

NASSIF CIVIL RESOURCE RECOVERY FACILITY

29-37 PLASSER CRESCENT, NORTH ST MARYS

AIR QUALITY IMPACT ASSESSMENT

RWDI # 2405613

25 November 2024

SUBMITTED TO

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DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
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B	Final	25 July 2024	Rama Robbi	Joshua Bollom
C	Final	25 November 2024	Rama Robbi	Davis Lai

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EXECUTIVE SUMMARY

This Air Quality Impact Assessment report has been prepared by RWDI Australia Pty Ltd to accompany Environment Impact Statement (EIS) and Development Application (DA) for the proposed development of an expanded Construction and Demolition (C&D) recycling facility (the Proposal) located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353). The proposed C&D facility would process up to 99,000 tonnes per annum of wastes generated mainly from construction sites.

The report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for air quality and odour with respect to the proposed development.

The report assessed the potential Construction and Operational dust and odour impacts associated with the proposed modifications in general accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2022).

A risk-based approach was adopted to assess dust emissions from the construction of the proposed development in accordance with the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) "Guidance on the Assessment of Dust from Demolition and Construction" (EPUK & IAQM, 2024). The assessment concluded that there would be a negligible risk of dust impacts from construction, and with the implementation of recommended mitigation measures, no significant air quality impacts are expected to occur during the construction and operation of the proposed development.

A quantitative approach was adopted to assess air quality impacts on nearby receptors during the operation of the Project. The results of the dispersion modelling indicate that dust concentrations due to the worst-case operation of the proposed development would comply with the established criteria at all sensitive receptors.

Therefore, there would be no adverse air quality impacts associated with the construction and operation of the proposed development.

1 INTRODUCTION

RWDI Australia (RWDI) has been engaged by Nassif Civil Pty Ltd c/- Jackson Environment and Planning Pty Ltd to conduct an Air Quality Impact Assessment (AQIA) for the proposed development of an expanded Construction and Demolition (C&D) recycling facility (the Proposal) located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353). The proposed C&D facility would process up to 99,000 tonnes per annum of wastes generated mainly from construction sites. Number 33 Plasser Crescent is already in use as a C&D recycling facility and number 29 Plasser Crescent was most recently used as a dry cement plant (Consent number DA/0489 - Additions to Existing & Use of Building for Dry Cement Plant).

The maximum waste processing capacity will be 99,000 tonnes per annum. Under Section 4.12 of the Environmental Planning and Assessment Act 1979 the proposed development is a Designated Development, requiring an EIS. This report has been prepared to address the below Air Quality and odour requirements of the SEARs (SEAR# 1694) with respect to the proposed development.

- A quantitative assessment of the potential air quality, dust, and odour impacts of the development, during both construction and operation, in accordance with relevant Environment Protection Authority guidelines; and,
- A description and appraisal of air quality and odour impact mitigation, management, and monitoring measures.

The waste materials handled by the Proposal include C&D waste which comprises of concrete, brick, tiles, cardboard, wood/timber, gyprock, plastics, ferrous and non-ferrous metals, etc. These materials are not considered odorous. Accordingly, the risk of odour impacts from the Proposal is negligible and odour impacts are not discussed any further in this report.

1.1 Objectives

The purpose of this assessment is to document the process, objectives, and outcomes of the AQIA to support the development application for the proposed development.

This AQIA report provides the following details:

- the existing environment;
- the land zoning of the Site and neighbouring area;
- the closest existing sensitive receivers;
- relevant air quality criteria;
- meteorology;
- construction and operational air quality predictions for the tyre recycling facility and assumption used in the assessment; and
- recommendations to minimise the air quality impact on the affected receivers, if required.

This AQIA has been completed with reference to relevant guidelines and policies, namely:

- Environmental Protection Authority (EPA) guideline entitled "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW" (NSW EPA, 2022);
- Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) "Guidance on the Assessment of Dust from Demolition and Construction" (EPUK & IAQM, 2024);



- Climate Averages Australia, Bureau of Meteorology (BOM, 2023);
- Protection of the Environment Operations Act 1997 No 156 (NSW Parliament, 2023); and
- Technical Notes - Assessment and management of odour from stationary sources in NSW (NSW EPA, 2006)

2 PROJECT DESCRIPTION

2.1 Site Location, Surrounding Land Use and Sensitive Receptors

The site is located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353) within an industrial area of North St Marys as shown in Figure 2-1. The locations of all nearby sensitive receptors are identified in Table 2-1 and also shown in Figure 2-1.



Figure 2-1: Site Location, Surrounding Land Use and Sensitive Receptors

The land use immediately surrounding the site is a mix of commercial, services and industrial suppliers and is located within the industrial area. The site is surrounded by the following receivers:

- Industry developments to the north, south, east and west boundary (these were not identified as sensitive receptors);
- Transport for NSW Railway Assets
 - Railway line approximately 100 m to the south;
 - St Mary Railway Station approximately 700 m to the south-west;
- Nearest residential receivers approximately:
 - 120 m to the north;
 - 150 m to the south;
 - 2 km to the west.
- St Demetrios Church approximately 500 m south-east; and

- Obley Educational Centre approximately 500 m to the west.

It is understood Obley Educational Centre is now permanently closed and will not be included in this assessment.

Table 2-1: Sensitive Receptors

Receptors	Address	Type	Coordinates (MGA 56)	
			X	Y
R1	2/7 Kurrajong Road, Cnr Plasser Cres, North St Marys NSW 2760	Residential	294790	6262162
R2	2 Australia St, St Marys NSW 2760	Residential	294636	6261829
P1	42 Plasser Cres, North St Marys NSW 2760	Place of Worship	295167	6261743
RA1	North St Marys NSW 2760	Railway Asset	294130	6261968
RC1	14A Kurrajong Road, North St Marys, NSW 2670	Recreational	295022	6262133
R3	2 Maple Road, North St Marys, NSW 2760	Residential	295171	6262101
R4	35 Cedar Crescent, North St Marys, NSW 2760	Residential	294723	6262253
R5	72 Glossop Street, North St Marys, NSW 2760	Residential	294521	6262333
R6	10 Chesham Street, St Marys, NSW 2760	Residential	294442	6261812
R7	96 Glossop Street, St Marys, NSW 2760	Residential	294500	6261857
R8	82 Hobart Street, St. Marys NSW 2760	Residential	294557	6261845
R9	74 Hobart Street, St Marys, NSW 2760	Residential	294721	6261817
R10	66 Hobart Street, St Marys, NSW 2760	Residential	294839	6261795
R11	59 Hobart Street, St Marys, NSW 2760	Residential	294949	6261773
R12	52 Hobart Street, St Marys, NSW 2760	Residential	295063	6261746
R13	2 Sydney Street, Oxley Park, NSW 2760	Residential	295284	6261705



2.2 Proposed Development

The Proposal includes the following elements:

- Partial demolition of the existing structure on Lot 15, DP263353;
- Construction of a new shed on Lot 15, DP263353;
- Installation of an additional 20 m pit style weighbridge inside the site entrance of Lot 15, DP263353;
- Installation of processing equipment, including:
 - A vibratory finger screen;
 - Two elevated manual picking stations;
 - Density separator;
 - Magnetic separator; and
 - Timber shredder.
- Installation of conveyor belts to transfer materials between sorting equipment and storage bays;
- Conveyor belts will traverse both indoors and outdoors, and where outdoors, conveyors will be enclosed to avoid dust generation and reduce noise levels;
- Separate waste storage bays to separate and store sorted waste prior to being loaded onto trucks for off-site recycling and reuse;
- Upgrades to site office, lunchroom and amenities for staff, truck drivers and visitors; and
- Improvements to landscaping provided to the site.

The proposed operational hours of the site are 6 am to 11 pm Monday to Friday, and 7 am to 3 pm Saturday. There are no proposed operations on Sundays or public holidays.

The existing and proposed site layout are presented in Figure 2-2 and Figure 2-3. A 3-D view of the development is presented in Figure 2-4.

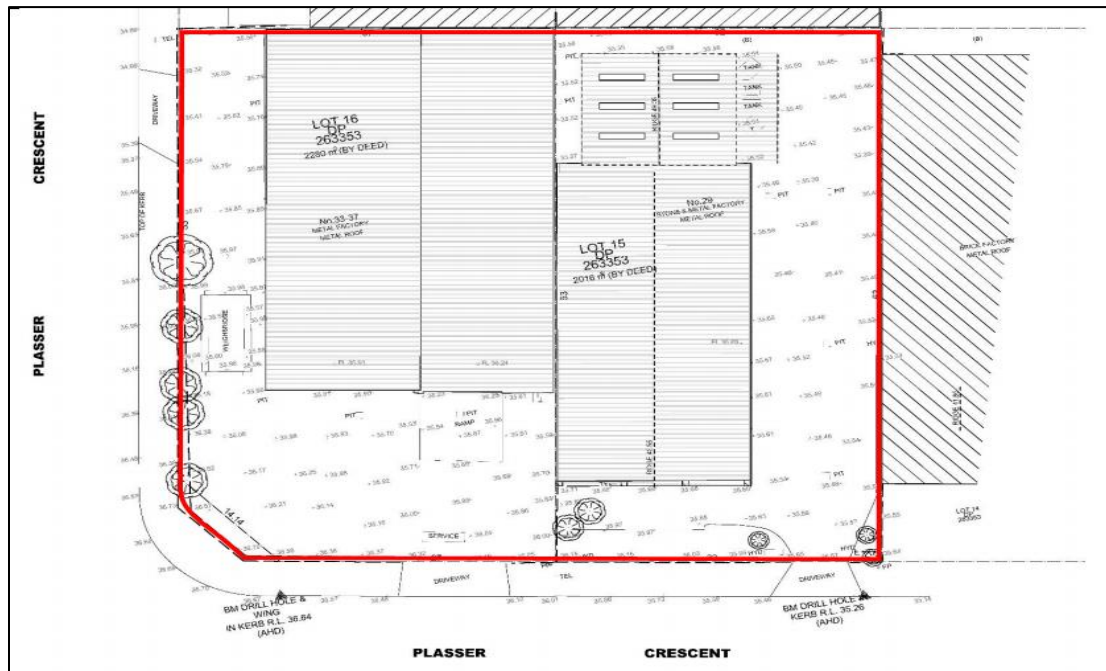


Figure 2-2: Existing Site Layout

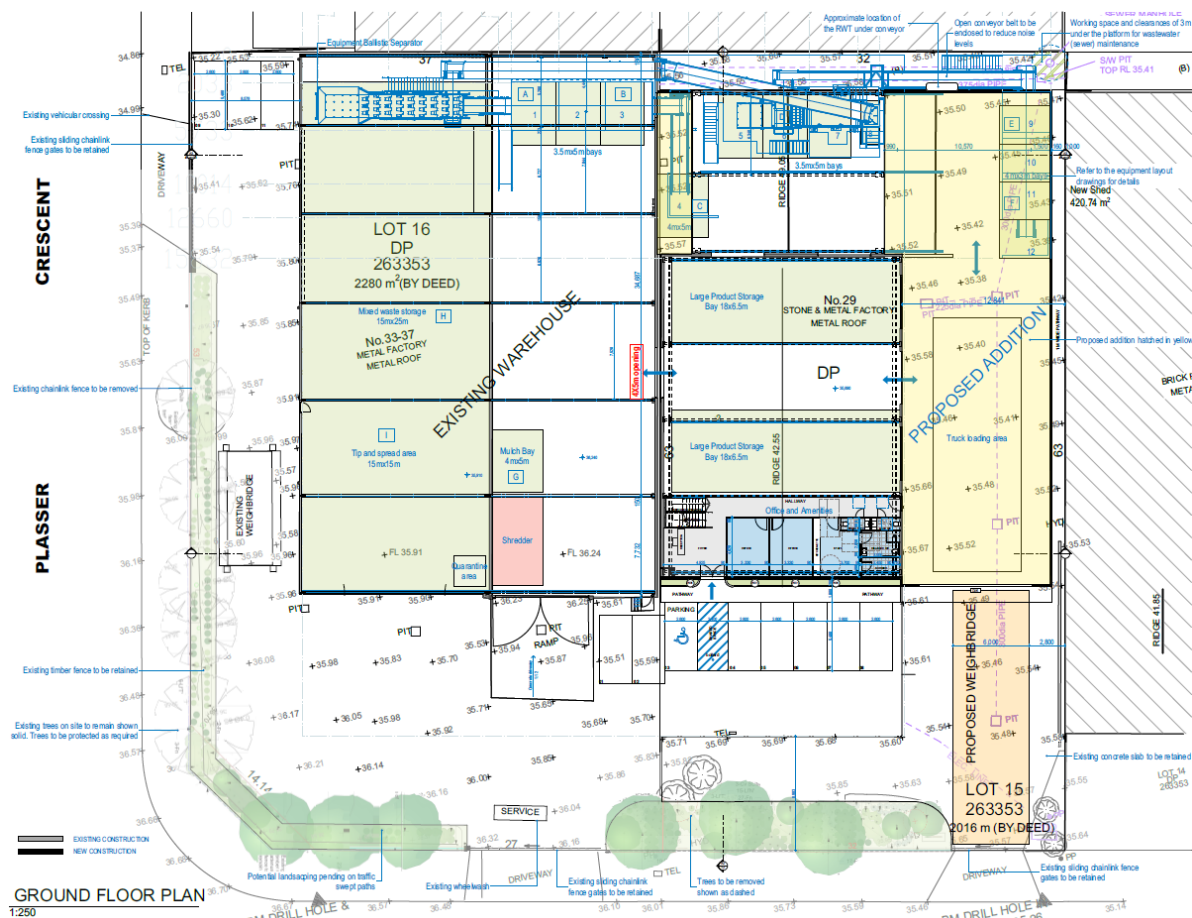


Figure 2-3: Proposed Site Layout (Existing to be demolished, New Construction)



Figure 2-4: Proposed Development 3-D View

2.2.1 Waste Inputs and Processing

Nassif Civil proposes to operate a best practice C&D Resource Recovery Facility (RRF) at 29-37 Plasser Crescent North St Marys (Lots 15 & 16 DP263353). The RRF will have an annual waste throughput of up to 99,000 tonnes per annum. Waste received at the RRF will consist of construction and demolition waste in skip bin collects from the Greater Metropolitan region.

Waste will be received in skip bins collected by Nassif Civil and other collection contractors servicing building sites. The general community will not have access to the Site and the facility will not accept waste from the public. All waste receipt and processing will occur inside the warehouse. There will be no outdoor storage of waste.

Materials sorted at the facility will include:

- Concrete, brick, and tile;
- Clean timber;
- Engineered/treated timber;
- Ferrous metals;
- Stainless steel;
- Aluminium;
- Copper;

- Plasterboard;
- Recovered fines (as GSW CT1); and
- Residual waste.

The following materials will not be accepted at the facility:

- Special waste (incl. asbestos);
- Liquid waste;
- Hazardous waste;
- Restricted solid waste; and
- General solid waste (putrescible).

2.2.2 Proposed Operational Activity

The proposed operational activity is as follows:

- Waste deliveries will occur via skip bins delivered on 12.5 m rigid trucks or hook lift trucks. Skip bin sizes will vary between 2 m³ and 12 m³ and hook lift bins between 15 m³ and 30 m³.
- Vehicles will access the Site via Plasser Crescent on the western side of the existing building on Lot 16 DP263353. Vehicles will pass over the weighbridge for inspection of non-compliant waste and for assessing the net weight of materials before reversing into the warehouse via the western roller door for tipping of waste.
- Once inside the warehouse, vehicles will be directed to the dedicated “tip and spread area” and inspected for non-compliant waste. Rejected waste will be re-loaded for off-site transport and disposal at an appropriate licensed facility. Upon tipping of waste, vehicles will exit the warehouse and exit the site in a forward direction using the western driveway on the south side of the of the existing building on Lot 16 DP263353.
- Accepted waste will be stored in the mixed waste storage bay. This bay is used for the temporary storage of waste materials requiring further sorting and to ensure the “tip and spread area” remains clear for the next waste deliveries. An excavator will load waste into a feed hopper before entering a vibratory finger screen.
- The vibratory finger screen will separate the 2-dimensional wastes (flat waste) from the 3-dimensional wastes (bulky waste). Separated 2D waste will be conveyed to a picking station elevated above designated storages bays, where it will be manually separated and stored as follows:
 - Bay 1 - Cardboard;
 - Bay 2 - Timber; and
 - Bay 3 - Other recovered materials such as gyprock and metals (ferrous and non-ferrous) as required; and
 - Bay 4 - Residual waste
- Oversized materials (>50 mm) which will predominantly include timber, masonry (concrete, brick and tile) and metals will then be conveyed to a second elevated picking station. The oversized materials conveyor will be enclosed where it traverses along the external back side of the new shed on Lot 15 DP263353 to mitigate noise and dust issues. The oversized materials conveyor will also contain a magnet to separate ferrous materials from the oversized portion. These ferrous materials will be stored in Bay 8, which is a 25 m³ skip bin. Within the picking station, oversized materials will be manually separated and stored as follows:
 - Bay 9 - Timber

- Bay 10 - Concrete, brick, and tile
- Bay 11 - Other recovered material waste such as metals (non-ferrous) or rigid plastics as required; and
- Bay 12 - Residual waste.
- Clean, separated timber stored in Bay 2 and 9 may be further processed into mulch using a shredder within the existing building on Lot 16 DP263353 and stored in the designated mulch bay. An articulated loader will be used to transfer materials between the designated bays and will also be used for loading trucks with outgoing products and residual waste. Separated waste materials are stored in the designated storage bays within the warehouse.
- Sorted waste for further off-site processing / recovery will be collected regularly in 19-m semi-trailers on a daily basis for lawful recovery / disposal at other NSW EPA licensed facilities. All waste loading will occur inside the warehouse within the “truck loading area”. Wastes that are compliant with applicable Resource Recovery Orders and Exemptions such as mulch, aggregates, and recovered fines will be transported to customers for on-sale or reuse. Retail sale of these products will not occur on the site.

The Waste storage bay layout is shown in the Figure 2-5 below.

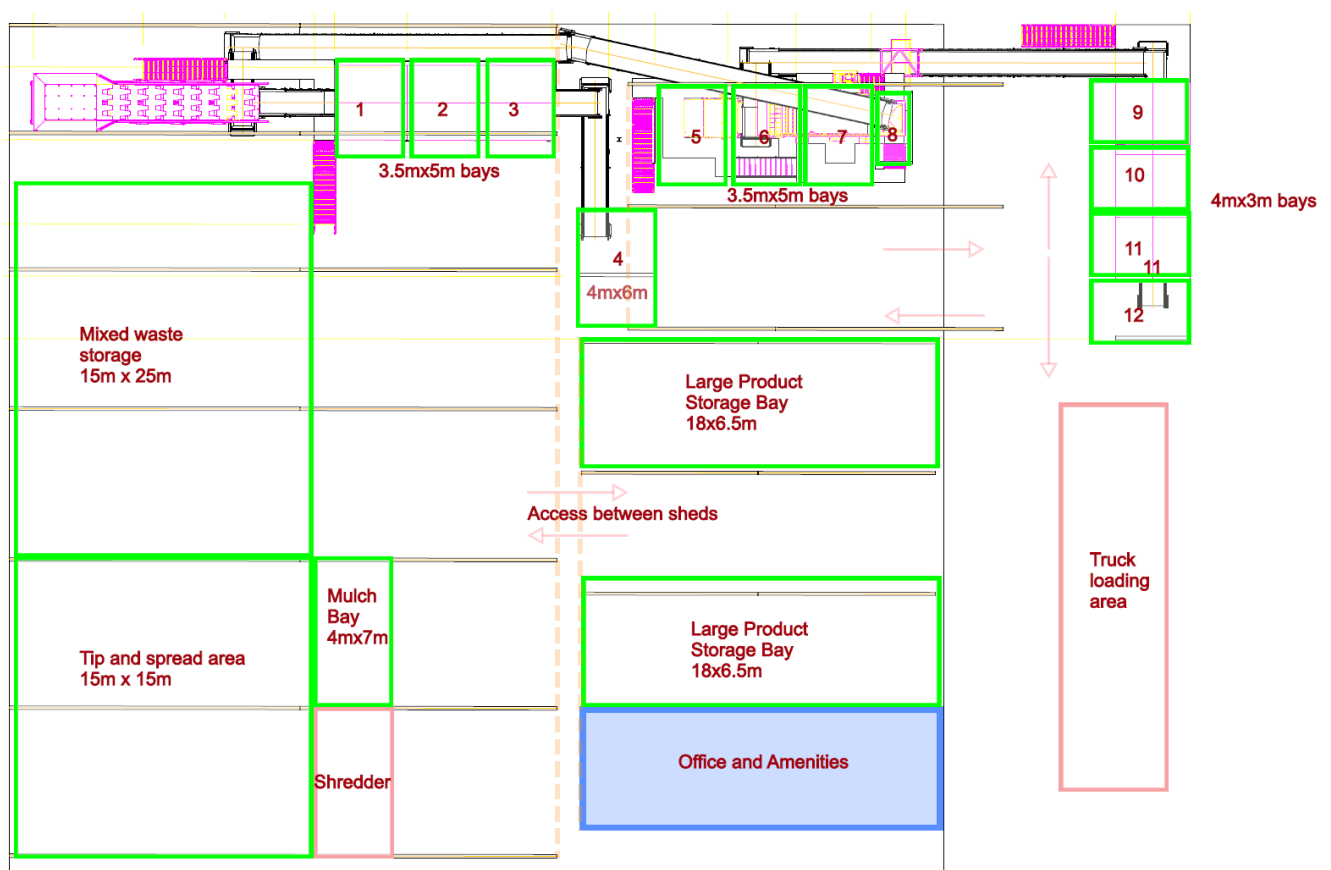


Figure 2-5: Waste storage Bay Layout

3 AIR QUALITY CRITERIA

3.1 Introduction

The NSW EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (the Approved Methods - 2022) provides applicable impact assessment criteria for a number of air pollutants. Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to ambient air quality. The sections below identify the pollutants of interest in this study and the applicable impact assessment criteria.

3.2 Pollutants of Interest

Dust and particulate matter are the major air pollutants associated with the Proposal. Specifically, the following pollutants are identified:

- Total suspended particulates (TSP)
- Particulate matter (PM_{2.5} and PM₁₀)
- Deposited dust

3.3 Impact Assessment Criteria

The EPA's Approved Methods specifies air quality assessment criteria for assessing impacts from dust generating activities. These criteria are consistent with the National Environment Protection Measures for Ambient Air Quality (NEPC, 2021).

Table 3-1 summarises the air quality goals for dust and particulate matter that are relevant to this study. The air quality goals relate to the total concentrations of dust and particulate matter in the air and not just that from the Proposal. Therefore, some consideration of background levels needs to be made when using these goals to assess impacts.

Table 3-1: Impact Assessment Criteria

Pollutant	Averaging Period	Impact ⁽¹⁾	Criteria
Particulate Matter ≤ 2.5 µm (PM _{2.5})	24-hours	Total	25 µg/m ³
	Annual	Total	8 µg/m ³
Particulate Matter ≤ 10 µm (PM ₁₀)	24-hours	Total	50 µg/m ³
	Annual	Total	25 µg/m ³
Total Suspended Particulates (TSP)	Annual	Total	90 µg/m ³
Deposited Dust	Annual	Incremental	2 g/m ² /month
	Annual	Total	4 g/m ² /month

Note: (1) For air quality criteria related to the total impact, project contributions and background levels need to be considered. Incremental impacts are from project only.

4 EXISTING ENVIRONMENT

4.1 Local Meteorology

Meteorological conditions strongly influence air quality. Most significantly, wind speed, wind direction, temperature, relative humidity, and rainfall affect the dispersion of air pollutants. The following sub-sections discuss the local meteorology near the Project Site and identify a representative set of meteorological data for use in the dispersion modelling to be undertaken for this assessment.

4.1.1 Long-Term Climate

Long-term meteorological data for the area surrounding the Site is available from the Horsley Park Equestrian Centre AWS operated by the Bureau of Meteorology (BoM). The Horsley Park Equestrian Centre AWS is located approximately 11.5 km south-east of the Site and records observations of several meteorological parameters including wind speed, wind direction, temperature, humidity and rainfall.

Long-term climate statistics are presented in Table 4-1. Temperature data recorded at the Horsley Park Equestrian Centre AWS indicate that January is the hottest month of the year with a mean daily maximum temperature of 29.9°C. July is the coolest month with a mean daily minimum temperature of 5.9°C. February is the wettest month with an average rainfall of 122 mm falling over 8 days. There are, on average, 77 rain days per year, delivering 804 mm of rain.

Table 4-1: Long-term Climate Averages, Horsley Park Equestrian Centre AWS

Obs.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
9 am Mean Observations													
Temp (°C)	22.0	21.5	19.4	17.5	13.8	11.1	10.3	12.0	15.6	18.1	19.2	20.9	16.8
Hum (%)	73	77	81	76	77	80	78	70	65	61	70	71	73
3 pm Mean Observations													
Temp (°C)	28.2	27.1	25.3	22.2	19.2	16.6	16.1	17.8	20.8	22.5	24.2	26.5	22.2
Hum (%)	49	53	54	53	52	55	50	42	42	45	50	48	49
Daily Minimum and Maximum Temperatures													
Min (°C)	18.0	17.8	16.2	12.9	9.0	7.1	5.9	6.5	9.3	11.9	14.3	16.2	12.1
Max (°C)	29.9	28.7	26.8	23.8	20.5	17.7	17.5	19.1	22.4	24.7	26.4	28.4	23.8
Rainfall													
Rain (mm)	75.7	122.3	90.1	69.0	43.6	66.5	51.3	39.1	37.4	62.7	77.8	66.2	804.4
Rain (days)	8.0	7.5	8.6	6.9	5.1	6.0	5.4	4.1	5.0	6.0	7.1	7.1	76.8

Figure 4-1 presents the annual wind-roses for 9 am and 3 pm from the Horsley Park Equestrian Centre AWS (from 1997 to 2013). The wind-rose diagram indicates a notable emphasis of north-westerly, westerly and south-westerly winds at 9 am and easterly and south-easterly winds at 3 pm.

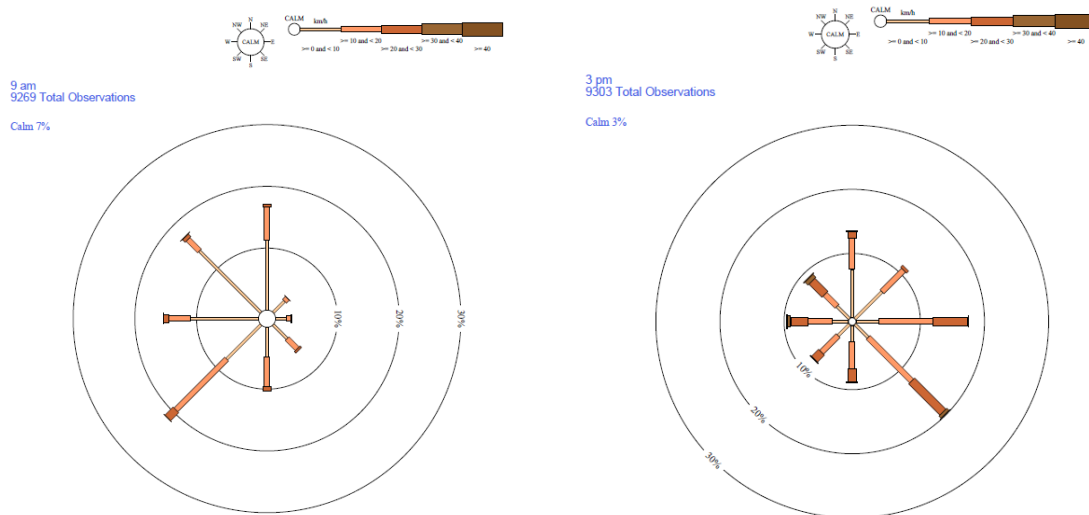


Figure 4-1: Horsley Park Equestrian Centre AWS 9 am and 3 pm Annual Wind Roses – Wind Speed in km/h (04 Sep 1997 to 10 Aug 2023)

4.1.2 Wind

The dispersion of dust emissions is primarily influenced by the following meteorological factors:

- wind speed and direction;
- wind profile and turbulence intensity (which are affected by terrain);
- temperature gradient, which affects atmospheric stability and is determined from wind speed, cloud cover and solar radiation; and
- mixing height, which is the depth of the atmospheric boundary layer, where most of the dispersion occurs.

Wind speed and atmospheric stability are examined with respect to flow direction to investigate typical flow regimes and directions of poor dispersion.

Observations of wind speed and direction from the Office of Environment and Heritage (OEH) Air Quality Monitoring Station (AQMS) at St. Mary's are selected to represent typical wind patterns in the area surrounding the Site and have been incorporated into the dispersion modelling for this assessment. St. Mary's AQMS is located approximately 3.7 km south of the Site.

Figure 4-2 through Figure 4-7 present annual and seasonal wind roses for St. Mary's AQMS for the period from 2019 to 2023. As can be seen, winds from the south-southwest and north-northwest are most common in the annual wind roses. The 2022 wind roses are in good agreement with the multi-year average wind roses and have therefore been adopted for modelling purposes.

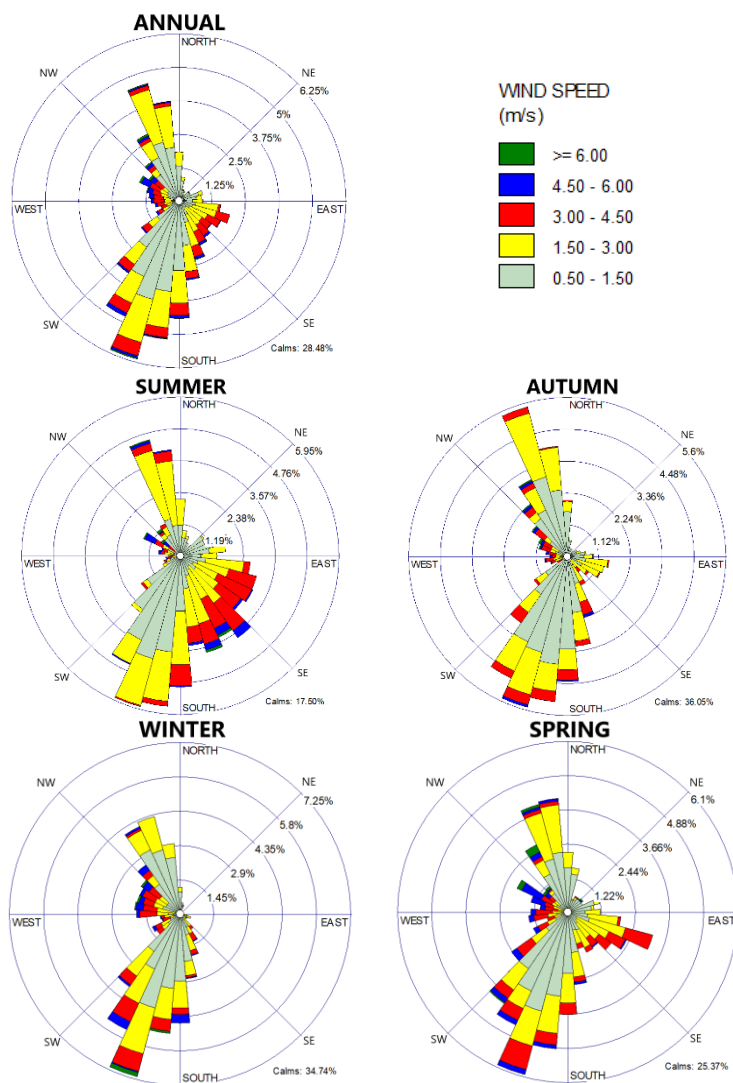


Figure 4-2: St. Mary's AQMS Wind Roses, 2019

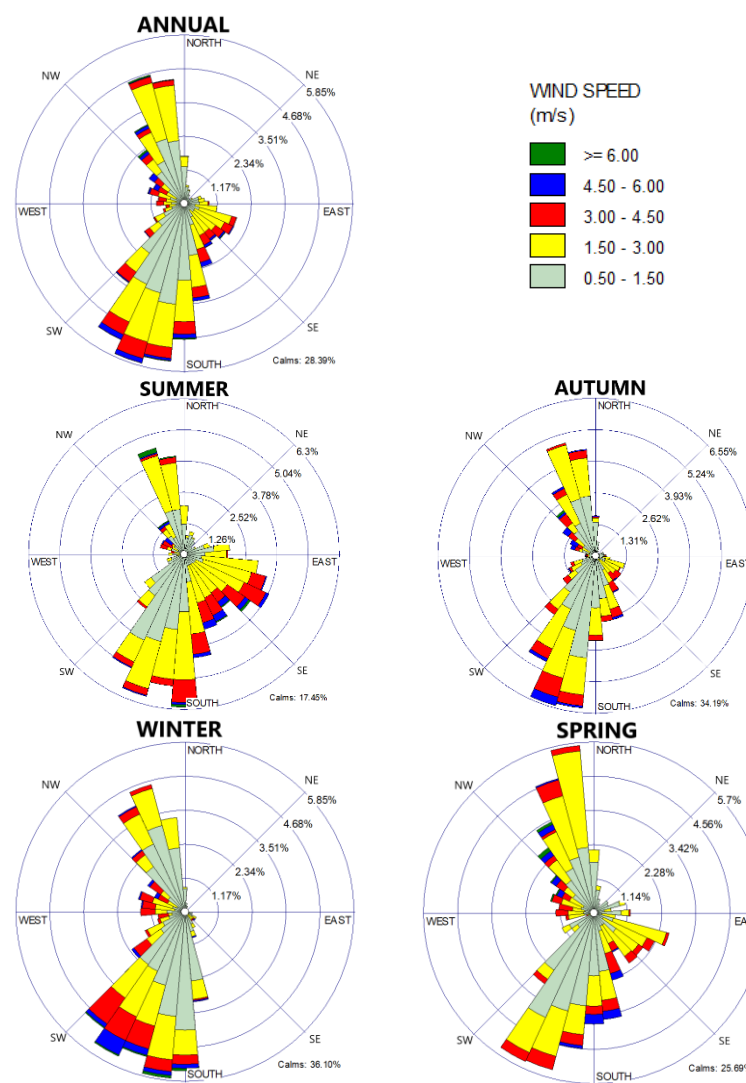


Figure 4-3: St. Mary's AQMS Wind Roses, 2020

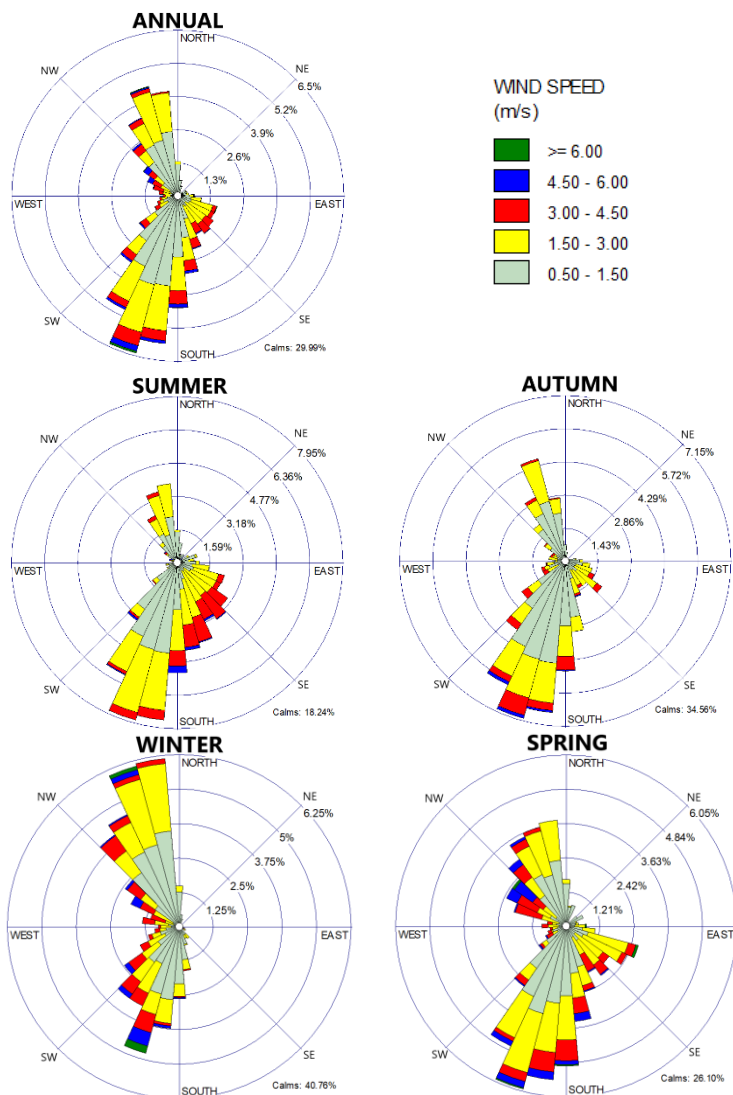


Figure 4-4: St. Mary's AQMS Wind Roses, 2021

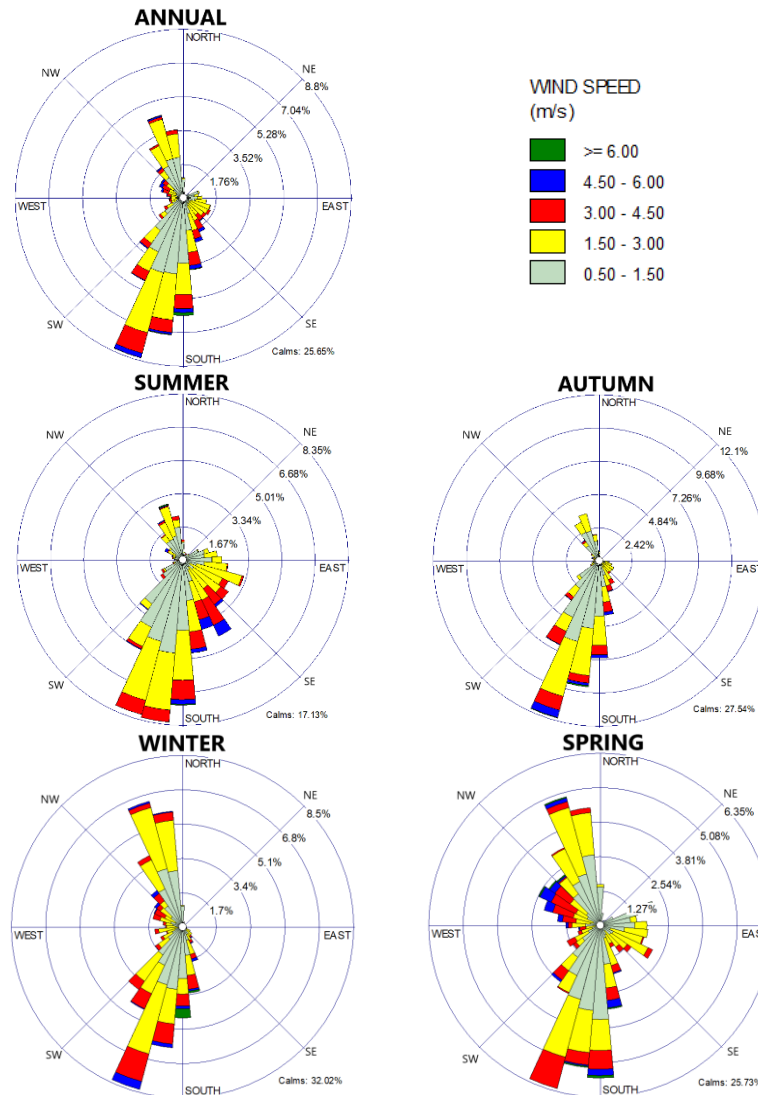


Figure 4-5: St. Mary's AQMS Wind Roses, 2022

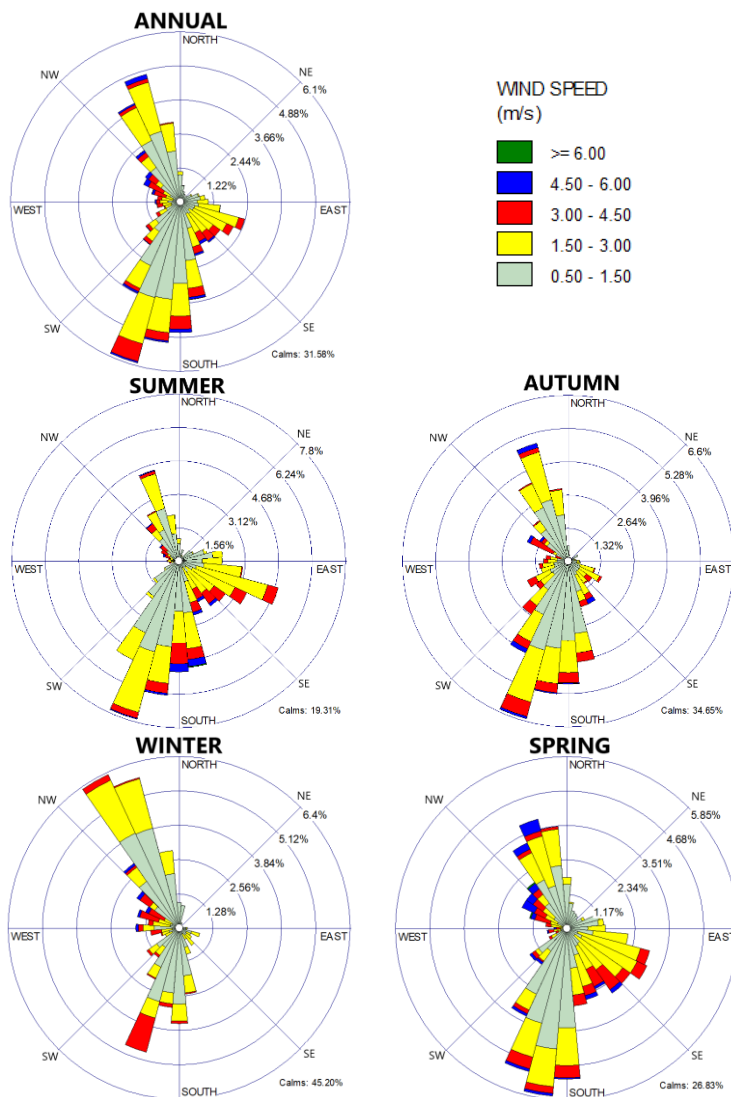


Figure 4-6: St. Mary's AQMS Wind Roses, 2023

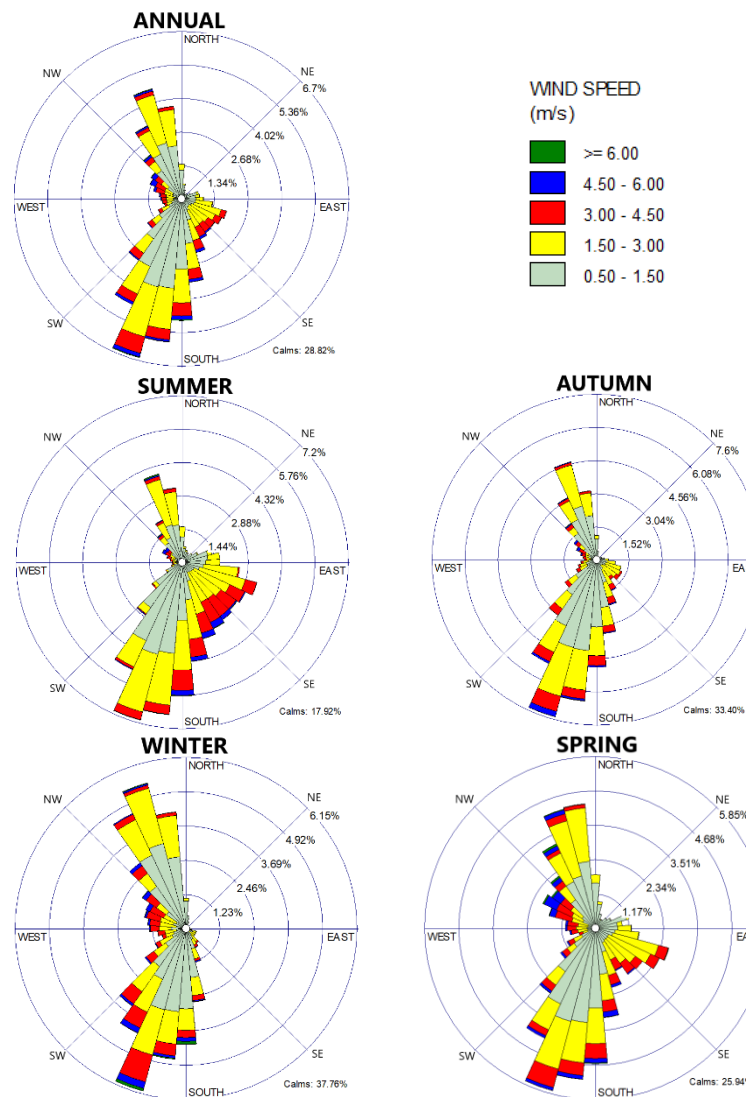


Figure 4-7: St. Mary's AQMS Wind Roses, 2019 - 2023

4.1.3 Local Ambient Air Quality

No site-specific data are available to determine the existing concentrations of air pollutants at sensitive receptors near the proposed development. Data on existing background pollution concentrations were obtained from the NSW Department of Planning and Environment (DPE) Air Quality Monitoring network. The DPE operates a network of AQMS across NSW. The nearest AQMS measuring the selected pollutants is located at St. Mary's approximately 3.7 km south of the proposed development.

A summary of the ambient air quality monitoring data collected for year 2022 at St. Mary's AQMS is presented in Table 4-2. Note that Total Suspended Particulates (TSP) and deposited dust are not monitored at the station. Instead, annual average background TSP concentrations were estimated from a relationship with measured PM₁₀ concentrations. This relationship assumes that 40% of the TSP is PM₁₀ and was established as part of a review of ambient monitoring data collected by co-located TSP and PM₁₀ monitors operated for reasonably long periods of time in the Hunter Valley (NSW Minerals Council, 2000).

To estimate annual average dust deposition levels, a similar process to the method used to estimate TSP concentrations is applied. This approach assumes that a TSP concentration of 90 µg/m³ will have an equivalent dust deposition value of 4 g/m²/month. Based on this approach, the background annual average dust deposition was 1.33 g/m²/month for the area surrounding the proposed development.

Table 4-2: Ambient air quality monitoring concentrations used in the AQ Assessment

Pollutant	Averaging Period	Concentration (µg/m ³)	Impact Criteria (µg/m ³)	Ambient Air Quality Concentration as a % of Criteria
Total suspended particulates (TSP)	Annual ¹	26.6	90	30%
Particulate matter ≤10 µm (PM₁₀)	Annual ²	11.7	25	47%
	24-hour ³	29.9	50	60%
Particulate matter ≤2.5 µm (PM_{2.5})	Annual ²	4.0	8	50%
	24-hour ³	12.8	25	51%
Deposited Dust	Annual ⁴	1.18 g/m ² /month	4 g/m ² /month	29%

Note

1. Calculated assuming 40% of the TSP is PM₁₀
2. Average of 1-hour data over the year
3. Maximum of 24-hour data over the year
4. Calculated assuming 90 µg/m³ will have an equivalent dust deposition value of 4 g/m²/month

As seen in Table 4-2, the ambient concentrations of all the pollutants are well below the criteria for all pollutants.

5 POTENTIAL SOURCES OF AIR EMISSIONS

Air emissions are likely during both the construction and the operation of the proposed development. The most likely air quality sources for construction and operation are summarised in the following sections.

5.1 Construction Phase

At the time of preparing this assessment a detailed construction programme had not been developed, but the following stages and typical activities can be expected:

- Minor dust emissions from demolition and staging works
- Dust emissions from earthworks and civil works
- Minor Exhaust emissions from vehicles and equipment's
- Minor dust emissions from the construction of structure

Demolition and Excavation is the only construction stage with potential to release substantial dust emissions. Minor dust emissions are expected from all other construction stages.

5.2 Operational Phase

Dust emissions during operation of the Proposal have been estimated based on information provided by the client, using emission factors sourced from both locally developed and US EPA developed documentation.

The significant sources of dust/particulate emissions associated with the operation of the Proposal are identified as:

- Loading/unloading of material;
- Processing (grinding/crushing and screening) material;
- Truck movements on paved roads; and
- Vehicle Combustion exhaust

No material handling, processing or stockpiling would occur outside the building. Therefore, windblown dust emissions would be negligible. A control factor of 70% has been applied to all sources located inside the building.

The estimated dust emissions associated with the operation of the Proposal are presented in Table 5-1. A detailed emissions inventory is provided in Appendix A.

Table 5-1: Estimated Operational Dust Emissions

Source ID's	Activity	Total Emissions (kg/year)			Base Emission Rate (g/s)		
		TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
RA1 - Volume Source	Raw Material Dumped to Stockpile	233.6	93.5	14.2	1.34×10 ⁻⁰²	5.37×10 ⁻⁰³	8.13×10 ⁻⁰⁴
	Load Material into Feed Hopper (Feeding Excavator)	233.6	93.5	14.2	1.34×10 ⁻⁰²	5.37×10 ⁻⁰³	8.13×10 ⁻⁰⁴
	Vehicle Exhaust Emissions - Receiving Area	3.6	1.4	1.3	2.05×10 ⁻⁰⁴	8.21×10 ⁻⁰⁵	7.75×10 ⁻⁰⁵
PS1 - Volume Source	Screening Material	29.6	10.1	0.9	1.70×10 ⁻⁰³	5.80×10 ⁻⁰⁴	5.42×10 ⁻⁰⁵
	Processing Material	16.2	7.3	1.3	9.29×10 ⁻⁰⁴	4.18×10 ⁻⁰⁴	7.74×10 ⁻⁰⁵
UNLD1 - Volume Source	Unload Processed Material to Stock Piles	233.6	93.5	14.2	1.34×10 ⁻⁰³	5.37×10 ⁻⁰³	8.13×10 ⁻⁰⁴
	Load Processed Material to Truck	1,401.1	560.4	84.9	8.05×10 ⁻⁰²	3.22×10 ⁻⁰²	4.87×10 ⁻⁰³
	Skip Truck Idling - Unloading Area	0.5	0.2	0.2	2.72×10 ⁻⁰⁵	1.09×10 ⁻⁰⁵	1.03×10 ⁻⁰⁵
SLINE1 - Line Volume Source	Loaded Trucks Entering Site	435.4	56.4	13.6	2.50×10 ⁻⁰²	3.24×10 ⁻⁰³	7.83×10 ⁻⁰⁴
	Empty trucks entering site	54.9	7.1	1.7	3.16×10 ⁻⁰³	4.08×10 ⁻⁰⁴	9.88×10 ⁻⁰⁵
SLINE2 - Line Volume Source	Unloaded Trucks Leaving Site	286.2	37.0	9.0	1.64×10 ⁻⁰²	2.13×10 ⁻⁰³	5.15×10 ⁻⁰⁴
	Loaded Trucks Leaving Site	153.2	19.8	4.8	8.80×10 ⁻⁰³	1.14×10 ⁻⁰³	2.75×10 ⁻⁰⁴

6 CONSTRUCTION DUST ASSESSMENT

6.1 Methodology

A qualitative assessment method of dust impacts associated with the construction of the proposed development is considered appropriate for this project. The assessment follows the “Guidance on the Assessment of Dust from Demolition and Construction” published by the Institute of Air Quality Management in the United Kingdom (IAQM 2024).

This approach has been widely used for performing qualitative assessments of dust emissions from construction sites and has been used in NSW by RWDI and other consultants. Furthermore, it has been accepted as a suitable approach in the absence of any guidance by Australian regulatory authorities.

This approach presents the risk of dust soiling and human health impacts associated with four types of activities that occur on construction sites (demolition, earthworks, construction and trackout) and involves the following steps:

- Step 1: Screen the need for a detailed assessment;
- Step 2: Assess the risk of dust impacts arising, based on:
 - The potential magnitude of dust emissions from the works; and
 - The sensitivity of the surrounding area.
- Step 3: Identify site-specific mitigation; and
- Step 4: Consider the significance of residual impacts, after the implementation of mitigation measures.

For this assessment, the process outlined above will be applied to the worst-case on-site and off-site activities that are likely to result in the highest generation of dust. This approach will result in a conservative assessment of the potential risks for human health and dust soiling impacts.

6.2 Assessment of Construction Dust Impacts

The following qualitative risk assessment of potential dust impacts has been conducted for the proposed construction works.

6.2.1 Step 1 – Screen the Need for a Detailed Assessment

The IAQM guidance recommends that a risk assessment of potential dust impacts from construction activities be undertaken when human receptors are located within:

- 250 m of the boundary of the site; or,
- 50 m of the route(s) used by construction vehicles on public roads up to 250 m from the site entrance(s).

As some of the nearby sensitive receptors identified in Table 2-1 and shown in Figure 2-1, are located within 250 m of the Site and therefore, an assessment of dust impacts is recommended under the guideline.

6.2.2 Step 2A – Potential Dust Emission Magnitude

In accordance with the IAQM guidance (Section 7, Step 2: Assess the Risk of Dust Impacts), the dust emission magnitude for the proposed modification:

- Small for demolition.
- Small for earthworks.
- Small for construction.
- Small for trackout.

6.2.3 Step 2B – Sensitivity of Surrounding Area

The sensitivity of the surrounding area to dust impacts considers a number of factors, including:

- Specific receptor sensitivities;
- The number of receptors and their proximity to the works;
- Existing background dust concentrations; and,
- Site-specific factors that may reduce impacts, such as trees that may reduce wind-blown dust.

In accordance with the IAQM guideline, the following receptor sensitivity has been determined:

- **Low** sensitivity to dust soiling.
- **Low** sensitivity to human health.

6.2.4 Step 2C – Define the Risk of Impacts

To define the risk of impacts, the dust emission magnitude (“small” for this site) is combined with the sensitivity of the area, for demolition, earthworks, construction and trackout, respectively. In accordance with the IAQM guideline, the following risks has been determined:

- Demolition works - **Negligible** risk for both dust soiling and human health;
- Earthwork Activities - **Negligible** risk for both dust soiling and human health;
- Construction Activities - **Negligible** risk for both dust soiling and human health; and
- Haulage/Trackout activities - **Negligible** risk for both dust soiling and human health.

The above risks assume that the dust mitigation measures are not implemented.

6.2.5 Step 3 – Site-Specific Mitigation

The IAQM guidance document identifies a range of appropriate dust mitigation measures that should be implemented as a function of the risk of impacts. These measures are presented in Section 8.1.

6.2.6 Step 4 – Significance of Residual Impacts

In accordance with the IAQM guidance document, the final step in the assessment is to determine the significance of any residual impacts, following the implementation of mitigation measures. To this end, the guidance states:



“For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be “not significant”.

Based on the proposed works, and the advice in the IAQM guidance document, it is considered unlikely that these works would result in unacceptable air quality impacts, subject to the implementation of the mitigation measures outlined in Section 8.1 below.

7 OPERATIONAL DUST ASSESSMENT

7.1 Methodology

The approach taken for the operational dust assessment is as follows:

1. Determine meteorological information (section 7.2).
2. Estimate annual dust emissions of each activity associated with worst-case operations of proposed development (section 5.2 above).
3. Provide emissions and meteorological information to a computer-based dispersion model to predict dust concentrations in the region and at nearest sensitive receptors for the above scenarios (section 7.2).
4. Compare predicted concentrations with relevant air quality criteria (sections 7.3).

7.2 Meteorological Modelling

7.2.1 TAPM

No meteorological observation data is available for the Proposal Site. Therefore, site-specific meteorological data was generated through the use of a prognostic model. The prognostic model used was The Air Pollution Model (TAPM), developed and distributed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

TAPM is an incompressible, non-hydrostatic, primitive equations prognostic model with a terrain-following vertical coordinate for three-dimensional simulations. It predicts the flows important to local scale air pollution, such as sea breezes and terrain induced flows, against a background of large-scale meteorology provided by synoptic analyses. TAPM benefits from having access to databases of terrain, vegetation and soil type, leaf area index, sea-surface temperature and synoptic scale meteorological analyses for various regions around the world.

The prognostic modelling domain was centred at 33.76° S, 150.78° E and involved four nesting grids of 30 km, 10 km, 3 km and 1 km with 41 grids points in the lateral dimensions and 25 vertical levels.

The TAPM model included assimilation of wind data collected at the St. Mary's AQMS during 2022.

7.2.2 AERMET

The TAPM results, including predictions of wind speed, wind direction, temperature, humidity, cloud cover, solar radiation and rainfall, were used as inputs to AERMET – AERMOD's meteorological pre-processor. AERMET uses the TAPM data, along with land use data, to calculate mixing heights and velocity scaling parameters.

The wind-rose plots generated by AERMET using TAPM modelling results are shown in Figure 7-1. The annual wind roses produced by AERMET have predominately south-southwest and north-northwest winds which is similar to winds observed at directions observed at the Horsley Park Equestrian AWS and St. Mary's AQMS. Wind speeds tend to be somewhat lower than observed. Overall, the meteorological data used in the model can be considered sufficiently representative of the Proposal Site.

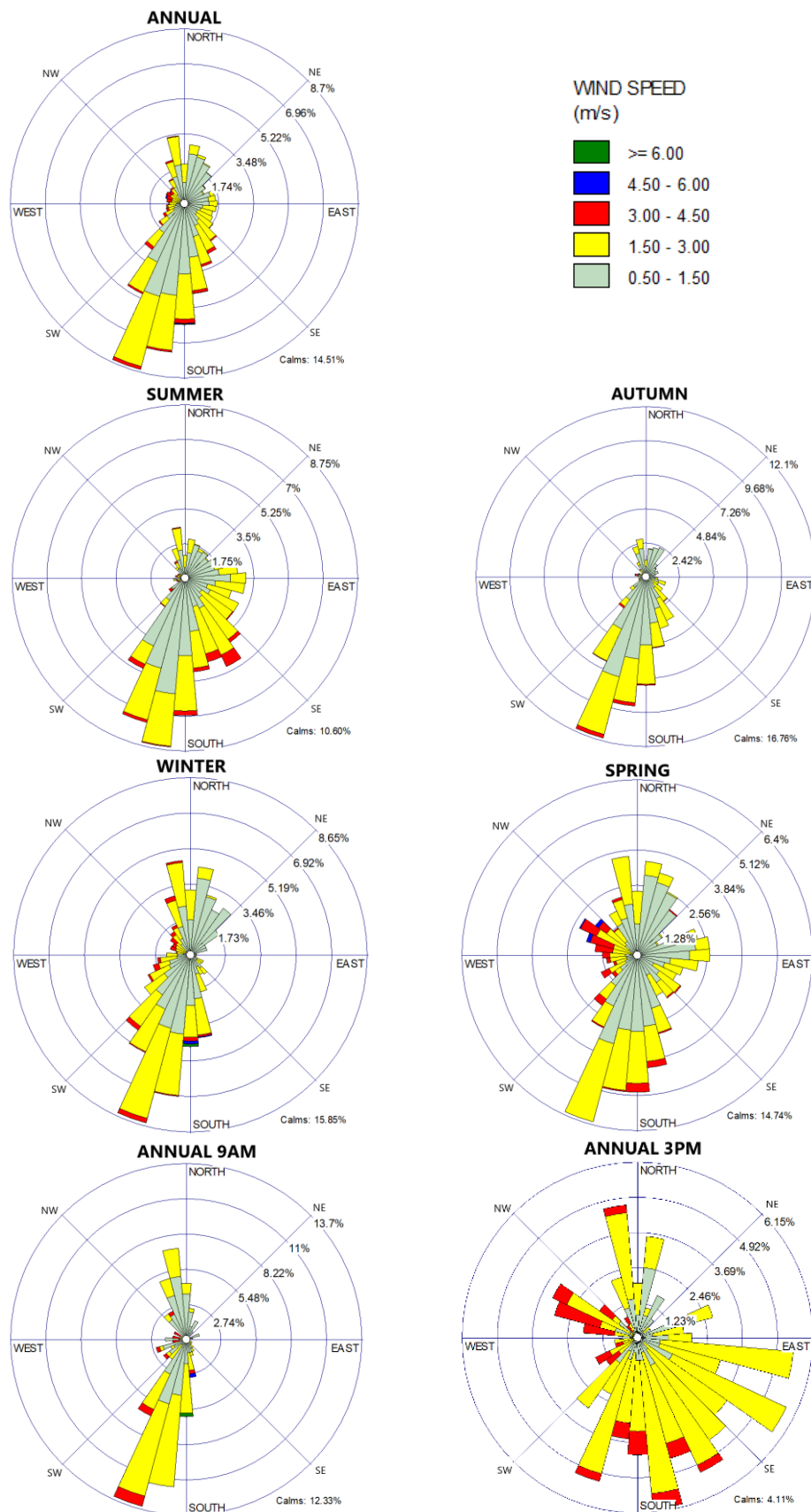


Figure 7-1: AERMET Wind Roses, 2022

7.2.3 AERMOD

The dispersion model chosen for this assessment was AERMOD – the US EPA regulatory Gaussian plume air dispersion model. AERMOD is a steady state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts. It includes treatment of both surface and elevated sources, and both simple and complex terrain. AERMOD is accepted by NSW EPA for use in air quality impact assessments.

For the current study, the worst-case operational scenario of dust emissions was modelled with the operations represented by a series of volume sources (including line volume sources for truck movements). Emission rates for each source were estimated considering maximum activities that would take place at that location.

7.3 Assessment of Operational Dust Impacts

This section presents the dispersion modelling results and discusses the likely off-site air quality impacts associated with the operation of the Proposal.

7.3.1 Fine Particulate matter (PM_{2.5})

Table 7-1 presents the summary of the incremental and cumulative 24-hour average and annual average PM_{2.5} concentrations predicted at each surrounding sensitive receptor.

Table 7-1: Predicted Maximum 24-hour and Annual Average PM_{2.5} Concentrations at Sensitive Receptors

Receptor	24-hour Averaging Time (Criterion: 25 µg/m ³)		Annual Averaging Time (Criterion: 8 µg/m ³)	
	Incremental Impact (µg/m ³)	Cumulative Impact (µg/m ³)	Incremental Impact (µg/m ³)	Cumulative Impact (µg/m ³)
R1	0.91	11.37	0.33	4.20
R2	1.29	11.19	0.19	4.06
P1	0.16	11.07	0.03	3.90
RA1	0.20	11.07	0.03	3.90
RC1	0.24	11.11	0.07	3.94
R3	0.14	11.08	0.04	3.91
R4	0.88	11.49	0.20	4.07
R5	0.40	11.15	0.08	3.95
R6	0.80	11.07	0.06	3.93
R7	1.00	11.10	0.10	3.97
R8	1.20	11.12	0.14	4.01
R9	1.19	11.21	0.21	4.08
R10	0.62	11.15	0.12	3.99

Receptor	24-hour Averaging Time (Criterion: 25 µg/m³)		Annual Averaging Time (Criterion: 8 µg/m³)	
	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)
R11	0.46	11.11	0.08	3.94
R12	0.27	11.08	0.05	3.92
R13	0.10	11.06	0.02	3.89

The results in Table 7-1 show that the Incremental and cumulative 24-hour average and annual average PM_{2.5} concentrations predicted at each surrounding sensitive receptor caused by operational emissions are below the applicable criteria. The predicted air quality impacts near the surrounding locations are presented as contour plots of incremental 24-hour and annual average PM_{2.5} in Appendix B.

7.3.2 Coarse Particulate matter (PM₁₀)

Table 7-2 presents the summary of the incremental and cumulative 24-hour average and annual average PM₁₀ concentrations predicted at each surrounding sensitive receptor.

Table 7-2: Predicted Maximum 24-hour and Annual Average PM₁₀ Concentrations at Sensitive Receptors

Receptor	24-hour Averaging Time (Criterion: 50 µg/m³)		Annual Averaging Time (Criterion: 25 µg/m³)	
	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)
R1	5.61	31.88	2.03	13.76
R2	7.90	30.75	1.15	12.88
P1	1.00	30.08	0.21	11.94
RA1	1.23	30.06	0.20	11.93
RC1	1.46	30.30	0.44	12.17
R3	0.83	30.13	0.24	11.98
R4	5.45	32.64	1.25	12.98
R5	2.48	30.57	0.50	12.23
R6	4.89	30.06	0.38	12.11
R7	6.16	30.23	0.62	12.36
R8	7.33	30.38	0.85	12.59
R9	7.14	30.87	1.24	12.98
R10	3.78	30.53	0.75	12.48
R11	2.79	30.28	0.46	12.19

Receptor	24-hour Averaging Time (Criterion: 50 µg/m³)		Annual Averaging Time (Criterion: 25 µg/m³)	
	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)	Incremental Impact (µg/m³)	Cumulative Impact (µg/m³)
R12	1.68	30.15	0.29	12.02
R13	0.60	30.03	0.14	11.88

The results in Table 7-2 show that the Incremental and cumulative 24-hour average and annual average PM₁₀ concentrations predicted at each surrounding sensitive receptor caused by operational emissions are below the applicable criteria. The predicted air quality impacts near the surrounding locations are presented as contour plots of incremental 24-hour and annual average PM_{2.5} in Appendix B.

7.3.3 TSP and Deposited Dust

Table 7-3 presents the summary of the incremental and cumulative annual average of TSP and Deposited Dust concentrations predicted at each surrounding sensitive receptor.

Table 7-3: Predicted Annual Average TSP Concentrations and Annual Averages of Total Monthly Dust Deposition at Sensitive Receptors

Receptor	Annual Average TSP (µg/m³)		Deposited Dust (g/m²/month)	
	Incremental Impact	Cumulative Impact (Criterion: 90 µg/m³)	Incremental Impact (Criterion: 2 g/m²/month)	Cumulative Impact (Criterion: 4 g/m²/month)
R1	4.38	31.04	0.13	1.31
R2	2.68	29.34	0.05	1.23
P1	0.38	27.04	0.01	1.19
RA1	0.36	27.02	0.01	1.19
RC1	0.86	27.52	0.02	1.20
R3	0.45	27.11	0.01	1.19
R4	2.59	29.25	0.08	1.26
R5	1.00	27.67	0.02	1.20
R6	0.88	27.54	0.02	1.20
R7	1.44	28.10	0.03	1.21
R8	1.99	28.65	0.04	1.22
R9	2.83	29.49	0.06	1.24
R10	1.61	28.27	0.03	1.21
R11	0.92	27.59	0.02	1.20



Receptor	Annual Average TSP ($\mu\text{g}/\text{m}^3$)		Deposited Dust ($\text{g}/\text{m}^2/\text{month}$)	
	Incremental Impact	Cumulative Impact (Criterion: $90 \mu\text{g}/\text{m}^3$)	Incremental Impact (Criterion: $2 \text{ g}/\text{m}^2/\text{month}$)	Cumulative Impact (Criterion: $4 \text{ g}/\text{m}^2/\text{month}$)
R12	0.55	27.21	0.01	1.19
R13	0.26	26.92	0.01	1.19

The results in Table 7-3 show that the incremental and cumulative annual average TSP concentrations and dust depositions predicted at all surrounding sensitive receptors as a result of operational emissions are below the applicable criteria. The contour plots for annual average TSP concentrations are not shown as the incremental annual average concentrations are well below the criteria.

The existing building has air extraction system and dust filters on waste receipt shed area. Therefore, the dust impact would be negligible and likely insignificant.

8 RECOMMENDED MITIGATION AND MANAGEMENT

8.1 Construction Dust Mitigation Measures

The assessment of potential dust impacts from the proposed works indicate that the proposed project will have a **negligible risk** for all the activities (demolition, earthworks, construction and trackout) for both dust soiling and human health impacts if dust mitigation measures are not implemented.

To ensure best practice management, the following mitigation measures are recommended so that construction dust impacts are minimised.

- **Site Management:**
 - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
 - Make the complaints log available to relevant authorities (Council, EPA, etc).
- **Measures for General Construction Activities:**
 - Ensure an adequate water supply on the Site for effective dust/PM suppression/mitigation, using non-potable water where possible and appropriate.
 - Ensure equipment is readily available on Site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

8.2 Operational Dust Mitigation and Management

Air quality impacts associated with the operation of the Proposal are predicted to comply with relevant impact assessment criteria. Notwithstanding, in an effort to minimise air quality impacts associated with the Proposal, the following mitigation measures should be implemented where reasonable and feasible:

- engines of vehicles and plant to be switched off when not in use;
- vehicles and plant to be maintained in accordance with manufacturer's specifications;
- reduce drop heights when handling dusty material;
- dampen excessively dusty material during handling;
- trafficable areas to be swept/cleaned regularly;
- vehicles restricted to designated routes;
- on-site speed limits enforced;
- vehicle loads to be covered when travelling off-site; and
- although the results would comply with the established criteria when the doors are open, it is recommended to keep the doors closed.



9 CONCLUSION

RWDI was engaged by Nassif Civil Pty Ltd c/- Jackson Environment and Planning Pty Ltd to conduct an AQIA to accompany EIS and DA for the proposed construction and demolition (C&D) waste processing facility located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353). The proposed C&D facility would process up to 99,000 tonnes per annum of wastes generated mainly from construction sites.

The assessment concludes:

- The construction phases would be adequately managed so that the short-term and temporary dust related impacts would be negligible risk.
- The results of the dispersion modelling indicate that most pollutants concentrations (dust) due to the operation of the proposed development would comply with the established criteria at nearby sensitive receptors.

As such, it is expected that the air quality impacts from the proposed development would be negligible and likely insignificant.



10 REFERENCES

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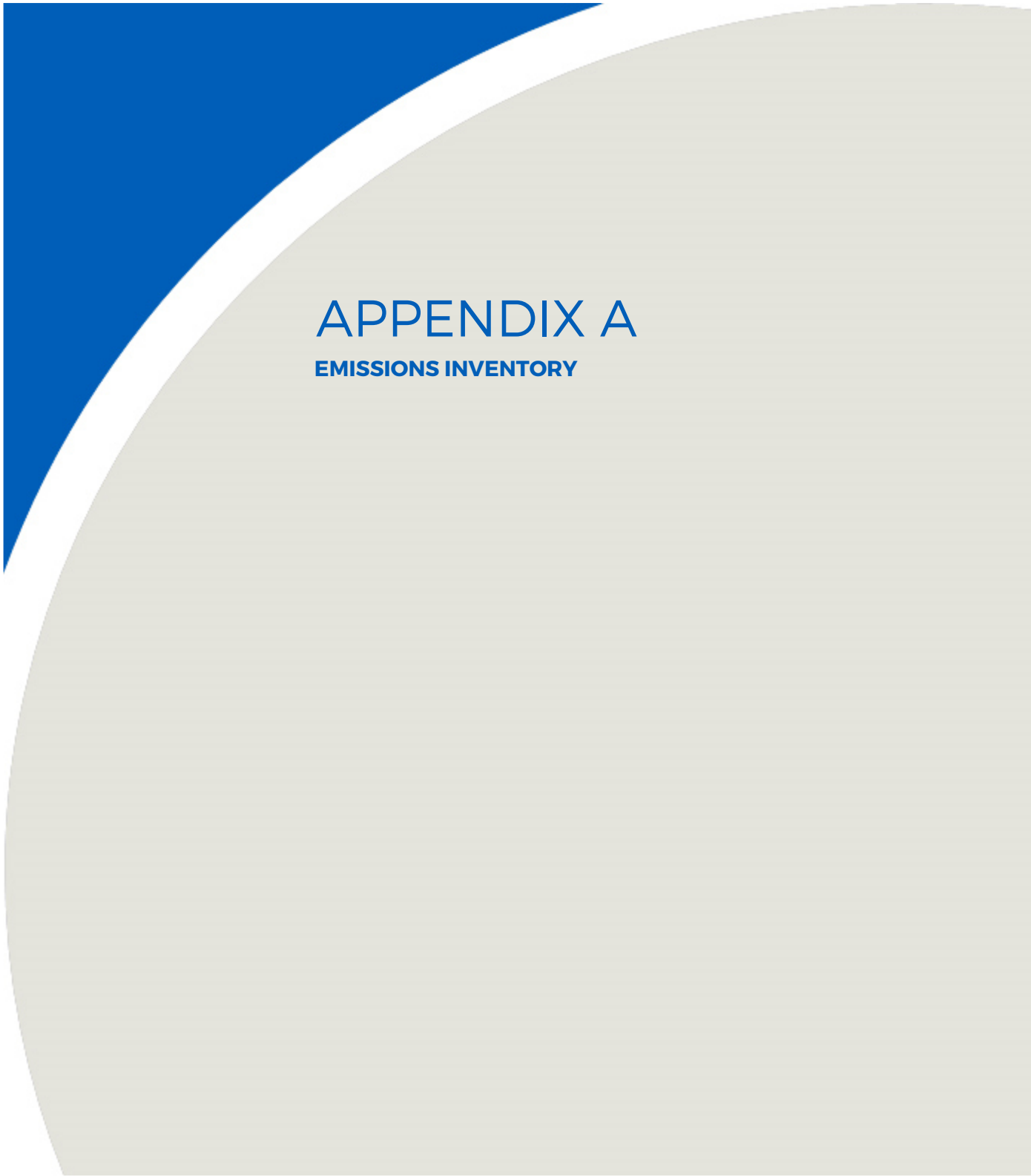


11 STATEMENT OF LIMITATIONS

This report entitled *Nassif Civil Resource Recovery Facility, Air Quality Impact Assessment*, dated 25 November 2024, was prepared by RWDI Australia Pty Ltd ("RWDI") for Nassif Civil Pty Ltd c/- Jackson Environment ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

A large decorative graphic on the left side of the page, featuring a blue triangle at the top left and a large, light beige curved shape that sweeps across the middle and bottom of the page.

APPENDIX A

EMISSIONS INVENTORY

Appendix A1: Hauling Roads Emissions

29-37 Plasser Crescent, North St Marys, NSW

Project #2405613

UNPAVED ROAD SECTIONS - AP-42 Section 13.2.2

PAVED ROAD SECTIONS - AP-42 Section 13.2.1

Paved Roads:	$E = k (sL)^{0.91} (W)^{1.02}$	
Unpaved Roads - Industrial:	$E = 281.9 k (s / 12)^a (W / 3)^b$	
Unpaved Roads - Public:	$E = 281.9 k (s / 12)^a (S / 30)^c / (M / 0.5)^d - C$	
E particulate emission factor (g/VKT)	W average weight of the vehicles traveling the road (US short tons)	M surface material moisture content (%)
k particle size multiplier (see below)	s surface material silt content (%)	S mean vehicle speed (mph)
sL road surface silt loading (g/m ²)	C emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear	a, b, c, d constants (see below)

Activity	Vehicle Type	Traffic Passes [1]			Segment Length [2] (m)	Road Surface [3]	Roadway Type [4]	Mean Vehicle Speed		Average Vehicle Weight [5] (tons)	Surface Material Moisture Content [6] (%)	Surface Silt Content [7] (%)	Road Surface Silt Loading [8] (g/m ²)	Water Control (%)	Base AP-42 Emission Factor			Base Emission Rate		
		Daily	Weekly	Monthly											TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
		(#/d)	(#/w)	(#/m)				(km/h)	(mph)						(g/VKT)	(g/VKT)	(g/VKT)	(g/s)	(g/s)	(g/s)
Loaded Trucks Entering Site	12.5 m High Rigid Vehicle	98	553	2,212	42	Paved	Industrial	25	16	26.5			3		3.68E+02	4.8E+01	1.2E+01	2.50E-02	3.24E-03	7.83E-04
Unloaded Trucks Leaving Site	12.5 m High Rigid Vehicle	98	553	2,212	50	Paved	Industrial	25	16	15			3		2.06E+02	2.7E+01	6.5E+00	1.64E-02	2.13E-03	5.15E-04
Empty trucks entering site	19 m Semi-Trailer Truck	13	627	2,508	42	Paved	Industrial	25	16	15			3		2.1E+02	2.7E+01	6.5E+00	3.16E-03	4.08E-04	9.88E-05
Loaded Trucks Leaving Site	19 m Semi-Trailer Truck	13	74	296	50	Paved	Industrial	25	16	35			3		4.9E+02	6.3E+01	1.5E+01	8.80E-03	1.14E-03	2.75E-04

Constants for Mobile Emission Equations

Roadway Type	Contaminant	k	a	b	c	d	Quality
Paved Roads:	PM_{2.5}	0.15	-	-	-	-	-
	PM₁₀	0.62	-	-	-	-	-
	PM₃₀	3.23	-	-	-	-	-
	TSP	4.79	-	-	-	-	-
Unpaved Roads - Industrial:	PM_{2.5}	0.15	0.9	0.45	-	-	C
	PM₁₀	1.5	0.9	0.45	-	-	B
	PM₃₀	4.9	0.7	0.45	-	-	B
	TSP	7.32	0.6	0.45	-	-	C
Unpaved Roads - Public:	PM_{2.5}	0.18	1	-	0.2	0.5	C
	PM₁₀	1.8	1	-	0.2	0.5	B
	PM₃₀	6	1	-	0.3	0.3	B
	TSP	8.96	1	-	0.49	0.2	C

Comments
Constants for TSP (PM44) extrapolated from published factors for PM30, PM10 and PM2.5. Data quality downgraded by one step.

Hours per day

17

6AM to 11PM M-F, 7AM-3PM Saturday and 52 weeks per year

- [1] As per traffic report, incoming trucks are 98 trucks/day and outgoing trucks are 13 trucks/day
 [2] Length of a specific road segment. A separate segment should be used whenever one or more parameters change.
 [3] Paved surfaces include asphalt, concrete, and recycled asphalt (if it forms a relatively consistent surface).
 [4] Publicly accessible and dominated by light vehicles, or industrial, and dominated by heavy vehicles.
 [5] The average vehicle weight reflects the average of the empty (15 tons) and loaded vehicle weight (26.5 and 35 tons), for travel in both directions.
 [6] Required only for publicly accessible unpaved roads.
 [7] Required only for unpaved roads (public and industrial).
 [8] Required only for industrial paved roads, AP42 13.2.1 Table 13.2.1-2, Access road – ubiquitous baseline for ADT volume <500, Inside the building – for municipal solid waste landfills
 For Truck Deliveries - Table 4: Default Values of sL of 3 g/m² for Paved Roads, Emissions Estimation Technique Manual for Aggregated Emissions from Paved and Unpaved Roads
 (<https://www.dcccew.gov.au/sites/default/files/documents/pavedunpavedff.pdf>)

Sample calculation for uncontrolled TSP emission factor for Activity Loaded Trucks Entering Site: 12.5 m High Rigid Vehicle

$$EF = 281.9 \times 7.32 \times (6.9 / 12)^{0.91} \times (0.6) \times (30 / 3)^{1.02} = 368 \text{ g TSP / vehicle kilometer travelled (vkt)} \quad 217.01$$

Sample calculation for TSP emission rate for Activity Loaded Trucks Entering Site: 12.5 m High Rigid Vehicle

98 vehicles	42 m	1 km	368 g _{TSP}	1.00 day	1 hr	1.00 Water Control	
1 day		1000 m	1 vehicle km	17 hr	3600 s	100	= 2.50E-02 g _{TSP} / s

Appendix A2: Loading / Unloading / Transferring Material Emissions

29-37 Plasser Crescent, North St Marys, NSW

Project #2405613

US EPA emission factor (US EPA, 1985 and updates)

$$E[kg/t] = k \times 0.0016 \times \left(\frac{U}{2.2} \right)^{1.3} \left(\frac{M}{2.0} \right)^{1.4}$$

k = 0.74 for TSP, 0.35 for PM10 and 0.053 for PM2.5

U = wind speed [ms-1] - Average Wind Speed from TAPM Dataset

M = moisture content [%]

Activity	Max Wind Speed [1]	Moisture Content [2]	Control Factor [3]	Base AP-42 Emission Factor			Base Emission Rate		
				TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
	(m/s)	(%)	(%)	(kg/t)	(kg/t)	(kg/t)	(g/s)	(g/s)	(g/s)
Raw Material Dumped to Stockpile	8.3	2.0	70.0%	7.87E-03	3.15E-03	4.76E-04	1.34E-02	5.37E-03	8.13E-04
Load Material into Feed Hopper (Feeding Excavator)	8.3	2.0	70.0%	7.87E-03	3.15E-03	4.76E-04	1.34E-02	5.37E-03	8.13E-04
Unload Processed Material to Stock Piles	8.3	2.0	70.0%	7.87E-03	3.15E-03	4.76E-04	1.34E-02	5.37E-03	8.13E-04
Load Processed Material to Truck	8.3	2.0	70.0%	7.87E-03	3.15E-03	4.76E-04	8.05E-02	3.22E-02	4.87E-03

Constants Emission Equations

Contaminant	k
PM _{2.5}	0.053
PM ₁₀	0.35
PM ₃₀	0.74
TSP	0.875

Annual throughput [t] 99,000 tons/year

Hours per week 93 6AM to 11PM M-F, 7AM-3PM Saturday and 52 weeks per year

[1] Maximum Windspeed from the TAPM Met Data at facility

As per NSW EPA (<https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/070320-constr-demol-waste2.pdf?la=en&hash=6378AA7296D9E01511CBBD2765F7824B60F2F166>) - moisture content is <5%, so assumed 2.0%

[2] No material handling, processing, or stockpiling would occur outside the building. Therefore, windblown dust emissions would be negligible. A control factor of

[2] 70% has been applied to all sources located inside the building.

Sample calculation for uncontrolled TSP emission factor for Activity Raw Material Dumped to Stockpile

$$EF = 0.74 \times 0.0016 \times ((1.0/12)^{(1.3)}) / ((2.5/2.0)^{(1.4)}) = 7.87E-03 \text{ kg TSP / ton (material)}$$

Sample calculation for TSP emission rate for Activity Raw Material Dumped to Stockpile

7.87E-03 kg _{TSP}	1000 g	99000 ton	1 year	1.00 week	1 hr	70.00 Control Factor	=
1 ton	kg	1 year	52 weeks	93 hours	3600 s	100	

Appendix A3: Screening Emissions

29-37 Plasser Crescent, North St Marys, NSW

Project #2405613

US EPA emission factor (US EPA, 1985 and updates - Table 11.19.2-2)

Activity	Screening Tonnage	Control Factor [1]	Base AP-42 Emission Factor [2]			Base Emission Rate		
			TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
			(kg/t)	(kg/t)	(kg/t)	(g/s)	(g/s)	(g/s)
Screening Material	99,000	70%	9.98E-04	3.40E-04	3.18E-05	1.70E-03	5.80E-04	5.42E-05
Processing Material	99,000	70%	5.44E-04	2.45E-04	4.54E-05	9.29E-04	4.18E-04	7.74E-05

No material handling, processing, or stockpiling would occur outside the building. Therefore, windblown dust emissions would be negligible. A

[1] control factor of 70% has been applied to all sources located inside the building.

[2] Controlled emission factors

Annual throughput [t] 99,000 tons/year
Hours per week 93 6AM to 11PM M-F, 7AM-3PM Saturday and 52 weeks per year

Sample calculation for TSP emission rate for Activity Screening Material

9.98E-04 kg_{TSP}

1 ton

1000 g

kg

99000 ton

1 year

1 year

52 weeks

1.00 week

93 hours

1 hr

3600 s

70.00 Control Factor

100

=

1.70E-03 g_{TSP} / s

Appendix A4: Summary of Combustion Exhaust Emissions

29-37 Plasser Crescent, North St Marys, NSW

Project #2405613

US EPA emission factor (US EPA, 1985 and updates)

NPI Emission Estimation Techniques -

Emissions for Combustion engines, version 3.0, Section 5.4.1.1 and 5.4.1.2

Vehicle Combustion Exhaust Emissions:

For Road Transport Particulate emissions

$$E = L \times EF$$

L = Distance Travelled (km/annum), EF = Emission Factor (kg/km)

For Industrial Vehicles

$$E = P \times \text{OpHrs} \times LF \times EF$$

P = Rated Engine Power (kW), OpHrs = Vehicle Operating Hours (h/annum)

LF = Load Factor, EF = Emission Factor (kg/kWh)

Activity	Distance Travelled (L) [1] (km/year)	Rated Engine Power (P) (kW)	Vehicle Operating Hours (OpHrs) (h/annum)	Load Factor (LF)	Emission Factor (kg/km)			Base Emission Rate		
					TSP [2]	PM ₁₀ [3]	PM _{2.5} [3]	TSP (g/s)	PM ₁₀ (g/s)	PM _{2.5} (g/s)
Vehicle Exhaust Emissions - Receiving Area	3055.1	-	-	-	1.29E-03	5.15E-04	4.86E-04	2.05E-04	8.21E-05	7.75E-05
Vehicle Exhaust Emissions - Unloading Area	405.3	-	-	-	1.29E-03	5.15E-04	4.86E-04	2.72E-05	1.09E-05	1.03E-05

Notes

[1] # of vehicles per day x segment length in km x (365-52) workdays

[2] AP-42, USEPA 2009, TSP is 40% of PM₁₀

[3] Based on Emission Factors from Appendix B and C of NPI Emissions for Combustion engines, version 3.0, Section 5.4.1.1 and 5.4.1.2

converted kg/m³ to kg/km based on 0.286 l/km of diesel consumption - <https://www.abs.gov.au/statistics/industry/tourism-and-transport/survey-motor-vehicle-use-australia/latest-release>

Hours per day 17 6AM to 11PM M-F, 7AM-3PM Saturday and 52 weeks per year

Days per year 313

Sample calculation for uncontrolled PM10 emission factor for Activity Vehicle Exhaust Emissions - Receiving Area

$$EF = 0.00252 = 5.15E-04 \text{ kg PM}_{10} / \text{km}$$

Sample calculation for PM10 emission rate for Activity Vehicle Exhaust Emissions - Receiving Area

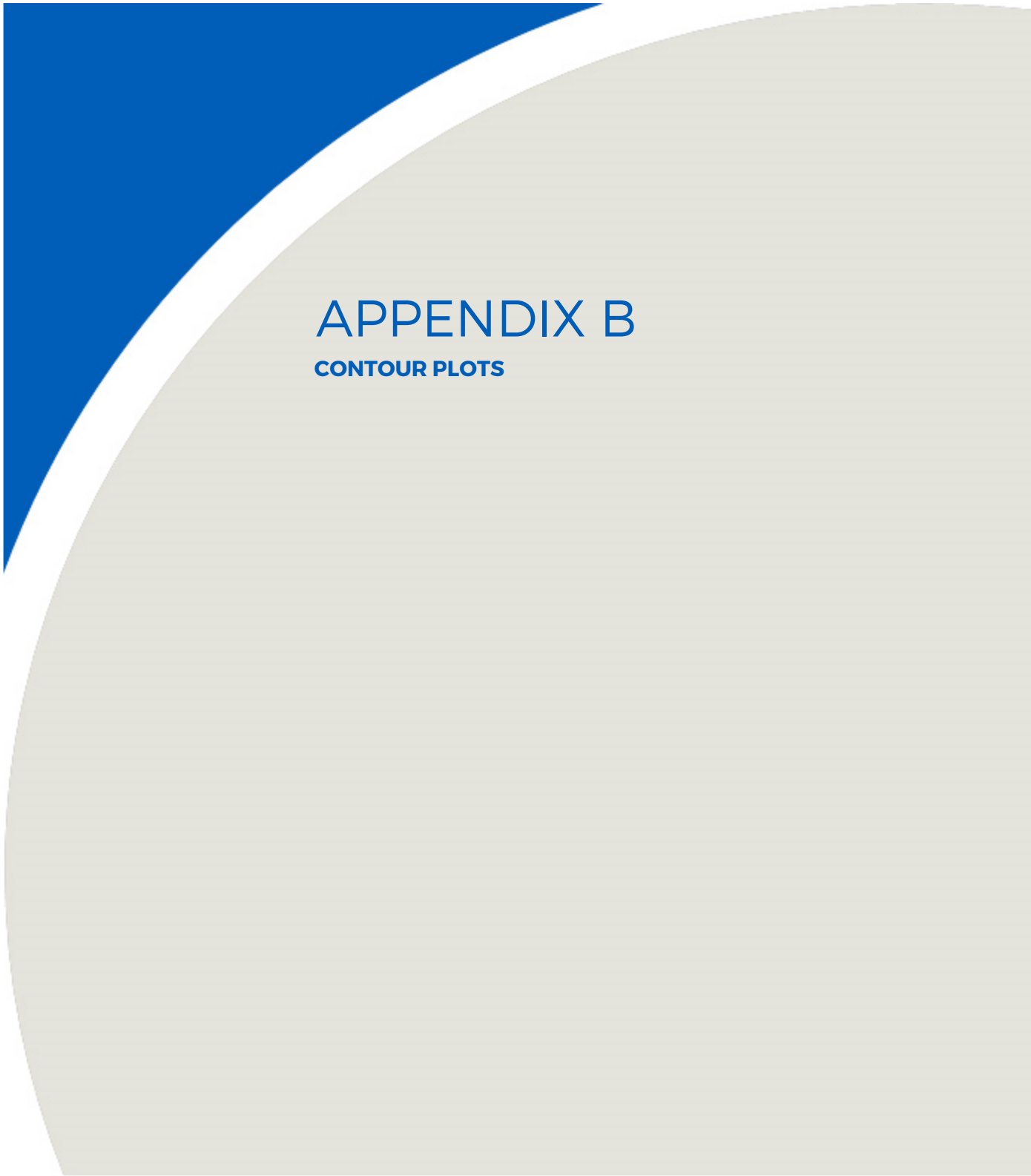
$$\frac{5.15E-04 \text{ kg}_{\text{TSP}}}{1 \text{ km}} \times \frac{1000 \text{ g}}{\text{kg}} \times \frac{3055 \text{ km}}{\text{year}} \times \frac{1 \text{ Year}}{313 \text{ days}} \times \frac{1 \text{ day}}{17 \text{ hour}} \times \frac{1 \text{ hour}}{3600 \text{ s}} = 8.21E-05 \text{ gPM}_{10} / \text{s}$$

Appendix A5: Summary of Emission Inventory

29-37 Plasser Crescent, North St Marys, NSW

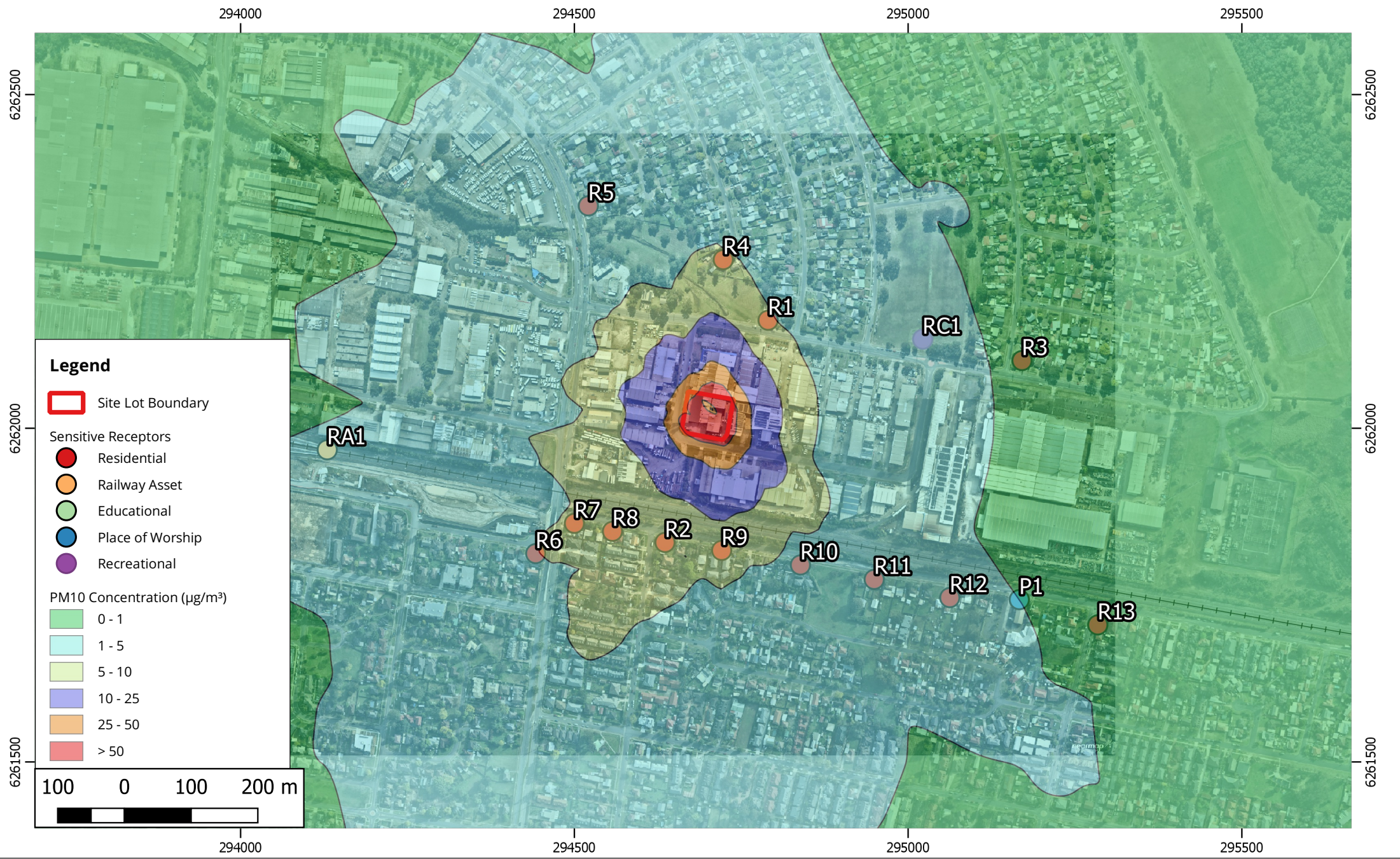
Project #2405613

Source ID's	Activity	Total Emissions (kg/year)			Base Emission Rate (g/s)		
		TSP	PM ₁₀	PM _{2.5}	TSP	PM ₁₀	PM _{2.5}
RA1 - Volume Source	Raw Material Dumped to Stockpile	233.6	93.5	14.2	1.34E-02	5.37E-03	8.13E-04
	Load Material into Feed Hopper (Feeding Excavator)	233.6	93.5	14.2	1.34E-02	5.37E-03	8.13E-04
	Vehicle Exhaust Emissions - Receiving Area	3.6	1.4	1.3	2.05E-04	8.21E-05	7.75E-05
PS1 - Volume Source	Screening Material	29.6	10.1	0.9	1.70E-03	5.80E-04	5.42E-05
	Processing Material	16.2	7.3	1.3	9.29E-04	4.18E-04	7.74E-05
UNLD1 - Volume Source	Unload Processed Material to Stock Piles	233.6	93.5	14.2	1.34E-02	5.37E-03	8.13E-04
	Load Processed Material to Truck	1,401.1	560.4	84.9	8.05E-02	3.22E-02	4.87E-03
	Skip Truck Idling - Unloading Area	0.5	0.2	0.2	2.72E-05	1.09E-05	1.03E-05
SLINE1 - Line Volume Source	Loaded Trucks Entering Site	435.4	56.4	13.6	2.50E-02	3.24E-03	7.83E-04
	Empty trucks entering site	54.9	7.1	1.7	3.16E-03	4.08E-04	9.88E-05
SLINE2 - Line Volume Source	Unloaded Trucks Leaving Site	286.2	37.0	9.0	1.64E-02	2.13E-03	5.15E-04
	Loaded Trucks Leaving Site	153.2	19.8	4.8	8.80E-03	1.14E-03	2.75E-04

A large decorative graphic on the left side of the page. It features a blue triangular shape in the top-left corner, separated from a large light-grey circular area by a white curved line. The text 'APPENDIX B' and 'CONTOUR PLOTS' is centered within the grey area.

APPENDIX B

CONTOUR PLOTS



Legend

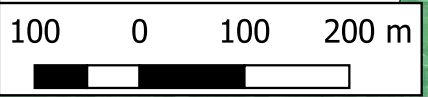
Site Lot Boundary

Sensitive Receptors

- Residential
- Railway Asset
- Educational
- Place of Worship
- Recreational

PM10 Concentration ($\mu\text{g}/\text{m}^3$)

- 0 - 1
- 1 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- > 50



NASSIF CIVIL RESOURCE RECOVERY FACILITY
Contour Plots of 24 Hour Average Incremental PM10 Concentration
Lot 15 & 16 DP 263353

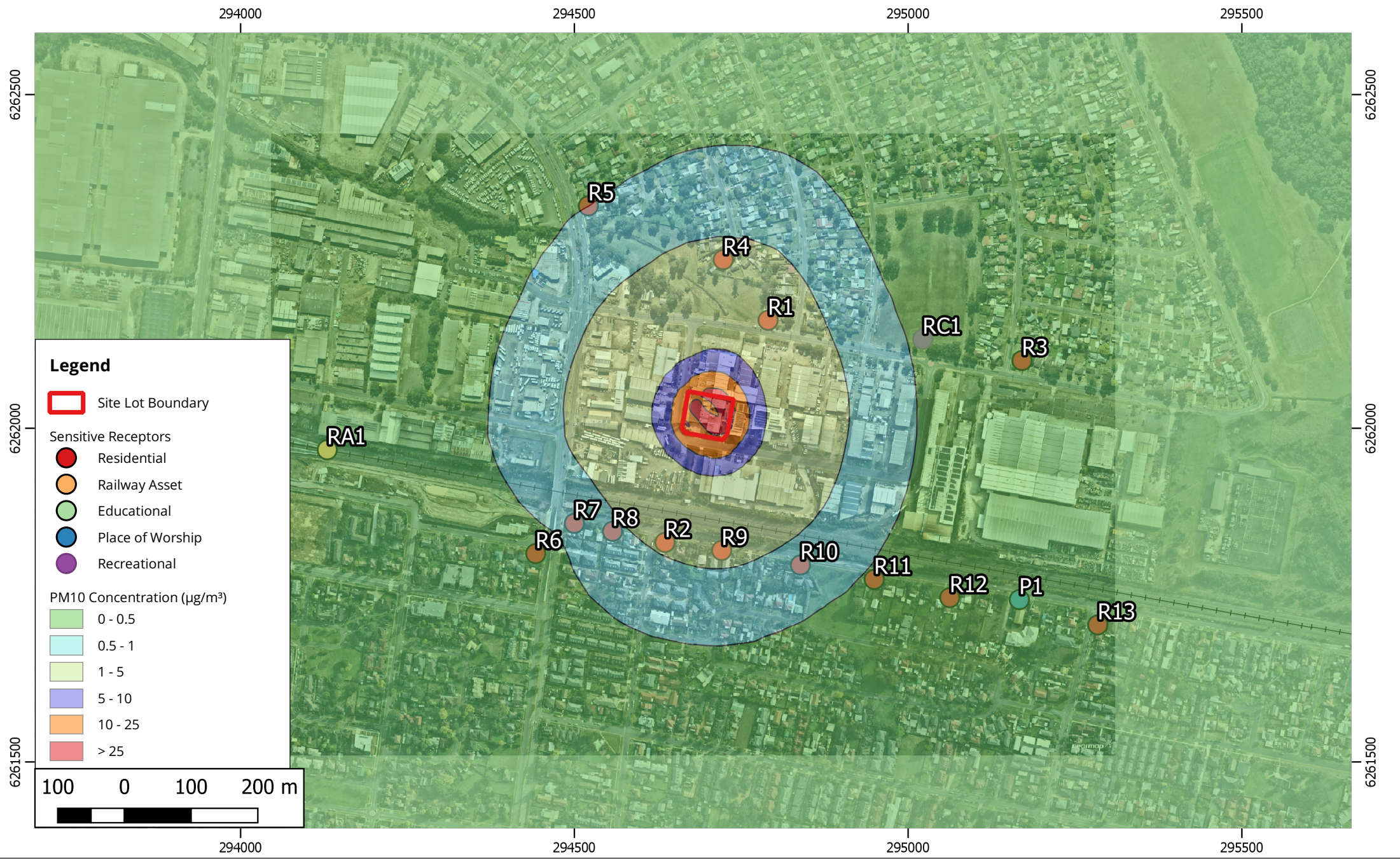
Sources:
1. Basemap: © 2022 Nearmaps

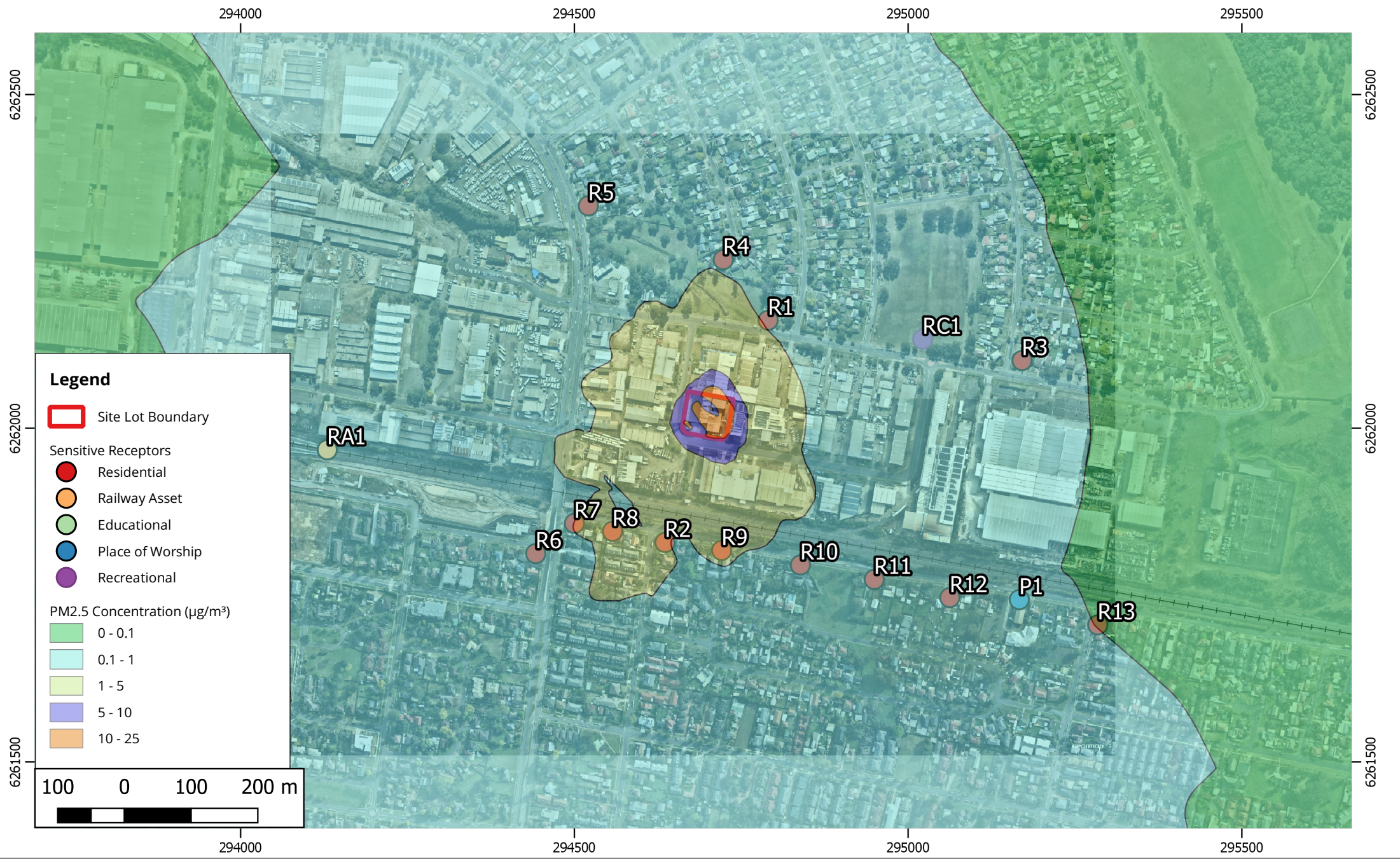
Map Projection: / (EPSG:28356)

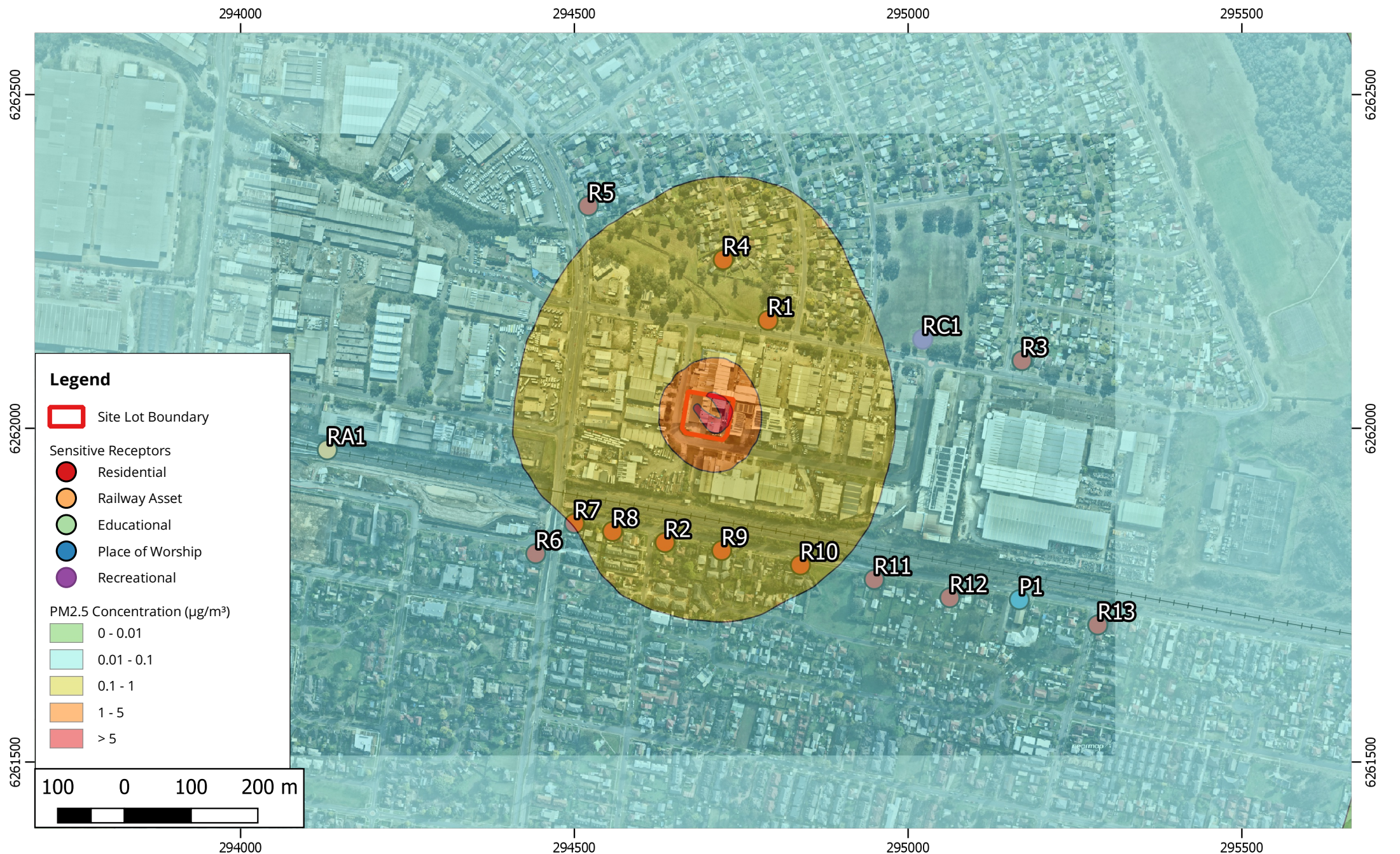


Revised on: 30/05/2024	
Project #: 2405613	Figure: Appendix B-1
Drawn by: RAMA.ROBBI	Checked by: CXR









NASSIF CIVIL RESOURCE RECOVERY FACILITY
 Contour Plots of Annual Average Incremental PM2.5 Concentration
 Lot 15 & 16 DP 263353

Sources:
 1. Basemap: © 2022 Nearmaps

Map Projection: / (EPSG:28356)



Revised on: 30/05/2024	
Project #: 2405613	Figure: Appendix B-4
Drawn by: RAMA.ROBBI	Checked by: CXR

