CHAPTER 15 – AIR QUALITY

STANMORE ID EXTENSION PTY LTD
ISAAC DOWNS EXTENSION PROJECT

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15. AIR QUALITY

15.1 Introduction

This chapter describes the aspects of the Isaac Downs Extension Project (the Project) that may result in emissions to the atmosphere, outlines how compliance with the air quality objectives for the Project were assessed, identifies potential air quality impacts to sensitive receptors, and provides mitigation measures for potential adverse air quality impacts. Queensland and Australian legislation, policies and guidelines relevant to the Project's assessment and management of air emissions are described in the chapter.

This chapter was developed from a detailed air quality assessment (AQA) completed for the Project by Katestone Environmental Australia Pty Ltd (Katestone). The AQA is provided in **Appendix U**.

Chapter 14 details the Project's greenhouse gas emissions and abatement measures.

15.2 Regulatory Framework

15.2.1 Environmental Protection Act 1994 and Environmental Protection Regulation 2019

The management of Queensland's air environment is addressed under two key pieces of legislation, the overarching *Environmental Protection Act 1994* (EP Act), and the subordinate regulation to the EP Act, the EP Regulation.

The EP Act outlines fundamental principles, objectives, and powers related to environmental regulation, including air quality management. The *Environmental Protection Regulation 2019* (EP Regulation) elaborates how the principles and objectives of the EP Act are to be implemented and enforced. The EP Regulation also defines the environmental objective and performance outcomes for Queensland's air quality environment (Section 15.2.4).

15.2.2 Environmental Protection Policies

The Department of Environment, Tourism, Science, and Innovation (DETSI) under legislation has developed Environmental Protection Policies for Queensland that identify and aim to protect, environmental values of the atmosphere and environment that are conducive to the health and well-being of humans and biological integrity. DETSI's Environmental Protection Policy developed for air quality in Queensland are the *Environmental Protection (Air) Policy 2019* and the *Environmental Protection (Air) Amendment Policy 2024* (Air EPP).

The principal objectives of the Air EPP are to identify the environmental values of the air environment to be enhanced or protected, and to achieve the objective of the EP Act (i.e. ecologically sustainable development).

15.2.3 National Environment Protection Council

The National Environment Protection Council (NEPC) defines the national ambient air quality standards and goals in consultation and with agreement from all Australian State and Territory governments. The current national ambient air quality standards and goals are presented in the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM).

The AAQ NEPM contains, amongst other parameters, standards for particulates and combustion products. Compliance with the AAQ NEPM standards is determined by ambient air quality monitoring undertaken

at locations prescribed by the AAQ NEPM and that are representative of large urban populations. The goal of the AAQ NEPM is to monitor and improve ambient air quality.

15.2.4 Environmental Objective and Performance Outcomes

The Project's environmental objectives and performance outcomes for air quality are based on the requirements of Schedule 8 of the EP Regulation and the terms of reference (ToR) for the Project's environmental impact statement (EIS). Table 15-1 describes where these environmental objectives and performance outcomes are addressed in the EIS.

Table 15-1 Environmental Objective and Performance Outcomes – Air Quality

Requirement	Environmental Objectives and Performance Outcomes	EIS Reference
EP Regulations Terms of Reference	The activity will be operated in a way that protects the environmental values of air.	15.7, 15.8
Performance Outcomes		
1 There is no discharge to air of contaminants that may cause an adverse effect on the environment from the operation of the activity, or		Not applicable
2 All of the following— (a) fugitive emissions of contaminants from storage, handling and processing of materials and transporting materials within the site are prevented or minimised;		15.6, 15.7, 15.8
(b) contingency measures will prevent or minimise adverse effects on the environment from unplanned emissions and shut down and start up emissions of contaminants to air;		15.6, 15.6.3, 15.7, 15.8
(c) releases of contaminants to the atmosphere for dispersion will be managed to prevent or minimise adverse effects on environmental values.		15.6, 15.7, 15.8

15.2.5 EIS Information Guideline

The EIS assessment has been undertaken in accordance with the EIS information guideline – Air[1] . The relevant EIS sections where the requirements of this guideline have been addressed are provided in Table 15-2.

Table 15-2 EIS Information Guidelines – Air Quality

Requirement	EIS Reference
Environmental values	15.5
Meteorology	15.5, 15.5.4
Air environment - existing	15.4, 15.5
Emissions	15.4, 15.6
Objectives	15.3
Modelling	15.4, 15.6
Potential Impacts	15.7

[1] https://www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=5294&name=eis-tm-air-information-guide.pdf

Requirement	EIS Reference
Avoidance and Mitigation Measures	15.6, 15.7, 15.8
Commitments and conditions	15.6, 15.7, 15.8 **Appendix AA**

15.2.6 Impacts to Air Guideline

As a guide for air quality impact assessment in Queensland, DETSI has published the 'Guideline: Application requirements for activities with impacts to air, ESR/2015/1840' (Impacts to Air Guideline)[2]. The Impacts to Air Guideline outlines the information required to be provided for the Project's EIS and to support future approval of the Project's environmental authority (EA). The relevant EIS sections where the requirements of this guideline have been addressed are provided in Table 15-3.

Table 15-3 Impacts to Air Guideline

Requirement	EIS Reference
Relevant environmental law	15.2, 15.3
Environmental values, including sensitive receptors, topography, meteorology and ambient air quality	15.4, 15.5
Potential Impacts, including emissions, potential dust impacts and air dispersion modelling	15.4, 15.6, 15.7
Proposed management practices	15.6, 15.7, 15.8

15.3 Air Quality Objectives

The Air EPP objectives for the Project's key potential air emissions and the Queensland benchmark for dust deposition (amenity / nuisance standard) are presented in Table 15-4, and were used for the Project's AQA presented in Section 3.4 of **Appendix U**.

Table 15-4 Project's Air Quality Objectives

Emission	Environmental value	Averaging period	Air quality objective (µg/m³)	Basis
Total Suspended Particulates (TSP)	Health and wellbeing	1-year	90	Air EPP
PM_{10}	Health and wellbeing	24-hour	50	Air EPP
		1-year	25	Air EPP
$PM_{2.5}$	Health and wellbeing	24-hour	20	Air EPP
		1-year	7	Air EPP

[2] https://www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=1840&name=era-gl-air-impacts.pdf

Emission	Environmental value	Averaging period	Air quality objective (µg/m³)	Basis
Dust Deposition	Amenity / nuisance guideline	Monthly	120 mg/m^2/day*	Impacts to Air Guideline

* = when monitored in accordance with 'AS/NZS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of Particulates – Deposited Matter – Gravimetric method'.

15.4 Air Quality Assessment

15.4.1 Methodology

The Project description, including Project location, is provided in **Chapter 4**, with air quality assessment scenarios, based on the Project description, described below.

The methodology employed for the AQA is detailed in Section 4 of **Appendix U**. In summary, the methodology used for development of the Project's AQA included the following:

- Analysis of the existing environment for the Project area.
- Development of site-specific meteorological data by coupling the prognostic model TAPM (version 4.0.5) (Air Pollution Model) with the diagnostic meteorological model CALMET (version 6.5.0).
- Determination of the two worst-case Project operational scenarios for adoption as modelling years through evaluation of the annual extraction rates of overburden and run-of-mine (ROM) coal, and the mine progression layouts for each year of the Project.
- Calculation of emission rates for dust and particulates as the primary emissions to air of concern generated by the Project, which comprised total suspended particulates (TSP), particulate matter of an aerodynamic diameter of 10 microns or less (PM_{10}), particulate matter of an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and deposited dust.
- Generation of dispersion models for the two worst-case operational scenario years (2029 and 2034) using the CALPUFF dispersion model (version 7.2.1), which is the industry standard and regulated model developed by Earth Tech Inc.
- Modelling and evaluation of cumulative concentrations of the primary emissions to air of concern by adding, where available, ambient background concentrations to the modelled contributions to determine the total cumulative concentrations.
- Discussion about the dispersion model's limitations, uncertainties and conservative assumptions.
- Provision of the modelling results for the primary emissions to air of concern during the two worst-case operation scenario years (2029 and 2034).
- Provision of the modelling results for the primary emissions to air of concern during the two worst-case operation scenario years (2029 and 2034) using additional mitigation measures.
- Professional advice on impact management for the primary emissions to air of concern during mining operations to minimise to an acceptable level or eliminate the risk of exceedances.

15.4.2 Assessment Scenario Selection

The scenarios for air quality assessment were based on the years of peak extraction rates of overburden and ROM coal, and the mine layouts with operations nearest to the closest sensitive receptor (Winchester Downs Homestead, R1).

Project year 2029 was selected as the first worst-case scenario for modelling purposes. Although this year does not represent the maximum quantity of material extraction, it does represent the year when mining operations are closest to the R1 located approximately 1.2 km south of proposed mining activities, and captures operations associated with the southwestern out-of-pit dump (Figure 15-1).

Project year 2034 was selected as the second worst-case scenario for modelling purposes. This year represents peak total material extraction for the Project and maximum overburden extraction from any year. It also represents extensive mining areas covering the length of the Project's disturbance area from north to south with some operations near R1, particularly the southern ROM coal and overburden haul routes (Figure 15-2).

Emissions from 2029 and 2034 are expected to materially greater than emissions associated with the Project's construction or mine closure activities. Therefore, compliance against the relevant air quality objectives in 2029 and 2034 would also demonstrate compliance during construction and closure activities. All other operational mine years either represent lesser material extraction rates or mining operations which are further from the nearest sensitive receptor.

Section 4.3 of **Appendix U** provides additional details on the AQA's scenario selection for the Project.

15.4.3 Emission Rates

The Project's AQA quantitatively assessed emissions for TSP, PM_{10}, $PM_{2.5}$ and deposited dust associated with:

- drilling and blasting
- dozing of ROM coal and overburden
- handling of extracted materials including loading and unloading from vehicles
- haulage of ROM coal to onsite stockpiles and via road-train to the northern boundary of MLA 700084, including return trips
- haulage of overburden to waste dumps, including return trips
- movement of overburden via dragline, specifically characterised as a function of drop height
- grading of haul routes
- wind erosion of exposed surfaces.

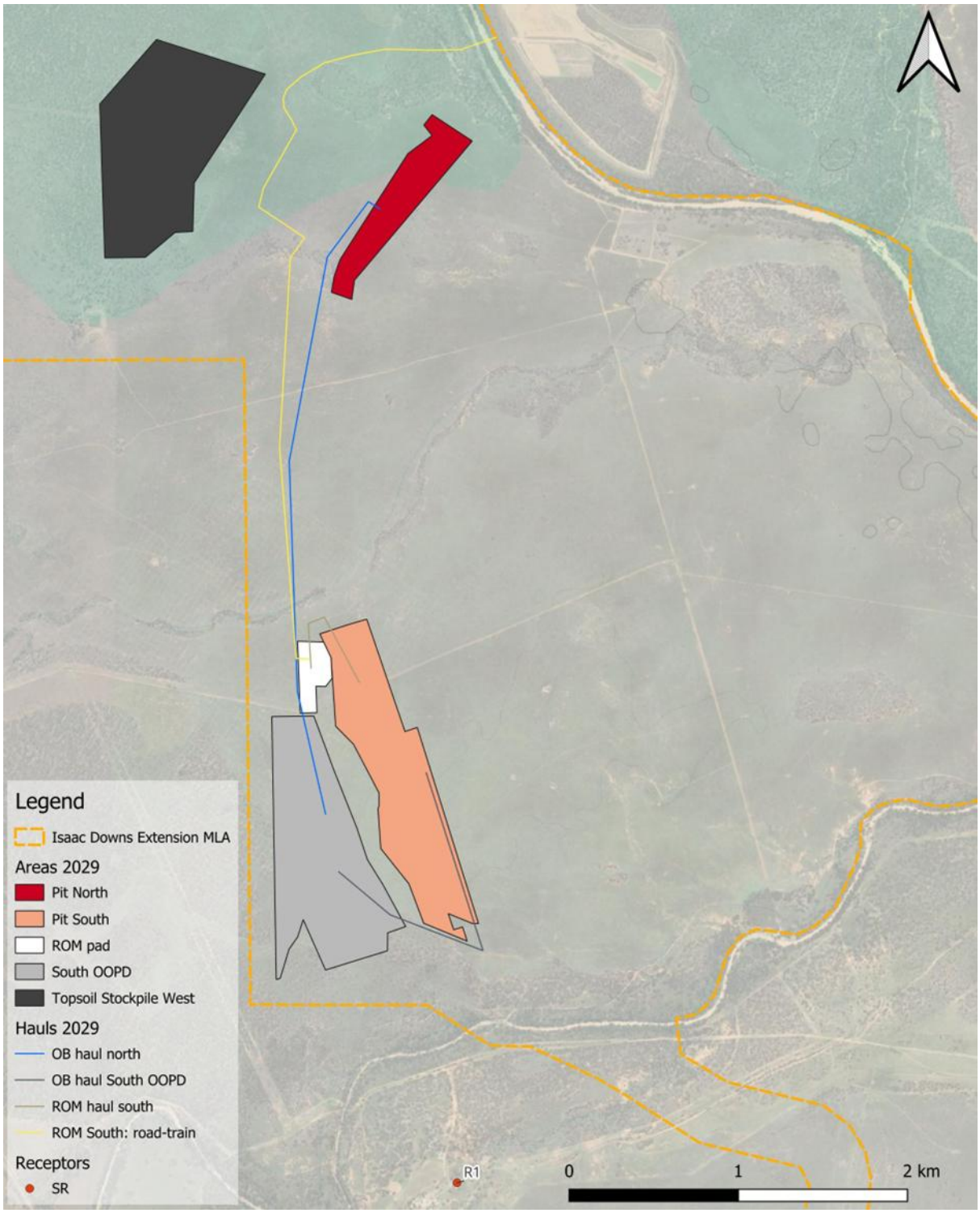
Small quantities of odour and combustion products (nitrogen dioxide, carbon monoxide, and sulphur dioxide) may also be emitted from the Project's vehicles and equipment. However, Katestone considered the emission rates of these substances to be low compared to the emission rates of particulate matter, and therefore, they were expected to have negligible impacts. As a result, these emissions were not evaluated by the Project's AQA.

Further details on the development of the Project's emission rates are provided in Section 4.4 of **Appendix U**.

15.4.4 Dispersion Modelling

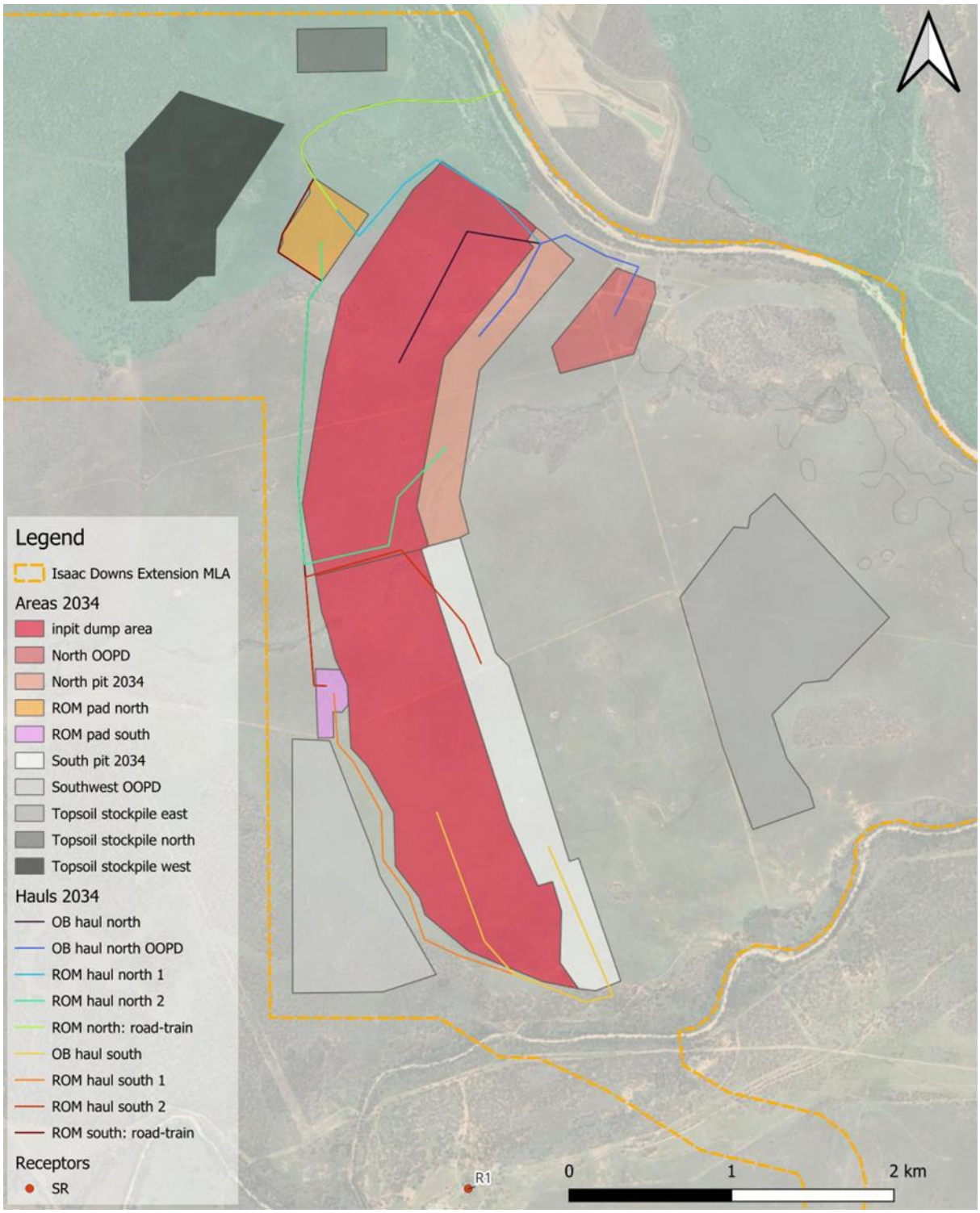
CALPUFF dispersion model (version 7.2.1) was utilised to generate the Project's modelled scenarios for TSP, PM_{10}, $PM_{2.5}$ and deposited dust during 2029 and 2034. CALPUFF is an advanced non-steady-state air quality modelling system and was used to predict ground level particulate concentrations and dust deposition rates at nearby sensitive receptor locations and across a cartesian grid representing the extent of investigations. In summary, air quality impacts for TSP, PM_{10}, $PM_{2.5}$ and dust deposition were predicted across the modelling domain and graphically presented as contour plots and as tabulated concentrations at discrete sensitive receptors. Emissions concentrations were determined for short-term (24-hour) and long-term averaging periods (monthly and annual).

Further information on the Project's dispersion modelling process is provided in Section 4.5 of **Appendix U**.



OB = overburden, OOPD = out of pit dump, ROM = run of mine coal, SR = sensitive receptor

Figure 15-1 2029 Model Scenario – Mine Layout



OB = overburden, OOPD = out of pit dump, ROM = run of mine coal, SR = sensitive receptor

Figure 15-2 2034 Model Scenario – Mine Layout

15.4.5 Cumulative Impacts

For TSP, PM_{10}, $PM_{2.5}$ and dust deposition, the contributions of all modelled sources were combined to investigate the Project's cumulative impacts. As explained in Section 15.4.1, the available ambient background concentrations were added to the modelled contributions to determine the total cumulative concentrations.

The ambient background data for the evaluation of cumulative impacts was sourced by Katestone from the Moranbah monitoring stations operated and maintained by DETSI. Real-time monitoring conducted by Isaac Downs Mine (IDM) and Isaac Plains Mine (IPM) for PM_{10} and $PM_{2.5}$ using beta-attenuation monitors (BAMs) was also reviewed by Katestone (i.e. as active mining operations adjacent and nearby the Project area, respectively).

Katestone evaluated the available air quality monitoring data to determine suitable ambient background concentrations, which were subsequently included cumulatively with modelled predictions as follows:

- 24-hour concentrations: 24-hour ambient background concentrations were added contemporaneously to the model predicted 24-hour model concentrations for PM_{10} and $PM_{2.5}$ to determine the maximum cumulative 24-hour concentration at each sensitive receptor.
- Annual concentrations: annual average ambient background concentrations were added to the annual average predicted model concentrations for TSP, PM_{10}, and $PM_{2.5}$.
- Dust deposition: 12-month rolling average dust deposition rate data from the DETSI Moranbah deposition gauge was added to the maximum monthly annual average model deposition rate.

A full explanation of the development of the Project's cumulative impacts assessment is provided in Section 4.6 of **Appendix U**.

15.4.6 Limitations, Uncertainties and Conservative Assumptions

It is important to note that numerical models are based on an approximation of governing equations and will inherently be associated with some degree of uncertainty. The more complex the physical model, the greater the number of physical processes that must be included. There will be physical processes that are not explicitly accounted for in the model, and as a result, these approximations tend to lead to an over prediction of air emissions levels. The Project's AQA also relies on the accuracy of a number of data sets that feed into the dispersion model, which naturally will have uncertainties associated with them.

The Project's AQA uses a dispersion model that has been configured with conservative assumptions, and therefore, the assessment results are likely to overpredict the potential air quality impacts of the Project.

Further detail on the limitations, uncertainties and conservative assumptions associated with the Project's AQA are provided in Section 4.7 of **Appendix U**.

15.5 Existing Environment

15.5.1 Local Terrain

Figure 15-3 displays the terrain and mining leases (MLs) within the AQA assessment area (45 km by 45 km), including the Project's MLAs. The nearest MLs to the Project include the adjoining IDM ML to the north (ML 700046), Poitrel and Daunia open cut coal mines to the east (ML 4749 and ML 1781, respectively), Winchester South open cut coal mine to the southeast (ML 700049) and Eagle Downs underground coal mine to the south (ML 70389). Daunia, Poitrel and IDM are existing mines with mining at IDM ramping down with the commencement of the Project. Winchester South and Eagle Downs mines are yet to commence operations.

Terrain within the AQA assessment area is largely gently sloping plains approximating 200 m above sea level (asl) interspersed by some elevated areas, particularly to the north rising to approximately 500 m asl and southwest reaching approximately 320 m asl. The Project is located within a flat low area between 200 – 220 m asl. Land-use in the region is predominantly coal mining and low-intensity cattle grazing. A population of approximately 9,500 resides in Moranbah township.

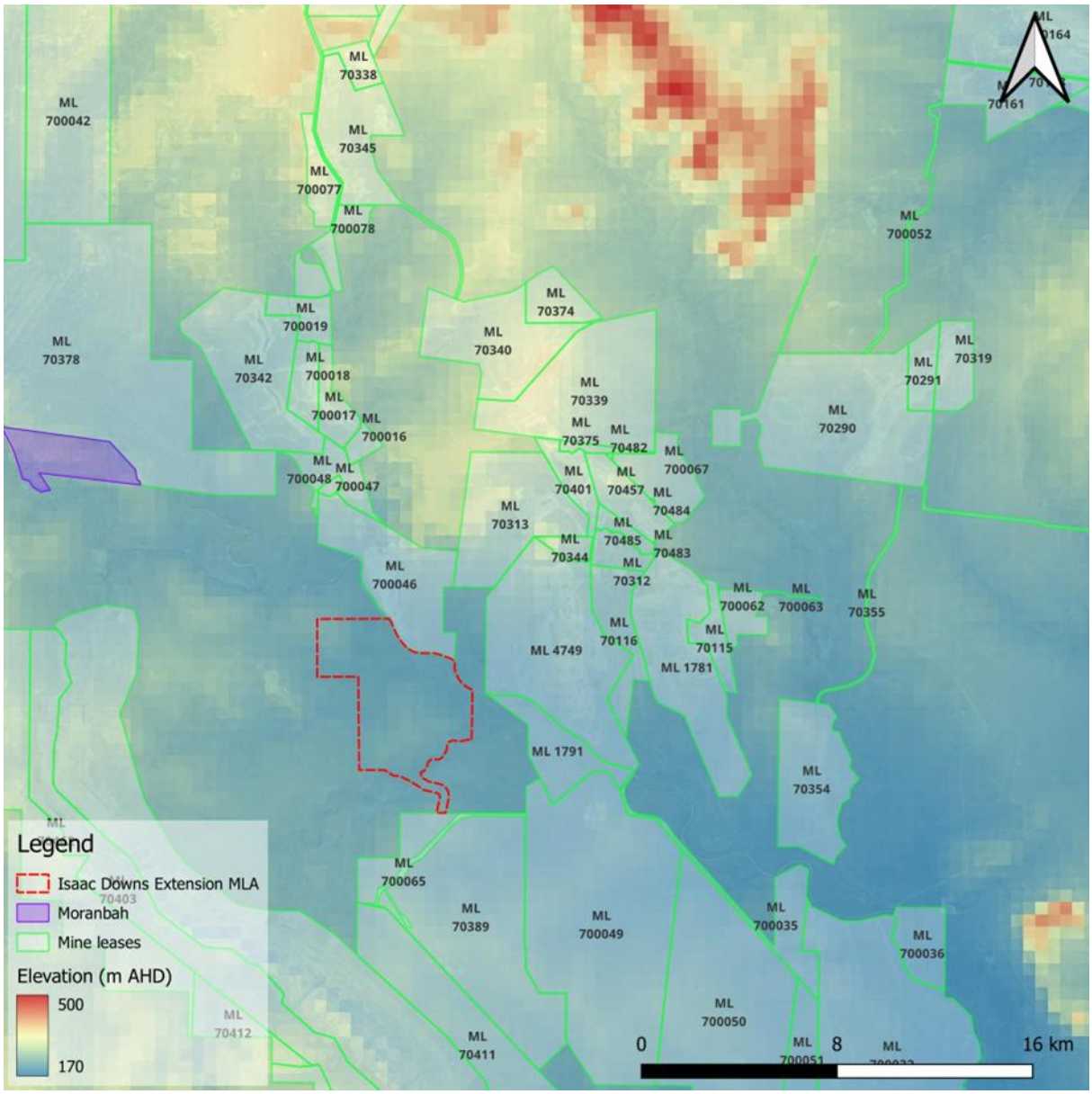


Figure 15-3 Terrain and Mining Leases within the AQA assessment area (CALMET 45 x 45 km)

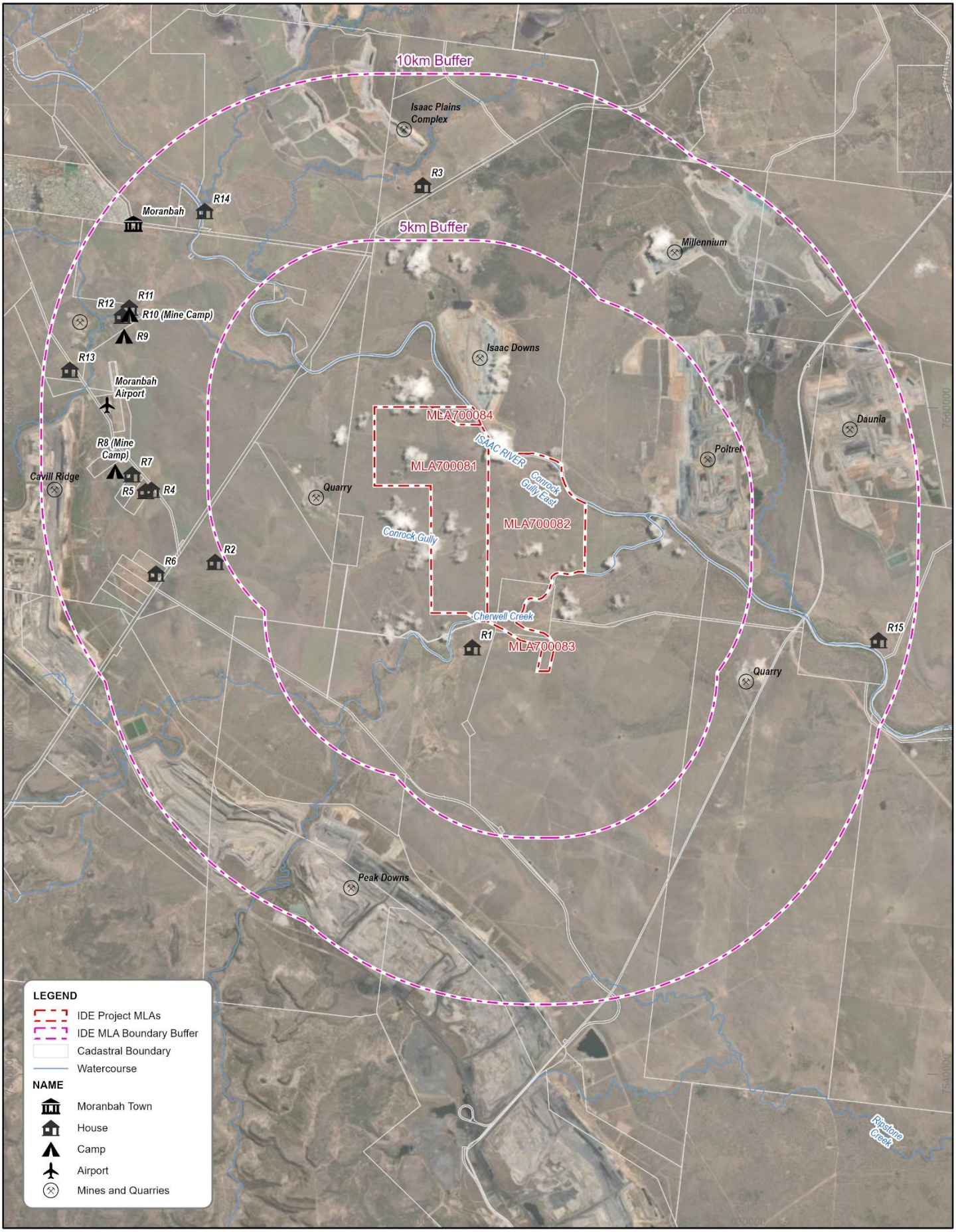
15.5.2 Sensitive Receptors

The Project's locality is sparsely populated with sixteen sensitive receptors located within a 10 km radius, comprising isolated homesteads, camps and a local township. As highlighted in Section 15.4.2, the closest and most significant receptor is Winchester Downs Homestead (R1), 0.8 km south of southern boundary the MLA 700081, and approximately 1.2 km south of proposed mining activities.

The remainder of the identified sensitive receptors are 5-10 km from the Project's boundary. Three sensitive receptors are mine or other camps. The closest town, Moranbah, is located approximately 9.1 km northwest of the Project area, and approximately 10 km northwest of the Project's mining activities. The Project's sensitive receptors are presented in Table 15-5 and Figure 15-4 .

Table 15-5 Sensitive Receptors

Receptor Identification Number	Description	Easting (km)	Northing (km)	Distance and direction from the Project ML boundary
R1	Residential property	621.714	7552.798	0.8 km, S
R2	Residential property	614.001	7555.363	5.3 km, W
R3	Residential property	620.229	7566.672	6.6 km, N
R4	Residential property	612.085	7557.528	6.7 km, W
R5	Residential property	611.915	7557.488	6.8 km, W
R6	Residential property	612.227	7555.014	7.1 km, W
R7	Residential property	611.505	7557.991	7.3 km, W
R10	Mine camp	611.431	7562.793	7.6 km, NW
R8	Mine camp	611.001	7558.082	7.8 km, W
R9	Mine camp	611.266	7562.139	7.8 km, NW
R14	Residential property	613.688	7565.893	7.8 km, NW
R11	Residential property	611.422	7562.992	7.9 km, NW
R12	Residential property	611.215	7562.754	8.0 km, NW
R15	Residential property	633.907	7553.014	9.1 km, E
R0	Moranbah	611.544	7565.526	9.1 km, NW
R13	Residential property	609.640	7561.130	9.2 km, W



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Source:	Minserve/Stanmore
File:	20260223 Sensitive Receptors.aprx

DISCLAIMER: Third party data sources are used in this map compilation. Minserve makes no warranty regarding this data's accuracy or currency.

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ISAAC DOWNS EXTENSION

Sensitive Receptors

Figure | **15-4**

15.5.3 Existing Air Quality

The National Pollution Inventory (NPI) is a public database of annual emissions of 93 substances reported by industries across Australia. Industries exceeding set emission limits for different substances are required to report their emissions to the NPI on an annual basis.

As a component of the Project's AQA, Katestone reviewed the NPI annual emissions reporting database for the reporting period FY2023/2024 and identified 15 industries reporting emissions of particulate matter to air within 25 km of the Project.

In summary, the large number of coal mines within the vicinity of the Project are likely to result in elevated ambient concentrations of dust. In addition, local grazing land will be prone to wind erosion and likely to also contribute to elevated ambient concentrations of dust. Many of these facilities are close to the township of Moranbah where DETSI conducts ambient air quality monitoring.

As explained in Section 15.4.5, Katestone considered the air quality monitoring data from the Moranbah township stations as suitably representative of ambient conditions for the region. Moranbah is also the primary regional residential centre and possesses the greatest concentration of sensitive receptors. DETSI's ambient air quality monitoring conducted at Moranbah East and Moranbah West monitoring stations, as evaluated for the Project's AQA, is described in Section 5.3.2.1 of **Appendix U**.

Stanmore Resources Ltd (Stanmore) conducts monitoring of PM_{10} and $PM_{2.5}$ at two BAM stations located approximately 1 km east of the Moranbah East DETSI air quality monitoring station. These monitoring stations were installed as part of management plans for IDM's and IPM's mining operations. Katestone's evaluation of PM_{10} and $PM_{2.5}$ monitoring data from Stanmore's two BAM stations is detailed in Section 5.3.2.2 of **Appendix U**.

15.5.4 Meteorology

Local meteorology is important for dispersion of air emissions generated by the Project's operation and involves the key parameters of wind speed, wind direction, atmospheric stability and boundary layer mixing height. Conditions in the Project's local area, as derived from the meteorological modelling carried out for the Project's AQA, are discussed in detail in Section 5.5 of **Appendix U**.

Figure 15-5 summarises the wind speed and direction for the Project area between 2020 to 2024. The predicted annual average wind speed at the Project site in 2023 was 2.94 m/s, with winds predominantly coming from the east to southeast. In terms of annual average dispersion of emissions, dispersion can be expected to follow this general pattern, with the greatest impacts occurring downwind of the Project's mining areas under the prevailing wind conditions, which are west to northwest directions. The nearest sensitive receptor, Winchester Downs Homestead (R1), is located to the south of the Project site, and therefore, the majority of winds experienced on an annual basis will beneficially transport fugitive dust emissions from the Project's mining areas away from this receptor.

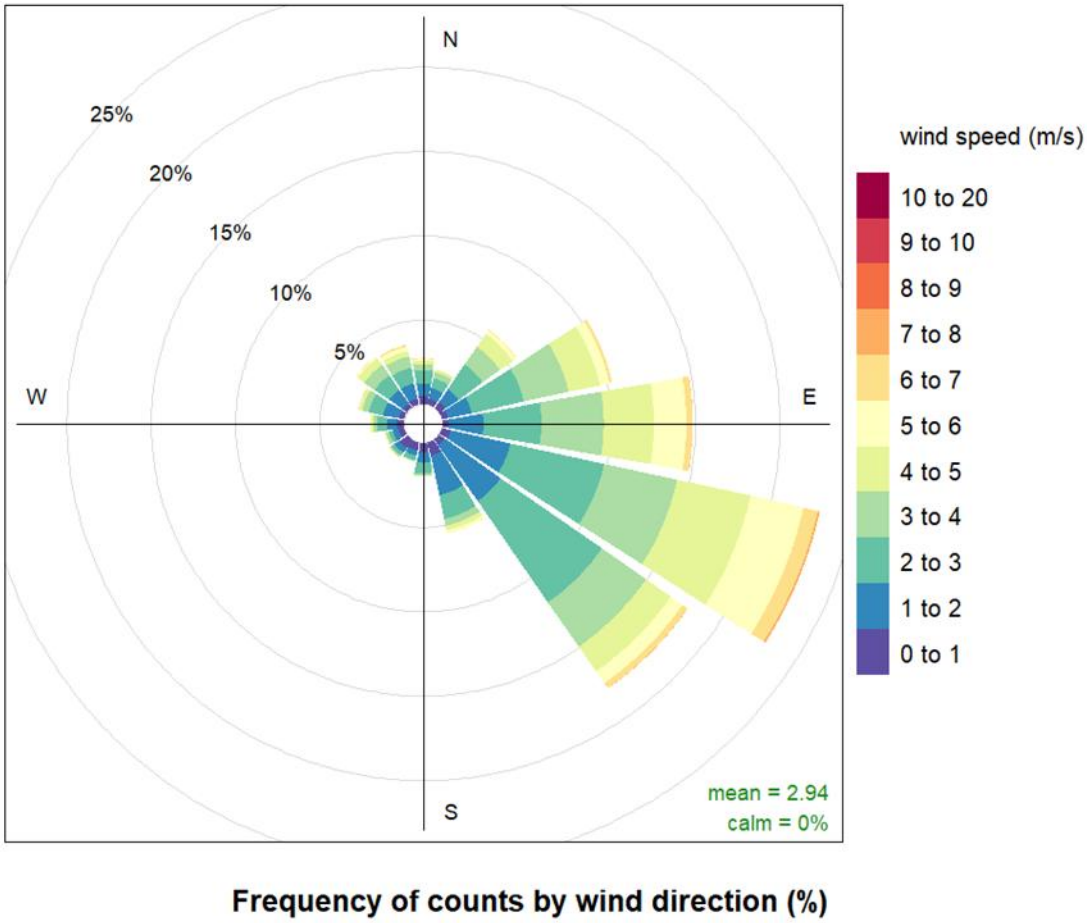

Figure 15-5 Annual Wind Rose for 2020-2024 (Extracted from TAPM/CALMET)

15.6 Emissions to the Air Environment

15.6.1 Routine Mitigation

The Project will have access to a reliable water supply with available water storage options, through the integrated IPC water management system. The Project's water supply is detailed in **Chapter 8**. Routine mitigation will involve operation of a watercart to wet down unpaved haul routes, additional watering and chemical suppressant application during dryer periods, and management of vehicle speeds. The mitigation control efficiencies incorporated in the Project's AQA are summarised in Table 15-6.

Previously mined and waste material dump areas will be progressively rehabilitated to minimise exposed surfaces to wind erosion in accordance with the Project's progressive rehabilitation and closure plan. The assessment has not accounted for the impacts of rehabilitation actions on reducing dust emissions, and therefore, conservatively overestimates emissions.

Routine mitigation measures have been applied to all hours included within the dispersion modelling for the Project's AQA.

Table 15-6 Routine Mitigation Measures

Activity	Mitigation Measure	Control Efficiency	Reference
Wheel generated dust from overburden hauling	Level 2 watering (>2 L/m^2/h) + chemical suppressants + vehicle speed limits	85%	NPI Mining v3.1 Table 4; NSW benchmarking study
Wheel generated dust from ROM coal hauling	Level 2 watering (>2 L/m^2/h) + chemical suppressants + vehicle speed limits	85%	NPI Mining v3.1 Table 4; NSW benchmarking study

15.6.2 Additional Mitigation

Currently, Stanmore operates IPC under IDM's EA EA0002817 and IPM's EA EPML00932713. In accordance with these EAs, Stanmore implements a dust management plan (DMP). The Proponent will expand upon IPC's existing DMP to include the Project, and will comprise real-time monitoring of PM_{10} and $PM_{2.5}$, real-time meteorological monitoring of wind speed and direction, a trigger-action-response-plan (TARP) and complaints handling procedures. A DMP including real-time monitoring and a TARP will assist in managing air quality impacts resulting from the Project's operations. Further details on potential additional mitigation measures are provided in Section 15.8.

In addition to the DMP and potential additional mitigation measures, the Proponent will make all reasonable efforts to enter an into an 'alternative arrangement' with the owners of Winchester Downs Homestead (R1) for amenity. These alternative arrangements would form part of the compensation agreement required with the owners of Winchester Downs for the grant of the MLAs. In accordance with EAs issued for other mining projects, where an 'alternative arrangement' is agreed, a residence would not be considered a sensitive receptor.

15.6.3 Emissions Inventory

The calculation of emission rates for Project mining operations in 2029 and 2034 are detailed in Section 6.3 of **Appendix U**. In summary, emissions were calculated using NPI emission factor calculations in conjunction with operational data provided by IPC's air quality monitoring. Mine layout configurations for 2029 and 2034 are as presented in Figure 15-1 and Figure 15-2, respectively. The calculated emission rates also incorporated the routine mitigation control factors for overburden and ROM coal haulage (Table 15-6).

Emissions associated with construction and commissioning of onsite equipment or worksites, and closure and rehabilitation activities will be insignificant in magnitude compared to the worst-case operational mining emissions. The quantification of dispersion modelling results for the worst-case operational years (2029 and 2034) and the subsequent demonstration of compliance with relevant air quality objectives, indirectly supports, with a high degree of confidence, the compliance of significantly less intensive mining, construction and closure activities. Therefore, emissions for less intensive mining, construction and closure were not quantified by the Project's AQA.

Project activities do not include activities that would result in 'shut down' and 'start up', or 'upset' emissions.

15.7 Air Quality Assessment Results

15.7.1 Routine Mitigation Assessment

Table 15-7 and Table 15-8 provide the Project's predicted ground-level concentrations of TSP, PM_{10}, $PM_{2.5}$, and dust deposition rates at each sensitive receptor for 2029 and 2034, respectively. These results show peak contributions resulting from the Project in isolation and cumulatively with the inclusion of ambient background concentrations.

Importantly, the cumulative results presented for the Project in Table 15-7 and Table 15-8 do not show a constant predicted concentration occurring at all times, but instead represent the single worst-case day, which is dominated by the peak day ambient background concentrations. Cumulative concentrations for the majority of the year are significantly lower than the presented single day peak concentrations.

Contour plates displaying the Project only (isolation) ground-level concentrations for each emission type and averaging period are provided in Section 11 of **Appendix U**.

15.7.1.1 Results Summary – Isolation: Project only for 2029 and 2034

The key findings for the routine mitigation assessment of the Project only for 2029 and 2034 are as follows:

- Predicted maximum monthly average dust deposition rates comply with the guideline of 120 $mg/m^2/day$ at all sensitive receptors.
- Predicted annual average ground-level concentrations of TSP comply with the annual average objective of 90 $\mu g/m^3$ at all sensitive receptors.
- Predicted 24-hour and annual average ground-level concentrations of PM_{10} comply with the relevant air quality objectives at all sensitive receptors.
- Predicted 24-hour and annual average ground-level concentrations of $PM_{2.5}$ comply with the relevant air quality objectives at all sensitive receptors.

15.7.1.2 Results Summary – Cumulative: Project plus Ambient Background for 2029

The key findings for the routine mitigation assessment of the Project plus ambient background (cumulative) for 2029 are as follows:

- Predicted cumulative maximum monthly average dust deposition rates comply with the guideline of 120 $mg/m^2/day$ at all sensitive receptors.
- Predicted cumulative annual average ground-level concentrations of TSP comply with the annual average objective of 90 $\mu g/m^3$ at all sensitive receptors.
- Predicted cumulative 24-hour maximum ground-level concentrations of PM_{10} indicate (Table 15-7 and Table 15-9):
    - Six exceedance days occur due to the ambient background PM_{10}
    - No additional exceedances occur due to the Project at sensitive receptors R3 and R15
    - One additional exceedance day is predicted due to the Project at sensitive receptors Moranbah and R9 – R14
    - Two additional exceedance days are predicted due to the Project at sensitive receptors R4 – R8
    - Three additional exceedance days are predicted due to the Project at sensitive receptor R2
    - Eight additional exceedance days are predicted due to the Project at sensitive receptor R1
    - Contributions from the Project to 24-hour maximum PM_{10} concentrations are at most 63.6% (31.78 $\mu g/m^3$) of the air quality objective of 50 $\mu g/m^3$ at R1. Beyond R1, the Project's contribution reduces to a maximum of 17.1% of the air quality objective.

- Predicted cumulative annual average ground-level concentrations of PM_{10} are predicted to exceed at four sensitive receptors: R1, R2, R10 and R11 (Table 15-7). This result is primarily due to the high ambient background concentration of 23.8 µg/m^3 or 95% of the annual average PM_{10} objective (25 µg/m^3). The Project does not contribute more than 8.3% of the air quality objective at any sensitive receptor (2.07 µg/m^3).
- Predicted cumulative 24-hour maximum ground-level concentrations of $PM_{2.5}$ indicate (Table 15-7 and Table 15-9):
    - Five exceedance days occur due to the ambient background $PM_{2.5}$
    - No additional exceedance days are predicted due to the Project at any sensitive receptor, except for one additional day at R13
    - Contributions from the Project to 24-hour maximum $PM_{2.5}$ concentrations are at most 20.8% (4.17 µg/m^3) of the air quality objective of 20 µg/m^3 at R1. Beyond R1, the Project's contribution reduces to a maximum of 7.8% of the air quality objective.
- Predicted cumulative annual average ground-level concentrations of $PM_{2.5}$ are predicted to exceed at eight sensitive receptors: R1, R2, R4, R10 – R12 and R14 (Table 15-7). This result is primarily due to the high ambient background concentration of 6.8 µg/m^3 or 98% of the annual average $PM_{2.5}$ objective (7 µg/m^3). The Project does not contribute more than 3.9% of the air quality objective at any sensitive receptor (0.27 µg/m^3).

15.7.1.3 Results Summary – Cumulative: Project plus Ambient Background for 2034

The key findings for the routine mitigation assessment of the Project plus ambient background (cumulative) for 2034 are as follows:

- Predicted cumulative maximum monthly average dust deposition rates comply with the guideline of 120 mg/m^2/day at all sensitive receptors.
- Predicted cumulative annual average ground-level concentrations of TSP comply with the annual average objective of 90 µg/m^3 at all sensitive receptors.
- Predicted cumulative 24-hour maximum ground-level concentrations of PM_{10} indicate (Table 15-8 and Table 15-9):
    - Six exceedance days occur due to the ambient background PM_{10}
    - No additional exceedances occur due to the Project at sensitive receptors R3 and R15
    - One additional exceedance day is predicted due to the Project at sensitive receptors Moranbah, R9 – R12 and R14
    - Two additional exceedance days are predicted due to the Project at sensitive receptors R4 – R8 and R13
    - Three additional exceedance days are predicted due to the Project at sensitive receptor R2
    - Eleven additional exceedance days are predicted due to the Project at sensitive receptor R1
    - Contributions from the Project to 24-hour maximum PM_{10} concentrations are at most 68.3% (34.17 µg/m^3) of the air quality objective of 50 µg/m^3 at R1. Beyond R1, the Project's contribution reduces to a maximum of 20.7% of the air quality objective.
- Predicted cumulative annual average ground-level concentrations of PM_{10} are predicted to exceed at ten sensitive receptors: Moranbah, R1, R2, R4, R6, R9 – R12 and R14 (Table 15-8). This result is primarily due to the high ambient background concentration of 23.8 µg/m^3 or 95% of the annual average PM_{10} objective (25 µg/m^3). The Project does not contribute more than 13.8% of the air quality objective at any sensitive receptor (3.46 µg/m^3).
- Predicted cumulative 24-hour maximum ground-level concentrations of $PM_{2.5}$ indicate (Table 15-8 and Table 15-9):
    - Five exceedance days occur due to the ambient background $PM_{2.5}$

  - No additional exceedance days are predicted due to the Project at sensitive receptors Moranbah, R1, R3 – R5, R7 - R8 and R14 - R15
  - One additional exceedance day is predicted due to the Project at sensitive receptors R2, R6, R9, and R10 – R13
  - Contributions from the Project to 24-hour maximum $PM_{2.5}$ concentrations are at most 23.0% (4.61 µg/m^3) of the air quality objective of 20 µg/m^3 at R1. Beyond R1, the Project's contribution reduces to a maximum of 13.7% of the air quality objective.
- Predicted cumulative annual average ground-level concentrations of $PM_{2.5}$ are predicted to exceed at all sensitive receptors, except R3 and R15 (Table 15-8). This result is primarily due to the high ambient background concentration of 6.8 µg/m^3 or 98% of the annual average $PM_{2.5}$ objective (7 µg/m^3). The Project does not contribute more than 6.5% of the air quality objective at any sensitive receptor (0.46 µg/m^3).

Table 15-7 Year 2029 - Model Predicted Ground-level Dust and Particulate Concentrations

Sensitive Receptor	$PM_{2.5}$ (µg/m³)				PM_{10} (µg/m³)				TSP (µg/m³)		Dust Deposition (mg/m²/day)	
	Max. 24 hour $PM_{2.5}$		Annual avg. $PM_{2.5}$		Max. 24 hour PM_{10}		Annual avg. PM_{10}		Annual avg. TSP		Max monthly avg. Dust Deposition	
	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[2]	Project	Project + BG[3]
Moranbah	1.55	44.22	0.20	7.04	8.54	96.59	1.17	24.96	1.32	48.91	3.47	60.97
R1	4.17	44.15	0.27	7.12	31.78	96.22	2.07	25.87	3.95	51.54	22.97	80.47
R2	1.19	44.15	0.22	7.07	7.07	96.22	1.46	25.25	1.96	49.55	4.94	62.44
R3	0.50	44.15	0.01	6.86	3.13	96.23	0.06	23.85	0.08	47.66	0.21	57.71
R4	0.79	44.15	0.15	7.00	4.29	96.22	0.94	24.73	1.22	48.81	2.46	59.96
R5	0.75	44.15	0.15	6.99	4.05	96.22	0.91	24.70	1.18	48.77	2.37	59.87
R6	0.97	44.15	0.16	7.00	5.22	96.22	0.97	24.76	1.26	48.85	3.04	60.54
R7	0.72	44.15	0.13	6.98	4.02	96.22	0.82	24.61	1.07	48.66	2.16	59.66
R8	0.63	44.15	0.12	6.97	3.69	96.22	0.74	24.53	0.97	48.55	1.97	59.47
R9	1.06	44.15	0.18	7.03	6.23	96.22	1.12	24.91	1.39	48.98	2.85	60.35
R10	0.99	44.16	0.21	7.05	5.10	96.26	1.27	25.06	1.55	49.14	2.99	60.49
R11	0.96	44.16	0.21	7.06	5.68	96.28	1.30	25.10	1.58	49.17	3.02	60.52
R12	0.97	44.16	0.20	7.04	4.93	96.25	1.20	25.00	1.47	49.06	2.87	60.37
R13	0.62	44.15	0.12	6.97	2.85	96.22	0.73	24.52	0.94	48.52	2.22	59.72
R14	1.27	44.56	0.18	7.02	7.20	98.04	1.02	24.81	1.11	48.70	1.48	58.98
R15	0.88	44.15	0.03	6.87	4.81	96.22	0.14	23.93	0.16	47.74	0.33	57.83

Sensitive Receptor	$PM_{2.5}$ (µg/m^3)				PM_{10} (µg/m^3)				TSP (µg/m^3)		Dust Deposition (mg/m^2/day)	
	Max. 24 hour $PM_{2.5}$		Annual avg. $PM_{2.5}$		Max. 24 hour PM_{10}		Annual avg. PM_{10}		Annual avg. TSP		Max monthly avg. Dust Deposition	
	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[2]	Project	Project + BG[3]
Background:	**44.15**		**6.85**		**96.22**		**23.79**		**47.6**		**57.50**	
Objective:	**20**		**7**		**50**		**25**		**90**		**120**	

Table notes:
[1] Results represent the maximum 24-hour concentration from the contemporaneous addition of model predicted concentrations with ambient background concentrations from the Moranbah East DETSI monitoring station. Peak ambient background days and peak model predicted concentrations do not always occur on the same day. The Project columns show peak contributions from the Project which demonstrate the majority of the peak cumulative result is attributable to the background.
[2] Results present the annual average model predicted concentration with the addition of the annual average monitored concentration at the Moranbah East DETSI monitoring station.
[3] Results present the annual maximum of monthly average dust deposition rates with addition of the 12-month rolling average dust deposition rate monitored between December 2020 and November 2021 as measured by DETSI at Moranbah East.
Abbreviations: BG = background, Max. = maximum, avg. = average.

Table 15-8 Year 2034 - Model Predicted Ground-level Dust and Particulate Concentrations

Sensitive Receptor	$PM_{2.5}$ (µg/m³)				PM_{10} (µg/m³)				TSP (µg/m³)		Dust Deposition (mg/m²/day)	
	Max. 24 hour $PM_{2.5}$		Annual avg. $PM_{2.5}$		Max. 24 hour PM_{10}		Annual avg. PM_{10}		Annual avg. TSP		Max monthly avg. Dust Deposition	
	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[2]	Project	Project + BG[3]
Moranbah	2.54	44.24	0.32	7.17	9.87	96.71	1.89	25.68	2.17	49.75	6.13	63.63
R1	4.61	44.15	0.46	7.30	34.17	96.22	3.46	27.25	6.53	54.12	30.12	87.62
R2	2.14	44.15	0.31	7.15	9.39	96.22	1.85	25.65	2.41	49.99	6.81	64.31
R3	0.72	44.16	0.02	6.86	4.33	96.25	0.10	23.90	0.13	47.72	0.33	57.83
R4	1.11	44.15	0.21	7.06	4.46	96.22	1.22	25.02	1.58	49.16	3.31	60.81
R5	1.08	44.15	0.21	7.05	4.60	96.22	1.18	24.98	1.52	49.11	3.19	60.69
R6	1.42	44.15	0.22	7.06	6.40	96.22	1.26	25.06	1.60	49.19	4.10	61.60
R7	1.02	44.15	0.19	7.04	4.10	96.22	1.08	24.88	1.40	48.99	3.07	60.57
R8	0.97	44.15	0.18	7.02	3.91	96.22	0.99	24.78	1.28	48.86	2.81	60.31
R9	1.62	44.15	0.26	7.11	6.79	96.22	1.50	25.30	1.89	49.48	4.22	61.72
R10	2.12	44.16	0.30	7.14	8.37	96.25	1.73	25.53	2.14	49.73	4.61	62.11
R11	2.24	44.16	0.31	7.15	8.88	96.26	1.79	25.58	2.20	49.78	4.73	62.23
R12	1.94	44.16	0.29	7.13	7.67	96.24	1.64	25.43	2.03	49.62	4.37	61.87
R13	1.15	44.15	0.18	7.03	4.53	96.22	1.00	24.79	1.27	48.86	2.94	60.44
R14	2.74	45.00	0.29	7.13	10.34	99.66	1.71	25.50	1.91	49.50	3.75	61.25
R15	1.64	44.15	0.05	6.89	9.10	96.22	0.24	24.03	0.27	47.86	0.55	58.05

Sensitive Receptor	$PM_{2.5}$ (µg/m^3)				PM_{10} (µg/m^3)				TSP (µg/m^3)		Dust Deposition (mg/m^2/day)	
	Max. 24 hour $PM_{2.5}$		Annual avg. $PM_{2.5}$		Max. 24 hour PM_{10}		Annual avg. PM_{10}		Annual avg. TSP		Max monthly avg. Dust Deposition	
	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[1]	Project	Project + BG[2]	Project	Project + BG[2]	Project	Project + BG[3]
Background:	**44.15**		**6.85**		**96.22**		**23.79**		**47.6**		**57.50**	
Objective:	**20**		**7**		**50**		**25**		**90**		**120**	

Table notes:
[1] Results represent the maximum 24-hour concentration from the contemporaneous addition of model predicted concentrations with ambient background concentrations from the Moranbah East DETSI monitoring station. Peak ambient background days and peak model predicted concentrations do not always occur on the same day. The Project columns show peak contributions from the Project which demonstrate the majority of the peak cumulative result is attributable to the background.
[2] Results present the annual average model predicted concentration with the addition of the annual average monitored concentration at the Moranbah East DETSI monitoring station.
[3] Results present the annual maximum of monthly average dust deposition rates with addition of the 12-month rolling average dust deposition rate monitored between December 2020 and November 2021 as measured by DETSI at Moranbah East.
Abbreviations: BG = background, Max. = maximum, avg. = average.

15.7.2 Additional Mitigation Assessment

For the Project to achieve compliance with the 24-hour and annual average concentrations of PM_{10} and $PM_{2.5}$ at each sensitive receptor, additional mitigation measures are required. The Project's additional mitigation measures will be enacted incrementally and proactively as necessary based on real-time monitoring data as part of the DMP's TARP. The Project's additional mitigation measures are those undertaken in addition to the routine mitigation measures (watering, reduced speed limits, and chemical suppressants on haul roads) and may involve the application of one or more of the following actions:

- Watering or use of chemical suppressants on exposed dump areas.
- Reducing or relocating operations within certain active mining areas.
- Reducing hauling operations.
- Ceasing or reducing certain operations in specific mining areas.
- Proactive identification and operational communication of adverse wind conditions (e.g. strong northerly winds that blow towards R1 from the Project area) to key site personnel to guide the potential use of the planned additional mitigation measures.

The ground-level dispersion modelling results were investigated via a source-contribution approach to determine the level of additional mitigation required to avoid any predicted exceedances due to the Project above those attributable to the ambient background. For the 24-hour concentrations of PM_{10}, the ambient background exceeds the Air EPP objective on six occasions, and for the 24-hour concentrations of $PM_{2.5}$, the ambient background exceeds the Air EPP objective on five occasions.

Additional mitigation is predicted to be necessary for up to eight days for the Project's 2029 scenario and 11 days for the Project's 2034 scenario.

Table 15-9 depicts additional exceedance days for the Project's 2029 and Year 2034 modelling scenarios before and after application of the planned additional mitigation measures. R1 is predicted to experience the greatest number of impacts. R13 is predicted to have an additional exceedance of $PM_{2.5}$ in both years. Importantly, in all cases the application of the additional mitigation measures can achieve zero additional exceedance days.

Source-contribution plots provided in Figure 15-6, Figure 15-7, Figure 15-8 and Figure 15-9 show the top 50-days of ground-level concentrations of 24-hour PM_{10} at R1 and 24-hour $PM_{2.5}$ at R13 prior to additional mitigation. These source-contribution figures demonstrate the dominant contribution of ambient background concentrations. The mostly smaller Project contributions result primarily from haul road emissions, and in the case of predicted impacts at R1, mining operations in the southern pit and dump areas. Controlling haul road emissions and managing southern pit operations, including progressive rehabilitation activities, are key factors for the purposes of mitigating additional impacts due to the Project at R1 and reducing wind-blown dust at more distant downwind receptors to the northwest, for example, R13.

Figure 15-10 and Figure 15-11 display a daily timeseries of ground-level predicted concentrations of 24-hour PM_{10} at R1 for 2029 and 2034 before and after the application of the additional mitigation, demonstrating that, with additional mitigation measures, the Project will result in no additional exceedances of air quality objectives at sensitive receptors.

The modelling represents predicted ground-level concentrations informed by assumptions described in Section 15.4.6. These assumptions include the accuracy and representativeness of ambient background data, meteorological modelling and monitoring data, and conservative assumptions concerning continuous emissions from all mining activities across the Project site for every hour of the year and the inability of modelling to account for rainfall. As a result, peak model predicted ground-level concentrations for the Project may never coincide with ambient background concentrations under the same meteorological conditions as represented by the AQA's dispersion modelling assessment. Therefore, the AQA's modelling is understood to represent worst-case hypothetical emissions scenarios

that conservatively represent the broad range of possible operational, meteorological, and ambient background conditions.

In this context, the AQA's dispersion modelling results indicate that emissions will comply with all relevant Air EPP air quality objectives for the Project operating in isolation, and with the application of appropriate additional mitigation measures, the Project will result in no additional exceedances of air quality objectives at any of the sensitive receptors. Based on these results, the Project is also not expected to materially affect the operation of local pastoral activities conducted in the vicinity of the Project.

From an operational perspective, real-time monitoring and TARP triggers as components of the Project's DMP, will be integral to effectively identifying occasions when the application of additional mitigation measures may be required.

Table 15-9 Predicted Additional Exceedance Days for PM_{10} and $PM_{2.5}$ Before and After Additional Mitigation Measures for 2029 and 2034

Sensitive Receptor	PM_{10}				$PM_{2.5}$			
	Predicted additional number of days above 50 µg/m³				Predicted additional number of days above 20 µg/m³			
	2029		2034		2029		2034	
	Additional Mitigation		Additional Mitigation		Additional Mitigation		Additional Mitigation	
	Before	After	Before	After	Before	After	Before	After
Moranbah	1	0	1	0	0	0	0	0
R1	8	0	11	0	0	0	0	0
R2	3	0	3	0	0	0	1	0
R3	0	0	0	0	0	0	0	0
R4	2	0	2	0	0	0	0	0
R5	2	0	2	0	0	0	0	0
R6	2	0	2	0	0	0	1	0
R7	2	0	2	0	0	0	0	0
R8	2	0	2	0	0	0	0	0
R9	1	0	1	0	0	0	1	0
R10	1	0	1	0	0	0	1	0
R11	1	0	1	0	0	0	1	0
R12	1	0	1	0	0	0	1	0
R13	1	0	2	0	1	0	1	0
R14	1	0	1	0	0	0	0	0
R15	0	0	0	0	0	0	0	0

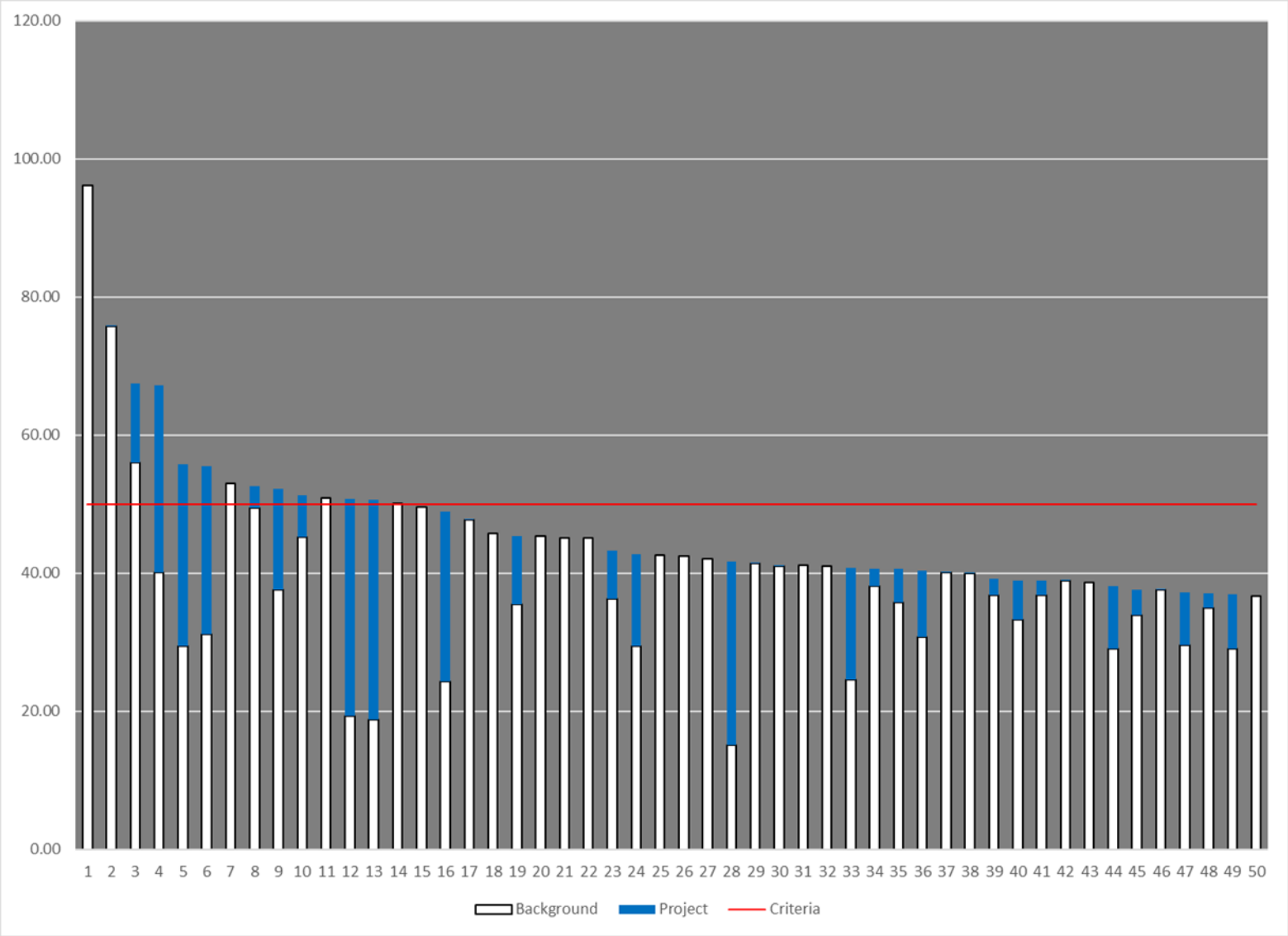

Figure 15-6 Year 2029 – R1: 24-hour PM_{10} Ground-level Concentration Source-contribution Plot for the Top 50 days

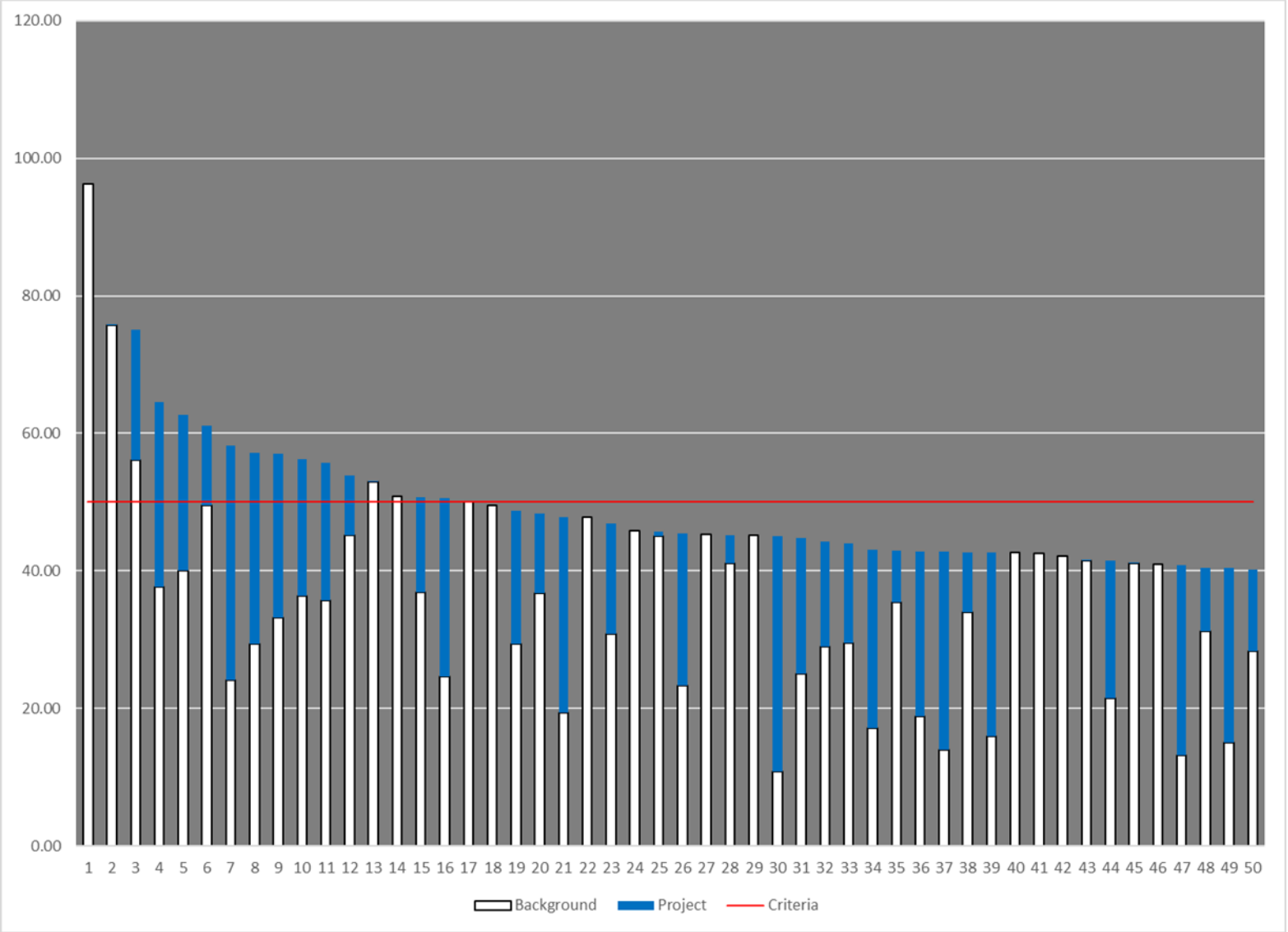

Figure 15-7 Year 2034 – R1: 24-hour PM_{10} Ground-level Concentration Source-contribution Plot for the Top 50 days

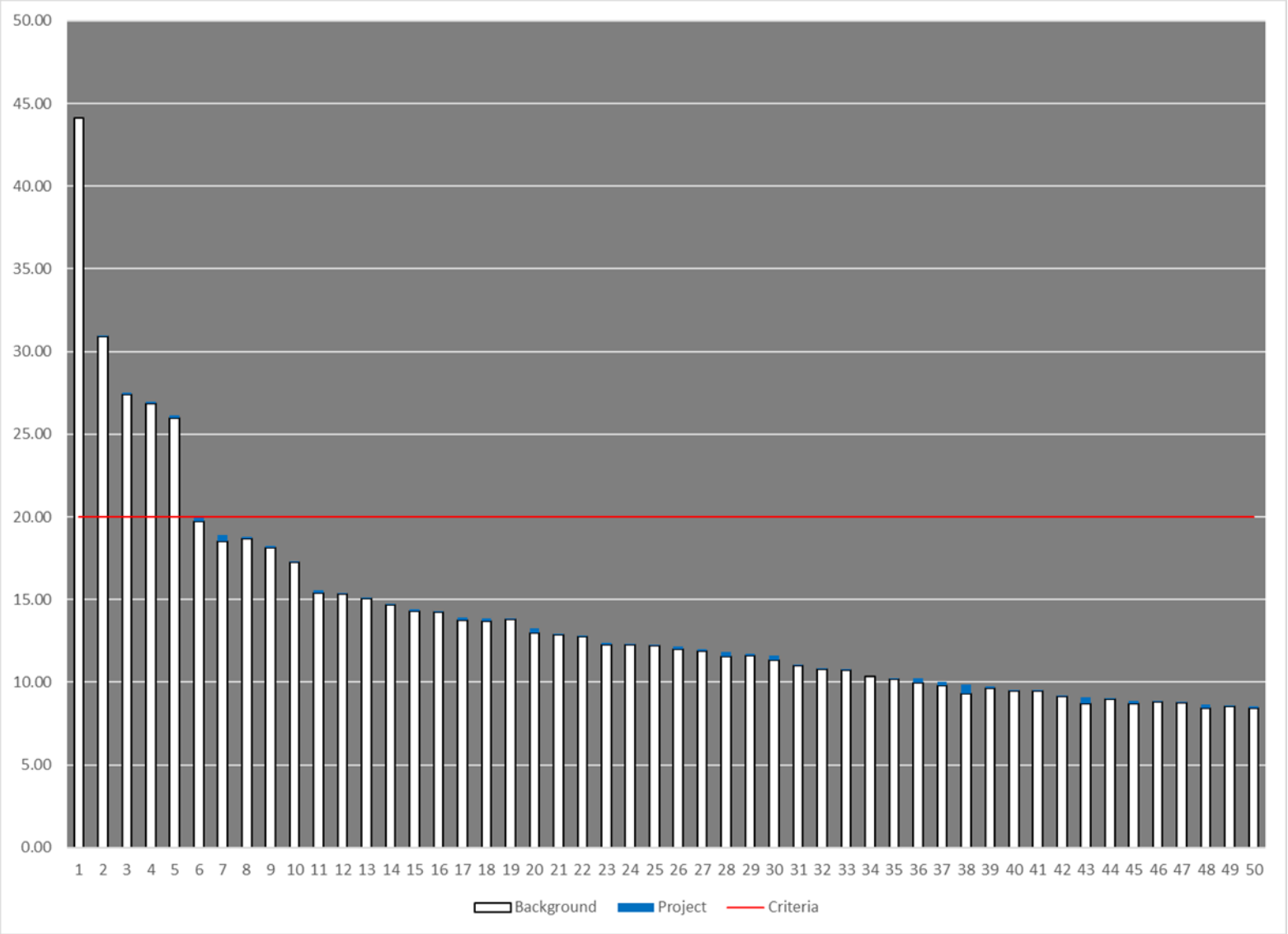

Figure 15-8 Year 2029 – R13: 24-hour $PM_{2.5}$ Ground-level Concentration Source-contribution Plot for the Top 50 days

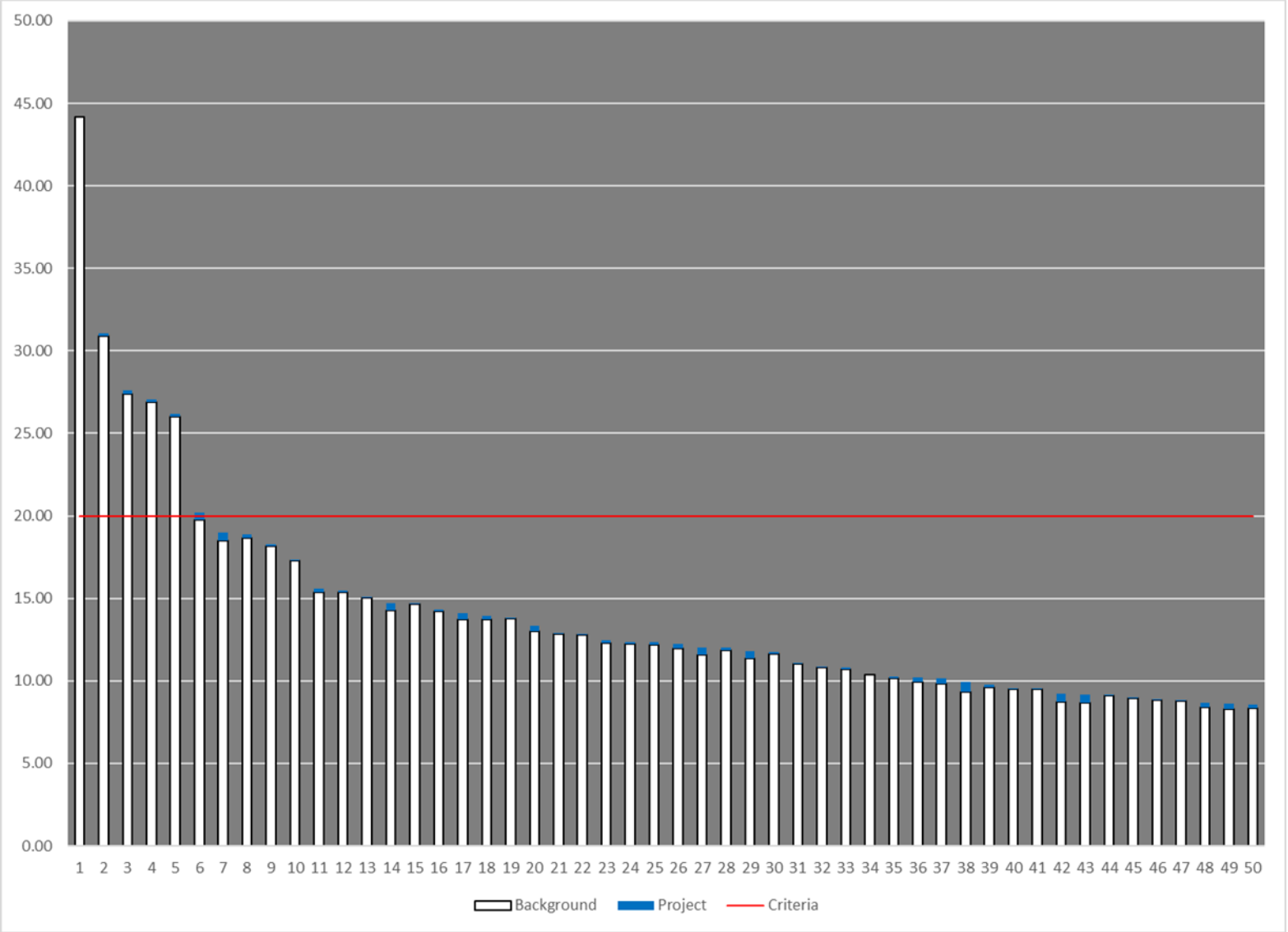

Figure 15-9 Year 2034 – R13: 24-hour $PM_{2.5}$ Ground-level Concentration Source-contribution Plot for the Top 50 days

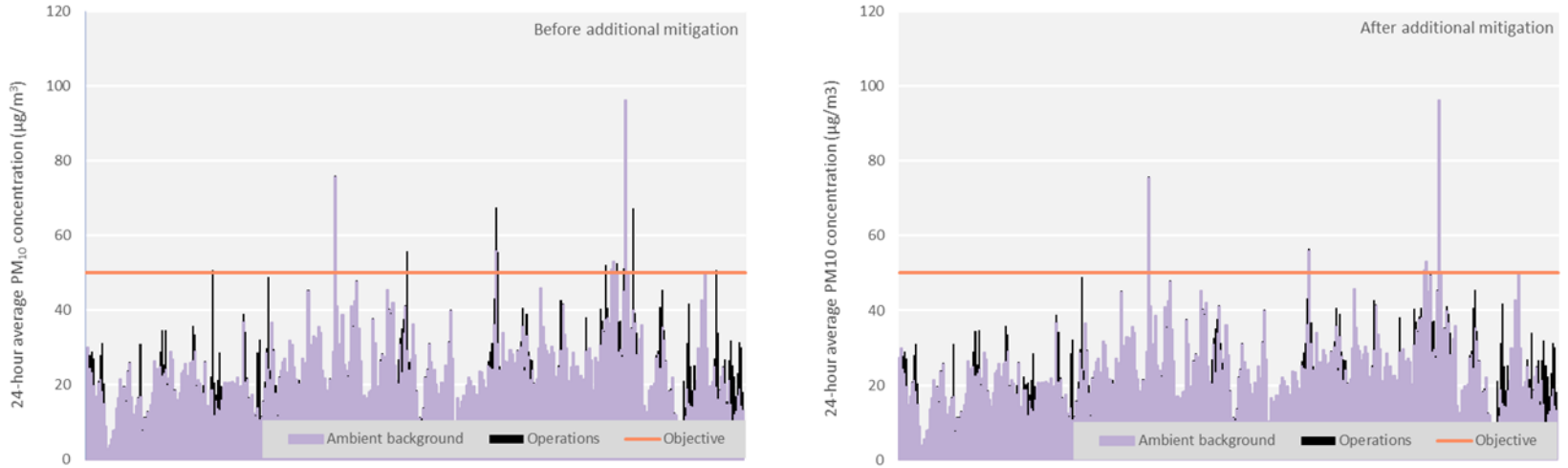

Figure 15-10 Year 2029 – R1: 24-hour Cumulative PM_{10} (µg/m³) Before and After Additional Mitigation

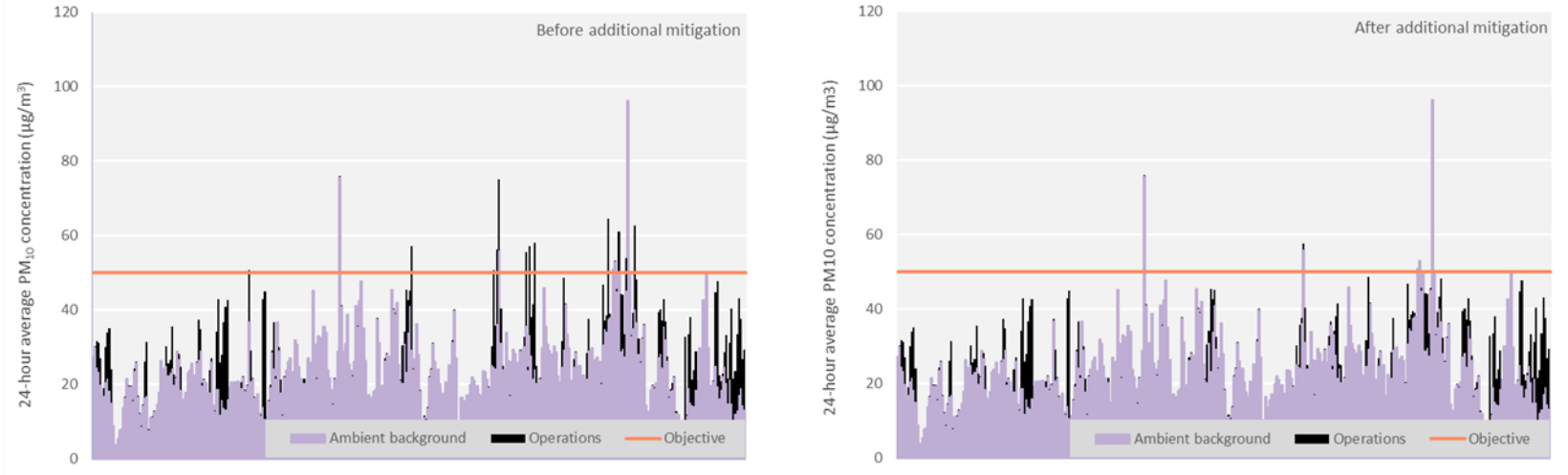

Figure 15-11 Year 2034 – R1: 24-hour Cumulative PM_{10} (µg/m³) Before and After Additional Mitigation

15.7.3 Cumulative Assessment with Future Mines

As described in Section 15.4.5, emissions from existing operational mines within the region are included in the ambient background air quality concentrations that were modelled to determine the total cumulative concentrations.

There are several proposed mining operations located near the Project which are approved but are yet to commence, for example, the Eagle Downs underground coal mine, Peak Downs Mine Continuation project, and Winchester South open cut coal mine.

The potential for these approved future mining projects to cumulatively contribute to the predicted air quality impacts from the Project are qualitatively discussed as follows:

- The Eagle Downs underground mine ML and underground mine portal are approximately 2 km south and 8 km south, respectively, of the Project's operational mining areas. Cumulative impacts from Eagle Downs and the Project at the nearest sensitive receptor, Winchester Downs Homestead (R1), are unlikely to occur at the same time as the Project. Dust from Eagle Downs will be transported to R1 under southerly winds, and from the Project to R1 under northerly winds. Eagle Downs is an underground coal mine, and therefore, will make minor contributions in emissions to the local airshed compared to open cut mining. Review of the publicly available Assessment Report (DERM, 2010) indicates the Eagle Downs mine will be subject to a range of dust related mitigation measures, considered adequate to manage the potential air impacts from the mine's operation.
- The Peak Downs Continuation project represents a continuation of existing mining rather than new additional mining. Consequently, the magnitude of emissions will remain largely consistent with current emissions due to the ceasing and rehabilitation of Peak Downs mine areas that are preceding the Peak Downs Continuation project. Current ambient background monitoring is representative of these existing emissions. The Peak Downs Continuation project is located >6 km to the south of the Project's operational mining areas and any dust from the Peak Downs Continuation project is unlikely to affect the nearest sensitive receptor, R1, under the same meteorological conditions as the Project. Review of the publicly available Terms of Reference (DSDILGP, 2023) for the Peak Downs Continuation Project requires the environmental impact statement to detail mitigation measures, including a DMP; provide a description on how the air objectives would be monitored, audited, and reported; and outline how corrective / preventive actions would be managed over the life of the mine. As a result, it is reasonable to expect that the Peak Downs Continuation project will incorporate monitoring and management measures necessary to mitigate impacts at R1.
- The Winchester South open cut coal mine ML, similar to the Eagle Downs underground mine and Peak Downs Continuation project, is located >4.5 km southeast of the Project's operational mining areas, and therefore, is unlikely to affect the nearest sensitive receptor, R1, under the same meteorological conditions as the Project. Draft EA conditions for the Winchester South open cut coal mine indicate that real-time monitoring and a DMP will be implemented. This DMP will include mitigation measures for dust to ensure compliance with relevant air quality objectives.

Most mines (existing and approved) within the region will implement monitoring and management procedures to proactively avoid dust impacts. Therefore, mines within the region are committed to achieving the same positive air quality outcomes. Cumulative modelling of regional mining operations without detailed operational information will not reflect this reality and will produce highly conservative results not represented by monitoring data conducted either at the DETSI monitoring sites or mine operated monitoring sites.

The Project's DMP will commit to the regular review and improvement of the active dust management practices and monitoring to ensure emissions and impacts from the Project are appropriately managed into the future to minimise the risk of non-compliance with the required air quality objectives.

15.8 Dust Management Plan

The AQA's dispersion modelling for the Project indicates that there is a potential for exceedances of the Air EPP objectives for PM_{10} and $PM_{2.5}$ when considered cumulatively with ambient background concentrations. As demonstrated, these potential exceedances can be managed through the staged implementation of additional mitigation measures. To identify when these additional measures should be implemented, a DMP, strategic monitoring network and TARP, will be adopted for the Project's mining operations.

The requirement to monitor air quality is consistent with existing EAs approved for currently operating Stanmore mines (e.g. IDM and IPM) and other mines within the region, and as a result, may be a conditioned requirement of the Project's EA.

The Proponent will develop a DMP for the Project, building on IPC's existing DMP, which will include:

- Information on potential dust sources.
- Information on the compliance requirements of the relevant air quality conditions of the EA.
- Dust management and mitigation methods.
- Dust monitoring locations and methods for PM_{10}, $PM_{2.5}$ (real-time monitoring) and deposited particulate matter (monthly collected dust deposition gauges), noting that existing dust monitoring stations operated by Stanmore in the region, may be suitable.
- A meteorological monitoring station capable of monitoring wind direction and speed, noting that existing meteorological monitoring stations operated by Stanmore in the region, may be suitable.
- A TARP, with triggers and actions to include any additional Project relevant mitigation measures and the location of sensitive receptors with particular emphasis on the Winchester Downs Homestead receptor (R1).
- A complaints management procedure.
- Reporting procedures involving annual reviews and periodic performance audits of the DMP to ensure continuous improvement as future conditions change with the progression of mining, including as required the development of new mitigation measure and/or corrective actions for existing dust management and mitigation measures.

The combination of real-time monitoring of wind speed, wind direction, and PM_{10} and $PM_{2.5}$ concentrations with a TARP enables the Project to identify when adverse air quality conditions are happening and to proactively implement additional mitigation measures to avoid and manage potential impacts. Additional mitigation measures may be implemented during adverse meteorological conditions such as high wind speeds from the Project towards sensitive receptors, calm evening conditions with poor dispersion, or during prolonged dry and hot conditions (e.g. heatwaves and droughts). Triggers will be incrementally set based on measured concentrations of PM_{10} and $PM_{2.5}$, and wind conditions (speed and direction). Actions in response to triggers will likewise increase in scope as the severity of triggers increases. Additional mitigation measures may involve the application of one or more of the following actions:

- Watering or use of chemical suppressants on exposed dump areas.
- Reducing or relocating operations within certain active mining areas.
- Reducing hauling operations.
- Ceasing or reducing certain operations in specific mining areas.
- Proactive identification and operational communication of adverse wind conditions (e.g. strong northerly winds that blow towards R1 from the Project area) to key site personnel to guide the potential use of the planned additional mitigation measures.

As a minimum, the Project's DMP will include the following monitoring requirements:

- Real-time PM_{10} and $PM_{2.5}$ monitoring at or near Winchester Downs Homestead (R1) utilising compliance level monitoring equipment (Australian Standard compliant BAMs), noting that an

existing dust monitoring station operated by Stanmore at Winchester Downs Homestead (R1) may be suitable.
- Dust deposition gauges including at or near Winchester Downs Homestead (R1), noting that an existing dust deposition gauge deployed by Stanmore at Winchester Downs Homestead (R1) may be suitable.

The Proponent has existing data sharing agreements with other nearby mine operators which will enable the periodic coordination and use of dust monitoring data for general performance and continuous improvement analysis.

As outlined in Section 15.6.2, Stanmore will additionally make all reasonable efforts to secure an 'alternative arrangement' with the owners of Winchester Downs Homestead (R1) for amenity impacts.

15.9 Conclusion

An AQA was undertaken in accordance with the requirements of the Project's ToR and DETSI's Impacts to Air Guideline (DESI, 2024).

The Project's AQA was prepared for the worst case mining scenario years (2029 and 2034) to:

- identify the emissions to the atmosphere from mining operations
- identify potential impacts to sensitive receptors in relation to the air quality objectives for TSP, PM_{10}, $PM_{2.5}$ and dust deposition
- if required, propose mitigation measures for potential adverse impacts to achieve compliance with the air quality objectives for TSP, PM_{10}, $PM_{2.5}$ and dust deposition.

Dispersion modelling was undertaken to assess the potential impacts of mining operations at the Project on nearby sensitive receptors both in isolation and cumulatively including ambient background levels. Model predicted ground-level concentrations of each emission of concern were assessed against the air quality objectives detailed in the Air EPP.

The results indicated the following:

- Predicted ground-level concentrations of all emissions comply with the relevant air quality objectives at all sensitive receptors for the Project operating in isolation.
- Predicted cumulative maximum monthly average dust deposition rates comply with the guideline of 120 $mg/m^2/day$ at all sensitive receptors.
- Predicted cumulative annual average ground-level concentrations of TSP comply with the annual average objective of 90 $\mu g/m^3$ at all sensitive receptors.
- Predicted cumulative 24-hour maximum ground-level concentrations of PM_{10} can avoid potential additional exceedances of the air quality objective of 50 $\mu g/m^3$ at all sensitive receptors through the implementation of the planned additional mitigation measures.
- Predicted cumulative 24-hour maximum ground-level concentrations of $PM_{2.5}$ can avoid potential additional exceedances of the air quality objective of 20 $\mu g/m^3$ at all sensitive receptors through the implementation of the planned additional mitigation measures.
- Predicted cumulative annual average ground-level concentrations of PM_{10} can comply with the annual average objective of 25 $\mu g/m^3$ at all sensitive receptors through the implementation of the planned additional mitigation measures.
- Predicted cumulative annual average ground-level concentrations of $PM_{2.5}$ can comply with the annual average objective of 7 $\mu g/m^3$ at all sensitive receptors through the implementation of the planned additional mitigation measures.

The AQA's findings indicate that the Project can meet the Air EPP objectives at all nearby sensitive receptors in isolation and cumulatively through the implementation of the planned additional mitigation measures. In addition, the Proponent will develop a DMP for the Project, building on the existing DMP for

IPC, to enable the effective implementation of the planned additional mitigation measures. In summary, the Project's mining operations will be able to achieve the environmental objective and performance outcomes for air quality specified in the EP Regulation.

15.10 References

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