REPORT

REDEVELOPMENT OF WAREHOUSE & DISTRIBUTION CENTRE

149-155 AIRDS ROAD, MINTO

NOISE & VIBRATION IMPACT ASSESMENT
RWDI # 2205167
24 January 2023

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

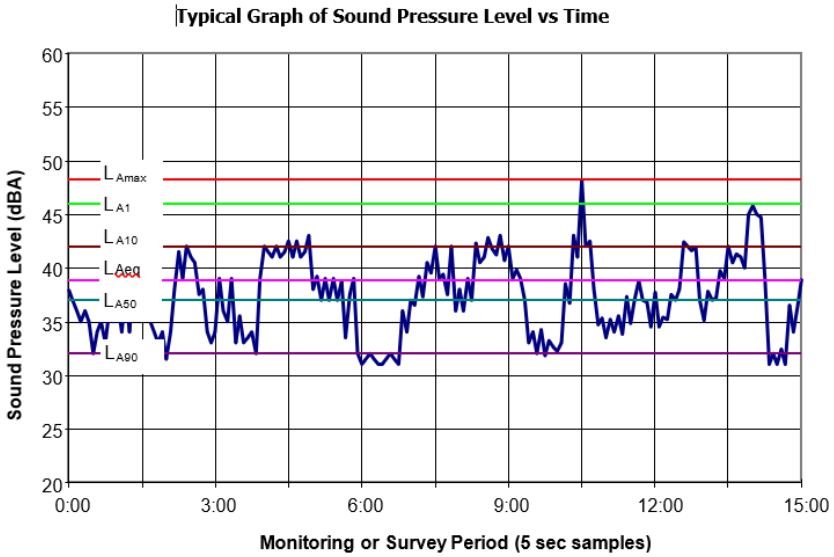
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night-time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night-time.



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1 INTRODUCTION

RWDI was engaged by Tactical Group to conduct a noise and vibration impact assessment supporting a development application for the redevelopment of 149-155 Airds Road, Minto (**the site**). The application relates to the development of Warehouse 1 (split into A and B) and a light industrial premises, Building 2 located onthe southern portion of the site.

1.1 Objectives

The purpose of this report is to document the process, objectives, and outcomes of RWDI's noise & vibration impact assessment to support a development application to Campbelltown Council for the proposed warehouses A, B and the light industrial premises, Building 2, within Part Lot 12 in Deposited Plan (DP)251997, Lot 131 in DP 583995 and Lot 213 in DP 260735. The noise & vibration assessment has the followingmain components:

- Conducting a baseline noise survey through unattended noise monitors placed over 8 to 12 days at three (3) receptor locations;
- Identifying the sensitive receivers for noise & vibration assessment;
- Establishing target criteria at sensitive receivers for:
    - Operational noise in accordance with the NSW Noise Policy for Industry **(NPfI, EPA NSW2017)**
    - Noise and vibration associated with construction works in accordance with the Interim Construction Noise Guideline (**ICNG, DECC 2009**)
    - Road traffic noise in accordance with the NSW Road Noise Policy (**RNP, EPA NSW 2011**)
- Preparation of a computer noise model representative of the proposed operations;
- Determination of the potential impacts of construction noise and vibration emissions associated with construction noise/vibration sources upon nearby residential receivers;
- Determination of the potential impacts of operational noise and vibration emissions associated with site noise/vibration sources such as mechanical plant, on-site movements of vehicles upon nearby residential receivers;
- Based on projected traffic generation, prediction and assessment of additional road traffic noise levels generated as a result of the development; and
- Providing recommendations to ensure operations and construction activities do not result in any adverse noise impacts upon the surrounding community.

Note that it has been assumed that the only noise emissions from the light industrial premises, Building 2, are associated with the movement of trucks and equipment for deliveries, loading/unloading, shipping, and the building ventilation systems. The noise emissions associated with Building 2 are the same as if it were a warehouse operation. Should a future tenant in this space have activities that would generate additional noise, then a separate noise impact assessment is expected to be required.

1.2 Scope of Assessments

In performing the noise and vibration impact assessments (the "**Assessments**") listed above, RWDI confirms that such assessments were performed in accordance with generally accepted professional standards at the time when the Assessments were performed and in the location of the Project. No other representations, warranties, or guarantees are made with respect to the accuracy or completeness of the information, findings,

recommendations, or conclusions contained in this Report. This report is not a legal opinion regarding compliance with applicable laws.

The findings and recommendations set out in this report are based on the following information ("**Project Data**") disclosed to RWDI:

1. Architectural concept plans, prepared by Watch This Space Design; and
2. Traffic volumes provided by Ason Group as detailed in the report titled *Warehouse 1&2, 149-155 Airds Road Minto, Transport Assessment, Development Application* dated Nov 2022 (reference no. P2038r02v1)

The recommendations and conclusions are based on the following assumptions:

1. The Project Data is accurate and complete; and
2. Traffic volumes provided by Ason Group are accurate and representative of the potential future tenants for the site (collectively "**Project Specific Conditions**")

RWDI assumes no responsibility for any inaccuracy or deficiency in information it has received from others.

The recommendations and conclusions in this report are partially based on historical data and can be affected by a number of external factors, including but not limited to Project design, quality of materials and construction, site conditions, meteorological events, and climate change. As such, the conclusions and recommendations contained in this report do not list every possible outcome.

2 PROJECT DESCRIPTION

2.1 Site Description

The site is located at 149 and 151 Airds Road, Minto within Part Lot 12 in DP 251997, Lot 131 in DP 583995 and Lot 213 in DP 260735 in the Campbelltown City Council Local Government Area (LGA) and is therefore subject to that Council's controls. Under the Campbelltown Local Environmental Plan 2015 (LEP), the land is zoned IN1 – General Industrial. The site is currently occupied by two single-storey warehouses and associated hardstand, accessed from Airds Road.

The site is located within the established Minto industrial precinct with existing warehouse and distribution development to the north, east and south of the site**.** Charter Hall is redeveloping the site to the east of Airds Road in accordance with a State Significant Development Application (SSD-7500). To the west of the site is Campbelltown Road, beyond which is the residential area of Woodbine.

2.2 Proposed Development Description

Charter Hall have recently purchased the site and are seeking to redevelop the site to provide a modern warehouse and distribution centre and also a light industrial development which meets the needs of current and future tenants.

The proposed development is for a warehouse and distribution centre for Warehouse 1 split into two adjacent tenancies A and B and also a light industrial premise 2 located in the southern portion of the site.

The proposal comprises of the construction, fit-out and operation of the development with a total of 28,126 m^2 gross floor area (GFA), being 26,626 m^2 of warehouse GFA and 1,500 m^2 of ancillary office space comprising of:

- Warehouse A: 6,640 m^2 warehouse GFA and 300 m^2 ancillary office GFA
- Warehouse B: 6,670 m^2 warehouse GFA and 300 m^2 ancillary office GFA
- Building 2: 13,316 m^2 light industrial facility GFA and 900 m^2 ancillary office GFA
- The proposed buildings A, B & 2 are expected to have a 24/7 operation
- Provision of two (2) new vehicle crossovers from Airds Road
- Private access road and turning circle
- Hardstand and loading docks
- 177 car parking spaces
- Bulk earthworks
- Provision of site infrastructure
- Hard and soft landscaping
- Estate and building identification signage

Figure 2-1 details the layout of the proposed development with respect to the surrounding area. The proposed site plans for buildings 1A, 1B & 2 are reproduced in **Figure 2-2** and further detailed architectural plans for are provided in **Appendix A**.

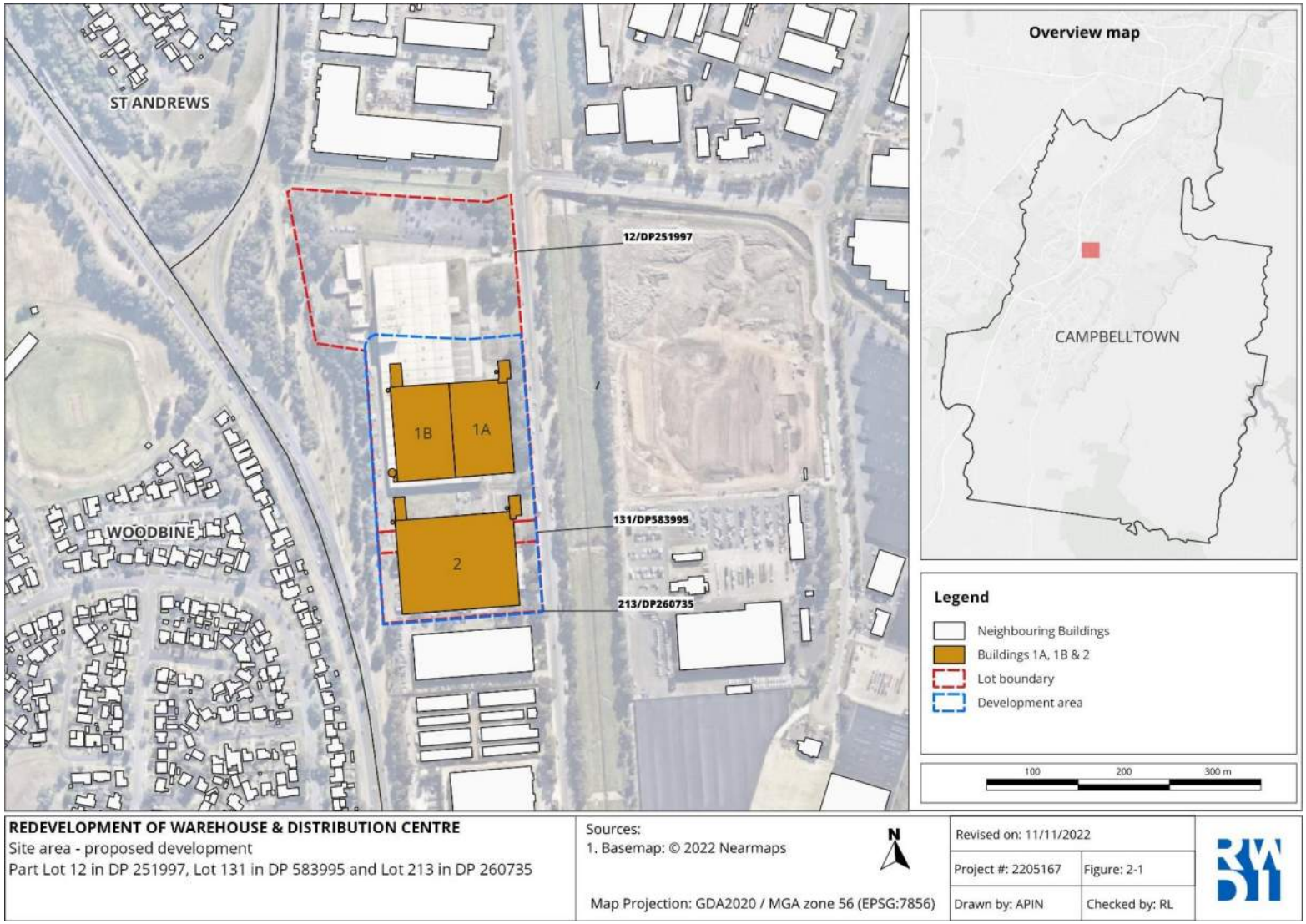

Figure 2-1 Site Area - Proposed Development

Figure 2-2 Site plan for buildings 1A, 1B & 2

3 NOISE SENSTIVE RECEIVERS

The sensitive receivers surrounding the site consist of residential, industrial, and active recreational receivers. presents the land zoning map for the site and its surrounding areas under the Campbelltown Local Environmental Plan 2015.

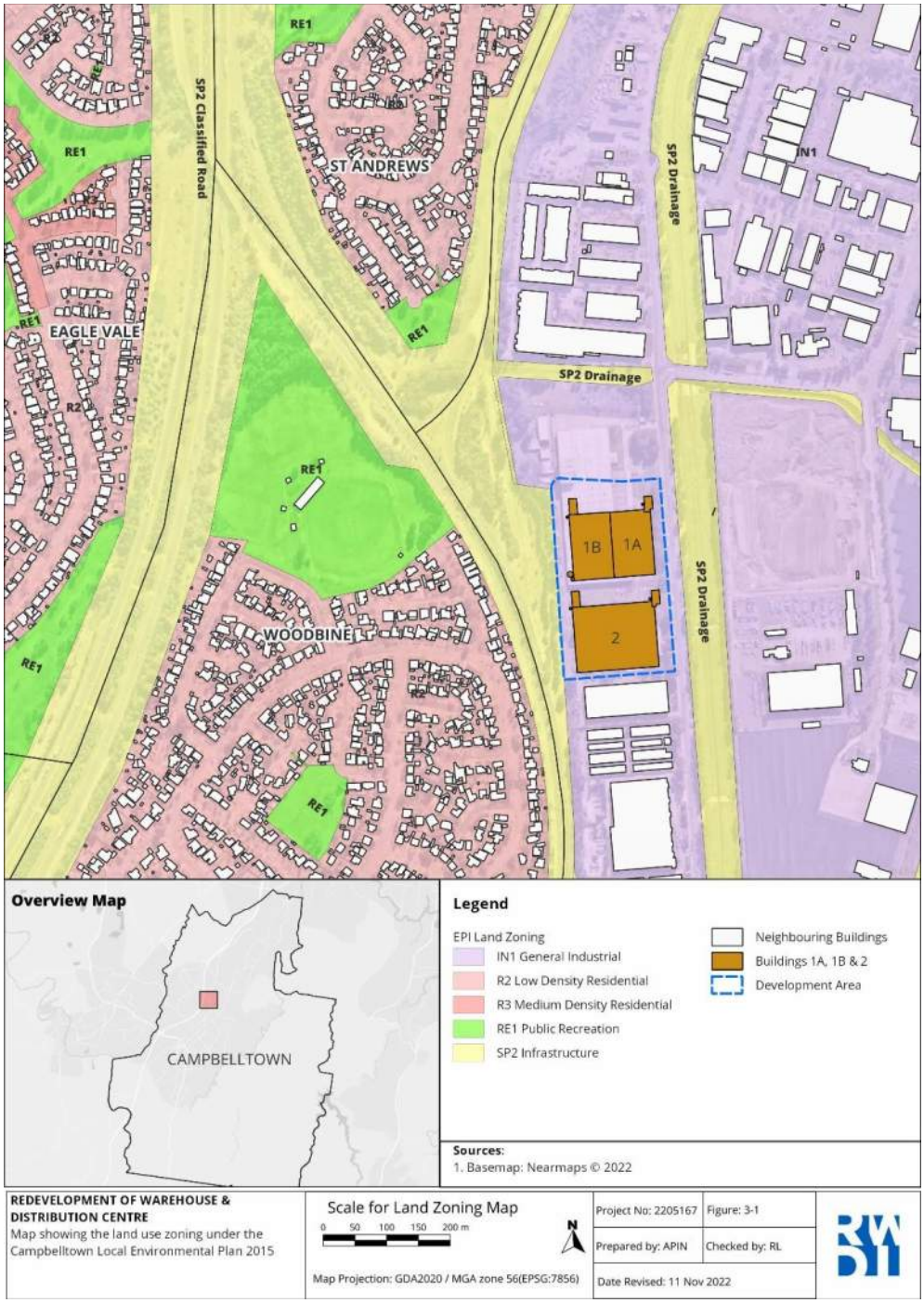

Figure 3-1 Land use zoning map

The study area for the assessment was divided into four Noise Catchment Areas (NCAs), as shown in Error! Reference source not found. NCAs are areas where receivers have a similar land use and ambient noise environment. NCAs are defined for residential receivers only.

The land zoning map indicates that the site is located within an IN1 (General Industrial) zone and that nearby residences are zoned R2 (low density residential). On the basis of the zoning alone, the noise catchments NCA1 through NCA4 would be designated as suburban residential as per the Table 2.3 of the NPfI. However, the Noise Amenity Category of a residential receiver should include consideration of the typical existing background noise levels and the land use description in Table 2.3 of the NPfI.

The measured typical existing background noise levels for receivers representing NCA1 through NCA4, expressed as the daytime, evening and night-time RBLs are all significantly higher, from 8 to 11 dBA for the critical night-time period (see **Section 5**), than the levels characteristic of a Suburban residential receiver category as identified in Table 2.3. Additionally, onsite observations indicate that the location of these noise catchment areas is exposed to an 'urban hum' characterized by traffic from the adjacent highways rather than evening sounds of nature as would be characteristic of suburban residential. Lastly, noise catchment areas NCA1 and NCA2 are adjacent to an industrial zoning. With the above factors in mind, catchment areas NCA1 through NCA4 have been classified as **Urban residential areas**. These classifications apply throughout the catchment areas as they are narrow catchments adjacent to roadways and the measurements used in the classification were located in the front yards of homes where they were screened from direct roadway noise exposure.

The potentially most affected noise sensitive receivers within each NCA have been selected as presented in **Table 3-1** and also in **Figure 3-2.**

Table 3-1 Noise sensitive receiver locations

Receiver ID	NCA	Address	Receiver category[1]
R1	NCA 1	24 Glenshee Pl, St Andrews	Residential (urban)
R2		11 Indaal Pl, St Andrews	Residential (urban)
R3	NCA 2	15 Bungan Pl, Woodbine	Residential (urban)
R4		7 Bungan Pl, Woodbine	Residential (urban)
R5		42A Queenscliff Dr, Woodbine	Residential (urban)
R6		34 Queenscliff Dr, Woodbine	Residential (urban)
R7	NCA 3	42 Long Reef Cres, Woodbine	Residential (urban)
R8	NCA 4	31 Opal Pl, Eagle Vale	Residential (urban)
AR1	-	Peace Park, St Andrews	Active Recreation Area
AR2	-	Jackson Park, Long Reef Cres, Woodbine	Active Recreation Area
I1	-	1 Swaffham Rd, Minto	Industrial premises
I2	-	1/157 Airds Rd, Campbelltown	Industrial premises
I3	-	119 Airds Rd, Minto	Industrial premises

Note 1 Receiver categories have been assigned as per the table 2.3 of the Noise Policy for Industry to assist in the selection of the appropriate amenity noise levels

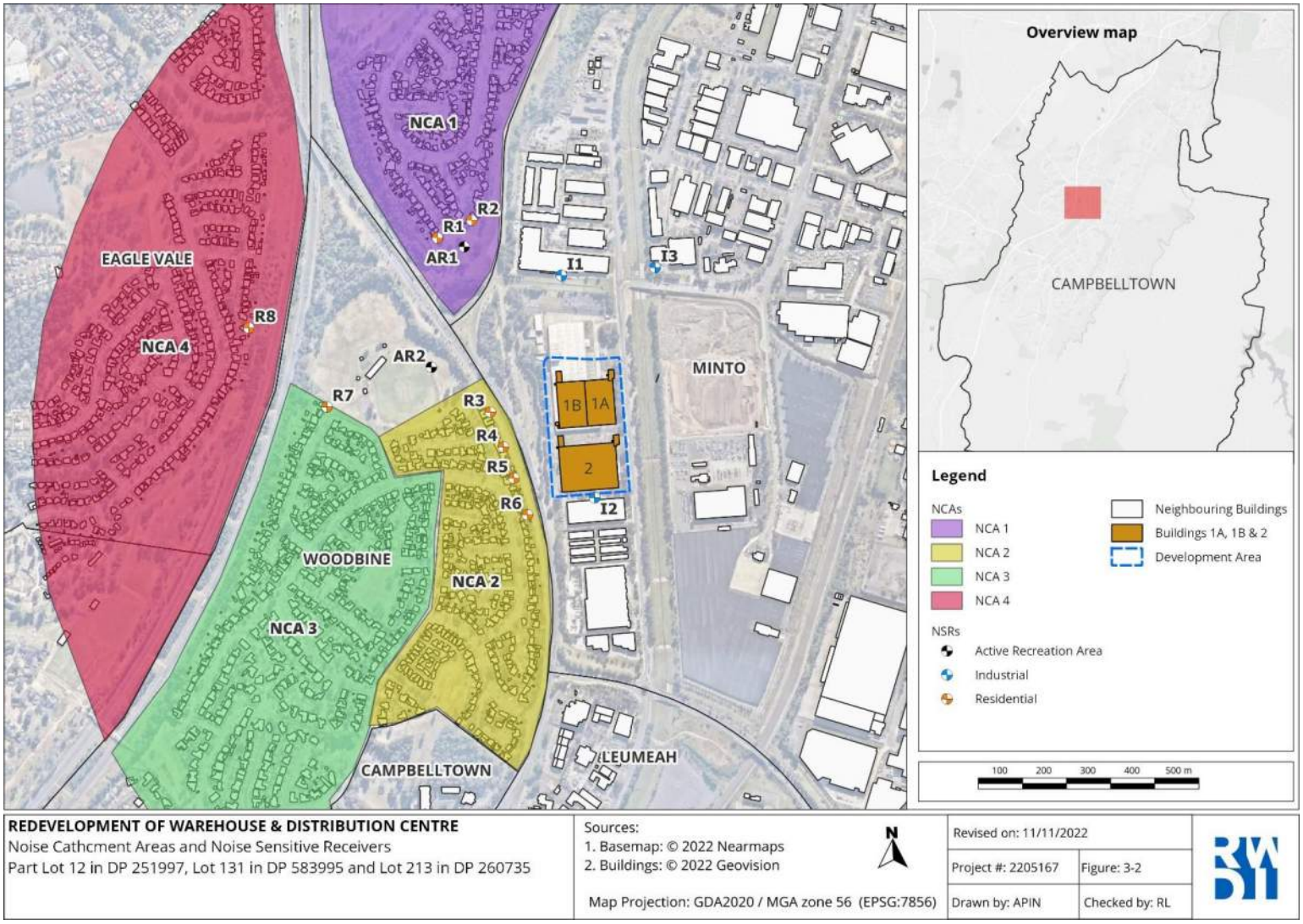

Figure 3-2 Noise Catchment Areas (NCAs) and noise sensitive receivers

4 ENVIRONMENTAL NOISE GUIDELINES

4.1 Campbelltown City Council Development Control Plan 2015 (DCP)

Part 7 of the *Campbelltown (Sustainable City) Development Control Plan 2015, published on 19 May 2022, effective 11 March 2016* sets out development controls for industrial development within areas zoned IN1 and IN2.

Clause 7.7.3 of the Campbelltown DCP states the Noise Design Requirements:

> *a) Any development that is likely to or capable of generating levels of noise exceeding the requirements of the Industrial Noise Policy (published by the Office of Environment and Heritage) shall demonstrate appropriate measures to mitigate against noise pollution*

Note that the NSW Industrial Noise Policy (INP, EPA NSW 2000) was superseded in November 2017 by the NSW Noise Policy for Industry (NPfI, EPA NSW 2017). Hence the noise emission criteria and the noise assessment applicable to the proposal will be based upon the NPfI. The relevant criteria are outlined in **section 6.2.**

4.2 Interim construction noise guideline (ICNG)

The NSW EPA released the *Interim Construction Noise Guideline* (ICNG) in July 2009 for the management of construction works noise (State of NSW and Department of Environment & Climate Change NSW, 2009).

The ICNG promotes a best practice approach to the management of noise emissions from construction to allow works to proceed during recommended standard hours. Additional constraints apply to minimise potential impacts upon sensitive receivers where works are proposed outside these standard hours.

The ICNG recommends the following approaches to mitigating adverse noise impacts from construction sites. The ICNG recognises that people are usually annoyed more by noise from longer-term works than by the same type of works occurring for only a few days. For this reason, the ICNG identifies two methods of assessing noise from construction:

- The quantitative assessment method which applies to long-term duration work; and
- The qualitative assessment method which applies to short-term duration work.

The quantitative assessment method is considered appropriate for this project, since the construction works are likely to occur for more than 3 weeks.

Further, the ICNG states that the five categories of works that might be undertaken outside the recommended standard hours are:

1. the delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads
2. emergency work to avoid the loss of life or damage to property, or to prevent environmental harm
3. maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours

4. public infrastructure works that shorten the length of the project and are supported by the affected community
5. works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours.

In the last two categories, the proponent should provide the relevant authority with clear justification for reasons other than convenience, such as to sustain operational integrity of road, rail and utility networks. In general, only works undertaken on public infrastructure need to be undertaken outside the recommended standard hours.

For this project, construction will be assumed to be undertaken during standard construction hours only.

4.2.1 Construction noise management levels

The ICNG recommends that the $L_{Aeq,15min}$ noise levels arising from a construction project, measured within the curtilage of an occupied noise-sensitive premises i.e., at boundary or within 30 m of the residence, whichever is the lesser, should not exceed the levels indicated in **Table 4-1**.

Table 4-1 Construction Noise Management Levels (CNMLs)

Type of receiver	Period of Noise Exposure	$L_{Aeq,15min}$ CNML	How to Apply
Residential	Recommended Standard Hours	Noise affected[1] RBL[2] + 10 dBA	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ 15\ min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
		Highly noise affected[3] 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after

Type of receiver	Period of Noise Exposure	$L_{Aeq,15min}$ CNML	How to Apply
			school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
	Outside Recommended Standard Hours	Noise affected[1] RBL + 5 dBA	A strong justification would typically be required for works outside the recommended standard hours.
	Sleep disturbance criteria	$L_{Aeq,15min}$ **40 dBA** or the prevailing **RBL + 5dB**, whichever is the greater, **and/or** L_{AFmax} **52 dBA** or the prevailing **RBL + 15dB**, whichever is the greater	Where construction works are planned to extend over more than two consecutive nights, and a quantitative assessment method is used, the analysis should cover the maximum noise level, and the extent and the number of times that the maximum noise level exceeds the RBL.
Industrial premises	All periods	75 dBA	The proponent should assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required
Active recreation area	When in use	65 dBA external	External noise levels are to be assessed at the most affected point within 50 m of the area boundary.

Note 1 The noise affected level represents the point above which there may be some community reaction to noise.
Note 2 Refer to Glossary of Acoustic Terms.
Note 3 The highly noise affected level represents the point above which there may be strong community reaction to noise.
Note 4 For normal construction (works other than blasting), where possible, the ICNG recommends confining work times to the following:

Monday to Friday	7.00 am to 6.00 pm
Saturdays	8.00 am to 1.00 pm
Sundays or Public Holidays	No construction

Where predicted or measured levels exceed the recommended Noise Management Levels, the ICNG recommends that the proponent apply all feasible and reasonable work practices to minimise noise.

Where $L_{Aeq,15min}$ construction noise levels are predicted to exceed the **highly noise affected** level (i.e., 75 dBA) the relevant authority (consent, determining or regulatory) may require respite periods to be observed. This may include restricting the hours that the noise-generating activities can occur, considering:

- Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); and

- If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

The implementation of an effective community consultation and liaison programme is emphasised as being a critical tool in successfully handling adverse noise impacts from construction works.

4.3 Noise Policy for Industry (2017)

The *NSW Noise Policy for Industry 2017 (NPfI)* provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in the state of New South Wales. Whilst specifically aimed at assessment and control of noise from industrial premises regulated by the EPA, the policy is also appropriate for use by the Department of Planning & Environment (DPE) when assessing major development proposals and also by local councils when assessing development applications.

The NPfI documents a procedure for assessment and management of industrial noise which involves the following steps:

- Determining the project noise trigger levels for a development
- Predicting or measuring noise produced by the development (having regard to any associated annoying characteristics and prevailing meteorological effects).
- Comparing the predicted or measured noise levels with the project noise trigger level and assessing impacts and the need for noise mitigation and management measures.
- Considering any residual noise impacts following the application of feasible and reasonable noise mitigation measures.
- Setting statutory compliance levels that reflect the best achievable and agreed noise limits for development.
- Monitoring and reporting environmental noise levels from the development.

The above steps are summarised in **Figure 4-1**.

The **project noise trigger level** represents the level that, if exceeded, may indicate a potential noise impact upon a community. It is a benchmark or objective and is not intended for use as a mandatory requirement. The project noise trigger level is the lower of the intrusiveness noise levels and the amenity noise levels for each receiver discussed in section **4.3.1 Intrusive noise level** & section **4.3.2 Amenity noise level**.

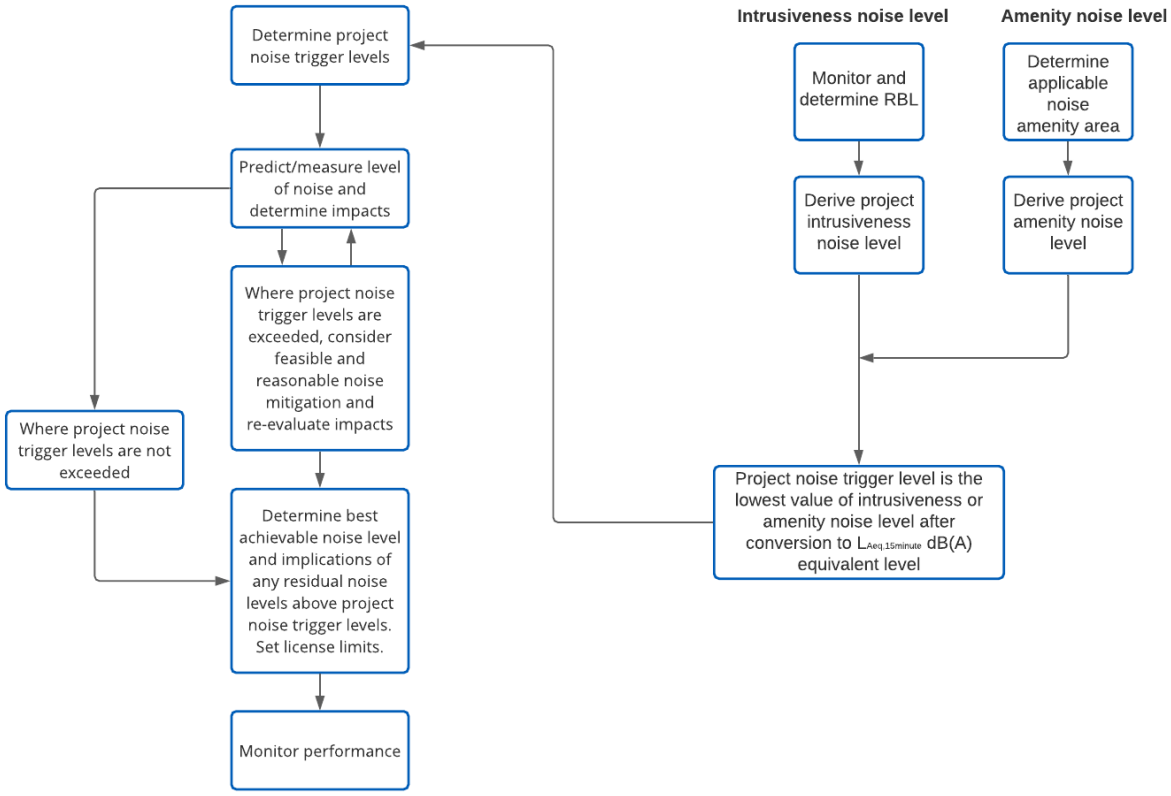

Figure 4-1 Typical Noise Impact Assessment Process (source: NSW NPfI)

Note RBL is the Rating Background noise level that provides a single figure that represents the background noise level for assessment purposes

4.3.1 Intrusive noise level

The **intrusiveness noise level** represents short term changes in the noise level and is derived from measurements of existing background noise levels at locations representative of a receiver. The intrusiveness noise is aimed at limiting the degree of change a new noise source introduces to an existing environment.

The intrusiveness noise level (INL) is the noise level 5 dBA above the background noise level for each time period (AM shoulder, daytime, evening or night-time) of interest at a residential receiver. The background noise level is derived from the measured L_{A90} noise levels.

$$L_{Aeq,\ 15min} = \text{Rating Background Noise Level} + 5\ dB$$

Where the rating background noise level (RBL) represents the background level to be used for assessment purposes, as determined by the method outlined in Fact Sheets A and B of the NPfI.

Note that the minimum RBLs apply in the NPfI. Thus in cases where the background noise are below the minimum RBLs i.e., 35 dBA (Day) and 30 dBA (Evening/Night), the intrusiveness criteria for that period will be based upon the minimum RBL.

4.3.2 Amenity noise level

As the number of industries in an area increases over a long term, the background levels in the area tend to increase. The recommended **amenity noise level (ANL)** is aimed at limiting continuing increases in noise levels from the application of intrusiveness level alone. This approach limits the ambient noise within an area from all industrial noise sources combined below the recommended amenity noise levels as specified in Table 2.2 of the NPfI. The recommended amenity levels have been selected based on various studies as described in the NPfI and are aimed at protecting 90% of the community from being highly annoyed by industrial noise.

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the **project amenity noise level (PANL)** represents the objective for noise from a single industrial development at a receiver location. To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows.

Project ANL for industrial developments = Recommended ANL - 5dB(A)

The recommended amenity noise levels specified in the NPfI are defined as a $L_{Aeq,\ period}$ noise descriptor. Due to different averaging periods for the $L_{Aeq,15min}$ and $L_{Aeq,\ period}$ noise descriptors, to enable direct comparison between descriptors, the project ANL is calculated as a $L_{Aeq,15min}$ to be equal to the **$L_{Aeq,\ period}$ level plus 3dB** in accordance with the NPfI.

4.3.3 Maximum Noise level event assessment (MNLEA)

Noise sources of short duration and high level that may cause disturbance to sleep if occurring during the night-time need to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

The approach recommended by the NPfI is to apply initial screening noise levels. Where the subject development/premises night-time noise levels at a residential location exceed:

- $L_{Aeq,15min}$ **40 dB(A)** or the prevailing **RBL + 5dB,** whichever is the greater; **and/or**
- L_{AFmax} **52 dB(A)** or the prevailing **RBL + 15dB,** whichever is the greater,

a detailed maximum noise level event assessment should be undertaken.

The sleep disturbance screening noise levels apply outside bedroom windows during the night. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

4.3.4 Shoulder Period

The development consent is proposed for warehouses to operate on a 24/7 basis. It has been noted in the NPfI that it may be unreasonable to expect such operations to be assessed against the night-time project noise trigger levels. As a rule of thumb and for the purpose of deriving the intrusiveness noise level only, it may be appropriate to assign a shoulder period rating background noise level based on:

- The lowest 10th percentile of $L_{AF90,15min}$ dB measurements for the equivalent of one weeks' worth of valid data taken over the shoulder period (that is, all days included in a single data set of should period); **or,**

- The $L_{AF90(shoulder\ period)}$ dB value (that is, the lowest 10th percentile value of aggregate data for the equivalent of one week's worth of valid data taken over the shoulder period).

Hence as per the NPfI, a intrusive noise criterion for the morning (5 am to 7 am) and night shoulder (10 pm to 12 am) period is considered.

4.3.5 Noise Modification Factors – Annoying Noise Characteristics

Section C1 of the NPfI outlines 'modifying factor' adjustments to account for potential greater annoyance of a noise source due to certain characteristics, such as:

- Tonality
- Intermittency
- Irregularity
- Dominant Low Frequency Content

Modifying factors are applicable for predicted or measured levels at the receiver after consideration of reasonable and feasible mitigation.

4.3.5.1 Tonality

The NPfI recommends modifying factors be applied to account for increased annoyance from tonal noise (noise containing a prominent frequency and characterised by a definite pitch). A 5dB correction is applied if the level of each one-third octave band exceeds the level of the adjacent bands on both sides by:

- 5 dB or more if the centre frequency of the band containing the tone is in the range 500–10,000 Hz
- 8 dB or more if the centre frequency of the band containing the tone is in the range 160–400 Hz
- 15 dB or more if the centre frequency of the band containing the tone is in the range 25–125 Hz.

4.3.5.2 Dominant Low Frequency Noise

The NPfI recommends modifying factors be applied to account for increased annoyance from low frequency noise when the difference between the C-weighted and A-weighted $L_{eq,15min}$ noise levels exceeds 15 dB, and sufficient acoustic energy from the source is identified in third octave bands between 10 Hz and 160 Hz, based on exceeding the third-octave band levels presented in **Table 4-2**.

Table 4-2 Third octave band low frequency noise thresholds

Hz/dBZ f, Hz	One-third octave $L_{Zeq,15minute}$ threshold level												
	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dBZ	92	89	86	77	69	61	54	50	50	48	48	46	44

If the difference between the C-weighted and A-weighted $L_{eq,15min}$ noise levels exceeds 15 dB, and the measured/predicted third octave band levels exceed any of those in **Table 4-2** by more than 5 dB, the following conditions apply:

- a 2 dB adjustment should be added to the measured $L_{Aeq,15min}$ noise levels during the daytime; or

- a 5 dB adjustment should be added to the measured $L_{Aeq,15min}$ noise levels during the evening and night-time periods.

4.3.5.3 Intermittency

The intermittency modifying factor applies to a sudden and sustained step change in continuous or quasi-continuous noise at the receiver if the source noise audible at the receiver varies by more than 5 dBA several times: for example – equipment cycling on/off.

4.3.5.4 Duration

This is applied where a single event noise is continuous for a period of less than two and a half hours during an assessment period. This adjustment is designed to account for unusual and one-off events and does not apply to regular and/or routine high noise level events.

4.3.6 Residual Noise Impacts

A residual noise impact may exist where the best-achievable noise level from a development, when assessed at a sensitive receiver location, remains above the project noise trigger levels. The NSW NPfI states that *a residual noise impact is identified after all source and pathway feasible and reasonable noise mitigation measures have been considered. The significance of the residual impact and the need to assess receiver-based treatment options may need to be considered as part of an authority's determination/approval process.* **Table 4-3** below is derived from the NPfI which provides a guide to the significance of residual noise impact. Examples of noise mitigation at a residence that may be required to mitigate residual noise impacts are also outlined.

Table 4-3 Significance of Residual Noise Impacts

If predicted noise minus project noise trigger level...	And total cumulative industrial noise level...	Then the significance of residual noise level is:	Example of potential treatment
≤ 2 dB(A)	Not applicable	Negligible	The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatment for controls
≥ 3 but ≤ 5 dB(A)	< recommended amenity noise level or > recommended amenity noise level, but the increase in total cumulative industrial noise level resulting from the development is less than or equal to 1 dB	Marginal	Provide mechanical ventilation/comfort condition systems to enable windows to be closed without compromising internal air quality/amenity.
>5 dB(A)	≤ recommended amenity noise level	Moderate	As for 'marginal', but also upgraded façade elements, such as windows,

If predicted noise minus project noise trigger level...	And total cumulative industrial noise level...	Then the significance of residual noise level is:	Example of potential treatment
			doors or roof insulation, to further increase the ability of the building façade to reduce noise levels.
>5 dB(A)	> recommended amenity noise level	Significant	May include suitable commercial agreements where considered feasible and reasonable.

Note: This approach is designed for new and substantially modified developments and should be applied with caution to assessments of existing operations

4.4 Road Traffic Noise

The *NSW Road Noise Policy* (RNP) (2011) was released by the NSW EPA with key provisions of the policy being an emphasis on the use of land use planning, better road design and vehicle noise emission control to avoid or minimise road traffic noise impacts.

The assessment criteria for residences potentially affected by additional traffic generated by land use developments on arterial and sub-arterial roads are summarised in **Table 4-4.**

Table 4-4: Road Traffic Noise Assessment Criteria for Residential Land Uses

Road Category	Type of Development	Assessment Criteria – dB(A)	
		Day (7am-10pm)	Night (10pm-7am)
Freeway / arterial / sub-arterial roads	Existing residences affected by **additional traffic** on existing freeways / arterial / sub-arterial roads generated by land use developments	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)

In addition, the *RNP* states that *an increase of up to 2 dB above the existing noise levels represents a minor impact that is considered barely perceptible to the average person*. Where predicted noise levels exceed the project-specific noise criteria, an assessment of all feasible and reasonable mitigation options should be considered.

4.5 Vibration objectives

The effects of vibration in buildings can be divided into two main categories;

- Human exposure to vibration – where the occupants or users of the affected building are possibly disturbed.
- Building damage– where the integrity of the building or the structure itself may be compromised.

4.5.1 Human Comfort

Criteria for assessment of the effects of vibration on human comfort are set out in British Standard 6472-1: 2008 *Guide to evaluation of human exposure to vibration in buildings Vibration sources other than blasting*. Methods and criteria in that Standard are used to set "preferred" and "maximum" vibration levels in the document "*Assessing Vibration: A Technical Guideline*" (2006) produced by the NSW DECCW.

Acceptable values of human exposure to continuous vibration, such as that associated with drilling, are dependent on the time of day and the activity taking place in the occupied space (e.g. workshop, office, residence or a vibration-critical area). Guidance on preferred values for continuous vibration is set out in **Table 4-5**.

Table 4-5 Criteria for Human Exposure to Continuous Vibration

Place	Time	Peak Particle Velocity (mm/s)	
		Preferred	Maximum
Critical working areas (e.g. hospital operating theatres precision laboratories)	Day or night-time	0.14	0.28
Residences	Daytime	0.28	0.56
	Night-time	0.20	0.40
Offices	Day or night-time	0.56	1.1
Workshops	Day or night-time	1.1	2.2

In the case of intermittent vibration, which is caused by plant such as rock breakers, the criteria are expressed as a Vibration Dose Value (VDV) and are presented in **Table 4-6**. Calculation of VDV requires knowledge of the number of events and their duration in the relevant time period.

Table 4-6 Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)

Location	Daytime		Night-time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

4.5.2 Building Damage

In terms of the most recent relevant vibration damage objectives, Australian Standard AS 2187: Part 2-2006 "*Explosives – Storage and Use – Part 2: Use of Explosives*" recommends the frequency dependent guideline values and assessment methods given in BS 7385 Part 2-1993 "*Evaluation and measurement for vibration in buildings Part 2*", as they "*are applicable to Australian conditions*".

The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented numerically in **Table 4-7.**

Table 4-7 Transient Vibration Guide Values – Minimal Risk of Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and Above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4 Hz and above	N/A
Un-reinforced or light framed structures Residential or light commercial type buildings	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above

The Standard states that the guide values in **Table 4-7** relate predominantly to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings.

The British Standard goes on to state that "*Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity*". In addition, a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.

In addition to the British Standard, for the case of nearby heritage buildings, guidance for structural damage is derived from the German Standard DIN 4150 -3 *Structural Vibration Part 3 – Effects of Vibration on Structures*. **Table 4-8** details these recommendations for heritage buildings.

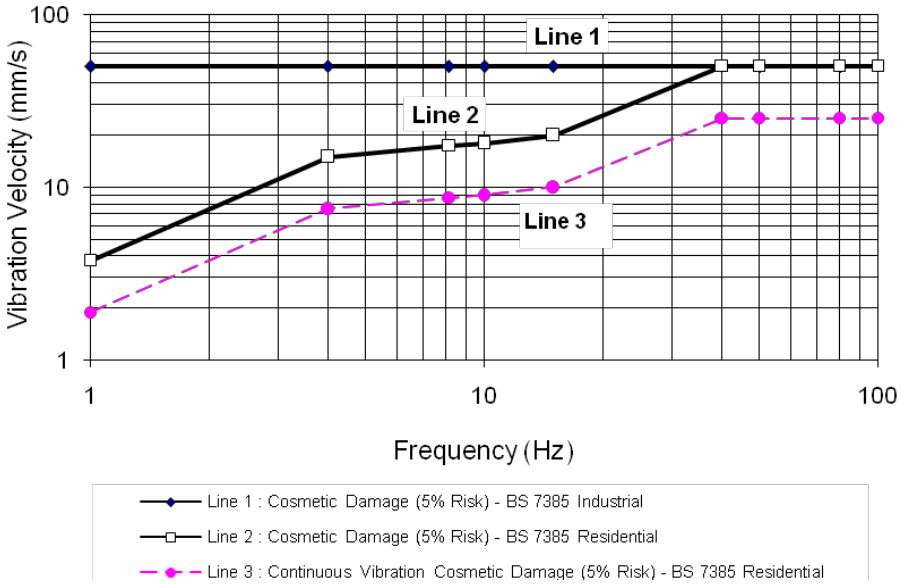

Figure 4-2 Graph of transient vibration guide values for cosmetic damage

Table 4-8 DIN 4150 recommended Peak Particle Velocity (PPV) vibration levels for heritage buildings

Frequency	Guideline values for PPV – mm/s		
	1-10 Hz	10 to 15 Hz	40 to 50 Hz
Vibration Limit	3	3 to 8	8-10

5 BACKGROUND NOISE LEVELS

Measured background noise levels are used to establish the intrusive noise criteria for the project. Background monitoring was conducted at 3 locations between 29 July 2022 and 23 August 2022.

The noise monitoring equipment used for these measurements consisted of environmental noise loggers set to A-weighted, fast response continuously monitoring over 15-minute sampling periods. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. These noise loggers conform to Australian Standard *AS/NZS IEC 61672.2-2019 Electroacoustics – Sound level meters Pattern evaluation tests* and also AS/NZS IEC 61672.3:2019 *Electroacoustics - Sound level meters Periodic tests* as a Class 1 precision sound level meter which has an accuracy suitable for field and laboratory use.

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the existing noise environment. The L_{A1}, L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample time respectively. The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional pass-by of a heavy vehicle. The L_{A90} level is normally taken as the background noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and has the same sound energy over the sampling period as the actual noise environment with its fluctuating sound levels. Whilst the L_{A10} has in the past been used as a descriptor for traffic noise, the L_{Aeq} is now the standard descriptor for traffic noise.

Where possible the measurements were conducted at a height of 1.5 m above ground and in free field. Serial numbers of all noise monitors are presented in **Table 5-1.** All loggers were calibrated at the start and end of the monitoring period and no significant drift was noted. All loggers have been NATA calibrated within the previous two years in accordance with RWDI's Quality Assurance procedures. A summary of logger data has been presented in **Appendix B.**

Table 5-1 Noise logger details

ID	Address	Monitoring Period	Logger Make	Logger SN
BG1	22 Glenshee Place, St Andrews	29/07/2022-10/08/2022	ARL NGARA	878092
BG2	1/15 Bungan Road, Woodbine	15/08/2022-23/08/2022	Rion NL-52EX	876008
BG3	42 Long Reef Crescent, Woodbine	29/07/2022-10/08/2022	ARL NGARA	878094

The measured data was analysed in accordance with the Factsheet B *Measurement procedures for determining background noise* of the NPfI to obtain the rating background levels for each location. These are summarised in **Table 5-2**. The RBLs indicate the background noise levels in the area while the L_{eq} represents the average noise levels at that location for the time period.

Table 5-2 Noise monitoring summary

Background Monitor ID	Applicable Receivers	RBL dB					$L_{Aeq, period}$				
		D	E	N	AM	PM	D	E	N	AM	PM
BG1	NCA 1	49	50	43	51	48	56	55	53	56	53

Background Monitor ID	Applicable Receivers	RBL dB					$L_{Aeq, period}$				
		D	E	N	AM	PM	D	E	N	AM	PM
BG2	NCA 2	50	49	44	52	47	61	56	53	56	53
BG3	NCA 3 & NCA 4	52	52	46	53	49	58	56	54	57	54

Note 1 **D**: daytime (7.00am - 6.00pm)
E: evening time (6.00pm - 10.00pm)
N: night-time (10.00pm - 7.00am)
AM: AM Shoulder (5.00am – 7.00am)
PM: PM Shoulder (10.00pm – 12.00am)

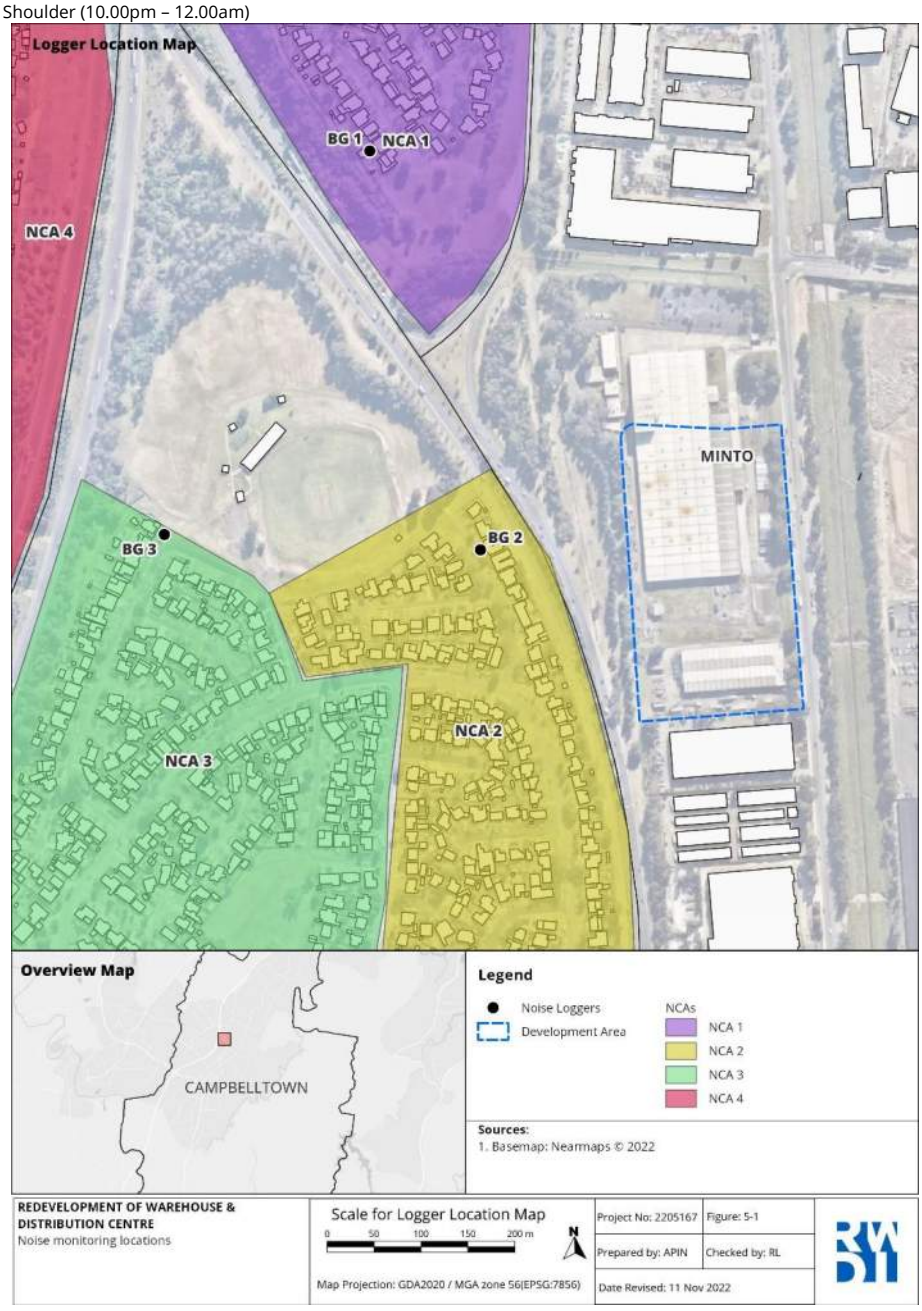

Figure 5-1 Noise monitoring locations

6 NOISE CRITERIA

6.1 Construction noise management levels

Construction for the development is proposed to take place during standard work hours only. Hence the Construction noise management levels (CNMLs) have been based upon the daytime RBLs for the residential receivers. **Table 6-1** summarises the construction noise management levels for the project.

Table 6-1 Project Construction Noise Management Levels (CNMLs)

Receiver ID	Type of receiver	Period of Noise Exposure	Project CNMLs
R1/R2	Residential	Recommended Standard Hours	Noise affected **59** dBA
			Highly noise affected **75** dBA
R3/R4/R5/R6	Residential	Recommended Standard Hours	Noise affected **60** dBA
			Highly noise affected **75** dBA
R7/R8	Residential	Recommended Standard Hours	Noise affected **62** dBA
			Highly noise affected **75** dBA
I1/I2/I3	Industrial premises	All periods	**75** dBA
AR1/AR2	Active Recreation Area	When in use	**65** dBA external

6.2 Operational Noise

6.2.1 Continuous noise

Based on the procedures of the NPfI described in **Section 4.2** and also the discussion in **Section 3**, the project noise trigger levels were calculated.

Table 6-2 summarises the project noise trigger levels highlighted in **bold** font style.

Table 6-2 Noise trigger levels applicable for the project

Receiver ID	Intrusive Criteria $L_{Aeq,15\ min}$ dBA					Amenity Criteria $L_{Aeq,\ 15\ min}$ dBA			Project Trigger Levels $L_{Aeq,15\ min}$ dBA				
	D	E	N	AM	PM	D	E	N	D	E	N	AM	PM
R 1	54	54[1]	48	56	53	58	48	43	**54**	**48**	**43**	**56**	**53**
R 2													
R 3	55	54	49	57	52	58	48	43	**55**	**48**	**43**	**57**	**52**
R 4													
R 5													
R 6													
R 7	57	57	51	58	54	58	48	43	**57**	**48**	**43**	**58**	**54**
R 8													
AR 1	-	-	-	-	-	48			**48**				
AR 2													
I 1	-	-	-	-	-	68			**68**				
I 2													
I 3													

Note 1 Evening criteria has been set to be equal to the day period project intrusiveness noise level since the evening RBLs are higher than the day period RBL, likely due to increased noise from insects.

Note 2 Intrusive criteria are applicable only to residential receivers

Note 3 **D**: daytime (7.00am - 6.00pm)
E: evening time (6.00pm - 10.00pm)
N: night-time (10.00pm - 7.00am)
AM: AM Shoulder (5.00am – 7.00am)
PM: PM Shoulder (10.00pm – 12.00am)

6.2.2 Sleep Disturbance Criteria

Table 6-3 presents the initial screening noise level sleep disturbance criteria relevant for the project for applicable receivers in **bold** font style. These criteria are applicable to residential receivers only.

Table 6-3 Project maximum noise level event level screening criteria

Applicable receivers	NCA	Background level location ID	$L_{Aeq,15min}$ dB	L_{Amax} dB
R1/R2	NCA 1	BG 1	**48**	**58**
R3/R4/R5/R6	NCA 2	BG 2	**49**	**59**
R 7/R 8	NCA 3 & 4	BG 3	**51**	**61**

7 CONSTRUCTION NOISE & VIBRATION ASSESSMENT

7.1 Methodology and general assumptions

Construction is proposed to only occur during the standard hours and so only daytime predictions have been completed.

The data for the noise model has been obtained from various sources as presented in Table 7-1 below.

Table 7-1 Variables used for construction noise modelling

Parameter	Comment
Noise Model	The model was implemented in CadnaA software (2022 MR1) using the CONCAWE prediction algorithm
Terrain	5m contours extracted from the Digital Elevation Model available from Geoscience Australia via Elvis Elevation and Depth.
Buildings	Building information such as addresses, outlines and the heights were obtained from Geovision by Precisely.
Ground Absorption	Ground absorption factor was set to 50% for the entire area.
Sound Power levels	Detailed in **Table 7-2**
Source heights	**Stage 1:** Concrete works modelled as area sources– 1.5 m above ground level (AGL) Heavy vehicles modelled as line sources – 1.5m AGL **Stage 2:** Heavy vehicles modelled as line sources – 1.5m AGL Elevated Work Platform modelled as point source – 1.5 m AGL Hand tools modelled as point source – 1.5 m AGL Mobile Crane modelled as point source – 1.5 m AGL Welding modelled as point source – 1.5m AGL
Receiver heights	1.5 m for single storey buildings and 4.5 m for 2 storey buildings. Receivers are located at the most affected point where possible
Reflection for buildings	2.5 dB reflection loss with 3 orders of reflection
Period of assessment	Worst case 15-minute period has been assessed for construction during the day period
Meteorological conditions	A conservative approach has been taken by adopting noise enhancing meteorological conditions for all assessment periods:

Parameter	Comment
	Source-to-receiver wind vectors have been considered for all receivers with the following stability category and wind speed: **Day / evening** – stability category D with light winds (up to 3m/s at 10m AGL) **Night** – Stability category F with winds up to 2 m/s at 10m AGL Humidity 70% Temperature 20ºC Air Pressure 101.3 kPa

7.2 Sound Power Levels

The potential construction noise impacts at sensitive receivers were predicted using a noise model representative of the construction stages for the proposed development.

At this stage, a detailed list of equipment likely to be used during the construction project was not provided. Therefore, based on experience from similar projects, the construction project is divided into two separate work stages. The typical equipment expected to be used is also assumed in each construction stage. The stages and assumptions include:

- **Stage 1:** Concrete works for pad & hardstand
  - Concrete trucks and pumps will largely dominate the main works in this stage
  - During the concreting, typically 108dBA to 115dA is expected depending on the number of teams of trucks and pumps.
- **Stage 2:** Construction of warehouse& office structures
  - This stage is largely expected to include truck deliveries, cranes, and the use of elevated platforms and powered hand tools.
  - There will be up to several teams on each warehouse with expected sound power levels of 108dBA to 114dBA expected with some of the work elevated to greater than 10m when roofing works are being conducted.

Given the early stage of the Project, preliminary assumptions to provide noise predictions are provided in **Table 7-2** These assumptions can be revisited at detailed design stage and once a construction contractor has been appointed.

Table 7-2 Indicative Sound Power Levels for Construction Equipment

Construction Activity	Equipment	Sound Power Level dBA	Operating minutes in a15-minute period	No of Items in each Work Area	Sound Power Level per activity (dBA)	
					$L_{Aeq,15min}$	L_{Amax}
Stage 1 – Concrete works for pad & hardstand	Concrete Pump	106	15	1	112	119
	Concrete Truck / Agitator	108	15	1		
	Concrete Vibrator	110	5	1		
	Plate compactor	108	5	1		

Construction Activity	Equipment	Sound Power Level dBA	Operating minutes in a15-minute period	No of Items in each Work Area	Sound Power Level per activity (dBA)	
					$L_{Aeq,15min}$	L_{Amax}
	Skid steer Loaders	102	7.5	1		
Stage 2 – Construction of warehouse& office structures	Elevated Working Platform	97	10	2	112	118
	Flatbed Truck	106	15	1		
	Hand Tools (electric)	108	5	4		
	Mobile Crane (100 tonne)	101	10	1		
	Welding Equipment	97	10	1		

7.3 Predicted Construction Noise Levels

Table 7-3 details predicted construction noise levels for each scenario. Each stage was modelled in sub-stages representative of typical movement of construction sources around the site. Thus, depending on the distance of each source from the receiver, a minimum and maximum range of noise levels likely to be experienced by the receiver are computed. Based on these predictions, it can be concluded that construction noise is unlikely to cause any impacts to nearby receivers and is highly likely to be within the CNML at all receiver locations.

Table 7-3 Predicted Construction Noise Levels

Receiver	Period	$L_{Aeq,15min}$ Noise Level (dBA)				Meets CNML?
		CNML	Highly Affected NML	Stage 1 – Concrete Works	Stage 2 – Construction of Warehouse & office structures	
R1	Day	59	75	38-46	39-45	Yes
R2	Day	59	75	42-46	41-45	Yes
R3	Day	60	75	47-53	47-54	Yes
R4	Day	60	75	55-57	51-57	Yes
R5	Day	60	75	54-57	50-57	Yes
R6	Day	60	75	52-58	48-55	Yes
R7	Day	62	75	29-33	27-35	Yes
R8	Day	62	75	30-38	30-37	Yes
AR1	Day	65	-	41-47	40-47	Yes
AR2	Day	65	-	37-45	35-44	Yes
I01	Day	75	-	45-51	45-53	Yes
I02	Day	75	-	55-66	50-58	Yes

Receiver	Period	$L_{Aeq,15min}$ Noise Level (dBA)				Meets CNML?
		CNML	Highly Affected NML	Stage 1 – Concrete Works	Stage 2 – Construction of Warehouse & office structures	
I03	Day	75	-	39-48	39-49	Yes

7.4 Construction Noise Management

7.4.1 Noise Management Control

The predicted noise levels comply with the NMLs for all receivers. However, noise management control measures might be implemented in order to minimise and prevent impacts on the surrounding receivers.

Prior to commencement of works, it is recommended that a Construction Noise and Vibration Management Plan (CNVMP) be prepared and implemented in accordance with the requirements of the *ICNG*, and the recommendations documented herein. The CNVMP would take into consideration measures for reducing the source noise levels of construction equipment by construction planning and equipment selection where practicable. Reasonable and feasible noise mitigation measures should be outlined to reduce the noise impact from construction activities. The following preliminary controls are recommended:

- *Site Induction Training* – Training should include noise awareness component, community consultation and response to complaints as provided in the CNVMP.
- *Operator Instruction* – Operators should be trained in order to raise their awareness of potential noise problems and to increase their use of techniques to minimise noise emission.
- *Site Noise Planning* – Where practical, the layout and positioning of fixed noise-producing plant and activities should be away from the nearby receivers.
- *Scheduling* – Where practical, minimise the number of tools and machines operating simultaneously.
- *Plant Equipment* – Where possible, plant and equipment with a low sound power level should be selected while still maintaining efficiency of function.

7.4.2 Community consultation

Consultation with and the provision of information to the surrounding community is regarded as a major factor in controlling the negative reaction to the inevitable impacts associated with construction works. Contact details should be prominently displayed on the site boundary fence.

7.4.3 Response to complaints

Should ongoing complaints of excessive noise and vibration impacts occur, measures shall be undertaken to investigate the complaint, the cause of the complaint identified and changes to work practices implemented by the contractor.

Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated. If a noise and vibration complaint is received the complaint should be recorded. The complaint form should list:

- The name and location of the complainant (if provided) as well as the time, date and nature of the complaint received.
- The name of the employee who received the complaint, actions taken to investigate the complaint, and a summary of the results of the investigation.
- Required remedial action, if required.
- Validation of the remedial action by a site manager.
- Summary of feedback to the complainant.

A permanent Register of Complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable:

- measurements at the affected receiver;
- an investigation of the activities occurring at the time of the incident;
- inspection of the activity; and
- whether work practices were being carried out either within established guidelines or outside these guidelines.

7.5 Construction Vibration Impact Assessment

There are no plant items likely to generate a significant level of vibration on nearby receivers. As a result, the vibration levels are unlikely to be discernible off-site and hence no vibration impacts would be expected.

Nonetheless, it is recommended that within the Construction Noise and Vibration Management Plan (CNVMP), a review of proposed vibration intensive activities be completed. Vibration propagation is dependent on the local geological makeup. Attended vibration testing should be conducted at the commencement of any vibration intensive activity to confirm the dominant frequency of the vibration and the corresponding upper limit “component” peak particle velocity for nearby structures to revise the safe working distance accordingly.

The CNVMP should also employ the follow standard mitigation measures where practicable:

- Maximising the offset distance between high vibration plant items and nearby buildings.
- Substitution by alternative equipment, plant, and processes.
- Reduction vibration settings levels when operating the vibratory roller nearby buildings.
- Consultation with affected residences and business owners.

8 OPERATIONAL NOISE & VIBRATION ASSESSMENT

Noise emissions from the proposed site operations have been predicted at nearby receiver locations based upon a reasonable worst-case scenario.

8.1 Methodology and general assumptions

The noise at sensitive receivers was predicted using noise modelling/prediction software. Noise modelling is a powerful tool in assessing noise from an industrial facility with a large number of noise sources or determining the impact of a particular area without the influence of other noise sources. It can accurately determine what noise sources are the main contributors to noise pollution in the surrounding environment and how the noise environment will change when problem noise sources are controlled. The model accounts for the following factors:

- Source sound power levels;
- Source directivity, tonality, and orientation;
- Distance attenuation, including source and receptor heights;
- Barrier effects due to fences, structures, and other buildings;
- Ground effects;
- Atmospheric attenuation; and
- Meteorological effects.

The data for the noise model has been obtained from various sources as presented in **Table 8-1** below.

Table 8-1 Variables used for operational noise modelling

Parameter	Comment
Noise Model	The model was implemented in CadnaA software (2022 MR1) using the CONCAWE prediction algorithm
Terrain	Off-site 5m contours extracted from the Digital Elevation Model available from Geoscience Australia via Elvis Elevation and Depth. For contours within the site boundary, the ground level was set to 47.3m above sea level
Buildings	Building information such as addresses, outlines and the heights were obtained from Geovision by Precisely.
Ground Absorption	Ground absorption factor was set to 50% for the entire area.
Sound Power levels	Sound pressure level/sound power level data for operational noise sources were obtained from data for similar equipment & tasks from various references. The Sound power levels adopted are presented in **Table 8-4.**
Source heights	Heavy vehicles – 1.5 m AGL Light vehicles – 0.5m AGL Forklifts – 1m AGL Outdoor condenser units – 1m AGL

Parameter	Comment
	Rooftop fans – 0.5m above roof level
Receiver heights	1.5 m for single storey buildings and 4.5 m for 2 storey buildings. Receivers are located at the most affected point where possible
Reflection for buildings	2.5 dB reflection loss with 3 orders of reflection
Period of assessment	Site operations are 24/7 and the worst case 15-minute period has been assessed for daytime, evening time & night-time periods.
Meteorological conditions	A conservative approach has been taken by adopting noise enhancing meteorological conditions for all assessment periods. Source-to-receiver wind vectors have been considered for all receivers with the following stability category and wind speed: **Day / evening** – stability category D with light winds - up to 3m/s at 10m above ground level (AGL) **Night** – Stability category F with winds up to 2 m/s at 10m AGL Humidity 70% Temperature 20ºC Air Pressure 101.3 kPa

Note: AGL= Above Ground Level

8.2 Model assumptions for Site operations

The site is proposed to be used as a warehouse and a distribution facility. The following 'reasonable' worst case operational situations have been developed to best represent the operations of Warehouse A, B and 2. All sources are modelled assuming a typical worst case 15-minute period scenario. **Table 8-2** presents the assumed operational noise scenario.

Table 8-2 Modelling assumptions for site related operational noise sources

Use	Day period	Evening/Night period

Warehouse & distribution facility (Buildings 1A & 1B)	• Warehouse & offices mechanical plant operating continuously for a 15 minute duration
	  ○ outdoor condenser unit – 1 per warehouse office
	  ○ rooftop fan – 2 per warehouse
	• Light vehicle and heavy vehicle traffic movements as per Table 8-3
	• 1 heavy vehicle idling for 7.5 of a 15-minute period (50% of the time);
	• 1 heavy vehicle reversing over a 30 second period
		• Warehouse & offices mechanical plant operating continuously for a 15 minute duration
		  ○ outdoor condenser unit – 1 per warehouse office
		  ○ rooftop fan – 2 per warehouse
		• Light vehicle and heavy vehicle traffic movements as per Table 8-3
		• 1 heavy vehicle idling for 7.5 of a 15-minute period (50% of the time);
		• 1 heavy vehicle reversing over a 30 second period

Use	Day period	Evening/Night period
	• 1 forklift loading & unloading goods for 100% of a 15-minute period	• 1 forklift loading & unloading goods for 100% of a 15-minute period

Light Industrial use (Building 2)	• Main building & offices mechanical plant operating continuously for a 15 minute duration
	  ○ outdoor condenser unit – 1 per office
	  ○ rooftop fan – 4 in total
	• Light vehicle and heavy vehicle traffic movements as per Table 8-3
	• 2 heavy vehicles idling for 7.5 minutes of a 15-minute period (50% of the time);
	• 2 heavy vehicles reversing over a 30 second period
	• 2 forklifts loading & unloading goods for 100% of a 15-minute period
		• Main Building & offices mechanical plant operating continuously for a 15 minute duration
		  ○ outdoor condenser unit – 1 per office
		  ○ rooftop fan – 4 in total
		• Light vehicle and heavy vehicle traffic movements as per Table 8-3
		• 2 heavy vehicles idling for 7.5 minutes of a 15-minute period (50% of the time);
		• 2 heavy vehicles reversing over a 30 second period
		• 2 forklifts loading & unloading goods for 100% of a 15-minute period

Table 8-3 presents the peak-hour traffic volumes used for the project based on the traffic report prepared by Ason group titled *Warehouse 1 & 2, 149-155 Airds Road Minto, Transport Assessment, Development Application* dated Nov 2022 (reference no. P2038r02v1). It has been assumed that the light vehicles account for 80% and heavy vehicles account for 20%. of the total traffic generated by the development.

Since the day and evening peak times used in the traffic assessment (i.e., Day peak hour – 7:45 to 8:45 AM and evening peak hour - 16:15 -17:15 PM) are not in line with the day/evening peaks hours for the noise assessment, an assumption has been made that the evening & night peak hour for the noise assessment is 30% of the daytime peak traffic projection. This is in line with noise assessments conducted for similar developments.

Table 8-3 Projected peak hour traffic movements

Building	GFA	Trip rate per 100 m²	Traffic split		Day		Evening		Night	
			LV %	HV %	LV	HV	LV	HV	LV	HV
1A	6940	0.158	80%	20%	9	2	3	1	3	1
1B	6970	0.158	80%	20%	9	2	3	1	3	1
2	14220	0.158	80%	20%	18	4	5	1	5	1

Note 1 Assumed evening time traffic = night-time traffic =30% of daytime traffic

Note 2 AM/PM shoulder movements for the noise assessment = night-time movements

Note 3: 1 movement = 1 trip = 1 vehicle in or out

Note 4 daytime (7.00am - 6.00pm)
evening time (6.00pm - 10.00pm)
night-time (10.00pm - 7.00am)

8.3 Equipment sound power levels

The table below presents a summary of sound power levels for the equipment used at the site. The sound power levels used are based on historical data from other measurements for warehouse and distribution type projects. The noise levels presented below are consistent with US-FHWA-TNM 2.5 technical model and are considered to be conservative for the purposes of this assessment. Sound power levels of the various heavy vehicle activities previously measured by RWDI for warehouse and distribution type projects are found to be at or below the levels presented in this table. Note the increased level for a truck reversing is to account for audible reversing alarms and air brake releases.

Table 8-4 Adopted sound power levels for operational noise sources

Noise Source	Noise Characteristic	Sound Power Level SWL, dBA
Forklift operational on hardstand	Quasi-steady L_{Aeq}	93
Light Vehicles on site, up to speed of 40km/h	Quasi-steady L_{Aeq}	90
Heavy Vehicle[1] @25 km/h	Quasi-steady L_{Aeq}	106
Heavy Vehicle[1], unloaded @ 10 km/h	Quasi-steady L_{Aeq}	106
Heavy Vehicle[1], loaded @ 10 km/h	Quasi-steady L_{Aeq}	107
Heavy Vehicle[1], reversing[2] @ 5 km/h	Quasi-steady L_{Aeq}	111
Heavy vehicle[1] idling	Quasi-steady L_{Aeq}	103
Office condenser unit	Quasi-steady L_{Aeq}	69
Rooftop exhaust fan	Quasi-steady L_{Aeq}	90
Heavy vehicle engine starting	Instantaneous L_{Amax}	100
Heavy vehicle airbrake release	Instantaneous L_{Amax}	115
Forklift reverse beepers	Instantaneous L_{Amax}	101

Note 1: Heavy vehicle defined as any cargo vehicle with three or more axles with gross vehicle weight > 12,000 kg.

Note 2: Assumed that reversing operation will not take more than 30 seconds for each vehicle, includes reversing alarm and air brake release.

8.3.1 Fixed Noise Sources

Assumptions have been made for mechanical services and fixed plant that are consistent with other industrial developments given the size and type of customer likely to be attracted to the building. By predicting the noise levels at the sensitive receivers using this method, we are able to determine the upper limit of the sound power level of plant items required to meet the noise criteria.

Mechanical plant serving the proposed development will require review to determine potential noise impacts prior to issue of a construction certificate. Upon final selection, noise emissions from plant to be installed should be compared with the project noise trigger levels listed in **Table 6-2**. Considerations must be made such that the cumulative noise emissions from mechanical plant and other operational noise sources do not exceed the project noise trigger level.

8.3.2 Vehicle movements

Heavy vehicle traffic movements are represented as line sources travelling at 25 km/hr on the private road and 10Km/hr within the site. Light vehicles traffic movements are represented as line sources travelling 25 km/hr within the site.

Locations where vehicles require greater engine capacity, such as accelerating from a stationary position, cornering, or accessing entry/exit ramps have been modelled as line sources travelling 5 km/hr for heavy vehicles.

Heavy vehicles reversing into delivery docks, including reversing alarm and airbrake release have been modelled as a single line source. Duration of heavy vehicle reversing is assumed to be not greater than 30 seconds and includes reversing alarm and air-break release events.

External gas-powered forklifts and heavy vehicles idling have been modelled as point sources.

A figure showing the locations of the onsite traffic movements is provided in **Appendix C**.

8.4 Predicted continuous operational noise levels

A single reasonable worst-case scenario was modelled to predict the noise from the proposed site.

To assist in determining the NPfI modifying factors for tonality & low frequency at the receivers, third-octave sound power levels were utilised for most equipment. Where this data was not available i.e., for outdoor condenser units & rooftop fans, octave band data was utilised. The predicted noise was analysed at each receiver and modifying factors were determined quantitatively in accordance with the NPfI factsheet C.

Tonality (T): Narrow band analysis using the reference method in *ISO 1996-2007, Annex C* indicated no presence of significant tonal noise.

Low frequency (LF): Low frequency analysis using the method outlined in NPfI factsheet C indicates no requirement for a low frequency modification factor.

Intermittency (I): We note that industrial sites that have vehicle movements at night do not normally attract the intermittent correction, which is meant to apply to repeated sudden and periodic step changes in noise that might occur from loud equipment that regularly cycles on and off.

Duration (D): No duration factors were applied since there are no one-off and unusual events occurring on site.

Preliminary analysis indicates that the site sources are likely to exceed the night-time criterion of 43 dBA by a small margin of 1 dB at receiver R3, predominantly due to heavy vehicle activity within the site. To achieve compliance, two 2m high noise barriers have been modelled along the western boundary of the Proposal as a potential mitigation measure as indicated in **Figure 8-1.**

Table 8-5 presents the predicted $L_{Aeq,\ 15min}$ noise levels for continuous operation of the development with the proposed noise barriers. Compliance is indicated with the use of the noise barrier at all receiver locations. Note that the predictions for the shoulder periods are the same as the night-time predictions, with the night period being the more stringent criteria. Hence shoulder periods are not presented in the table.

Noise contours are presented in **Appendix D**.

Table 8-5 Predicted noise levels for continuous operation

Receiver ID	Location	Criteria (D/E/N)	NPfI modifying factors dB				Predicted values $L_{Aeq,\ 15min}$ dB			Criteria met? Yes (Y)/No (N)
			T	LF	D	I	Day	Evening	Night	
R1	24 Glenshee Place	54/48/43	0	0	0	0	39	37	37	Y
R2	11 Indaal Pl, St Andrews	54/48/43	0	0	0	0	40	38	38	Y
R3	15 Bungan Place	55/48/43	0	0	0	0	45	42	42	Y
R4	7 Bungan Pl, Woodbine	55/48/43	0	0	0	0	44	40	40	Y
R5	42A Queenscliff Dr, Woodbine	55/48/43	0	0	0	0	43	40	40	Y
R6	34 Queenscliff Dr, Woodbine	55/48/43	0	0	0	0	41	38	38	Y

Receiver ID	Location	Criteria (D/E/N)	NPfI modifying factors dB				Predicted values $L_{Aeq, 15min}$ dB			Criteria met? Yes (Y)/No (N)
			T	LF	D	I	Day	Evening	Night	
R7	42 Long Reef Cres, Woodbine	57/48/43	0	0	0	0	34	32	32	Y
R8	31 Opal Pl, Eagle Vale	57/48/43	0	0	0	0	28	27	27	Y
AR1	Peace Park, St Andrews	48	0	0	0	0	39	37	37	Y
AR2	Jackson Park, Long Reef Cres, Woodbine	48	0	0	0	0	39	37	37	Y
I1	1 Swaffham Rd, Minto	68	0	0	0	0	47	45	45	Y
I2	1/157 Airds Rd, Campbelltown	68	0	0	0	0	43	38	38	Y
I3	119 Airds Rd, Minto	68	0	0	0	0	43	41	41	Y

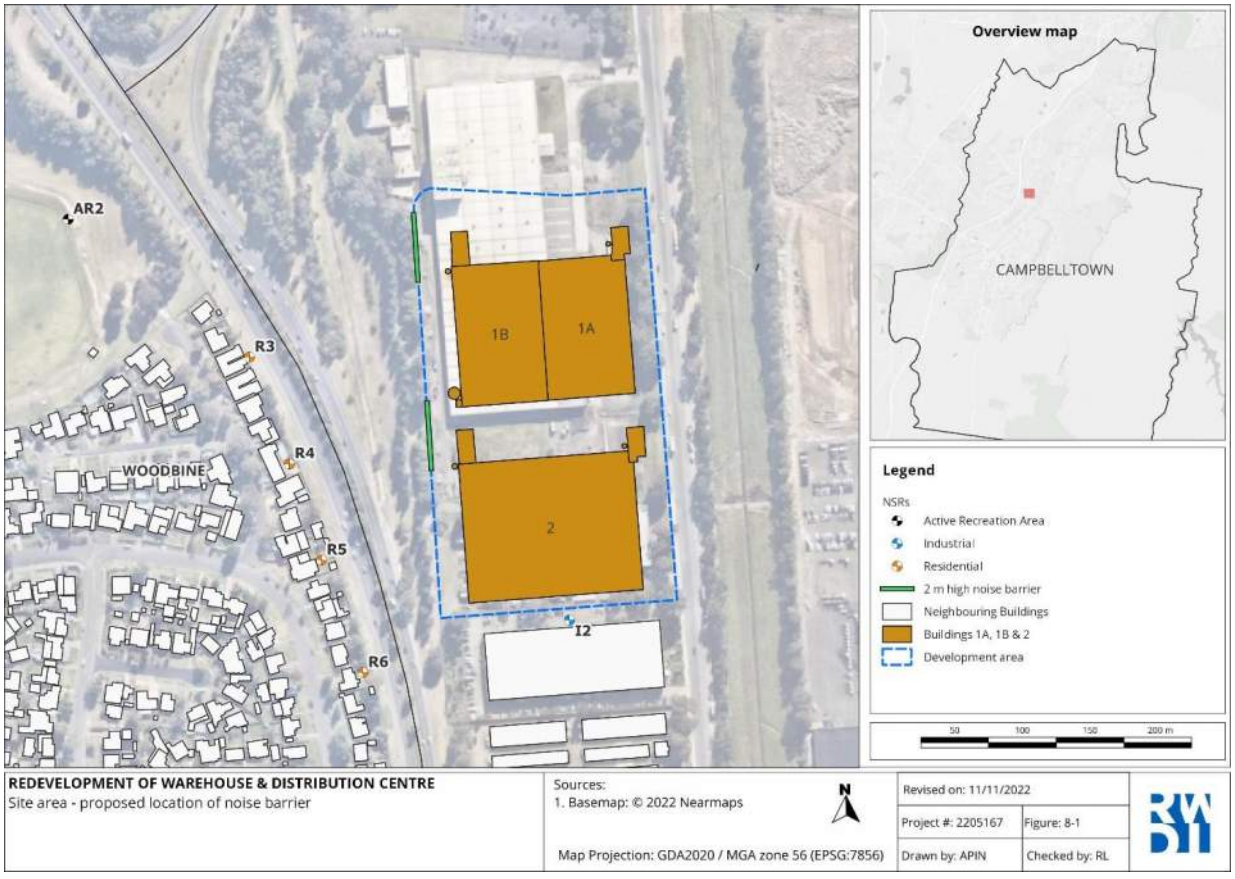

Figure 8-1 Proposed noise barrier

8.5 Predicted Maximum level noise event assessment

An assessment of potential sleep disturbance has been undertaken considering heavy vehicle brake releases, forklift impacts and reversing alarms modelled in the hardstand areas of the development.

Table 8-6 identifies the night-time $L_{Aeq,15min}$ and L_{Amax} typical maximum operational noise predictions in comparison with the adopted sleep disturbance screening level criteria. Note that the predictions include the use of the proposed noise barrier discussed in **section 8.4**.

Table 8-6 Maximum noise level event assessment

Receiver ID	Location	Screening Criteria dBA		Predicted levels dBA		Criteria met?
		$L_{Aeq\ 15min}$	L_{Amax}	$L_{Aeq\ 15min}$	L_{Amax}	Yes (Y)/No (N)
R1	24 Glenshee Place	48	58	37	52	Y
R2	11 Indaal Pl, St Andrews	48	58	38	55	Y
R3	15 Bungan Place	49	59	42	56	Y
R4	7 Bungan Pl, Woodbine	49	59	40	51	Y
R5	42A Queenscliff Dr, Woodbine	49	59	40	55	Y
R6	34 Queenscliff Dr, Woodbine	49	59	38	43	Y
R7	42 Long Reef Cres, Woodbine	51	61	32	40	Y
R8	31 Opal Pl, Eagle Vale	51	61	27	36	Y

8.6 Operational vibration

A review of the site plant and surrounding receivers indicates that there are no vibration generating activities during the site operation indicating that site activities are unlikely to cause any cosmetic building damage or discomfort to humans within buildings.

9 OFF-SITE TRAFFIC NOISE

The NSW Road Noise Policy (*RNP)* requires noise mitigation where new land use developments increase road traffic noise by more than 2 dB. An increase of greater than 2 dB requires an increase in traffic volumes of approximately 60% or higher.

It has been assumed that during construction and operation, the majority of traffic from the Project will be via Culverston Road before connecting onto Campbelltown Road via Airds Road. No residential receivers are located along this route, with the closest residences being affected by traffic on Campbelltown road. The movements generated by the development will result in a negligible increase in the road traffic noise levels generated by Campbelltown Road. On this basis, there is no noise impact on residences due to additional traffic from construction and operational phases.

10 DISCUSSION & CONCLUSION

10.1 Construction noise and vibration

The potential construction noise impacts at sensitive receivers were predicted using a noise model representative of the construction stages for the proposed development.

At this stage, a detailed list of equipment likely to be used during the construction project was not provided. Therefore, based on experience from similar projects, the construction project is divided into two separate work stages i.e., stage 1 being concrete works for pad & hardstand and stage 2 being construction of warehouse & office structures

Given the early stage of the Project, considering the preliminary assumptions for the construction stages, compliance is indicated at all receivers for both the stages. These assumptions can be revisited during the detailed design stage and once a construction contractor has been appointed.

There are no plant items likely to generate a significant level of vibration on nearby receivers. As a result, the vibration levels are unlikely to be discernible off-site and hence no construction-related vibration impacts would be expected.

10.2 Operational Noise and vibration

Although details of the proposed mechanical services design were not available at this stage of the project, based upon assumed roof-mounted HVAC plant and equipment, noise emissions are likely to achieve the criteria for continuous operational noise emissions at the nearest residential receivers to the east and west of the site.

Compliance with project specific noise goals can be achieved at all surrounding residential areas under typical operating conditions on the access roadway, the hardstand and loading dock and storage areas with the recommended mitigation measures i.e. the noise barrier.

Reversing alarm operation, truck air brakes and impact noise generated by loading/unloading activities during night-time will achieve recommended environmental assessment criteria for sleep disturbance.

Noise breakout from within the warehouse buildings is not considered to be of acoustical significance given the noise levels of activity in the external areas are higher than the internal warehouse noise levels.

A review of the site plant and surrounding receivers indicates that there are no vibration generating activities during the site operation indicating that site activities are unlikely to cause any cosmetic building damage or discomfort to humans within buildings.

10.3 Road Traffic

Road traffic noise generated by the project are likely to comply with the NSW Road Noise Policy guidelines. Existing levels of road traffic noise on the surrounding road network will not be significantly increased as a result of the proposal and emissions associated with individual vehicular events will be indistinguishable from existing traffic noise levels at surrounding residential receivers.

The existing road traffic noise level may increase along Culverston Rd and movements generated by the development will result in a negligible increase in the road traffic noise levels generated by Campbelltown Road Hence the proposed development is unlikely to cause noise impact on sensitive receivers in nearby residential areas which are along Campbelltown Road.

11 CONCLUSION

RWDI has completed a noise and vibration impact assessment (NVIA) of a proposed development at 149-155 Airds Road, Minto.

The NVIA has confirmed that noise emissions from operation and construction of the proposed development will comply with relevant regulatory guidelines with the noise mitigation recommended. It is expected that vibration generated from the operation and construction of the proposed modifications will meet relevant standards. Additional road traffic noise generated from the Project will be minimal and meet relevant noise goals.

APPENDIX A

PROPOSED DEVELOPMENT ARCHITECTURAL DRAWINGS

DEVELOPMENT APPLICATION - WAREHOUSE 1 AND 2

ADDRESS:	LOT 12 DP 251997 149-155 AIRDS ROAD, MINTO NSW
PREPARED FOR:	CHARTER HALL LEVEL 20, 1 MARTIN PLACE, SYDNEY NSW 2000
PREPARED BY:	WATCH THIS SPACE DESIGN PTY LTD LEVEL 3, SUITE 9, 35 BUCKINGHAM STREET, SURRY HILLS NSW 2010
DATE:	OCTOBER 2022

DA2 DRAWING LIST

SHEET NO.	SHEET NAME	SHEET ISSUE DATE	CURRENT REVISION
DA2-000	COVER SHEET	21/10/2022	P6
DA2-001	SURVEY PLAN	21/10/2022	P6
DA2-002	SITE ANALYSIS PLAN	21/10/2022	P6
DA2-003	SHADOW DIAGRAMS	21/10/2022	P6
DA2-004	OVERALL SITE PLAN	21/10/2022	P6
DA2-100	WAREHOUSE 1 & 2 - FLOOR PLAN	21/10/2022	P6
DA2-101	WAREHOUSE 1 & 2 - ROOF PLAN	21/10/2022	P6
DA2-110	WAREHOUSE 1A - OFFICE PLANS	21/10/2022	P6
DA2-111	WAREHOUSE 1A - OFFICE ELEVATIONS	21/10/2022	P6
DA2-120	WAREHOUSE 2B - OFFICE PLANS	21/10/2022	P6
DA2-121	WAREHOUSE 1B - OFFICE ELEVATIONS	21/10/2022	P6
DA2-200	WAREHOUSE 1 - ELEVATIONS	21/10/2022	P6
DA2-201	WAREHOUSE 1 - ELEVATIONS	21/10/2022	P6
DA2-300	WAREHOUSE 1 - SECTIONS	21/10/2022	P6
DA3-110	WAREHOUSE 2A - OFFICE PLANS	21/10/2022	P6
DA3-111	WAREHOUSE 2A - OFFICE ELEVATIONS	21/10/2022	P6
DA3-120	WAREHOUSE 2B - OFFICE PLANS	21/10/2022	P6
DA3-121	WAREHOUSE 2B - OFFICE ELEVATIONS	21/10/2022	P6
DA3-200	WAREHOUSE 2 - ELEVATIONS	21/10/2022	P6
DA3-201	WAREHOUSE 2 - ELEVATIONS	21/10/2022	P6
DA3-300	WAREHOUSE 2 - SECTIONS	21/10/2022	P6
DA3-700	SIGNAGE DETAIL	21/10/2022	P6
DA3-800	3D VIEWS - 01 (NOT INCLUDED)		
DA3-801	3D VIEWS - 02 (NOT INCLUDED)		
DA3-900	NOTIFICATION PLAN	21/10/2022	P6
DA3-901	NOTIFICATION PLAN	21/10/2022	P6

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P1	ISSUED FOR MARKETING COLLATERAL	27/07/2022
P2	ISSUED FOR CONSULTANTS	29/07/2022
P3	ISSUED FOR CLIENT CONSIDERATION	12/08/2022
P4	ISSUED FOR INFORMATION	21/09/2022
P5	ISSUED FOR REVIEW	14/10/2022
P6	ISSUED FOR COORDINATION	21/10/2022

Managing Consultant

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO
Scale NTS
Checked EC
Date 21/10/2022
Approved PM
Date 21/10/2022

Drawing Title
COVER SHEET

Project Number
CH 149AI DA

Drawing Number
DA2-000

Rev
P6

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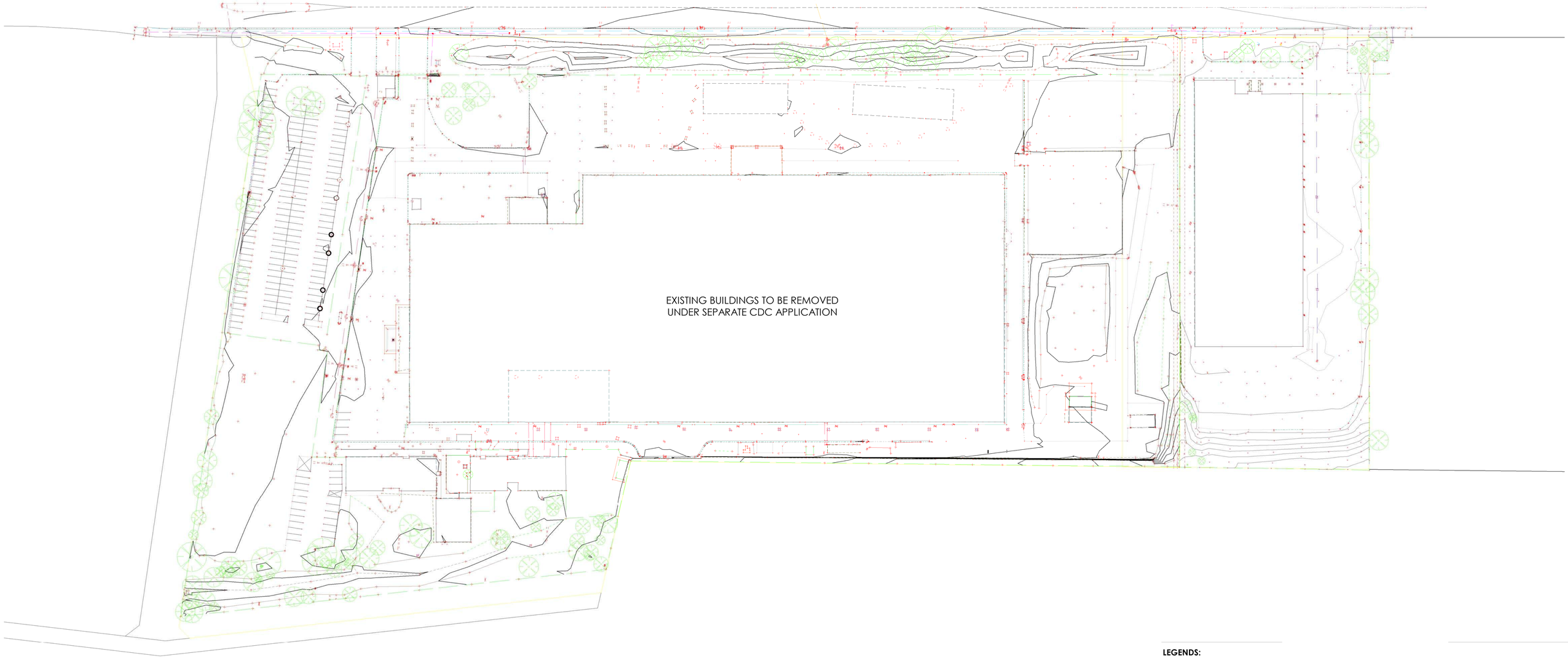
DEVELOPMENT APPLICATION ONLY



1 STAGE 02 - SURVEY PLAN

1 : 800

NOTES

- TREE SIZES ARE ESTIMATES ONLY
- ONLY VISIBLE SERVICES HAVE BEEN LOCATED IN THIS SURVEY
- SERVICE AND UTILITIES SHOWN ON PLAN HAVE BEEN LOCATED BY PHYSICAL EVIDENCE ON SITE ONLY AND MAY NOT HAVE BEEN OPENED TO VERIFY THE TYPE OF UTILITY. NEITHER EXCAVATION NOR POTHOLING HAVE BEEN CARRIED OUT TO CONFIRM UNDERGROUND LOCATION. SERVICE DETAILS SHOULD BE CONFIRMED WITH THE RELEVANT SERVICE AUTHORITY DURING DESIGN AND PRIOR TO ANY CONSTRUCTION
- ALL DIMENSIONS MUST BE VERIFIED ON SITE PRIOR TO ANY CONSTRUCTION
- THE POSITION OF SURVEYED DATA HAS BEEN LOCATED AND IS SHOWN TO TOPOGRAPHIC ACCURACIES. IF CLEARANCES TO BOUNDARIES OR OTHER FEATURES ARE CRITICAL AND DIMENSIONS ARE NOT SHOWN FURTHER SURVEY MAY BE REQUIRED
- BOUNDARIES ARE APPROXIMATE AND WILL REQUIRE FURTHER DEFINITION
- ANY CONSTRUCTION ON OR NEAR BOUNDARIES WILL REQUIRE FURTHER SURVEY IN ORDER THAT MARKS DEFINING BOUNDARIES CAN BE PLACED

(A) - EASEMENT FOR ELECTRICAL SUPPLY

THERE ARE LAYERS WITHIN THIS PLAN THAT HAVE BEEN TURNED OFF FOR CLARITY PURPOSES

NOTES

The title boundaries shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey.

Services shown hereon have been located where possible by field survey. If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan. Where such records do not exist or are inadequate a notation has been made hereon.

Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

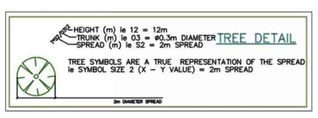
LEGENDS:

SYM	CODE	DESCRIPTION
	BIN	BIN
	BM	BENCH MARK
	BO	BOLLARD
	DJM	DRAINAGE MANHOLE
	EFP	ELEC FUSE BOX
	ELP	ELEC GARDEN LIGHT
	EL	ELEC GREEN PILLAR
	LP	ELEC LIGHT POLE
	EP	ELECT SINGLE PIT
	SPL	ELEC STAY POLE
	PP	ELEC POWER POLE
	ELP	ELEC POLE/LIGHT
	TRANS	ELE POLE/TRANSFORM
	FD	FUEL DIP
	GM	GAS MAIN
	GMR	GAS METER
	GAS	GAS VALVE
	AG	GATE
	GUL	GULLY PIT
	HYD	HYDRANT
	BOR	BOREHOLE

SYM	CODE	DESCRIPTION
	OFM	OPTICAL FIBRE MARKER
	OFP	OPTICAL FIBRE PIT
	TM	PALM TREE
	SE	SEAT
	TS	SHRUB
	TCA	TELSTRA PIT
	SLH	SEWER LAMP HOLE
	SMH	SEWER MANHOLE
	SVP	SEWER VENT PIPE
	SI	SIGN
	BUS	BUS STOP SIGN
	T	TREE
	SGL	TRAFFIC LIGHT
	SCL	TRAFFIC CONTROLLER
	SJX	TRAFFIC JUNCTION BOX
	US	UNKNOWN SERVICE
	WAV	WATER AIR VALVE
	WMR	WATER METER
	WEP	WATER PUMP
	WSV	WATER STOP VALVE
	WTP	WATER TAP
	WMH	WATER MANHOLE

Symbols shown are indicative only. The symbol size and orientation does not necessarily represent the real size or orientation of the feature.

DRAINAGE PIPE U/G
DRAIN
ELECT. CABLE A/G
ELEC. CABLE U/G
GAS PIPE
FENCE LINE
SEWERAGE PIPE
TELSTRA CABLE
WATER PIPE



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Charter Hall

Managing Consultant

TACTICAL GROUP

Client
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149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

Drawing Title
SURVEY PLAN

Project Number
CH 149AI DA

Drawing Number
DA2-001

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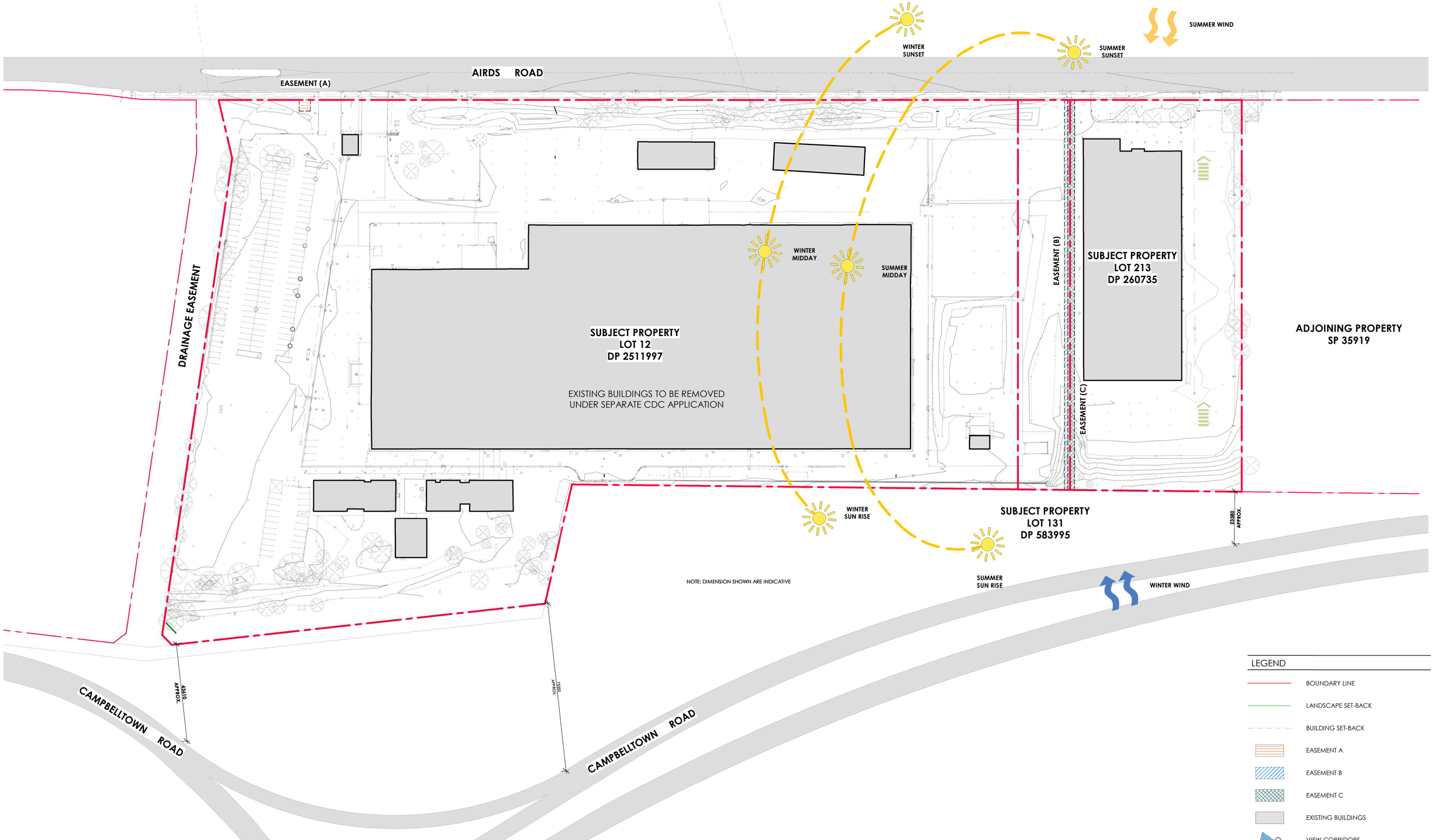

LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- EASEMENT A
- EASEMENT B
- EASEMENT C
- EXISTING BUILDINGS
- VIEW CORRIDORS
- SITE LANDFORM
- WIND DIRECTION

1 STAGE 02 - SITE ANALYSIS PLAN

1 : 800

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Drawing Title
SITE ANALYSIS PLAN

Project Number
CH 149AI DA

Drawing Number
DA2-002

Status
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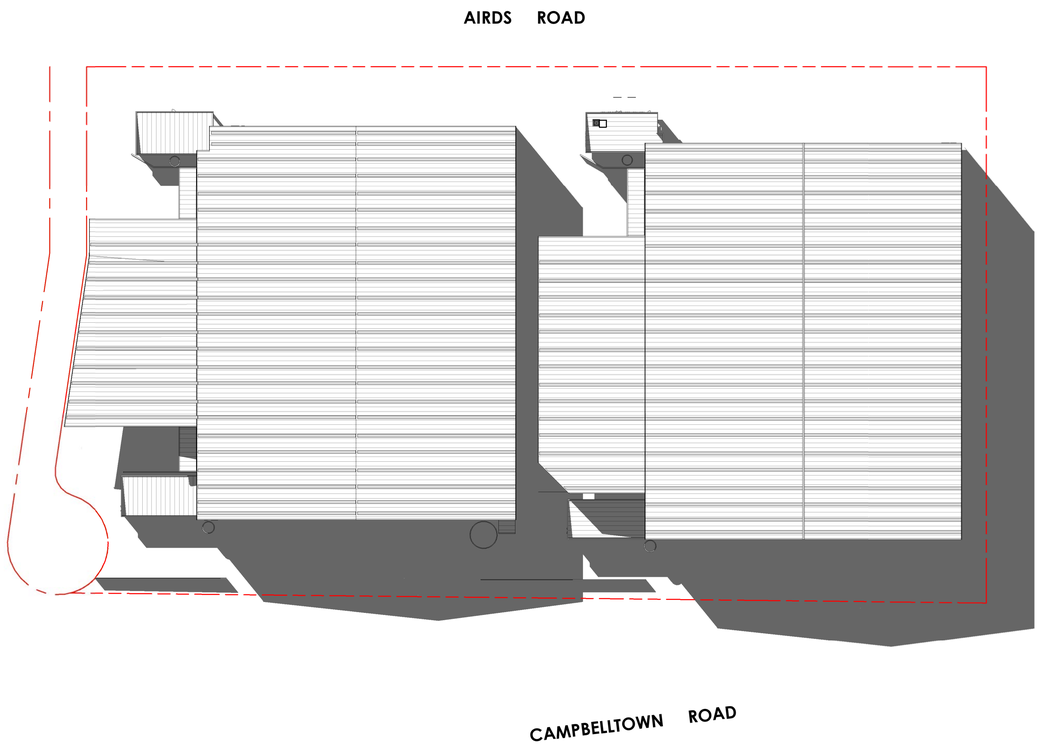

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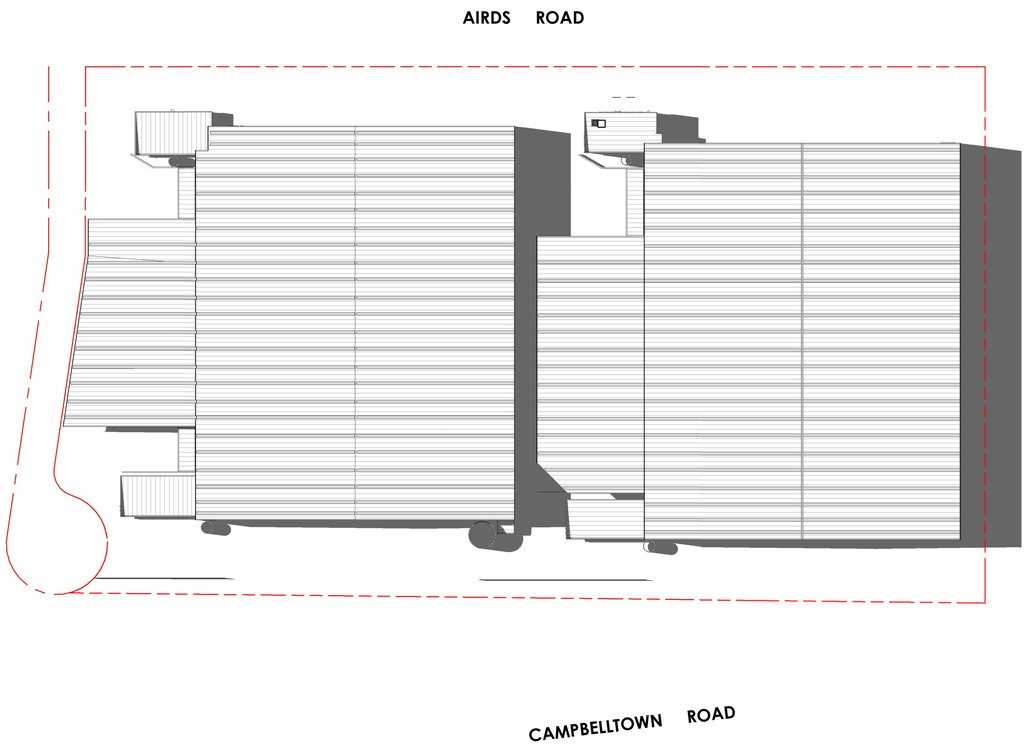

2 **WINTER SOLSTICE - 21st JUNE at 12pm WH1 + WH2**
1 : 1000

3 **WINTER SOLSTICE - 21st JUNE at 3pm WH1 + WH2**
1 : 1000

1:50 @A1 0 0.5 1 2 4m

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Date 21/10/2022
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Drawing Title
SHADOW DIAGRAMS

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Drawing Number
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N

1 OVERALL SITE PLAN - CAMPBELLTOWN RD

1 : 1000

1:1000 @A1 0 10 20 40 80m

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P4	ISSUED FOR INFORMATION	21/09/2022
P5	ISSUED FOR REVIEW	14/10/2022
P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO
Checked EC
Approved PM
Scale 1 : 1000
Date 21/10/2022
Date 21/10/2022

Drawing Title
OVERALL SITE PLAN

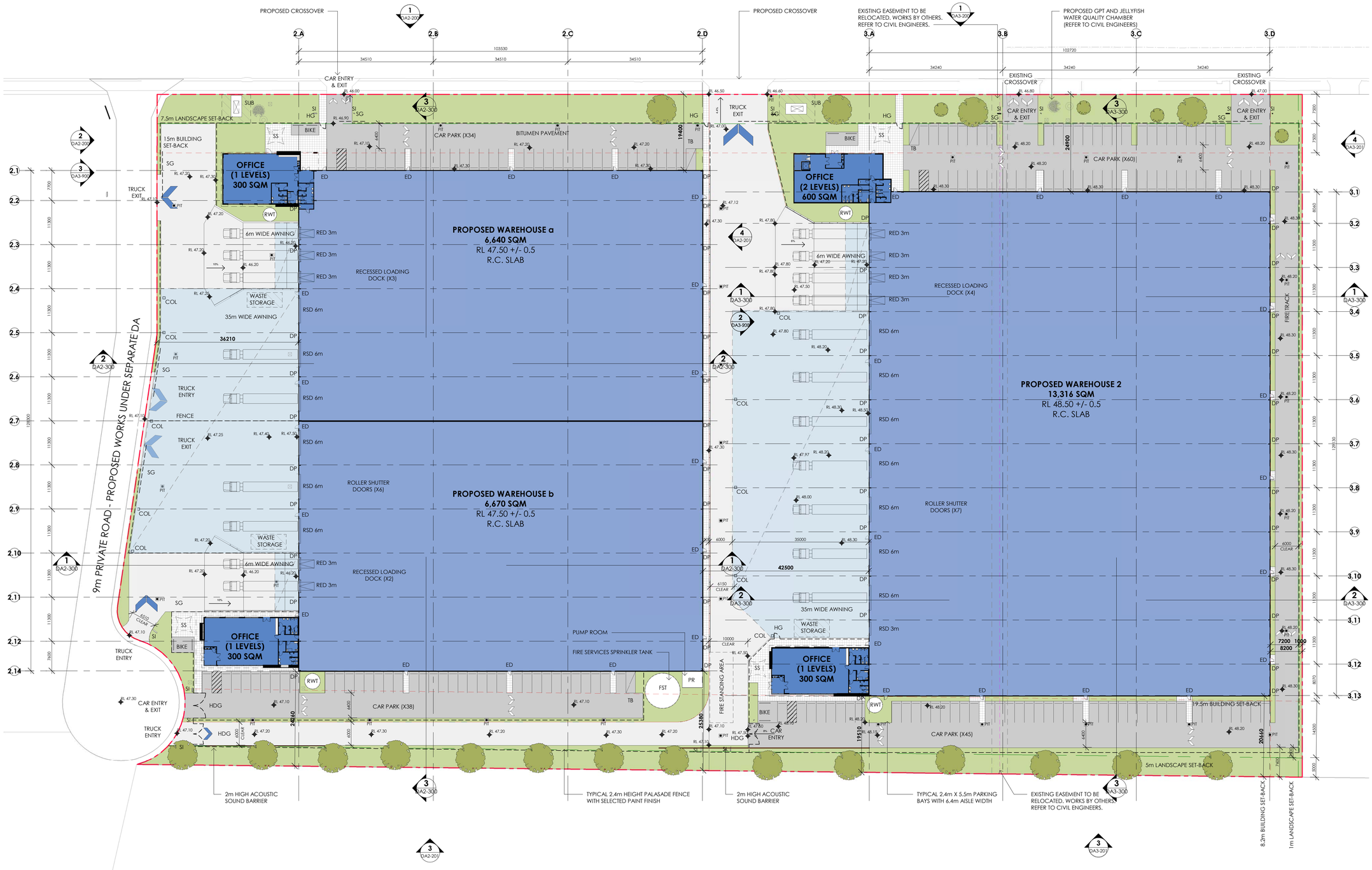
Project Number
CH 149AI DA

Drawing Number
DA2-004

Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

N



WH1&2 - GROUND LEVEL

1 : 500

LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
- STORM WATER PIT, OSD TANK TO CIVIL ENGS DETAIL
- PYLON SIGNAGE
- CONCRETE COLUMN AS PER ENG. DETAILS
- BUS STOP
- GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)
- SUB - STATION

149 - 155 AIRDS RD, MINTO
DEVELOPMENT SCHEDULE

149 Airds Rd - Site Area	53,845 sqm
155 Airds Rd - Site Area	13,379 sqm
Landscape Calculations Actual Provided 5,378 sqm (8.0% of site area 67,224 sqm)	
Warehouse Area	26,626 sqm
Office Area	1,500 sqm
Total	28,130 sqm
Car parking Provided	177

NOTE:
ALL AREAS SHOWN ARE SUBJECT TO CHANGE
ALL PROPOSED LEVELS ARE SUBJECT TO CIVIL ENGINEER REVIEW AND ADVICE.

LEGEND

- SITE
- WAREHOUSE
- OFFICE
- AWNING
- HEAVY DUTY AREA
- LIGHT DUTY AREA
- LANDSCAPING AREA
- GRAVEL / FIRE ACCESS
- UNOCCUPIED DEVELOPMENT SITE
- ESTATE ROAD
- DRAGINAGE RE-ALIGNMENT

NOTE:
CHECK EXACT LOCATION OF EXISTING SITE COMPONENT ON SITE.

LEGEND

BR	BIKE
DP	DOWNPIPE WITH PROTECTIVE SLEEVE
ED	EXIT DOOR
FST	FIRE SPRINKLER TANK - REFER TO HYDRALIC ENG.
PR	PUMP ROOM - REFER TO HYDRALIC ENG.
RED	RECESSED LOADING DOCK
RSD	ROLLER SHUTTER DOOR
RWT	RAIN WATER TANK
SS	SHADE SAIL
SI	SIGNAGE

1:500 @A1

0 5 10 20 40m

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	Amendments	date
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Charter Hall

Managing Consultant
TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO | Checked EC | Approved PM
Scale 1 : 500 | Date 21/10/2022 | Date 21/10/2022

Drawing Title
WAREHOUSE 1 & 2 - FLOOR PLAN

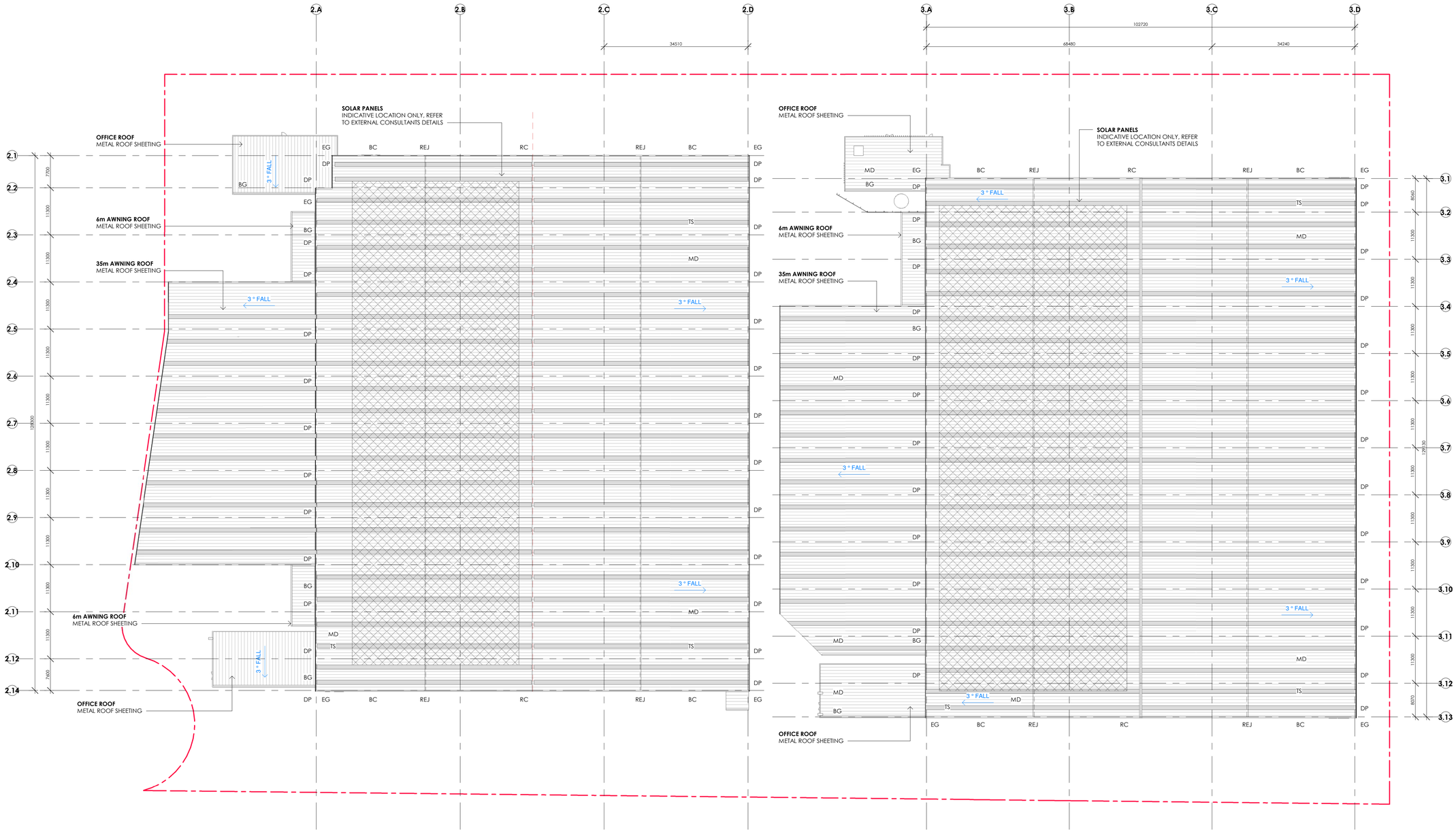
Project Number
CH 149AI DA

Drawing Number
DA2-100

Status
DEVELOPMENT APPLICATION ONLY

Rev
P6

N



LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
- STORM WATER PIT, OSD TANK TO CIVIL ENGS DETAIL
- PYLON SIGNAGE
- CONCRETE COLUMN AS PER ENG. DETAILS
- BUS STOP
- GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)
- SUB - STATION

LEGEND

BC	BARGE CAPPING
BG	BOX GUTTER - REFER TO HYDRALIC ENG.
DP	DOWNPIPE WITH PROTECTIVE SLEEVE
EG	EAVES GUTTER
MD	METAL PROFILE ROOF SHEETING
RC	RIDGE CAPPING
REJ	ROOF EXPANSION JOINT
TS	TRANSLUCENT PROFILE ROOF SHEETING

- SOLAR PANELS
- METAL PROFILE ROOF SHEETING
- TRANSLUCENT PROFILE ROOF SHEETING

2 WH2&3 - RIDGE LEVEL

1 : 500

1:500 @A1

0 5 10 20 40m

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Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
1 : 500	21/10/2022	21/10/2022

Drawing Title
WAREHOUSE 1 & 2 - ROOF PLAN

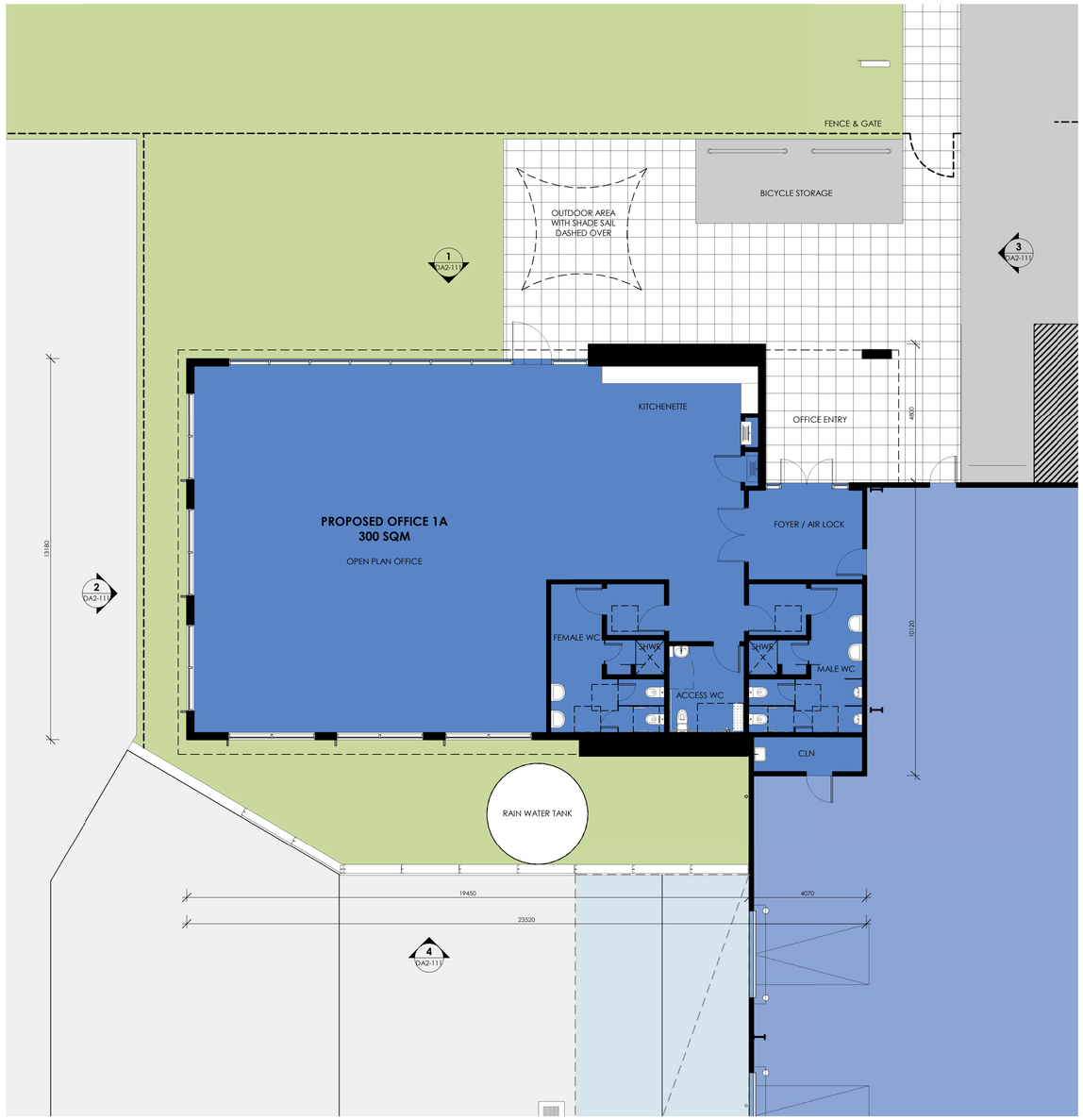
Project Number
CH 149AI DA

Drawing Number
DA2-101

Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

N



LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
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- S — PYLON SIGNAGE
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- SUB - STATION

1 OF1a. - GROUND LEVEL

1 : 100

1:100 @A1

0 1 2 4 8m

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149-155 AIRDS ROAD,
MINTO, NSW, 2566

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Scale As indicated | Date 21/10/2022 | Date 21/10/2022

Status
DEVELOPMENT APPLICATION ONLY

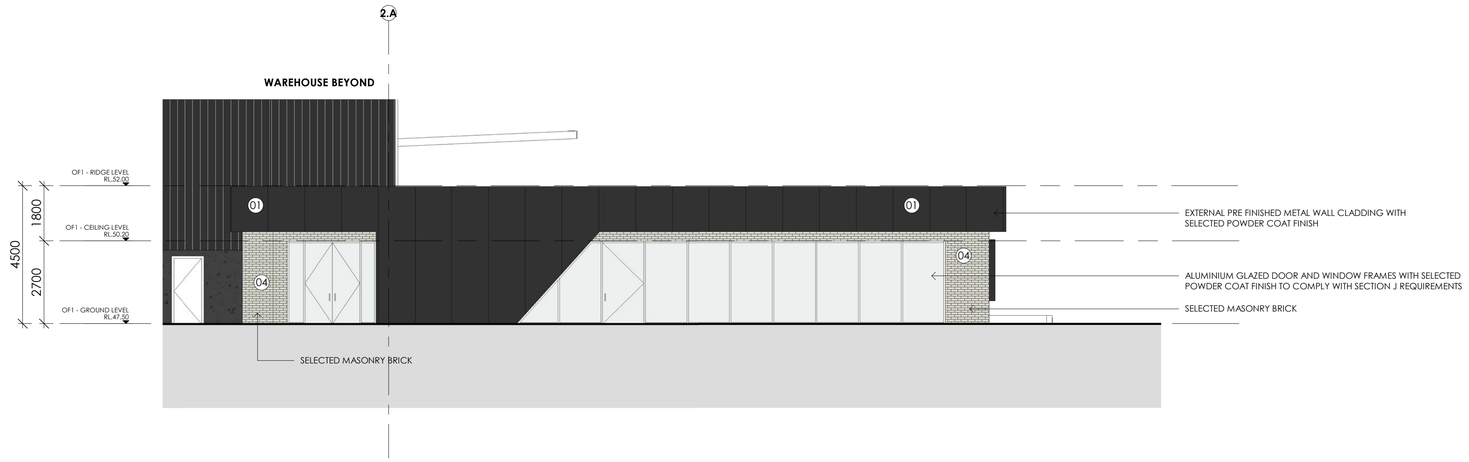
Drawing Title
WAREHOUSE 1A - OFFICE PLANS

Project Number
CH 149AI DA

Drawing Number
DA2-110

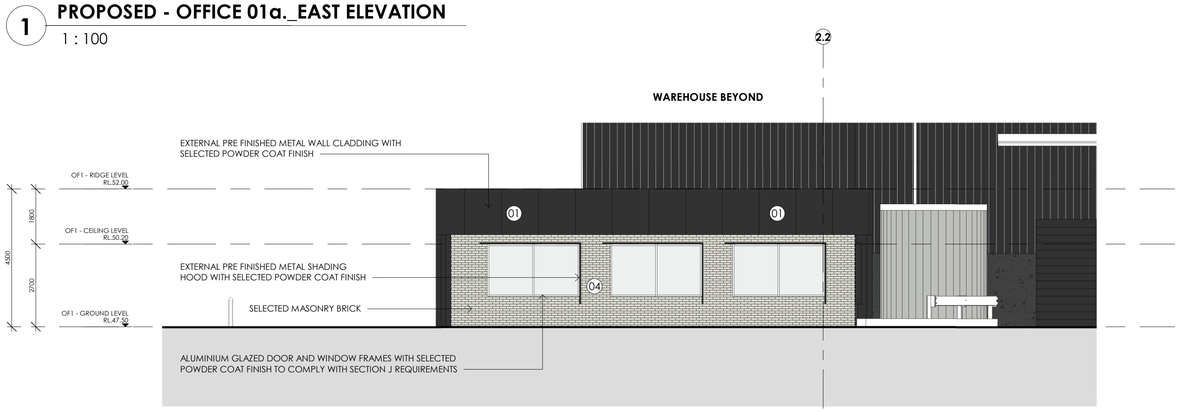
Rev
P6

N



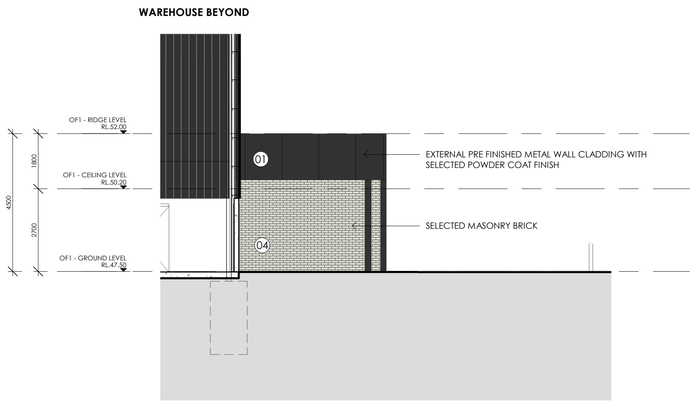
1 PROPOSED - OFFICE 01a._EAST ELEVATION

1 : 100



2 PROPOSED - OFFICE 01a._NORTH ELEVATION

1 : 100



3 PROPOSED - OFFICE 01a._SOUTH ELEVATION

1 : 100

4 PROPOSED - OFFICE 01a._WEST ELEVATION

1 : 100

FINISH SCHEDULE

01	MONDOCLAD METAL WALL CLADDING 'DARK GREY METALIC' TO MATCH OR SIMILAR
02	CEMINTEL PRE-FINISHED FIBRE CEMENT 'BARESTONE' TO MATCH OR SIMILAR
03	KNOTWOOD ALUMINIUM LOUVRE SCREEN 'WHITE ASH' TO MATCH OR SIMILAR
04	AUSTRAL FACE BRICK WALL "QUARTZ" TO MATCH OR SIMILAR

1:100 @A1 0 1 2 4 8m

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Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

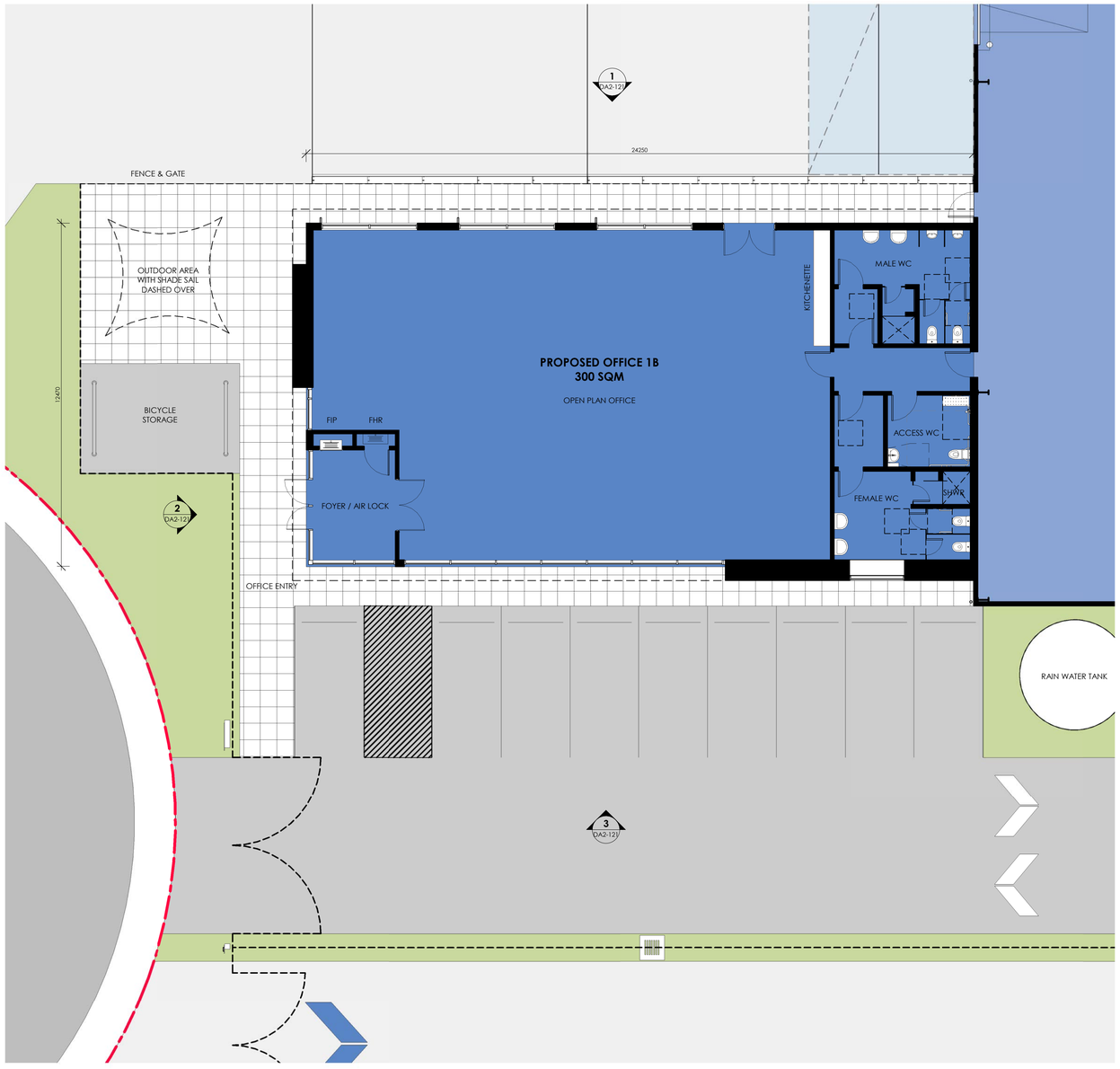
Drawing Title
WAREHOUSE 1A - OFFICE ELEVATIONS

Rev
P6

Project Number
CH 149AI DA

Drawing Number
DA2-111

Status
DEVELOPMENT APPLICATION ONLY



1 OF1b - GROUND LEVEL

1 : 100

LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
- STORM WATER PIT, OSD TANK TO CIVIL ENGS DETAIL
- S — PYLON SIGNAGE
- CONCRETE COLUMN AS PER ENG. DETAILS
- B — BUS STOP
- GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)
- SUB - STATION

1:100 @A1

0 1 2 4 8m

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P6	ISSUED FOR COORDINATION	21/10/2022

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Client
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Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

Drawing Title
WAREHOUSE 2B - OFFICE PLANS

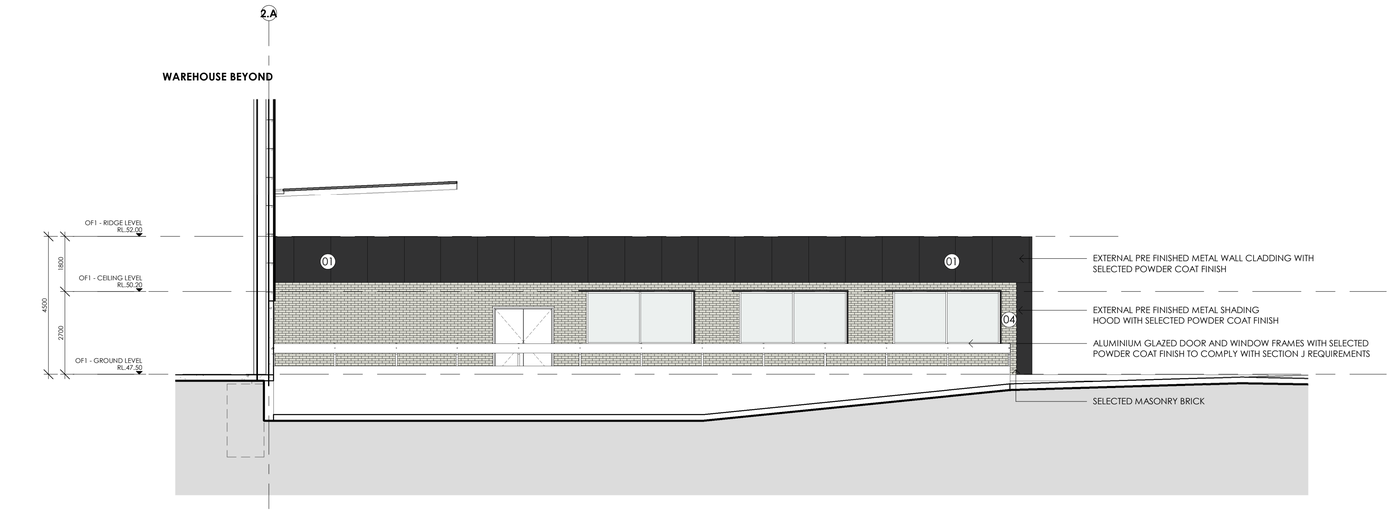
Project Number
CH 149AI DA

Drawing Number
DA2-120

Rev
P6

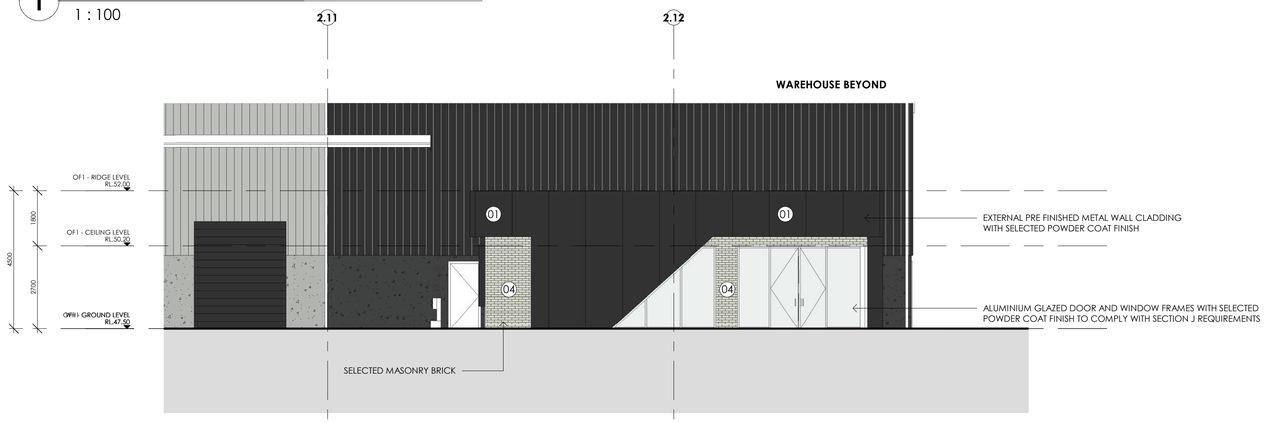
Status
DEVELOPMENT APPLICATION ONLY

N



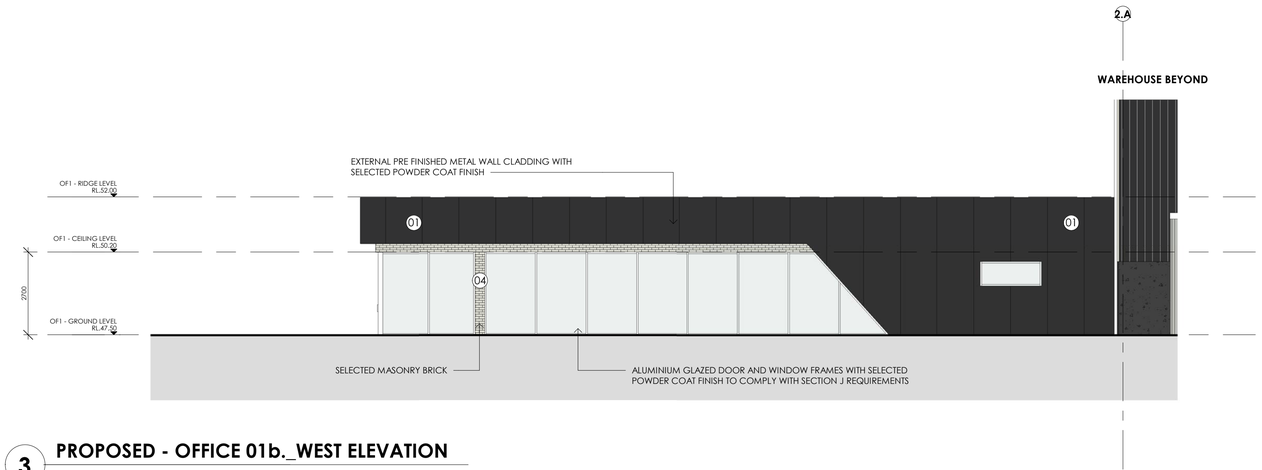
1 PROPOSED - OFFICE 01b._EAST ELEVATION

1 : 100



2 PROPOSED - OFFICE 01b._NORTH ELEVATION

1 : 100



3 PROPOSED - OFFICE 01b._WEST ELEVATION

1 : 100

FINISH SCHEDULE

01	MONDOCLAD METAL WALL CLADDING 'DARK GREY METALIC' TO MATCH OR SIMILAR
02	CEMINTEL PRE-FINISHED FIBRE CEMENT 'BARESTONE' TO MATCH OR SIMILAR
03	KNOTWOOD ALUMINIUM LOUVRE SCREEN 'WHITE ASH' TO MATCH OR SIMILAR
04	AUSTRAL FACE BRICK WALL "QUARTZ" TO MATCH OR SIMILAR

1:100 @A1

0 1 2 4 8m

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P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO | Checked EC | Approved PM
Scale As indicated | Date 21/10/2022 | Date 21/10/2022

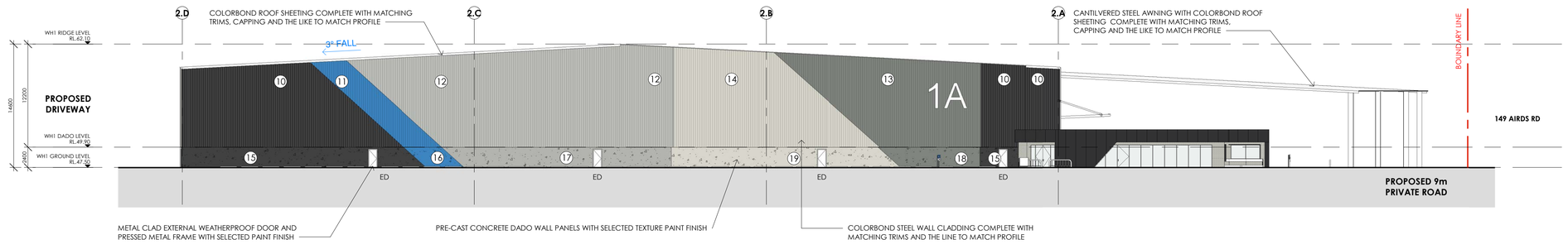
Drawing Title
WAREHOUSE 1B - OFFICE ELEVATIONS

Project Number
CH 149AI DA

Drawing Number
DA2-121

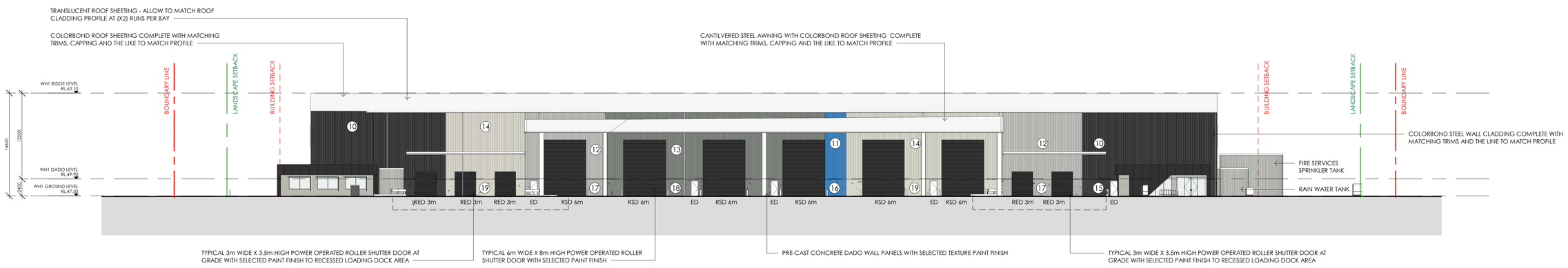
Rev
P6

Status
DEVELOPMENT APPLICATION ONLY



1 PROPOSED - WAREHOUSE 01_EAST ELEVATION

1 : 300



2 PROPOSED - WAREHOUSE 01_NORTH ELEVATION

1 : 300

FINISH SCHEDULE

10	COLORBOND METAL WALL CLADDING - VERTICAL 'MONUMENT' TO MATCH OR SIMILAR
11	COLORBOND METAL WALL CLADDING - VERTICAL 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
12	COLORBOND METAL WALL CLADDING - VERTICAL 'SHALE GREY' TO MATCH OR SIMILAR
13	COLORBOND METAL WALL CLADDING - VERTICAL 'WINDSPRAY' TO MATCH OR SIMILAR
14	COLORBOND METAL WALL CLADDING - VERTICAL 'SURFMIST' TO MATCH OR SIMILAR
15	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'MONUMENT' TO MATCH OR SIMILAR
16	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
17	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SHALE GREY' TO MATCH OR SIMILAR
18	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'WINDSPRAY' TO MATCH OR SIMILAR
19	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SURFMIST' TO MATCH OR SIMILAR

1:300 @A1

0 3 6 12 24m

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Managing Consultant

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

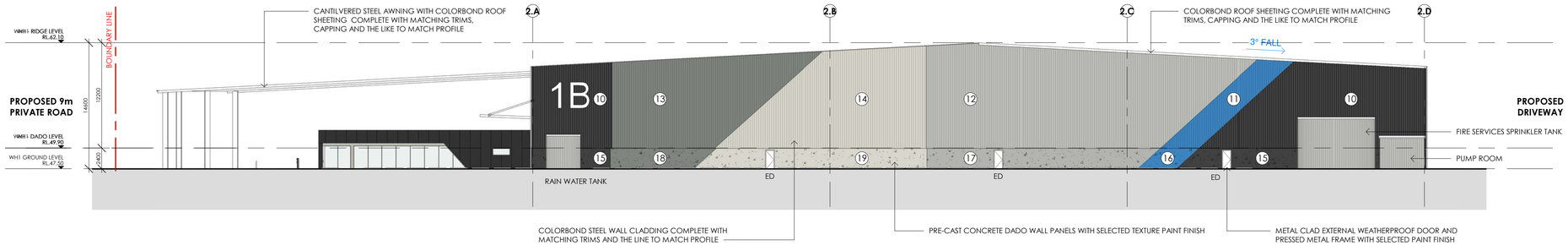
Drawing Title
WAREHOUSE 1 - ELEVATIONS

Project Number
CH 149AI DA

Drawing Number
DA2-200

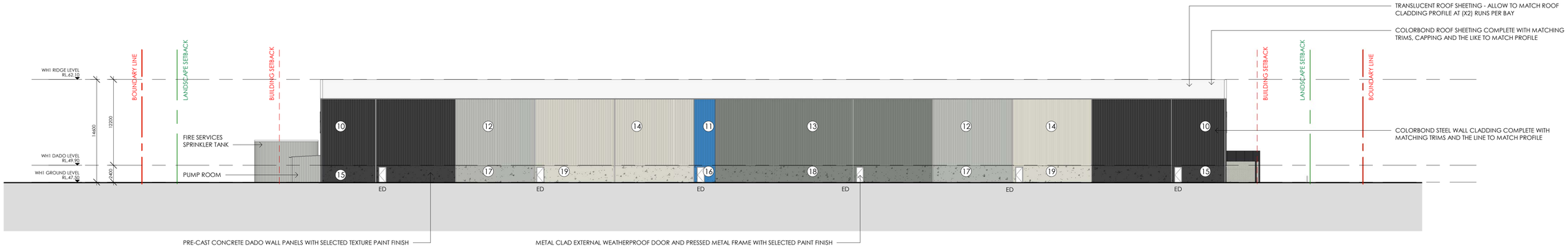
Status
DEVELOPMENT APPLICATION ONLY

Rev
P6



3 PROPOSED - WAREHOUSE 01_WEST ELEVATION

1 : 300



4 PROPOSED - WAREHOUSE 01_SOUTH ELEVATION

1 : 300

FINISH SCHEDULE

10	COLORBOND METAL WALL CLADDING - VERTICAL 'MONUMENT' TO MATCH OR SIMILAR
11	COLORBOND METAL WALL CLADDING - VERTICAL 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
12	COLORBOND METAL WALL CLADDING - VERTICAL 'SHALE GREY' TO MATCH OR SIMILAR
13	COLORBOND METAL WALL CLADDING - VERTICAL 'WINDSPRAY' TO MATCH OR SIMILAR
14	COLORBOND METAL WALL CLADDING - VERTICAL 'SURFMIST' TO MATCH OR SIMILAR
15	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'MONUMENT' TO MATCH OR SIMILAR
16	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
17	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SHALE GREY' TO MATCH OR SIMILAR
18	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'WINDSPRAY' TO MATCH OR SIMILAR
19	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SURFMIST' TO MATCH OR SIMILAR

1:300 @A1

0 3 6 12 24m

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Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

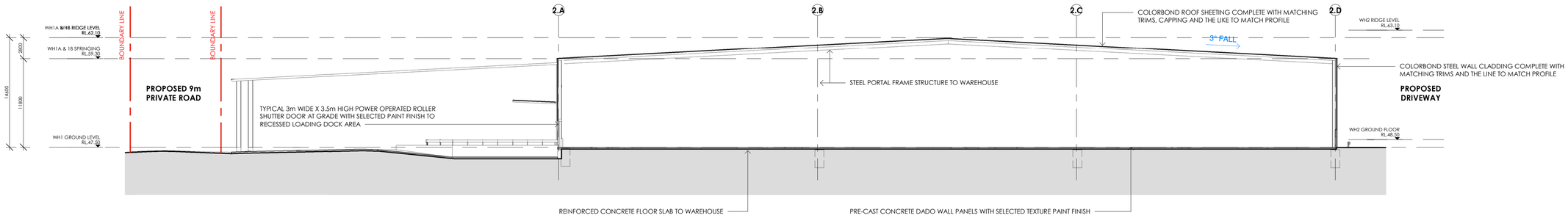
Drawing Title
WAREHOUSE 1 - ELEVATIONS

Project Number
CH 149AI DA

Drawing Number
DA2-201

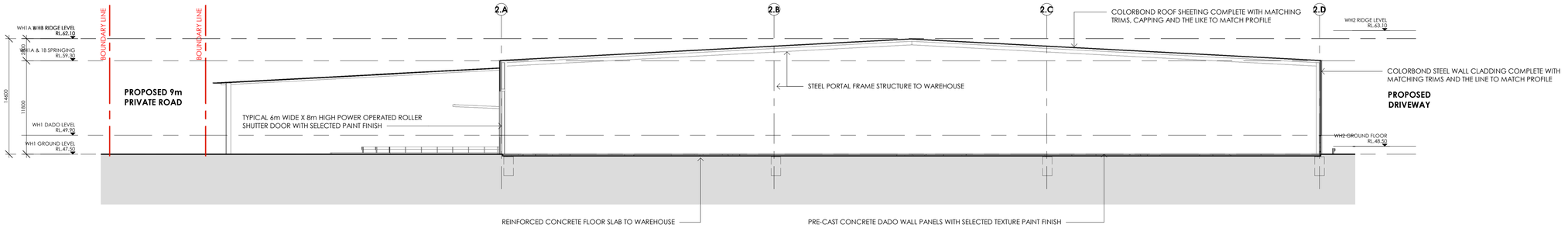
Status
DEVELOPMENT APPLICATION ONLY

Rev
P6



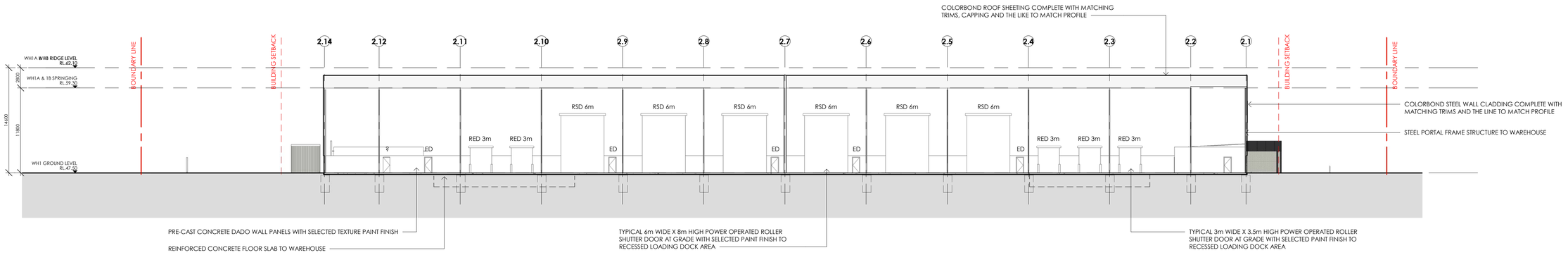
1 PROPOSED - WAREHOUSE 01_SECTION A

1 : 300



2 PROPOSED - WAREHOUSE 01_SECTION B

1 : 300



3 PROPOSED - WAREHOUSE 01_SECTION C

1 : 300

1:300 @A1

0 3 6 12 24m

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Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
1 : 300	21/10/2022	21/10/2022

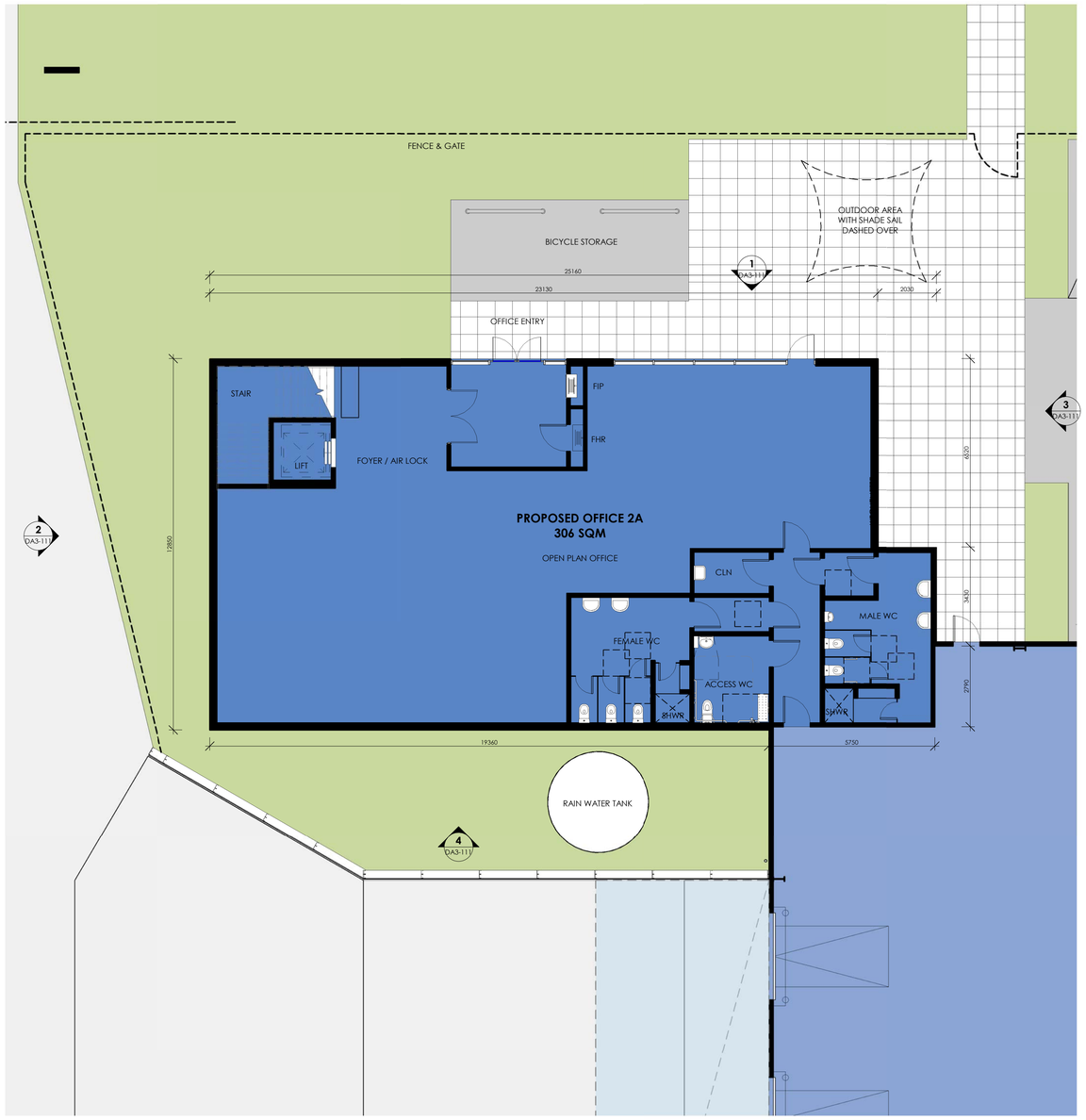
Drawing Title
WAREHOUSE 1 - SECTIONS

Rev
P6

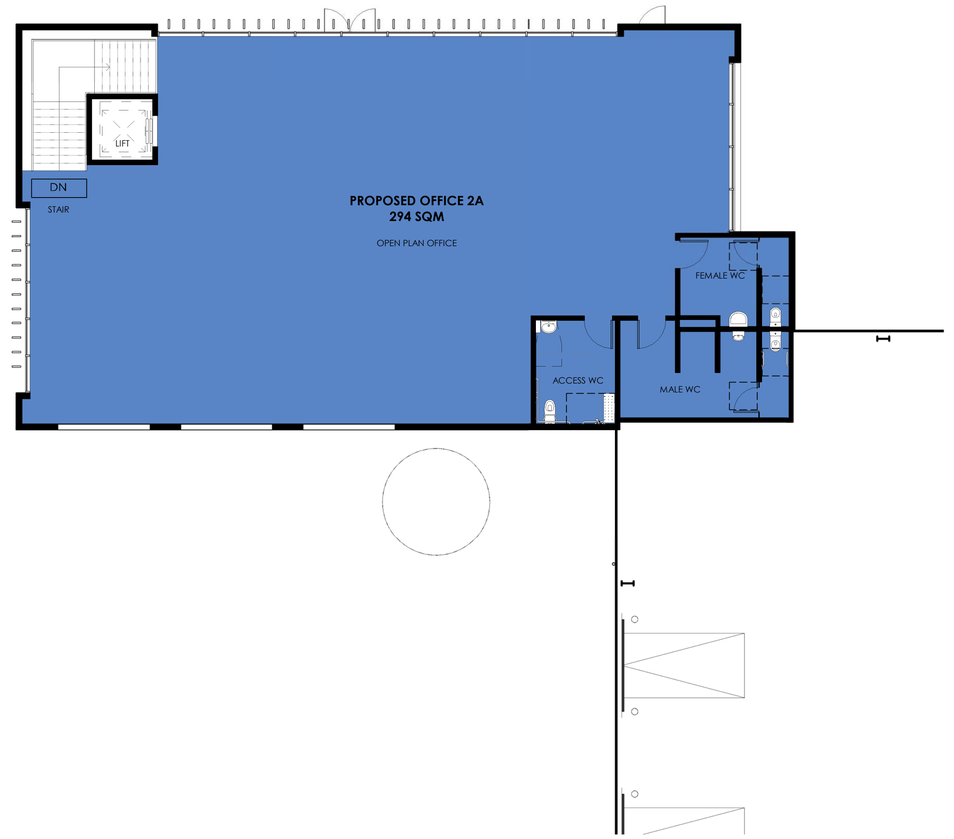
Project Number
CH 149AI DA

Drawing Number
DA2-300

Status
DEVELOPMENT APPLICATION ONLY



1 **OF2a - GROUND LEVEL**
1 : 100



2 **OF2a - LEVEL 1**
1 : 100

LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
- STORM WATER PIT, OSD TANK TO CIVIL ENGS DETAIL
- S — PYLON SIGNAGE
- CONCRETE COLUMN AS PER ENG. DETAILS
- B — BUS STOP
- GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)
- SUB - STATION

1:100 @A1 0 1 2 4 8m

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	Amendments	date
P1	ISSUED FOR MARKETING COLLATERAL	27/07/2022
P2	ISSUED FOR CONSULTANTS	29/07/2022
P3	ISSUED FOR CLIENT CONSIDERATION	12/08/2022
P4	ISSUED FOR INFORMATION	21/09/2022
P5	ISSUED FOR REVIEW	14/10/2022
P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant
TACTICAL GROUP

Client
CHARTER HALL
Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

Drawing Title
WAREHOUSE 2A - OFFICE PLANS

Project Number
CH 149AI DA

Drawing Number
DA3-110

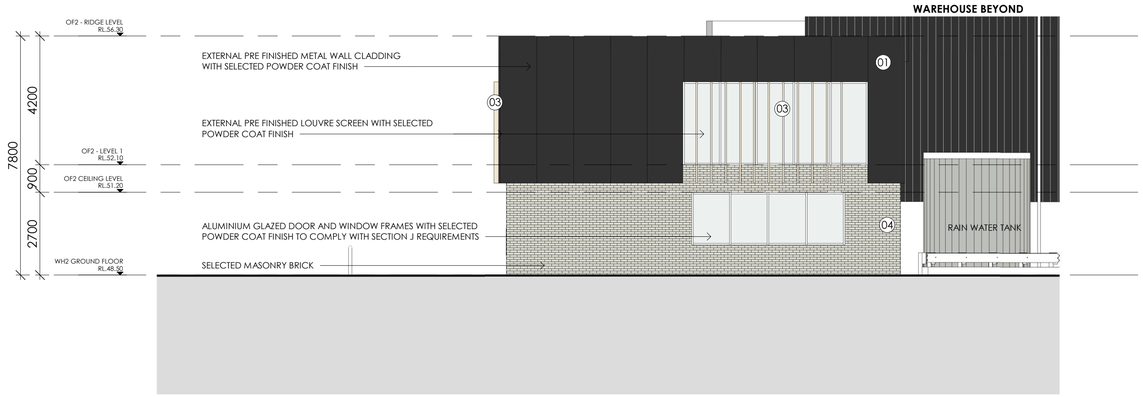
Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

N

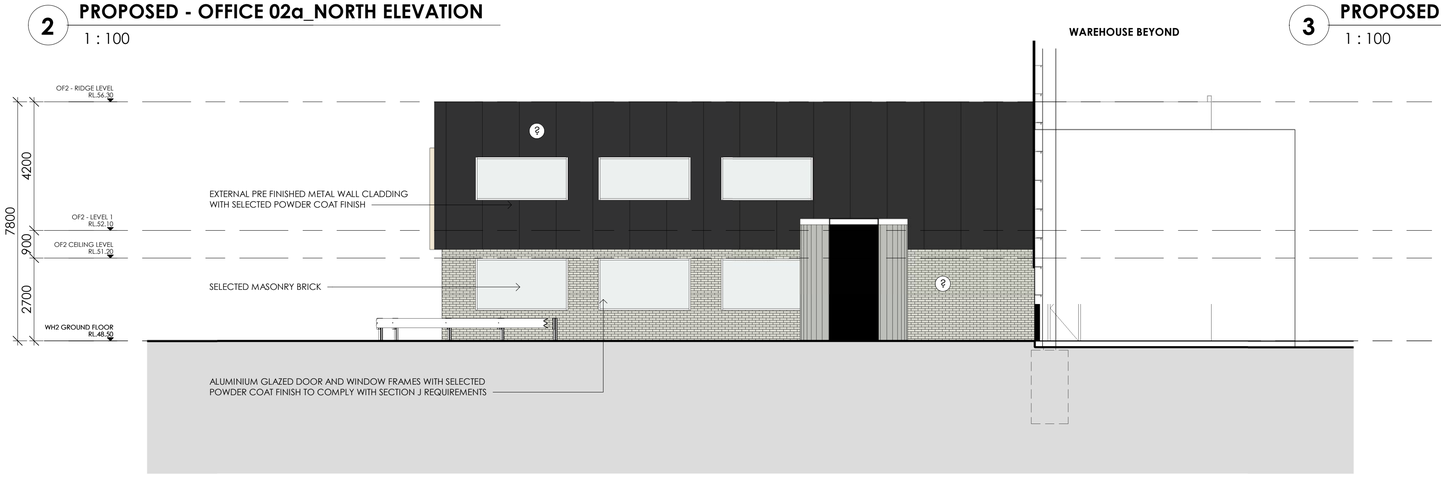
1 PROPOSED - OFFICE 02a_EAST ELEVATION

1 : 100



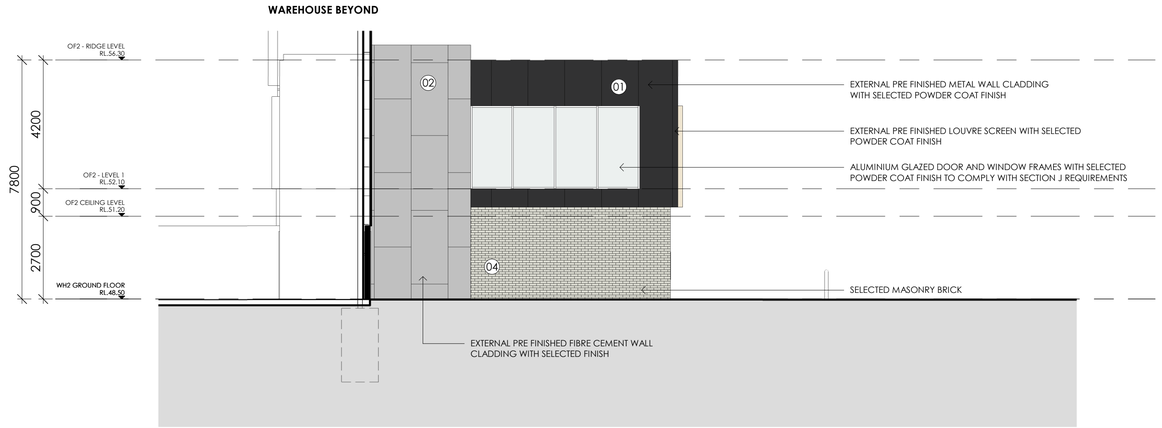
2 PROPOSED - OFFICE 02a_NORTH ELEVATION

1 : 100



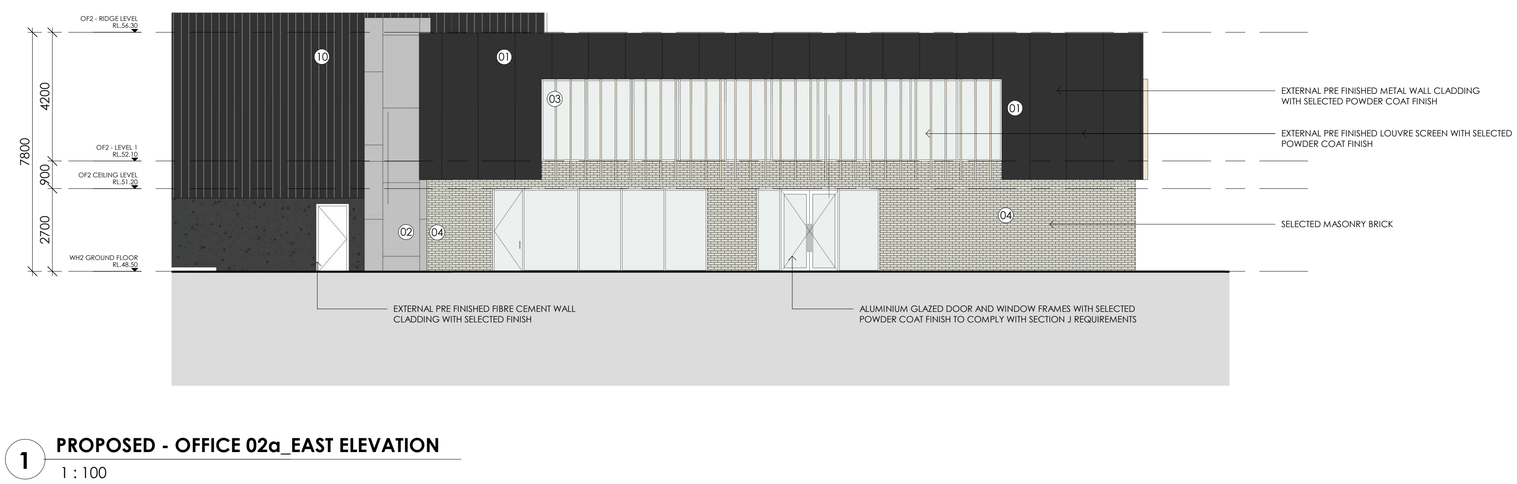
3 PROPOSED - OFFICE 02a_SOUTH ELEVATION

1 : 100



4 PROPOSED - OFFICE 02a_WEST ELEVATION

1 : 100



FINISH SCHEDULE

01	MONDOCLAD METAL WALL CLADDING 'DARK GREY METALIC' TO MATCH OR SIMILAR
02	CEMINTEL PRE-FINISHED FIBRE CEMENT 'BARESTONE' TO MATCH OR SIMILAR
03	KNOTWOOD ALUMINIUM LOUVRE SCREEN 'WHITE ASH' TO MATCH OR SIMILAR
04	AUSTRAL FACE BRICK WALL "QUARTZ" TO MATCH OR SIMILAR

1:100 @A1

0 1 2 4 8m

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P6	ISSUED FOR COORDINATION	21/10/2022

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Managing Consultant

TACTICAL GROUP

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CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn Author
Checked Checker
Approved Approver
Scale As indicated
Date 21/10/2022
Date 21/10/2022

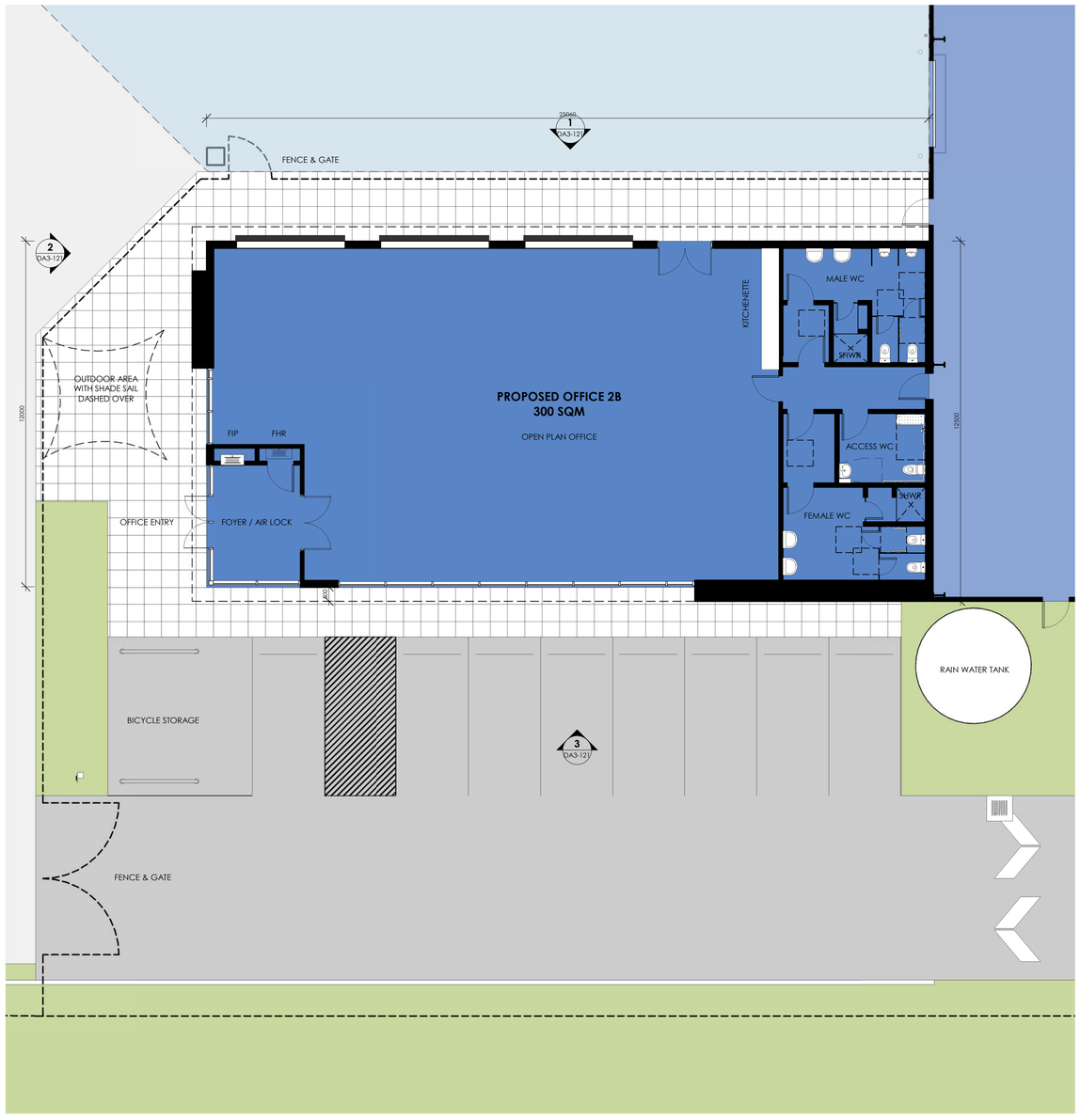
Drawing Title
WAREHOUSE 2A - OFFICE ELEVATIONS

Rev
P6

Project Number
CH 149AI DA

Drawing Number
DA3-111

Status
DEVELOPMENT APPLICATION ONLY



LEGEND

- BOUNDARY LINE
- LANDSCAPE SET-BACK
- BUILDING SET-BACK
- RETAINING WALL
- FENCE LINE
- STORM WATER PIT, OSD TANK TO CIVIL ENGS DETAIL
- S — PYLON SIGNAGE
- CONCRETE COLUMN AS PER ENG. DETAILS
- B — BUS STOP
- GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)
- SUB - STATION

1 OF2b - GROUND LEVEL

1 : 100

1:100 @A1

0 1 2 4 8m

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P6	ISSUED FOR COORDINATION	21/10/2022

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TACTICAL GROUP

Client
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149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

Drawing Title
WAREHOUSE 2B - OFFICE PLANS

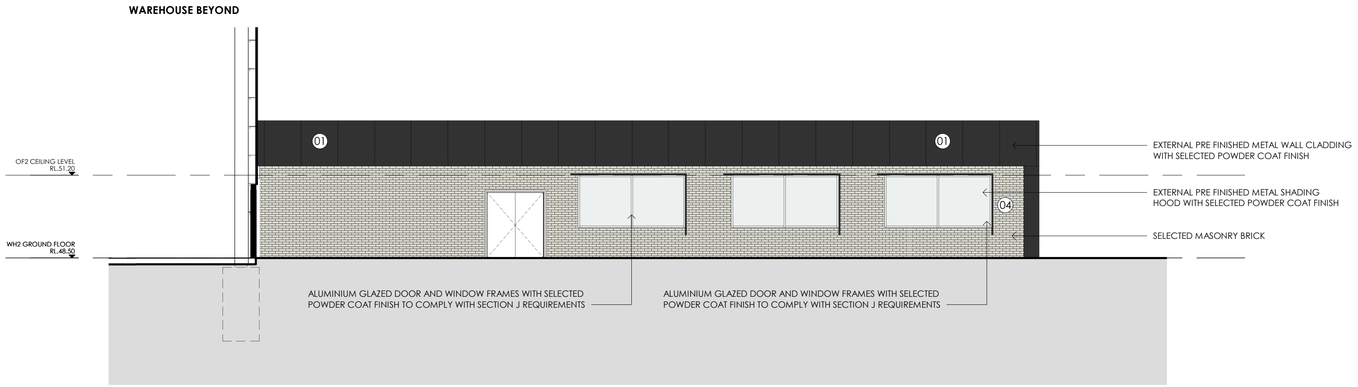
Project Number
CH 149AI DA

Drawing Number
DA3-120

Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

N

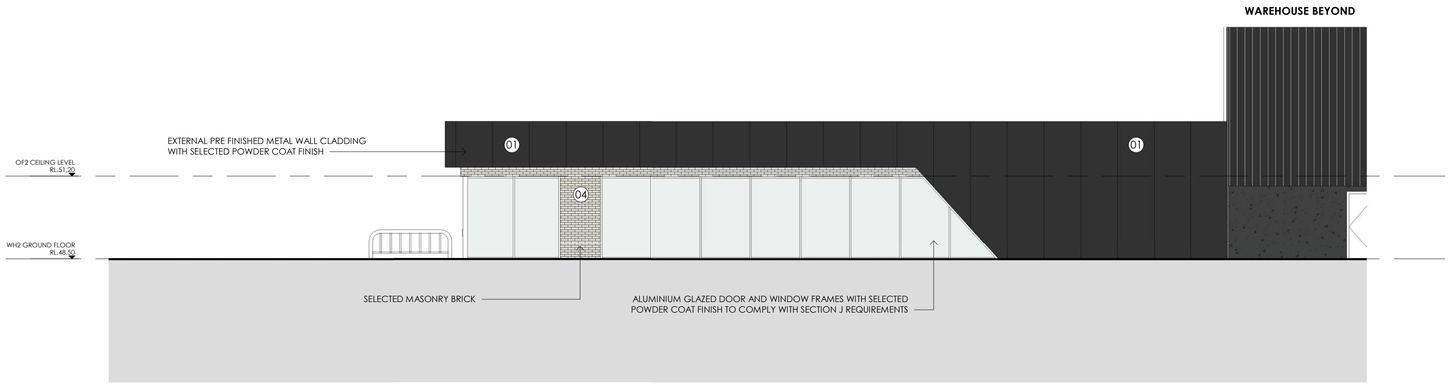


1 PROPOSED - OFFICE 02b_EAST ELEVATION

1 : 100

2 PROPOSED - OFFICE 02b_NORTH ELEVATION

1 : 100



3 PROPOSED - OFFICE 02b_WEST ELEVATION

1 : 100

FINISH SCHEDULE

01	MONDOCLAD METAL WALL CLADDING 'DARK GREY METALIC' TO MATCH OR SIMILAR
02	CEMINTEL PRE-FINISHED FIBRE CEMENT 'BARESTONE' TO MATCH OR SIMILAR
03	KNOTWOOD ALUMINIUM LOUVRE SCREEN 'WHITE ASH' TO MATCH OR SIMILAR
04	AUSTRAL FACE BRICK WALL "QUARTZ" TO MATCH OR SIMILAR

1:100 @A1

0 1 2 4 8m

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P6	ISSUED FOR COORDINATION	21/10/2022

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TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO
Checked EC
Approved PM
Scale As indicated
Date 21/10/2022
Date 21/10/2022

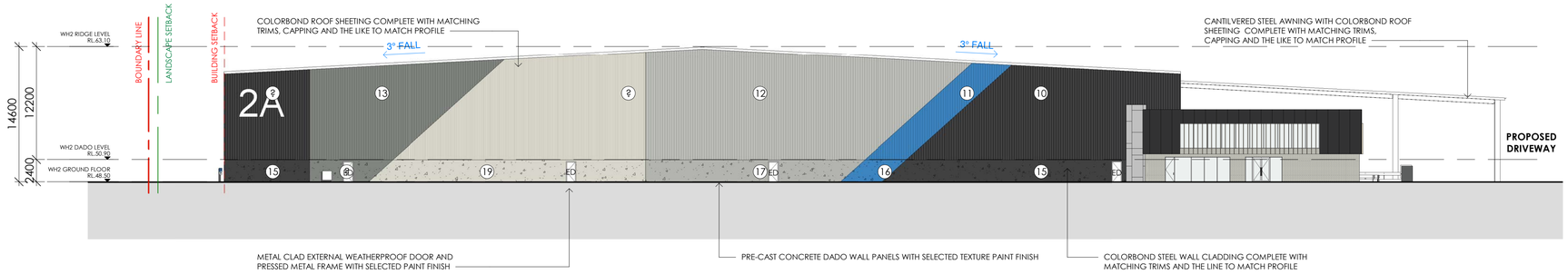
Drawing Title
WAREHOUSE 2B - OFFICE ELEVATIONS

Rev
P6

Project Number
CH 149AI DA

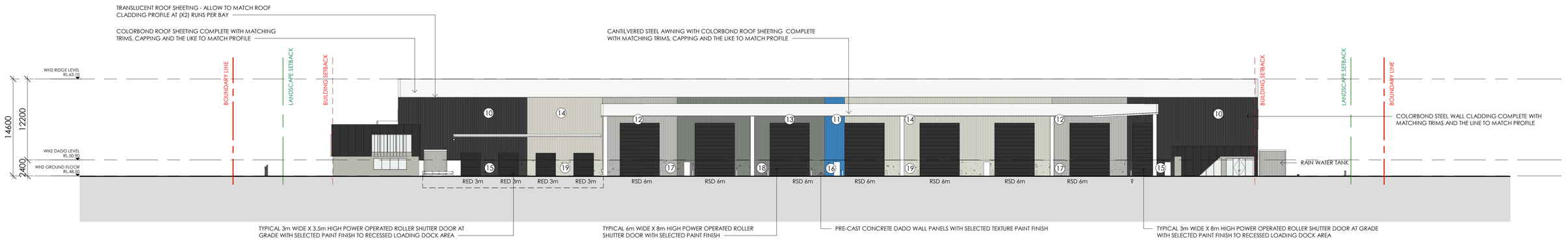
Drawing Number
DA3-121

Status
DEVELOPMENT APPLICATION ONLY



1 PROPOSED - WAREHOUSE 02_EAST ELEVATION

1 : 300



2 PROPOSED - WAREHOUSE 02_NORTH ELEVATION

1 : 300

FINISH SCHEDULE

10	COLORBOND METAL WALL CLADDING - VERTICAL 'MONUMENT' TO MATCH OR SIMILAR
11	COLORBOND METAL WALL CLADDING - VERTICAL 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
12	COLORBOND METAL WALL CLADDING - VERTICAL 'SHALE GREY' TO MATCH OR SIMILAR
13	COLORBOND METAL WALL CLADDING - VERTICAL 'WINDSPRAY' TO MATCH OR SIMILAR
14	COLORBOND METAL WALL CLADDING - VERTICAL 'SURFMIST' TO MATCH OR SIMILAR
15	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'MONUMENT' TO MATCH OR SIMILAR
16	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
17	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SHALE GREY' TO MATCH OR SIMILAR
18	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'WINDSPRAY' TO MATCH OR SIMILAR
19	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SURFMIST' TO MATCH OR SIMILAR

1:300 @A1

0 3 6 12 24m

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P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
As indicated	21/10/2022	21/10/2022

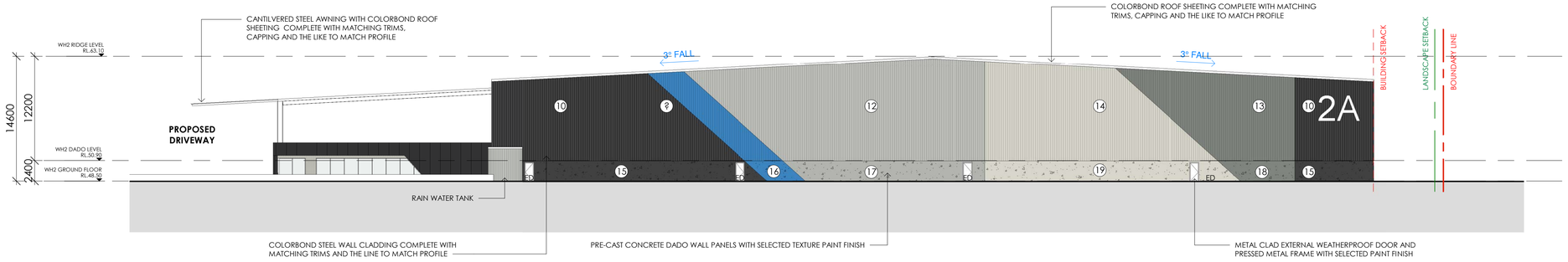
Drawing Title
WAREHOUSE 2 - ELEVATIONS

Project Number
CH 149AI DA

Drawing Number
DA3-200

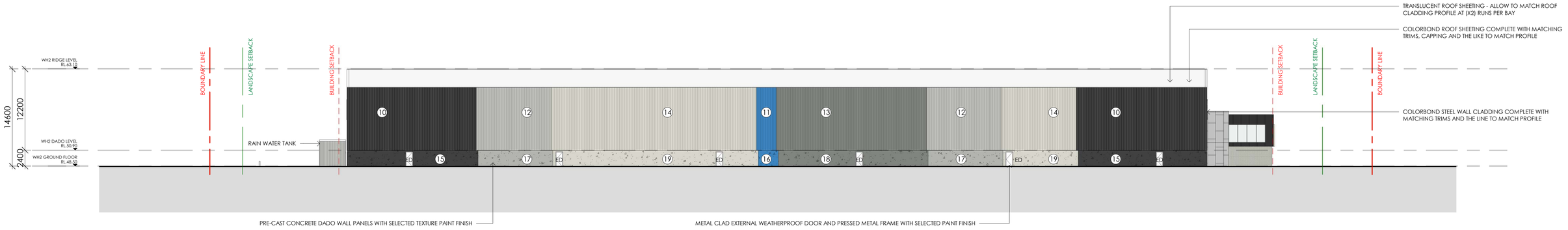
Rev
P6

Status
DEVELOPMENT APPLICATION ONLY



3 PROPOSED - WAREHOUSE 02_WEST ELEVATION

1 : 300



4 PROPOSED - WAREHOUSE 02_SOUTH ELEVATION

1 : 300

FINISH SCHEDULE

10	COLORBOND METAL WALL CLADDING - VERTICAL 'MONUMENT' TO MATCH OR SIMILAR
11	COLORBOND METAL WALL CLADDING - VERTICAL 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
12	COLORBOND METAL WALL CLADDING - VERTICAL 'SHALE GREY' TO MATCH OR SIMILAR
13	COLORBOND METAL WALL CLADDING - VERTICAL 'WINDSPRAY' TO MATCH OR SIMILAR
14	COLORBOND METAL WALL CLADDING - VERTICAL 'SURFMIST' TO MATCH OR SIMILAR
15	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'MONUMENT' TO MATCH OR SIMILAR
16	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'CHARTER HALL BLUE' TO MATCH OR SIMILAR
17	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SHALE GREY' TO MATCH OR SIMILAR
18	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'WINDSPRAY' TO MATCH OR SIMILAR
19	PRECAST CONCRETE WALL PANELS - PAINT FINISH 'SURFMIST' TO MATCH OR SIMILAR

1:300 @A1

0 3 6 12 24m

Architect

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P6	ISSUED FOR COORDINATION	21/10/2022

Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO
Checked EC
Approved PM
Scale As indicated
Date 21/10/2022
Date 21/10/2022

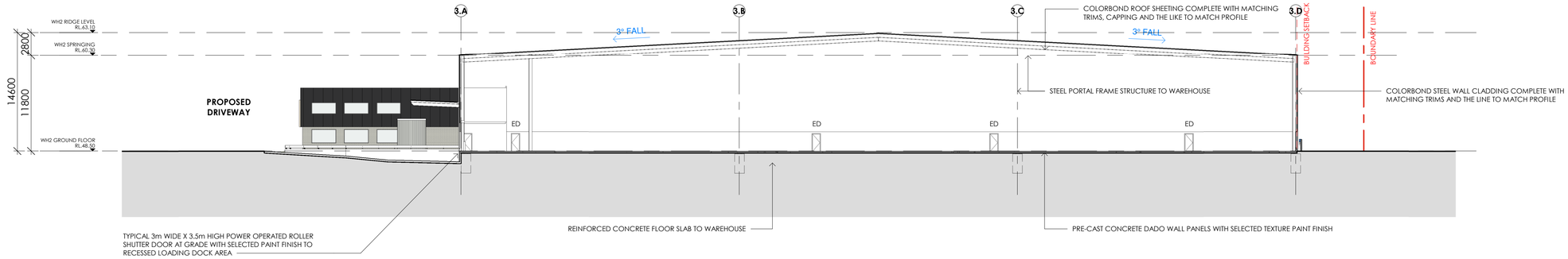
Drawing Title
WAREHOUSE 2 - ELEVATIONS

Project Number
CH 149AI DA

Drawing Number
DA3-201

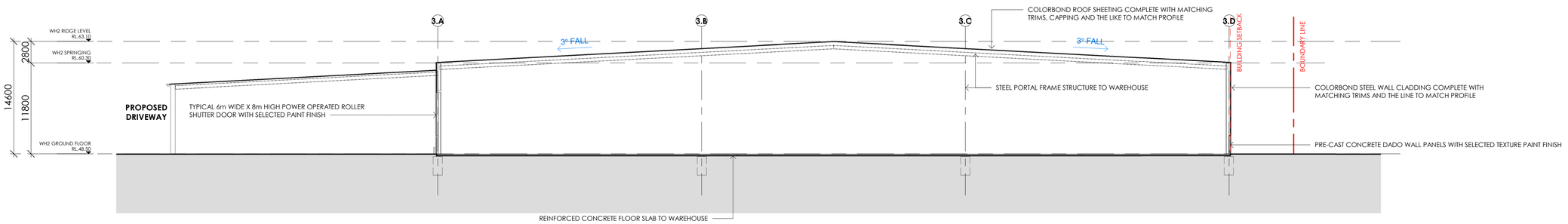
Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

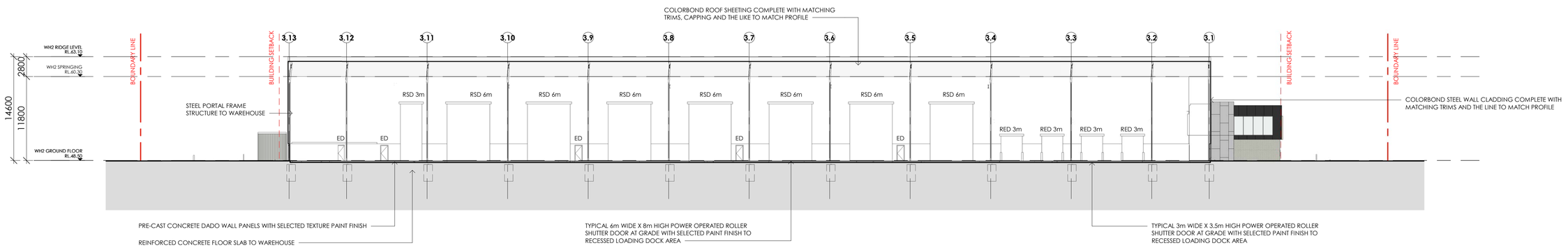


1 PROPOSED - WAREHOUSE 02_SECTION A

1 : 300



2 PROPOSED - WAREHOUSE 02_SECTION B



3 PROPOSED - WAREHOUSE 02_SECTION C

1 : 300

1:300 @A1

0 3 6 12 24m

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Managing Consultant

TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO
Checked EC
Approved PM
Scale 1 : 300
Date 21/10/2022
Date 21/10/2022

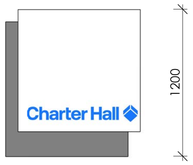
Drawing Title
WAREHOUSE 2 - SECTIONS

Project Number
CH 149AI DA

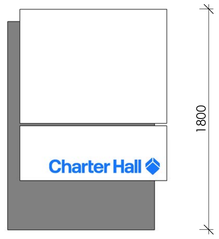
Drawing Number
DA3-300

Rev
P6

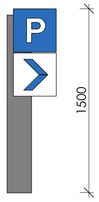
Status
DEVELOPMENT APPLICATION ONLY



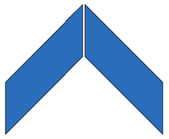
DIR 1 VEHICULAR DIRECTION TOTEM
1 : 25



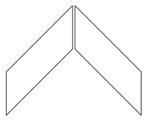
DIR 2 VEHICULAR DIRECTION TOTEM
1 : 25



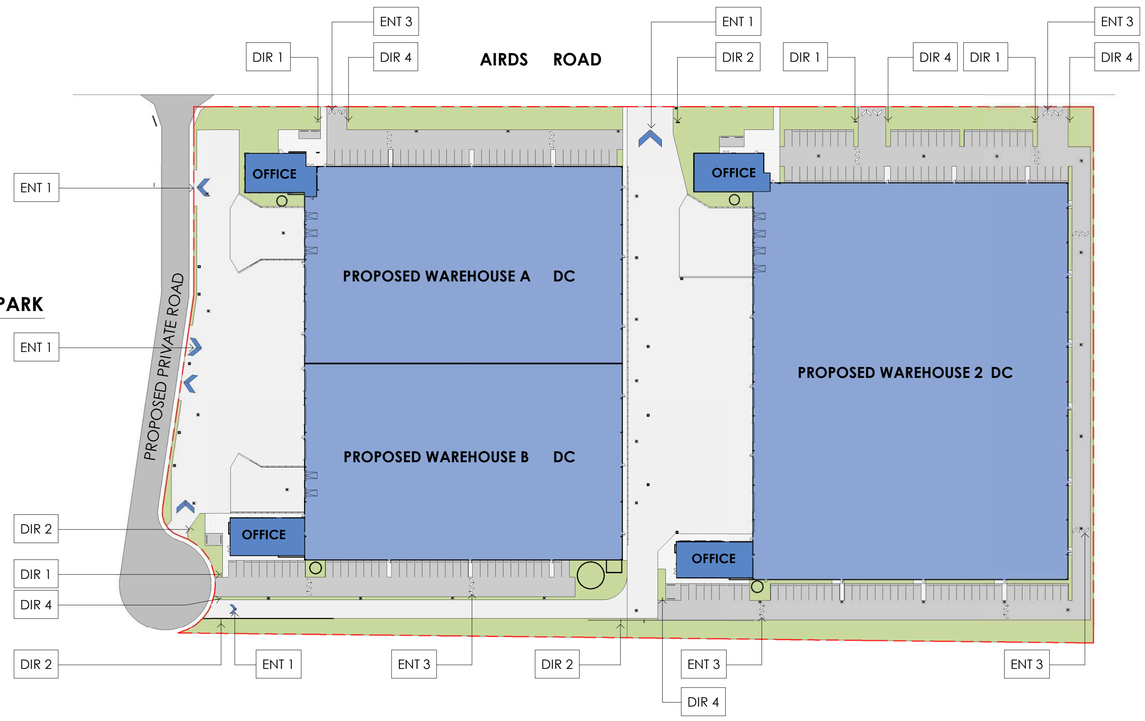
DIR 4 VEHICULAR DIRECTIONAL CARPARK
1 : 25



ENT 1 TRUCK DRIVEWAY MARKER
1 : 50



ENT 3 CAR DRIVEWAY MARKER
1 : 50



1 WH2 & 3 SIGNAGE PLAN
1 : 1000

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Managing Consultant
TACTICAL GROUP

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CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn	Checked	Approved
PO	EC	PM
Scale	Date	Date
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Drawing Title
SIGNAGE DETAIL

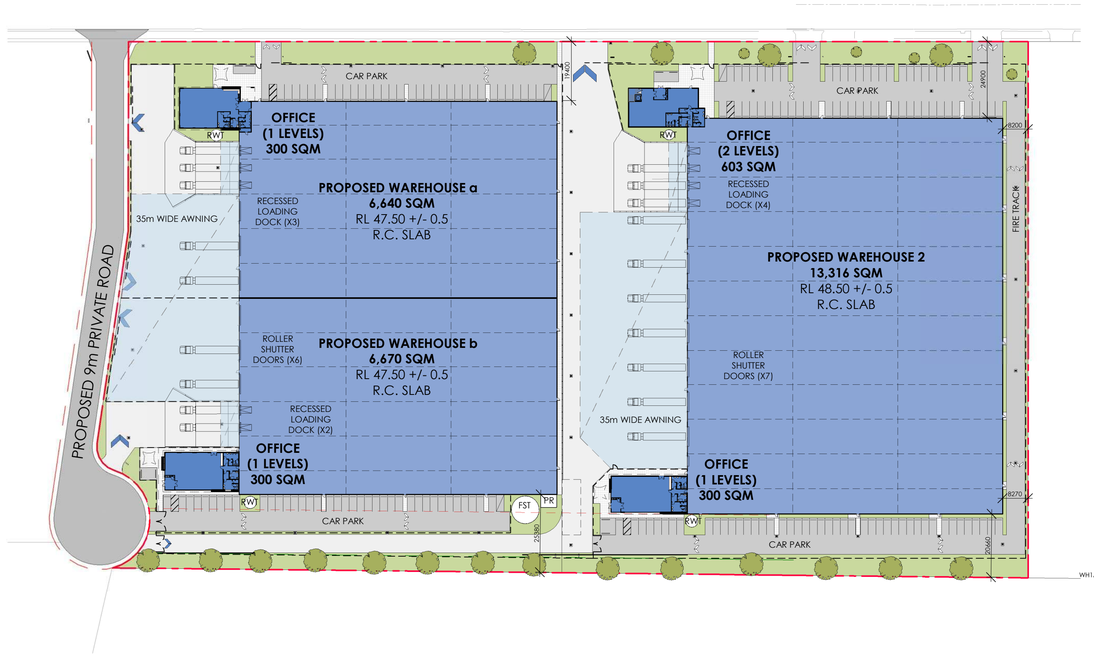
Project Number
CH 149AI DA

Drawing Number
DA3-700

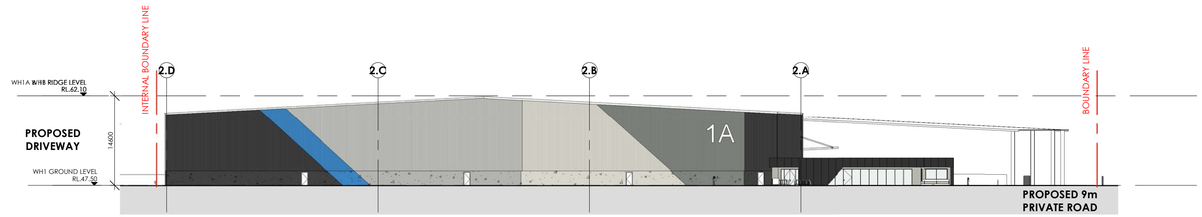
Rev
P6

Status
DEVELOPMENT APPLICATION ONLY

N

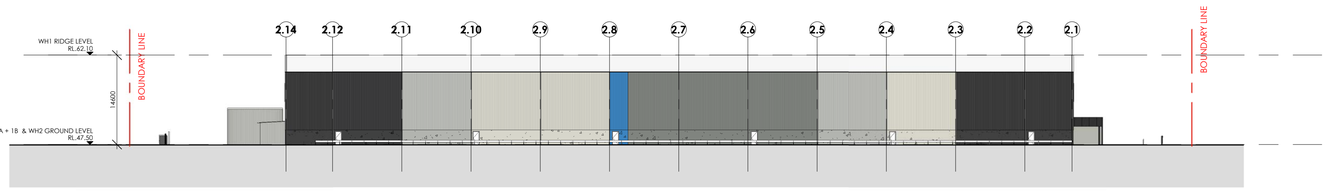


1 **OVERALL WH1 & 2 SITE PLAN NN**
1 : 1000

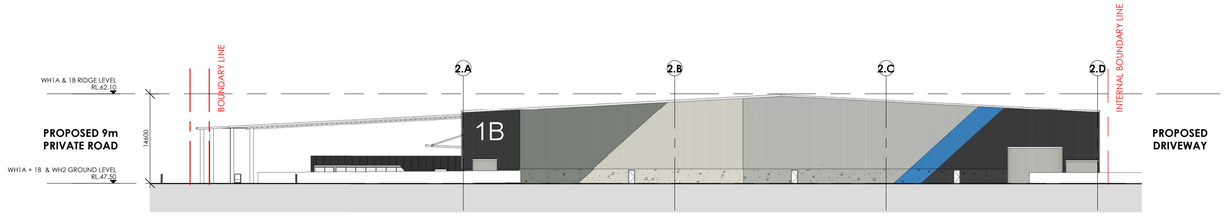


2 **PROPOSED - WAREHOUSE 01_EAST ELEVATION NN**
1 : 500

3 **PROPOSED - WAREHOUSE 01_NORTH ELEVATION NN**
1 : 500



4 **PROPOSED - WAREHOUSE 01_SOUTH ELEVATION NN**
1 : 500



5 **PROPOSED - WAREHOUSE 01_WEST ELEVATION NN**
1 : 500

[watch this SPACE design]

Architect

WATCH THIS SPACE DESIGN PTY LTD
STUDIO 9, LEVEL 3, 35 BUCKINGHAM STREET,
SURRY HILLS, NSW 2010
Email: info@watchthisspacedesign.com
www.watchthisspacedesign.com

	Amendments	date
P1	ISSUED FOR MARKETING COLLATERAL	27/07/2022
P2	ISSUED FOR CONSULTANTS	29/07/2022
P3	ISSUED FOR CLIENT CONSIDERATION	12/08/2022
P4	ISSUED FOR INFORMATION	21/09/2022
P5	ISSUED FOR REVIEW	14/10/2022
P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant
TACTICAL GROUP

Client
CHARTER HALL

Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn PO | Checked EC | Approved PM
Scale As indicated | Date 21/10/2022 | Date 21/10/2022

Drawing Title
NOTIFICATION PLAN

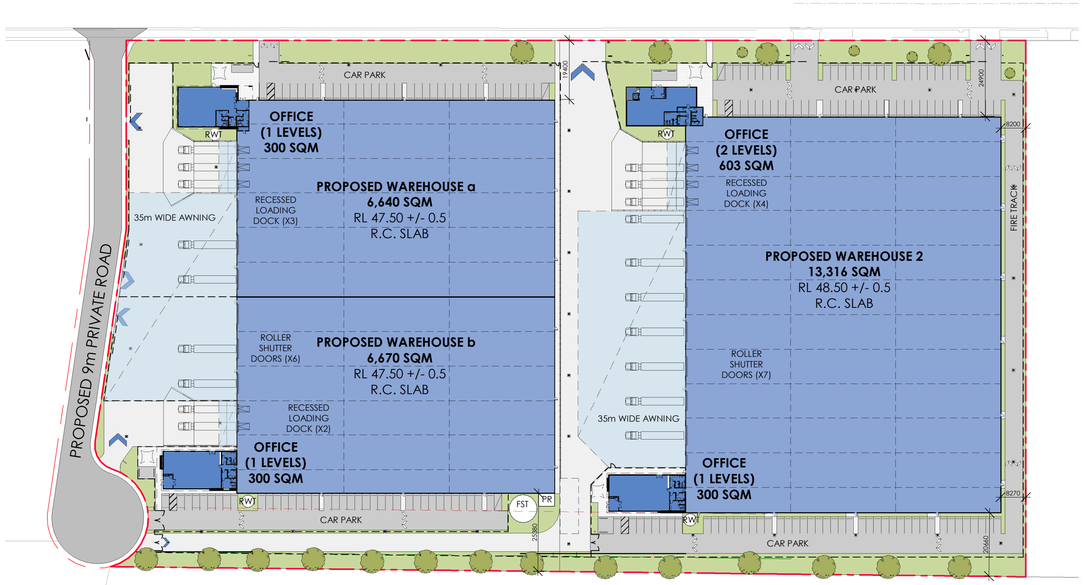
Project Number
CH 149AI DA

Drawing Number
DA3-900

Status
DEVELOPMENT APPLICATION ONLY

Rev
P6

N



5 OVERALL WH1 & 2 SITE PLAN NN.
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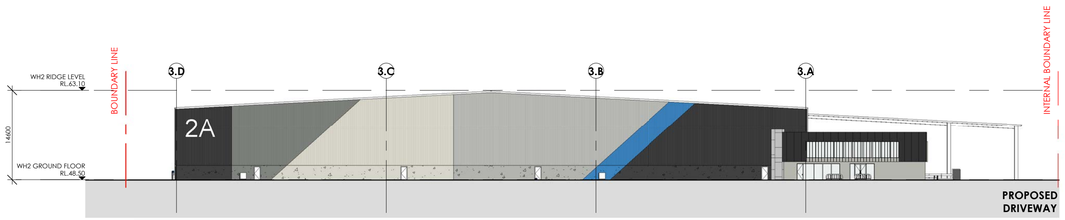
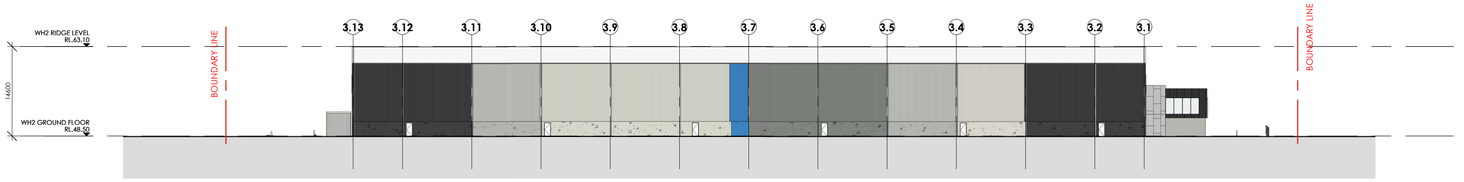


1 PROPOSED - WAREHOUSE 02_EAST ELEVATION NN
1 : 500

2 PROPOSED - WAREHOUSE 02_NORTH ELEVATION NN
1 : 500



3 PROPOSED - WAREHOUSE 02_SOUTH ELEVATION NN
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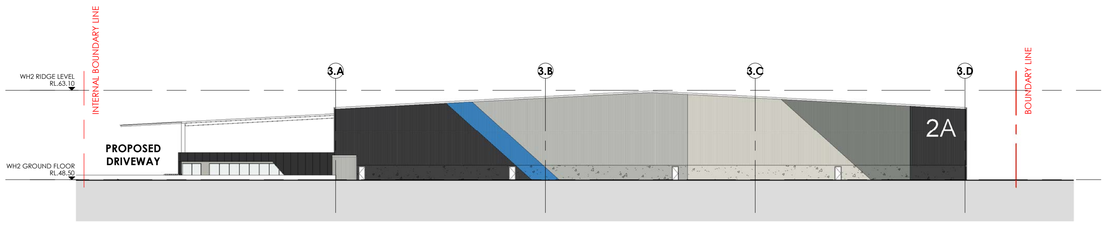

4 PROPOSED - WAREHOUSE 02_WEST ELEVATION NN
1 : 500

[watch this SPACE design]

Architect
WATCH THIS SPACE DESIGN PTY LTD
STUDIO 9, LEVEL 3, 35 BUCKINGHAM STREET,
SURRY HILLS, NSW 2010
Email: info@watchthisspacedesign.com
www.watchthisspacedesign.com

	Amendments	date
P1	ISSUED FOR MARKETING COLLATERAL	27/07/2022
P2	ISSUED FOR CONSULTANTS	29/07/2022
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P4	ISSUED FOR INFORMATION	21/09/2022
P5	ISSUED FOR REVIEW	14/10/2022
P6	ISSUED FOR COORDINATION	21/10/2022

Charter Hall

Managing Consultant
TACTICAL GROUP

Client
CHARTER HALL
Project
149-155 AIRDS ROAD,
MINTO, NSW, 2566

Drawn Author
Checked Checker
Approved Approver
Scale As indicated
Date 21/10/2022
Date 21/10/2022

Drawing Title
NOTIFICATION PLAN

Project Number
CH 149AI DA

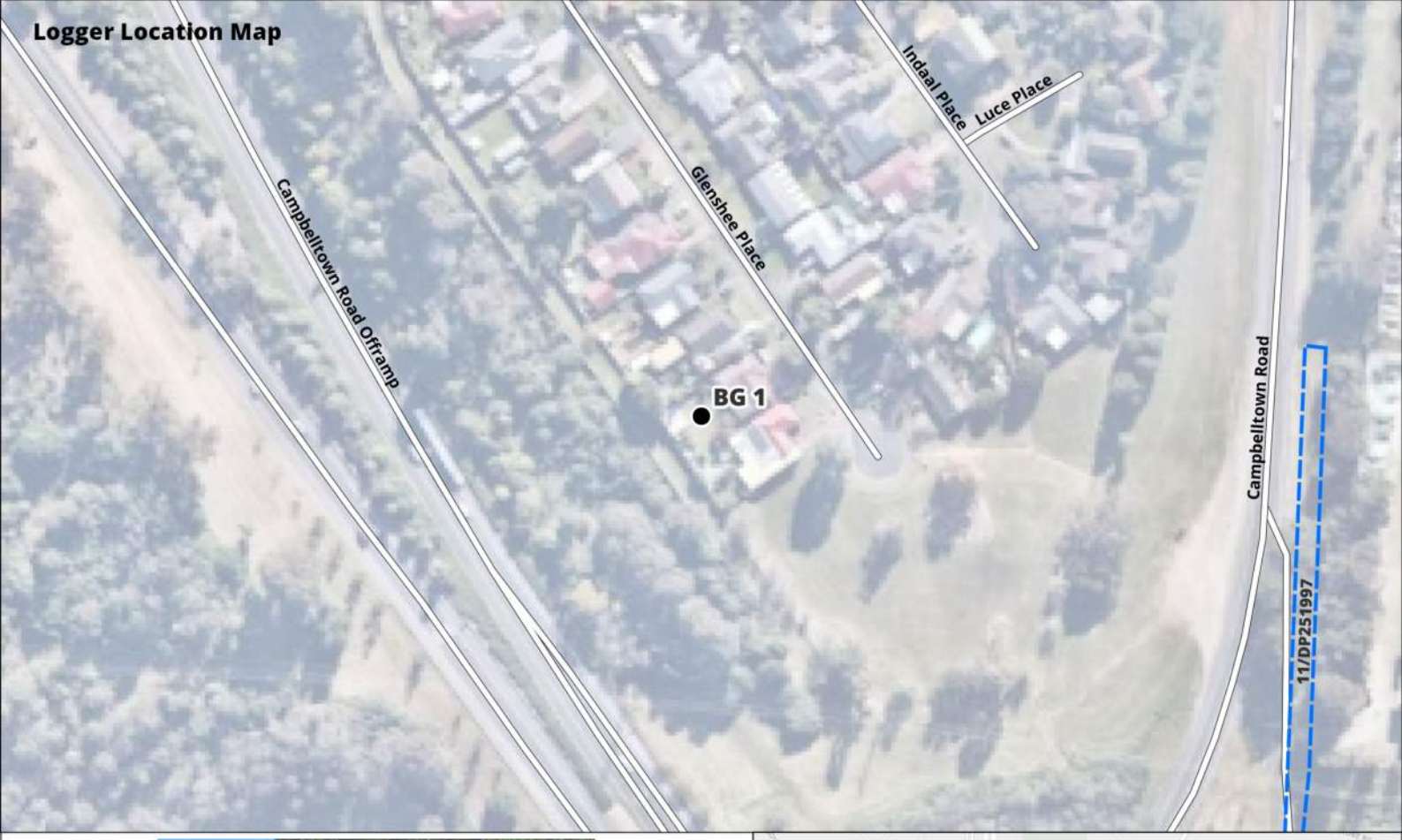
Drawing Number
DA3-901

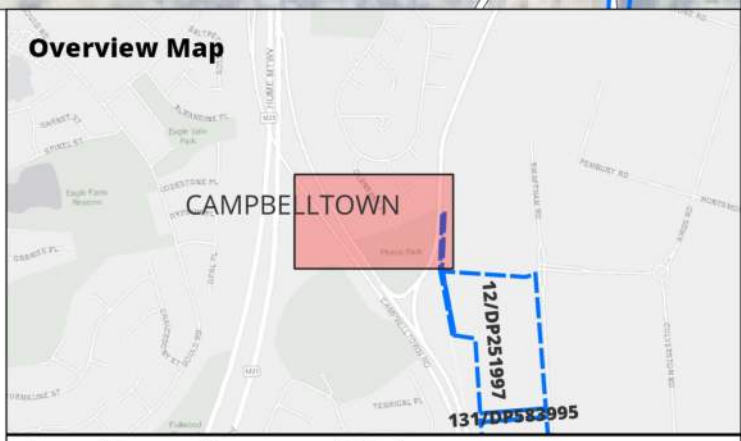
Status
DEVELOPMENT APPLICATION ONLY

Rev
P6

APPENDIX B

NOISE LOGGER DATA





Location reference: BG 1

Logger Model Name : ARL NGARA
Logger Serial No. : 878092
Start Date: 29/07/2022
Stop Date: 10/08/2022
Logger Position: Free Field
Address : 22 Glenshee Place, St Andrews

Legend

Roads
Lot boundary for site
Noise Loggers

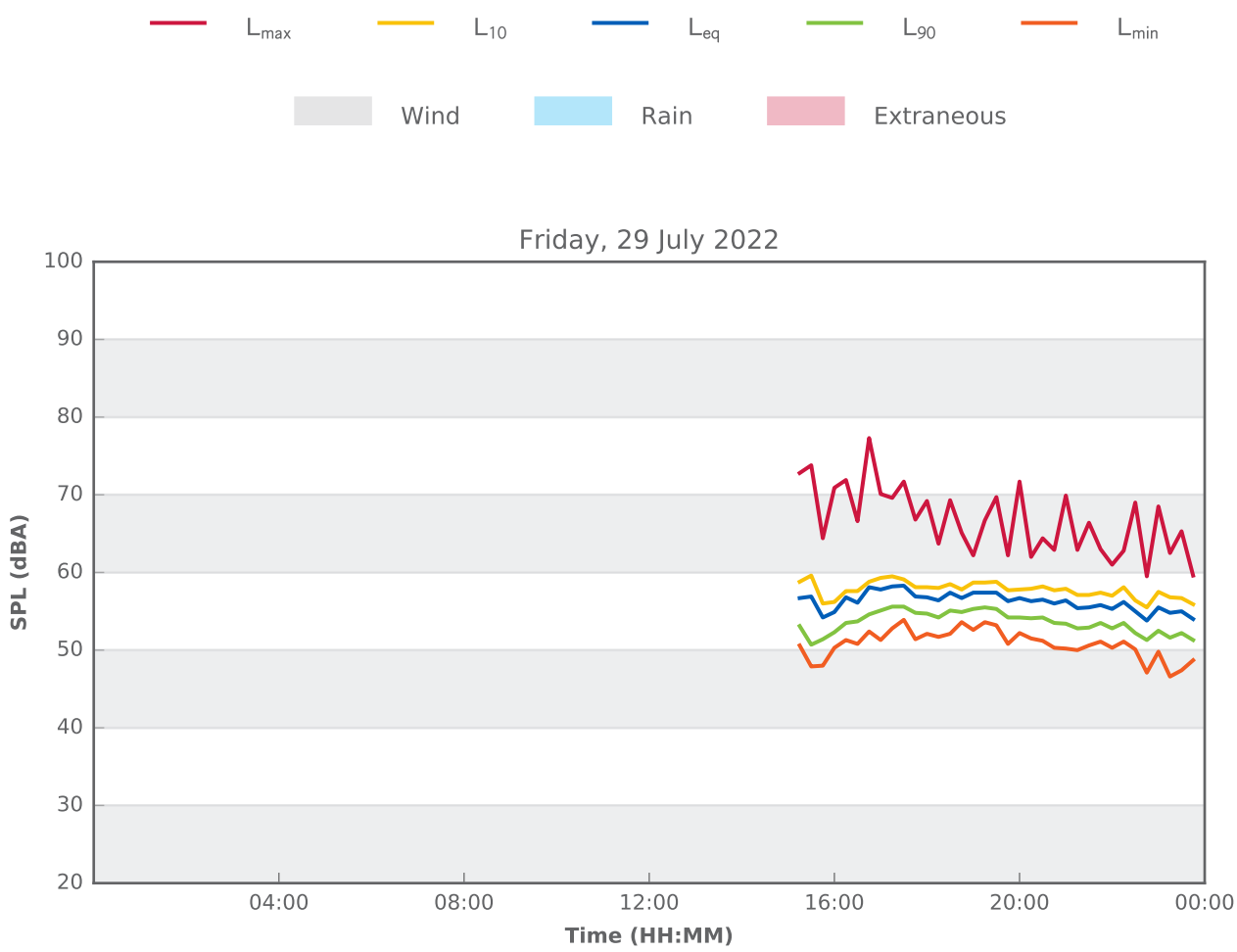
Sources:
1. Basemap: Six Maps NSW © 2022

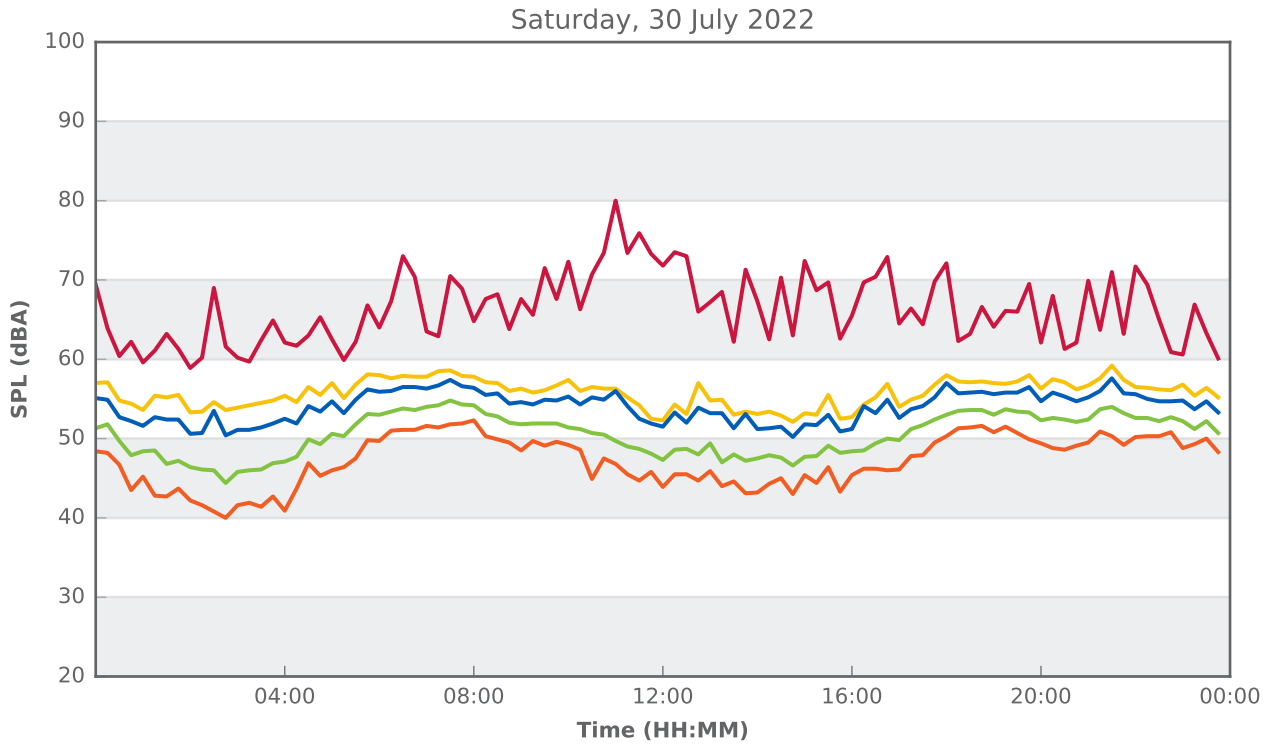
REDEVELOPMENT OF WAREHOUSE & DISTRIBUTION CENTRE
Noise monitoring locations

Scale for Logger Location Map
0 25 50 m
N
Map Projection: GDA2020 / MGA zone 56(EPSG:7856)

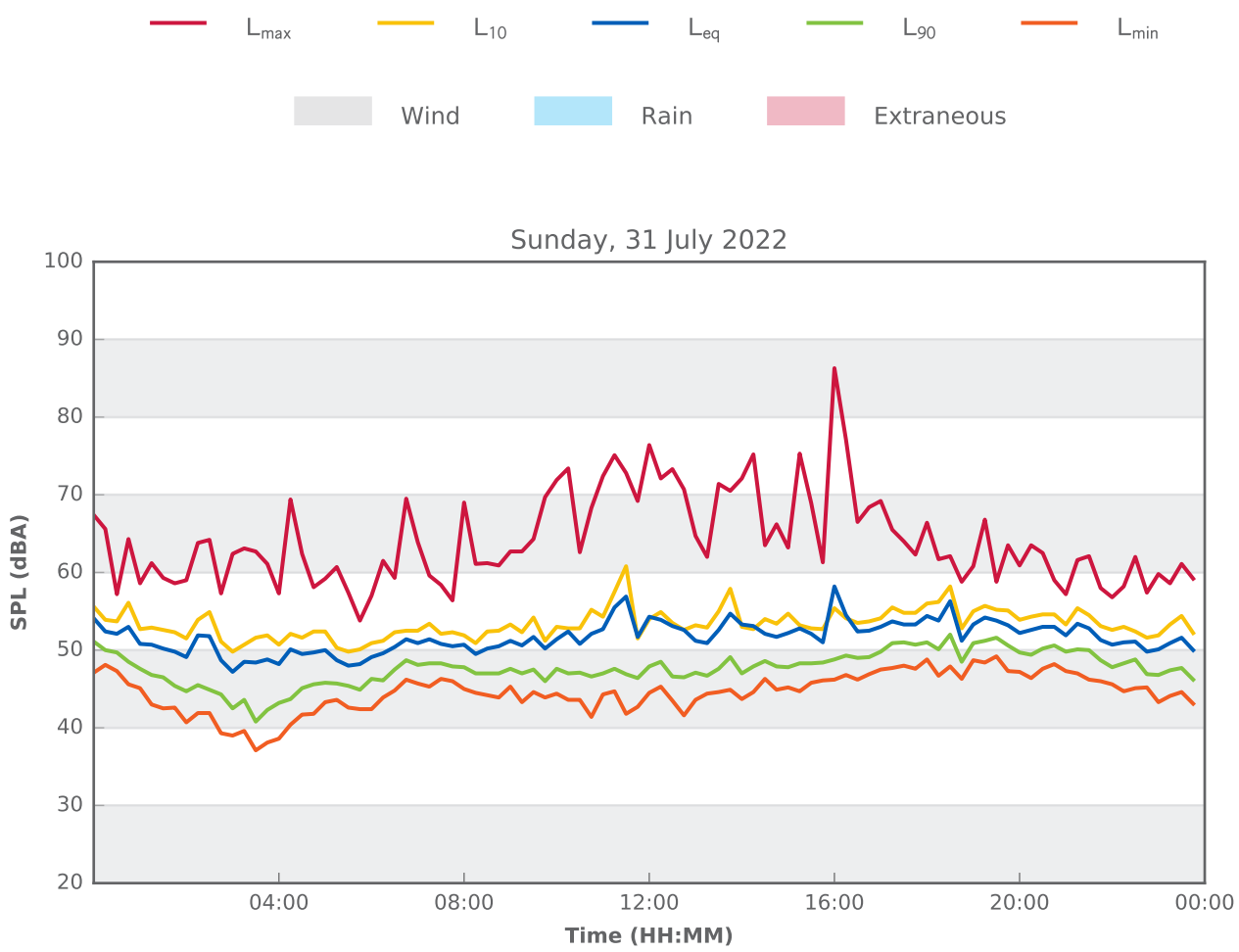
Project No: 2205167	Figure: B-1 of 3
Prepared by: APIN	Checked by: RL
Date Revised: 27 Sep 2022	

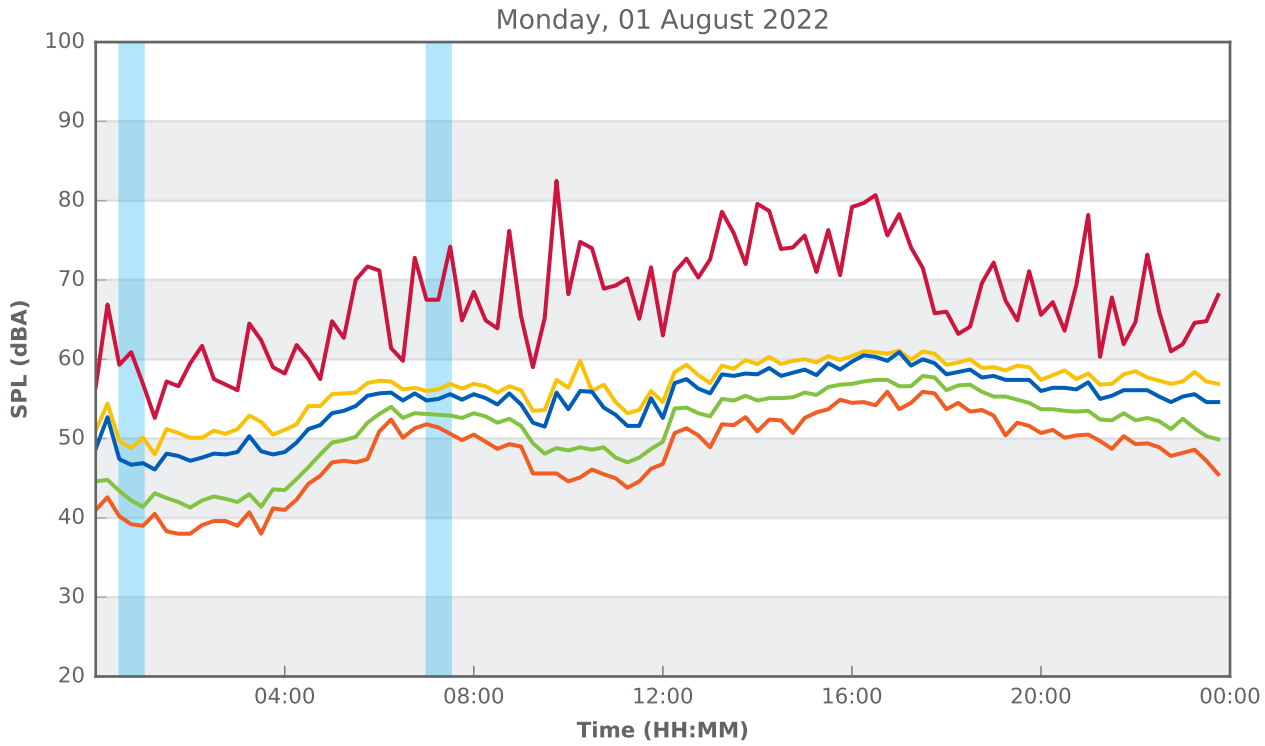
22 Glenshee Place, St Andrews



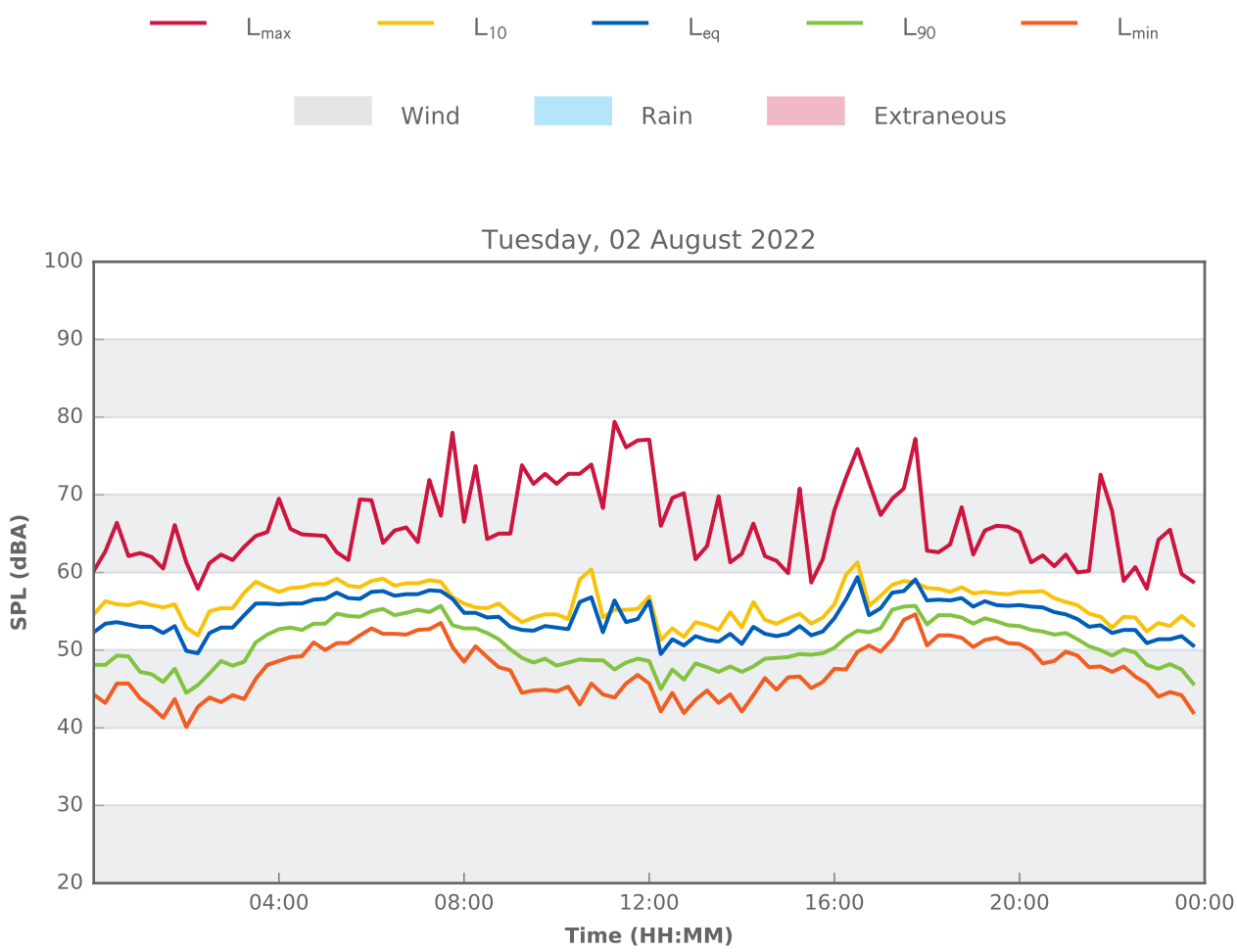


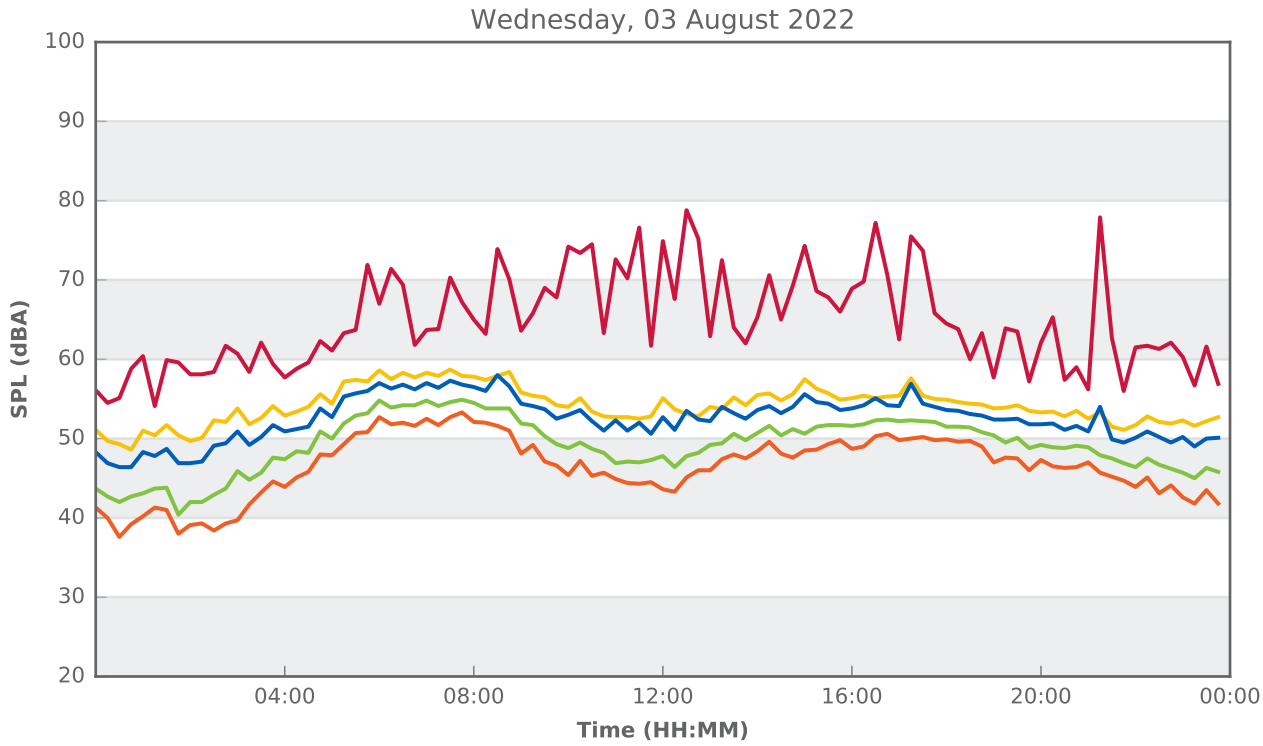
22 Glenshee Place, St Andrews



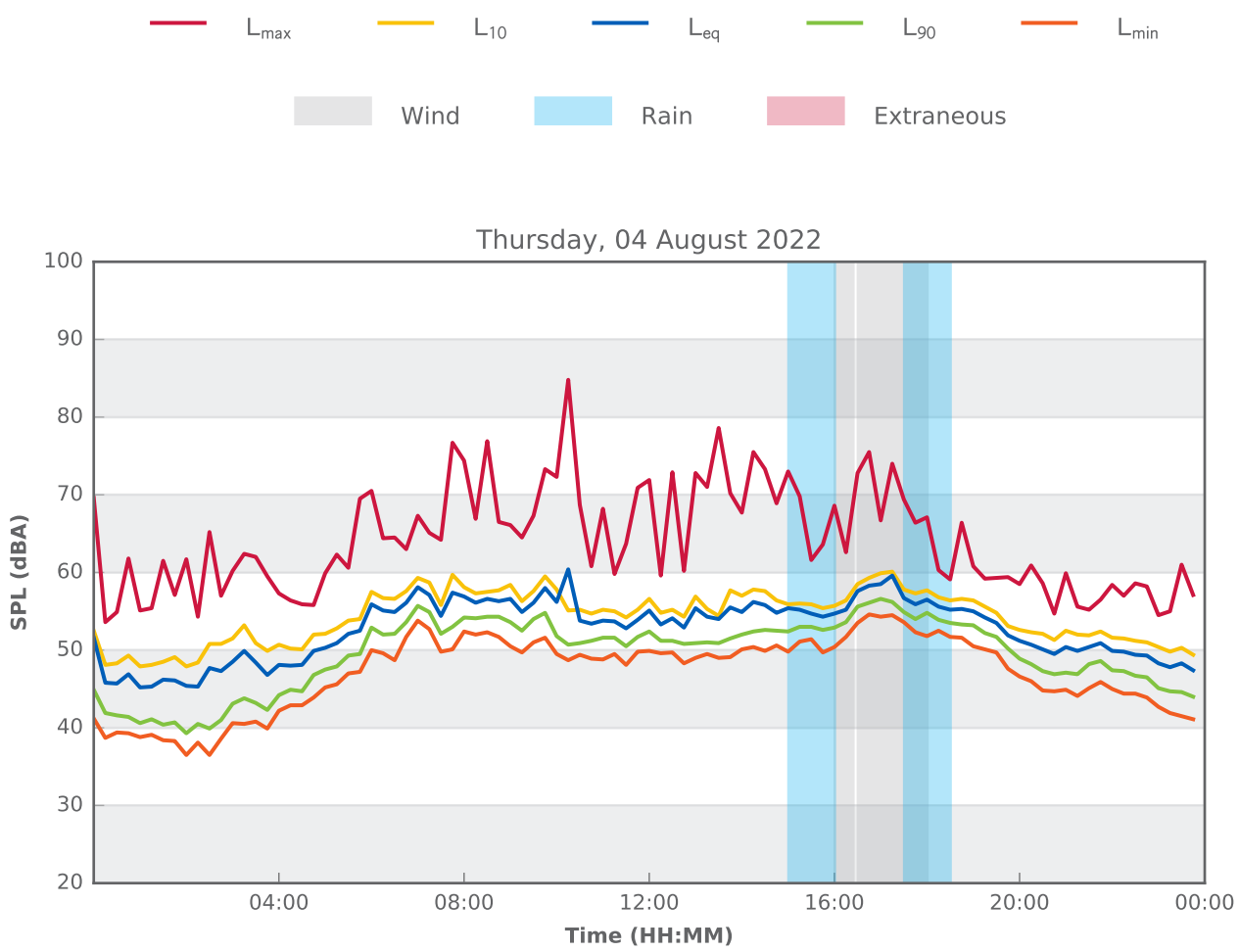


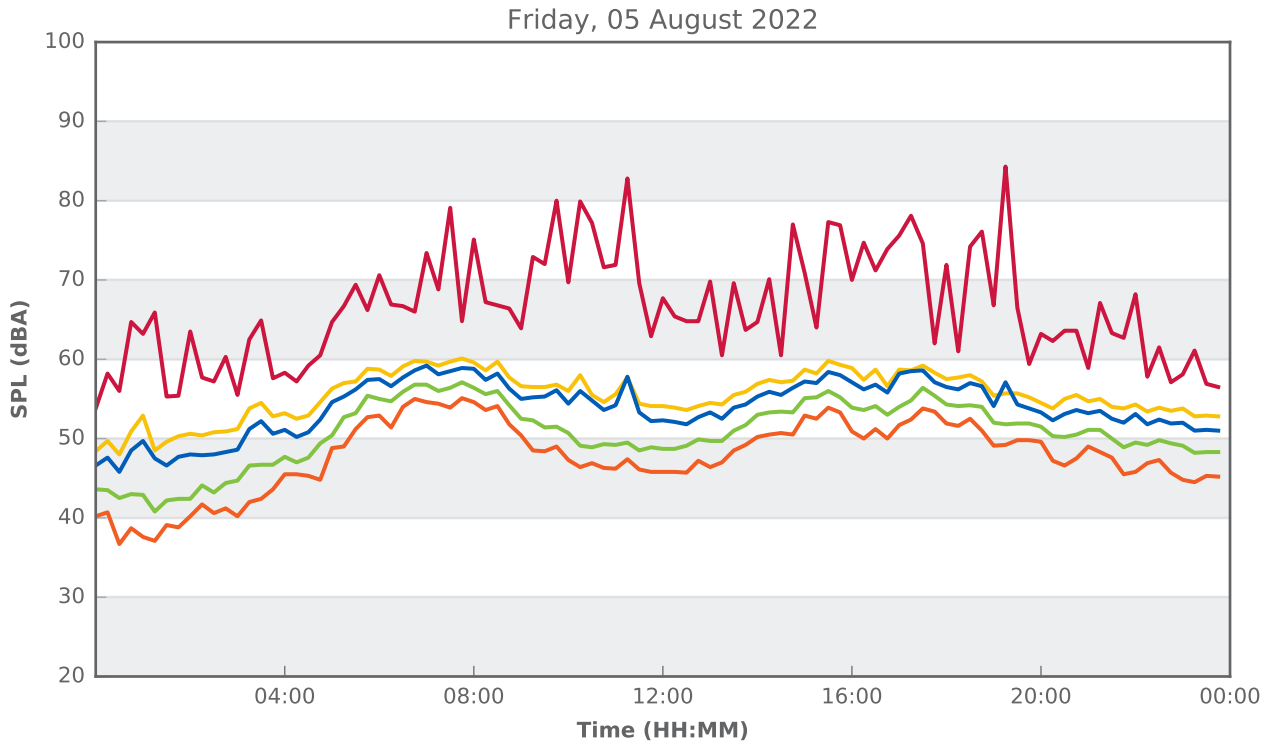
22 Glenshee Place, St Andrews



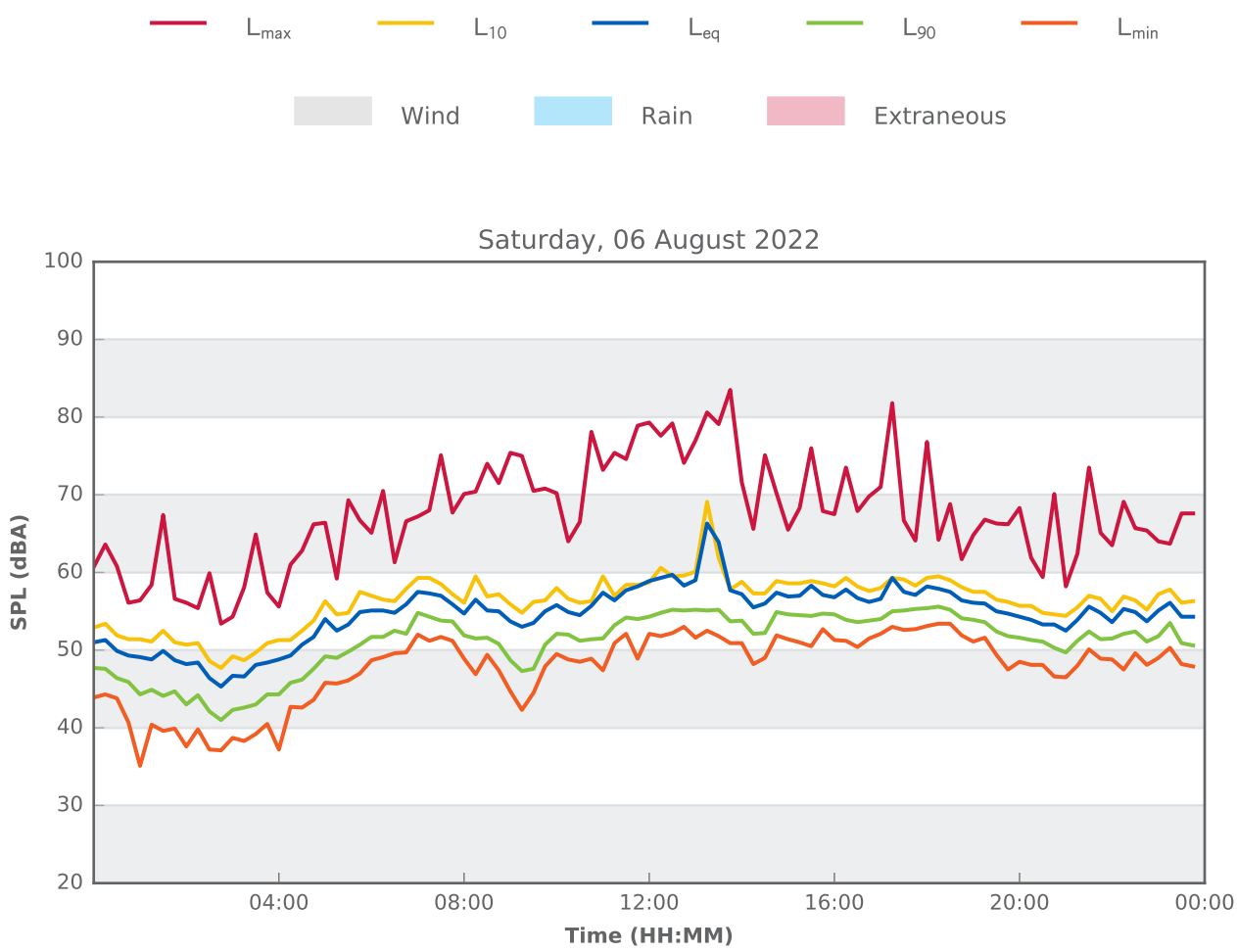


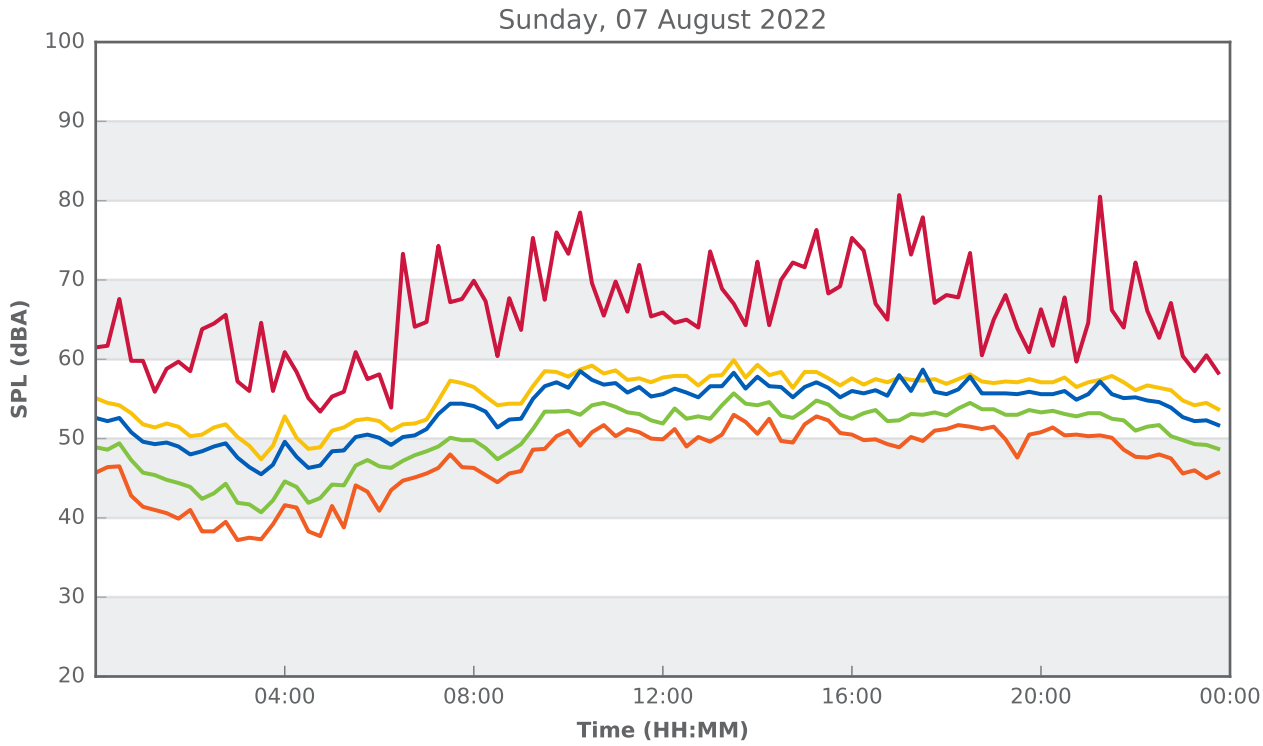
22 Glenshee Place, St Andrews





22 Glenshee Place, St Andrews





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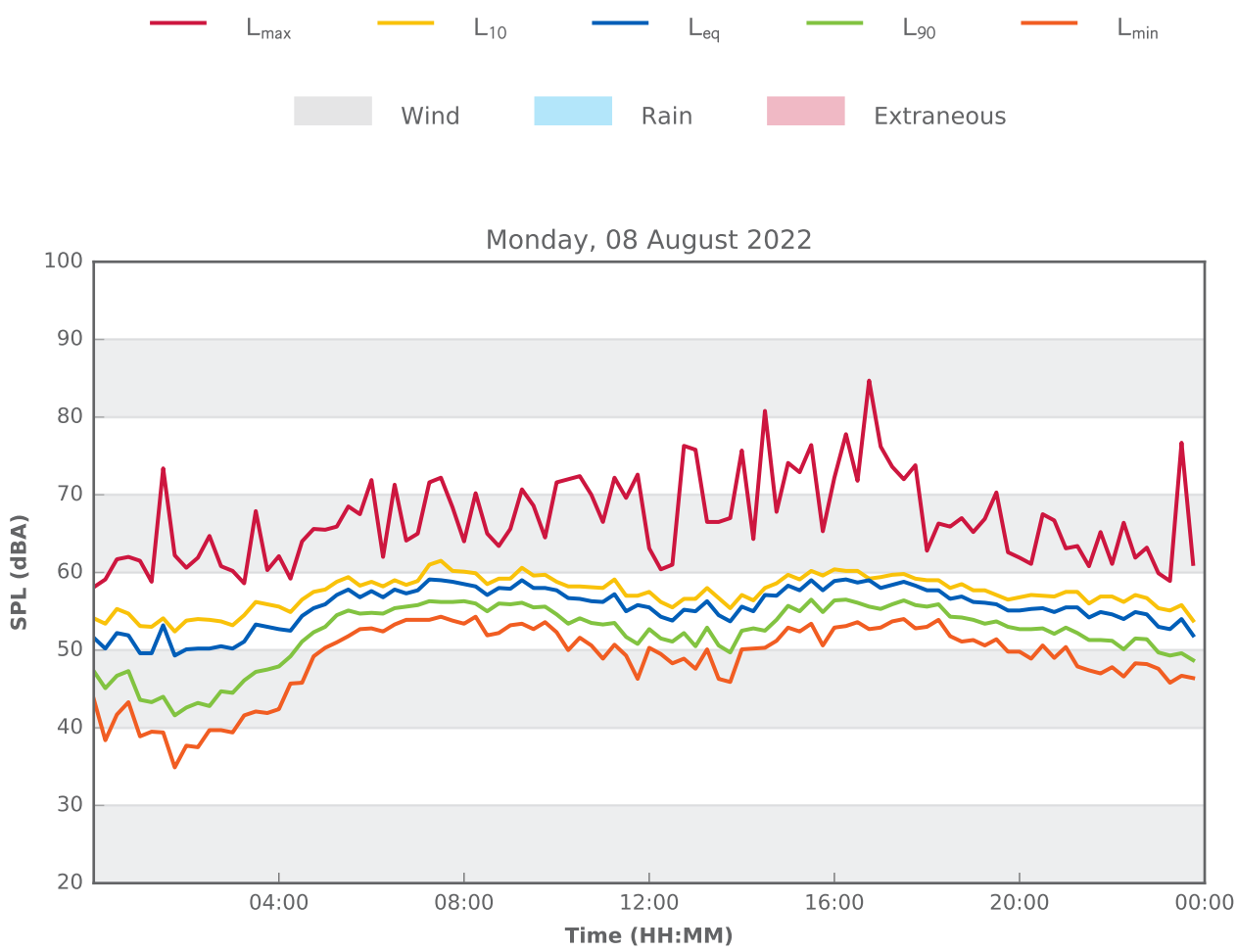
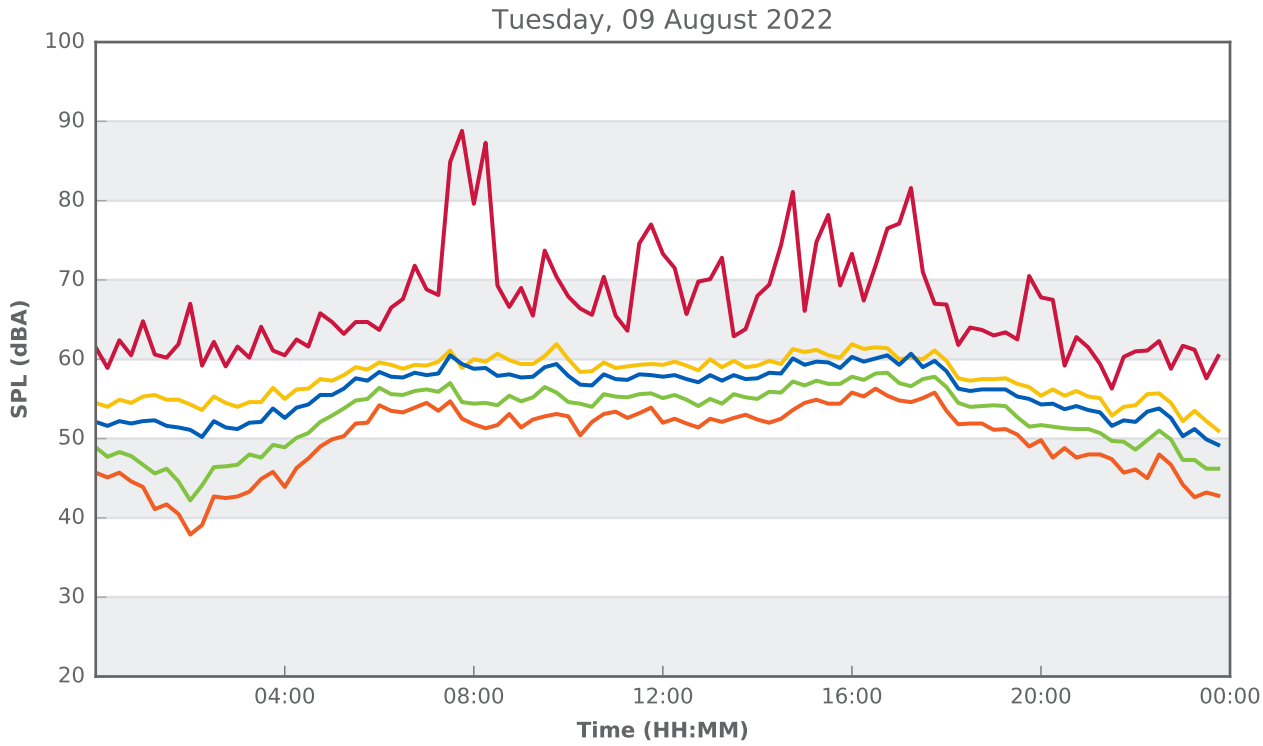
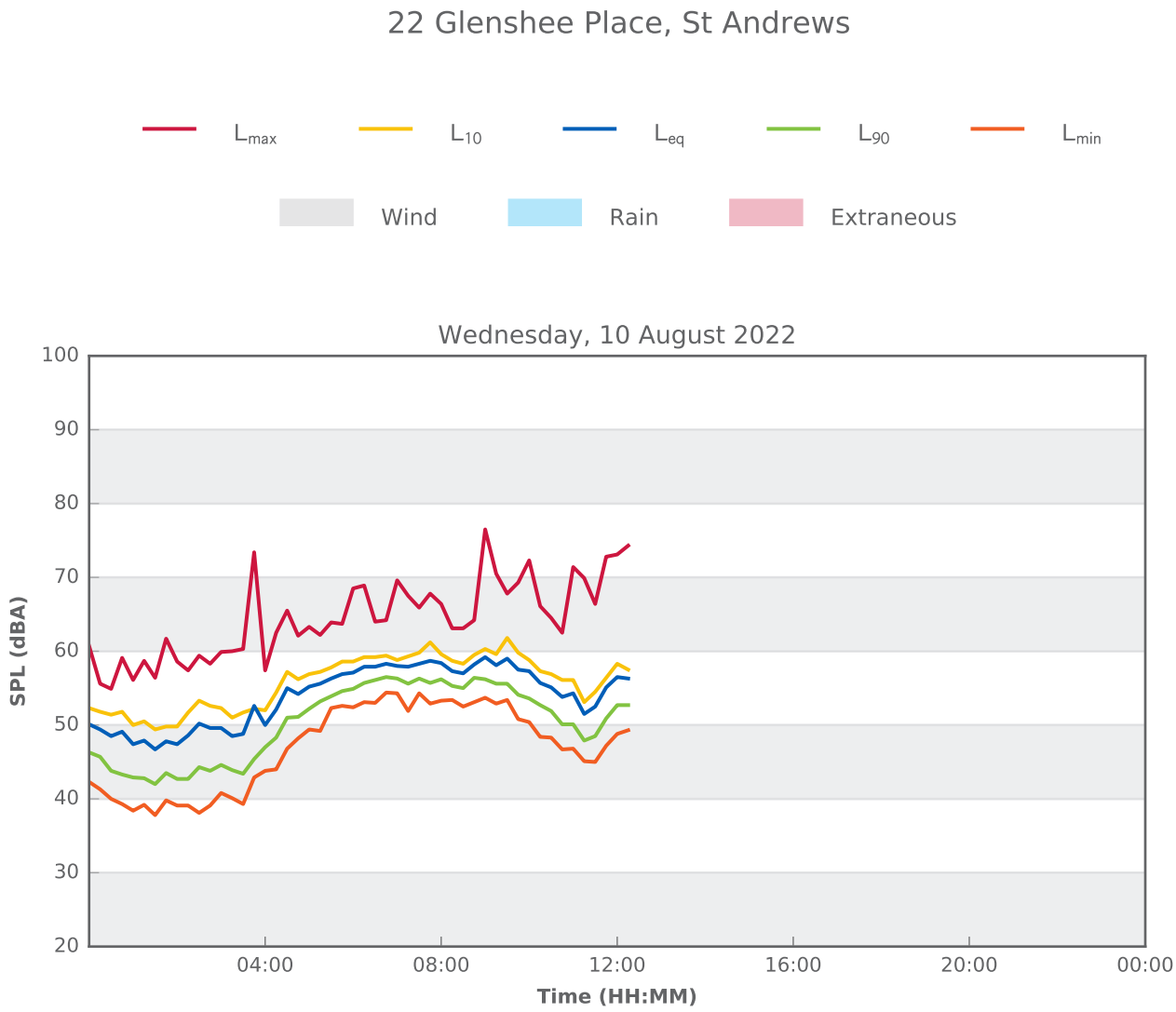





22 Glenshee Place, St Andrews
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Wednesday, 10 August 2022
100
90
80
70
60
50
40
30
20
SPL (dBA)
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C21541

Client Details	RWDI Level 4, 272 Pacific Highway Crows Nest NSW 2065
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878092
Microphone Serial Number :	317086
Pre-amplifier Serial Number :	27634

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	25.4°C	**Ambient Temperature :**	38.8°C
Relative Humidity :	39.1%	**Relative Humidity :**	25.2%
Barometric Pressure :	101.3kPa	**Barometric Pressure :**	101.3kPa

Calibration Technician : Lucky Jaiswal **Secondary Check:** Max Moore
Calibration Date : 12 Aug 2021 **Report Issue Date :** 13 Aug 2021

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*N/A*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.2°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±2.4%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests	*±0.10dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

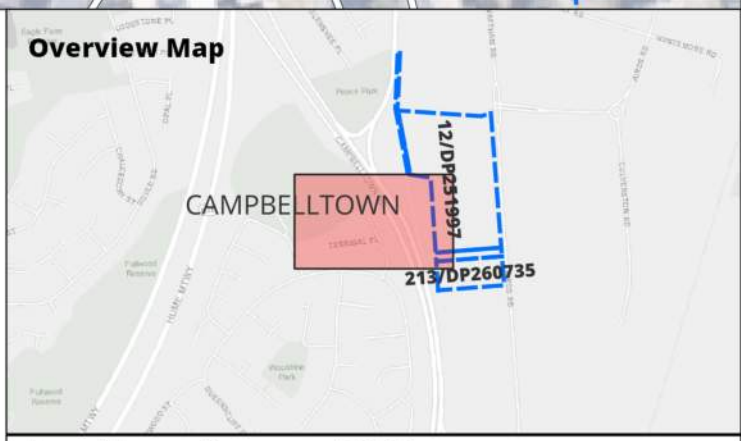
This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Logger Location Map



Location reference: BG 2

Logger Model Name : Rion NL-52EX
Logger Serial No. : 876008
Start Date: 15/08/2022
Stop Date: 23/08/2022
Logger Position: Free Field
Address : 1/15 Bungan Road, Woodbine

Legend

Roads
Lot boundary for site
Noise Loggers

Sources:
1. Basemap: Six Maps NSW © 2022

REDEVELOPMENT OF WAREHOUSE & DISTRIBUTION CENTRE
Noise monitoring locations

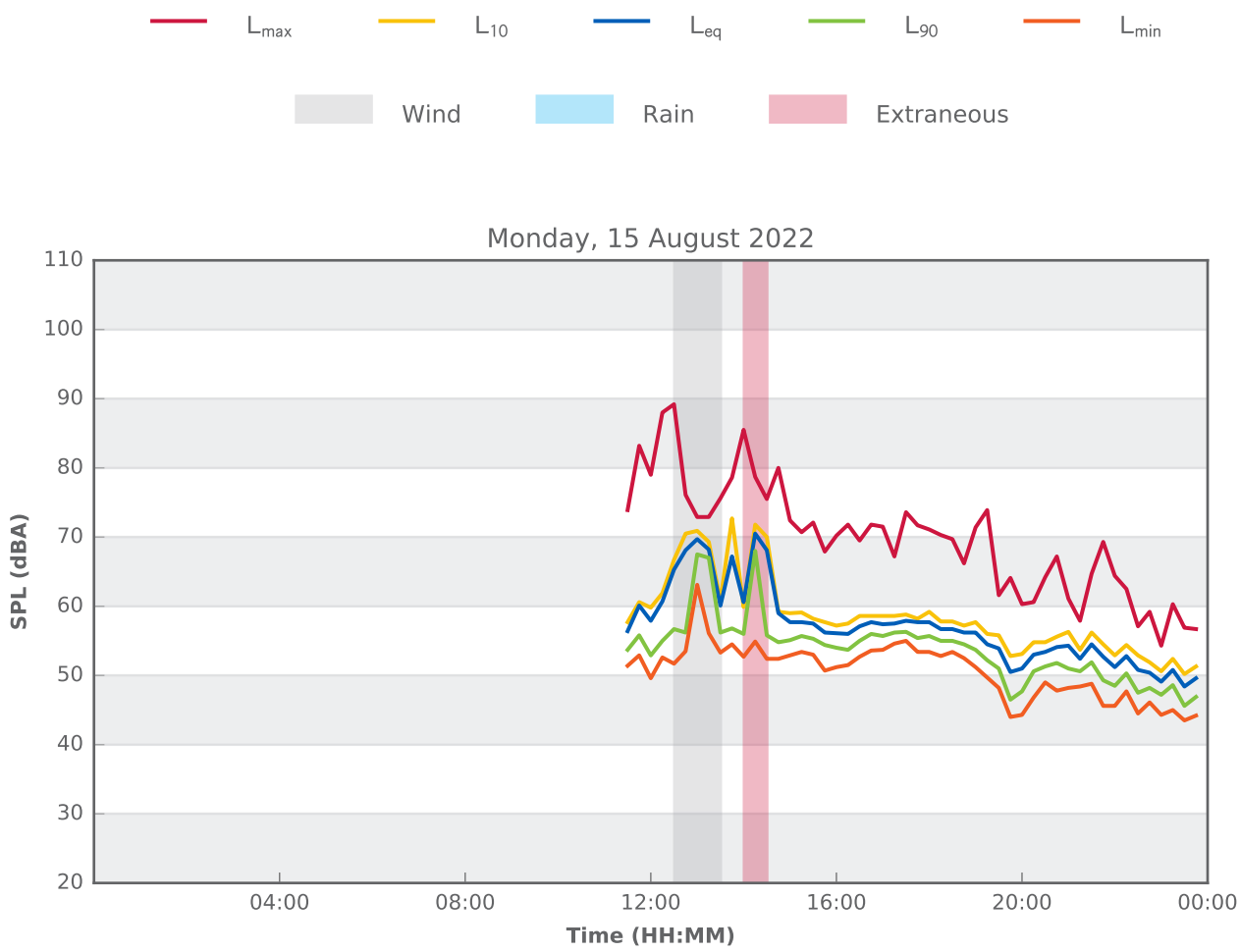
Scale for Logger Location Map
0 25 50 m

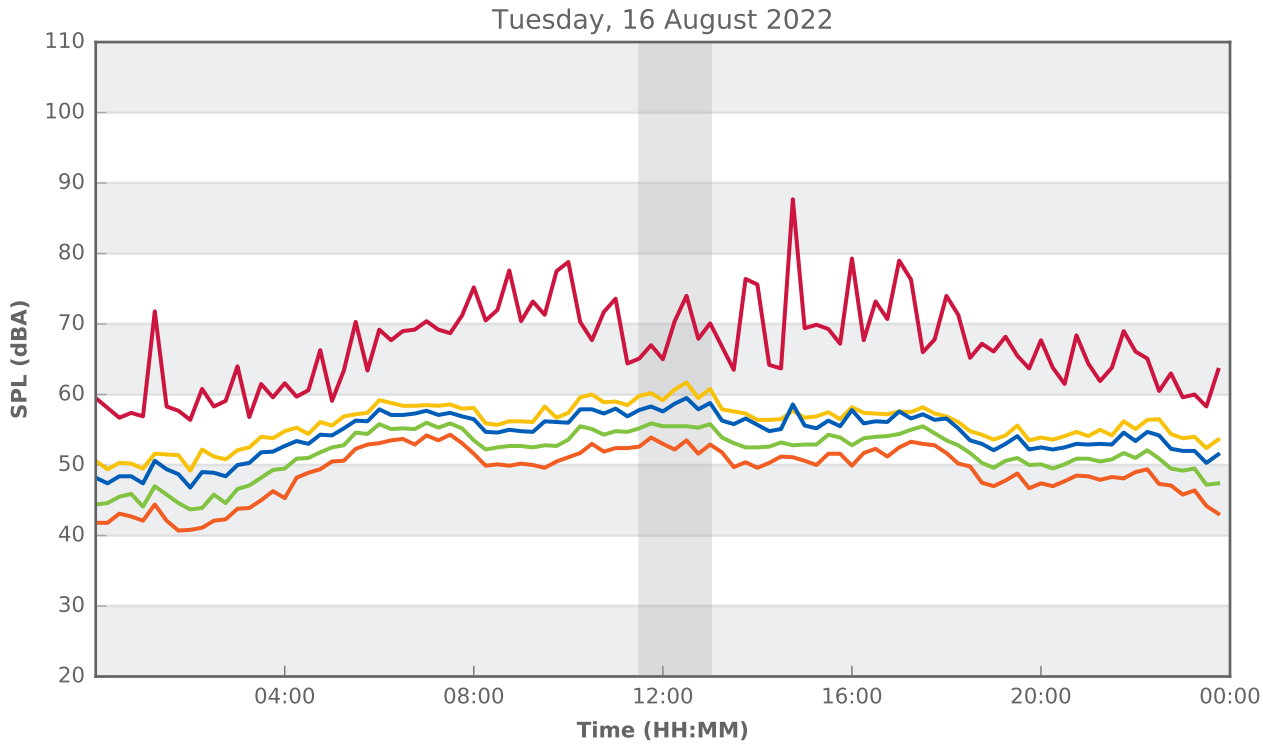
N

Map Projection: GDA2020 / MGA zone 56(EPSG:7856)

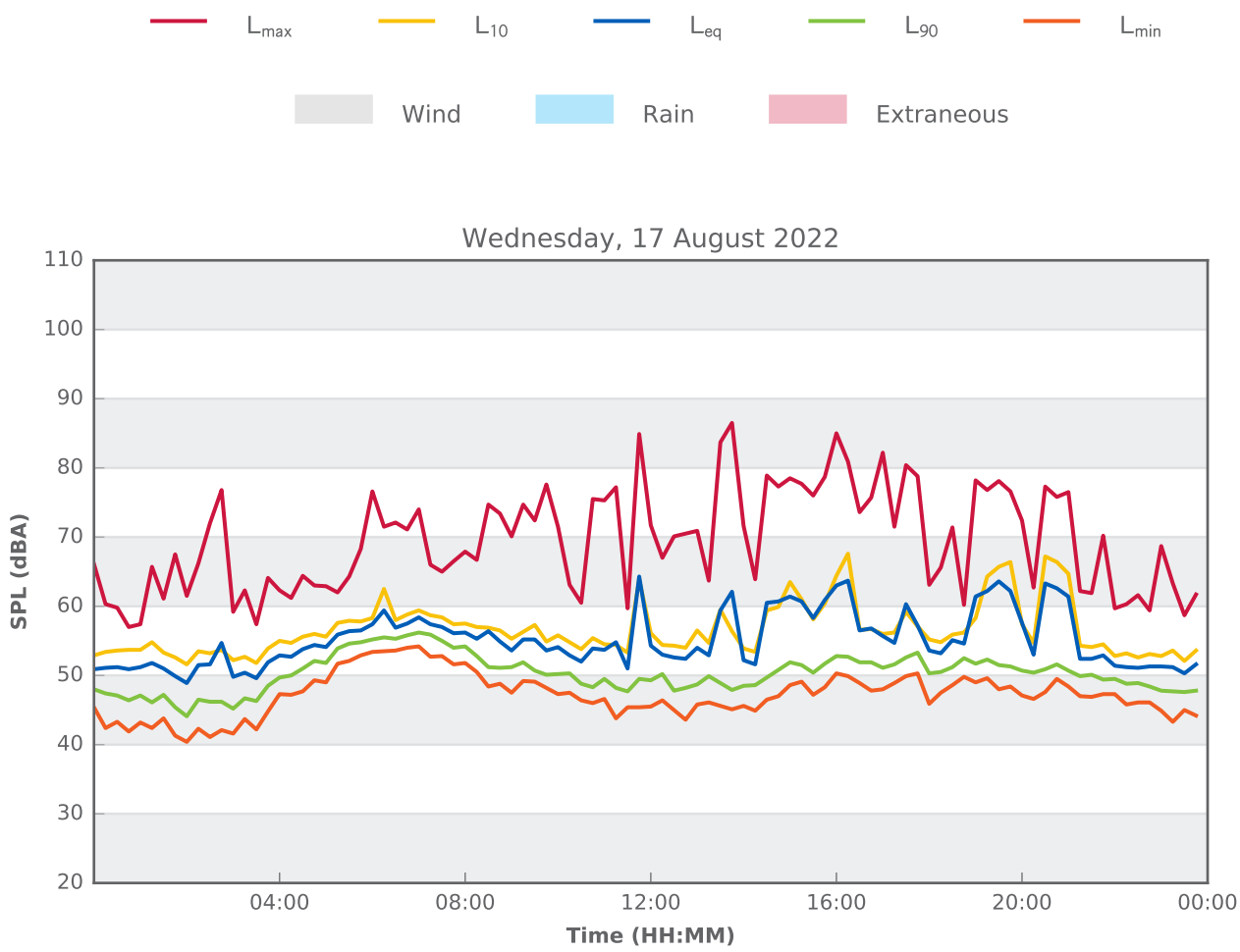
Project No: 2205167	Figure: B-2 of 3
Prepared by: APIN	Checked by: RL
Date Revised: 27 Sep 2022	

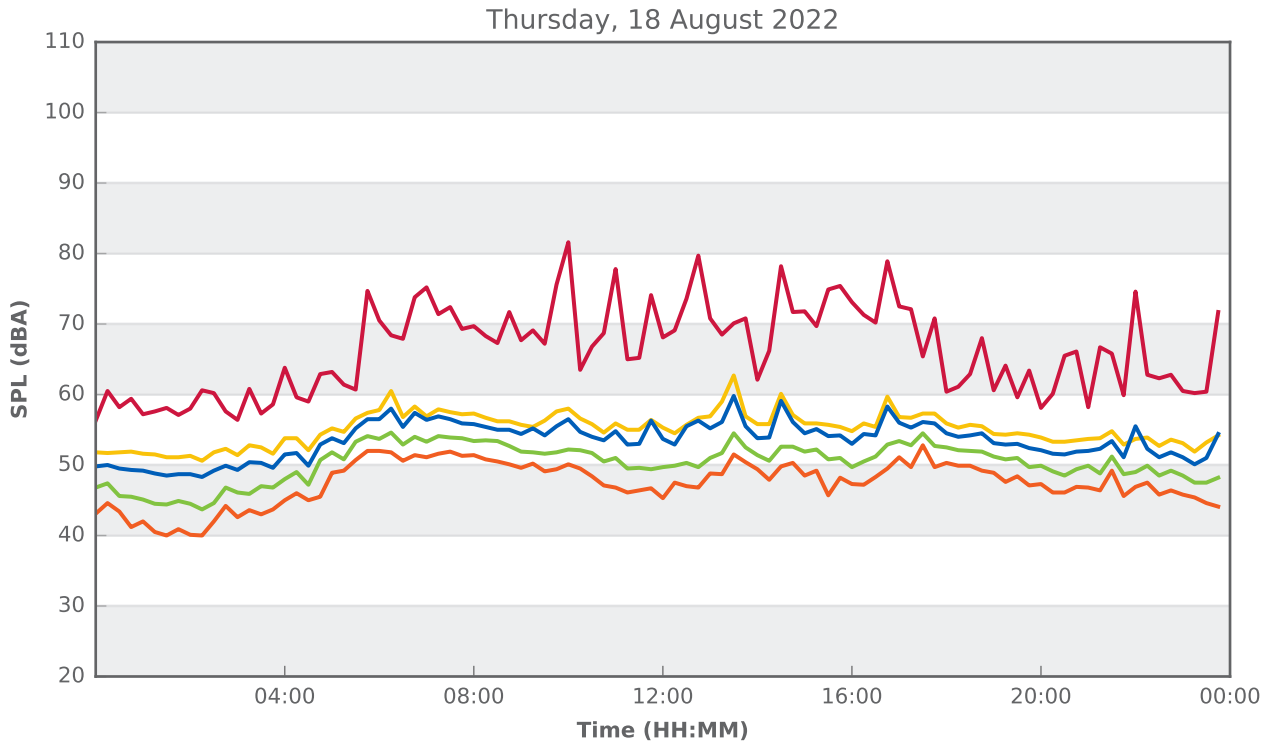
15 Bungan Road, Woodbine



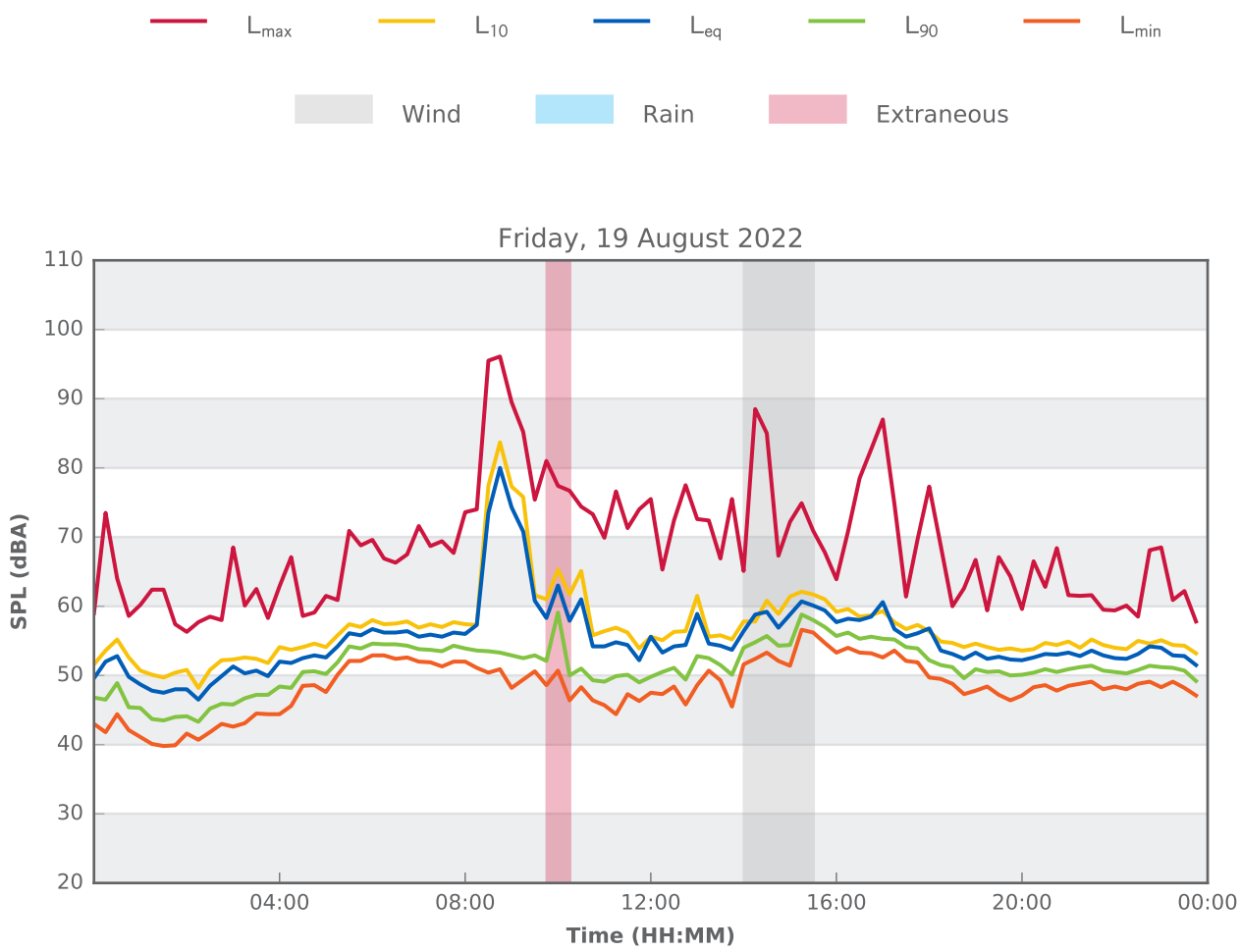


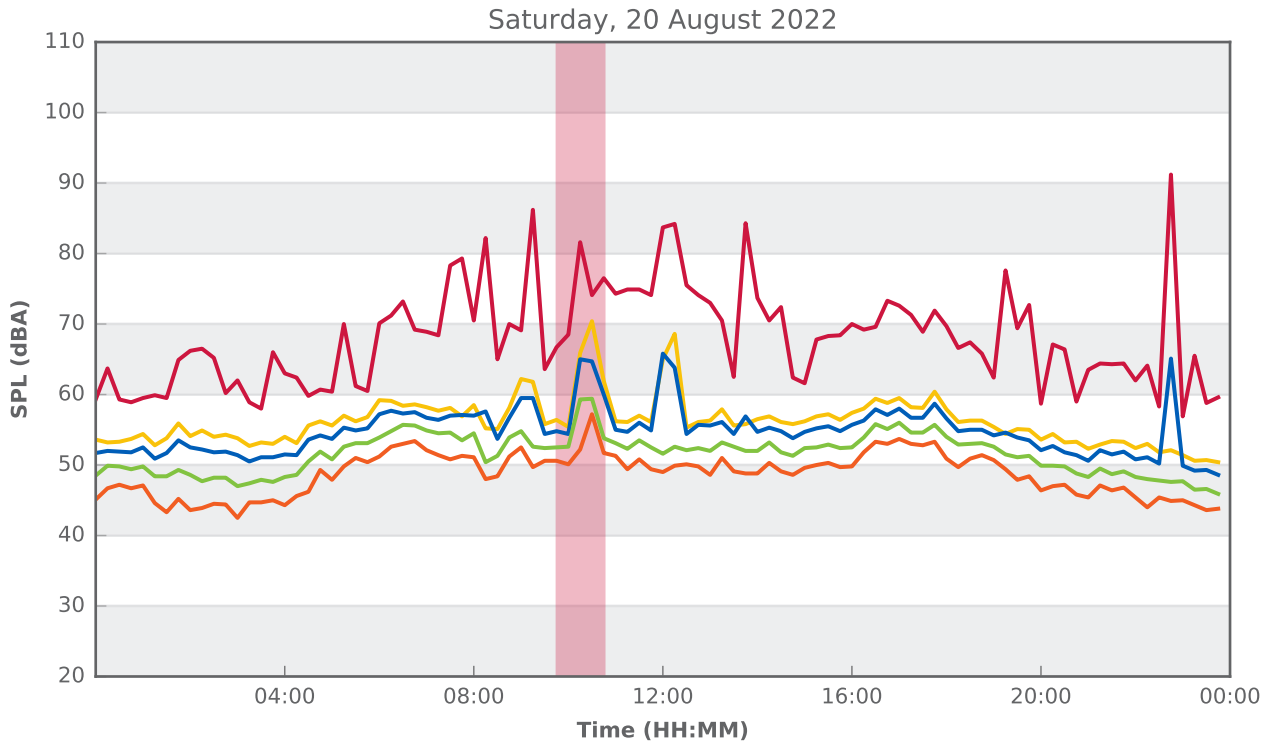
15 Bungan Road, Woodbine



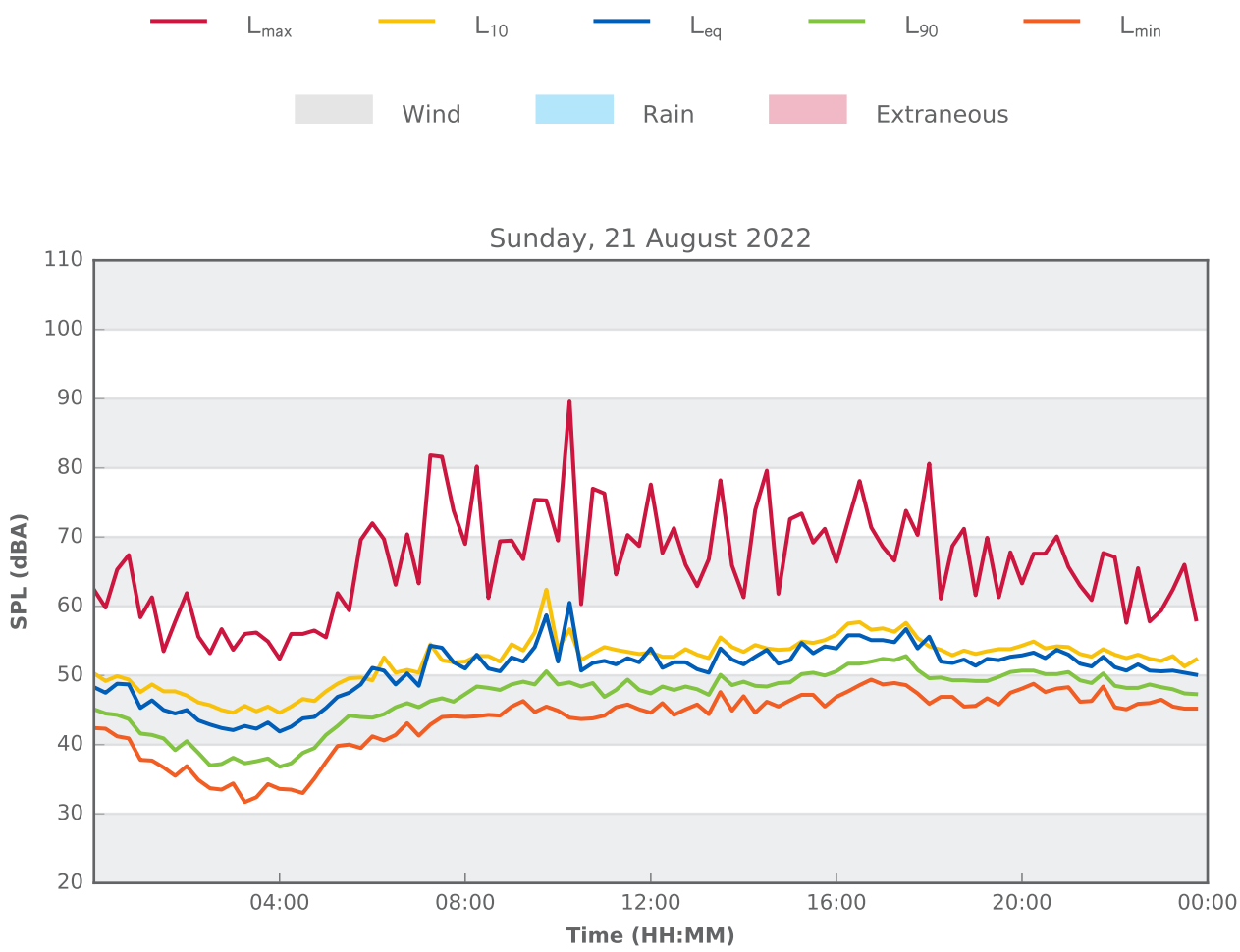


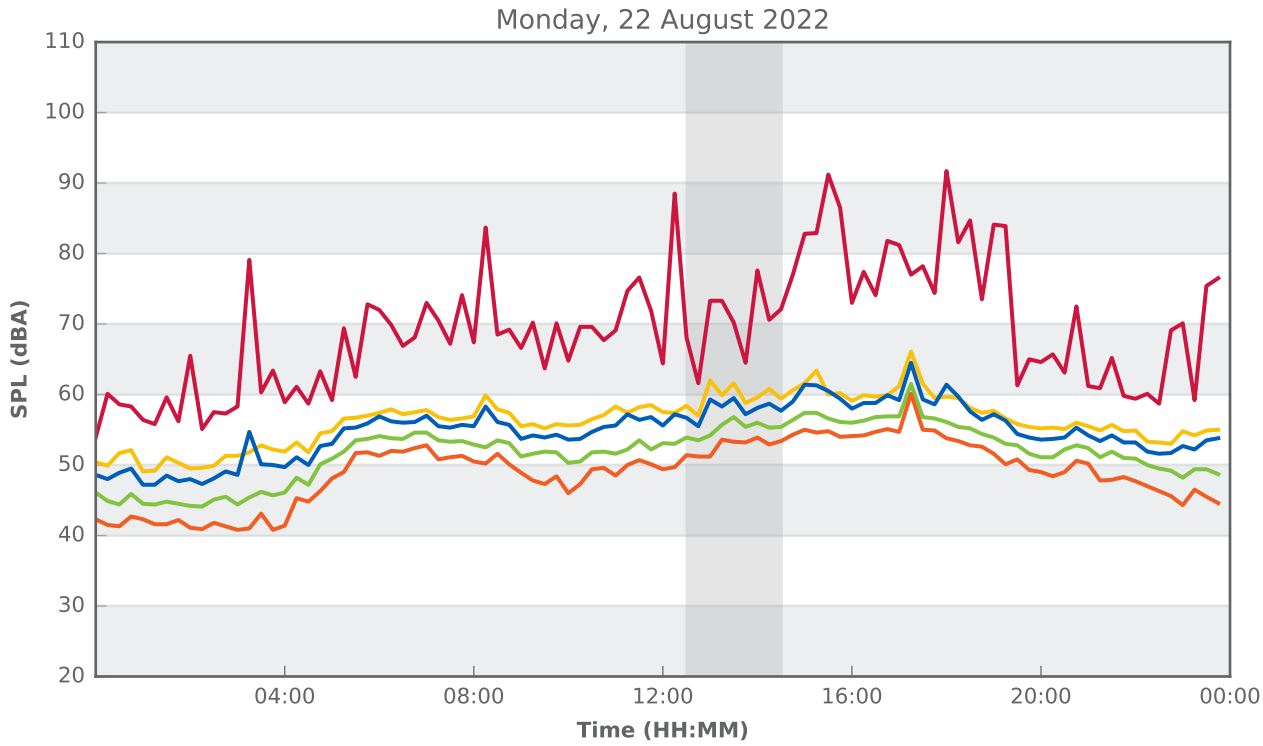
15 Bungan Road, Woodbine

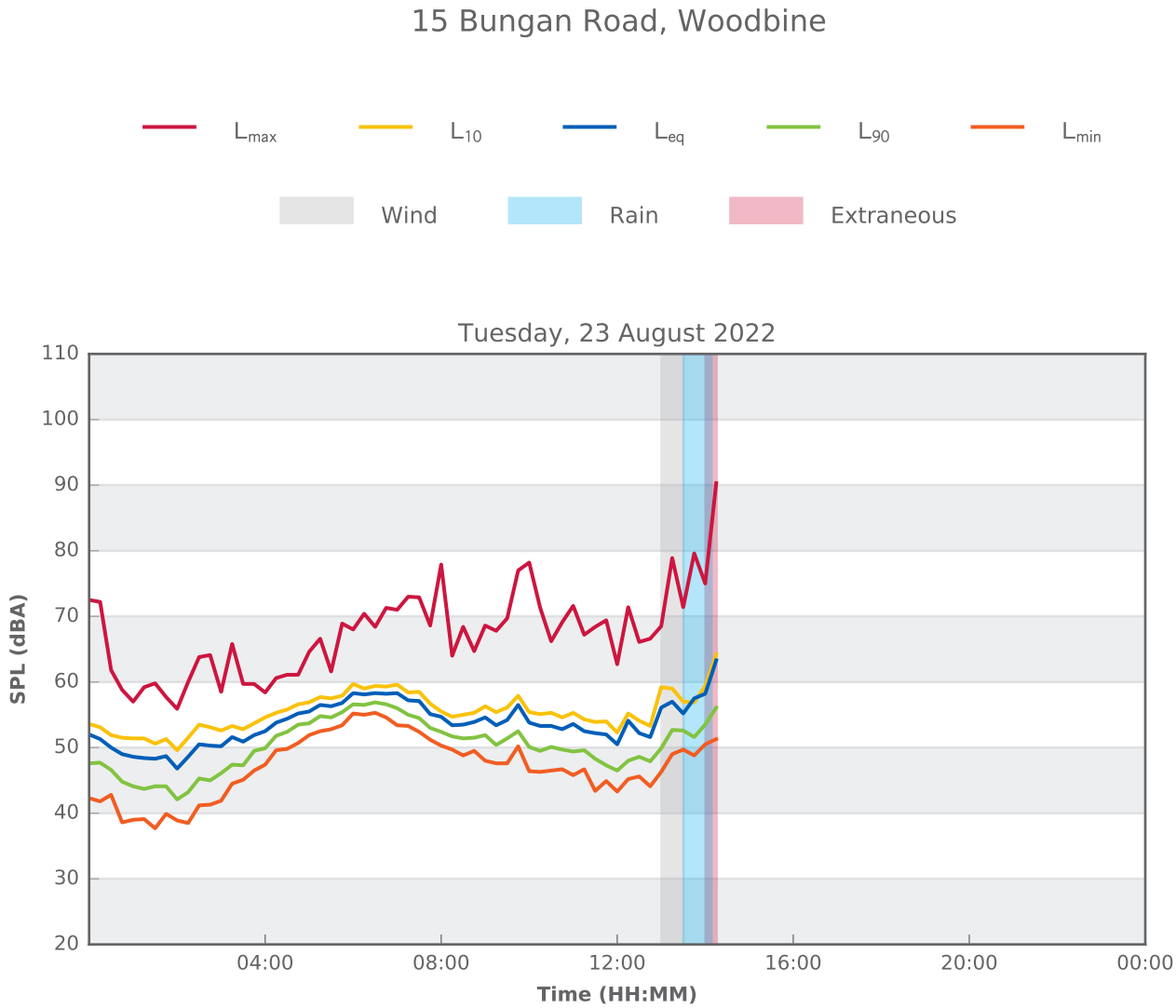




15 Bungan Road, Woodbine






15 Bungan Road, Woodbine
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Tuesday, 23 August 2022
SPL (dBA)
110
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)

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North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C21729

Client Details	RWDI Level 4, 272 Pacific Highway Crows Nest NSW 2065
Equipment Tested/ Model Number :	Rion NL-52EX
Instrument Serial Number :	00876008
Microphone Serial Number :	11410
Pre-amplifier Serial Number :	76125

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24°C	**Ambient Temperature :**	24°C
Relative Humidity :	50.4%	**Relative Humidity :**	48.4%
Barometric Pressure :	101.6kPa	**Barometric Pressure :**	101.6kPa

Calibration Technician :	Lucky Jaiswal	**Secondary Check:**	Harrison Kim
Calibration Date :	2 Nov 2021	**Report Issue Date :**	4 Nov 2021

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.2°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±2.4%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests	*±0.10dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

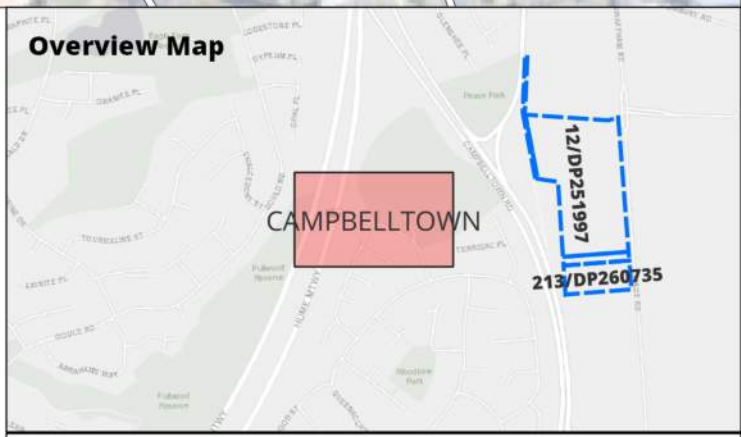
This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

Logger Location Map



Location reference: BG 3

Logger Model Name : ARL NGARA
Logger Serial No. : 878094
Start Date: 29/07/2022
Stop Date: 10/08/2022
Logger Position: Free Field
Address : 42 Long Reef Crescent, Woodbine

Legend

- Roads
- Lot boundary for site
- Noise Loggers

Sources:
1. Basemap: Six Maps NSW © 2022

REDEVELOPMENT OF WAREHOUSE & DISTRIBUTION CENTRE
Noise monitoring locations

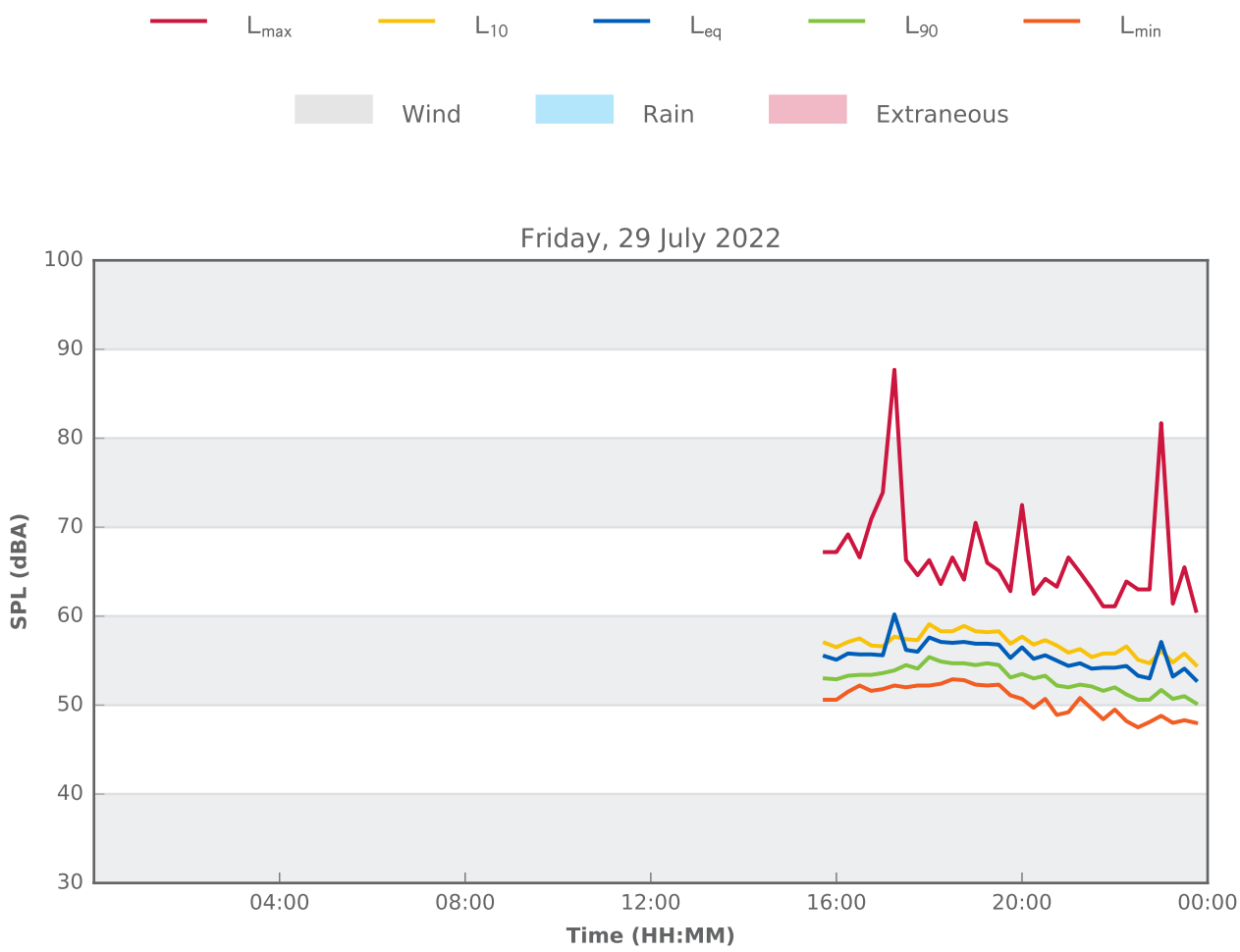
Scale for Logger Location Map
0 25 50 m

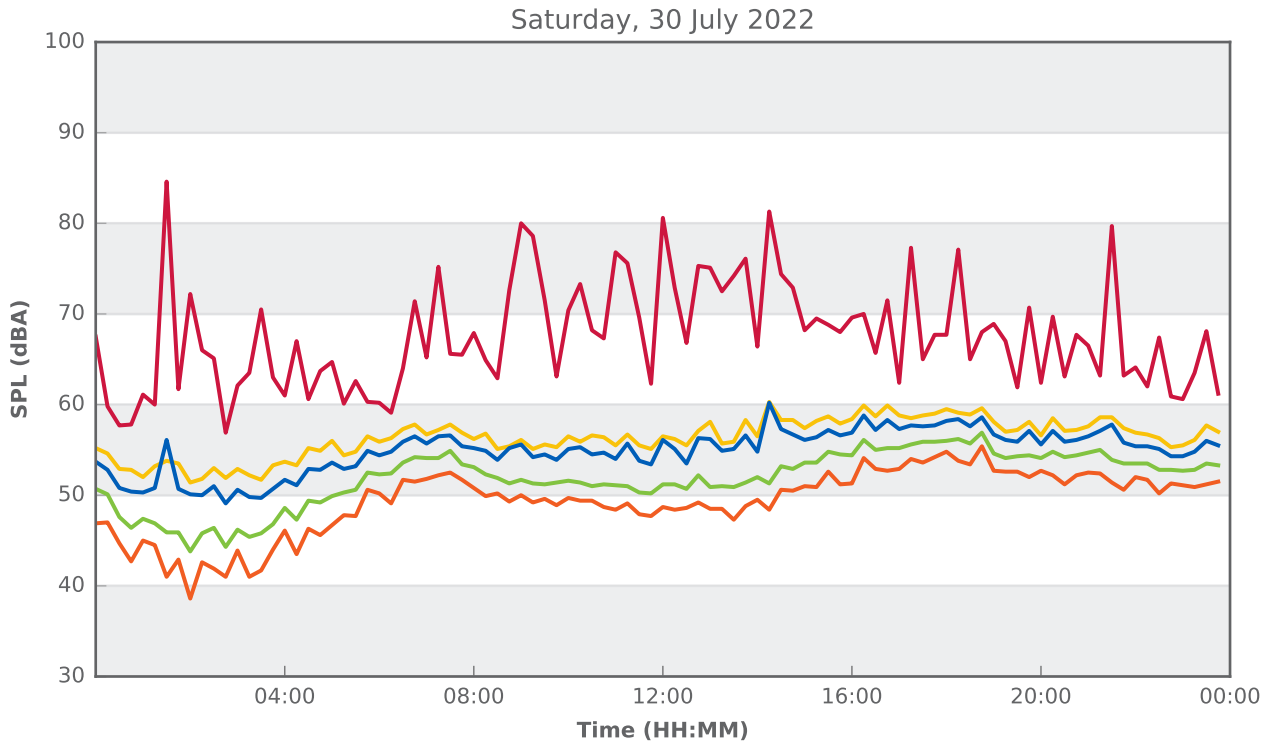
N

Map Projection: GDA2020 / MGA zone 56(EPSG:7856)

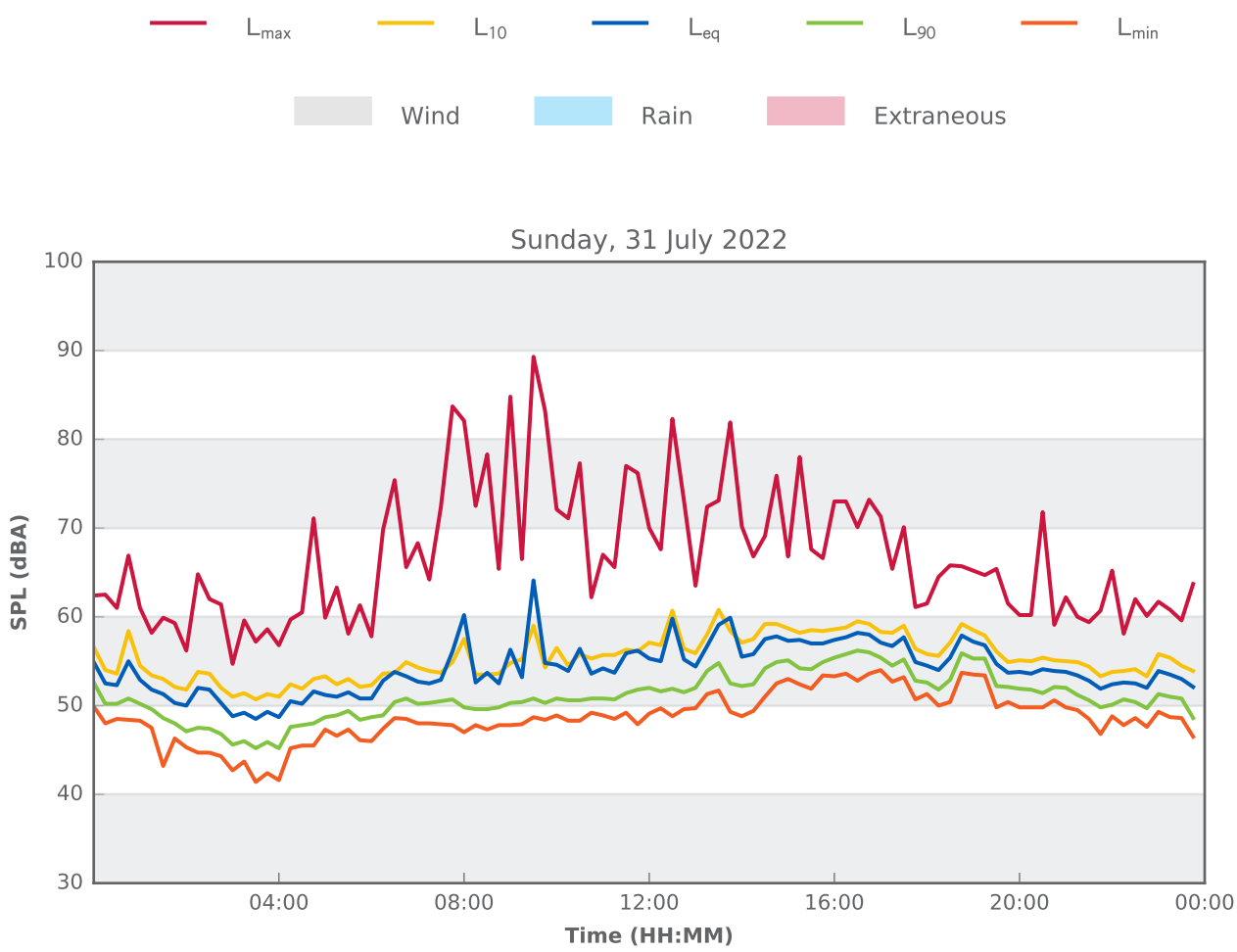
Project No: 2205167	Figure: B-3 of 3
Prepared by: APIN	Checked by: RL
Date Revised: 27 Sep 2022	

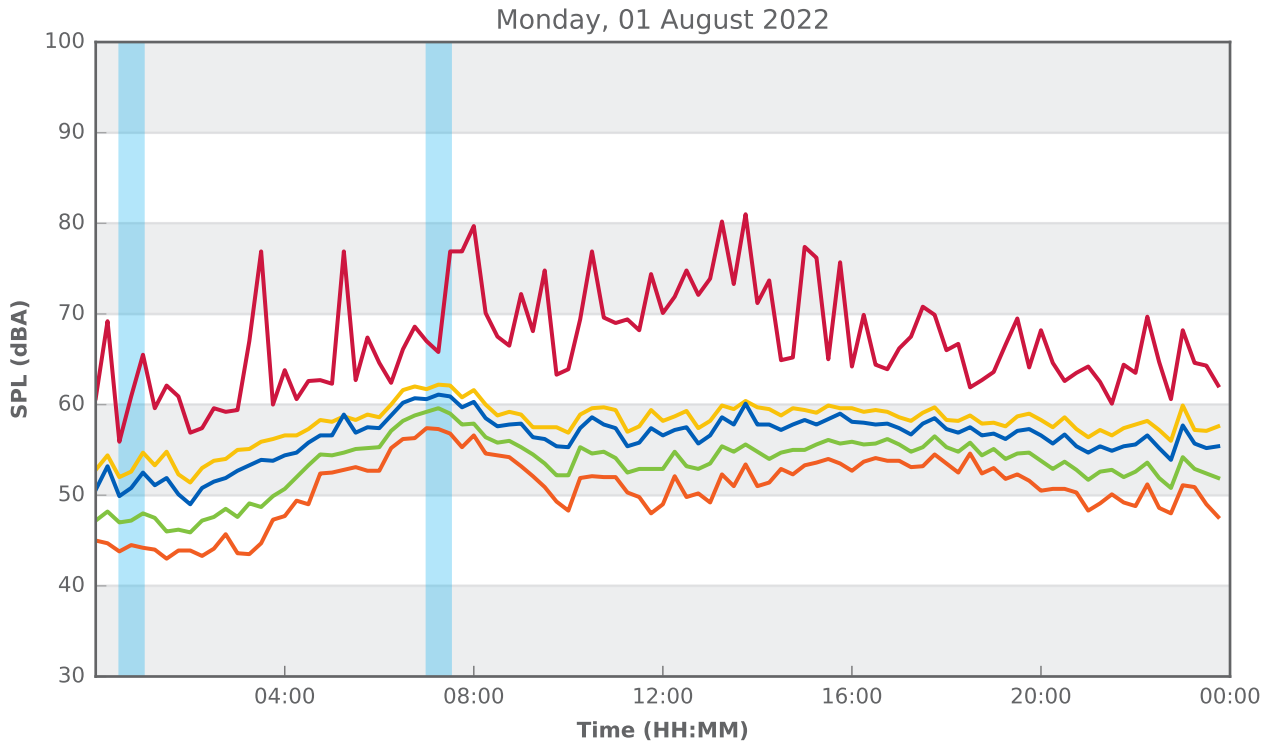
42 Long Reef Crescent, Woodbine



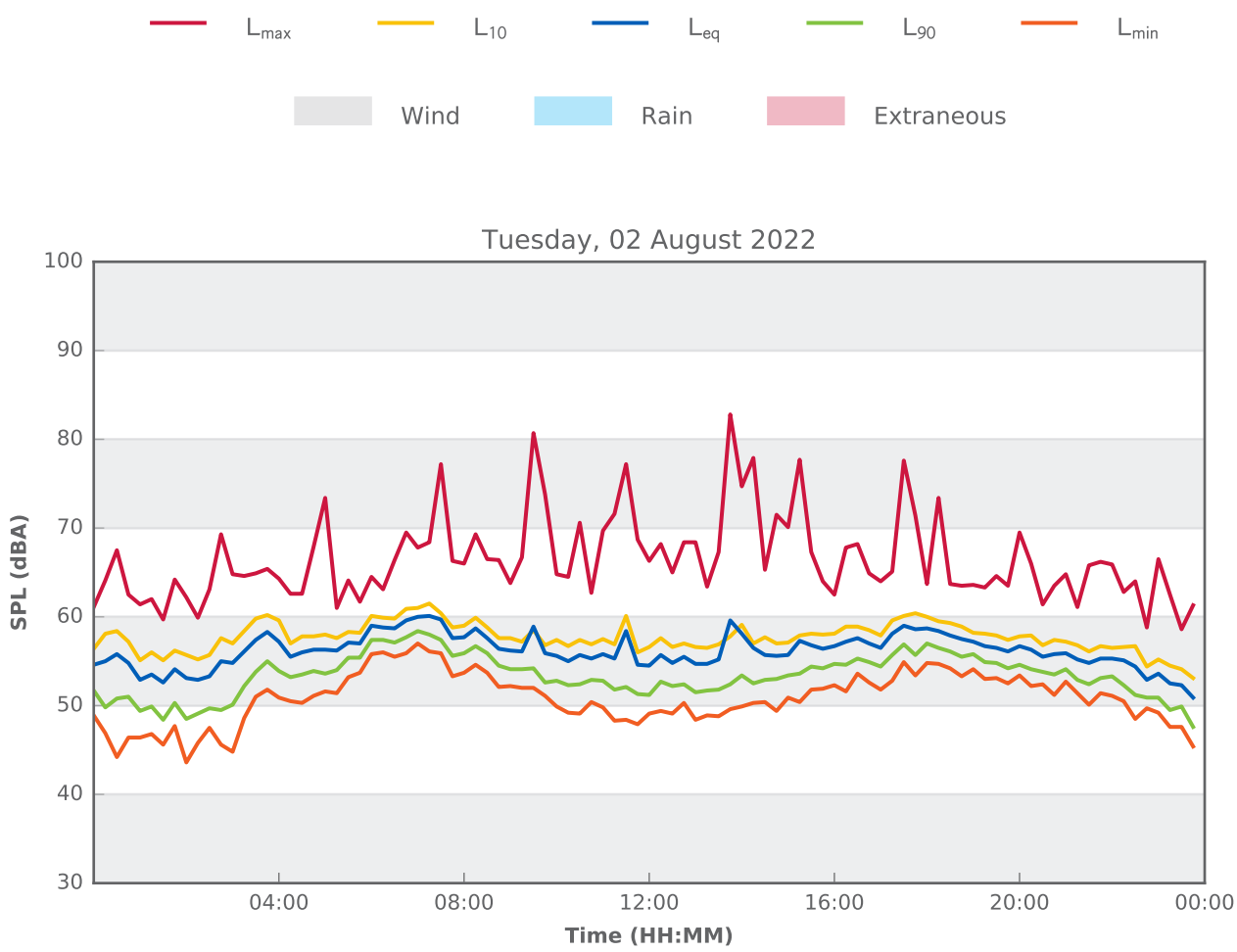


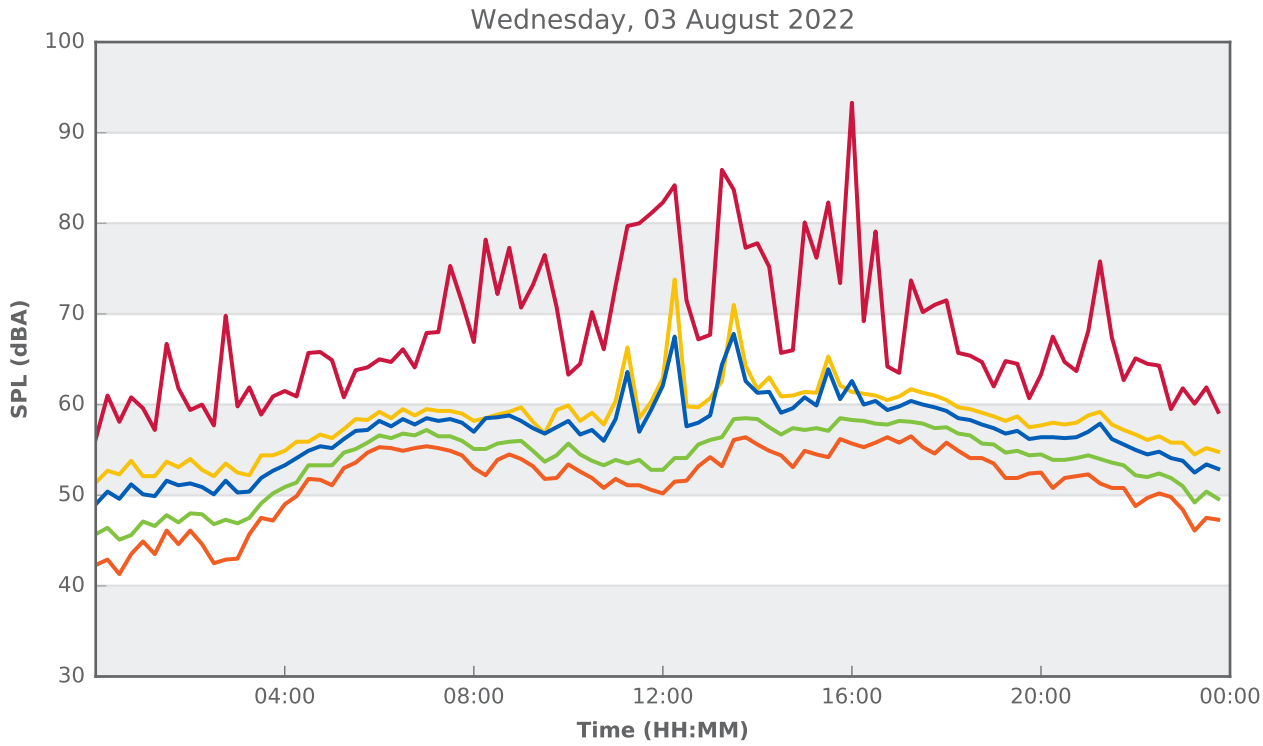
42 Long Reef Crescent, Woodbine



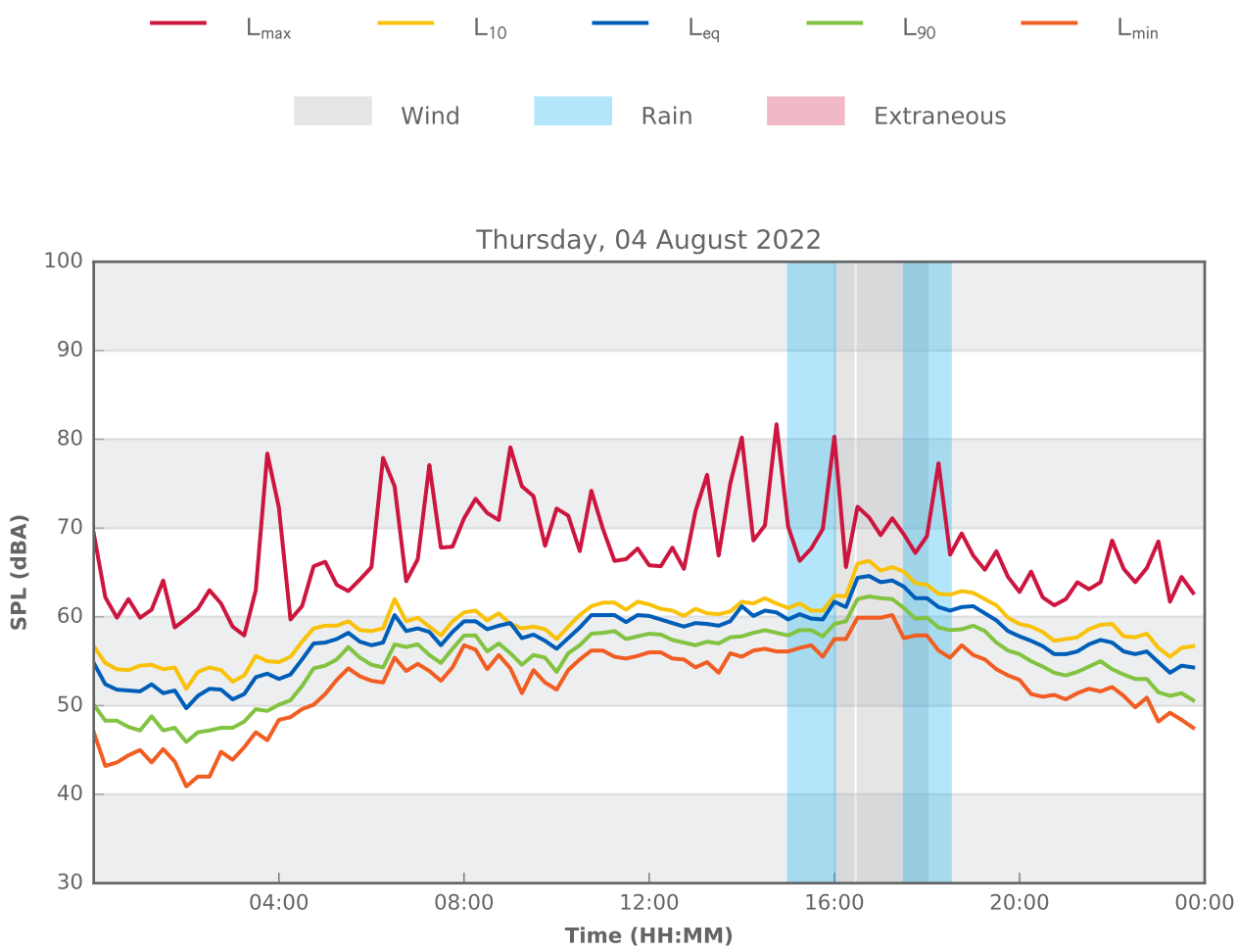


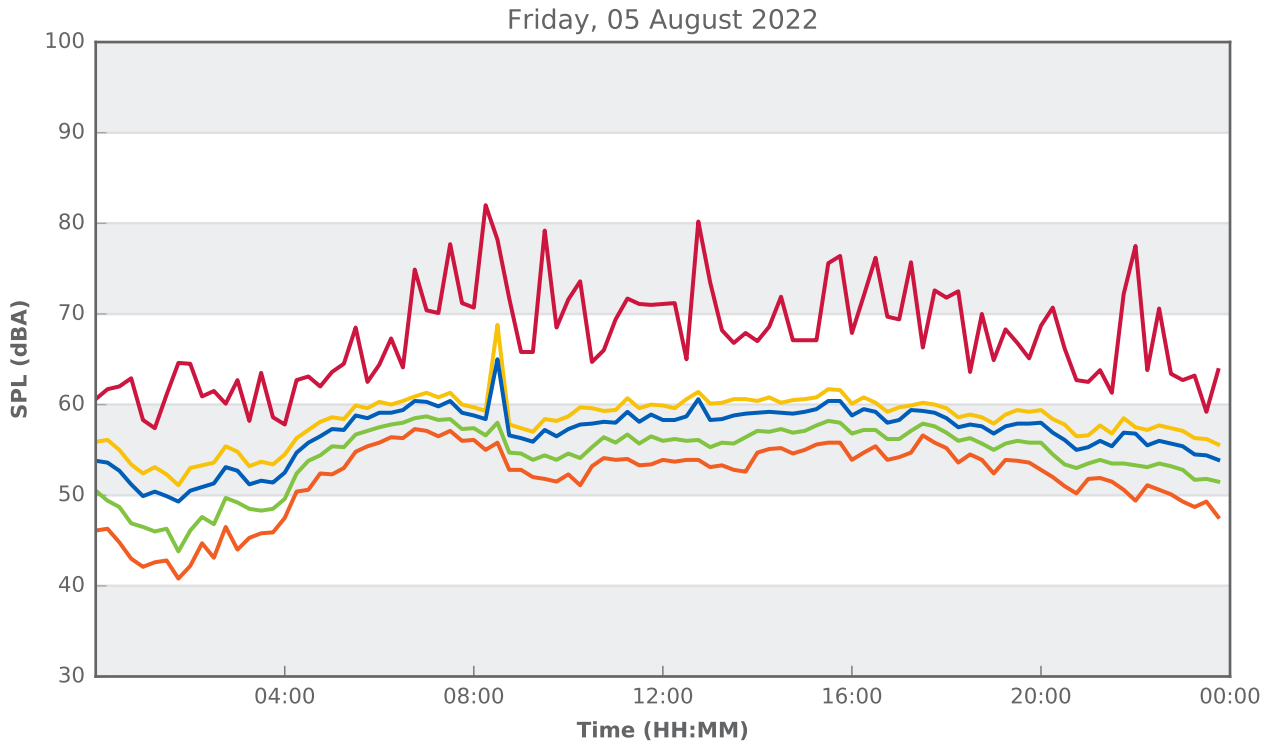
42 Long Reef Crescent, Woodbine



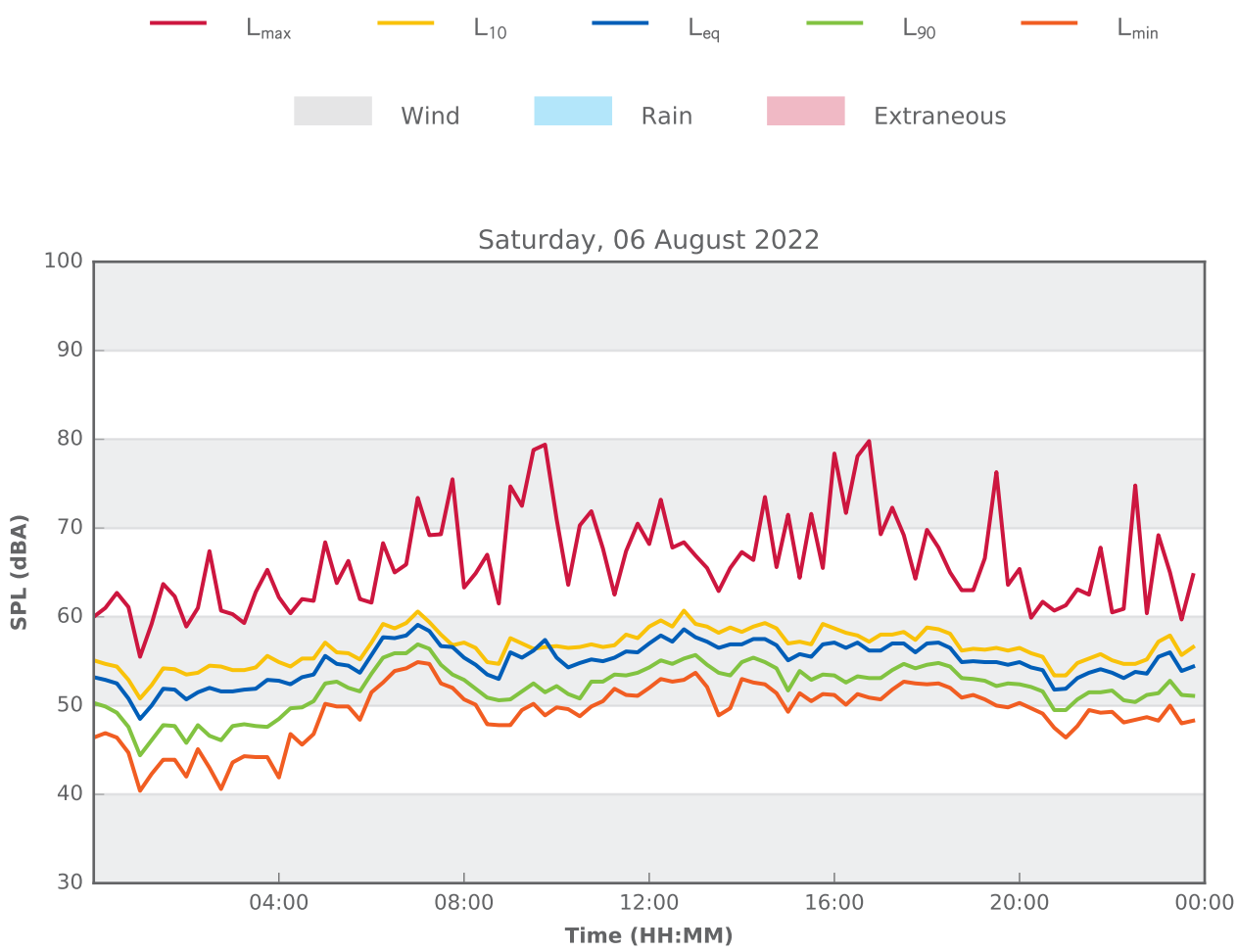


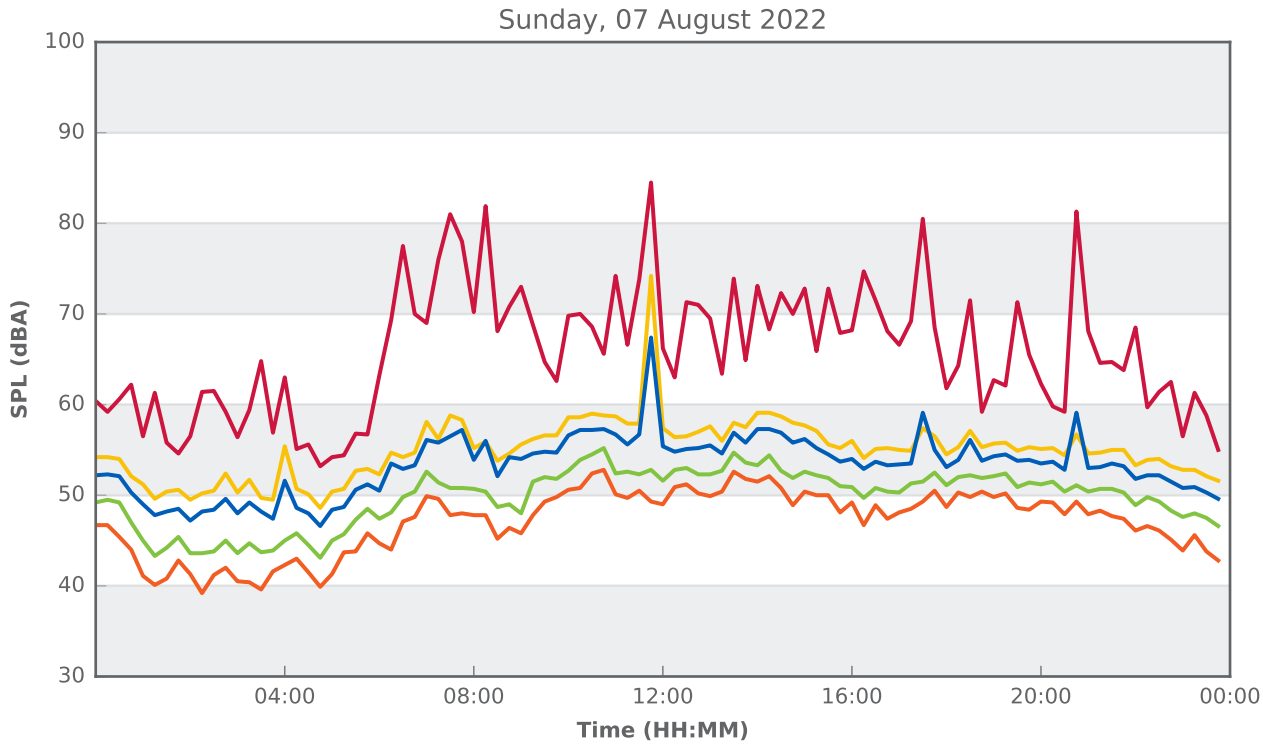
42 Long Reef Crescent, Woodbine





42 Long Reef Crescent, Woodbine





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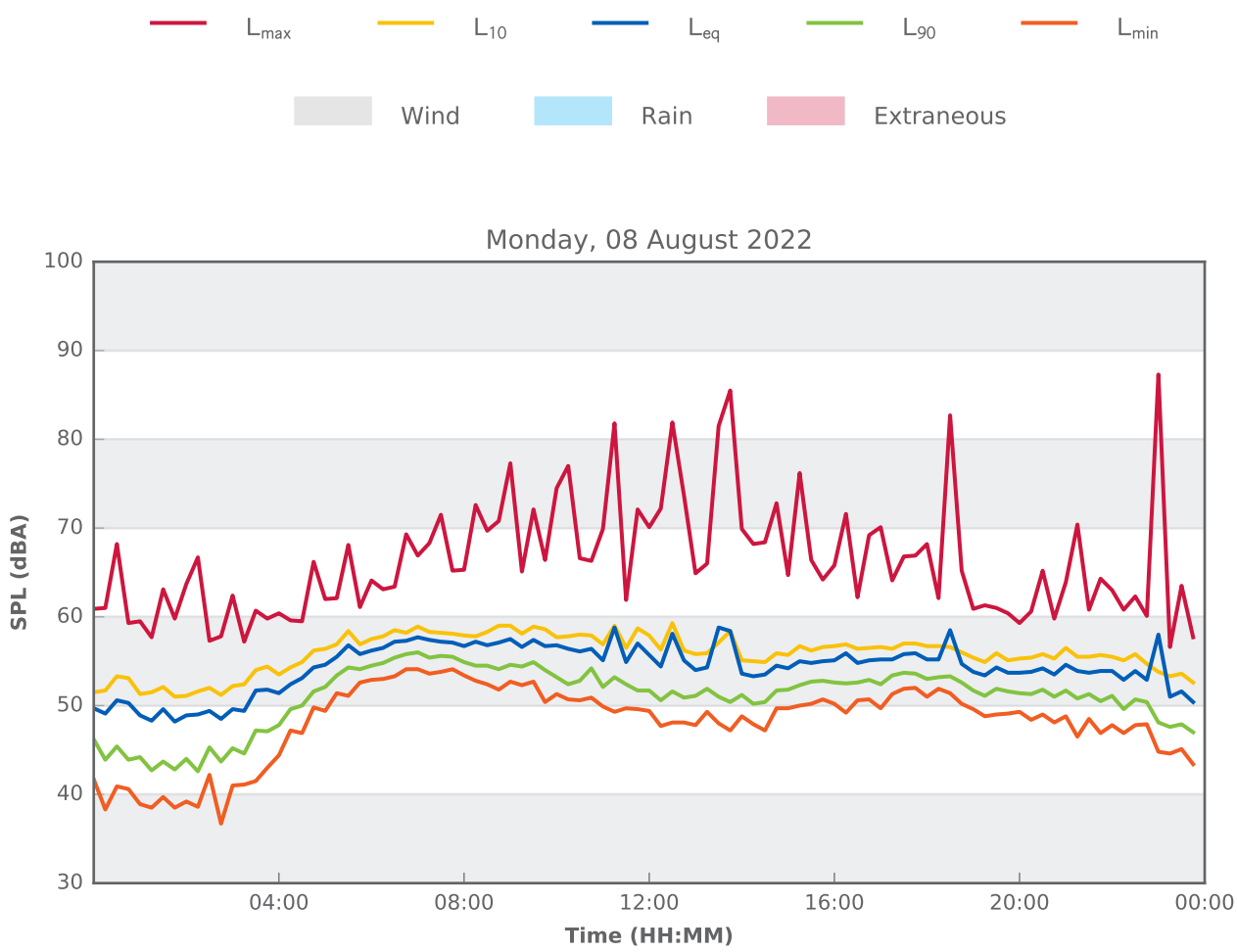

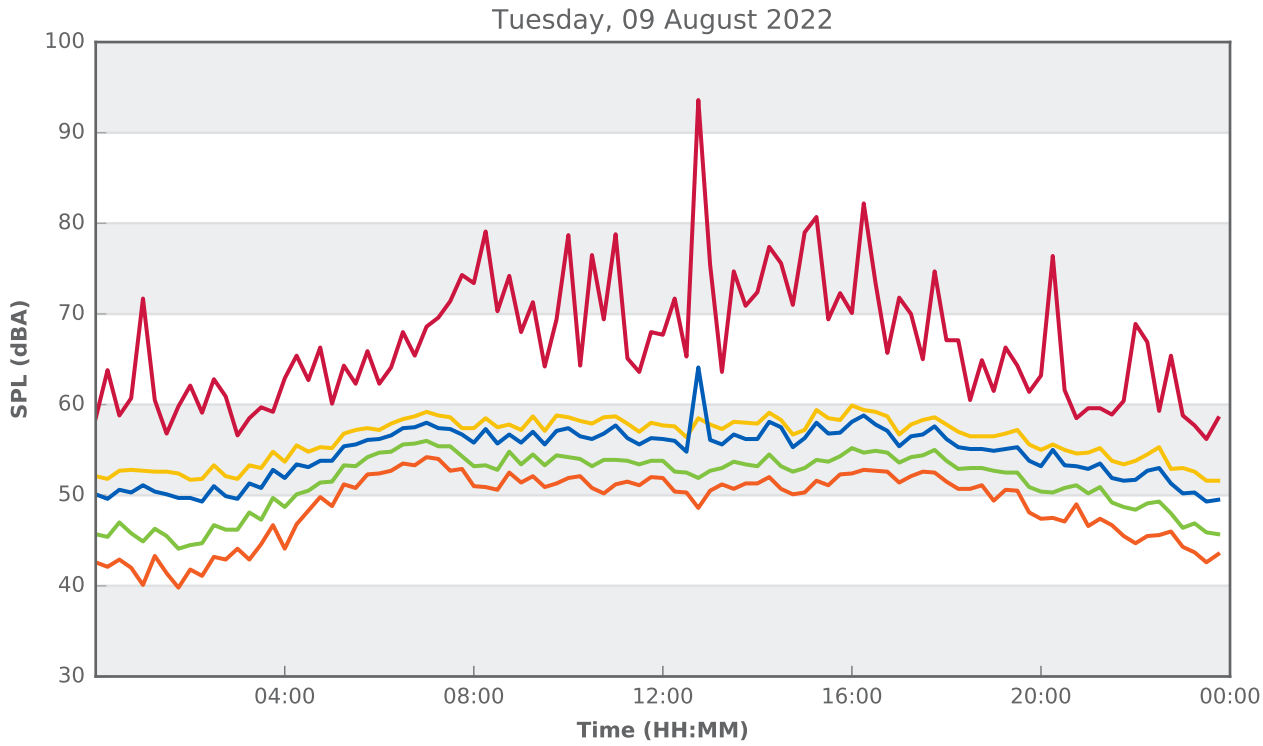


42 Long Reef Crescent, Woodbine
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Wednesday, 10 August 2022
100
90
80
70
60
50
40
30
SPL (dBA)
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)

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Sound Level Meter
IEC 61672-3.2013
Calibration Certificate

Calibration Number C21540

Client Details	RWDI Level 4, 272 Pacific Highway Crows Nest NSW 2065
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878094
Microphone Serial Number :	318361
Pre-amplifier Serial Number :	27934

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	20.9°C	**Ambient Temperature :**	21.1°C
Relative Humidity :	41.7%	**Relative Humidity :**	40.7%
Barometric Pressure :	101.6kPa	**Barometric Pressure :**	101.6kPa

Calibration Technician :	Lucky Jaiswal	**Secondary Check:**	Max Moore
Calibration Date :	13 Aug 2021	**Report Issue Date :**	13 Aug 2021

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*N/A*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.2°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±2.4%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.015kPa*
Electrical Tests	*±0.10dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

APPENDIX C

NOISE SOURCE LAYOUT IN MODEL

Legend

PROPOSED CROSSOVER

PROPOSED CROSSOVER

EXISTING EASEMENT TO BE RELOCATED. WORKS BY OTHERS. REFER TO CIVIL ENGINEERS.

PROPOSED GPT AND JELLYFISH WATER QUALITY CHAMBER (REFER TO CIVIL ENGINEERS)

EXISTING CROSSOVER

EXISTING CROSSOVER

CAR ENTRY & EXIT

7.5m LANDSCAPE SET-BACK

15m BUILDING SET-BACK

OFFICE (1 LEVELS) 300 SQM

CAR PARK (X34)

BITUMEN PAVEMENT

TRUCK EXIT

OFFICE (2 LEVELS) 600 SQM

CAR PARK (X40)

PROPOSED WAREHOUSE a
6,640 SQM
RL 47.50 +/- 0.5
R.C. SLAB

6m WIDE AWNING

RED 3m

RECESSED LOADING DOCK (X3)

WASTE STORAGE

35m WIDE AWNING

RSD 6m

TRUCK ENTRY

FENCE

TRUCK EXIT

PROPOSED WAREHOUSE b
6,670 SQM
RL 47.50 +/- 0.5
R.C. SLAB

ROLLER SHUTTER DOORS (X6)

RECESSED LOADING DOCK (X2)

5m WIDE AWNING

OFFICE (1 LEVELS) 300 SQM

TRUCK ENTRY

CAR ENTRY & EXIT

TRUCK ENTRY

CAR PARK (X38)

PUMP ROOM

FIRE SERVICES SPRINKLER TANK

FIRE STANDING AREA

RECESSED LOADING DOCK (X4)

PROPOSED WAREHOUSE 2
13,316 SQM
RL 48.50 +/- 0.5
R.C. SLAB

ROLLER SHUTTER DOORS (X7)

35m WIDE AWNING

WASTE STORAGE

OFFICE (1 LEVELS) 300 SQM

CAR ENTRY

CAR PARK (X45)

19.5m BUILDING SET-BACK

5m LANDSCAPE SET-BACK

2m HIGH ACOUSTIC SOUND BARRIER

TYPICAL 2.4m HEIGHT PALASADE FENCE WITH SELECTED PAINT FINISH

2m HIGH ACOUSTIC SOUND BARRIER

TYPICAL 2.4m X 5.5m PARKING BAYS WITH 6.4m AISLE WIDTH

EXISTING EASEMENT TO BE RELOCATED. WORKS BY OTHERS. REFER TO CIVIL ENGINEERS.

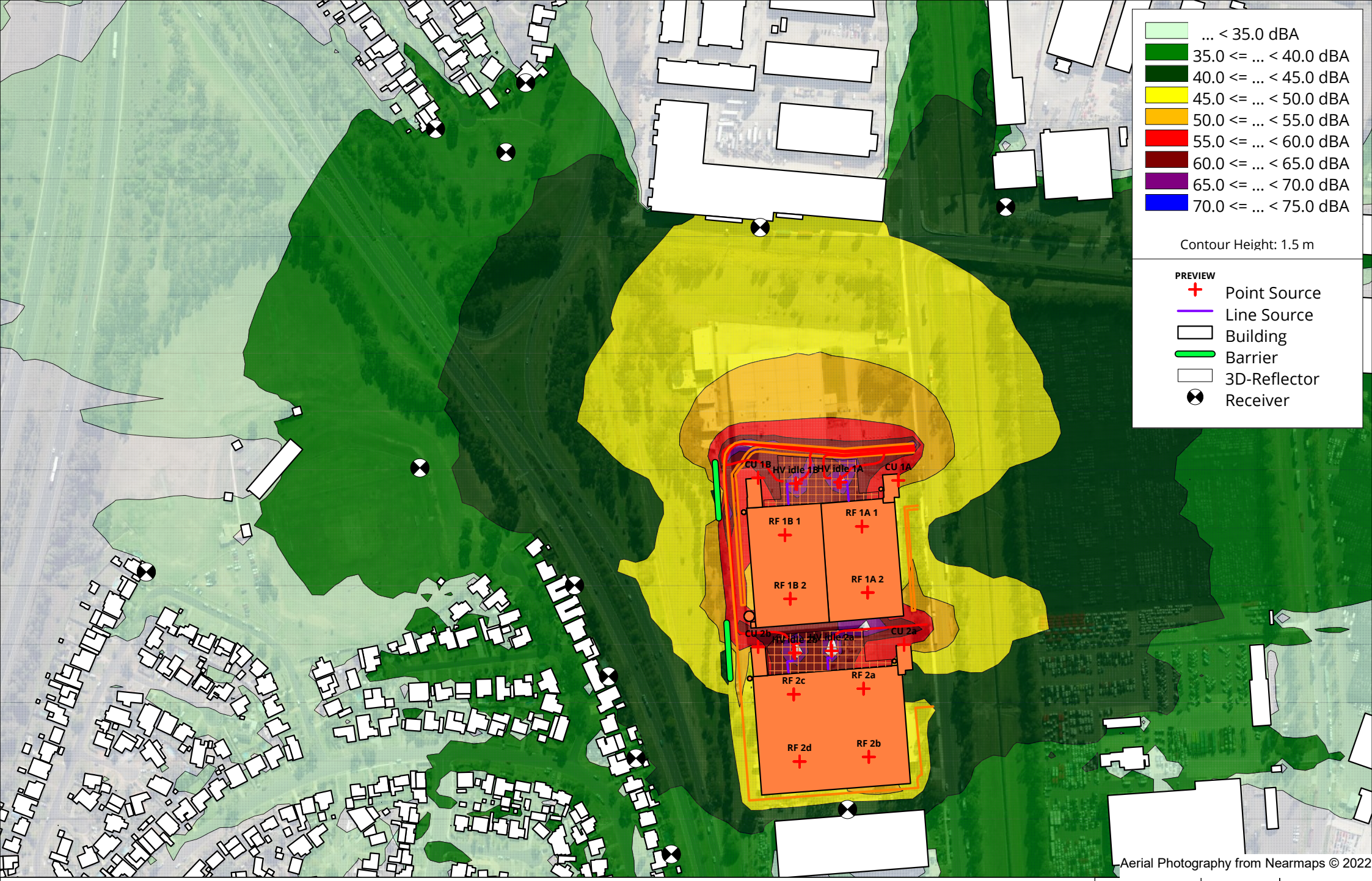
2m BUILDING SET-BACK

LANDSCAPE SET-BACK

SYDNEY PRIVATE ROAD - PROPOSED WORKS UNDER SEPARATE DA

APPENDIX D

NOISE CONTOUR PLOTS



Operational Noise Impact Assessment

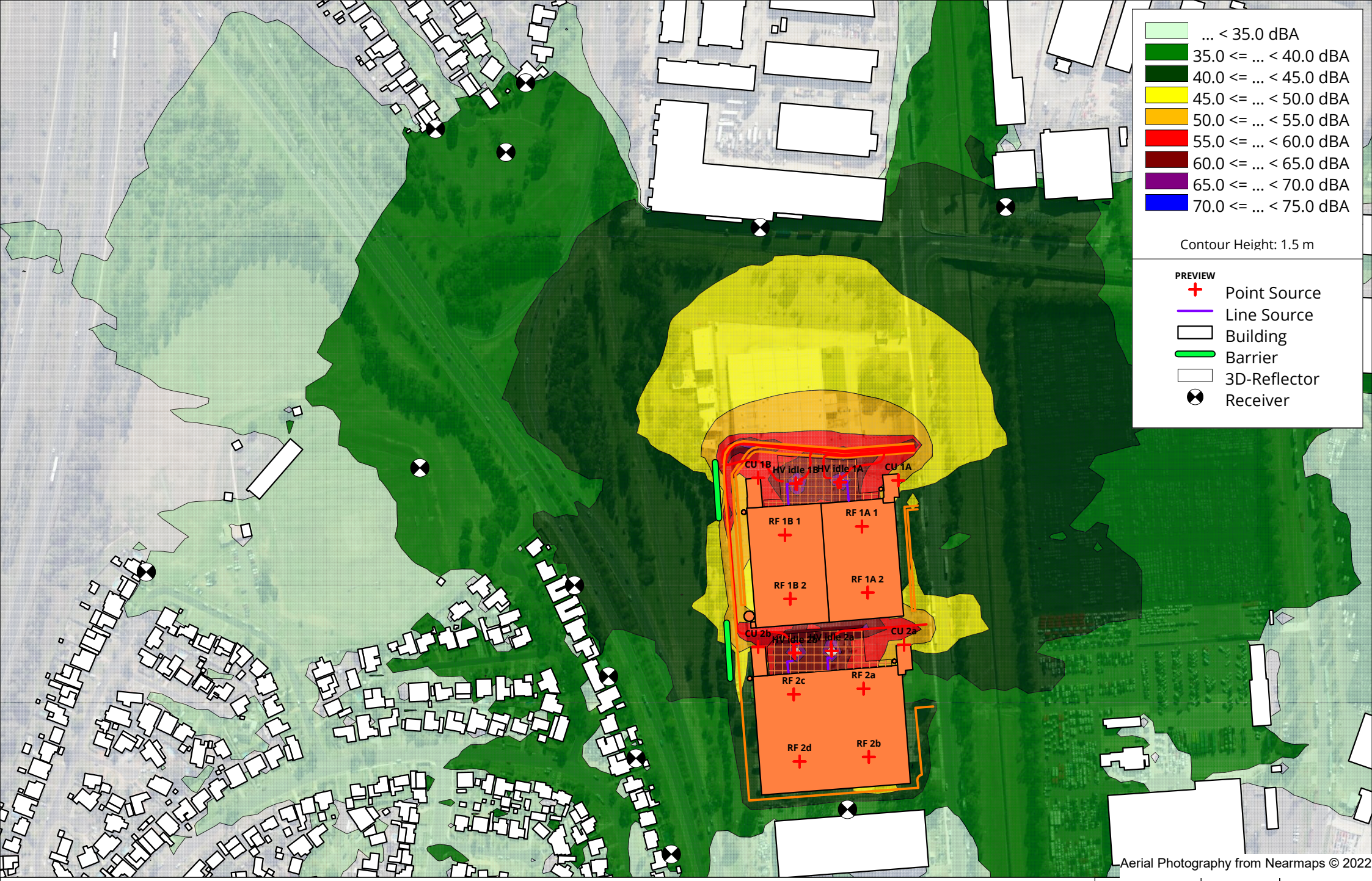
Noise contours - day period

Warehouse A, B & 2

True North

Project No. 2205167

Drawn by: APIN	Figure:**D-01**
Scale:	1:5000 on A4
Date:	01.11.2022



Operational Noise Impact Assessment

Noise contours - evening period

Warehouse A, B & 2

True North

Project No. 2205167

Drawn by: APIN	Figure:**D-02**
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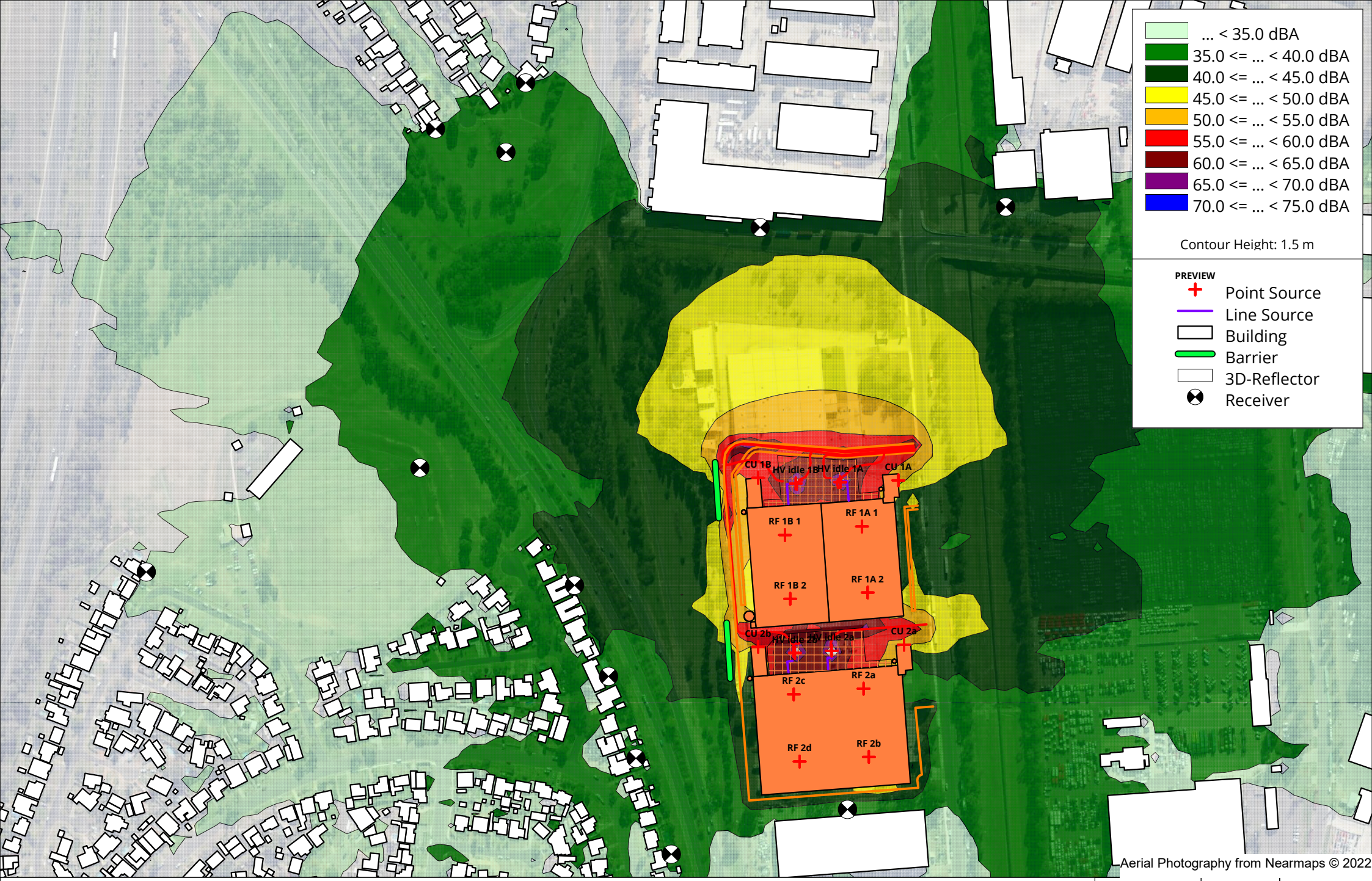

Operational Noise Impact Assessment

Noise contours - night period

Warehouse A, B & 2

True North

Project No. 2205167

Drawn by: APIN	Figure:**D-03**
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Date:	01.11.2022