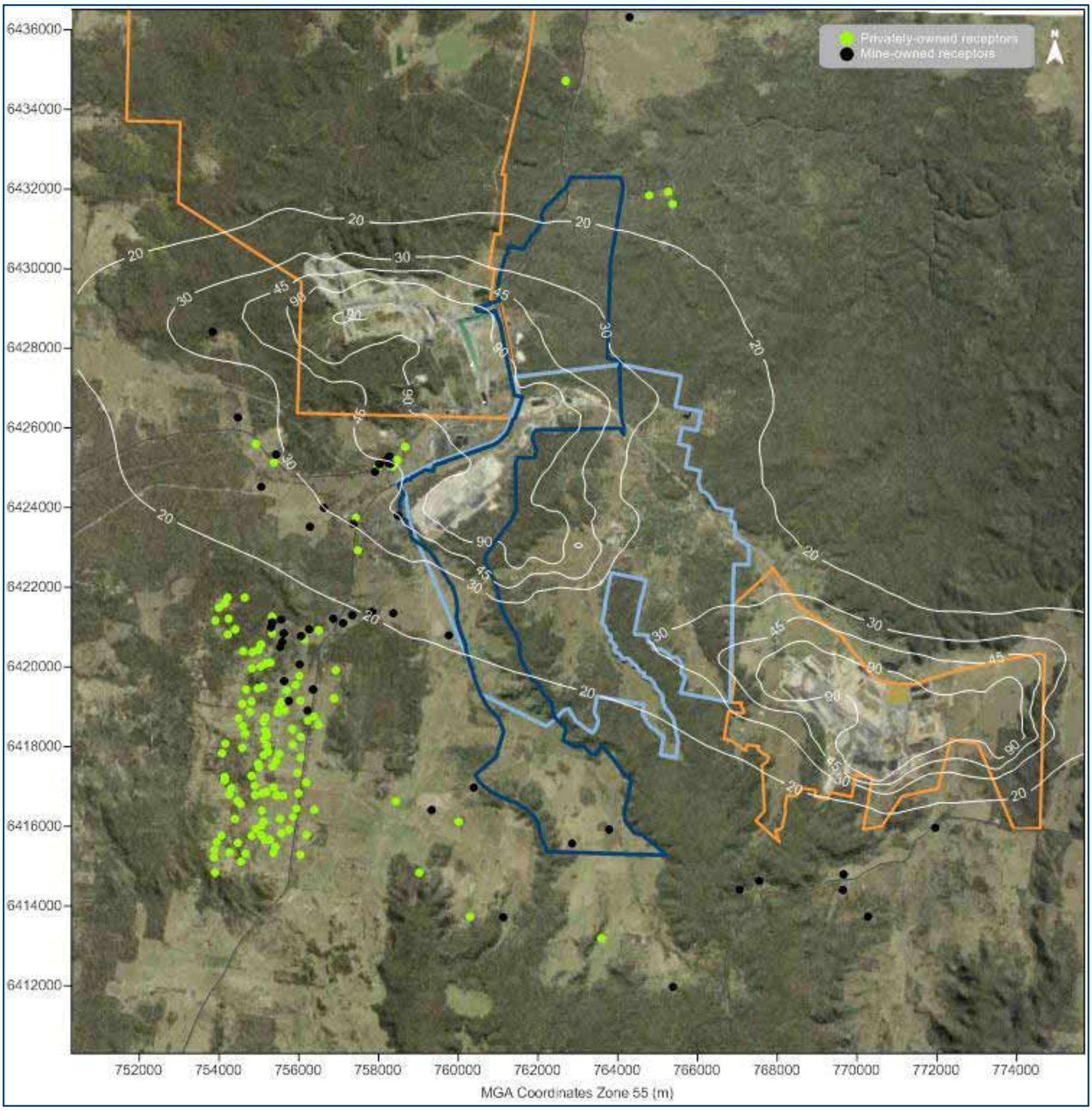

Figure E-7: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Year 2 (µg/m³)

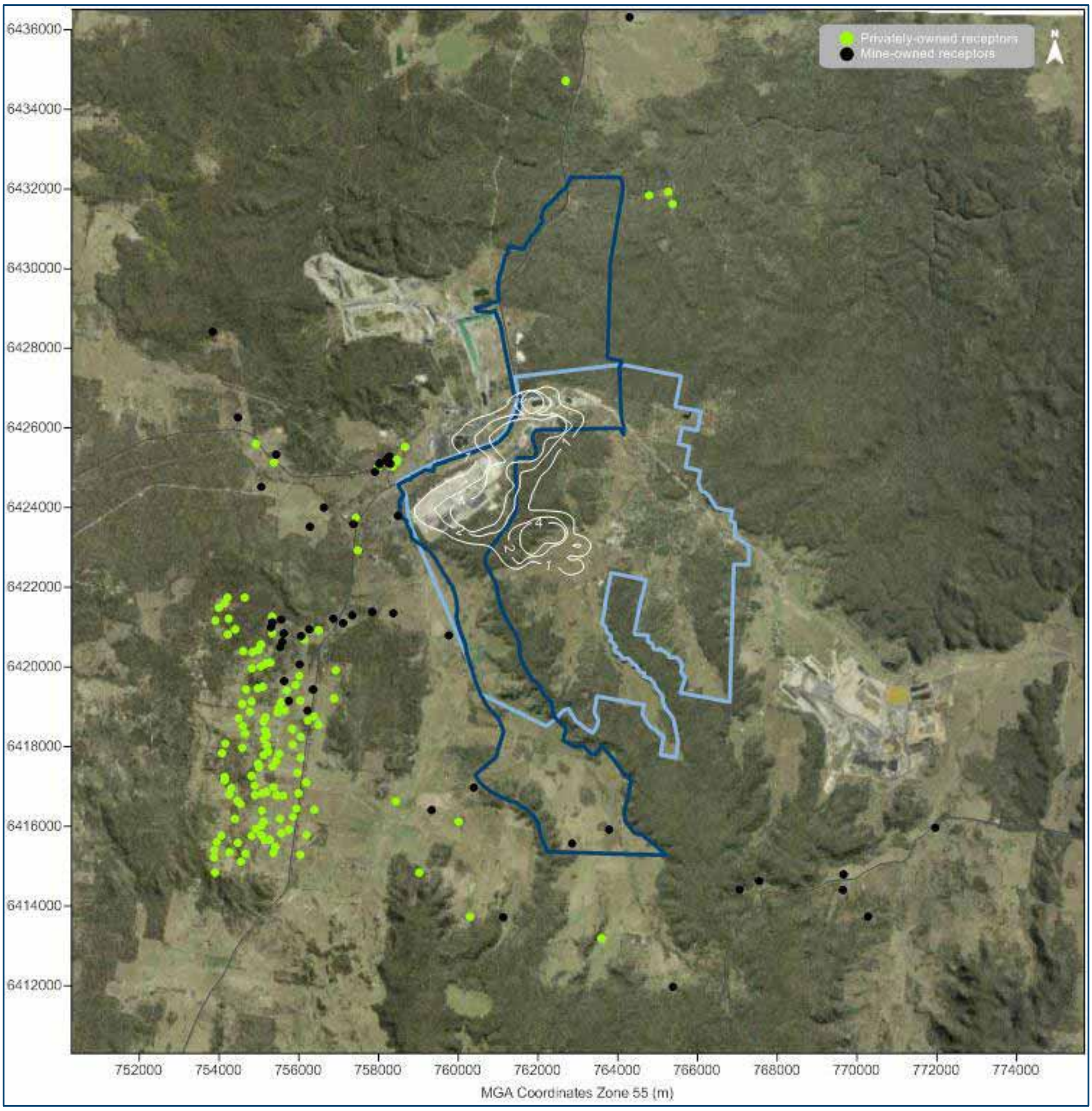

Figure E-8: Predicted annual average dust deposition levels due to emissions from the Project in Year 2 (g/m²/month)

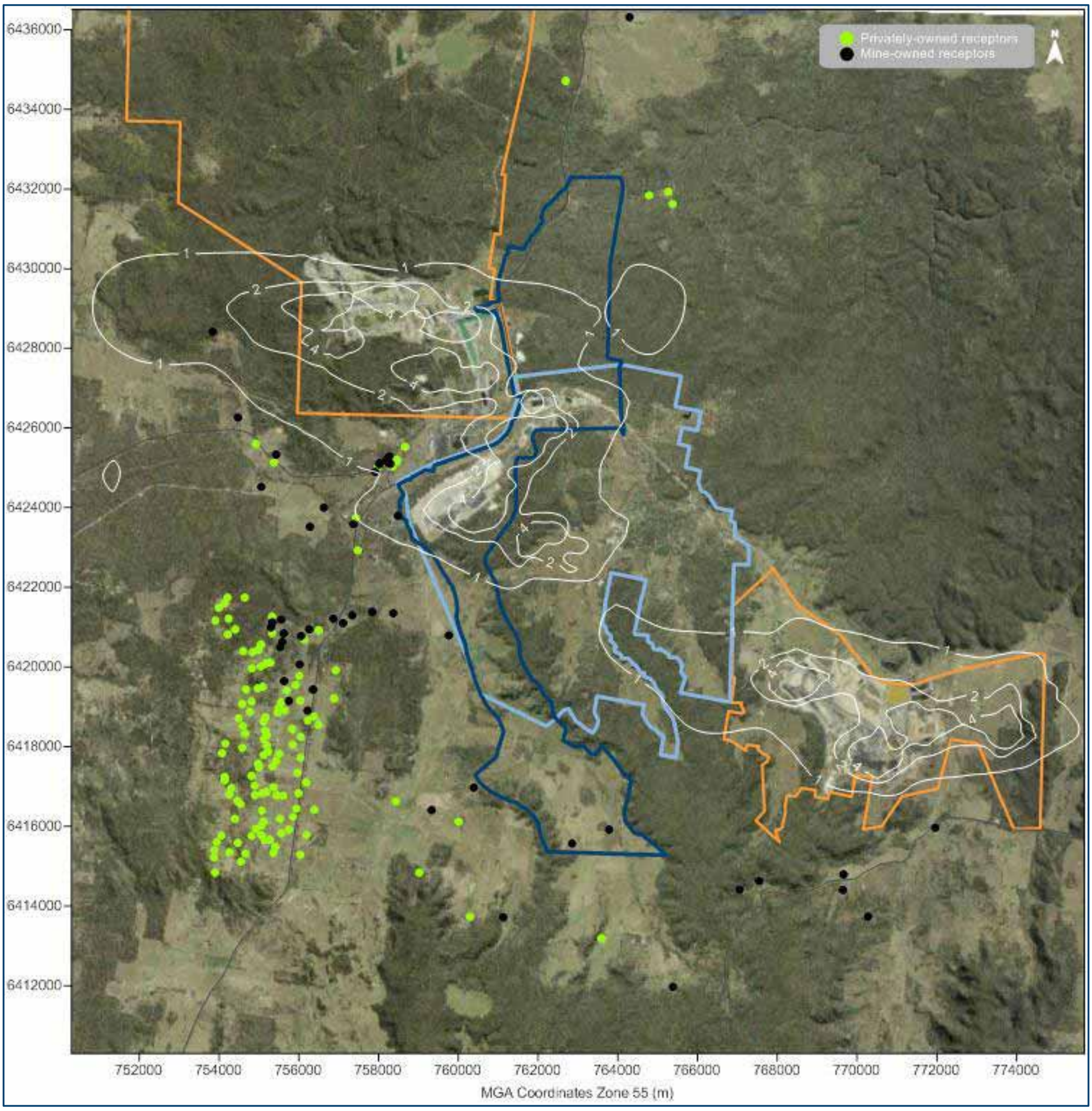

Figure E-9: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Year 2 (g/m²/month)

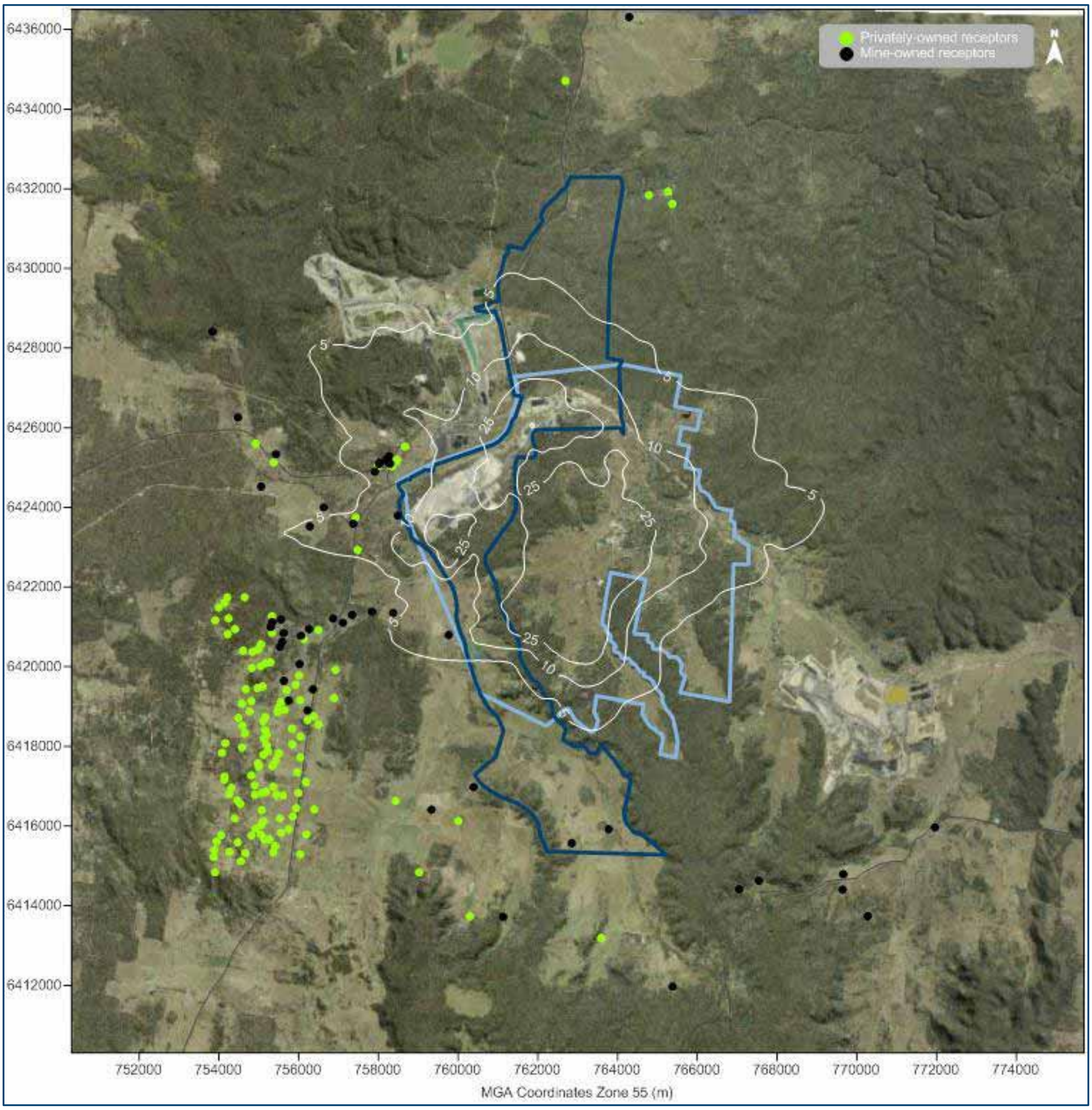

Figure E-10: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Year 6 ($\mu g/m^3$)

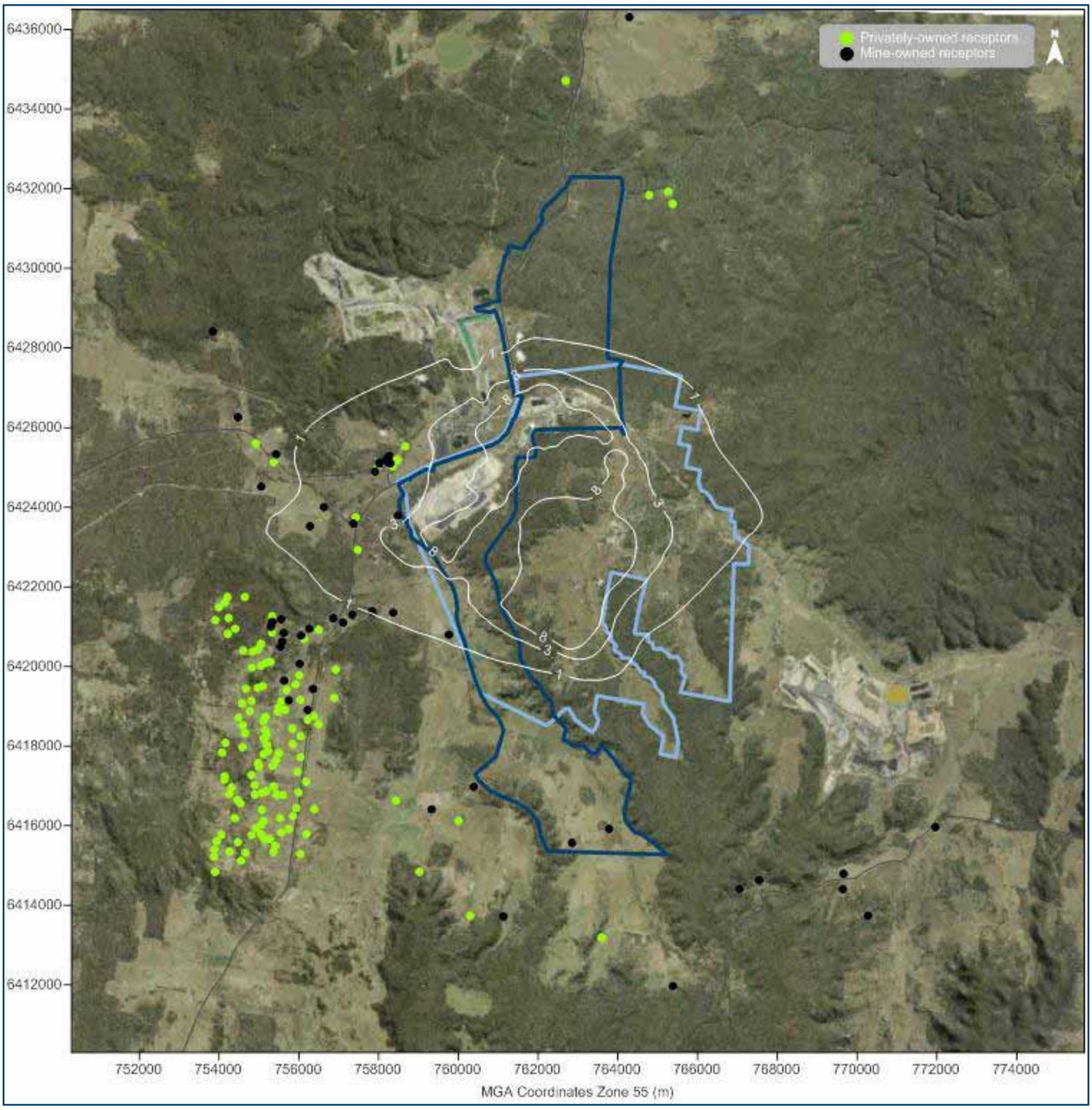

Figure E-11: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Year 6 (µg/m³)

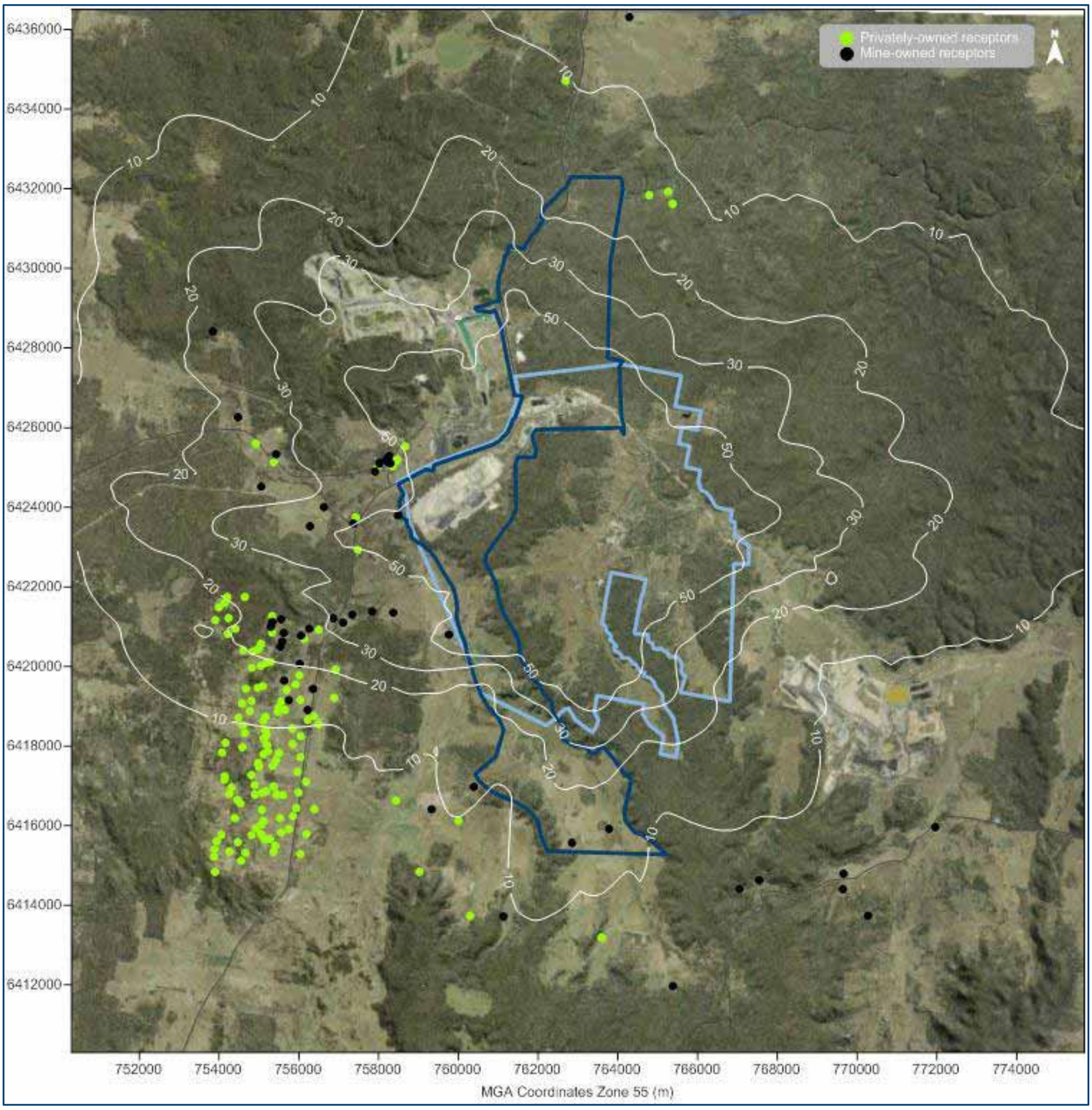

Figure E-12: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Year 6 (µg/m³)

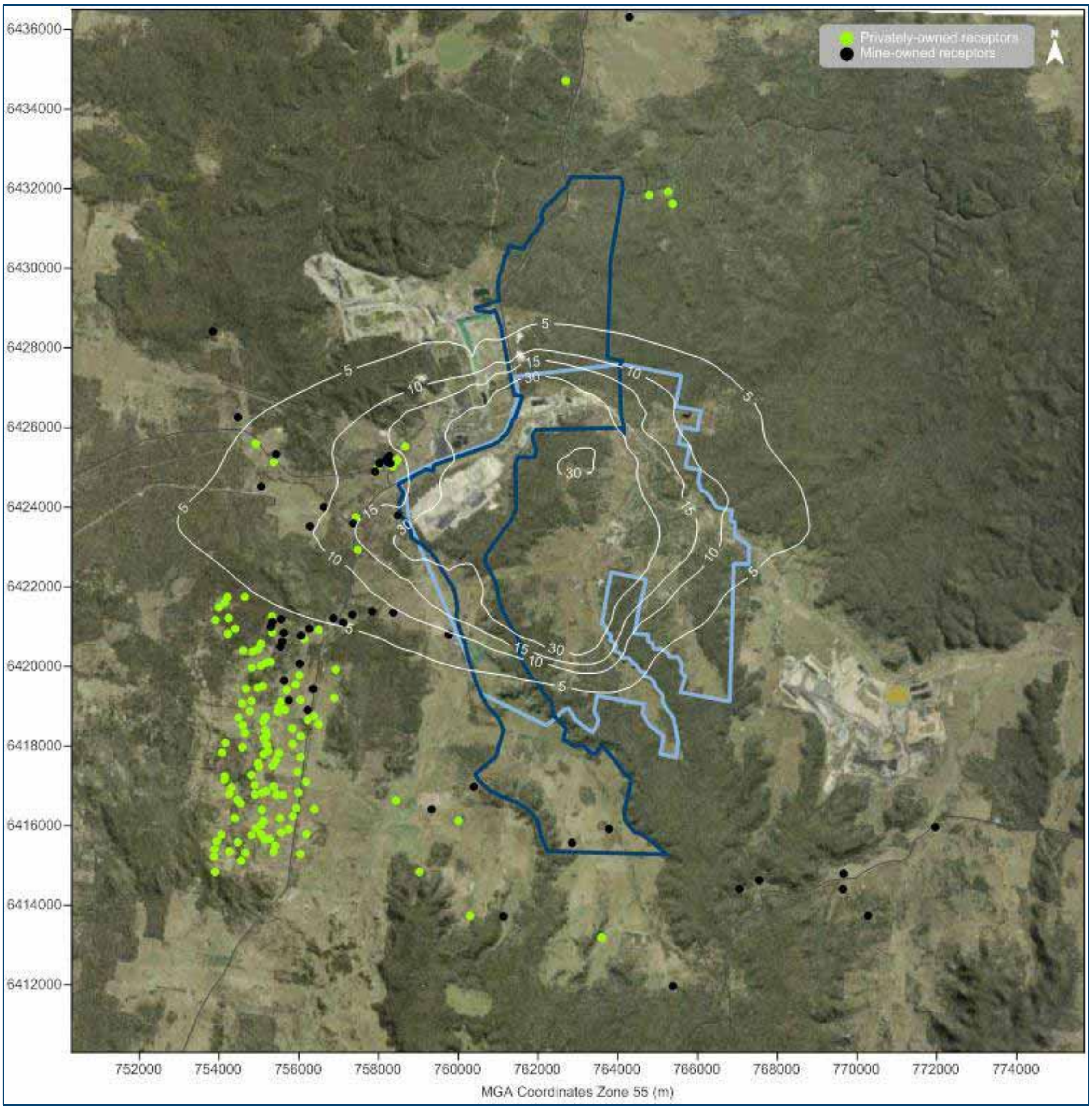

Figure E-13: Predicted annual average PM_{10} concentrations due to emissions from the Project in Year 6 (µg/m³)

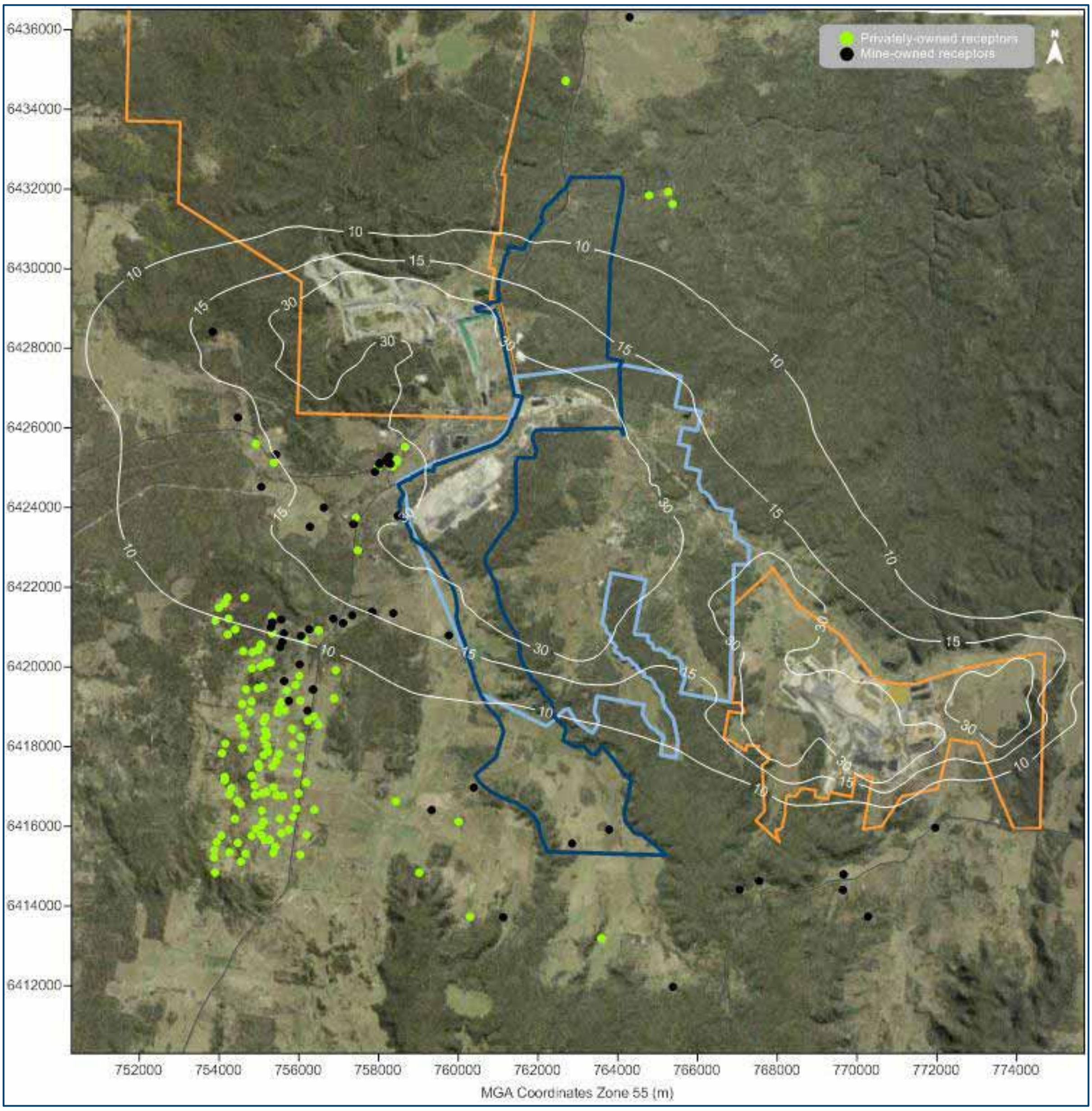

Figure E-14: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Year 6 (µg/m³)

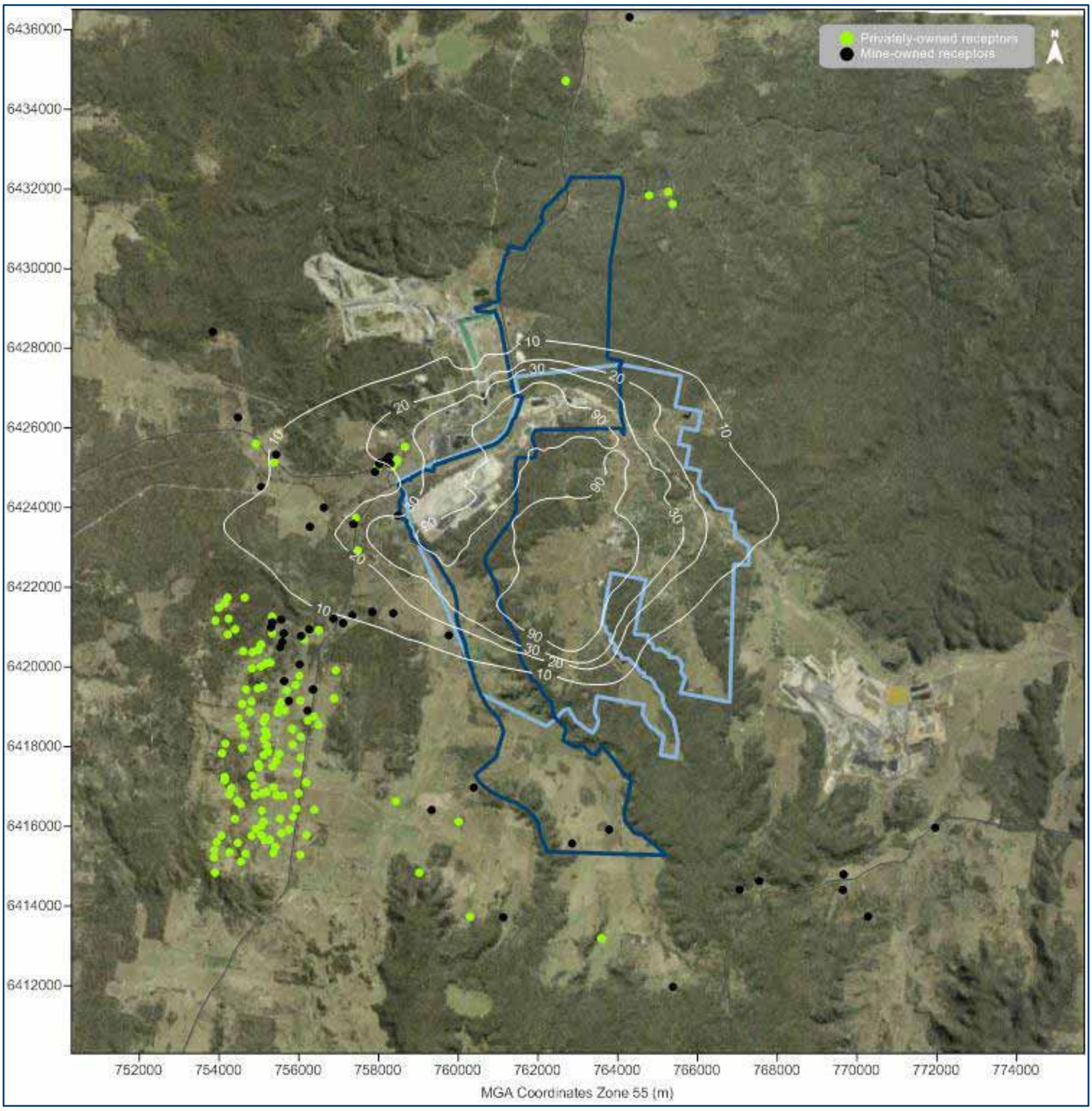

Figure E-15: Predicted annual average TSP concentrations due to emissions from the Project in Year 6 (µg/m³)

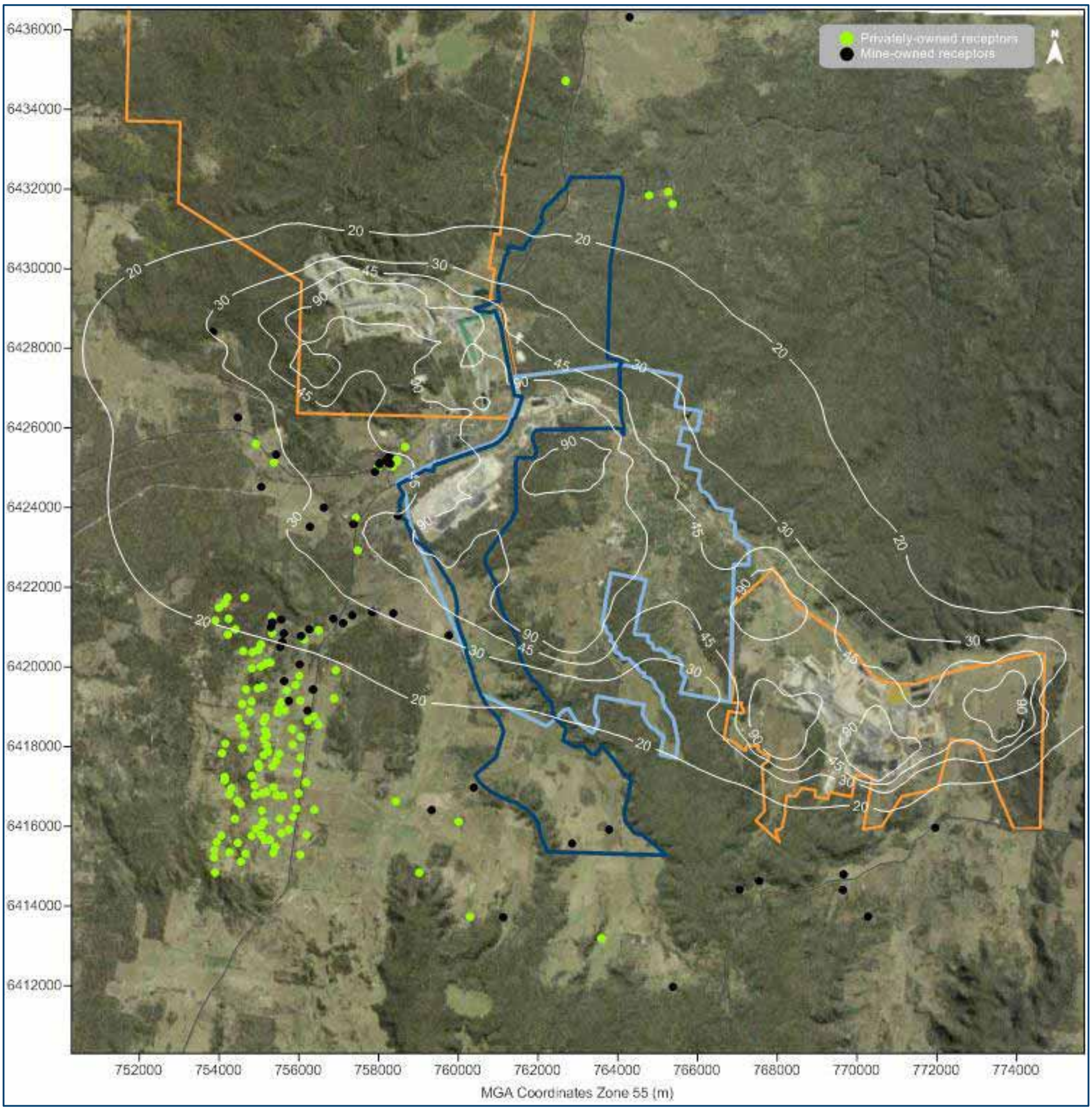

Figure E-16: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Year 6 (µg/m³)

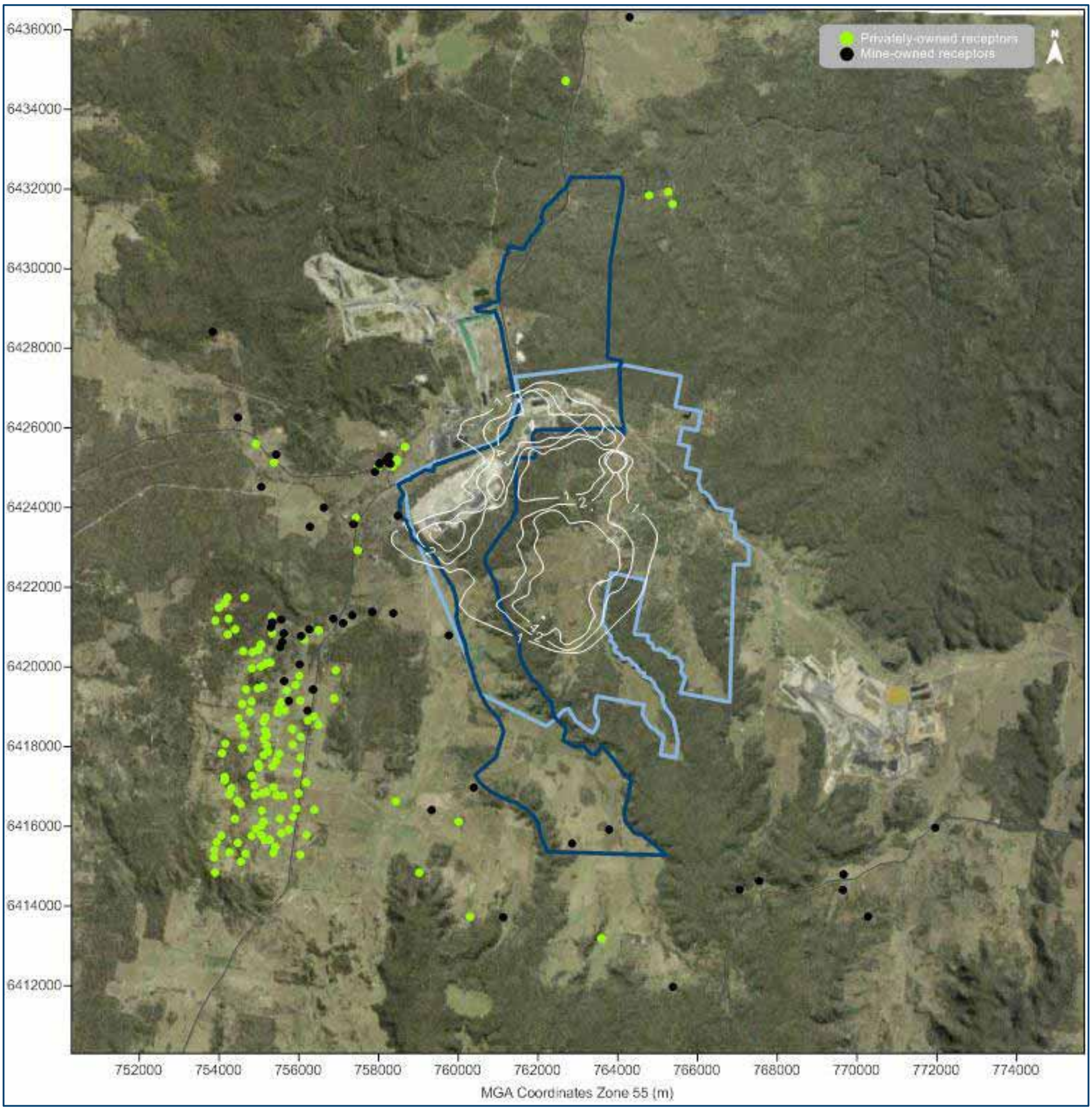

Figure E-17: Predicted annual average dust deposition levels due to emissions from the Project in Year 6 (g/m²/month)

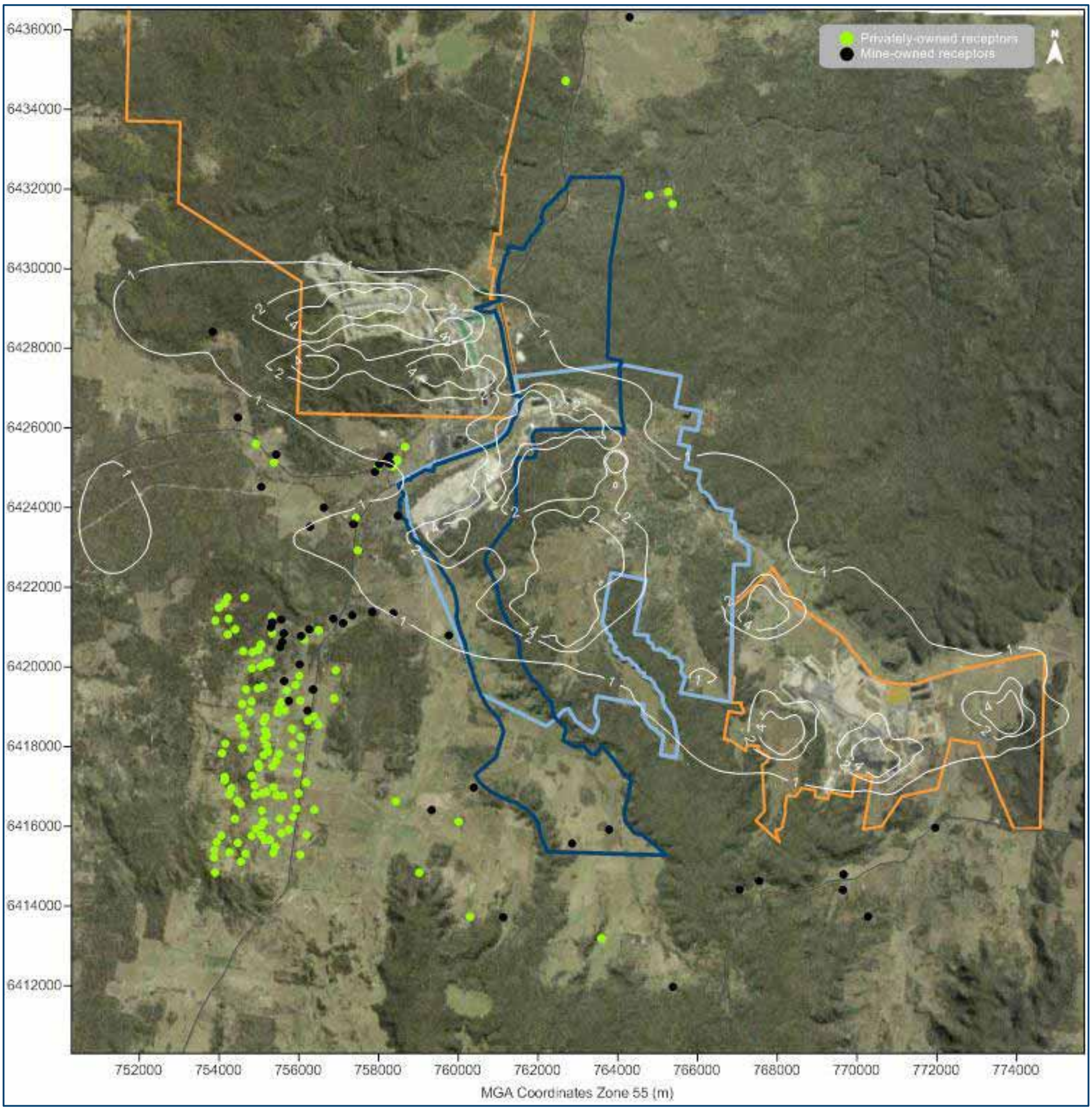

Figure E-18: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Year 6 (g/m²/month)

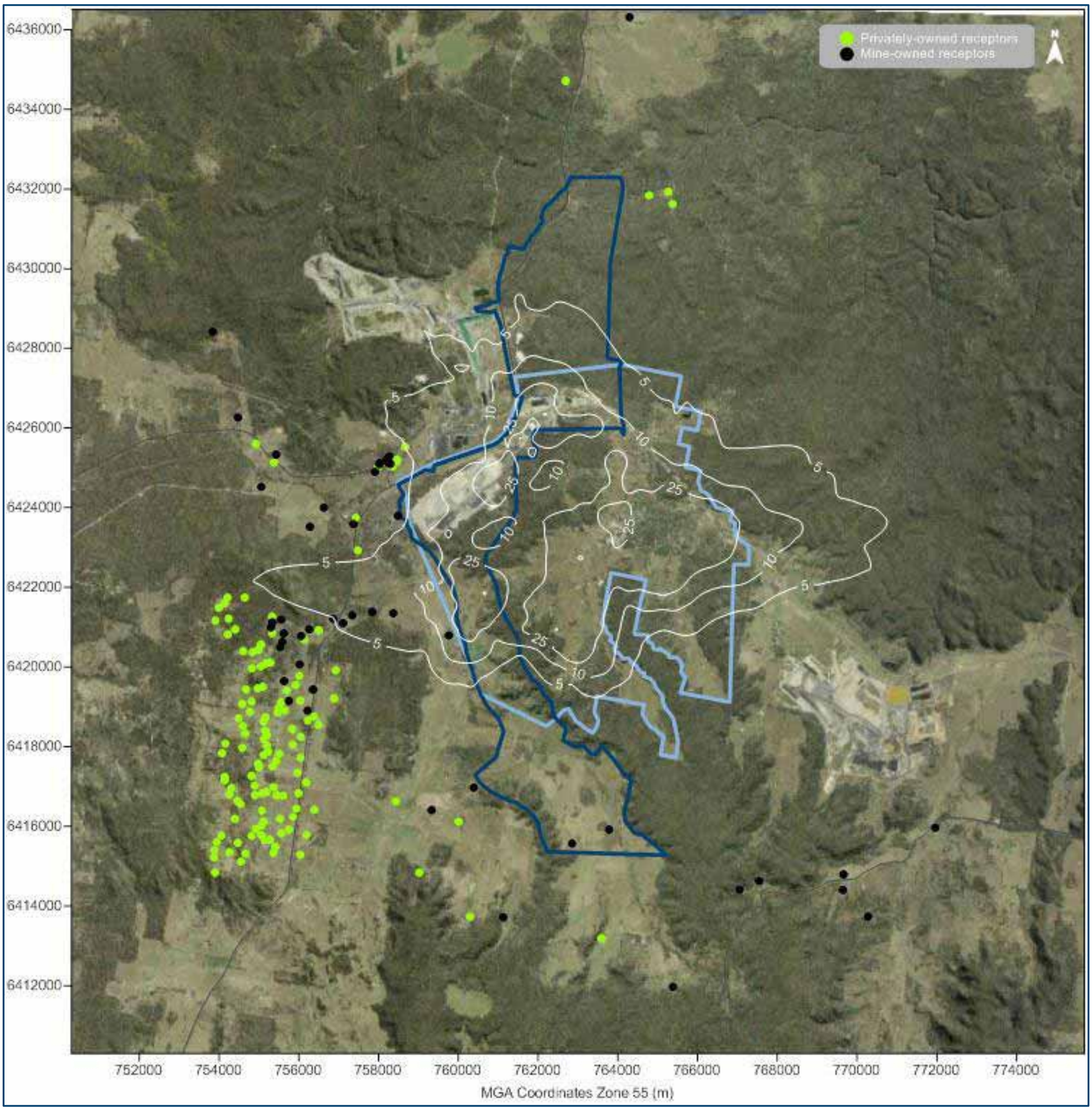

Figure E-19: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Year 11 (µg/m³)

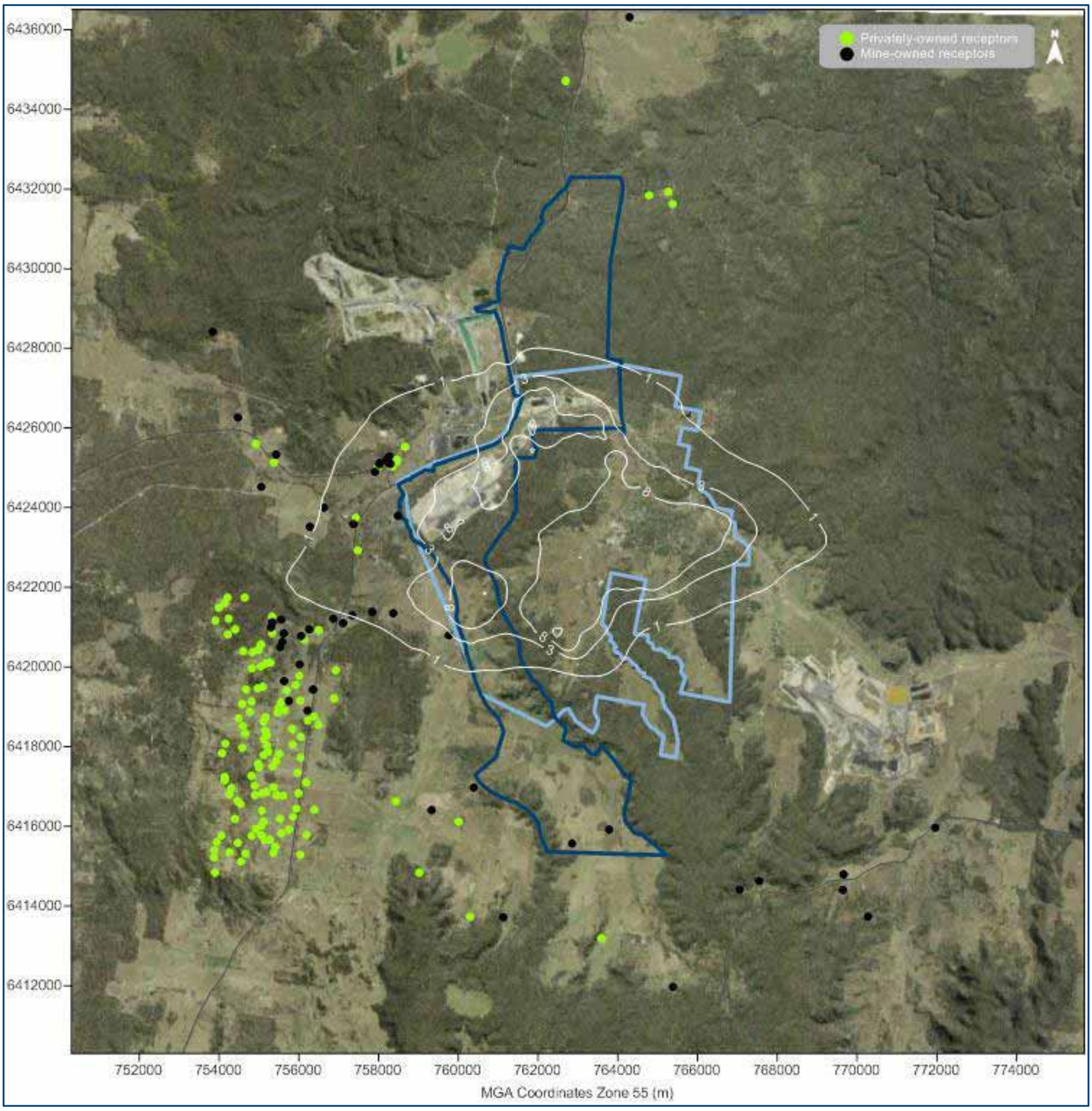

Figure E-20: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Year 11 (µg/m³)

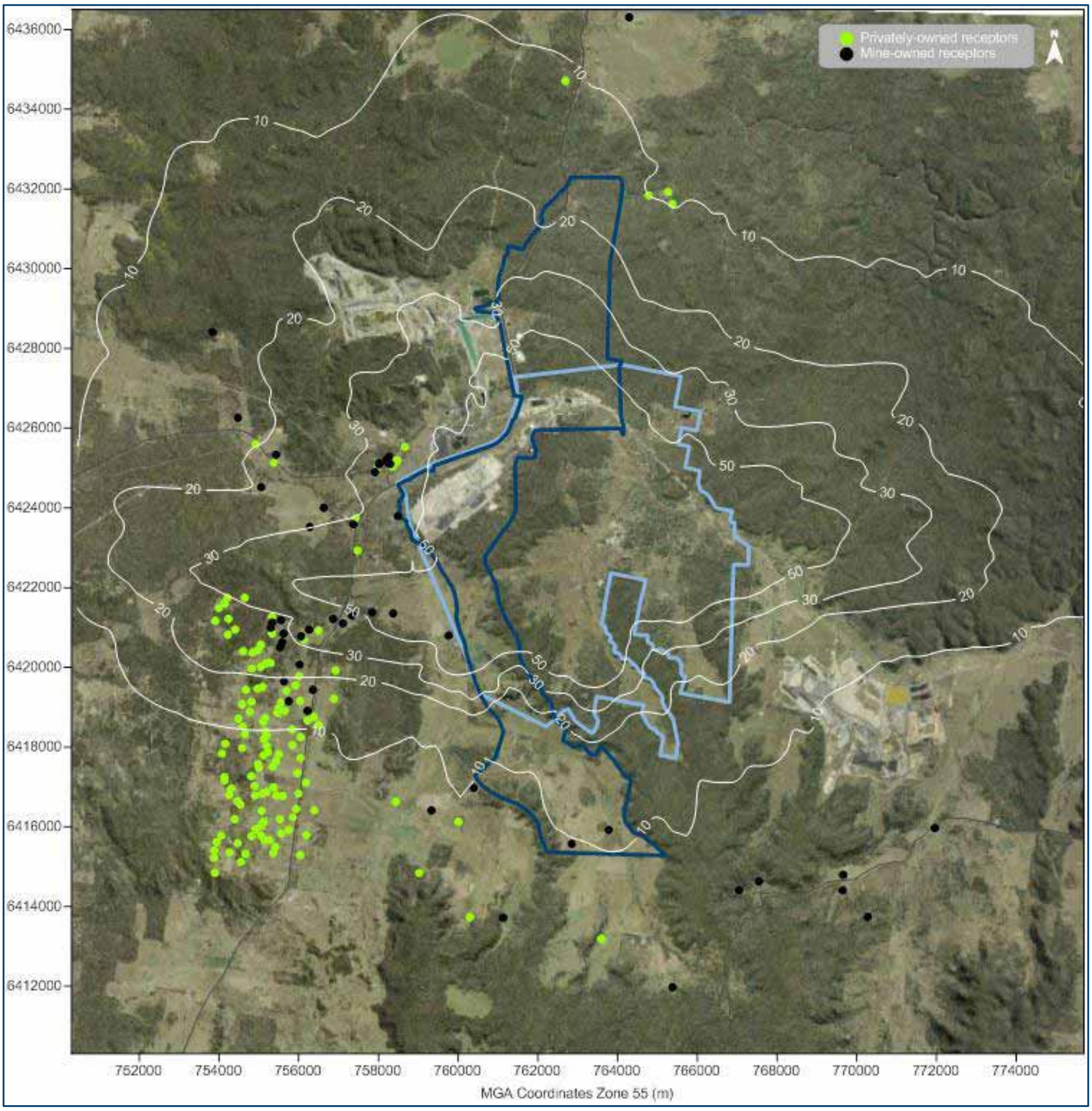

Figure E-21: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Year 11 (µg/m³)

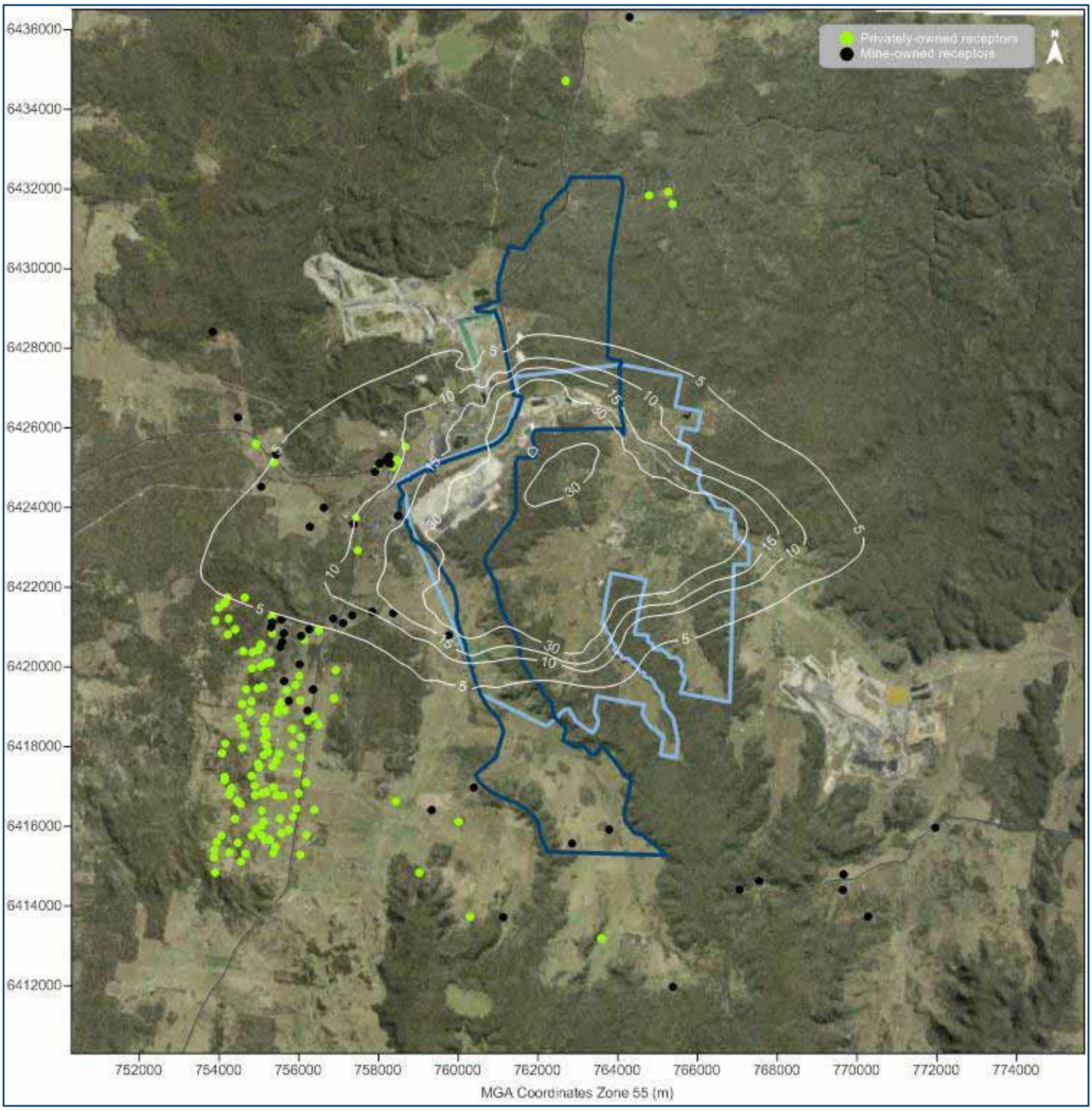

Figure E-22: Predicted annual average PM_{10} concentrations due to emissions from the Project in Year 11 (µg/m³)

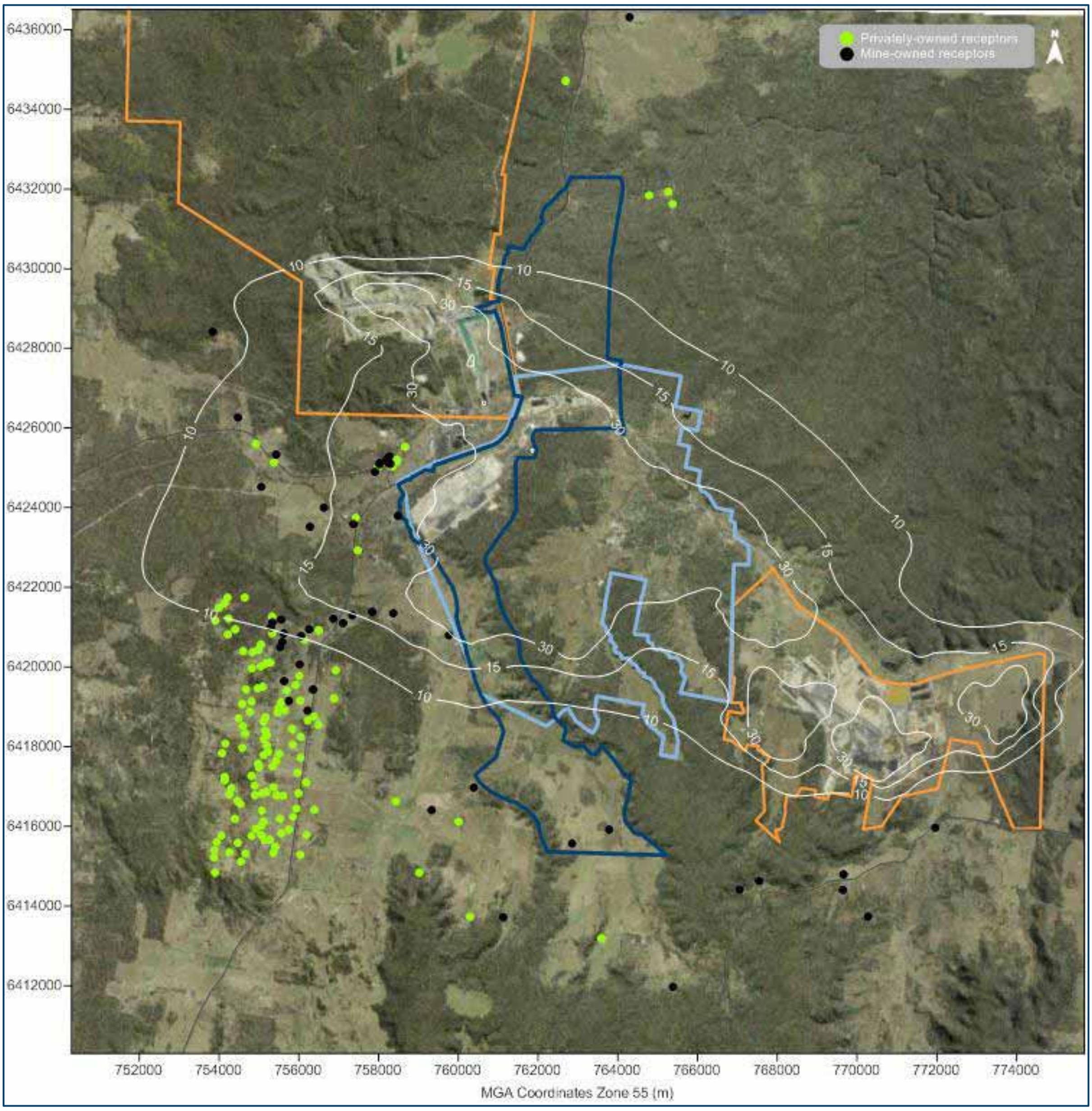

Figure E-23: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Year 11 (µg/m³)

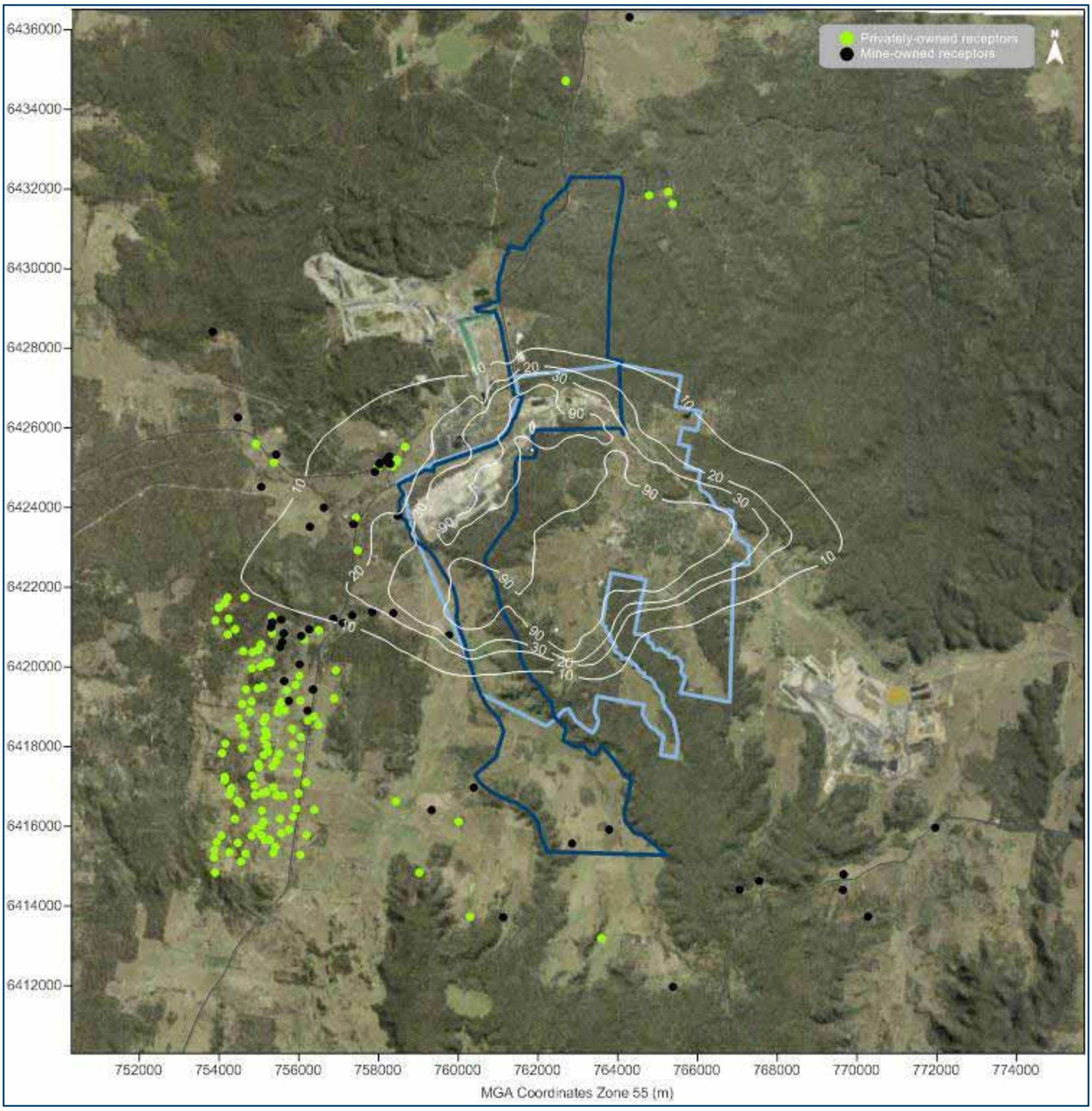

Figure E-24: Predicted annual average TSP concentrations due to emissions from the Project in Year 11 (µg/m³)

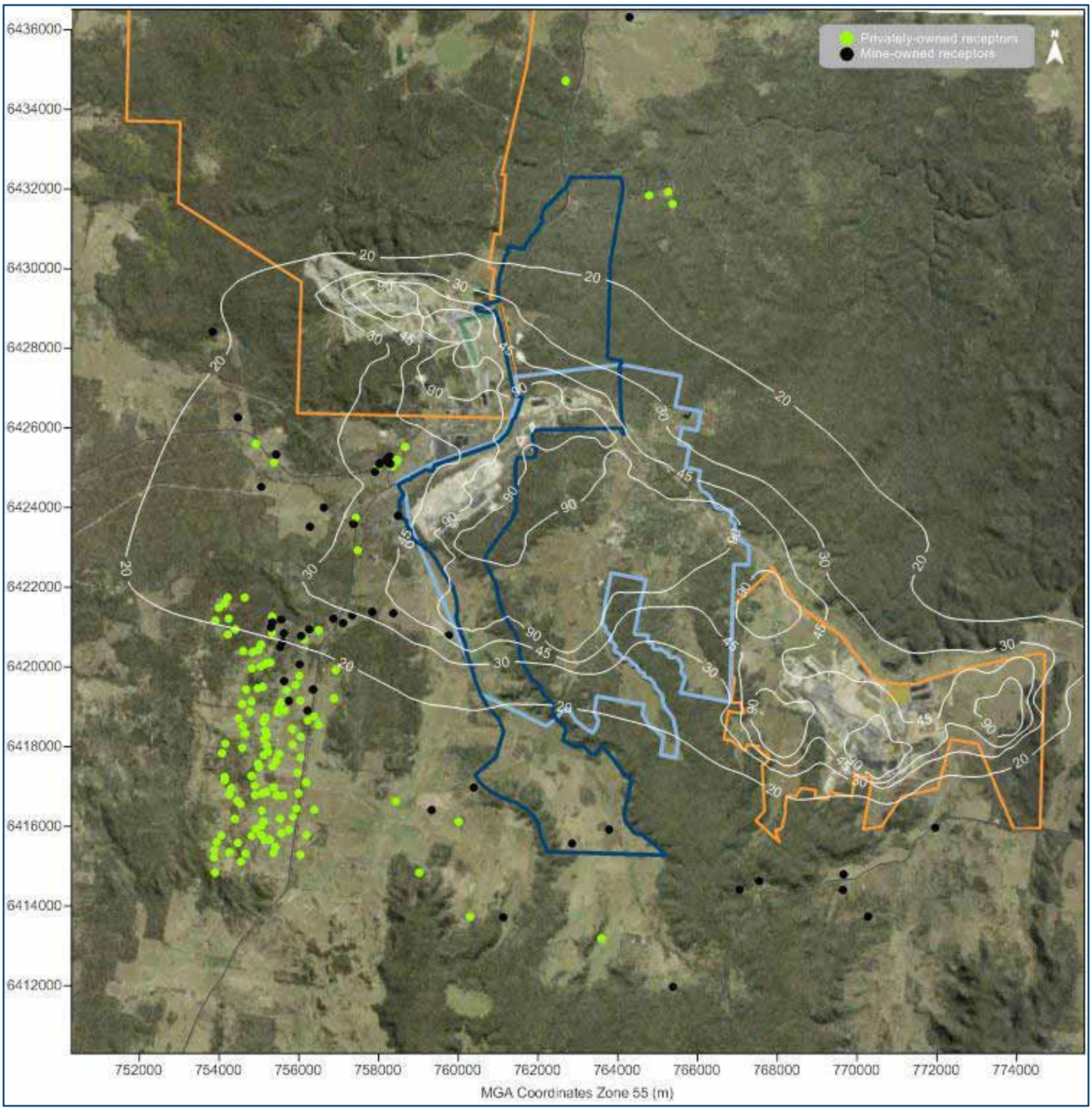

Figure E-25: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Year 11 (µg/m³)

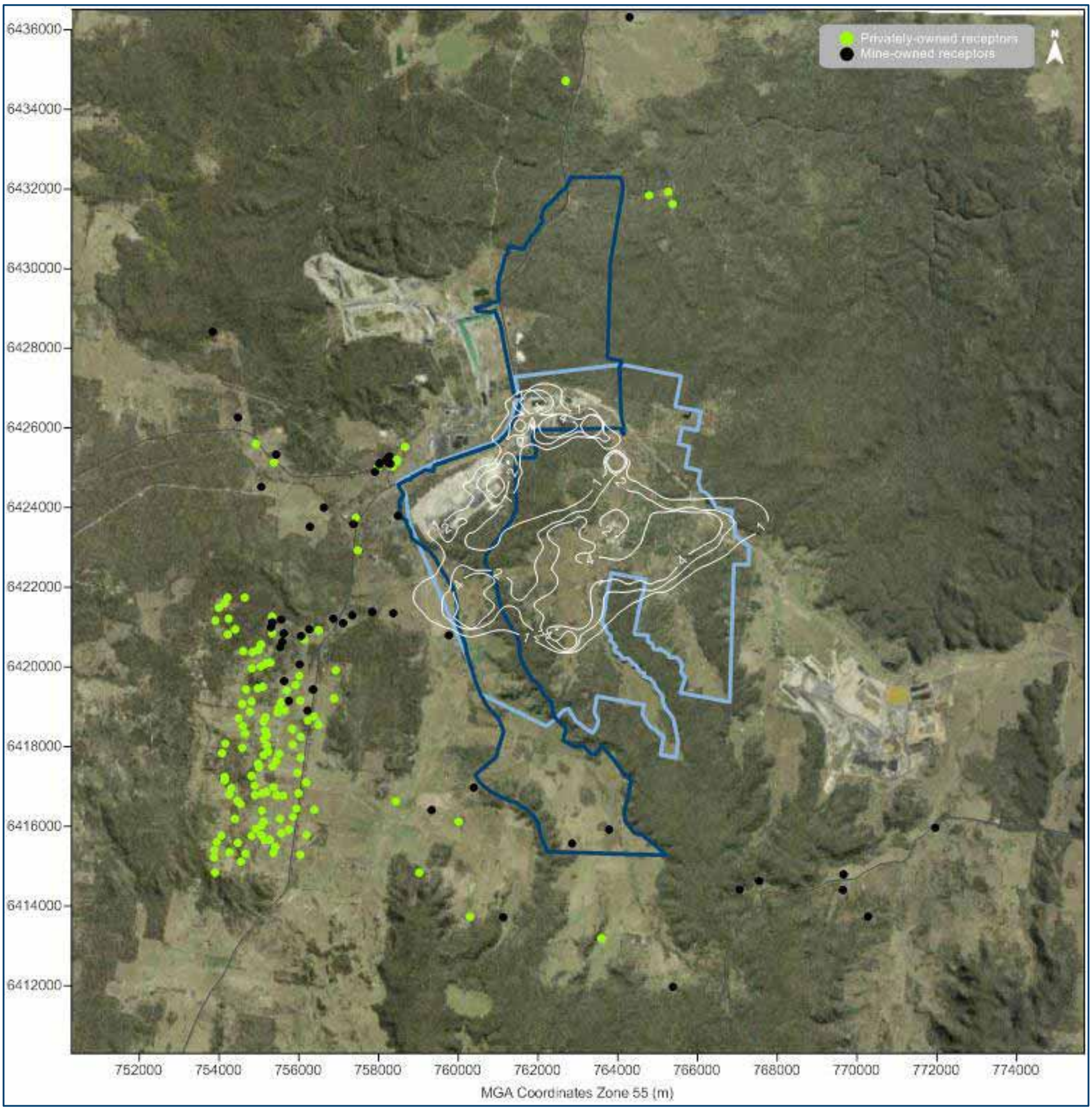

Figure E-26: Predicted annual average dust deposition levels due to emissions from the Project in Year 11 (g/m²/month)

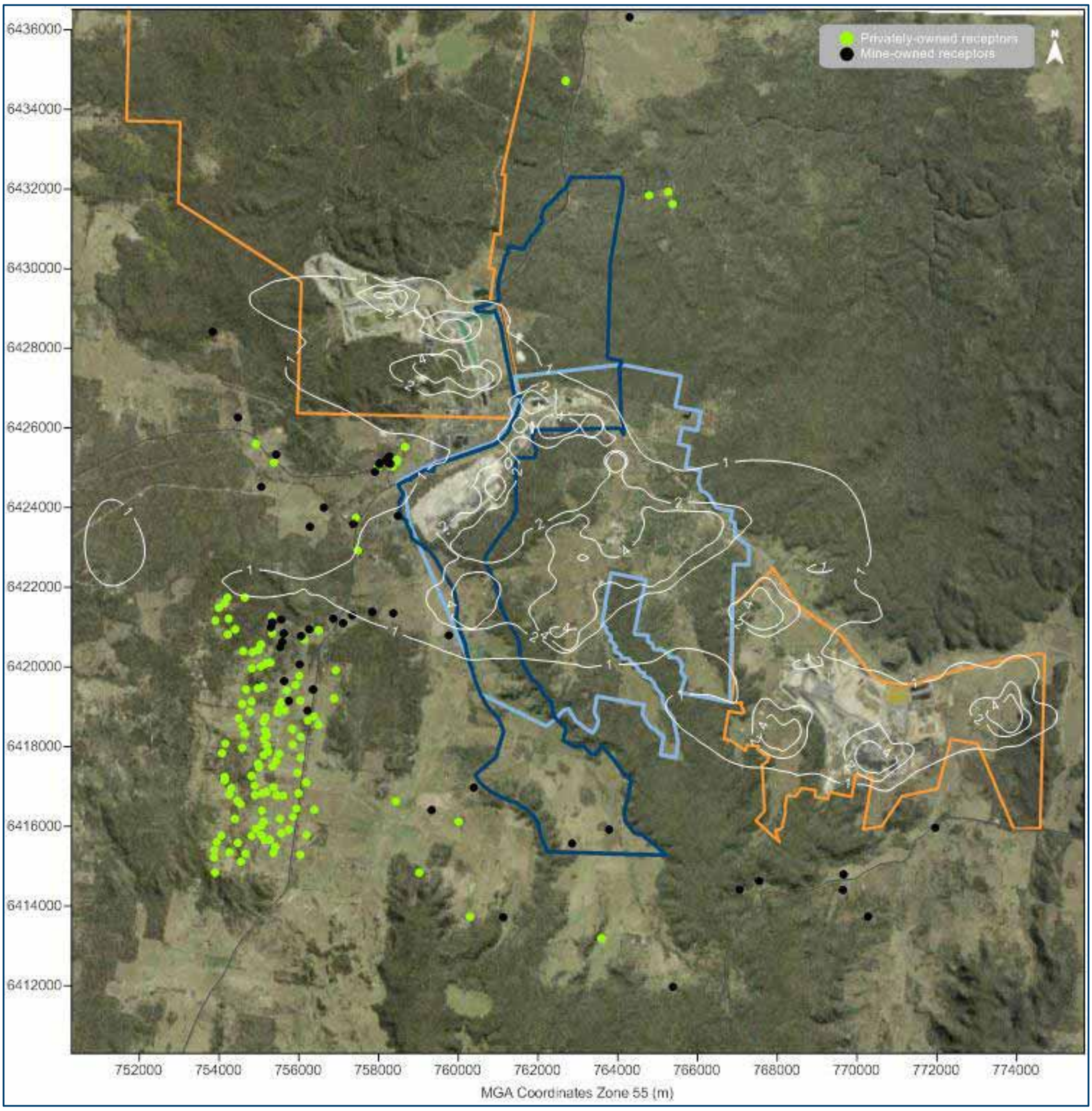

Figure E-27: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Year 11 (g/m²/month)

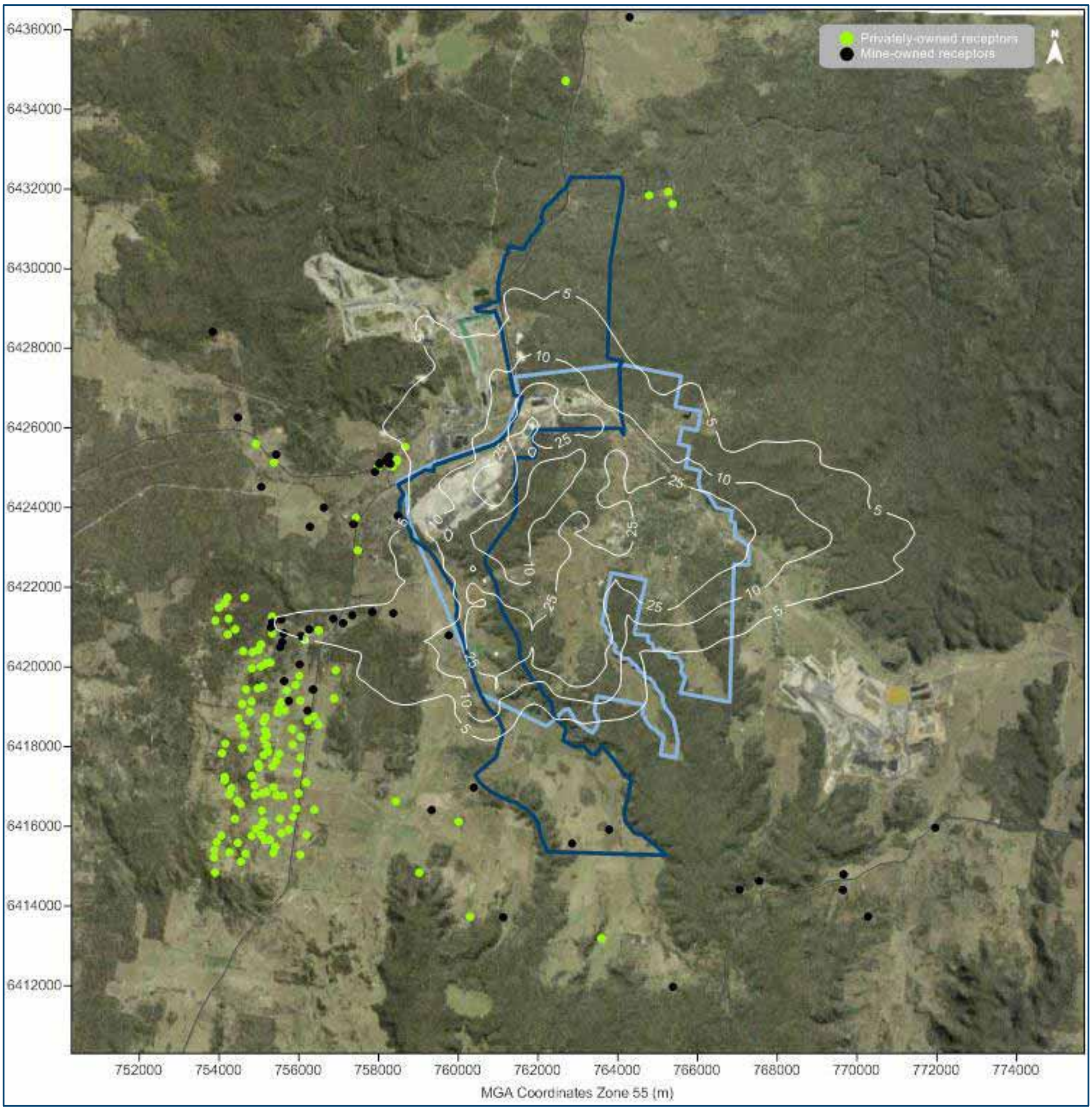

Figure E-28: Predicted maximum 24-hour average $PM_{2.5}$ concentrations due to emissions from the Project in Year 16 (µg/m³)

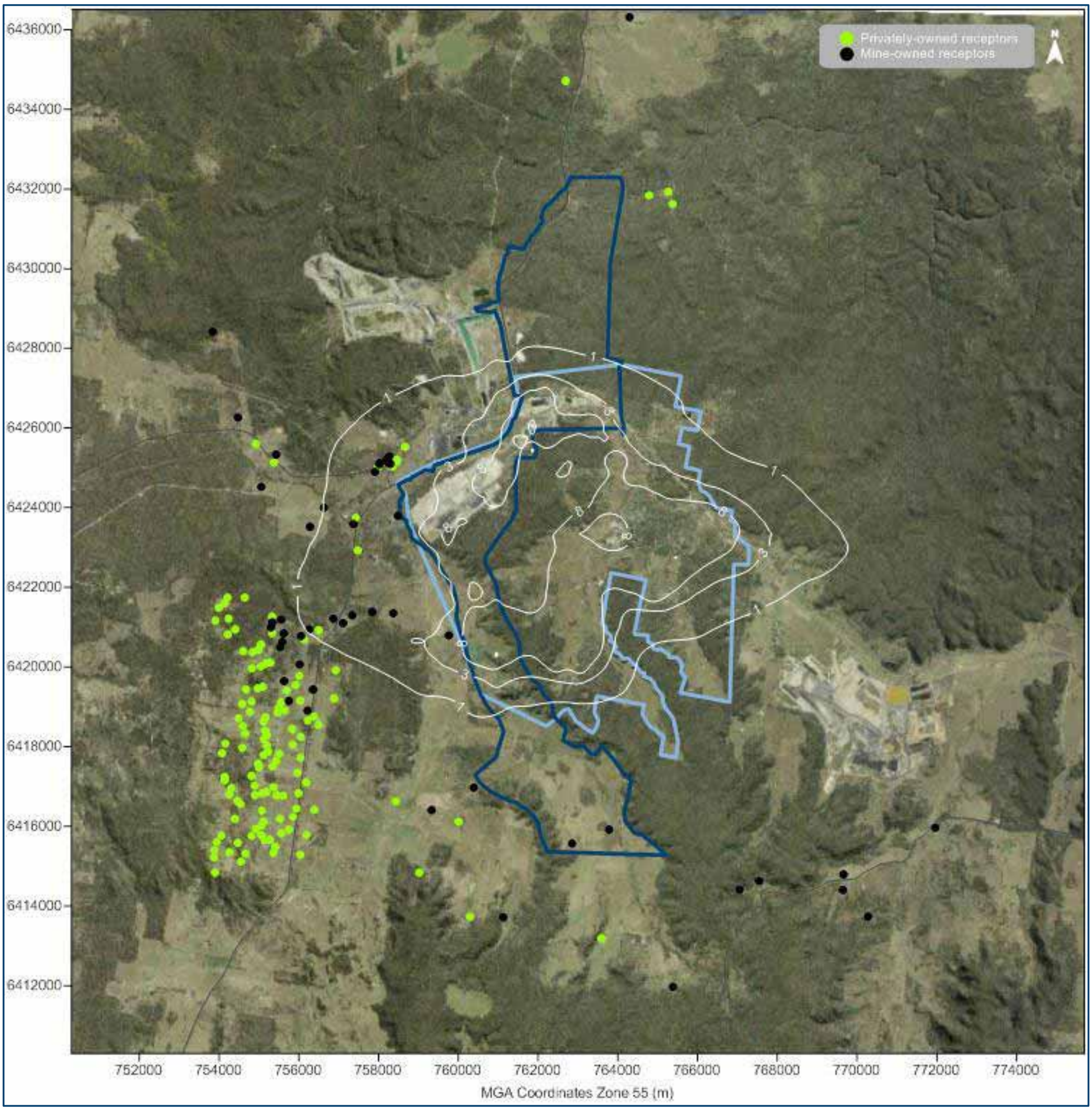

Figure E-29: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Project in Year 16 (µg/m³)

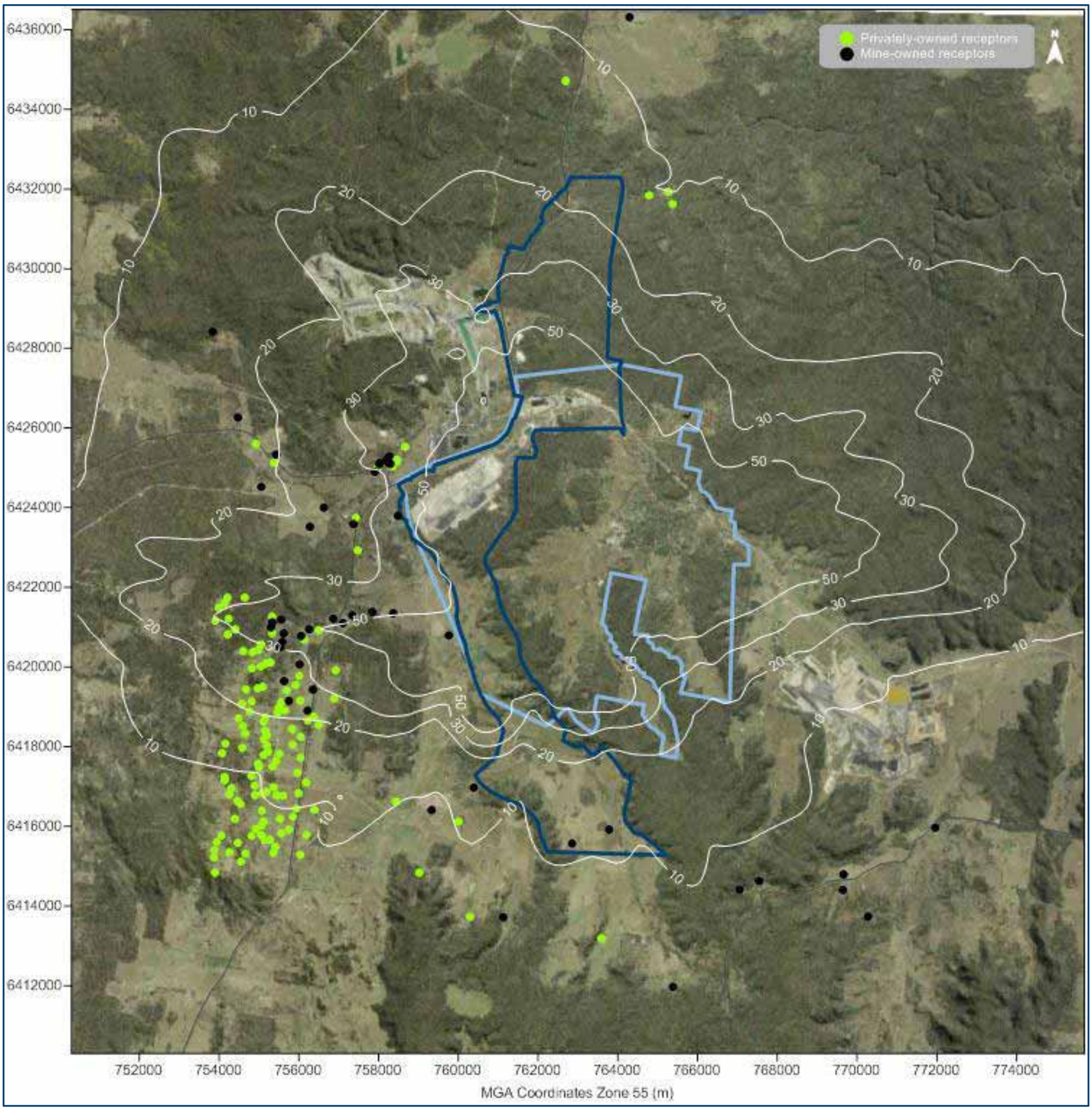

Figure E-30: Predicted maximum 24-hour average PM_{10} concentrations due to emissions from the Project in Year 16 (µg/m³)

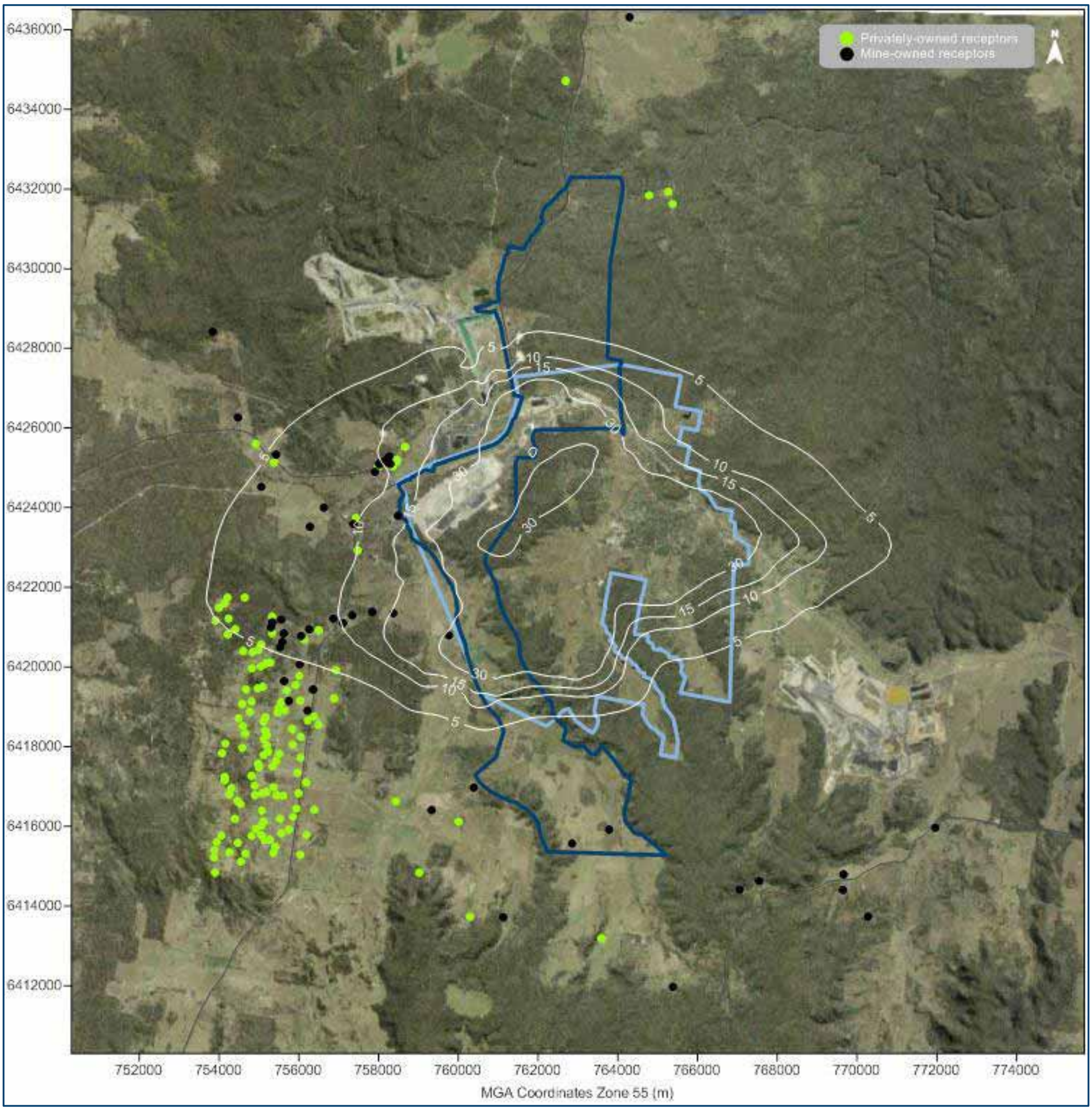

Figure E-31: Predicted annual average PM_{10} concentrations due to emissions from the Project in Year 16 (µg/m³)

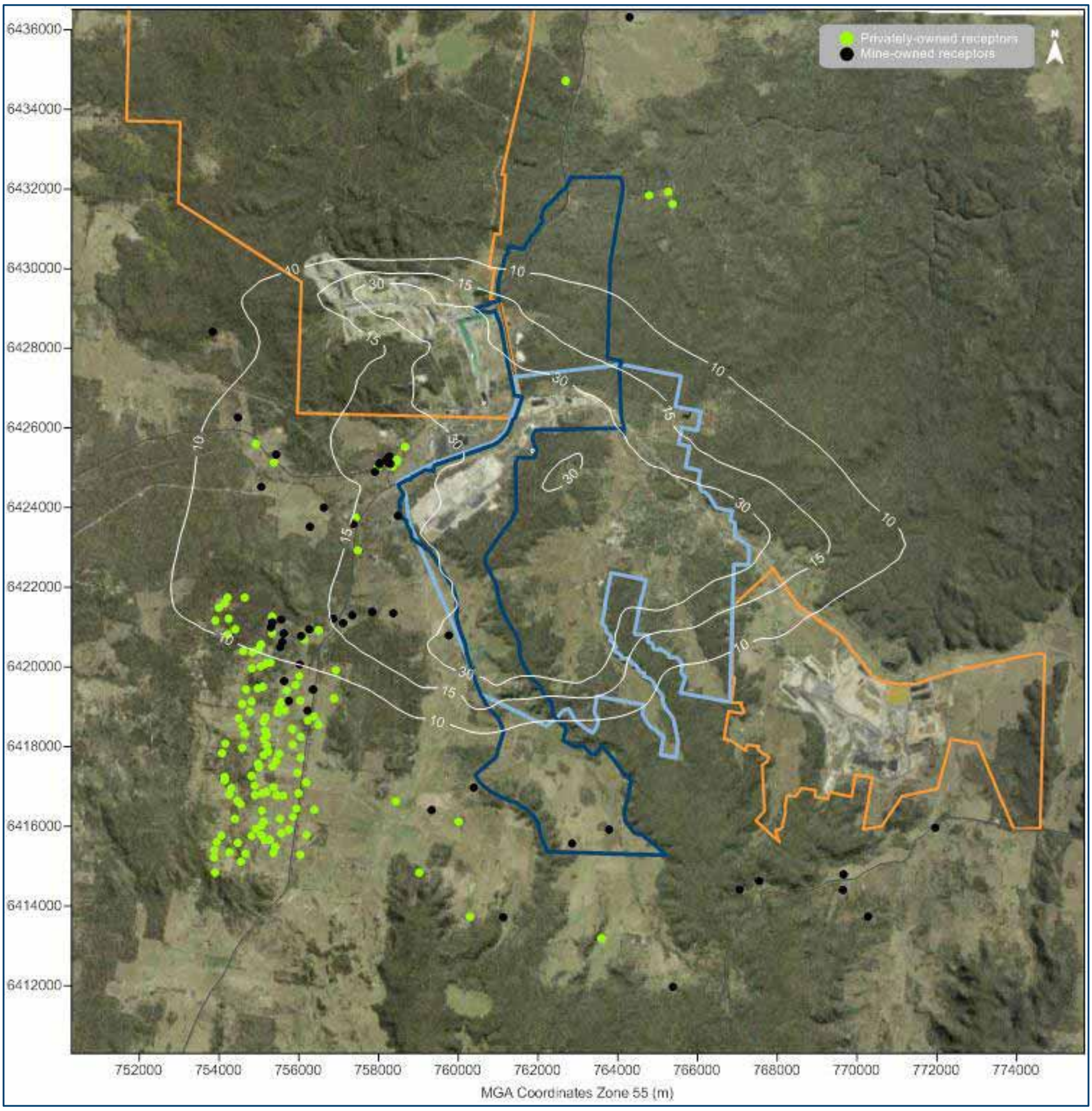

Figure E-32: Predicted annual average PM_{10} concentrations due to emissions from the Project and other sources in Year 16 (µg/m³)

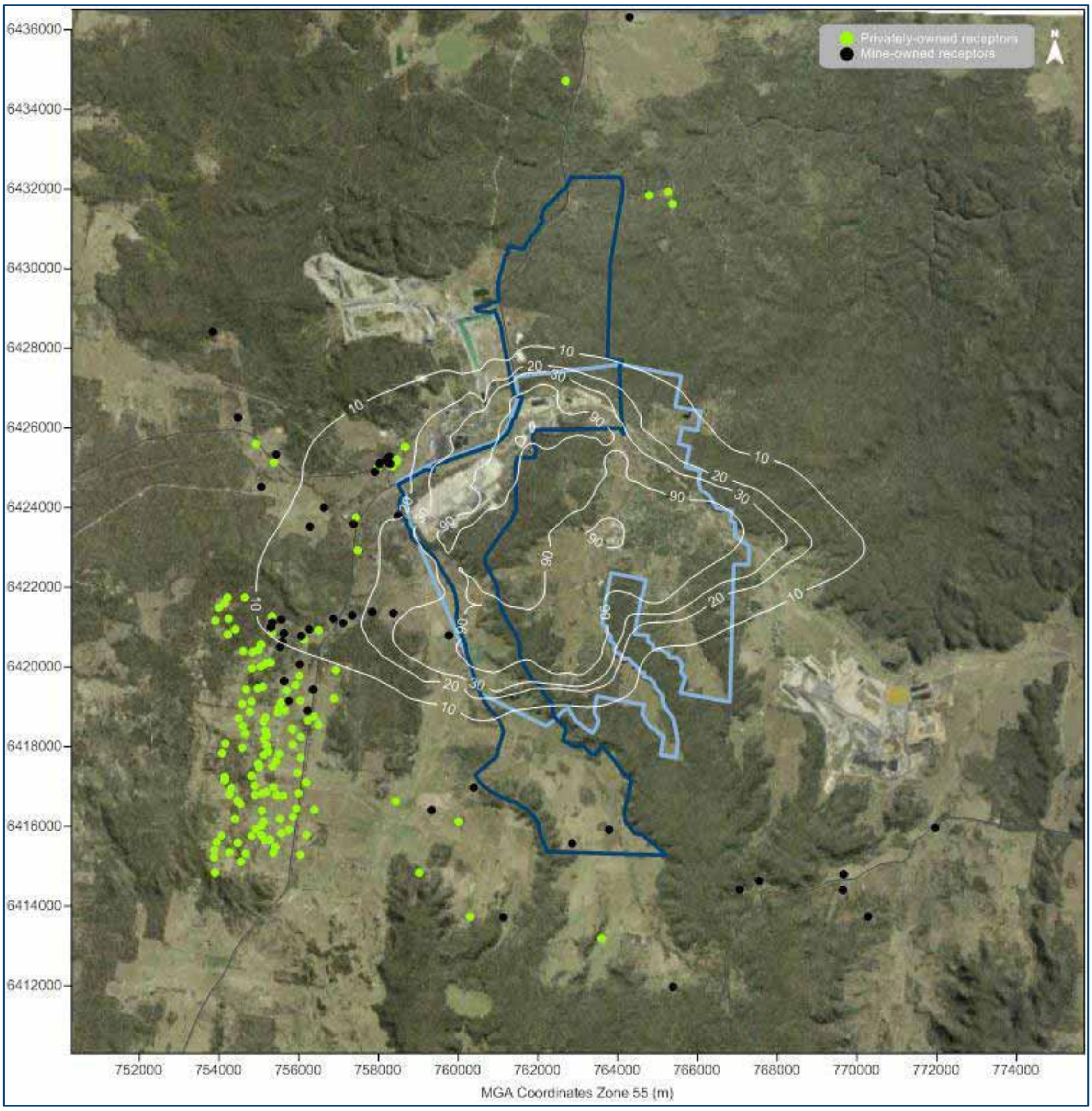

Figure E-33: Predicted annual average TSP concentrations due to emissions from the Project in Year 16 (µg/m³)

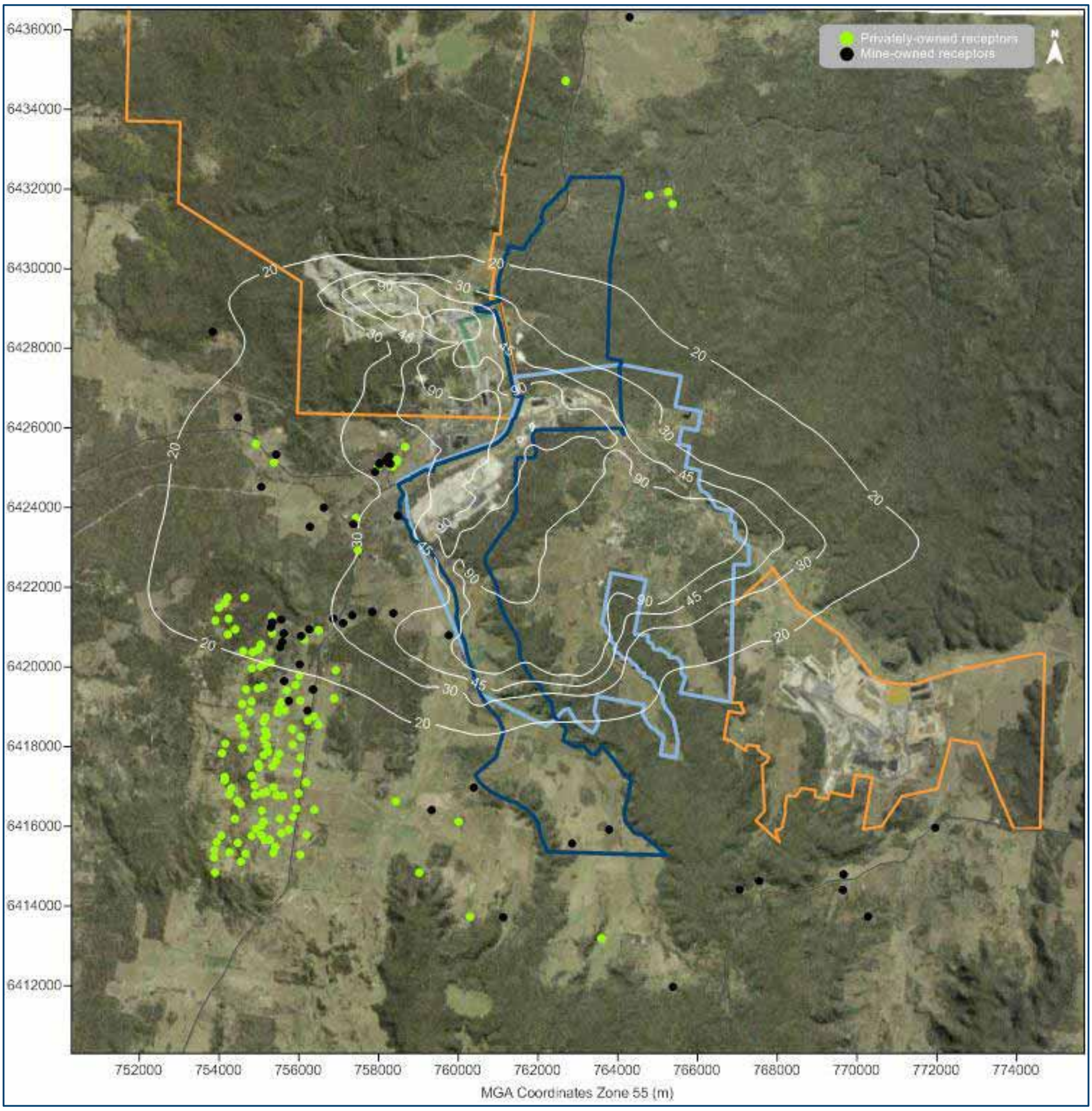

Figure E-34: Predicted annual average TSP concentrations due to emissions from the Project and other sources in Year 16 (µg/m³)

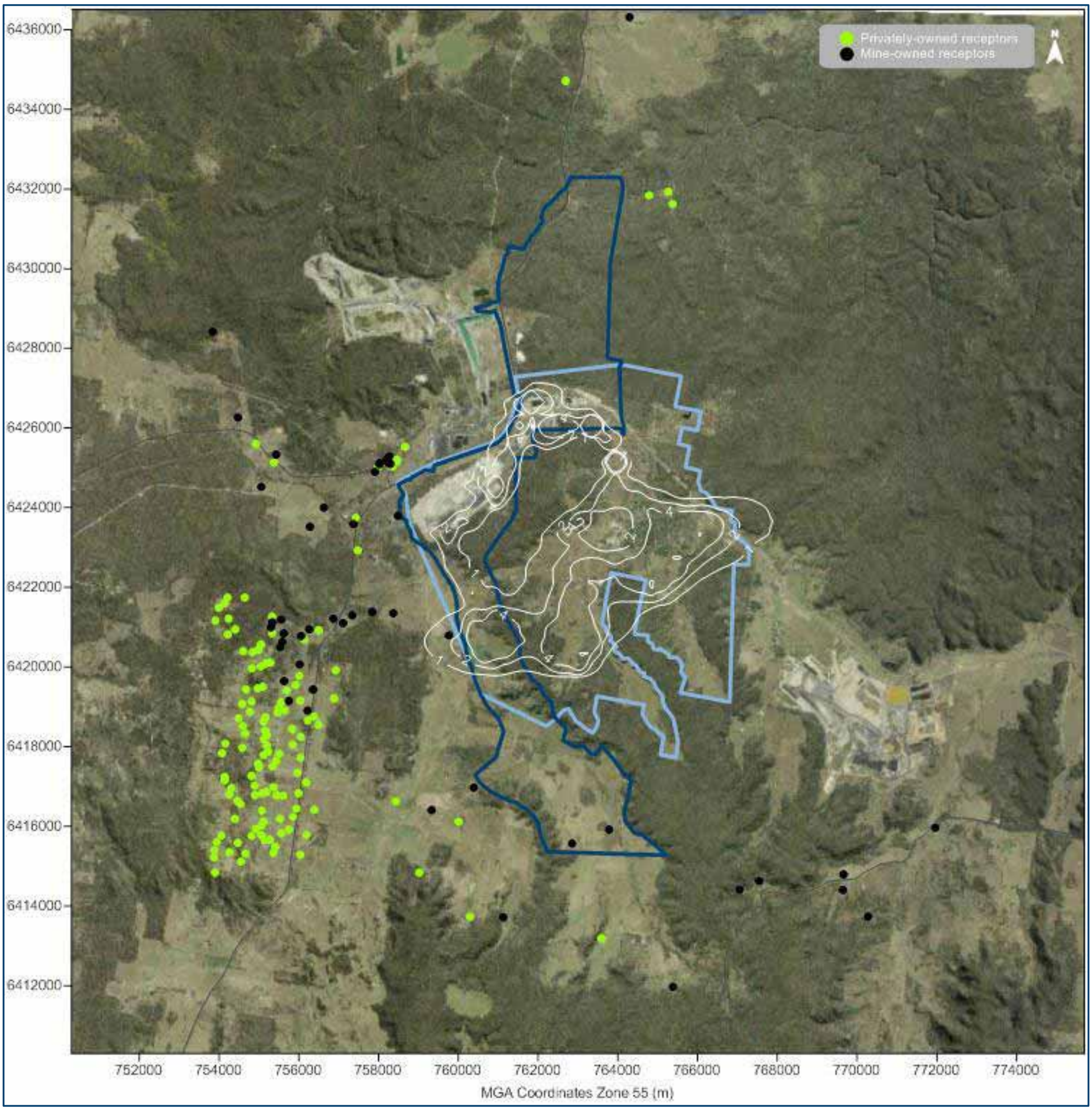

Figure E-35: Predicted annual average dust deposition levels due to emissions from the Project in Year 16 (g/m²/month)

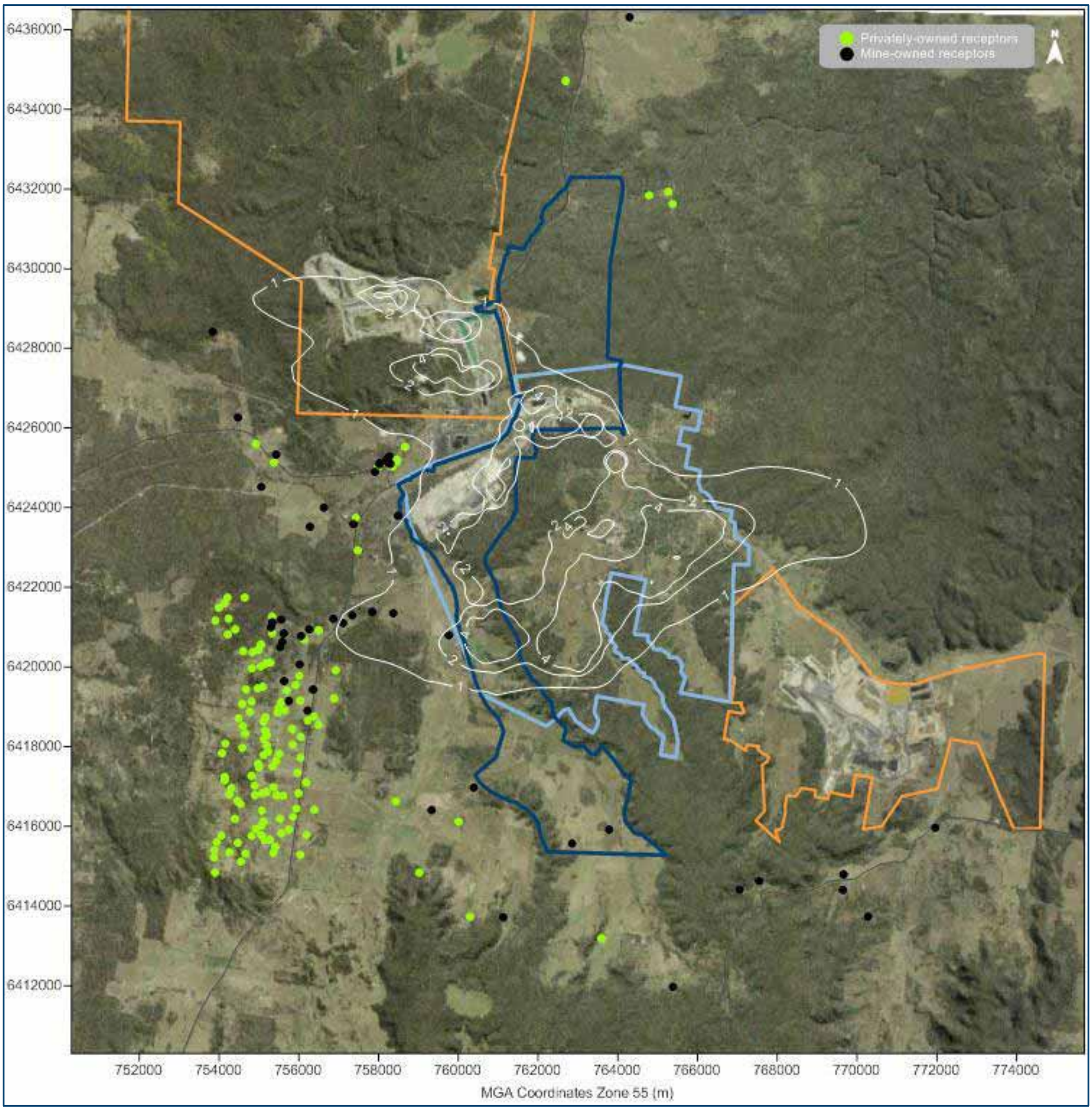

Figure E-36: Predicted annual average dust deposition levels due to emissions from the Project and other sources in Year 16 (g/m²/month)

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Appendix F

Further detail regarding 24-hour PM_{10} analysis

Table F-1: TEOM01 - Year 2

PM_{10} 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
19/09/2011	31.3	-5.2	26.1	21/12/2011	10.8	7.5	18.3
24/09/2011	29.1	-1.8	27.3	5/01/2011	8.2	4.1	12.3
22/10/2011	26.4	-4.8	21.6	1/12/2011	8.2	1.6	9.8
15/11/2011	24.7	-1.3	23.4	10/04/2011	10.4	1.4	11.8
28/06/2011	23.5	-5.6	17.9	10/02/2011	9.8	1.2	11.0
16/11/2011	23.3	-6.9	16.4	2/02/2011	13.8	1.1	14.9
20/11/2011	22.7	0.0	22.7	4/07/2011	8.3	0.8	9.1
4/11/2011	22.4	-6.0	16.4	26/07/2011	7.7	0.8	8.5
5/08/2011	22	-1.9	20.1	6/09/2011	16.6	0.6	17.2
2/06/2011	21.5	-7.9	13.6	18/08/2011	5.5	0.5	6.0

Table F-2: TEOM03 - Year 2

PM_{10} 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
28/06/2011	45.7	-6.5	39.2	6/08/2011	0.0	1.4	1.4
4/04/2011	32.7	-4.3	28.4	3/02/2011	16.7	1.2	17.9
20/05/2011	32.2	-10.4	21.8	10/04/2011	9.0	0.8	9.8
27/06/2011	29.9	-1.2	28.7	4/07/2011	5.6	0.6	6.2
14/07/2011	29.1	-2.5	26.6	30/11/2011	10.3	0.6	10.9
28/01/2011	27.6	-9.8	17.8	6/09/2011	10.0	0.5	10.5
2/06/2011	27	-4.5	22.5	4/12/2011	10.7	0.4	11.1
19/05/2011	26.8	-14.3	12.5	26/07/2011	0.0	0.4	0.4
29/01/2011	26.7	-8.2	18.5	30/05/2011	6.9	0.4	7.3
19/09/2011	26.3	-5.8	20.5	15/05/2011	4.5	0.4	4.9

Table F-3: PM01 - Year 2

PM_{10} 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
8/04/2011	33.4	-8.1	25.3	21/12/2011	ND	9.6	9.6
16/11/2011	27.3	-5.0	22.3	5/01/2011	ND	7.3	7.3
13/07/2011	25	0.0	25.0	10/02/2011	ND	5.9	5.9
25/02/2011	24.5	-6.3	18.2	15/12/2011	ND	5.5	5.5
23/10/2011	23.3	-5.1	18.2	4/01/2011	ND	5.5	5.5
9/03/2011	21.8	-1.3	20.5	1/12/2011	ND	5.2	5.2
26/01/2011	20.4	-5.9	14.5	31/03/2011	ND	3.7	3.7
1/02/2011	18.9	-1.6	17.3	15/03/2011	16.5	3.6	20.1
17/10/2011	18.1	-0.2	17.9	17/11/2011	ND	3.4	3.4
23/09/2011	17.2	-1.8	15.4	19/02/2011	14.2	3.3	17.5

ND - No data

Table F-4: PM02 - Year 2

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
16/11/2011	30	0.162798	30.2	17/10/2011	16.0	1.6	17.6
23/10/2011	23.6	-0.0736	23.5	21/12/2011	ND	1.4	1.4
26/01/2011	21.8	0.028848	21.8	11/11/2011	ND	1.4	1.4
23/09/2011	19.3	0.01275	19.3	27/12/2011	ND	1.3	1.3
1/02/2011	17.5	0.128607	17.6	16/12/2011	13.8	1.2	15.0
4/12/2011	17.4	0.344479	17.7	6/12/2011	ND	1.0	1.0
20/01/2011	16.8	0.078678	16.9	15/12/2011	ND	0.9	0.9
17/10/2011	16	1.632168	17.6	17/11/2011	ND	0.8	0.8
7/02/2011	15.8	0.07709	15.9	4/01/2011	ND	0.8	0.8
2/04/2011	15.2	0.110172	15.3	3/01/2011	ND	0.8	0.8

ND - No data

Table F-5: TEOM01 - Year 6

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
19/09/2011	31.3	-4.8	26.5	25/09/2011	4.2	10.7	14.9
24/09/2011	29.1	-7.6	21.5	13/06/2011	8.3	10.0	18.3
22/10/2011	26.4	-12.0	14.4	28/06/2011	23.5	7.2	30.7
15/11/2011	24.7	-0.2	24.5	30/06/2011	9.8	6.5	16.3
28/06/2011	23.5	7.2	30.7	29/06/2011	9.0	6.4	15.4
16/11/2011	23.3	-5.8	17.5	1/07/2011	13.0	6.1	19.1
20/11/2011	22.7	1.8	24.5	25/04/2011	8.5	5.1	13.6
4/11/2011	22.4	-5.8	16.6	6/01/2011	7.3	5.0	12.3
5/08/2011	22	-4.8	17.2	15/06/2011	7.2	3.8	11.0
2/06/2011	21.5	-8.4	13.1	26/04/2011	5.7	3.2	8.9

Table F-6: TEOM03 - Year 6

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
28/06/2011	45.7	13.1	**58.8**	26/04/2011	7.6	30.8	38.4
4/04/2011	32.7	4.5	37.2	27/04/2011	8.2	29.8	38.0
20/05/2011	32.2	1.4	33.6	22/02/2011	12.2	26.5	38.7
27/06/2011	29.9	1.4	31.3	29/06/2011	9.6	25.4	35.0
14/07/2011	29.1	1.6	30.7	20/03/2011	7.9	24.1	32.0
28/01/2011	27.6	-6.6	21.0	10/01/2011	12.6	23.3	35.9
2/06/2011	27	17.9	44.9	5/04/2011	16.2	23.2	39.4
19/05/2011	26.8	-0.6	26.2	16/04/2011	5.6	21.6	27.2
29/01/2011	26.7	-14.0	12.7	22/08/2011	0.0	21.2	21.2
19/09/2011	26.3	-1.1	25.2	25/09/2011	2.1	20.8	22.9

Table F-7: PM01 - Year 6

PM$_{10}$ 24-hour average (µg/m³)							
Date	**Background**	**Predicted increment**	**Total**	**Date**	**Background**	**Highest predicted increment**	**Total**
8/04/2011	33.4	0.2	33.6	25/09/2011	ND	10.0	10.0
16/11/2011	27.3	-0.1	27.2	28/06/2011	ND	8.9	8.9
13/07/2011	25	0.0	25.0	13/06/2011	10.3	8.1	18.4
25/02/2011	24.5	0.0	24.5	21/12/2011	ND	7.8	7.8
23/10/2011	23.3	0.1	23.4	30/06/2011	ND	7.3	7.3
9/03/2011	21.8	0.3	22.1	29/06/2011	ND	7.2	7.2
26/01/2011	20.4	0.1	20.5	6/01/2011	ND	6.5	6.5
1/02/2011	18.9	1.6	20.5	1/07/2011	7.1	5.9	13.0
17/10/2011	18.1	0.1	18.2	25/04/2011	ND	5.8	5.8
23/09/2011	17.2	0.1	17.3	15/06/2011	ND	5.3	5.3

ND - No data

Table F-8: PM02 - Year 6

PM$_{10}$ 24-hour average (µg/m³)							
Date	**Background**	**Predicted increment**	**Total**	**Date**	**Background**	**Highest predicted increment**	**Total**
16/11/2011	30	3.5	33.5	17/11/2011	ND	23.5	23.5
23/10/2011	23.6	0.4	24.0	15/03/2011	11.3	16.2	27.5
26/01/2011	21.8	1.5	23.3	27/10/2011	ND	16.1	16.1
23/09/2011	19.3	0.1	19.4	10/02/2011	ND	15.8	15.8
1/02/2011	17.5	0.3	17.8	24/12/2011	ND	15.6	15.6
4/12/2011	17.4	4.0	21.4	21/12/2011	ND	15.5	15.5
20/01/2011	16.8	9.9	26.7	25/11/2011	ND	14.6	14.6
17/10/2011	16	10.5	26.5	4/01/2011	ND	14.5	14.5
7/02/2011	15.8	8.3	24.1	15/12/2011	ND	14.1	14.1
2/04/2011	15.2	2.7	17.9	5/01/2011	ND	13.6	13.6

ND - No data

Table F-9: TEOM01 - Year 11

PM$_{10}$ 24-hour average (µg/m³)							
Date	**Background**	**Predicted increment**	**Total**	**Date**	**Background**	**Highest predicted increment**	**Total**
19/09/2011	31/01/1900	-12.8	18.5	27/04/2011	8.5	4.6	13.1
24/09/2011	29/01/1900	-17.5	11.6	26/04/2011	5.7	4.1	9.8
22/10/2011	26/01/1900	-19.0	7.4	20/03/2011	10.9	3.3	14.2
15/11/2011	24/01/1900	-8.4	16.3	19/08/2011	2.3	3.1	5.4
28/06/2011	23/01/1900	-3.8	19.7	25/09/2011	4.2	2.7	6.9
16/11/2011	23/01/1900	-10.4	12.9	13/06/2011	8.3	1.7	10.0
20/11/2011	22/01/1900	-1.5	21.2	21/07/2011	4.1	0.8	4.9
4/11/2011	22/01/1900	-14.2	8.2	29/06/2011	9.0	0.7	9.7
5/08/2011	22/01/1900	-10.9	11.1	26/05/2011	10.2	0.4	10.6
2/06/2011	21/01/1900	-14.7	6.8	10/05/2011	10.0	0.3	10.3

Table F-10: TEOM03 - Year 11

PM10 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
28/06/2011	45.7	3.5	49.2	13/06/2011	2.7	21.7	24.4
4/04/2011	32.7	-0.3	32.4	15/06/2011	4.4	20.9	25.3
20/05/2011	32.2	-4.2	28.0	1/06/2011	10.5	17.9	28.4
27/06/2011	29.9	1.5	31.4	21/08/2011	0.0	17.5	17.5
14/07/2011	29.1	-1.5	27.6	12/06/2011	9.0	17.0	26.0
28/01/2011	27.6	-12.8	14.8	16/04/2011	5.6	15.5	21.1
2/06/2011	27	11.8	38.8	25/09/2011	2.1	15.2	17.3
19/05/2011	26.8	-8.6	18.2	22/08/2011	0.0	15.0	15.0
29/01/2011	26.7	-13.9	12.8	28/04/2011	6.5	13.9	20.4
19/09/2011	26.3	-8.2	18.1	26/04/2011	7.6	12.9	20.5

Table F-11: PM01 - Year 11

PM10 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
8/04/2011	33.4	3.5	36.9	27/04/2011	ND	4.5	4.5
16/11/2011	27.3	0.4	27.7	20/03/2011	ND	3.8	3.8
13/07/2011	25	1.5	26.5	26/04/2011	6.6	2.9	9.5
25/02/2011	24.5	0.1	24.6	25/09/2011	ND	2.8	2.8
23/10/2011	23.3	0.3	23.6	19/08/2011	ND	1.7	1.7
9/03/2011	21.8	4.0	25.8	6/01/2011	ND	1.5	1.5
26/01/2011	20.4	9.9	30.3	29/06/2011	ND	1.4	1.4
1/02/2011	18.9	10.5	29.4	10/05/2011	ND	0.8	0.8
17/10/2011	18.1	8.3	26.4	22/07/2011	ND	0.8	0.8
23/09/2011	17.2	2.7	19.9	6/02/2011	ND	0.7	0.7

ND - No data

Table F-12: PM02 - Year 11

PM10 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
16/11/2011	30	3.1	33.1	17/11/2011	ND	27.9	27.9
23/10/2011	23.6	-0.2	23.4	27/10/2011	ND	19.5	19.5
26/01/2011	21.8	1.1	22.9	15/03/2011	11.3	19.5	30.8
23/09/2011	19.3	0.2	19.5	24/12/2011	ND	19.5	19.5
1/02/2011	17.5	0.2	17.7	4/01/2011	ND	19.4	19.4
4/12/2011	17.4	5.3	22.7	21/12/2011	ND	19.1	19.1
20/01/2011	16.8	12.1	28.9	28/01/2011	ND	18.8	18.8
17/10/2011	16	12.8	28.8	15/12/2011	ND	18.2	18.2
7/02/2011	15.8	11.4	27.2	10/02/2011	ND	18.1	18.1
2/04/2011	15.2	2.5	17.7	5/03/2011	ND	17.0	17.0

ND - No data

Table F-13: TEOM01 - Year 16

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
19/09/2011	31.3	-10.4	20.9	20/03/2011	10.9	3.1	14.0
24/09/2011	29.1	-13.3	15.8	19/08/2011	2.3	1.7	4.0
22/10/2011	26.4	-18.2	8.2	27/04/2011	8.5	1.2	9.7
15/11/2011	24.7	-6.7	18.0	26/04/2011	5.7	0.8	6.5
28/06/2011	23.5	-6.9	16.6	21/07/2011	4.1	0.6	4.7
16/11/2011	23.3	-8.8	14.5	30/10/2011	2.3	0.2	2.5
20/11/2011	22.7	-1.3	21.4	4/05/2011	10.3	0.2	10.5
4/11/2011	22.4	-11.8	10.6	26/05/2011	10.2	0.1	10.3
5/08/2011	22.0	-9.9	12.1	14/05/2011	4.2	0.1	4.3
2/06/2011	21.5	-12.7	8.8	12/07/2011	11.3	0.1	11.4

Table F-14: TEOM03 - Year 16

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
28/06/2011	45.7	2.8	48.5	15/06/2011	4.4	19.4	23.8
4/04/2011	32.7	1.4	34.1	13/06/2011	2.7	18.5	21.2
20/05/2011	32.2	-4.8	27.4	14/06/2011	5.8	16.7	22.5
27/06/2011	29.9	2.0	31.9	12/06/2011	9.0	14.2	23.2
14/07/2011	29.1	-0.1	29.0	1/06/2011	10.5	13.3	23.8
28/01/2011	27.6	-14.0	13.6	16/04/2011	5.6	13.3	18.9
2/06/2011	27.0	9.8	36.8	22/08/2011	0.0	12.9	12.9
19/05/2011	26.8	-8.0	18.8	5/04/2011	16.2	11.4	27.6
29/01/2011	26.7	-15.2	11.5	29/06/2011	9.6	11.0	20.6
19/09/2011	26.3	-7.5	18.8	21/08/2011	0.0	10.1	10.1

Table F-15: PM01 - Year 16

PM$_{10}$ 24-hour average (µg/m³)							
Date	Background	Predicted increment	Total	Date	Background	Highest predicted increment	Total
8/04/2011	33.4	3.1	36.5	20/03/2011	ND	3.6	3.6
16/11/2011	27.3	-0.2	27.1	27/04/2011	ND	1.3	1.3
13/07/2011	25.0	1.1	26.1	19/08/2011	ND	1.1	1.1
25/02/2011	24.5	0.2	24.7	21/07/2011	ND	0.7	0.7
23/10/2011	23.3	0.2	23.5	10/05/2011	ND	0.6	0.6
9/03/2011	21.8	5.3	27.1	15/05/2011	ND	0.3	0.3
26/01/2011	20.4	12.1	32.5	4/05/2011	ND	0.3	0.3
1/02/2011	18.9	12.8	31.7	30/10/2011	ND	0.2	0.2
17/10/2011	18.1	11.4	29.5	20/07/2011	ND	0.2	0.2
23/09/2011	17.2	2.5	19.7	26/05/2011	3.6	0.2	3.8

ND - No data

Table F-16: PM02 - Year 16

PM$_{10}$ 24-hour average (µg/m³)							
Date	**Background**	**Predicted increment**	**Total**	**Date**	**Background**	**Highest predicted increment**	**Total**
16/11/2011	30.0	7.8	37.8	26/10/2011	ND	42.6	42.6
23/10/2011	23.6	-0.3	23.3	27/10/2011	ND	36.9	36.9
26/01/2011	21.8	1.5	23.3	24/11/2011	ND	34.5	34.5
23/09/2011	19.3	0.2	19.5	10/01/2011	ND	33.2	33.2
1/02/2011	17.5	0.1	17.6	11/01/2011	ND	33.1	33.1
4/12/2011	17.4	12.0	29.4	25/11/2011	ND	29.9	29.9
20/01/2011	16.8	22.0	38.8	4/01/2011	ND	29.8	29.8
17/10/2011	16.0	6.7	22.7	14/10/2011	ND	28.0	28.0
7/02/2011	15.8	22.9	38.7	8/01/2011	13.3	27.8	41.1
2/04/2011	15.2	8.4	23.6	16/07/2011	ND	27.7	27.7

ND - No data