# AIR QUALITY IMPACT ASSESSMENT
# PREPARED FOR CHANINE DEVELOPMENTS PTY LTD
# 691-695 VICTORIA ROAD, RYDE NSW 2112

***Prepared for:*** Chanine Developments Pty Ltd

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# EXECUTIVE SUMMARY

Benbow Environmental (BE) was engaged by Chanine Developments Pty Ltd to provide an Air Quality Impact Assessment (AQIA) for the proposed development of a childcare centre located at 691-695 Victoria Road, Ryde NSW 2112.

Air quality at the subject site was examined to identify any potential air quality impacts that may affect occupants of the proposed childcare facility. A range of airborne pollutants have been examined including $NO_2$, CO, dust fractions ($PM_{2.5}$ and $PM_{10}$), and BTEX.

Roadside Air Quality Screening Tool (RAQST) was used to model air quality impacts on the proposed development from Blaxland Road and Victoria Road. The results of the model demonstrated negligible air impacts.

In addition, monitoring of air quality impacts has been undertaken at the site at two locations. CO, dust fractions ($PM_{2.5}$ and $PM_{10}$) and BTEX complied with the relevant criteria at both monitoring locations The results indicate that noxious gas Nitrogen Dioxide ($NO_2$) is present at the subject site at elevated levels due to heavy traffic along Victoria and Blaxland Road.

As elevated levels of Nitrogen Dioxide ($NO_2$) are still present in the early mornings and late evenings correlating to heavy traffic along Victoria and Blaxland Road, precautionary measures are recommended for both indoor and outdoor playing areas.

An air filtration system that is able to remove the $NO_2$ and fine particulates is recommended for the indoor play areas. The need for fine particulate removal in conjunction with $NO_2$ filtration is due to a significant proportion of the $NO_2$ (especially from diesel powered vehicles) attaching to particulates, subsequently contributing to further $NO_2$ exposure. The air ventilation system will require at least one (1) hour operation before the children arrive.

It is recommended that the outdoor play area is not utilised during peak traffic periods and outdoor playtimes are not scheduled before 10am or after 4pm.

The air quality model and monitoring demonstrates the site is suitable for the proposed childcare centre regarding air quality impacts, given the proposed recommendations are implemented.

# Contents

Page

# Tables

Page



# Figures

Page

# Attachments

# 1. INTRODUCTION

Benbow Environmental (BE) was engaged by Chanine Developments Pty Ltd to provide an Air Quality Impact Assessment (AQIA) for the proposed development of a childcare centre located at 691-695 Victoria Road, Ryde NSW 2112.

The assessment has been undertaken to ensure that the health of the occupants of the proposed childcare centre, particularly the children, would not be impacted upon by the nearby transport utilities, commercial or industrial premises located in the vicinity of the site.

The proposed childcare centre would have the capacity to accommodate up to 108 children. It is understood that the childcare centre would be occupy the ground level of the proposed mixed-use development. The proposed childcare facility will include two (2) outdoor play areas.

The *Child Care Planning Guideline (2021)* states that where a proposed childcare centre is close to a major road or industrial development an AQIA must be undertaken by a qualified air quality professional to demonstrate the suitability of the subject site.

The proposed site is set along Blaxland Road, Ryde. Future occupants have the potential to be exposed to air pollutants associated with emissions from vehicles on these roads.

This report addresses the suitability of the site and the potential air quality impacts associated with the location.

## 1.1 SCOPE OF WORKS

The scope of this report is limited to the following:

- Assess the air emission impacts of the adjoining land uses to the proposed childcare facility;
- Conduct air quality monitoring for critical pollutants identified given the surrounding land use;
- Compare the measured levels against relevant health limits, with emphasis on exposure to compromised health persons such as children;
- Derive a conclusion from the assessment, providing necessary recommendations to assist the management in making decisions for the use of the outdoor area and any other aspects involving air quality; and
- Prepare an Air Quality Impact Assessment report that summarises the methodology and outcomes from the assessment.

# 2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

## 2.1 LOCATION

The proposed childcare centre is located at 691-695 Victoria Road, Ryde NSW 2112 legally designated as Lot 17 on DP 777986. The site is within Ryde City Council, 10 km northwest of the Sydney CBD.

The land zoning of the site is MU1 – *Mixed Use*. Large areas surrounding the site are R2 – *Low Density* Residential with areas to the north and south of the site being R4 – *High-density* Residential. There is also an area to the south of the site marked as R1 – *General Residential.*

Directly to the north of the site is a large park area demarcated as RE1 – *Public Recreation*, with a few other areas to the south and southeast under the same zoning. There are multiple spaces surrounding the site zones as SP1 – *Special Activities* (health service activities) and Sp2 – *Special Purpose* (educational establishments, police stations, transport depot).

These are visualised in the land zoning map provided by NSW Planning Portal Spatial Viewer in Figure 2-2.

Site identification information and land use is summarised in Table 2-1 and an aerial photograph depicting the site's location is provided in Figure 2-1.

Table 2-1: Site Identification

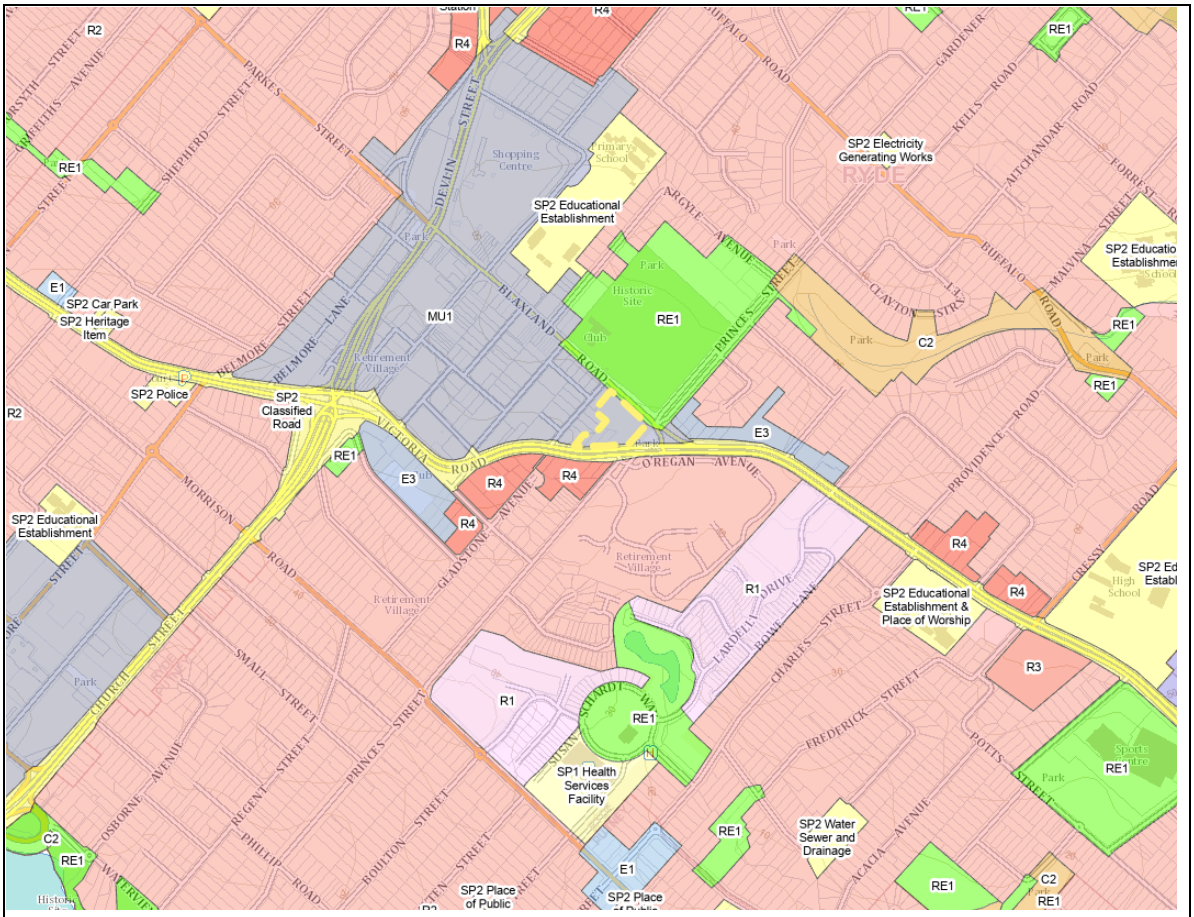
| | |
|---|---|
| **Lot and DP Numbers** | Lot 7, DP 777986 |
| **Approximate Lot Area** | ~6,962 $m^2$ |
| **Local Government Area** | Ryde City Council |
| **Current Land Zoning** | MU1 – Mixed Use |

Figure 2-1: Site location

**Source:** SixMaps (2018)

| | | |
|---|---|---|
| ↑N<br>Not to scale | **LEGEND**:<br>Lot boundaries | Benbow Environmental<br>27 Sherwood Street,<br>Northmead NSW 2152 |

Figure 2-2: Land Use Zoning




**Source:** NSW Planning Portal Land Zoning Map 2023

N

Not to scale

LEGEND

Lot boundaries

**Zone**

| | | | |
|---|---|---|---|
| B1 | Neighbourhood Centre | RE1 | Public Recreation |
| B2 | Local Centre | RE2 | Private Recreation |
| B3 | Commercial Core | RU1 | Primary Production |
| B4 | Mixed Use | RU2 | Rural Landscape |
| B5 | Business Development | RU4 | Primary Production Small Lots |
| B6 | Enterprise Corridor | RU5 | Village |
| E1 | National Parks and Nature Reserves | SP2 | Infrastructure |
| E2 | Environmental Conservation | SP3 | Tourist |
| E3 | Environmental Management | W1 | Natural Waterways |
| E4 | Environmental Living | W2 | Recreational Waterways |
| IN1 | General Industrial | | |
| IN2 | Light Industrial | | |
| IN4 | Working Waterfront | | |
| R2 | Low Density Residential | | |
| R3 | Medium Density Residential | | |
| R4 | High Density Residential | | |

As of 1 December 2021, a reference to an Environment Protection zone E1, E2, E3 or E4 in a document should be taken to be a reference to a Conservation zone C1, C2, C3 or C4. For further information please see Standard Instrument (Local Environmental Plans) Amendment (Land Use Zones) Order 2021 (nsw.gov.au)

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## 2.2 PROPOSED DEVELOPMENT

The proposed childcare centre would accommodate up to 108 children and 18 staff.

The internal areas will consist of indoor playrooms, amenities, offices, cot rooms, storage, cleaning room, kitchen, and staff room, meeting room.

The outdoor areas would include two (2) outdoors play areas. One of the outdoor play areas encompasses the northeastern aspect of the site fronting Blaxland Road and the other towards the south western aspect of the site towards visitor parking.

The architectural plans are included as Attachment 1.

## 2.3 AIR EMISSION IMPACTS FROM SURROUNDING LAND USE

The NSW Department of Planning 'Development Near Rail Corridors and Busy Roads – Interim Guideline' (2008) states that occupants of a childcare facility are likely to be sensitive to emissions from vehicles including fine particles, oxides of carbon and nitrogen dioxide.

The primary source of emission in the subject site's vicinity is from vehicles travelling on the main road (Blaxland Road).

# 3. AIR QUALITY ASSESSMENT

In accordance with relevant legislation, the *Child Care Planning Guideline (2021)* states that where a proposed childcare centre is close to a major road or industrial development, an AQIA must be undertaken by a qualified air quality professional to demonstrate the suitability of the subject site.

The *Child Care Planning Guideline (2021)* stipulates the following:

> *C1*
> *For proposed developments in commercial and industrial zones, consider:*
>
> - *potential impacts on the health, safety and wellbeing of children, staff and visitors with regard to local environmental or amenity issues such as air or noise pollution and local traffic conditions*
> - *the potential impact of the facility on the viability of existing commercial or industrial uses.*
>
> *C26*
> *Locate child care facilities on sites which avoid or minimise the potential impact of external sources of air pollution such as major roads and industrial development.*
>
> *C27*
> *A suitably qualified air quality professional should prepare an air quality assessment report to demonstrate that proposed child care facilities close to major roads or industrial developments can meet air quality standards in accordance with relevant legislation and guidelines.*
>
> *The air quality assessment report should evaluate design considerations to minimise air pollution such as:*
>
> - *Creating an appropriate separation distance between the facility and the pollution source. The location of play areas, sleeping areas and outdoor areas should be as far as practicable from the major source of air pollution*
> - *Using landscaping to act as a filter for air pollution generated by traffic and industry. Landscaping has the added benefit of improving aesthetics and minimising visual intrusion from an adjacent roadway*
> - *Incorporating ventilation design into the design of the facility*

Outdoor play areas have been identified as the area where occupants will have the highest risk of exposure to potential airborne pollutants. The air quality of the outdoor areas has been determined using air monitoring detectors for a number of airborne chemical substances critical to the site to ensure that the health of the occupants of the proposed childcare centre, especially newborns and children, would not be impacted upon by sources of air emissions located within the vicinity of the proposed development.

Measured pollutant concentrations have been compared against relevant health limits, with emphasis on exposure to compromised health persons such as young children.

## 3.1 AIR QUALITY ASSESSMENT CRITERIA

The exposure standards used in this assessment are based on the limits set in the following publications:

- *National Environment Protection (Ambient Air Quality) Measure*, National Environment Protection Council (NEPM 1998).
- Exposure Standards for Atmospheric Contaminants in the Occupational Environment, National Occupational Health and Safety Commission (NOHSC 1995);
- *Workplace Exposure Standards for Airborne Contaminants,* Safe Work (SWA) Australia (2018);
- *Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices*, American Conference of Governmental Industrial Hygienists (ACGIH 2017);
- *Dusts Not Otherwise Specified (Dust NOS) and Occupational Health Issues,* Australian Institute of Occupational Hygienists (AIOH 2014); and
- *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales,* New South Wales EPA (2022).

It is noted that the time-weighted averages provided by SWA and ACGIH are for adult workers, and not limits for children. It is recommended that if these criteria were used for children, that they would need to be divided by a factor of 10.

The National Environment Protection (Ambient Air Quality) Measure National Environment Protection Council (NEPM 1998) and the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2022) provide the relevant criteria for outdoor areas for childcare centres for certain pollutants, and such have been chosen as the primary criteria comparison for this Air Quality Impact Assessment. However, they do not provide an exhaustive list of pollutant limits to reduce risk to children health.

Table 3-1 and Table 3-2 list the threshold limits for the most relevant pollutants (BTEX, noxious gases and dust fractions).

Table 3-1: Threshold Limits for BTEX

| Substance | Source | 1 hour Average | TWA |
|---|---|---|---|
| **Benzene** | ACGIH (2021) | - | 0.5 ppm (0.7 mg/m$^3$) **STEL**: 2.5 ppm (7.99 mg/m$^3$) |
| | SWA | - | 0.2 ppm (0.7 mg/m$^3$) |
| | Approved Methods | **0.029 mg/m$^3$** | - |
| **Toluene** | ACGIH (2021) | - | 20 ppm (75.362 mg/m$^3$) |
| | SWA | - | 20 ppm (75 mg/m$^3$) |
| | Approved Methods | **0.36 mg/m$^3$** | - |

| Substance | Source | 1 hour Average | TWA |
|---|---|---|---|
| **Ethylbenzene** | ACGIH (2021) | - | 20 ppm (86.84 mg/m$^3$) |
| | SWA | - | 20 ppm (87 mg/m$^3$) |
| | Approved Methods | **8.0 mg/m$^3$** | - |
| **Meta- & para-Xylene** | ACGIH (2021) | - | 100 ppm (434.19 mg/m$^3$) **STEL**: 150 ppm (651.29 mg/m$^3$) |
| | SWA | - | 80 ppm (350 mg/m$^3$) **STEL**: 150 ppm (655 mg/m$^3$) |
| | Approved Methods | **0.19 mg/m$^3$** | **-** |
| **Ortho-Xylene** | ACGIH (2021) | - | 100 ppm (434.19 mg/m$^3$) **STEL**: 150 ppm (651.29 mg/m$^3$) |
| | SWA | - | 80 ppm (350 mg/m$^3$) **STEL**: 150 ppm (655 mg/m$^3$) |
| | Approved Methods | **0.19 mg/m$^3$** | **-** |

***Note**: ACGIH criteria are given as ppm, they have been converted to mg/m$^3$ using molecular weights.*

Table 3-2: Threshold Limits for Noxious Gases and Dust Fractions

| Substance | Source | 1 Hour Average | TWA |
|---|---|---|---|
| **Carbon Monoxide (CO)** | ACGIH (2021) | **-** | 25 ppm (28.64 mg/m$^3$) |
| | SWA | - | 20 mg/m$^3$ 23 ppm |
| | NEPM | **9.0 ppm (8 hours)** | - |
| **Nitrogen Dioxide ($NO_2$)** | ACGIH (2021) | **-** | 0.2 ppm (0.38 mg/m$^3$) |
| | SWA | - | 0.2 ppm (0.38 mg/m$^3$) |
| | NEPM | **0.08 ppm** | - |
| **$PM_{10}$** | NEPM | **0.05 mg/m$^3$ (24 hours)** | - |
| **$PM_{2.5}$** | NEPM | **0.025 mg/m$^3$ (24 hours)** | - |

***Note**: ACGIH criteria are given as ppm, they have been converted to mg/m$^3$ using molecular weights; $PM_{2.5}$ and $PM_{10}$ are given in µg/m$^3$ and have been converted.*

## 3.2 MODELLING

The Roadside Air Quality Screening Tool (RAQST) has been used in this assessment. It is a spreadsheet-based tool developed by Transport for NSW to estimate air quality impacts from road projects. It replaces the previous TRAQ tool and aligns with updated modelling practices and CASANZ guidelines.

RAQST supports Level 1 'screening' assessments of air quality impacts near roads, helping determine if more detailed analysis is necessary. It is built in Excel with VBA macros and includes emission calculations and dispersion modelling.

The inputs include project year, road and traffic characteristics, background air quality, and receptor locations and the tool predicts pollutant concentrations ($NO_2$, $PM_{10}$, $PM_{2.5}$) at the nearest sensitive receptor and compares them to the screening criteria.

The emissions are calculated for both exhaust and non-exhaust emissions (e.g., tyre and brake wear), and estimates $CO_2$ and $CO_2$-equivalent emissions.

The dispersion model uses a conservative CALINE 4-based function to estimate how emissions spread from roads to nearby receptors.

If predicted concentrations are below criteria, further assessment may not be needed; otherwise, a detailed Level 2 study is recommended. RAQST is publicly available and designed to be user-friendly, conservative, and consistent with NSW emission inventory practices.

### 3.2.1 Modelling Inputs

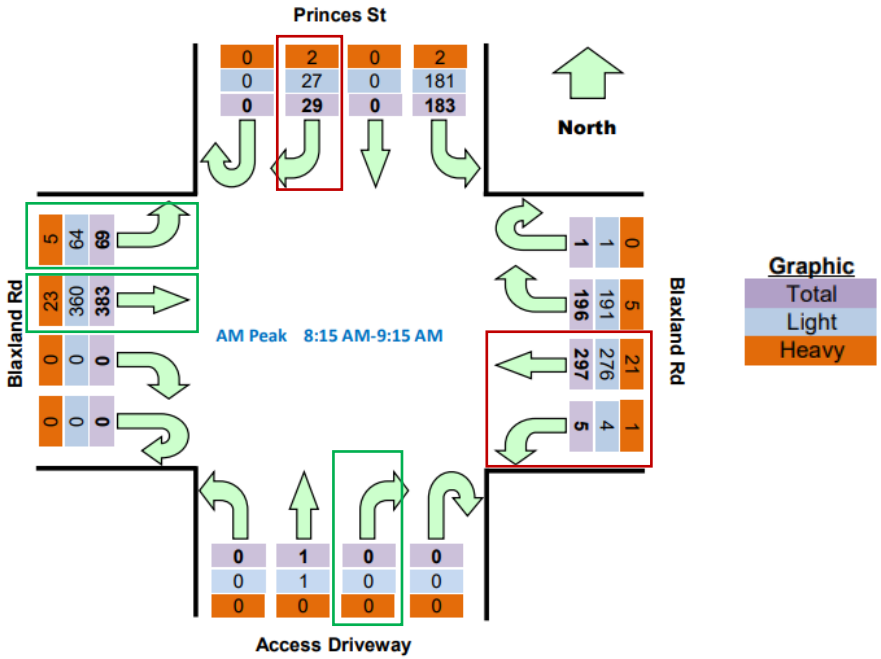
The following table presents the input data utilised in the RAQST Model.

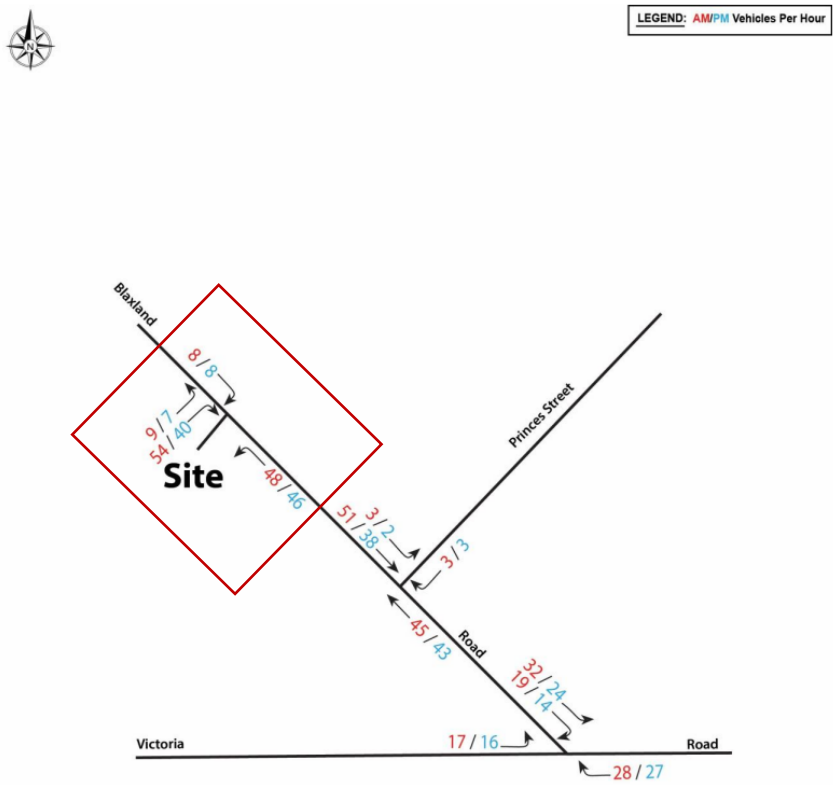
Table 3-3: RAQST Inputs

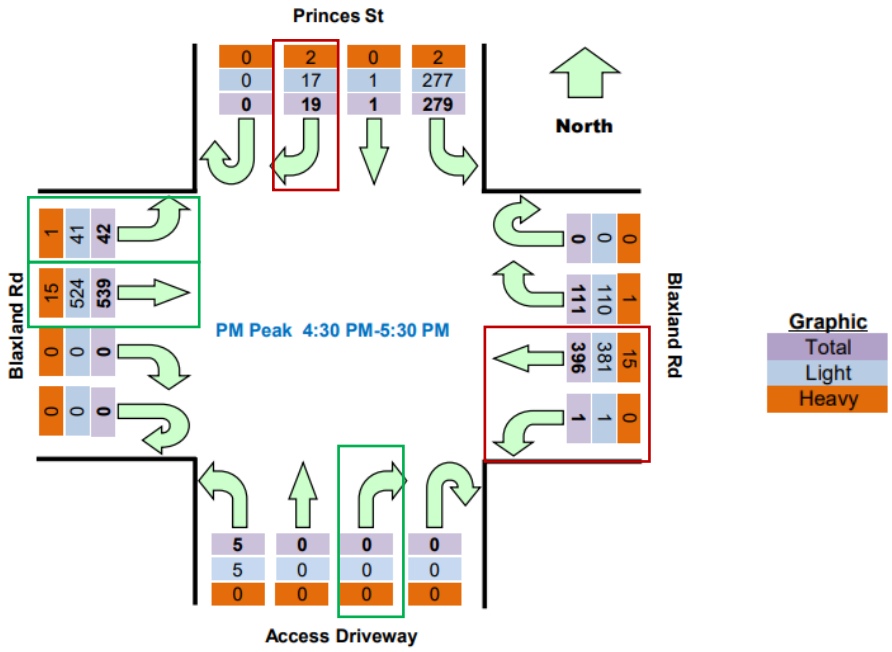
| Road Name | | Victoria Road | Blaxland Road | Comment/Justification |
|---|---|---|---|---|
| 1. General Setup | Assessment year | 2027 | 2027 | Allows for a conservative near-future projection (2 years post expected project commencement). |
| | Electric vehicles projections | YES | YES | Consistent with NSW Net Zero Plan projections supported by RAQST default settings |
| 2. Road Characteristics | Lanes per direction | 3 | 2 | - |
| | Road type | Commercial highway | | Victoria road is a classified commercial highway. Blaxland road is commercial arterial road. |
| | Road gradient in direction A | 0.0% | 0.0% | Conservative assumption, area is relatively flat. |
| | Median strip width (m) | 1m | 0m | Victoria Road has some separation. Blaxland Road has no separation. |
| | Lane width (m) | 3.5 m | 3.5 m | Victoria and Blaxland Road use standard arterial width |
| 3. Traffic data - general | Level for traffic composition | Level 2 | Level 2 | Victoria – Composition data from TfNSW Traffic Volume Viewer; Blaxland – data from Traffic Impact Assessment |
| | Fill with default composition | NO | NO | Victoria – Composition data from TfNSW Traffic Volume Viewer; Blaxland – data from Traffic Impact Assessment |
| | Traffic period | Peak Hour | Peak Hour | 2025 worst case weekly AM peak hour data was used for Victoria; TIA gives peak hour for Blaxland. |
| | Traffic speed (km/hr) | 60 | 60 | Confirmed in TIA. |
| | Peak hour traffic as % AADT | AADT | N/A | Default conservative assumption for Victoria Road; not required for peak hour data. |
| 4. Traffic Data by Lane | A1 | 673 (peak hour – vph) [91% LDV, 9% HDV) | 311 (peak hour – vph) [97% LDV, 3% HDV] | Victoria Road volumes 2025 worst case weekly AM peak hour 8am-9am data was used (2,020 eastbound and 1,258 westbound) as the most recent data available from the NSW Traffic Volume Viewer (Station Id: 51235). |
| | A2 | 673 (peak hour – vph) [91% LDV, 9% HDV) | 310 (peak hour – vph) [97% LDV, 3% HDV] | |

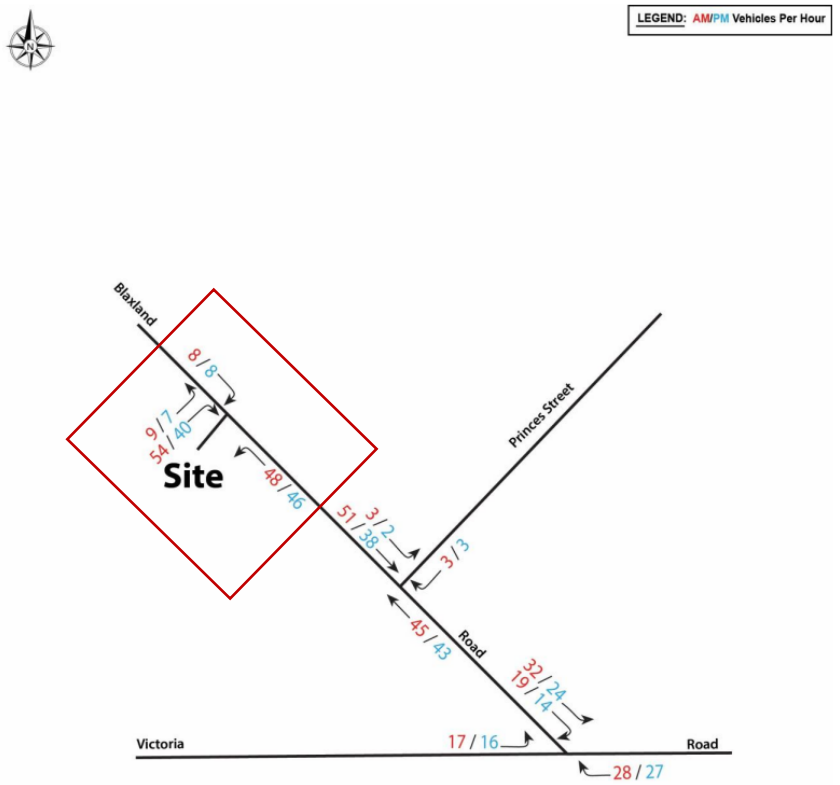
| | | | | |
|---|---|---|---|---|
| | A3 | 673 (peak hour – vph) [91% LDV, 9% HDV) | - | Blaxland Road - Table 3-4 below presents the Blaxland Road traffic modelling and the total volumes. Peak PM hour was used with existing and proposed. |
| | B3 | 419 (peak hour – vph) [91% LDV, 9% HDV) | - | |
| | B2 | 419 (peak hour – vph) [91% LDV, 9% HDV) | 231 (peak hour – vph) [96% LDV, 4% HDV] | |
| | B1 | 419 (peak hour – vph) [91% LDV, 9% HDV) | 231 (peak hour – vph) [96% LDV, 4% HDV] | |
| 5. Background concentrations | Background site for $NO_x$ | MACQUARIE PARK | MACQUARIE PARK | Closest air quality monitoring station for NOx, $PM_{10}$, and $PM_{2.5}$. |
| | Background site for $PM_{10}$ | MACQUARIE PARK | MACQUARIE PARK | |
| | Background site for $PM_{2.5}$ | MACQUARIE PARK | MACQUARIE PARK | |
| | 1-hour metric for $NO_x$ | 90$^{th}$ Percentile | 90$^{th}$ Percentile | Consistent with RAQST guidance; avoids spikes due to bushfires or dust storms |
| | 24-hour metric for $PM_{10}$ | 90$^{th}$ Percentile | 90$^{th}$ Percentile | |
| | 24-hour metric for $PM_{2.5}$ | 90$^{th}$ Percentile | 90$^{th}$ Percentile | |
| 6. Closest receptor | Distance from kerb of lane A1 (m) | 28 | 5 | Conservative measurement of distance from edge of kerb to closest outdoor play area (using aerial imagery). |

Table 3-4: Blaxland Road Volumes

| | Screenshot from Varga Traffic and Parking Assessment | Southeast bound Traffic Volume of Blaxland Road | Northwest bound Traffic Volume of Blaxland Road |
|---|---|---|---|
| AM Peak Hour <u>without</u> Development |  | 452 vehicles –<br><br>424 Light vehicles<br>28 Heavy vehicles | 331 vehicles<br><br>307 Light vehicles<br>24 Heavy vehicles |

| | | | |
|---|---|---|---|
| AM Peak Hour with Development |  | Additional: 54<br>Total: 506 | Additional: 48<br>Total: 379 |

| | | | | |
|---|---|---|---|---|
| PM Peak Hour <u>without</u> Development |  | 581 vehicles -<br><br>565 Light vehicles<br>16 Heavy vehicles | 416 vehicles –<br><br>399 Light vehicles<br>17 Heavy vehicles |

| | | | |
|---|---|---|---|
| PM Peak Hour with Development |  | **Additional vehicles: 40**<br>**Total: 621** | **Additional vehicles: 46**<br>**Total: 462** |

### 3.2.2 Modelling Results

The following tables present the predicted results for Victoria Road and Blaxland Road air quality impacts at the proposed site.

Predicted impacts for $NO_2$, $PM_{10}$ and $PM_{2.5}$ are all negligible except for $PM_{2.5}$ Annual from Victoria road and Blaxland road. However, this is due to elevated background levels, and the predicted incremental concentration is 0.5 µg/m$^3$ for Victoria road and 0.4 µg/m$^3$ for Blaxland road, representing only 11.3% of the criteria. $PM_{2.5}$ measurement data presented in section 3.3.4.2.1 demonstrates compliance at both monitoring locations during the entire monitoring period. Therefore, the modelled air quality impacts from road sources are negligible and the site is considered suitable for the proposed use.

Table 3-5: Victoria Road Impacts

| Pollutant | Averaging period | Air quality criterion (µg/m³) | Predicted concentration (µg/m³) | | | Predicted concentration as % of criterion | | | Compliance of total with criterion |
|---|---|---|---|---|---|---|---|---|---|
| | | | Background | Road | Total | Background | Road | Total | |
| $NO_X$ | 1-hour | - | 26.7 | 45.6 | **72.3** | Not applicable | | | Not applicable |
| | Annual | - | 12.3 | 9.1 | **21.4** | | | | |
| $NO_2$ | 1-hour | **164** | Not applicable | | **69.0** | Not applicable | | *42%* | Yes |
| | Annual | **31** | 9.7 | 3.9 | **13.6** | *31%* | *13%* | *44%* | Yes |
| $PM_{10}$ | 24-hour | **50** | 19.4 | 2.1 | **21.5** | *39%* | *4%* | *43%* | Yes |
| | Annual | **25** | 13.2 | 0.9 | **14.1** | *53%* | *3%* | *56%* | Yes |
| $PM_{2.5}$ | 24-hour | **25** | 10.4 | 1.3 | **11.8** | *42%* | *5%* | *47%* | Yes |
| | Annual | **8** | 7.3 | 0.5 | **7.8** | *91%* | *7%* | *98%* | Yes |

Table 3-6: Blaxland Road Impacts

| Pollutant | Averaging period | Air quality criterion (µg/m³) | Predicted concentration (µg/m³) | | | Predicted concentration as % of criterion | | | Compliance of total with criterion |
|---|---|---|---|---|---|---|---|---|---|
| | | | Background | Road | Total | Background | Road | Total | |
| $NO_X$ | 1-hour | - | 26.7 | 36.6 | 63.2 | Not applicable | | | Not applicable |
| | Annual | - | 12.3 | 7.3 | 19.6 | | | | |
| $NO_2$ | 1-hour | **164** | Not applicable | | **62.1** | Not applicable | | *38%* | Yes |
| | Annual | **31** | 9.7 | 3.1 | **12.9** | *31%* | *10%* | *41%* | Yes |
| $PM_{10}$ | 24-hour | **50** | 19.4 | 1.8 | **21.2** | *39%* | *4%* | *43%* | Yes |
| | Annual | **25** | 13.2 | 0.7 | **13.9** | *53%* | *3%* | *56%* | Yes |
| $PM_{2.5}$ | 24-hour | **25** | 10.4 | 1.1 | **11.6** | *42%* | *4%* | *46%* | Yes |
| | Annual | **8** | 7.3 | 0.4 | **7.7** | *91%* | *6%* | *97%* | Yes |

## 3.3 MONITORING

### 3.3.1 Sampling Location

Sampling was conducted at two (2) sampling locations at the site visualised in Figure 3-1.

Sampling location B was initially selected as a representative location of the outdoor play area for the proposed childcare centre. It is noted that with the most recent architectural plans, the outdoor play area was relocated from the previous location fronting Victoria Road and as such, the proposed childcare centre is now located along Blaxland Road as opposed to Victoria Road.

Ground level concentration was assessed at the proposed outdoor play area at Location A to identify any potential air quality issues future occupants may experience.

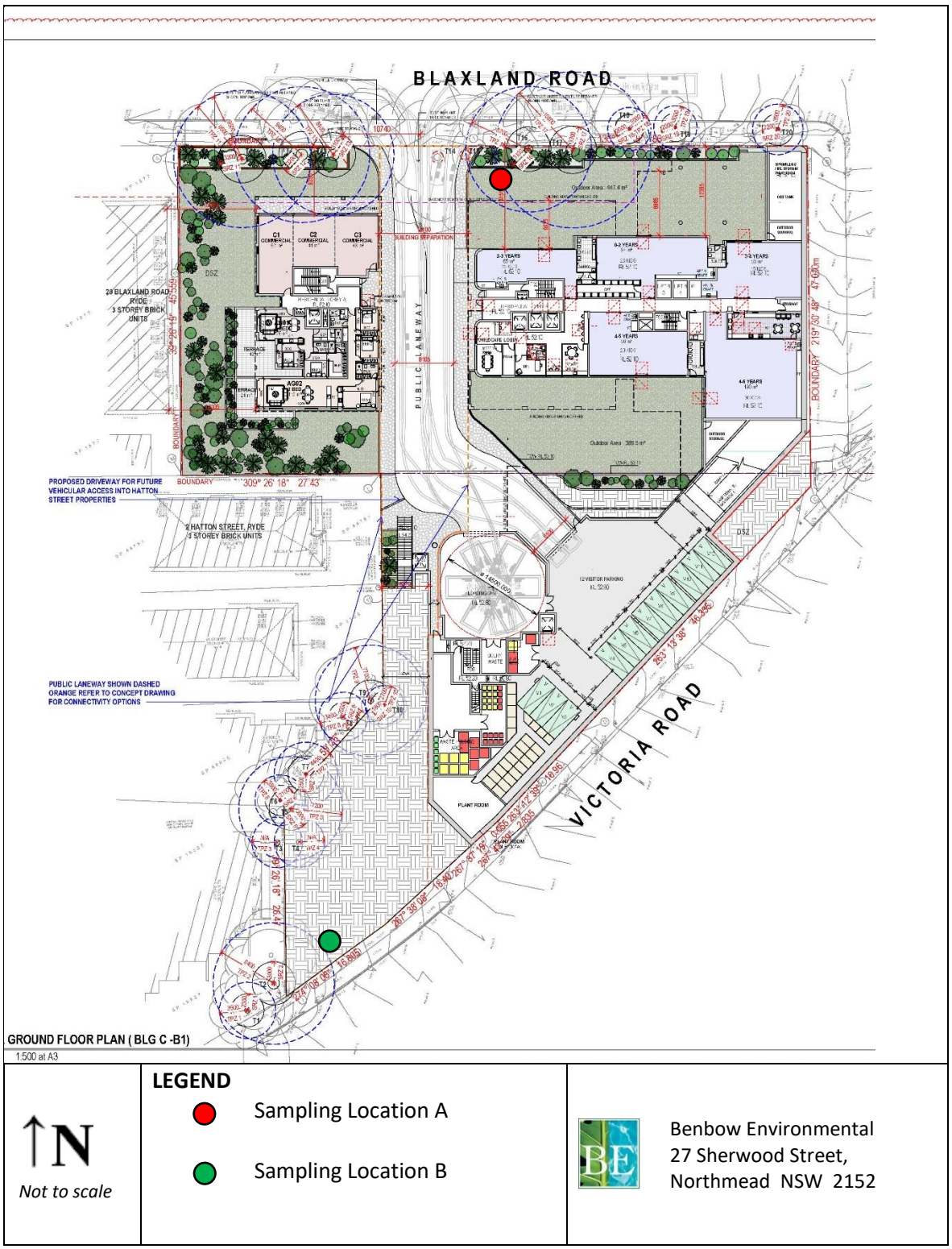
Figure 3-2 shows the location in context with the proposed site plan.

Figure 3-1: Sampling Location

**Source:** SixMaps (2023)

| | | |
|---|---|---|
| ↑N<br>Not to scale | **LEGEND**<br>Sampling Location A<br>Sampling Location B | Benbow Environmental<br>27 Sherwood Street,<br>Northmead NSW 2152 |

Figure 3-2: Sampling Location Overlaid on Proposed Site Plans




***Note*:** *Sampling Location B was initially chosen as a representative location of the outdoor play area. However, architectural plans have since been revised since the monitoring event. As such, outdoor play area is now located along Blaxland Road as opposed to Victoria Road, and monitoring was conducted at Location A.*

### 3.3.2 Sampling Methodology

The concentrations of critical airborne pollutants within the subject area were obtained using the following:

- Continuous sampling using an AirMetER-AX air quality monitoring station fitted with sensors for dust fractions ($PM_{2.5}$ and $PM_{10}$), CO and $NO_2$; and
- Active Sampling using a Sorbent tube analysed for BTEX (Benzene, Toluene, Ethylbenzene, meta- & para-Xylene, and ortho-Xylene).

The AirMetER-AX is an economical, laser-based optical device that is suitable for recording simultaneous measurements of $PM_{2.5}$, $PM_{10}$, CO and $NO_2$. It provides near real time measurements at 1-minute intervals. These 1-minute measurements have been used to provide hourly averages for comparison against the relevant criteria.

#### 3.3.2.1 Methods for Dust and Gas Monitoring

Continuous sampling for dust fractions, CO and $NO_2$ using the AirMetER-AX monitoring station commenced on 28th April 2025 through to the 7th of May 2025 (approximately 9 days) at Location A.

Continuous sampling for dust fractions, CO and $NO_2$ using the AirMetER-AX monitoring station commenced on 13th November 2023 through to the 20th of November 2023 (approximately 7 days) at Location B.

A data sheet for the AirMetER-AX has been provided in Attachment 2.

#### 3.3.2.2 Methodology for BTEX Sampling

Active sampling for BTEX was carried out on the 28th of April 2025 for Location A. Sampling was undertaken during the period 8 pm and 10 am to monitor traffic conditions.

Active sampling for BTEX was carried out on the 20th of November for Location B. Sampling was undertaken during the period 1 pm and 4 pm to monitor traffic conditions.

Measurements of Benzene, Ethylbenzene and Xylene compounds (BTEX) were conducted in accordance with the Australian Standard AS 3580 and AS 2986–2003: *Workplace air quality – Sampling and analysis of volatile organic compounds by solvent desorption/gas chromatograph,* Part 1: *Pumped sampling method.*

One (1) BTEX sample and one (1) Toluene sample was collected on site at Location A. One (1) BTEX sample was collected on site at Location B. Blank samples were collected for quality assurance purposes.

Sampling equipment was fixed to a tripod for the duration of sampling. Equipment was positioned on flat earth in an open, unobstructed area negativing any potential unforeseen air quality influences.

Prefilter cassettes were fitted at the air intake point of each sampling line to capture particulates and prevent oversaturation of BTEX samples. The line was then attached to SKC 226-01 charcoal tubes that are filled with sorbent material (coconut charcoal) for capturing VOCs. The line was then connected to the sampling pump and maintained at a constant flow rate of 0.2 L/min throughout the sampling period.

BTEX compound concentrations were analysed using inductively coupled plasma mass spectrometry (ICP-MS) by ALS Environmental, a National Association of Testing Authorities (NATA) accredited laboratory.

#### *3.3.2.2.1 BTEX Sample Parameters*

One (1) BTEX sample and one (1) Toluene sample was collected on site at Location A. One (1) sample for BTEX was taken at Location B. The sampling regime and parameters for the samples are outlined below.

Table 3-7: BTEX Sample Parameters (Location A)

| Sample ID | Analytes | Flow Rate (L/min) | Run Time (mins) |
|---|---|---|---|
| **BTEX 1** | Benzene<br>Ethylbenzene<br>Meta- & para-Xylene<br>Ortho-Xylene<br>Total Xylenes | 0.2 | 108 |
| **TOL 1** | Toluene | 0.2 | 36 |

Table 3-8: BTEX Sample Parameters (Location B)

| Sample ID | Analytes | Flow Rate (L/min) | Run Time (mins) |
|---|---|---|---|
| **BTEX 1** | Benzene<br>Ethylbenzene<br>Meta- & para-Xylene<br>Ortho-Xylene<br>Total Xylenes | 0.2 | 107 |

### 3.3.3 Quality Assurance and Control

#### 3.3.3.1 Field Quality Assurance and Quality Control

To ensure the sample was taken accurately, the air sampling pump was calibrated to the required flow rate of 0.2 L/min. A calibration was performed at the start of the sampling period to set the initial flow rate and again at the end of the sampling period to verify the final flow rate of the air.

A sampling data sheet was completed for the sample. The data sheet noted the sampling instrument identification number, calibration airflows, date and start and finish times.

Sample request form that specified the originator, delivery part and receiver as well as sample identification was completed and sent to the external laboratory for documentation of organised analyses.

#### 3.3.3.2 Laboratory Analysis

Analysis of the sorbent tubes was conducted by ALS Australia - a National Association of Testing Authorities (NATA) accredited laboratory.

During BTEX analysis, the methods were verified using surrogate compound analysis and were found to be within the defined recovery limits.

The certificate of analysis for ALS samples is included as Attachment 3, with the Chain of Custody form as Attachment 4.

#### 3.3.3.3 Blanks

The sample blanks were subjected to the same procedures, transport and handling as the sample tubes, with the omission of the sampling step. The blank returned results of below the Limit of Reporting (LOR).

### 3.3.4 Monitoring Results

#### 3.3.4.1 Noxious Gases

##### *3.3.4.1.1 Carbon Monoxide (CO)*

The following figures visualises the hourly and 8-hour averages of CO concentrations obtained through continuous monitoring and compared these CO results to the relevant criteria.

*3.3.4.1.1.1 Location A*

Figure 3-3: Carbon Monoxide (CO) Hourly Averages

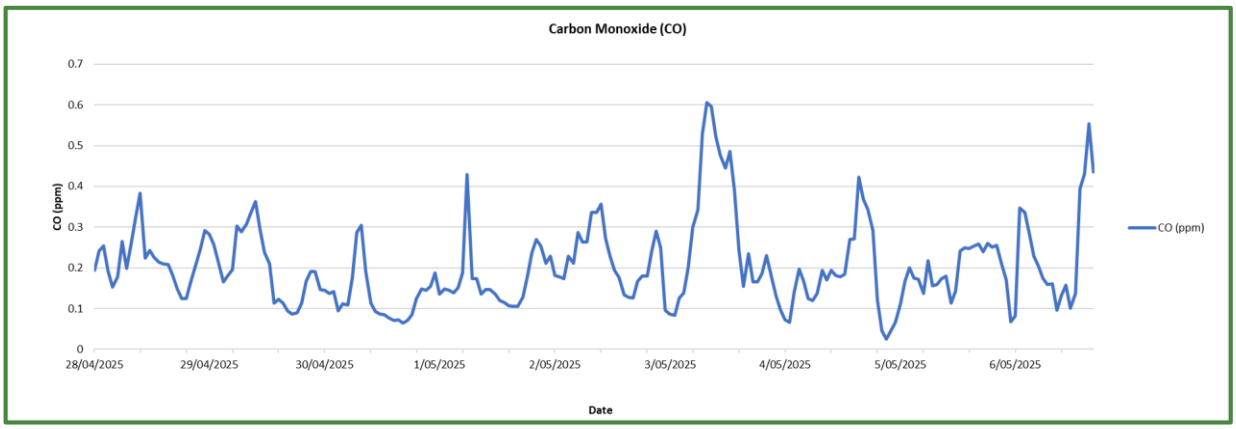


Figure 3-4: Carbon Monoxide (CO) Hourly Averages Against Approved Methods Criteria (25ppm)

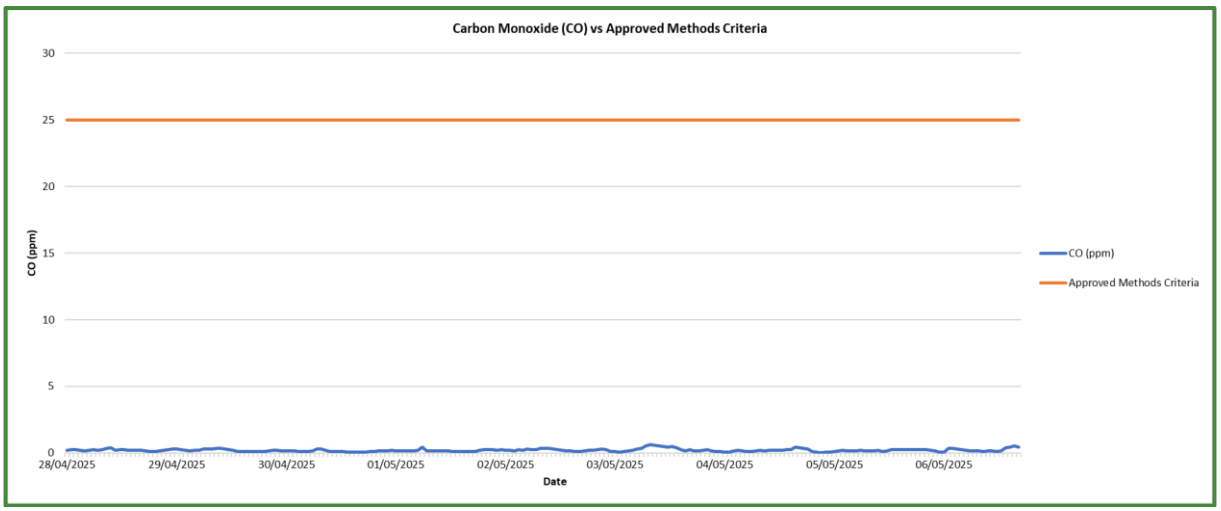



Figure 3-5: Carbon Monoxide (CO) 8-Hour Averages

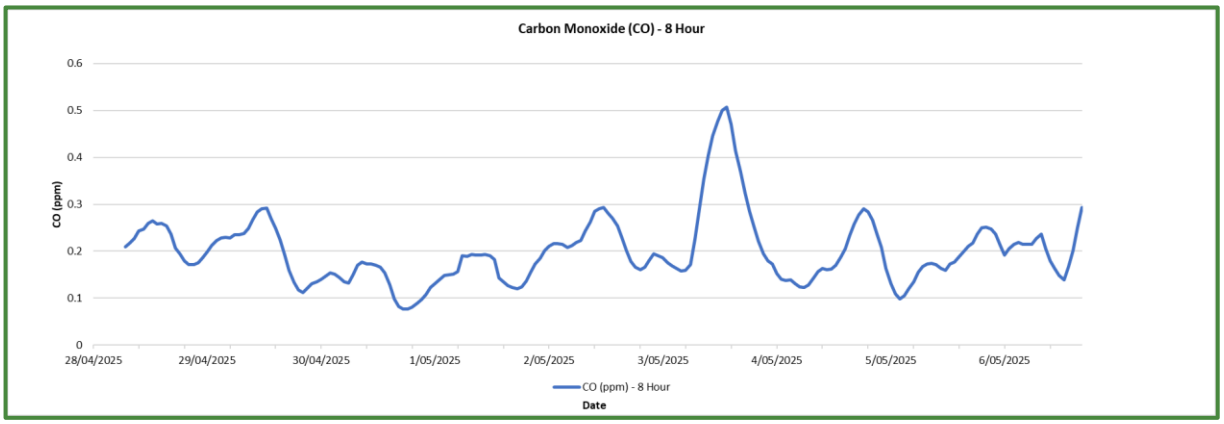
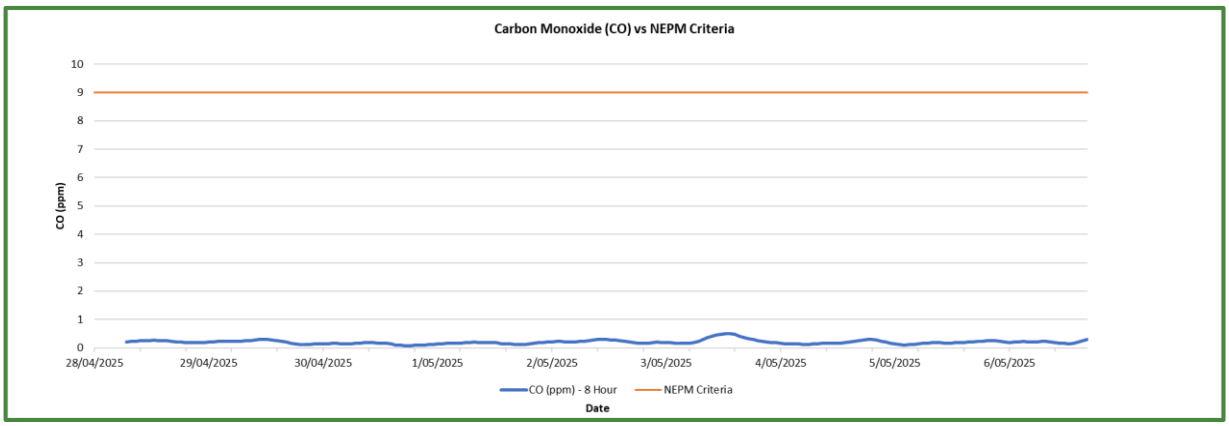



Figure 3-6: Carbon Monoxide (CO) 8-Hour Averages Against NEPM Criteria (9ppm)



*3.3.4.1.1.2 Location B*

Figure 3-7: Carbon Monoxide (CO) Hourly Averages

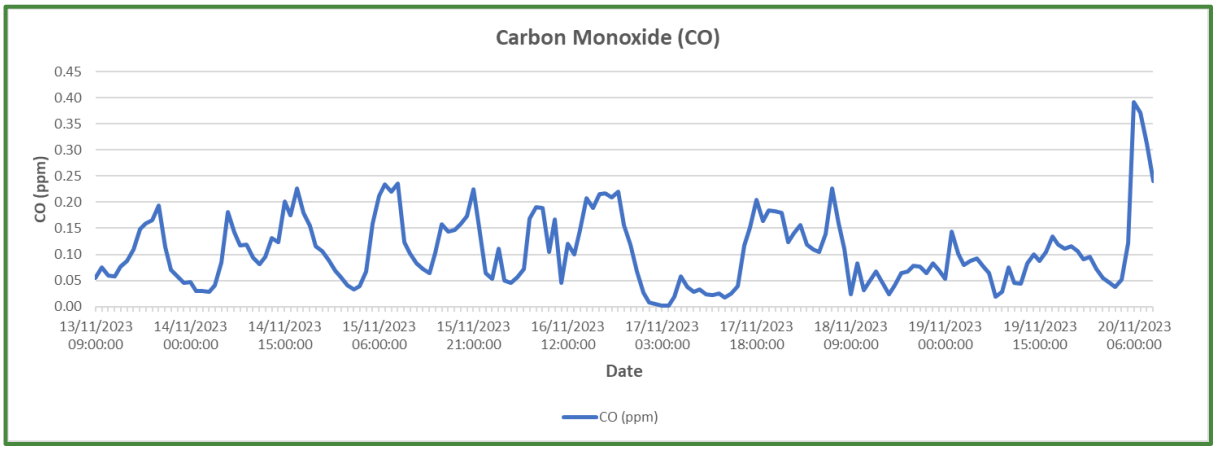



Figure 3-8: Carbon Monoxide (CO) Hourly Averages Against Approved Methods Criteria (25ppm)

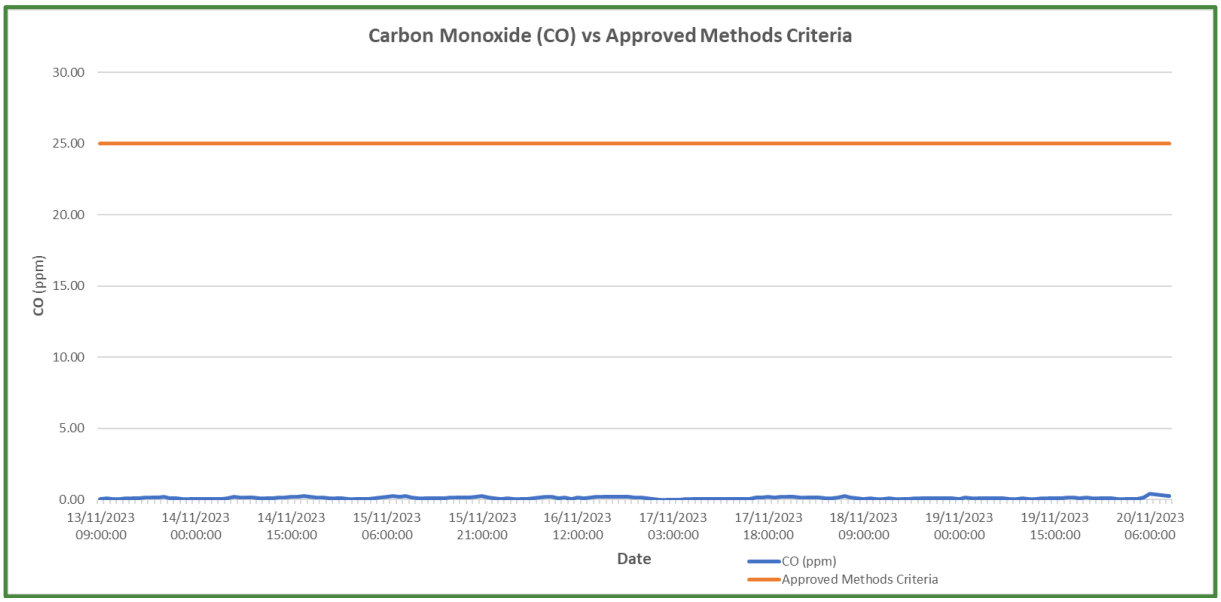



Figure 3-9: Carbon Monoxide (CO) 8-Hour Averages

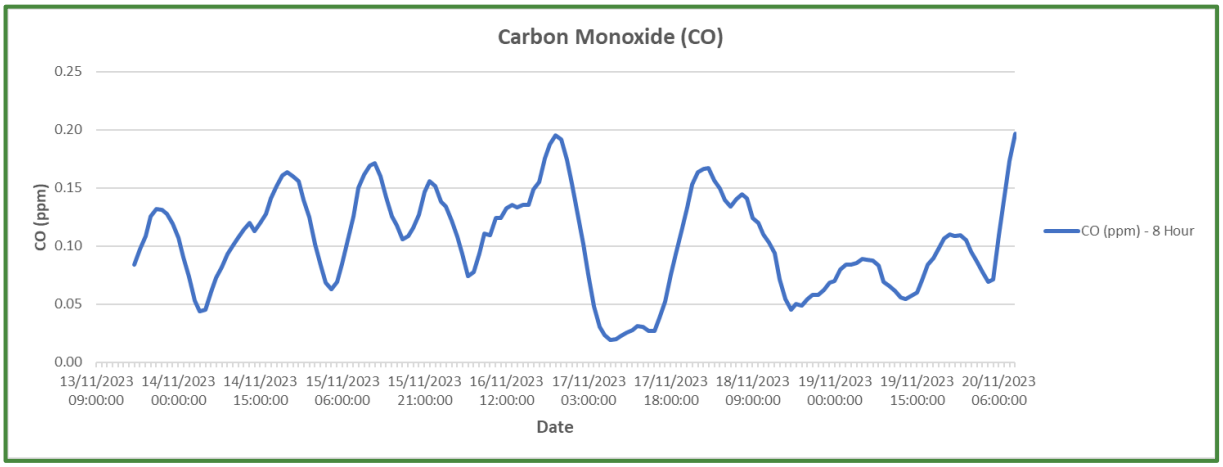
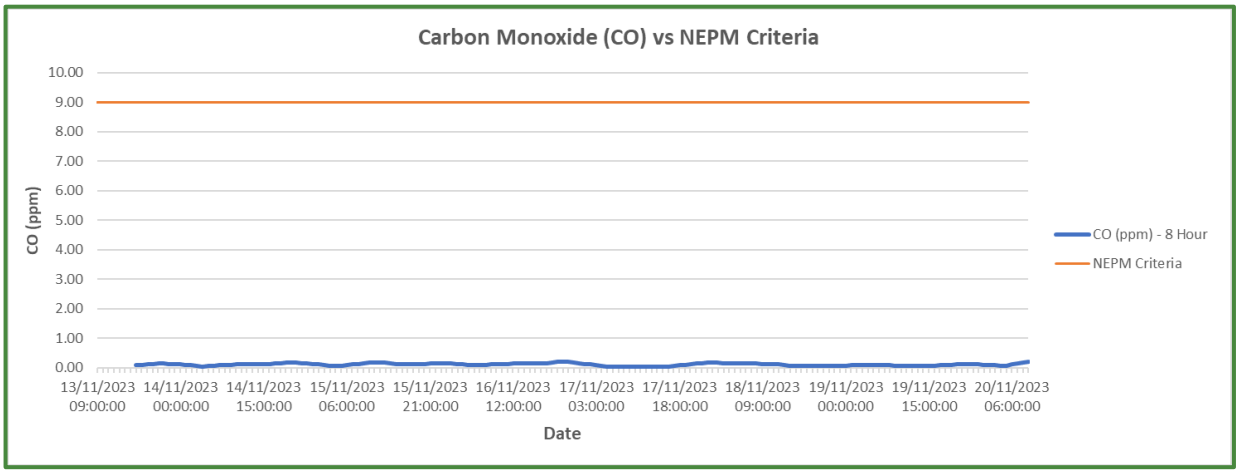


Figure 3-10: Carbon Monoxide (CO) 8-Hour Averages Against NEPM Criteria (9ppm)




### *3.3.4.1.2 Nitrogen Dioxide ($NO_2$)*

The following figures visualises the hourly averages of $NO_2$ concentrations obtained through continuous monitoring and compared these $NO_2$ results to the NEPM criteria threshold of 0.08 ppm.

#### *3.3.4.1.2.1 Location A*

Figure 3-11: Nitrogen Dioxide ($NO_2$) Hourly Averages

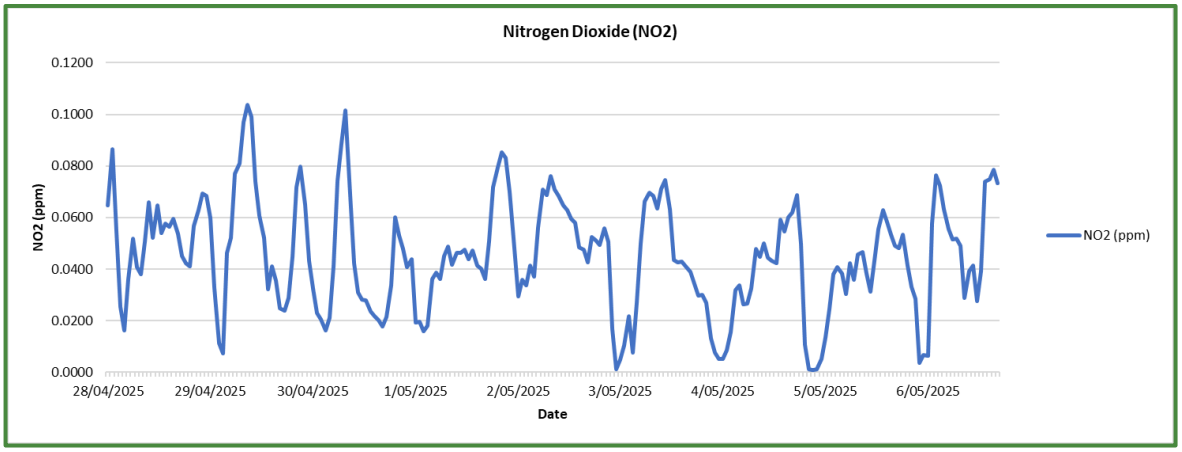
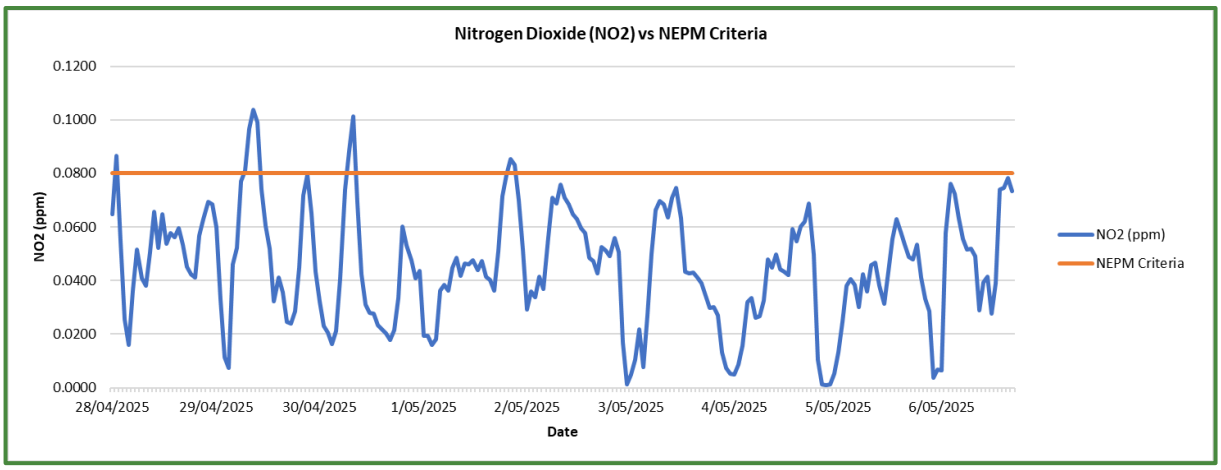


Figure 3-12: Nitrogen Dioxide ($NO_2$) Hourly Averages Against NEPM Criteria




*3.3.4.1.2.2 Location B*

Figure 3-13: Nitrogen Dioxide ($NO_2$) Hourly Averages

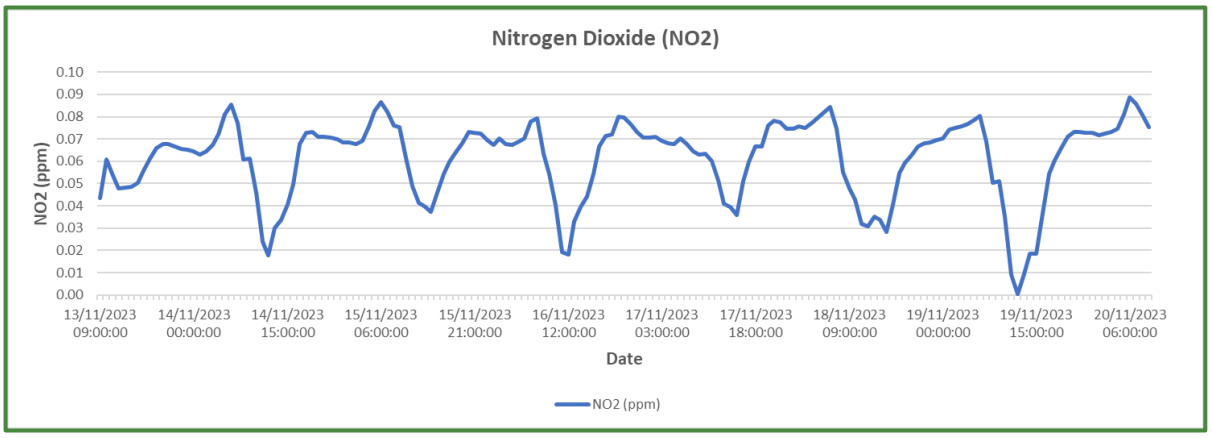
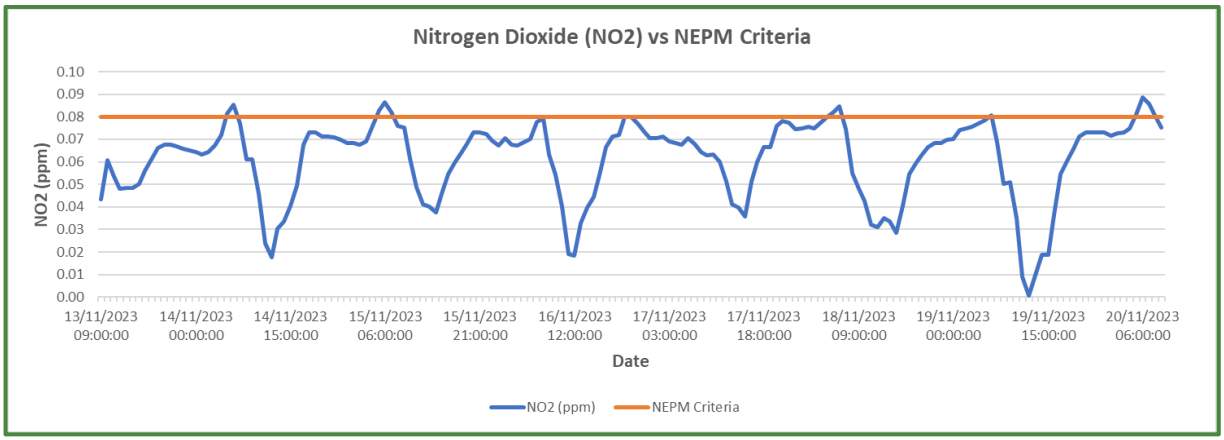



Figure 3-14: Nitrogen Dioxide ($NO_2$) Hourly Averages Against NEPM Criteria



### 3.3.4.2 Dust Fractions

#### *3.3.4.2.1 $PM_{2.5}$*

The following figures visualises the $PM_{2.5}$ averages over a 24-hour period obtained through continuous monitoring and compared these $PM_{2.5}$ results to the NEPM criteria threshold of 25 µg/m3 .

##### *3.3.4.2.1.1 Location A*

Figure 3-15: $PM_{2.5}$ Daily Averages

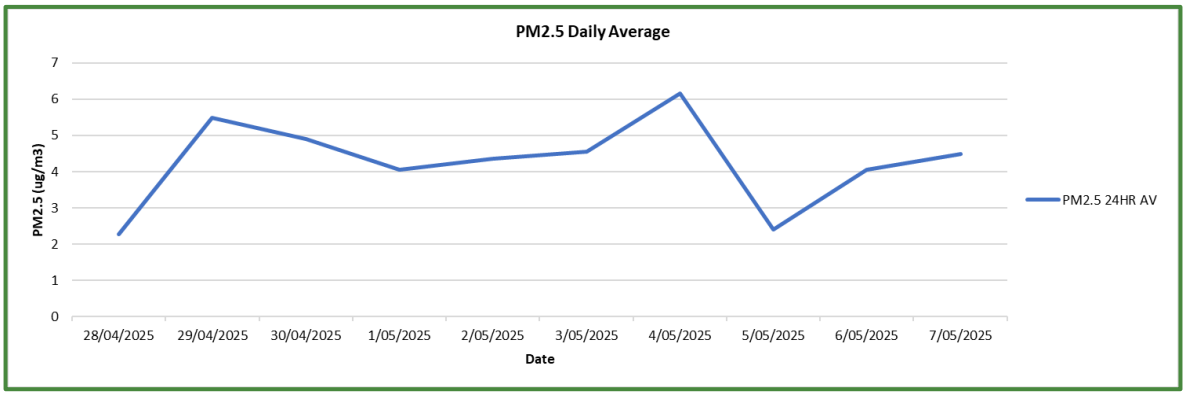
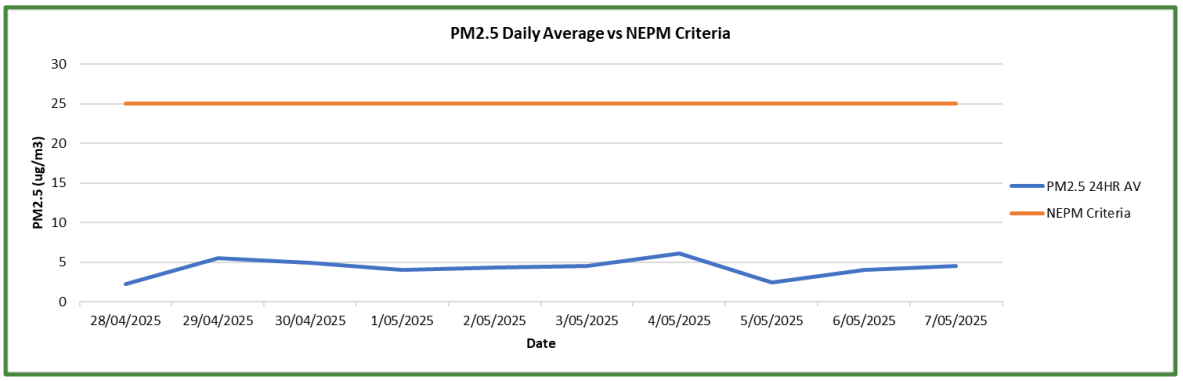



Figure 3-16: $PM_{2.5}$ Daily Averages Against NEPM Criteria



#### *3.3.4.2.1.2 Location B*

Figure 3-17: $PM_{2.5}$ Daily Averages

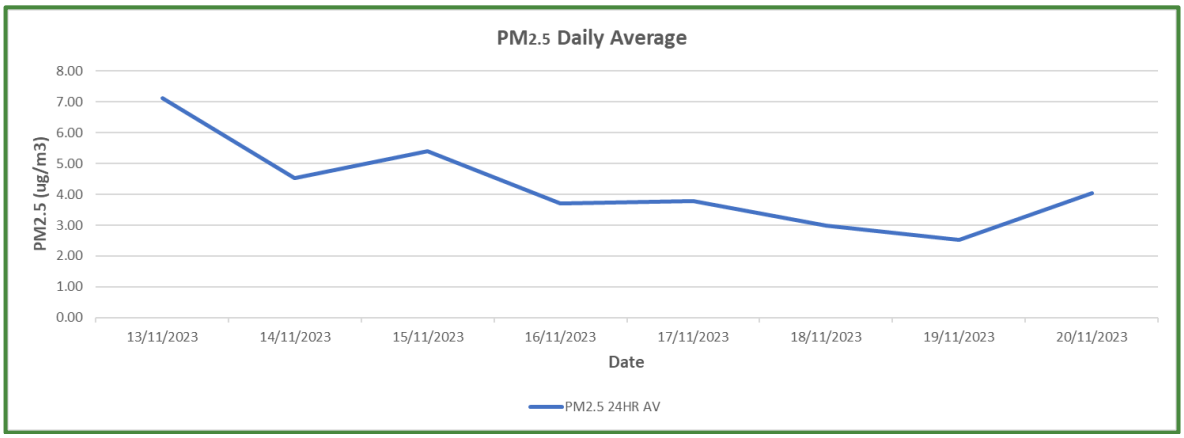
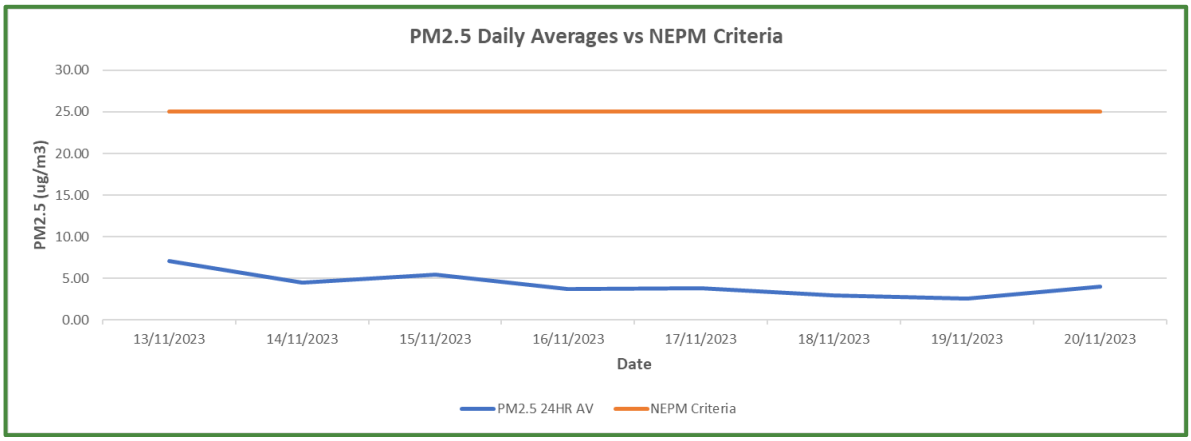



Figure 3-18: $PM_{2.5}$ Daily Averages Against NEPM Criteria




### *3.3.4.2.2 $PM_{10}$*

The following figures visualises the $PM_{10}$ averages over a 24-hour period obtained through continuous monitoring on the ground floor and compared these PM10 results to the NEPM criteria threshold of 50 µg/m$^3$.

#### *3.3.4.2.2.1 Location A*

Figure 3-19: $PM_{10}$ Daily Averages

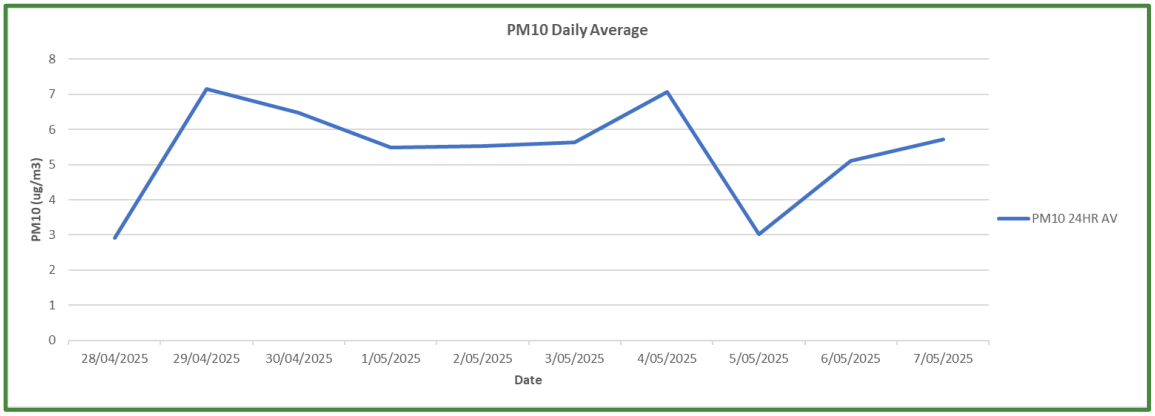
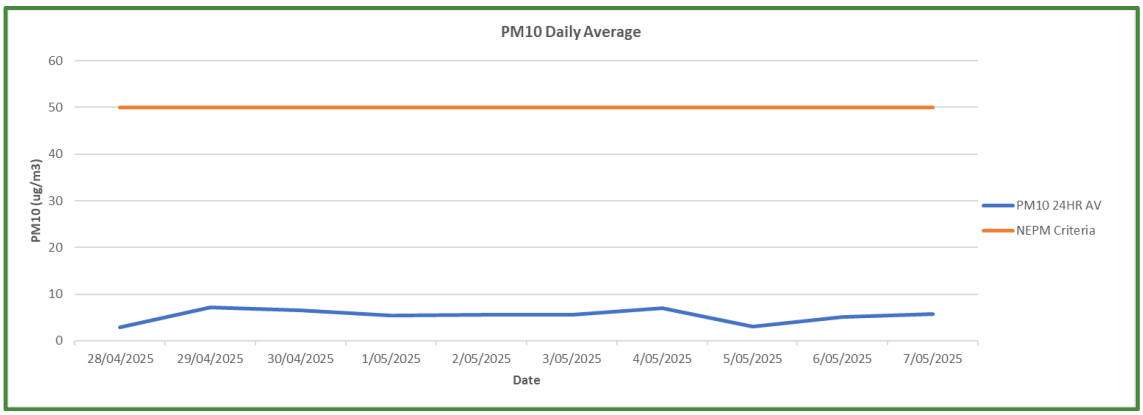


Figure 3-20: $PM_{10}$ Daily Averages Against NEPM Criteria




*3.3.4.2.2.2 Location B*

Figure 3-21: $PM_{10}$ Daily Averages

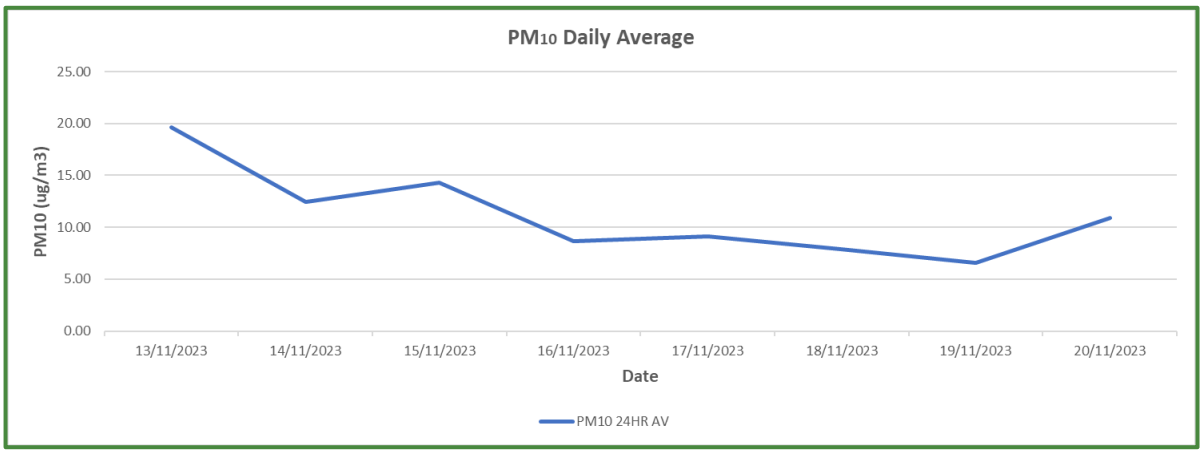
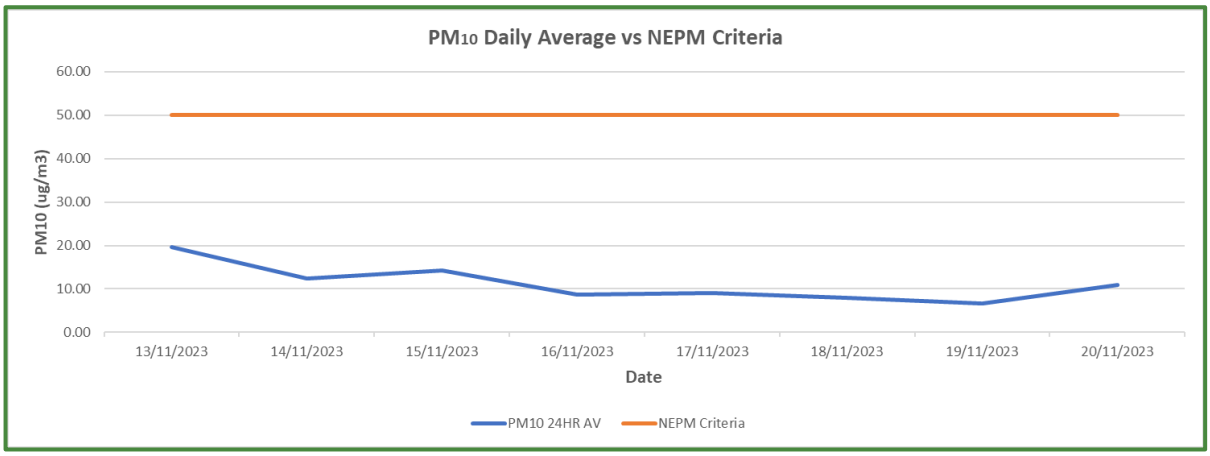



Figure 3-22: $PM_{10}$ Daily Averages Against NEPM Criteria




### 3.3.4.3 BTEX

The laboratory results from the BTEX samples are summarised in the following sections.

#### *3.3.4.3.1 Location A*

All reported results were below the LOR through laboratory sampling. LOR units were used in conjunction with sampling time and flow rate to calculate a result highest to compare with the approved methods. All samples at location A comply with associated criteria and do not exceed thresholds.

Table 3-9: BTEX Analysis Results (Location A)

| Sample ID | Contaminant | Results (µg/sample) | Results ($mg/m^3$) | Approved Methods ($mg/m^3$) | Complies |
|---|---|---|---|---|---|
| **BTEX 1** | Benzene | <0.5 (<LOR) | 0.023 | **0.029** | YES |
| | Meta- & para-Xylene | <1 (<LOR) | 0.047 | **0.19** | YES |
| | Ortho-Xylene | <0.5 (<LOR) | 0.023 | **0.19** | YES |
| | Total Xylenes | <1.5 (<LOR) | 0.07 | **0.19** | YES |
| **TOL 1** | Toluene | <0.5 (<LOR) | 0.069 | **0.36** | YES |
| **BTEX BLANK** | Benzene | <0.5 (<LOR) | - | **0.029** | - |
| | Ethylbenzene | <0.5 (<LOR) | - | **8.0** | - |
| | Meta- & para-Xylene | <1 (<LOR) | - | **0.19** | - |
| | Ortho-Xylene | <0.5 (<LOR) | - | **0.19** | - |
| | Total Xylenes | <1.5 (<LOR) | - | **0.19** | - |

#### *3.3.4.3.2 Location B*

All but one of the reported results were below the LOR through laboratory sampling. LOR units were used in conjunction with sampling time and flow rate to calculate a result highest to compare with the approved methods. All samples at location B comply with associated criteria and do not exceed thresholds.

Table 3-10: BTEX Analysis Results (Location B)

| Sample ID | Contaminant | Results (µg/sample) | Results ($mg/m^3$) | Approved Methods ($mg/m^3$) | Complies |
|---|---|---|---|---|---|
| **BTEX 1** | Benzene | <0.5 (<LOR) | 0.023 | **0.029** | YES |
| | Toluene | 1.4 | 0.065 | **0.36** | YES |
| | Ethylbenzene | <0.5 (<LOR) | 0.023 | **8.0** | YES |
| | Meta- & para-Xylene | <1 (<LOR) | 0.047 | **0.19** | YES |
| | Ortho-Xylene | <0.5 (<LOR) | 0.023 | **0.19** | YES |
| | Total Xylenes | <1.5 (<LOR) | 0.07 | **0.19** | YES |
| **BTEX (Blank)** | Benzene | <0.5 (<LOR) | - | **0.029** | - |
| | Toluene | <0.5 (<LOR) | - | **0.36** | - |
| | Ethylbenzene | <0.5 (<LOR) | - | **8.0** | - |
| | Meta- & para-Xylene | <1 (<LOR) | - | **0.19** | - |
| | Ortho-Xylene | <0.5 (<LOR) | - | **0.19** | - |
| | Total Xylenes | <1.5 (<LOR) | - | **0.19** | - |

### 3.3.5 Discussion of Results

#### 3.3.5.1 Noxious Gases Discussion

The following discusses the results from continuous air monitoring regarding noxious gases conducted between 28th April 2025 to the 7th May 2025 (approximately 9 days) at Location A and from the 13th of November 2023 to the 20th of November 2023 (approximately 7 days) at Location B.

##### *3.3.5.1.1 Nitrogen Dioxide ($NO_2$)*

*3.3.5.1.1.1 Location A*

Continuous monitoring of $NO_2$ at ground level identified frequent exceedances of the 0.08 ppm (1-hour average) NEPM criteria for several days of the sampling period at Location A. The highest $NO_2$ reading during the monitoring period was identified at 6pm on the 29th of April 2025, with a reading of 0.104 ppm (0.24 ppm above NEPM criteria of 0.08 ppm).

Of the nine (9) monitoring days, nine (9) readings were found to exceed the NEPM criteria for Nitrogen Dioxide.

The days noted to have exceedances are as follows:

- Monday, 28th of April 2025 at 9am;
- Tuesday, 29th of April 2025 at 4pm;
- Tuesday, 29th of April 2025 at 5pm;
- Tuesday, 29th of April 2025 at 6pm;
- Tuesday, 29th of April 2025 at 7pm;
- Wednesday, 30th of April 2025 at 5pm;
- Wednesday, 30th of April 2025 at 6pm;
- Friday, 2nd of May 2025 at 5pm;
- Friday, 2nd of May 2025 at 6pm;

The exceedances mostly occur during time-periods outside of standard operating hours, with elevated levels of $NO_2$ observed before 10am and after 4pm, correlating with traffic along Blaxland Road.

*3.3.5.1.1.2 Location B*

Continuous monitoring of $NO_2$ at ground level identified frequent exceedances of the 0.08 ppm (1-hour average) NEPM criteria for most days of the sampling period at Location B. The highest $NO_2$ reading during the monitoring period was identified at 6am on the 20th of November 2023, with a reading of 0.089 ppm (0.009 ppm above NEPM criteria of 0.08 ppm).

Of the seven (7) monitoring days, thirteen (13) readings were found to exceed the NEPM criteria for Nitrogen Dioxide.

The days noted to have exceedances are as follows:

- Tuesday, 14th of November 2023 at 5am;
- Tuesday, 14th of November 2023 at 6am;

- Wednesday, 15th of November 2023 at 5am;
- Wednesday, 15th of November 2023 at 6am;
- Wednesday, 15th of November 2023 at 7am;
- Thursday, 16th of November 2023 at 8pm;
- Saturday, 18th of November 2023 at 5am;
- Saturday, 18th of November 2023 at 6am;
- Sunday, 19th of November 2023 at 6am;
- Monday, 20th of November 2023 at 5am;
- Monday, 20th of November 2023 at 6am;
- Monday, 20th of November 2023 at 7am; and
- Monday, 20th of November 2023 at 8am.

All exceedances of the NEPM criteria, however, occur during time-periods outside of standard operating hours where the outdoor play areas would be most utilised through breaks such as recess and lunch (10am-1pm). It is also noted that three (3) of these exceedances are on the weekend (Saturday, 18th of November and Sunday, 19th of November), when the childcare facilities would not be operational.

#### *3.3.5.1.2 Carbon Monoxide (CO)*

Continuous monitoring of CO at ground level was found to robustly comply with the NEPM criteria, with no observed exceedances of the 1-hour average or the 8-hour average throughout the entire monitoring periods at Location A and Location B.

The highest CO reading during the monitoring period at Location A was identified at 2am on the 4th of May 2025, with a reading of 0.51 ppm (8.49 ppm below NEPM criteria).

The highest CO reading during the monitoring period at Location B was identified at 6am on the 20th of November 2023, with a reading of 0.2 ppm (8.8 ppm below NEPM criteria).

### 3.3.5.2 Dust Fractions Discussion

#### *3.3.5.2.1 $PM_{2.5}$*

Continuous monitoring of dust fraction $PM_{2.5}$ was found to comply with the NEPM 24-hour average criteria for each day throughout the monitoring period.

The highest concentration of $PM_{2.5}$ was observed on the 4th of May 2025, at 6.15 µg/m$^3$ (18.85 µg/m$^3$ below NEPM criteria) at location A and on the 20th of November 2023, at 7.13 µg/m$^3$ (17.87 µg/m$^3$ below NEPM criteria).

#### *3.3.5.2.2 $PM_{10}$*

Continuous monitoring of dust fraction $PM_{10}$ was also found to comply with the NEPM 24-hour average criteria for each day throughout the monitoring period.

The highest concentration of $PM_{10}$ was observed on the 29th of April 2025, at 7.14 µg/m$^3$ (17.86 µg/m$^3$ below NEPM criteria) at Location A and on the 13th of November 2023, at 19.51 µg/m$^3$ (30.49 µg/m$^3$ below NEPM criteria).

#### 3.3.5.3 BTEX Discussion

All results for BTEX sampling at Location A were below the limit of reporting and subsequently, below the relevant criteria.

All but one of the results for BTEX sampling at Location B were below the limit of reporting and subsequently, below the relevant criteria.

## 3.4 RECOMMENDATIONS

This section will address the recommendations for the proposed childcare facility located at 691-695 Victoria Road, Ryde NSW 2112 in response to the exceeding pollutants following an air quality assessment.

### 3.4.1 Indoor Areas

Due to the location of the proposed childcare centre and elevated noxious gas levels (particularly $NO_2$), an air filtration system that is able to remove the following is recommended:

- $NO_2$; and
- Fine particulates.

The implemented air filtration system will require an adequate number of air changes each hour to provide clean air for the enclosed places.

The need for fine particulate removal in conjunction with $NO_2$ filtration is due to a significant proportion of the $NO_2$ (especially from diesel powered vehicles) attaching to particulates, subsequently contributing to further $NO_2$ exposure.

Some air conditioning suppliers are able to provide a suitable mechanical ventilation system with the following air purification elements:

- Particulate filtration; and
- Activated charcoal filter media (for $NO_2$).

It is noted that the activated charcoal filter must not be charcoal impregnated fabric, instead consist of granules of activated charcoal.

Another consideration to take note of is the required air flow rate that is required for the air filtration system. This is expressed through the air ventilation flow rate. The lessons learnt on air purifiers for similar situations recommends five (5) air changes per hour.

The air ventilation system will require at least one (1) hour operation before the children arrive.

### 3.4.2 Outdoor Areas

The results indicate that noxious gas Nitrogen Dioxide ($NO_2$) is present at the subject site at elevated levels due to heavy traffic along Blaxland Road.

As elevated levels of Nitrogen Dioxide ($NO_2$) are still present in the early mornings and late evenings correlating to heavy traffic along Blaxland Road, precautionary measure are recommended.

It is recommended that the outdoor play area does not schedule outdoor playtimes before 10am or after 4pm and takes into consideration peak traffic impacts.

# 4. STATEMENT OF POTENTIAL AIR IMPACT

Air quality at the subject site was examined to identify any potential air quality impacts that may affect occupants of the proposed childcare facility.

Roadside Air Quality Screening Tool (RAQST) was used to model air quality impacts on the proposed development from Blaxland Road and Victoria Road. The results of the model demonstrated negligible air impacts.

In addition, a range of airborne pollutants have been examined including $NO_2$, CO, dust fractions, and BTEX. The results indicate that noxious gas Nitrogen Dioxide ($NO_2$) is present at the subject site at elevated levels due to heavy traffic along Victoria and Blaxland Road.

As elevated levels of Nitrogen Dioxide ($NO_2$) are still present in the early mornings and late evenings correlating to heavy traffic along Victoria and Blaxland Road, precautionary measures are recommended for both indoor and outdoor playing areas.

An air filtration system that is able to remove the $NO_2$ and fine particulates is recommended for the indoor play areas. The need for fine particulate removal in conjunction with $NO_2$ filtration is due to a significant proportion of the $NO_2$ (especially from diesel powered vehicles) attaching to particulates, subsequently contributing to further $NO_2$ exposure. The air ventilation system will require at least one (1) hour operation before the children arrive.

It is recommended that the outdoor play area is not utilised during peak traffic periods and outdoor playtimes are not scheduled before 10am or after 4pm.

All other potential airborne pollutants (CO, $PM_{2.5}$, $PM_{10}$ and BTEX) assessed were found to be below the relevant health criteria at ground level for the subject site.

This concludes the report.

| | | |
|---|---|---|
| Francesco Faustino | Prasanna Manoharan | R T Benbow |
| Environmental Scientist | Chemical Engineer | Principal Consultant |

# 5. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

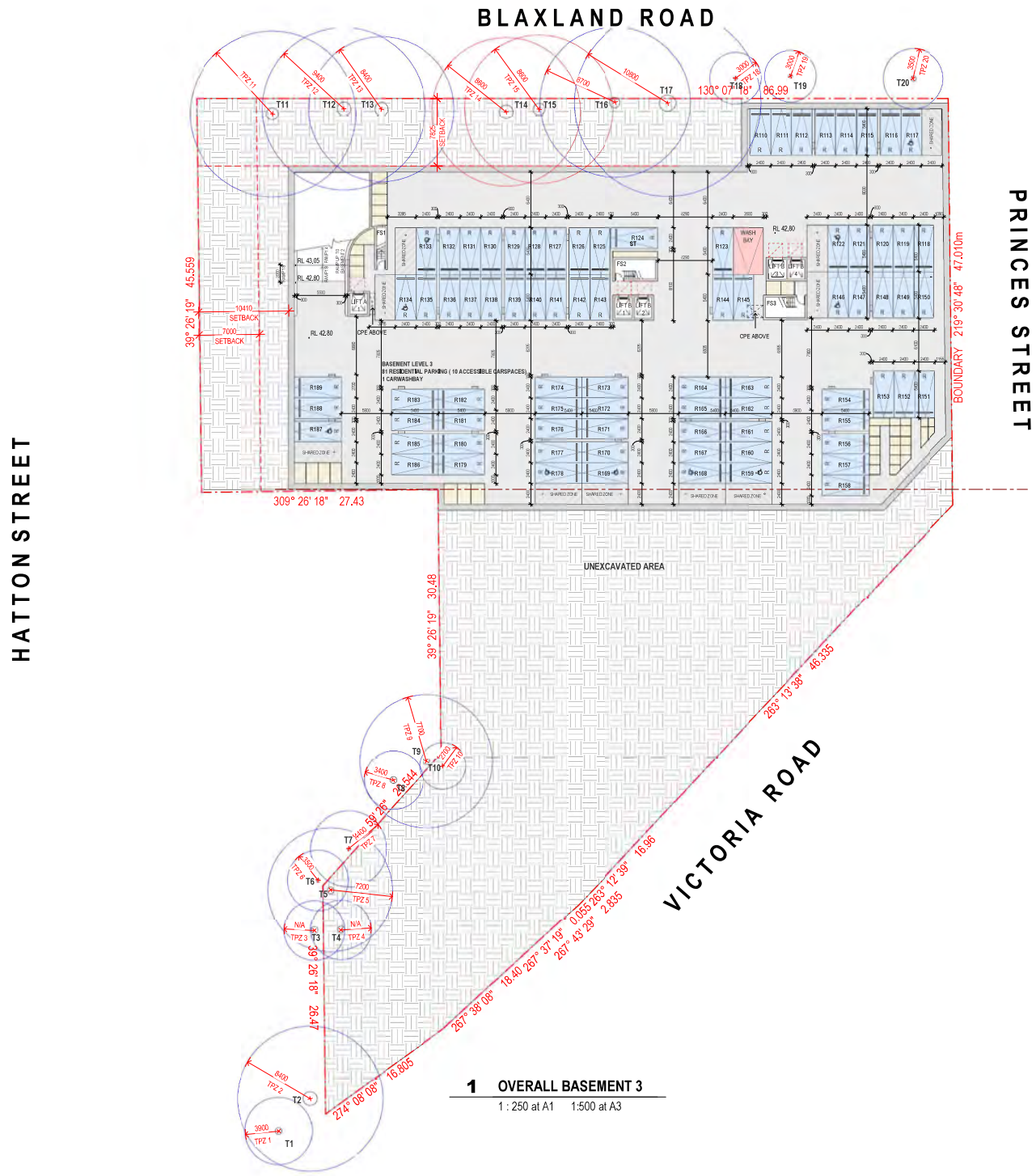
This report has been prepared solely for the use of Chanine Developments Pty Ltd, as per our agreement for providing environmental services. Only Chanine Developments Pty Ltd is entitled to rely upon the findings in the report within the scope of work described in this report. Otherwise, no responsibility is accepted for the use of any part of the report by another in any other context or for any other purpose.

Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that otherwise required by law) in relation to any of the information contained within this document. We accept no responsibility for the accuracy of any data or information provided to us by Chanine Developments Pty Ltd for the purposes of preparing this report.

Any opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal advice.

# ATTACHMENTS

Attachment 1:  Architectural Plans




**1 OVERALL BASEMENT 3**

1 : 250 at A1 1:500 at A3

## REFERENCES

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**TREE LEGEND**

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

**PARKING LEGEND**

BICYCLE
CARWASH
CHILDCARE
CHILDCARE STAFF
COMMERCIAL
RESIDENTIAL
VISITOR

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale
m 0 2.5 5 10 15 20
1:250 at A1 1:500 at A3

TRUE NORTH

## CAR PARKING SCHEDULE BY THE RYDE CITY COUNCIL DCP 2014

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| 1 BED (51) | 1 SPACE / 1 UNIT | 51 | 51 |
| 2 BED (70) | 1,2 SPACE / 1 UNIT | 84 | 84 |
| 3 BED (34) | 1,6 SPACE / 1 UNIT | 54.4 | 54 |
| VISITOR (155 UNITS) | 1 SPACE / 5 UNITS | 31 | 31 |
| CARWASH BAY | 1 SPACE | 1 | 1 |
| TOTAL | | 221.4 | 222 |
| CHILDCARE (108 KIDS) | | | |
| 108 CHILDREN | 1 SPACE / 8 CHILDREN | 13.5 | 14 |
| 18 STAFFS | 1 SPACE / 2 STAFFS | 9 | 9 |
| TOTAL | | 23 | 23 |
| COMMERCIAL | | | |
| 655m² | 1 SPACE / 40 m² | 16.4 | 16 |
| GRAND TOTAL | | 260.8 | 261 |
| EV CHARGING | 1 SPACE PER 50 CAR SPACES | 5.2 | 6 |

## BICYCLE SCHEDULE FOR MU1 ZONE THE RYDE CITY COUNCIL

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| RESIDENTIAL | 10% OF REQUIRED CAR SPACES | 22.1 | 30 |
| TOTAL | | 22.1 | 30 |


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Nominated Architect: Liljana Emilova 7887, ABN 24 243 205 327

Member Australian Institute of Architects


Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

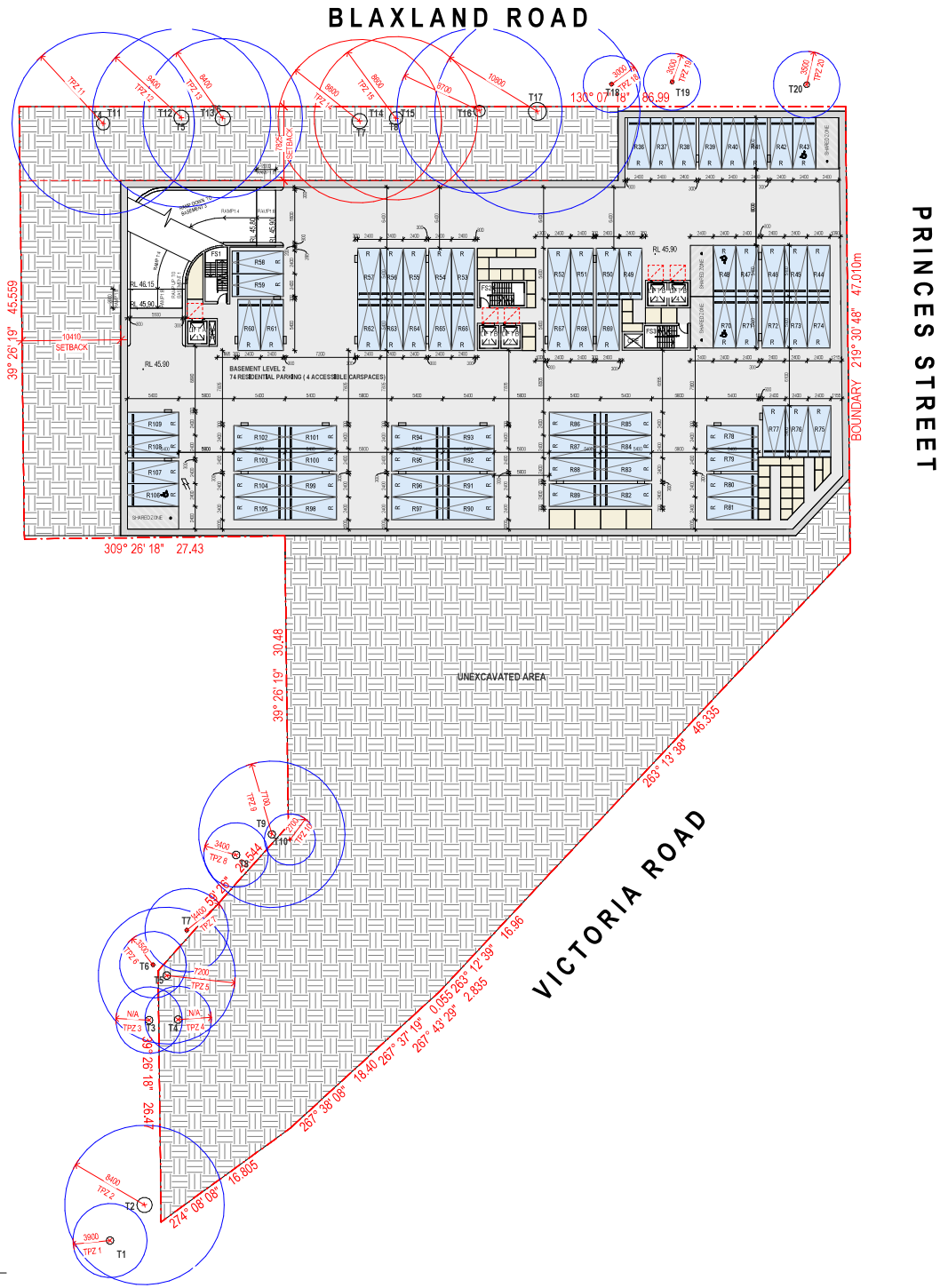
Drawing Title

**BASEMENT LEVEL 3 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1100 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




**1 OVERALL BASEMENT 2**

1 : 250 at A1 1:500 at A3

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**TREE LEGEND**

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

**PARKING LEGEND**

BICYCLE
CARWASH
CHILDCARE
CHILDCARE STAFF
COMMERCIAL
RESIDENTIAL
VISITOR

| Rev. | Date | Description |
|---|---|---|
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Scale m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3

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| 3 BED (34) | 1,6 SPACE / 1 UNIT | 54.4 | 54 |
| VISITOR (155 UNITS) | 1 SPACE / 5 UNITS | 31 | 31 |
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| COMMERCIAL | | | |
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TRUE NORTH



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Member Australian Institute of Architects

Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

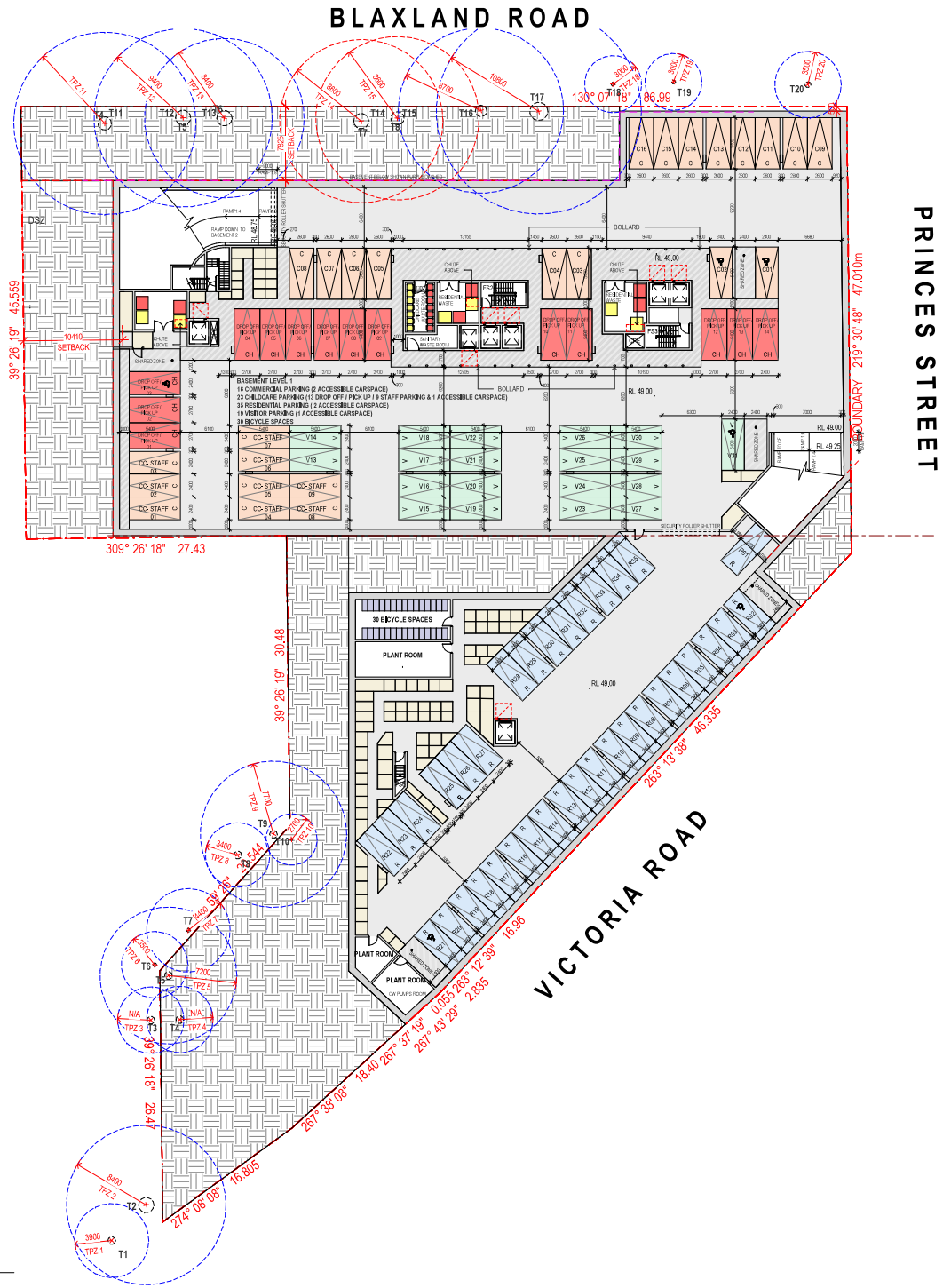
Drawing Title

**BASEMENT LEVEL 2 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1101 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |

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**TREE LEGEND**

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

## CAR PARKING SCHEDULE BY THE RYDE CITY COUNCIL DCP 2014

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| 1 BED (51) | 1 SPACE / 1 UNIT | 51 | 51 |
| 2 BED (70) | 1,2 SPACE / 1 UNIT | 84 | 84 |
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| VISITOR (155 UNITS) | 1 SPACE / 5 UNITS | 31 | 31 |
| CARWASH BAY | 1 SPACE | 1 | 1 |
| TOTAL | | 221.4 | 222 |
| CHILDCARE (108 KIDS) | | | |
| 108 CHILDREN | 1 SPACE / 8 CHILDREN | 13.5 | 14 |
| 18 STAFFS | 1 SPACE / 2 STAFFS | 9 | 9 |
| TOTAL | | 23 | 23 |
| COMMERCIAL | | | |
| 655m² | 1 SPACE / 40 m² | 16.4 | 16 |
| GRAND TOTAL | | 260.8 | 261 |
| EV CHARGING | 1 SPACE PER 50 CAR SPACES | 5.2 | 6 |

## BICYCLE SCHEDULE FOR MU1 ZONE THE RYDE CITY COUNCIL

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| RESIDENTIAL | 10% OF REQUIRED CAR SPACES | 22.1 | 30 |
| TOTAL | | 22.1 | 30 |

**1 OVERALL BASEMENT 1 / BLGC - B2**

1 : 250 at A1 1:500 at A3

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


Project Architect

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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

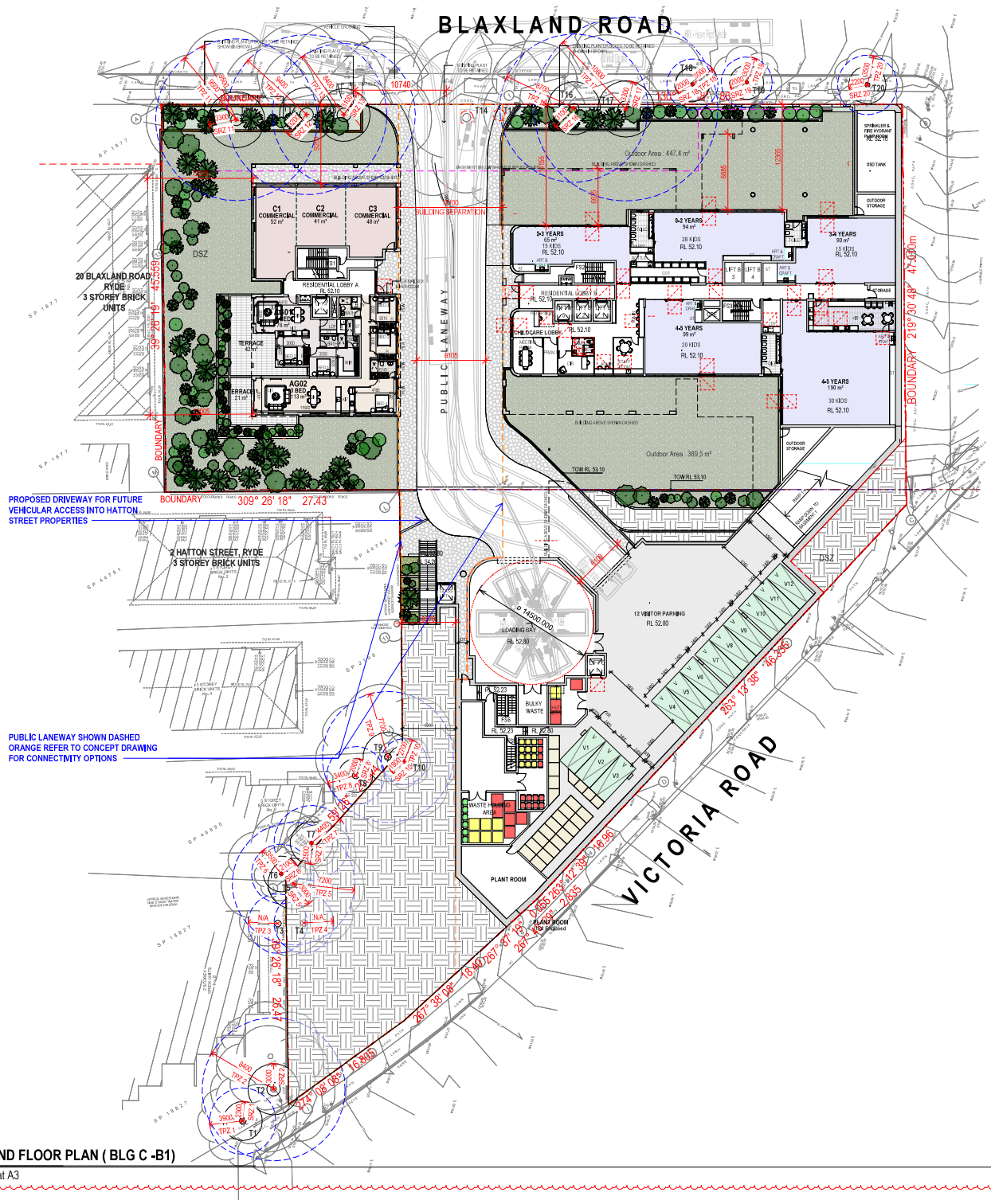
Drawing Title

**BASEMENT LEVEL 1 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1102 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




## 1 OVERALL GROUND FLOOR PLAN ( BLG C -B1)

1 : 250 at A1 1:500 at A3

### CAR PARKING SCHEDULE BY THE RYDE CITY COUNCIL DCP 2014

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| 1 BED (51) | 1 SPACE / 1 UNIT | 51 | 51 |
| 2 BED (70) | 1,2 SPACE / 1 UNIT | 84 | 84 |
| 3 BED (34) | 1,6 SPACE / 1 UNIT | 54.4 | 54 |
| VISITOR (155 UNITS) | 1 SPACE / 5 UNITS | 31 | 31 |
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| TOTAL | | 23 | 23 |
| COMMERCIAL | | | |
| 655m² | 1 SPACE / 40 m² | 16.4 | 16 |
| GRAND TOTAL | | 260.8 | 261 |
| EV CHARGING | 1 SPACE PER 50 CAR SPACES | 5.2 | 6 |

### BICYCLE SCHEDULE FOR MU1 ZONE THE RYDE CITY COUNCIL

| UNITS (155) | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| RESIDENTIAL | 10% OF REQUIRED CAR SPACES | 22.1 | 30 |
| TOTAL | | 22.1 | 30 |

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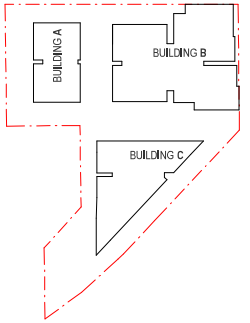


TREE LEGEND

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale
m 0 2.5 5 10 15 20
1:250 at A1 1:500 at A3


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Project
**PROPOSED MIXED USE DEVELOPMENT**

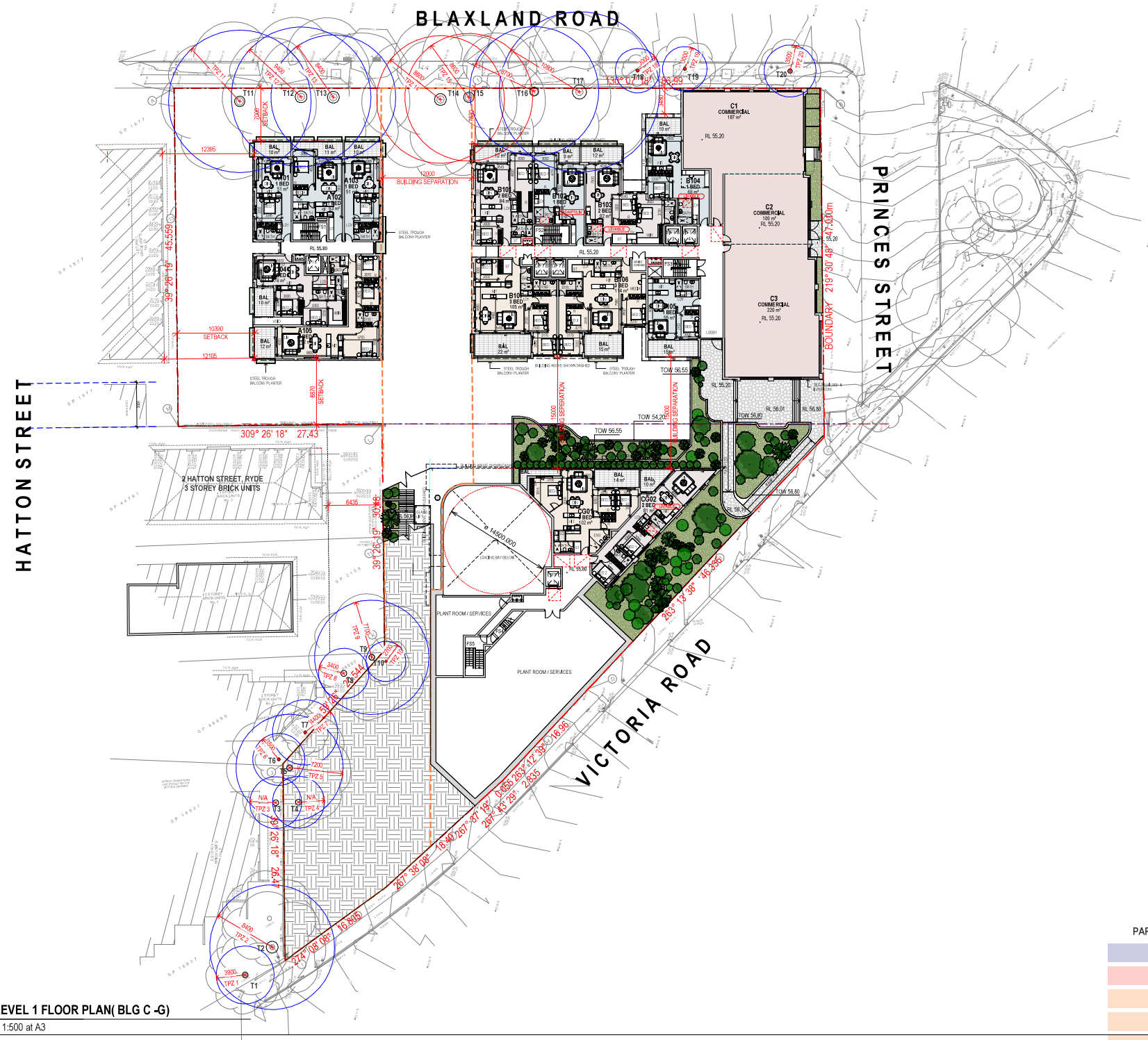
691-695 Victoria Road, Ryde

Drawing Title
**OVERALL GROUND FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1103 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




**1** OVERALL LEVEL 1 FLOOR PLAN( BLG C -G)

1 : 250 at A1 1:500 at A3

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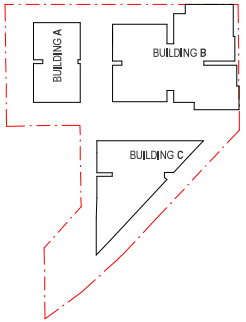


TREE LEGEND

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
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Scale

m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

Drawing Title

**OVERALL LEVEL 1 FLOOR PLAN**

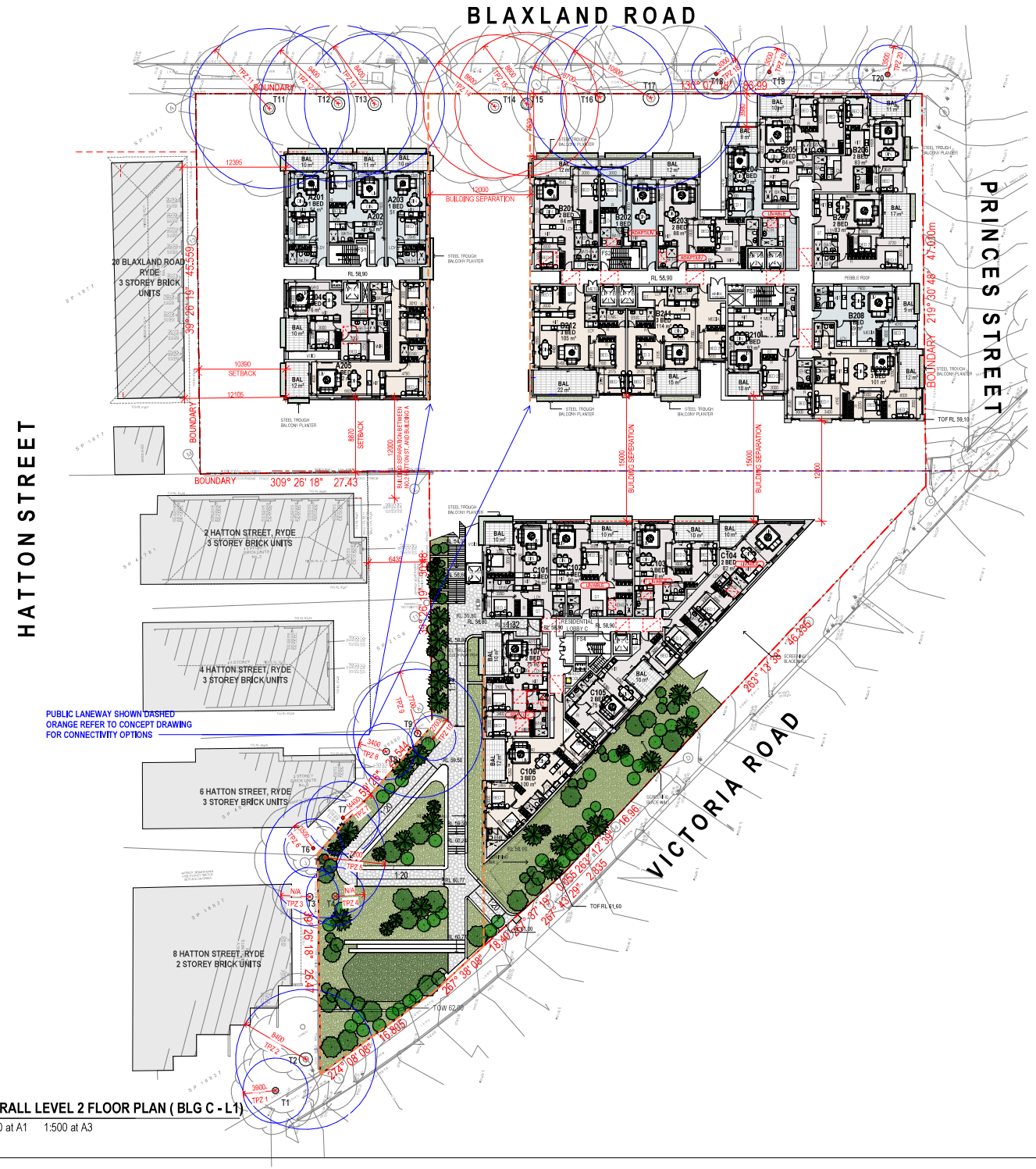
**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1104 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG. 2024 |

PARKING LEGEND

BICYCLE
CARWASH
CHILDCARE
CHILDCARE STAFF
COMMERCIAL
RESIDENTIAL




**1** **OVERALL LEVEL 2 FLOOR PLAN ( BLG C - L1)**

1 : 250 at A1 1:500 at A3

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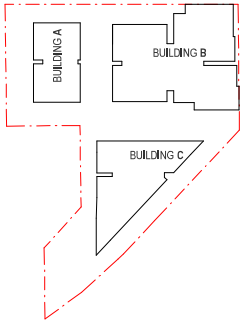


TREE LEGEND

TPZ - TREES TO BE RETAINED

TPZ - TREES TO BE REMOVED

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|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
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Scale m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


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**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

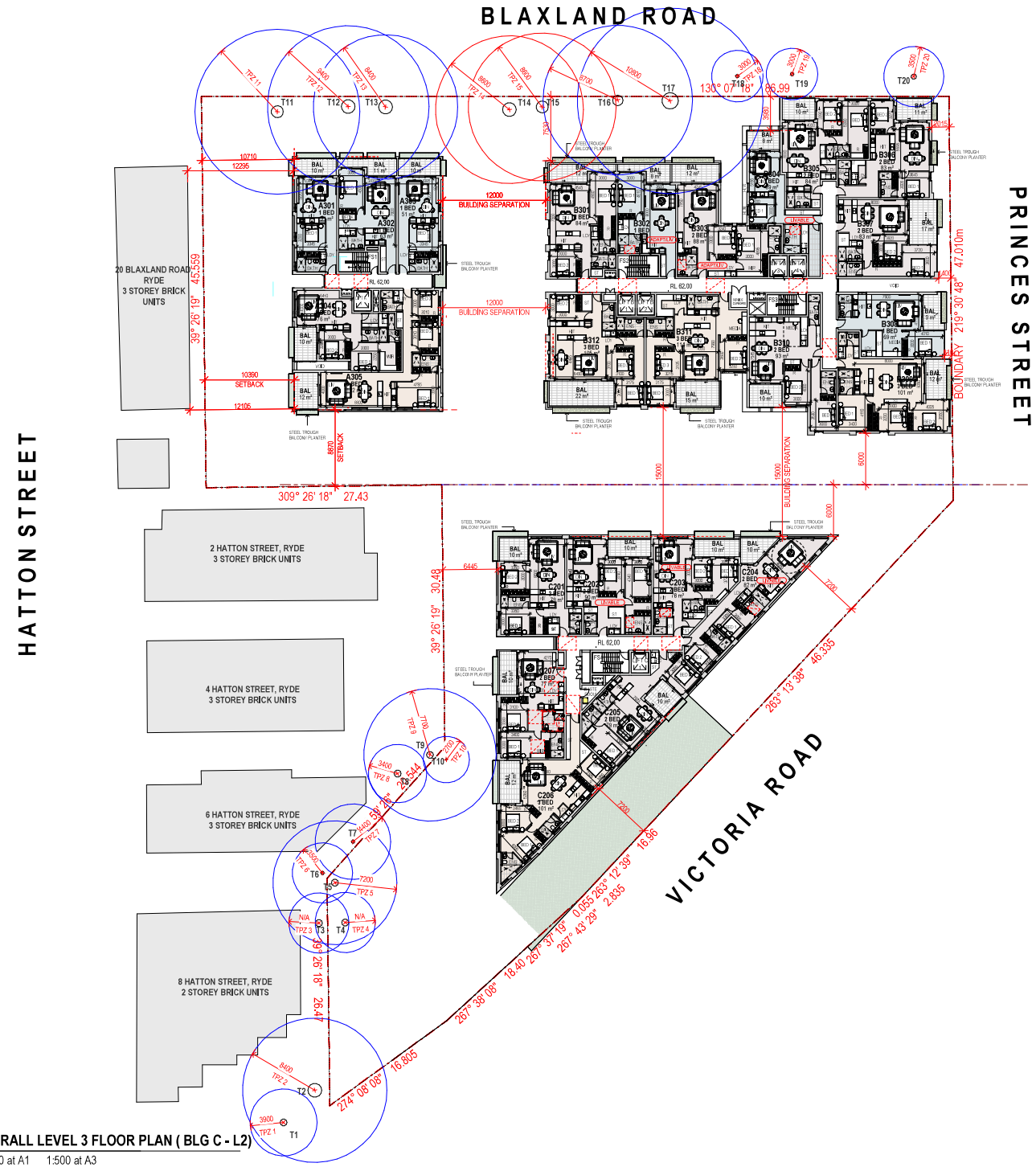
Drawing Title

**OVERALL LEVEL 2 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1105 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




**1** OVERALL LEVEL 3 FLOOR PLAN ( BLG C - L2)

1 : 250 at A1 1:500 at A3

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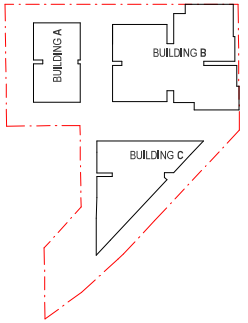


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TPZ - TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
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Scale

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1:250 at A1 1:500 at A3


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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

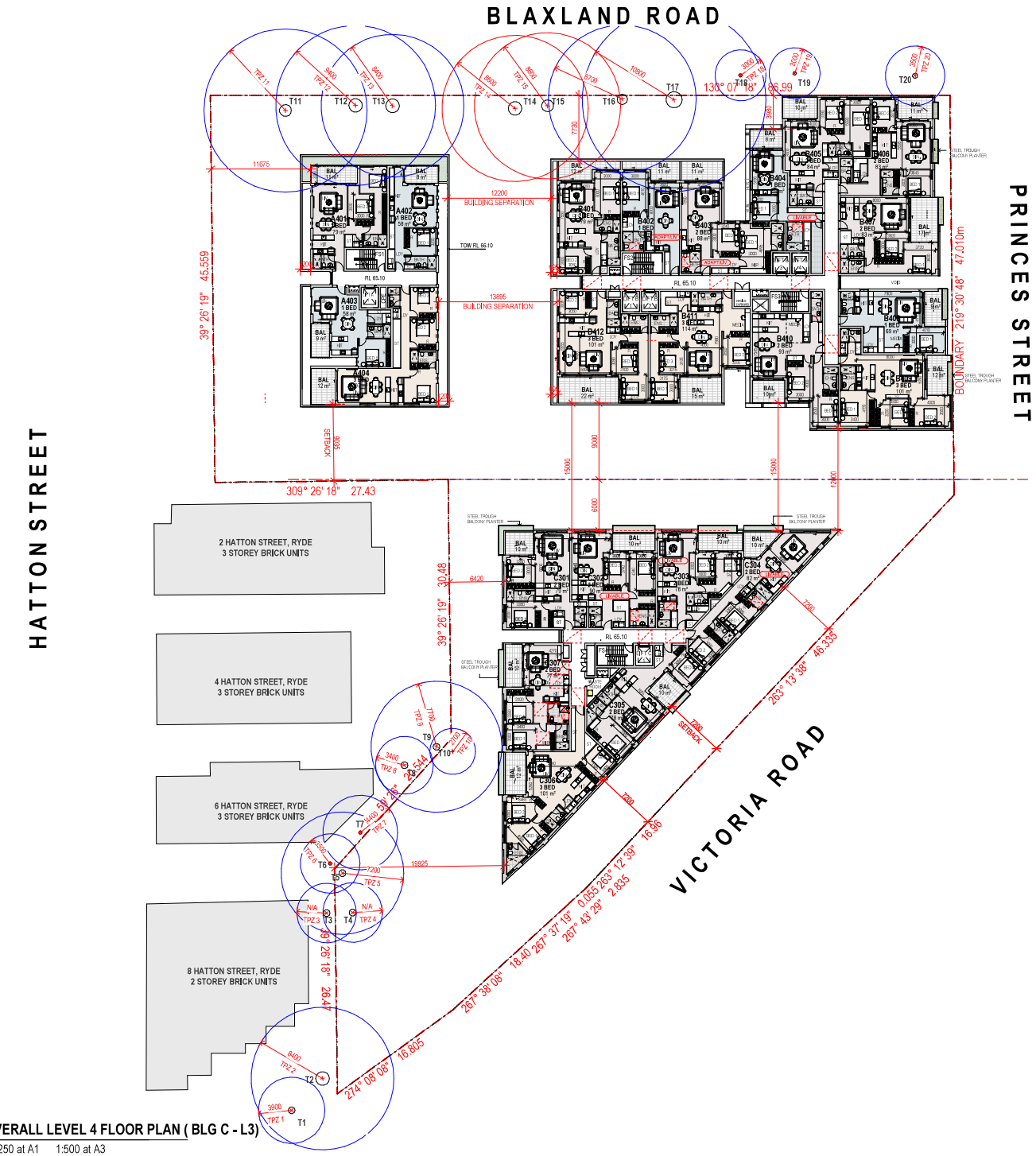
Drawing Title

**OVERALL LEVEL 3 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1106 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




**1** **OVERALL LEVEL 4 FLOOR PLAN ( BLG C - L3)**

1 : 250 at A1 1:500 at A3

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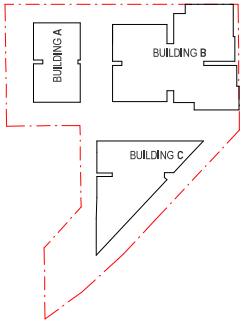



TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3

TRUE NORTH

Project Architect

CDA CDARCHITECTS

LEVEL 2, 60 PARK STREET
SYDNEY NSW 2000
P: 02 9267 2000
W: www.cdarchitects.com.au



Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

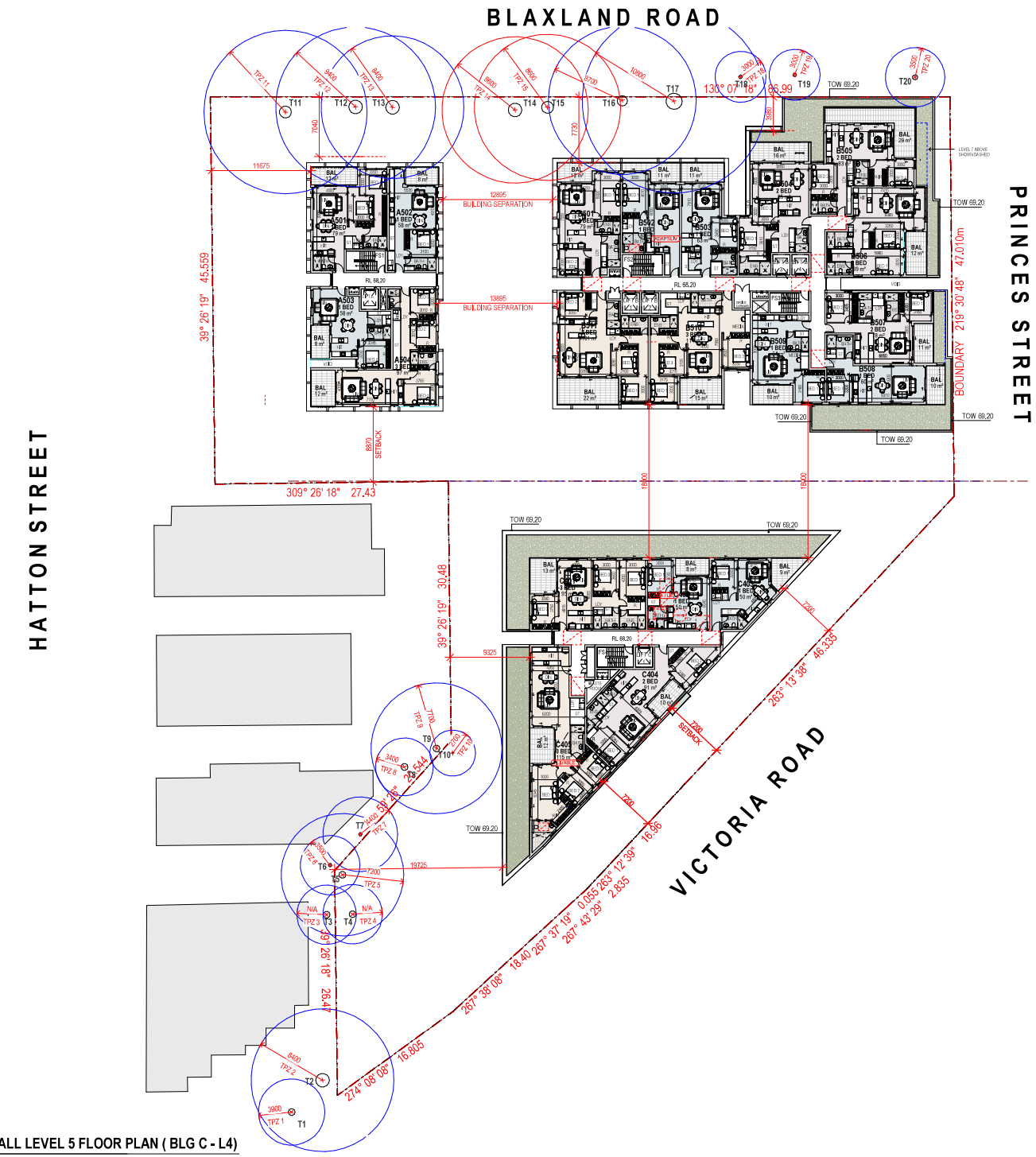
Drawing Title

**OVERALL LEVEL 4 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1107 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




## 1 OVERALL LEVEL 5 FLOOR PLAN ( BLG C - L4)

1 : 250 at A1 1:500 at A3

### REFERENCES

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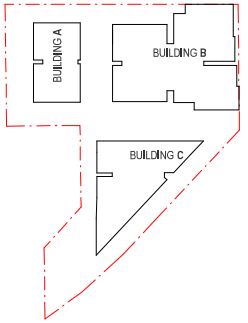


TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale

m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

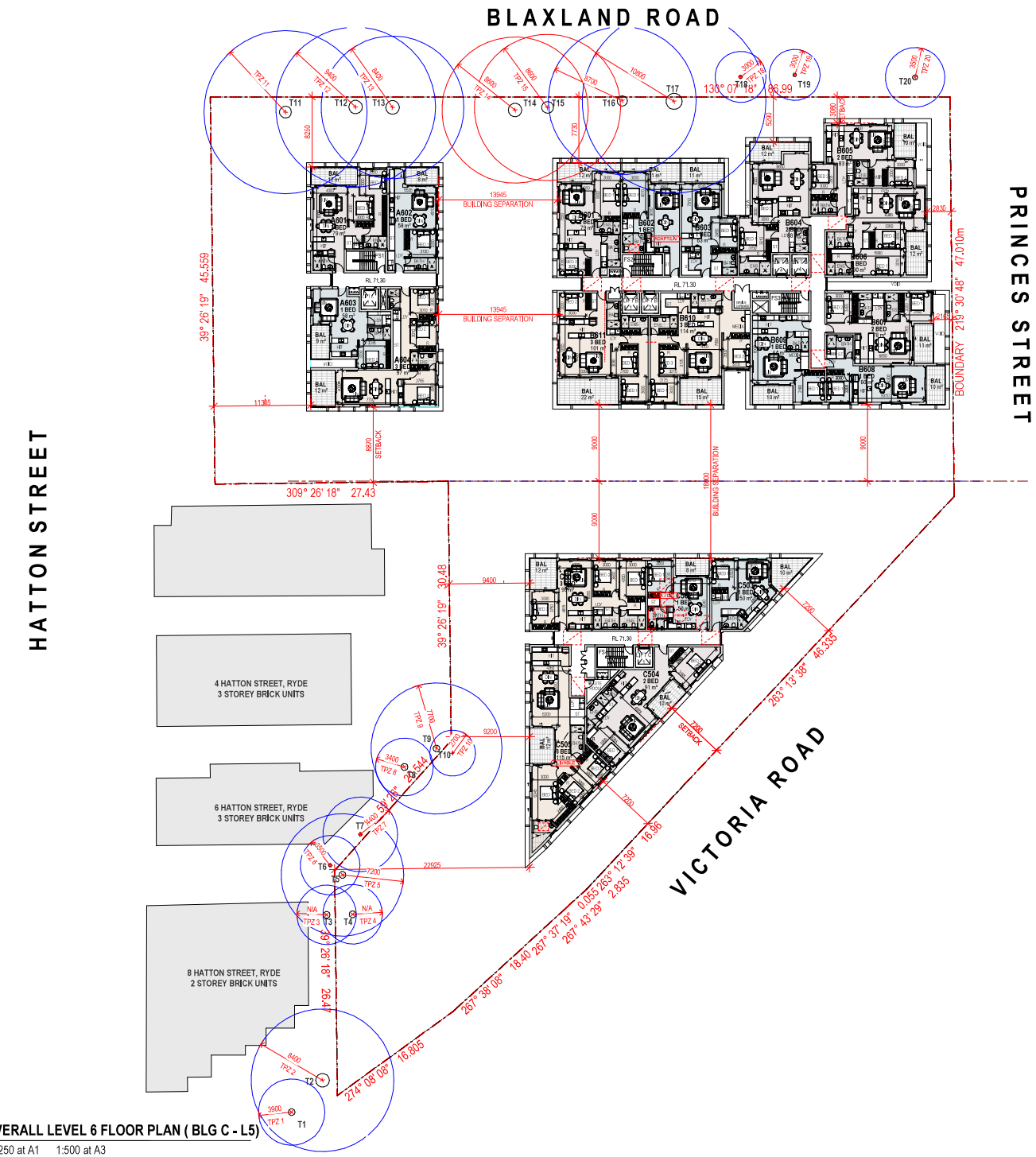
Drawing Title

**OVERALL LEVEL 5 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1108 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |

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TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale
m 0 2.5 5 10 15 20
1:250 at A1 1:500 at A3


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Project
**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

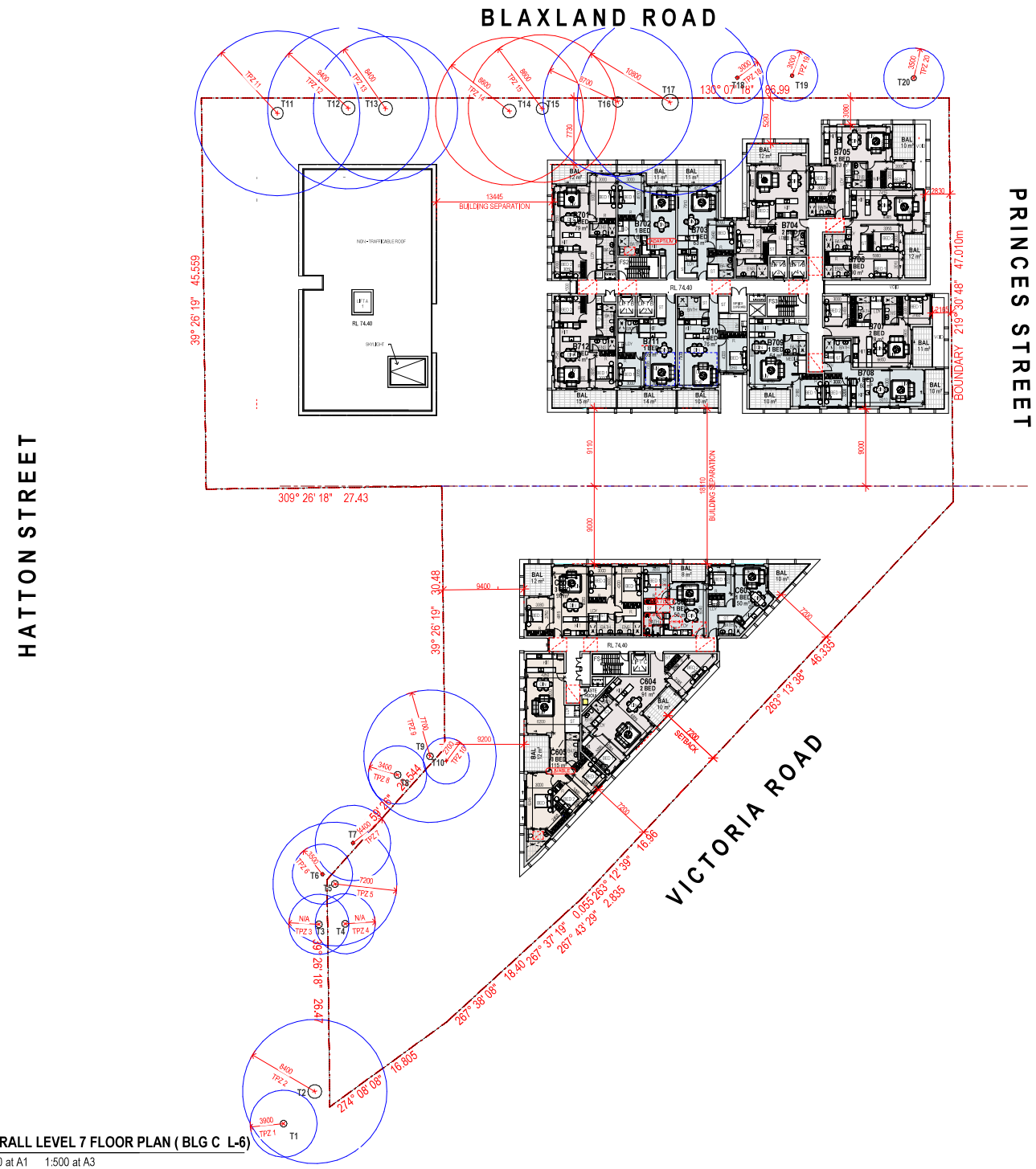
Drawing Title
**OVERALL LEVEL 6 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1109 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |

**1 OVERALL LEVEL 6 FLOOR PLAN ( BLG C - L5)**
1 : 250 at A1 1:500 at A3




**1 OVERALL LEVEL 7 FLOOR PLAN ( BLG C L-6)**

1 : 250 at A1 1:500 at A3

## REFERENCES

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TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale

m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

Drawing Title

**OVERALL LEVEL 7 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1110 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |


**1 OVERALL LEVEL 8 ( BLG C - L7)**

1 : 250 at A1 1:500 at A3

## REFERENCES

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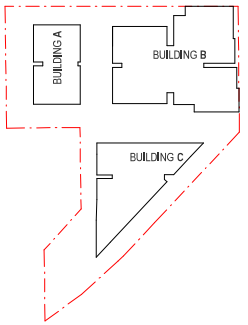


TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale

m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


Project Architect

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Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

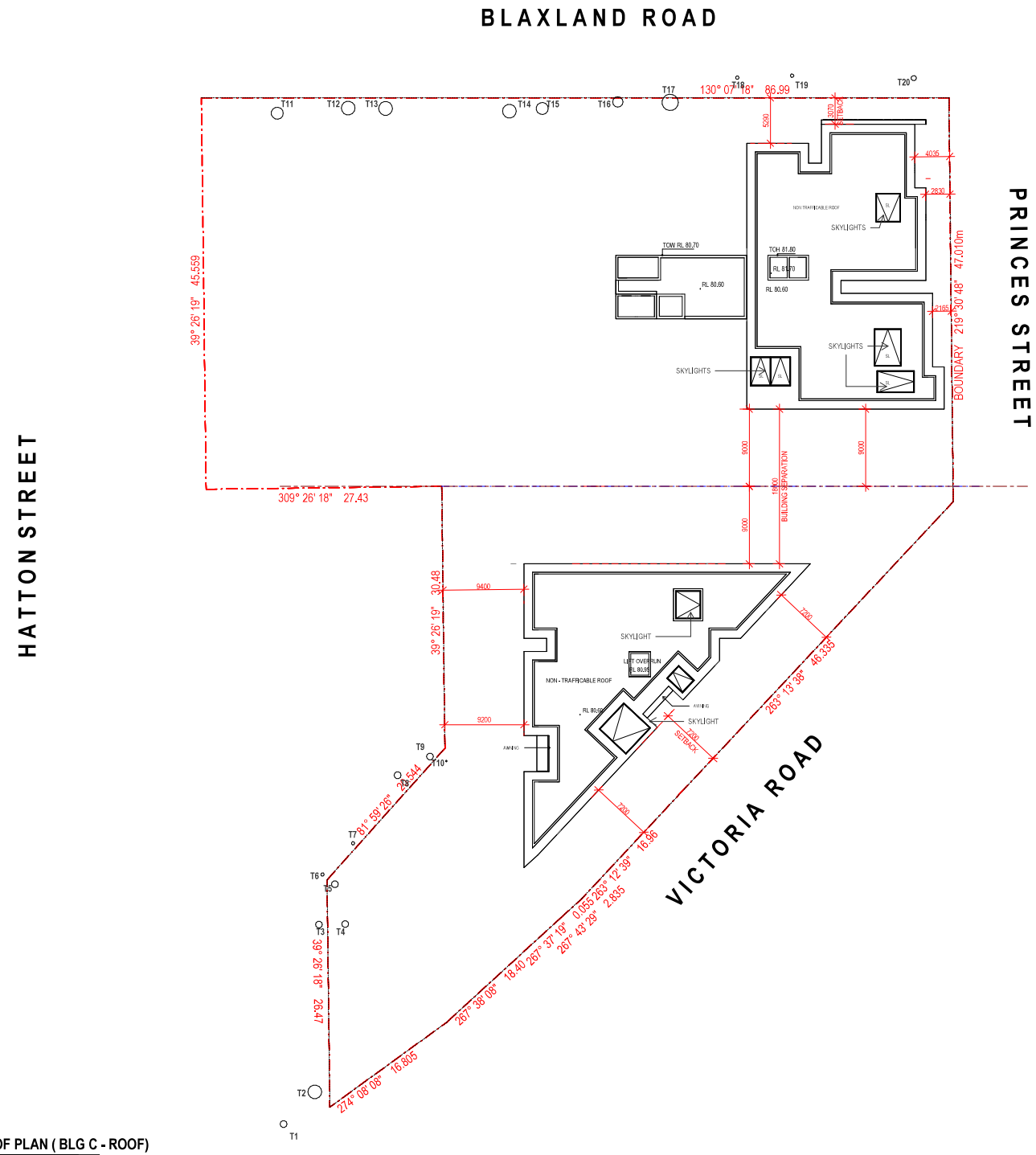
Drawing Title

**OVERALL LEVEL 8 FLOOR PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1111 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |




**1** **OVERALL ROOF PLAN ( BLG C - ROOF)**

1 : 250 at A1 1:500 at A3

## REFERENCES

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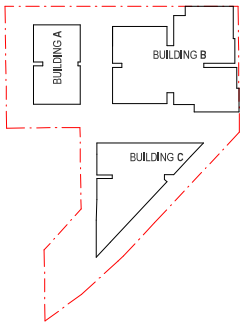


TREE LEGEND

TREES TO BE RETAINED

TREES TO BE REMOVED

| Rev. | Date | Description |
|---|---|---|
| C | 27.09.2024 | GENERAL AMENDMENTS |
| B | 02.09.2024 | WP S34 DISCUSSION |
| A | 27.11.2023 | DA SUBMISSION |

Scale

m 0 2.5 5 10 15 20

1:250 at A1 1:500 at A3


Project Architect

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Nominated Architect: Liljana Emiljeva 7887, ABN 24 243 205 327


Member Australian Institute of Architects

Project

**PROPOSED MIXED USE DEVELOPMENT**

691-695 Victoria Road, Ryde

Drawing Title

**ROOF PLAN**

**DA SUBMISSION**

| Job no. | Drawing no. | Rev. |
|---|---|---|
| J23589D | DA 1112 | C |

| Drawn by | Checked by | Approved by | Date |
|---|---|---|---|
| SP | RJ | ZC | AUG, 2024 |

DATASHEET

# AirMetER-AX

## MULTIPARAMETER AIR QUALITY MONITORING STATION

MONITORING SOLUTION FOR PARTICULATE, GAS, NOISE, ENVIRONMENTAL CONDITIONS


The AirMetER-AX is a compact, and easy to install air quality monitoring station. The modular design allows the unit to support 1-6 gas sensors, $PM_{2.5}$, $PM_{10}$, general weather conditions and noise.

Housed in a weather resistant enclosure, the AirMetER-AX is ideal for continuous round the clock outdoor monitoring and has data logging capacity at a minimum of 365 days at one-minute intervals. It also has a built-in log and forward capability to capture 1 week of operation in the event of a network disruption.

Integrating seamlessly with Air-Met Scientific's web-based portal for remote data access, this secure data portal enables users to access monitoring logs, set customisable alerts, manage monitoring reports and more. The web-service application is accessible on both desktop PC and mobile smart devices.


AUSTRALIAN MADE AND OWNED

**AirMetER-AX | Proudly Australian Made**

## FEATURES

- Heated inlet
- Humidity correction
- Over the air (OTA) K-factor correction (requires gravimetric sample data)
- Low maintenance
- Local service support

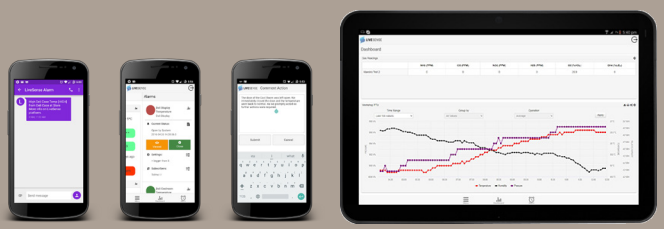
## PARAMETER CAPABILITIES

- Simultaneous $PM_{2.5}$ and $PM_{10}$ measurement
- Simultaneously monitor 1-6 different gases
  Available gases – CO, $CO_2$, VOC, $SO_2$, $H_2S$, $O_2$, $O_3$, NO and $NO_2$
- Weather monitoring
- Noise measurements

## DATA

Cellular telemetry through Air-Met Scientific's secure data portal. Requires minimum 12-month subscription to Air-Met's data portal.

- 5 minute datalogging interval with FTP transfer to Air-Met Scientific's secure web service
- 1-hour and 24-hour rolling averages as standard
- Data downloads, user management, threshold alert management (SMS and/or email) and auto-report generation all managed via Air-Met Scientific's data portal.

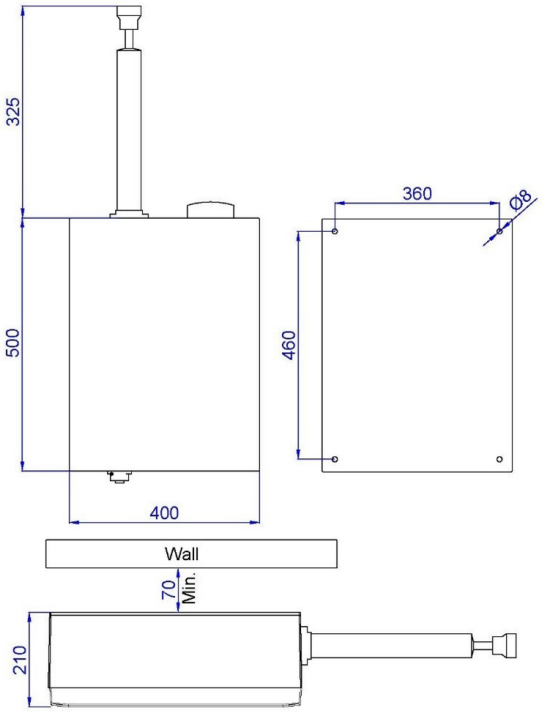


## TECHNICAL SPECIFICATIONS

| GENERAL | |
|---|---|
| Power Requirement | 12VDC |
| Rated Power | 43W maximum. |
| Operating Temperature | 0 to 50°C |
| Operating Humidity | 0 to 95% non-condensing |
| Operating Pressure | 860 to 1100 hPa |
| Laser Module Operating Life | 8000 hours |
| Datalogging | 3 years of logs onboard with unique file name creation every 24 hours |
| Alarm Indicator (optional) | Onboard dedicated alarm relay for all installed sensors |

| ENCLOSURE | |
|---|---|
| Material | Polycarbonate |
| Dimensions | 500mm (H) x 400mm (W) x 210mm (D) |
| Instrument Weight | 15kg |
| Mounting Options | Pole-mount kit supplied (recommended installation method)<br>Wall-mount: ~70 mm offset required for dust inlet clearance |

| COMMUNICATION | |
|---|---|
| FTP Upload | Cellular, Ethernet or WiFi |



Minimum wall mounting clearance distance 70mm

## PARAMETER SPECIFICATIONS

| PARTICULATES MEASUREMENTS (specifications are based on 20°C and 860 - 1100 hPa conditions) | |
|---|---|
| | **$PM_{2.5}$ & $PM_{10}$** |
| **Range** | 0.0-999.9 µg/$m^3$ |
| **Resolution** | 0.1 µg/$m^3$ |
| **Relative Error** | Max of ±15% and ±10µg/$m^3$ |

**GAS MEASUREMENTS (specifications are based on 20°C and 800-1200 hPa conditions)**

| Type | Range | Resolution | T90 Response (s) | Min. Repeatable Detectable Level |
|---|---|---|---|---|
| CO (low range) | 0-10ppm | 1ppb | <30 | 20ppb |
| CO (high range) | 0-300ppm | 1ppm | <25 | N/A |
| $CO_2$ | 0-2000ppm | 1ppm | <40 | 15ppm |
| VOC (low range) | 0-20ppm | 1ppb | <10 | 15ppb |
| VOC (high range) | 0-200ppm | 0.1ppm | <3 | N/A |
| $SO_2$ | 0-10ppm | 1ppb | <60 | 20ppb |
| $H_2S$ | 0-2ppm | 1ppb | <60 | 20ppb |
| $NO_2$ (low range) | 0-1ppm | 1ppb | <80 | 20ppb |
| $NO_2$ (high range) | 0-20ppm | 0.1ppm | <50 | N/A |
| $O_3$ | 0-1ppm | 1ppb | <80 | 20ppb |
| $O_2$ | 0-25%VOL | 0.1%VOL | <15 | N/A |
| NO | 0-5ppm | 1ppb | <45 | 20ppb |

| **WEATHER SENSOR**<br>Integrated climate sensor for weather monitoring | |
|---|---|
| Wind Speed | 0 to 60.0 m/s |
| Wind Direction | 0° to 360.0° |
| Air Temperature | -40.0 to +60.0°C |
| Relative Humidity | 0 to 100.0% |
| Barometric Air Pressure | 800.0 to 1060.0 hPa |
| Precipitation | 0.00 to 100.00 mm/h |

| **NOISE**<br>Integratged noise monitor using TA120 | |
|---|---|
| Range | 35.0 to 120.0 dB |
| Resolution | 0.1 dB |
| Accuracy | According to IEC 61672-1 Class 1 |

## SPARE PARTS & ACCESSORIES

| **PART NO.** | **DESCRIPTION** |
|---|---|
| TF-TRI-AL | Tripod Mounting |
| AMS/200S/170B/15M/9C | Remote Power System |
| LPF-60-12-AUP | Power Supply (100-240VAC Input) |
| 121-5866 | Pneumatic Silencer |
| 9933-05CQ | Pump Filter |
| 002-3022-001 | Water Stop Filter |
| KAM-SF9 | NOx Filter (for Air-MetER AX-3) |
| For all additional sensors, please contact Air-Met Scientific. | |

**WANT TO LEARN MORE? CONTACT US TODAY!**

For more information about the AirMetER-AX or additional sensors, contact your local Air-Met Scientific office on 1800 000 744 or contact our team via email at engineeredsolutions@airmet.com.au.

Alternatively, scan the QR code to find your nearest Air-Met Scientific office.

Attachment 3:  Certificate of Analysis (ALS)

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN2506802** | Page | : 1 of 5 |
| Client | : **Benbow Environmental** | Laboratory | : Environmental Division Newcastle |
| Contact | : Prasanna Manoharan | Contact | : |
| Address | : 25 Sherwood St<br>Northmead 2152 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : ---- | Telephone | : +61 2 4014 2500 |
| Project | : Blaxland Rd BTEX | Date Samples Received | : 28-Apr-2025 17:00 |
| Order number | : 231126-02 | Date Analysis Commenced | : 02-May-2025 |
| C-O-C number | : ---- | Issue Date | : 06-May-2025 15:13 |
| Sampler | : Prasanna Manoharan | | |
| Site | : ---- | | |
| Quote number | : EN/222 | | |
| No. of samples received | : 3 | | |
| No. of samples analysed | : 3 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Dale Semple | Analyst | Newcastle - Organics, Mayfield West, NSW |

## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

## Analytical Results

| Sub-Matrix: SORBENT TUBE (Matrix: AIR) | | | | Sample ID | BTEX 1 | TOL 1 | BTEX BLANK | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 28-Apr-2025 00:00 | 28-Apr-2025 00:00 | 28-Apr-2025 00:00 | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | EN2506802-001 | EN2506802-002 | EN2506802-003 | -------- | -------- |
| | | | | | Result | Result | Result | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons - Total** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg/sample | | <0.5 | ---- | <0.5 | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg/sample | | <0.5 | <0.5 | <0.5 | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg/sample | | <0.5 | ---- | <0.5 | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg/sample | | <1.0 | ---- | <1.0 | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg/sample | | <0.5 | ---- | <0.5 | ---- | ---- |
| **Total Xylenes** | ---- | 1.5 | µg/sample | | <1.5 | ---- | <1.5 | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons (Section 1)** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg | | <0.5 | <0.5 | <0.5 | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg | | <1.0 | ---- | <1.0 | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons (Section 2)** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg | | <0.5 | <0.5 | <0.5 | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg | | <1.0 | ---- | <1.0 | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg | | <0.5 | ---- | <0.5 | ---- | ---- |
| **EP091: Chlorinated Organic Surrogates (Section 1)** | | | | | | | | | |
| **1.2-Dichloroethane-D4** | 17060-07-0 | 0.5 | % | | **114** | **115** | **118** | ---- | ---- |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | | **76.3** | **76.2** | **76.6** | ---- | ---- |
| **EP091: Chlorinated Organic Surrogates (Section 2)** | | | | | | | | | |
| **1.2-Dichloroethane-D4** | 17060-07-0 | 0.5 | % | | **110** | **114** | **113** | ---- | ---- |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | | **79.5** | **80.7** | **80.6** | ---- | ---- |
| **EP091: MAH Surrogates (Section 1)** | | | | | | | | | |
| **Toluene-D8** | 2037-26-5 | 0.5 | % | | **94.4** | **93.4** | **93.3** | ---- | ---- |
| **EP091: MAH Surrogates (Section 2)** | | | | | | | | | |

## Analytical Results

| Sub-Matrix: SORBENT TUBE (Matrix: AIR) | | | | Sample ID | BTEX 1 | TOL 1 | BTEX BLANK | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 28-Apr-2025 00:00 | 28-Apr-2025 00:00 | 28-Apr-2025 00:00 | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | EN2506802-001 | EN2506802-002 | EN2506802-003 | -------- | -------- |
| | | | | | Result | Result | Result | ---- | ---- |
| **EP091: MAH Surrogates (Section 2) - Continued** | | | | | | | | | |
| **Toluene-D8** | 2037-26-5 | 0.5 | % | | **93.8** | **94.6** | **92.7** | **----** | **----** |

## Surrogate Control Limits

| Sub-Matrix: SORBENT TUBE | | Recovery Limits (%) | |
|---|---|---|---|
| Compound | CAS Number | Low | High |
| **EP091: Chlorinated Organic Surrogates (Section 1)** | | | |
| 1.2-Dichloroethane-D4 | 17060-07-0 | 70 | 130 |
| 4-Bromofluorobenzene | 460-00-4 | 60 | 130 |
| **EP091: Chlorinated Organic Surrogates (Section 2)** | | | |
| 1.2-Dichloroethane-D4 | 17060-07-0 | 60 | 140 |
| 4-Bromofluorobenzene | 460-00-4 | 60 | 140 |
| **EP091: MAH Surrogates (Section 1)** | | | |
| Toluene-D8 | 2037-26-5 | 70 | 130 |
| **EP091: MAH Surrogates (Section 2)** | | | |
| Toluene-D8 | 2037-26-5 | 60 | 140 |

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN2311783** | Page | : 1 of 5 |
| Client | : **Benbow Environmental** | Laboratory | : Environmental Division Newcastle |
| Contact | : Francesco Faustino | Contact | : |
| Address | : 25 Sherwood St<br>Northmead 2152 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : ---- | Telephone | : +61 2 4014 2500 |
| Project | : 231126 | Date Samples Received | : 22-Nov-2023 17:00 |
| Order number | : 231126 | Date Analysis Commenced | : 23-Nov-2023 |
| C-O-C number | : ---- | Issue Date | : 24-Nov-2023 16:12 |
| Sampler | : Francesco Faustino | | |
| Site | : ---- | | |
| Quote number | : EN/222 | | |
| No. of samples received | : 2 | | |
| No. of samples analysed | : 2 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Dale Semple | Analyst | Newcastle - Organics, Mayfield West, NSW |
| Daniel Junek | Senior Organic Chemist | Newcastle - Organics, Mayfield West, NSW |

## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

## Analytical Results

| Sub-Matrix: SORBENT TUBE (Matrix: AIR) | | | | Sample ID | BTEX 1 | BTEX BLANK | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 20-Nov-2023 00:00 | 20-Nov-2023 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | EN2311783-001 | EN2311783-002 | -------- | -------- | -------- |
| | | | | | Result | Result | ---- | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons - Total** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg/sample | | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg/sample | | **1.4** | <0.5 | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg/sample | | <0.5 | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg/sample | | <1.0 | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg/sample | | <0.5 | <0.5 | ---- | ---- | ---- |
| **Total Xylenes** | ---- | 1.5 | µg/sample | | <1.5 | <1.5 | ---- | ---- | ---- |
| **EP091E: Polycyclic Aromatic Hydrocarbons - Total** | | | | | | | | | |
| **Naphthalene** | 91-20-3 | 0.5 | µg/sample | | <0.5 | <0.5 | ---- | ---- | ---- |
| **EP091E: Polycyclic Aromatic Hydrocarbons (Section 2)** | | | | | | | | | |
| **Naphthalene** | 91-20-3 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons (Section 1)** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg | | **1.4** | <0.5 | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg | | <1.0 | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **EP091E: Polycyclic Aromatic Hydrocarbons (Section 1)** | | | | | | | | | |
| **Naphthalene** | 91-20-3 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **EP091B: Monocyclic Aromatic Hydrocarbons (Section 2)** | | | | | | | | | |
| **Benzene** | 71-43-2 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **Toluene** | 108-88-3 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **Ethylbenzene** | 100-41-4 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **meta- & para-Xylene** | 108-38-3 106-42-3 | 1.0 | µg | | <1.0 | <1.0 | ---- | ---- | ---- |
| **ortho-Xylene** | 95-47-6 | 0.5 | µg | | <0.5 | <0.5 | ---- | ---- | ---- |
| **EP091: Chlorinated Organic Surrogates (Section 1)** | | | | | | | | | |
| **1.2-Dichloroethane-D4** | 17060-07-0 | 0.5 | % | | **105** | **104** | ---- | ---- | ---- |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | | **80.8** | **79.4** | ---- | ---- | ---- |

## Analytical Results

| Sub-Matrix: SORBENT TUBE (Matrix: AIR) | | | | Sample ID | BTEX 1 | BTEX BLANK | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 20-Nov-2023 00:00 | 20-Nov-2023 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | EN2311783-001 | EN2311783-002 | -------- | -------- | -------- |
| | | | | | Result | Result | ---- | ---- | ---- |
| **EP091: Chlorinated Organic Surrogates (Section 2)** | | | | | | | | | |
| **1.2-Dichloroethane-D4** | 17060-07-0 | 0.5 | % | | **101** | **101** | **----** | **----** | **----** |
| **4-Bromofluorobenzene** | 460-00-4 | 0.5 | % | | **82.4** | **86.4** | **----** | **----** | **----** |
| **EP091: MAH Surrogates (Section 1)** | | | | | | | | | |
| **Toluene-D8** | 2037-26-5 | 0.5 | % | | **95.7** | **90.9** | **----** | **----** | **----** |
| **EP091: MAH Surrogates (Section 2)** | | | | | | | | | |
| **Toluene-D8** | 2037-26-5 | 0.5 | % | | **91.6** | **92.9** | **----** | **----** | **----** |

## Surrogate Control Limits

| Sub-Matrix: SORBENT TUBE | | Recovery Limits (%) | |
|---|---|---|---|
| Compound | CAS Number | Low | High |
| **EP091: Chlorinated Organic Surrogates (Section 1)** | | | |
| 1.2-Dichloroethane-D4 | 17060-07-0 | 70 | 130 |
| 4-Bromofluorobenzene | 460-00-4 | 60 | 130 |
| **EP091: Chlorinated Organic Surrogates (Section 2)** | | | |
| 1.2-Dichloroethane-D4 | 17060-07-0 | 60 | 140 |
| 4-Bromofluorobenzene | 460-00-4 | 60 | 140 |
| **EP091: MAH Surrogates (Section 1)** | | | |
| Toluene-D8 | 2037-26-5 | 70 | 130 |
| **EP091: MAH Surrogates (Section 2)** | | | |
| Toluene-D8 | 2037-26-5 | 60 | 140 |

# CHAIN OF CUSTODY

ALS Laboratory: please tick →


ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5800 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-16 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com


| | | | |
|---|---|---|---|
| **CLIENT:** Benbow Environmental | **TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) | ☐ Standard TAT (List due date): | **FOR LABORATORY USE ONLY (Circle)** |
| **OFFICE:** 27-29 Sherwood St Northmead 2152 | | ☒ Non Standard or urgent TAT (List due date): 5/05/2025 | Custody Seal Intact Yes / No / N/A |
| **PROJECT:** Blaxland Rd BTEX | **ALS QUOTE NO.:** | **COC SEQUENCE NUMBER (Circle)** | Free ice / frozen ice brick present Yes / No / N/A |
| **ORDER NUMBER:** 231126-02 | | COC: 1 2 3 4 5 6 7 | Random Sample Temperature on 22.0 °C |
| **PROJECT MANAGER:** Prasanna Manoharan | **CONTACT PH:** 02 9896 0399 | OF: 1 2 3 4 5 6 7 | Other comment: |
| **SAMPLER:** Prasanna Manoharan | **SAMPLER MOBILE:** 0401 578 175 | **RELINQUISHED BY:** PM | **RECEIVED BY:** CASS 4 |
| **COC emailed to ALS?** NO | **EDD FORMAT (or default):** | *Prasanna Manoharan* | DATE/TIME: 1700 28/04/24 |
| **Email Reports to:** admin@benbowenviro.com.au | | DATE/TIME: 28/04/2025 10:15 | **RELINQUISHED** DATE/TIME: |
| **Email Invoice to:** accountsreceivable@benbowenviro.com.au | | | **RECEIVED BY:** DATE/TIME: |

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:**

| ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | | | CONTAINER INFORMATION | | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | | | | | | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE *(refer to codes below)* | TOTAL CONTAINERS | BTEX EP091 BTEX | Toluene | | | | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| | BTEX 1 | 28/04/2025 | Air | | 1 | ✓ | | | | | | |
| | TOL 1 | 28/04/2025 | Air | | 1 | | ✓ | | | | | |
| | BTEX BLANK | 28/04/2025 | Air | | 1 | ✓ | | | | | | |
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| | | | | TOTAL | 3 | 2 | 1 | | | | | |

*Water Container Codes:* P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic

Environmental Division
Newcastle
Work Order Reference
EN2506802

Telephone : +61 2 4014 2500

# CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →


☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
☐MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5/585 Maitland Rd Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 F: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☒SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 F: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com


| | | |
|---|---|---|
| CLIENT: Benbow Environmental | TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) | ☒ Standard TAT (List due date): |
| OFFICE: 25 Sherwood Street Northmead, NSW, 2152 | | ☐ Non Standard or urgent TAT (List due date): |
| PROJECT: 231126 | ALS QUOTE NO.: | |
| ORDER NUMBER: 231126 | | |
| PROJECT MANAGER: Francesco Faustino | CONTACT PH: 0406 774 316 | |
| SAMPLER: Francesco Faustino | SAMPLER MOBILE: 0406 774 316 | |
| COC emailed to ALS? NO | EDD FORMAT (or default): | |
| Email Reports to: Ffaustino@benbowenviro.com.au | | |
| Email Invoice to: accountsreceivable@benbowenviro.com.au | | |

COC SEQUENCE NUMBER (Circle)

COC: (1) 2 3 4 5 6 7

OF: (1) 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

| | | | |
|---|---|---|---|
| Custody Seal Intact? | Yes | No | N/A |
| Free ice / frozen ice bricks present upon receipt? | Yes | No | N/A |
| Random Sample Temperature on Receipt: | | °C | |
| Other comment: | 18° C | | |

| RELINQUISHED BY: | RECEIVED BY: | RELINQUISHED BY: | RECEIVED BY: |
|---|---|---|---|
| *Francesco Faustino* | [signature] | [signature] | [signature] 23/11/23 |
| DATE/TIME: 20/11/2023 | DATE/TIME: 21/11/23 1420 | DATE/TIME: 21/11/23 1420 | DATE/TIME: 5pm. |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

| ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | | | CONTAINER INFORMATION | | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | | | | | | | | Additional Information |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE *(refer to codes below)* | TOTAL CONTAINERS | BTEX EP091 BTEX | | | | | | | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| | BTEX 1 | 20/11/2023 | Air | | 1 | ✓ | | | | | | | | |
| | BTEX BLANK | 20/11/2023 | Air | | 1 | ✓ | | | | | | | | |
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| | | | | TOTAL | 2 | 2 | | | | | | | | |

Environmental Division Newcastle
Work Order Reference
EN2311783

Telephone : +61 2 4014 2500

***Water Container Codes:*** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.