88 Newton Road, Wetherill Park

Noise and Vibration Impact Assessment

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E-LAB Consulting

Where science and engineering inspire design.

Document QA and Revisions

ISSUE	DATE	COMMENTS	ENGINEER	REVIEWER
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3				
4				

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Acoustics & Vibration

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1 EXECUTIVE SUMMARY

This Noise and Vibration Impact Assessment has been prepared by E-LAB Consulting to accompany a Development Application for the proposal at 88 Newton Road, Wetherill Park. The proposal is for the demolition of existing buildings and structures, construction and operational use of a single-storey warehouse and distribution centre with ancillary office space and amenities, on-site parking, landscaping and access, and other associated works including bulk earthworks, site preparation works and site clearance, as well as augmentation and construction of servicing utilities. A detailed breakdown of the proposed development is provided below:

- Single-storey warehouse and distribution centre with ancillary office space and amenities, on-site parking, landscaping and access, and other associated works.
- Car parking for 213 vehicles across two levels of carparking (Ground and Level 1) on the eastern corner of the development.
- Heavy vehicle access via a dedicated entry in the south western corner of the site, and exit driveway in the northern eastern corner.
- Single entry/exit driveway for cars towards the north eastern corner of the site off Newton Road.
- A total of 18 loading docks.
- Warehouse floor area of 28,850m^2 and office/dock office area totalling 1,400m^2.
- 24/7 operational hours are proposed.

This report concludes that the proposal is acceptable and supportable subject to the implementation of the mitigation measures outlined below.

- Typical mitigation measures for mechanical plant and equipment are outlined in Section 10.1, to be refined and finalised during the design development stage once equipment selections and detailed designs have progressed further.
- Reasonable and feasible construction noise and vibration mitigation measures in-line with the recommendations of the ICNG and AS2436 are outlined in Section 9.

Following implementation of the above mitigation measures, the proposal is appropriate from a noise and vibration perspective.

2 INTRODUCTION

This Noise and Vibration Impact Assessment (NVIA) has been prepared to accompany a Development Application (DA) for the development to be located at 88 Newton Road, Wetherill Park. The proposal includes construction of a single storey warehouse facility and associated spaces.

In summary, this assessment shall address the following key acoustics considerations:

- Noise generated by vehicles movements (trucks, cars and other moving equipment) and warehouse activities from general operation of the site
- Noise impacts of additional traffic on surrounding local roads generated by the proposed development
- Noise emissions from mechanical plant associated with the development
- Noise and vibration impacts from the construction of the development

The acoustic, noise and vibration legislation, standards and guidelines applicable to the proposal include:

- Fairfield Citywide Development Control Plan 2013 Amendment 22 – Chapter 9 Industrial Development (**DCP**)
- Fairfield City Council Local Environment Plan 2013 (**LEP**)
- NSW EPA *Road Noise Policy* 2011 (**RNP**)
- NSW EPA Noise Policy for Industry 2017 (**NPfI**)
- NSW EPA Interim Construction Noise Guideline 2009 (**ICNG**)
- AS 2436:2010 (R2016) Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites (AS 2436:2010)
- BS 6472:1992 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz) (BS 6472)
- BS 7385.2:1993 Evaluation and Measurement for Vibration in Buildings Part 2: Guide to Damage Levels from Ground-borne Vibration (BS 7385)
- DIN 4150.3:1999 Structural Vibration Part 3: Effects of Vibration on Structures (DIN 4150)

3 PROJECT OVERVIEW

3.1 SITE DESCRIPTION

The location of the proposal, noise monitoring and measurement positions are shown in Figure 1. Figure 1 also presents a summary of the most affected noise-sensitive receivers which have been delineated into receiver catchments (RCs).

Figure 1: Acoustic site plan identifying the surrounding noise-sensitive receivers and relevant noise monitoring locations

A detailed description for each receiver catchment is provided in Table 1, in addition to the approximate distance from the proposed development. it is noted the project site is located within the Wetherill Park Industrial Area and surrounded by industrial use development.

Table 1: Description of noise sensitive receiver catchments

RECEIVER CATCHMENT	DESCRIPTION OF RECEIVERS	APPROXIMATE DISTANCE
RC1	Mixed uses including, commercial, industrial and residential, situated west of the project site along Cowpasture Road, on the edge of existing industrially zoned development.	1500m
RC2	Industrial use development surrounding the project site along Newton Road and Victoria Street. These receivers share a common boundary with the project site.	N/A (Along common site boundaries)
RC3	Active recreation use development (sporting complexes) situated north-east of the project site along Gipps Road.	2600m
RC4	Residential development situated north-east of the project site along Gipps Road.	3200m
RC5	Industrial use development situated north-east of the project site along the Liverpool-Parramatta Transitway and Gipps Road.	3200m

RECEIVER CATCHMENT	DESCRIPTION OF RECEIVERS	APPROXIMATE DISTANCE
RC6	Residential development situated south of the project site along The Horsley Drive.	600m
RC7	Childcare centre at Unit 102 of 1183-1187 The Horsley Drive, situated on the north-western corner of the building. This childcare is the nearest to the project site	500m

3.2 DEVELOPMENT PROPOSAL

The proposal is for the demolition of existing buildings and structures, construction and operational use of a single-storey warehouse and distribution centre with ancillary office space and amenities, on-site parking, landscaping and access, and other associated works including bulk earthworks, site preparation works and site clearance, as well as augmentation and construction of servicing utilities. A detailed breakdown of the proposed development is provided below:

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- A total of 18 loading docks.
- Warehouse floor area of 28,850m^2 and office/dock office area totalling 1,400m^2.
- 24/7 operational hours are proposed.

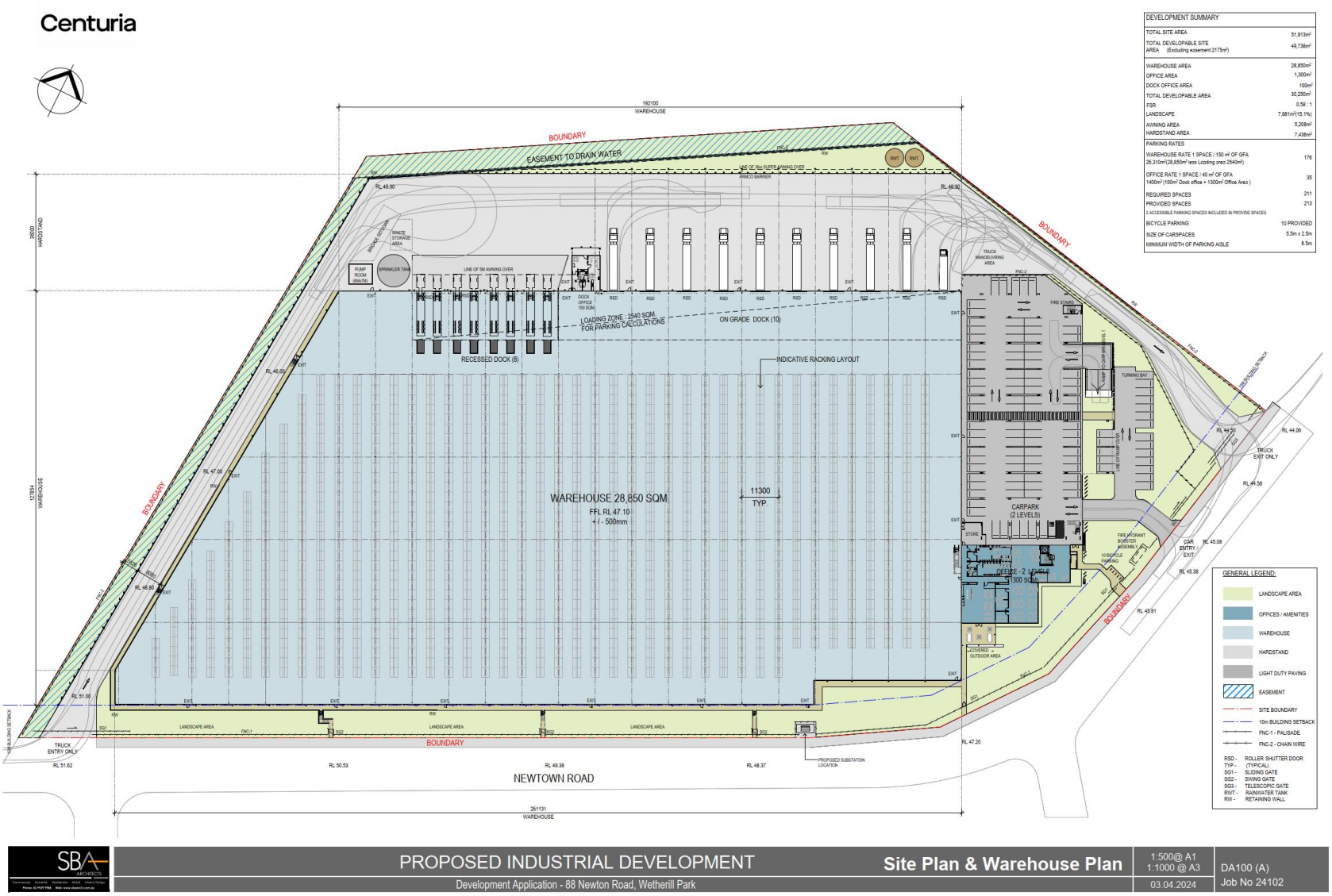
A layout of the site is shown in Figure 2.

3.3 SITE ACOUSTIC CONSIDERATIONS

Upon reviewing the design documentation prepared for the DA, the noise and vibration impacts to consider in this NVIA include the following:

- Noise generated by vehicles movements (trucks, cars and other moving equipment such as forklifts) within areas on the project site, and from general operation of the site;
- Noise impacts of additional traffic on surrounding local roads generated by the proposed development;
- Noise emissions from mechanical plant associated with the development to surrounding noise-sensitive receivers; and
- Noise and vibration impacts during the construction of the development to surrounding noise sensitive receivers.

Figure 2: General site layout (SBA Architects Ground floor plan, Drawing DA100 dated 03/04/2024)



4 NOISE SURVEYS

4.1 INSTRUMENTATION

The equipment used for noise surveys is summarised below:

- Bruel and Kjaer 2250 Integrating Sound Level Meter (S/N: 3031115)
- Bruel and Kjaer type 1 microphone – comprising of:
  - ZC 0032 preamplifier (S/N: 31930)
  - 4189 capsule (S/N: 3334640)
- Bruel and Kjaer Sound calibrator Type 4231 (S/N: 3029638)
- 3 x Convergence Instruments Sound Level Meter Data Logger (NSRT_mk3 Type 1)
  - S/N: CPh+jHUSW1W9CjNCQ4jZHD
  - S/N: ClF+DdW68Vc9ArlQy8h5tD
  - S/N: AHDWj%Uy8fW9iLvSyyhxND

All equipment was calibrated prior to the measurement period, and no significant drift was observed following the measurement period. All equipment carries current traceable calibration certificates that can be provided upon request.

4.2 SHORT-TERM (ATTENDED) NOISE MONITORING

Short-term attended noise measurements have been conducted at the subject site to qualify and supplement long-term unattended noise monitoring, and to determine environmental noise characteristics and ultimately confirming that the selection of the long-term monitoring location is valid.

4.2.1 Ambient Noise Levels

Attended noise measurements were conducted on Friday 7 July 2023. The results of attended noise measurement conducted at the locations indicated in Figure 1 is provided in Table 2.

Table 2: Short-term noise measurement summary – Ambient Noise – Friday 7 July 2023

MEASUREMENT LOCATION	MEASUREMENT TIME	L_{Aeq} dB(A)	L_{A90} dB(A)	COMMENTS
ST1	3.15pm	60	49	Intermittent noise from traffic along Redmayne Street, dogs barking from Eclypse K9 Security approx. 200m away
ST2	4.00pm	52	46	Noise from the natural environment, distant industry audible, distant traffic audible
ST3	2.30pm	66	56	Characterized by traffic along The Horsley Drive, some noise from Kennards Hire
	2.45pm	67	57	

4.3 LONG-TERM NOISE MONITORING

Long-term noise monitoring has been conducted at the project site at locations LT1 to LT3 as labelled in Figure 1. A detailed description of the monitoring locations, and acoustic characteristics of the surrounding environment are provided in Table 3.

L_{90} is a statistical measurement giving the sound pressure level which is exceeded for 90 percent of a measurement period. L_{90} is commonly referred to as a basis for measuring the background noise level.

$L_{Aeq,T}$ is the equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

Table 3: Noise monitoring locations and description

MONITOR LOCATION	MONIITOR ADDRESS AND DESCRIPTION	ACOUSTIC CHARACTERISTICS OF ENVIRONMENT
LT1	On Redmayne St, 150m west of Ferres Rd in bushes to the south	▪ Dogs barking from Eclipse K9 Security to the southwest ▪ Local traffic ▪ Noise from the natural environment
LT2	In reserve adjacent to 73 Munro St	▪ Noise from the natural environment ▪ Distant industry audible ▪ Distant traffic audible
LT3	In reserve opposite 12 Tolmer St	▪ Dominated by traffic along The Horsley Drive ▪ Noise from the natural environment ▪ Distant industry audible

4.3.1 LONG-TERM NOISE MONITORING – TRAFFIC NOISE

Traffic noise levels obtained from long-term noise monitoring are presented in Table 4. The description of time of day is outlined within the NSW Planning Guidelines; SEPP (Transport and Infrastructure) and Development Near Rail Corridors and Busy Roads – Interim Guideline and described as follows.

- Day – the period from 7:00am to 10:00pm
- Night – the period from 10:00pm – 7:00am

Table 4: Unattended traffic noise monitoring results

LOCATION	MEASURED TRAFFIC NOISE LEVELS – dB(A) $L_{Aeq,period}$	
	DAY (MEASURED)	NIGHT (MEASURED)
LT1	58	53
LT2	52	46
LT3	65	61

4.3.2 LONG-TERM NOISE MONITORING – BACKGROUND NOISE

Background noise levels and subsequent Rating Background Noise Levels (RBLs) have been established in accordance with the Noise Policy for Industry 2017 using the results of the noise monitoring.

We note the NPfI recognises that there are times of day when there is a clear change in the noise environment (such as early morning shoulder periods), where it may be unreasonable to expect operations to be assessed against the night-time project noise trigger levels as background noise levels steadily rise in early morning hours. Appendix A3 of the policy provides a method in deriving a shoulder period rating background noise level.

In light of the above, time periods used in this assessment have been determined in accordance with the NPfI and are summarized as follows:

- Day – the period from 7:00am to 6:00pm Monday to Saturday, 8am to 6pm on Sundays and public holidays
- Evening – the period from 6:00pm to 10:00pm
- Night – the period from 10:00pm – 5:00am

Table 5 provides a summary of ambient noise levels in line with the periods listed above. Also refer to graphical noise monitoring data provided in Appendix A.

Table 5: Long-term unattended noise monitoring results

LOCATION	MEASURED EQUILAVENT CONTINUOUS NOISE LEVEL – L_{eq} dB(A)			MEASURED RATING BACKGROUND NOISE LEVELS – L_{90} dB(A)		
	DAY	EVENING	NIGHT	DAY	EVENING	NIGHT
LT1	59	54	53	44	44	42
LT2	52	49	46	43	43	40
LT3	65	64	61	55	49	40

5 CONSTRUCTION NOISE AND VIBRATION CRITERIA

5.1 CONSTRUCTION NOISE CRITERIA

The noise criteria outlined within the Interim Construction Noise Guideline (ICNG) 2009 has been adopted for the assessment of noise emissions from the construction of the proposal.

5.1.1 Airborne Noise – Residential Receiver Catchments

The airborne noise criteria for surrounding residential receiver catchments (RC1 – RC3) has been extracted from Table 2 of the ICNG and is presented in Table 6 below.

Table 6: NSW ICNG construction noise criteria for surrounding residential receiver catchments

TIME OF DAY	MANAGEMENT LEVEL $L_{Aeq,15min}$ [1]	HOW TO APPLY
Recommended Standard Hours: Monday – Friday 7am – 6pm Saturday 8am – 1pm No work on Sundays or public holidays	Noise Affected RBL + 10dB	The noise-affected level represents the point above which there may be some community reaction to noise. ▪ Where the predicted or measured **$L_{Aeq,15min}$** 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 residences of the nature of works to be carried out, the expected noise levels and duration as well as contact details.
	Highly Noise Affected 75 dB(A)	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 in, taking into account: – 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) – 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 RBL + 5dB	▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. ▪ For guidance on negotiating agreements see section 7.2.2.

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

5.1.2 Airborne Noise – Other Sensitive Land Uses

Section 4.1.3 Table 3 of the ICNG provides guidance in establishing noise management levels for construction noise impacts at other sensitive land uses. Noise management levels applicable to noise sensitive receivers surrounding the site have been summarised in Table 7.

Table 7: ICNG noise management levels for other sensitive land uses

RECEIVER CATCHMENT	LAND USE	MANAGEMENT LEVEL, $L_{Aeq(15min)}$ (APPLIES WHEN PROPERTIES ARE BEING USED)
RC3	Active recreation	65 (External)
RC2 & RC5	Industrial	75 (External)
RC7	Childcare	65 (External)

5.1.3 Ground-borne Noise – Residential Receiver Catchments

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure, such as an excavator with a hydraulic hammer attachment, or impact/bore piling. The following ground-borne noise levels for residences have been extracted from Section 4.2 of the ICNG and indicate when management actions should be implemented.

- Evening (6pm to 10pm) – Internal Noise Level: $L_{Aeq,15min}$ 40 dB(A)
- Night-time (10pm to 7am) – Internal Noise Level: $L_{Aeq,15min}$ 35 dB(A)

An assessment of ground-borne noise to these levels is only required when the ground-borne noise levels are higher than airborne noise levels, and for surrounding residential receiver catchments. The ground-borne noise levels are for evening and night-time periods only. The levels shall be assessed at the centre of the most affected habitable room.

5.2 CONSTRUCTION VIBRATION CRITERIA

5.2.1 Human Comfort – Continuous and Impulsive Vibration Criteria

Where occupants can detect vibration in buildings, this may potentially impact on their quality of life or working efficiency. The level of vibration that affects the amenity of occupants within a building is lower than that associated with building damage. The NSW DEC have prepared a guideline, *"Assessing vibration: a technical guideline"*, which presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques.

Acceptable values of human exposure to continuous and impulsive vibration are dependent on the time of day and the activity taking place in the occupied space. Guidance on preferred values for continuous and impulsive vibration acceleration is provided in Table 8.

Table 8: Preferred and maximum weighted RMS values for continuous and impulsive vibration acceleration (m/s^2) 1-80 Hz

LOCATION	ASSESSMENT PERIOD[1]	PREFERRED VALUES		MAXIMUM VALUES	
		z-axis	x- and y-axes	z-axis	x- and y-axes
CONTINUOUS VIBRATION					
Critical[2]	Day- or night time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day- or night time	0.020	0.014	0.040	0.028
Workshops	Day- or night time	0.04	0.029	0.080	0.058
IMPULSIVE VIBRATION					
Critical[2]	Day- or night time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.30	0.21	0.60	0.42
	Night time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day- or night time	0.64	0.46	1.28	0.92
Workshops	Day- or night time	0.64	0.46	1.28	0.92

Note 1: Daytime is 7:00am to 10:00pm and night time is 10:00pm to 7:00am

Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992.

5.2.2 Human Comfort – Intermittent Vibration Criteria

Intermittent vibration is vibration which is perceived in separately identifiable repeated bursts. Its onset can be sudden, or there might be a gradual onset and termination bounding a more sustained event. The vibration dose value (VDV) defines a relationship that yields a consistent assessment of intermittent vibration and correlates well with subjective human response. Acceptable values of vibration dose have been extracted from Table 2.4 of the guideline and are presented in Table 9.

Table 9: Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

LOCATION	DAYTIME		NIGHT-TIME	
	PREFERRED VALUE	MAXIMUM VALUE	PREFERRED VALUE	MAXIMUM VALUE
Critical	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

5.2.3 Building Cosmetic Damage

Structural vibration thresholds are set to minimize the risk of cosmetic surface cracks and lie below the levels that have the potential to cause damage to the main structure. Table 10 presents guide values for building vibration, based on the vibration thresholds above which cosmetic damage has been demonstrated outlined within BS7385-Part 2:1993. These values are evaluated to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as 95% probability of no effect.

Table 10: Transient vibration guide values for cosmetic damage – BS 7385-2:1993

TYPE OF BUILDING	PEAK PARTICLE VELOCITY IN FREQUENCY RANGE OF PREDOMINANT PULSE (PPV)	
	4 HZ TO 15 HZ	15 HZ AND ABOVE
Reinforced or framed structures Industrial or light commercial type buildings	50mm/s	N/A
Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s	20mm/s (50mm/s at 40Hz and above)

5.2.4 Building Structural Damage

Structural damage criteria are established within DIN4150-Part 3 “Structural vibration in buildings – Effects on structures”. Table 11 indicates the vibration limits presented in DIN4150-Part 3, where upon exceeding these thresholds lies the risk in inducing structural damage.

Table 11: Guideline value of vibration velocity, vi, for evaluating the effects of short-term vibration – DIN4150-3

LINE	TYPE OF STRUCTURE	VIBRATION VELOCITY, IN MM/S FOUNDATION AT A FREQUENCY OF			PLANE OF FLOOR OF UPPERMOST FULL STOREY
		LESS THAN 10HZ	10 TO 50HZ	50 TO 100HZ*	ALL FREQUENCIES
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8
*For frequencies above 100Hz, at least the values specified in this column shall be applied					

6 OPERATIONAL NOISE AND VIBRATION CRITERIA

6.1 FAIRFIELD CITYWIDE DEVELOPMENT CONTROL PLAN 2013 AMENDMENT 22 – CHAPTER 9 INDUSTRIAL DEVELOPMENT

Chapter 9.10.6 (Industrial Development) of the DCP provides the following requirements to minimise the impact of noise generated by industrial activity:

a. *Noise and/or vibration generating activities are to be located within buildings or orientated away from residential properties or other sensitive land uses such as child care centres or places of public worship.*

b. *An Acoustic Engineers Report may be required to be prepared as part of a development application where Council considers that the proposed development has the potential to produce an adverse noise and/or vibration impact.*

In the absence of specific noise emission targets from the Fairfield City Wide DCP, operational noise emissions have been assessed against the requirements of the NSW EPA *Noise Policy for Industry* 2017 detailed below.

6.2 OPERATIONAL NOISE EMISSIONS

6.2.1 NSW EPA Noise Policy for Industry (NPI) 2017 – Industrial Noise

The NSW EPA's Noise Policy for Industry (NPfI) 2017 has been implemented to assess the noise impacts of mechanical plant and equipment, as well as other industrial noise sources on the surrounding receiver catchments.

The NPfI sets out a framework for the derivation of project noise trigger levels that are used to assess the potential impacts of noise from industry (and industrial noise sources) and indicate the noise level at which feasible and reasonable noise management measures should be considered.

This policy applies to noise sources from activities listed in Schedule 1 of the PoEO Act and those regulated by the EPA. This includes noise sources from mechanical plant and equipment within the proposed redevelopment, as well as activities in the operation of the site generally for which this policy will be applied.

The project noise trigger level provides a benchmark for assessing a proposal, where if exceeded, indicates a potential noise impact on the community and so triggers a management response such as additional mitigation measures. The project noise trigger level is the lower (the more stringent) value of the project intrusiveness noise level and project amenity noise level determined in Sections 2.3 and 2.4 of the NPfI, respectively.

Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (in terms of L_{Aeq}) measured over a 15-minute period does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. The project intrusiveness noise level is only applicable to surrounding residential receivers.

To account for the temporal variation of background noise levels, the method outlined in Fact Sheet A of the NPI establishes a method in determining the Rating Background Noise Level (RBL) to be used in the assessment.

The intrusiveness noise level is determined as follows:

$L_{Aeq,15min}$ (Intrusiveness Criteria) = Rating Background Noise Level (RBL) + 5 dB(A)

Table 12 provides the project intrusiveness noise levels applicable to each of the surrounding residential noise-sensitive receivers based on the measured background noise levels provided in Table 5.

Table 12: Project intrusiveness noise level criteria for each residential receiver

RECEIVER	TIME OF DAY	MEASURED RBL - dB(A)	PROJECT INTRUSIVENESS NOISE LEVELS - $L_{Aeq,15min}$ dB(A)
RC1 – Residential[1]	Day	44	49
	Evening	44	49
	Night	42	47
RC4 – Residential[2]	Day	43	48
	Evening	43	48
	Night	40	45
RC6 – Residential[3]	Day	55	60
	Evening	49	54
	Night	40	45

Note 1: Based on noise monitoring results at LT1.
Note 2: Based on noise monitoring results at LT2.
Note 3: Based on noise monitoring results at LT3.

Project Amenity Noise Level

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level 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 Amenity Noise Level = Recommended Amenity Noise Level (see Table 14) – 5 dB(A)

The following exceptions to the above method to derive the project amenity noise level apply:

- In areas with high traffic noise levels. Where the level of transport noise, road traffic noise in particular is high enough to make noise from an industrial source inaudible, the project amenity noise level shall be set at 15 dB(A) below the measured $L_{Aeq,period(traffic)}$ for the particular assessment period
- In proposed developments in major industrial clusters
- Where the resultant project amenity noise level is 10 dB(A) or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB(A) below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time
- Where cumulative industrial noise is not a necessary consideration because no other industries are present in the area, or likely to be introduced into the area in the future. In such cases the relevant amenity noise level is assigned as the project amenity noise level for the development
- Table 2.3 of the NPfI provides guidance on assigning residential receiver noise categories; being Rural, Suburban or Urban. The following descriptions have been replicated from the policy:

Table 13: Residential receiver category descriptions for Suburban and Urban residences

RECEIVER CATEGORY	TYPICAL EXISTING RBL'S	DESCRIPTION
Urban	Daytime > 45dB(A) Evening > 40dB(A) Night > 35dB(A)	An area with an acoustical environment that: ▪ Is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources ▪ Has through-traffic with characteristically heavy and continuous traffic flows during peak periods ▪ Is near commercial districts or industrial districts ▪ Has any combination of the above

In consideration of the above, we note the following based on long-term noise monitoring and on-site observations:

- Existing background noise levels at nearby residences are generally consistent with those associated with an Urban" residence.
- Existing land-use surrounding the site is predominantly industrial, or commercial.
- Ambient noise levels in the existing acoustical environment are governed by industrial noise sources and traffic, both located adjacent to the site and further in the distance.

On this basis, the receiver noise category most applicable to nearby residences is the Urban classification. The recommended amenity noise level, project amenity noise level, and converted project amenity noise level for comparison with the intrusiveness criteria (from time-of-day period to 15-minute) is provided for each surrounding receiver catchment in Table 14.

Table 14: Project amenity noise level criteria for each receiver catchment

RECEIVER TYPE	TIME OF DAY	RECOMMENDED AMENITY NOISE LEVEL - $L_{Aeq,period}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,period}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,15min}$ dB(A)
Residential – Urban	Day	60	55	58
	Evening	50	45	48
	Night	45	40	43
Commercial Premises	When in use	65	60	63
Industrial Premises	When in use	70	65	68
Active Recreation[1]	When in use	55	50	53
School Classroom (Childcare, external)[2]	When in use	60	55	58

Note 1: Also applies to external play areas serving childcare receivers.
Note 2: Project amenity noise levels adjusted to 15dB below the $LA_{eq(period, traffic)}$ as per Section 2.4.1 of the NPfI.

Corrections for Annoying Noise Characteristics – Noise Policy for Industry Fact Sheet C

Fact Sheet C contained within the Noise Policy for Industry outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels established within this report, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- The contribution noise level from the premises when assessed/measured at a receiver location, and
- The nature of the noise source and its characteristics (as set out in Fact Sheet C)

Table C1 within Fact Sheet C sets out the corrections to be applied for any assessment in-line with the NPI. The corrections specified for tonal, intermittent and low-frequency noise are to be added to be added to the measured or predicted levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion.

Project Noise Trigger Levels

Table 15 presents the project intrusiveness and project amenity noise levels for each period, and each receiver catchment, as well as the resultant project noise trigger levels (PNTLs) that shall be applied for any assessment of impacts of mechanical plant and equipment noise on the surrounding receiver catchments.

Table 15: Project noise trigger levels (PNTL) to be applied to each surrounding receiver type

RECEIVER TYPE	TIME OF DAY	PROJECT INTRUSIVENESS NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	SLEEP DISTURBANCE NOISE LEVEL - dB(A)	PROJECT NOISE TRIGGER LEVEL - $L_{Aeq,15min}$ dB(A)
RC1 – Residential (Urban)	Day	49	58	-	49
	Evening	49	48	-	48
	Night	47	43	43dB(A)L_{eq} and 57dB(A)L_{max}	43dB(A)L_{eq} and 57dB(A)L_{max}
RC4 – Residential (Urban)	Day	48	58	-	48
	Evening	48	48	-	48
	Night	45	43	45dB(A)L_{eq} and 55dB(A)L_{max}	43dB(A)L_{eq} and 55dB(A)L_{max}
RC6 – Residential (Urban)[1]	Day	60	58	-	58
	Evening	54	49[2]	-	49
	Night	45	46[2]	45dB(A)L_{eq} and 55dB(A)L_{max}	45dB(A)L_{eq} and 55dB(A)L_{max}
RC2, RC5 – Industrial Premises	When in use	-	68	-	68

RECEIVER TYPE	TIME OF DAY	PROJECT INTRUSIVENESS NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	SLEEP DISTURBANCE NOISE LEVEL - dB(A)	PROJECT NOISE TRIGGER LEVEL - $L_{Aeq,15min}$ dB(A)
RC3 – Active recreation	When in use	-	53	-	53
RC7 – Childcare (External areas)	When in use	-	53	-	53

Note 1: Project amenity noise levels adjusted to 15dB below the $LA_{eq(period, traffic)}$ as per Section 2.4.1 of the NPfI.
Note 2: Adjusted for highly traffic noise affected.

6.2.2 Sleep Disturbance

Noise Policy for Industry

Where the proposed redevelopment night-time noise levels generated at a residential location exceed either:

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

a detailed maximum noise level event assessment should be undertaken. The NPfI, in Section 2.6 also outlines that an external noise level of Lamax 60-65dB(A) is unlikely to cause awakening reactions.

Road Noise Policy

Furthermore, the RNP provides research over 30 years for sleep disturbance and concludes the following:

- maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep
- one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

We have based our sleep disturbance assessment on the above descriptors and is summarised as follows:

- An external L_{Amax} noise level of 60-65dB(A) is unlikely to awaken people from sleep
- For one or two L_{Amax} events of 75-80dB(A) are not likely to adversely affect health and wellbeing significantly

  This is based on the assumption that there is a 10dB(A) reduction from outside to inside

Based on the abovementioned research and applicable guidelines, an L_{Amax} 65dB(A) as an external noise level has been used in this assessment for sleep awakenings.

6.3 TRAFFIC NOISE GENERATION

Road traffic noise impact is assessed in accordance with the NSW Road Noise Policy (RNP). The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below in Table 16.

Table 16: NSW RNP – Traffic Noise Assessment Criteria

ROAD CATEGORY	TYPE OF PROJECT/LAND USE	ASSESSMENT CRITERIA – dB(A)	
		DAY (7AM – 10PM)	NIGHT (10PM – 7AM)
Freeway/ arterial/ sub-arterial roads	1. Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq, (15\ hour)}$ 55	$L_{Aeq, (15\ hour)}$ 50
	2. Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads	$L_{Aeq, (15\ hour)}$ 60	$L_{Aeq, (15\ hour)}$ 55
	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments		
Local Roads	4. Existing residences affected by noise from new local road corridors	$L_{Aeq, (1\ hour)}$ 55	$L_{Aeq, (1\ hour)}$ 50
	5. Existing residences affected by noise from redevelopment of existing local roads		
	6. Existing residences affected by additional traffic on existing local roads generated by land use developments		

In the event that the traffic noise at the site is already in excess of the criteria noted above, the NSW RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 of the RNP states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding 'no build option'.

Also, the inherent quality of noise from vehicles on public roads arriving to and departing from the site would be indistinguishable from other traffic noise on public roads.

7 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

7.1 CONSTRUCTION PROGRAMME

A breakdown of the indicative stages of work associated with the proposal is provided in Table 17.

Table 17: Indicative stages of work and expected duration

STAGE OF WORKS	ACTIVITIES TO BE UNDERTAKEN	INDICATIVE DURATION
Demolition and Civil Works	▪ Demolition of existing structures and tree removal ▪ Bulk earthworks to level and terrace the site	6-8 months
Construction and Landscaping	▪ Construction and landscaping including earthworks, retaining walls, drainage and essential services	18 months

The proposed hours of construction are expected to be in-line with the recommended standard hours in Section 2.2 of the ICNG, as summarised in Table 18:

Table 18: ICNG Recommended Standard Construction Hours

DAY OF THE WEEK	ICNG RECOMMENDED STANDARD CONSTRUCTION HOURS
Monday to Friday	7am to 6pm
Saturday	8am to 1pm
Sunday or public holidays	No work

In the event works are proposed to be conducted outside of those listed above, further discussion is provided in Section 9.1.3.

7.2 EXPECTED CONSTRUCTION EQUIPMENT

The indicative noise sources likely to be associated with the works listed in the previous section of this report are summarised in Section 7.2. The equipment sound power levels (SWL) have been extracted from AS2436:2010 "Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites" and from onsite measurements of similar equipment.

Table 19: Indicative construction equipment and respective noise levels

STAGES	EQUIPMENT	SWL – dB(A)	ACOUSTICAL USAGE FACTOR (%)	USAGE IN 15-MINUTE PERIOD (MINUTES)	TIME CORRECTED SWL – dB(A) $L_{Aeq,15min}$	QUANTITY
Demolition	Excavator breaker[1]	120	40	6	116	4
	Bobcat	107	70	10.5	105	6
	Dump truck	108	40	6	104	4
	General truck	107	40	6	103	4
	Powered hand tools	102	50	7.5	99	-

STAGES	EQUIPMENT	SWL – dB(A)	ACOUSTICAL USAGE FACTOR (%)	USAGE IN 15-MINUTE PERIOD (MINUTES)	TIME CORRECTED SWL – dB(A) $L_{Aeq,15min}$	QUANTITY
Civil Works	Excavator breaker	115	70	10.5	113	4
	Excavator with bucket	105	70	10.5	103	4
	Bobcat	107	70	10.5	105	4
	Dump truck	108	40	6	104	4
	General truck	107	40	6	103	4
Construction	Mobile Crane	110	100	15	110	2
	General Truck	107	40	6	103	4
	Concrete Pump Truck	107	100	15	107	2
	Powered Hand Tools	102	50	7.5	99	-
	Bobcat / Forklift	107	50	7.5	104	6

Note 1: Adjusted by a 5dB(A) penalty where noise sources are considered particularly annoying (typically such as saw cutting and hammering).

7.3 NOISE MODELLING AND ASSUMPTIONS

To assess the noise impact from the site during the various construction stages, a noise model was prepared using commercial software SoundPLAN v9.0, which is a comprehensive software package for conducting three-dimensional complex noise propagation modelling. Using the software, a 3D model of the site and its surroundings was constructed including the nearby buildings, and the construction plant and equipment were positioned as noise sources. Within the model, the effects of the environment (built and natural) on propagation of sound were considered to reliably estimate the resulting noise effects on the surrounding noise sensitive receivers.

The noise model represents the 'reasonable' worst case periods of construction activities, meaning that all the equipment of each stage is operating simultaneously during a 15-minute observation period.

The assumptions that were made within the assessment include the following:

- The predicted noise levels represent the worst-case scenario for each receiver
- The mitigation measures outlined in Section 9 are implemented
- Neutral weather conditions

7.4 PREDICTED NOISE LEVELS

Noise levels have been assessed to the construction noise management levels established in Section 5.1. The noise contour maps produced by the three-dimensional noise propagation modelling are provided in Appendix C for indicative works. Predicted noise levels for the demolition, civil works and construction stages have been presented in Table 20 to Table 22. Corresponding noise emission contours are presented in Appendix C.

Table 20: Predicted noise levels – Demolition Works

RECEIVER CATCHMENT	PREDICTED LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	COMPLIES WITH HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1 – Residential (Urban)	36	54	0	Yes
RC2 – Industrial	73	75	0	N/A
RC3 – Active Recreation	31	65	0	N/A
RC4 - Residential (Urban)	< 30	53	0	Yes
RC5 - Industrial	< 30	75	0	N/A
RC6 – Residential (Urban)	38	65	0	Yes
RC7 – Childcare (External active recreation spaces)	48	65	0	N/A

Table 21: Predicted noise levels – Civil Works

RECEIVER CATCHMENT	PREDICTED LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	COMPLIES WITH HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1 – Residential (Urban)	33	54	0	Yes
RC2 – Industrial	71	75	0	N/A
RC3 – Active Recreation	< 30	65	0	N/A
RC4 - Residential (Urban)	< 30	53	0	Yes
RC5 - Industrial	< 30	75	0	N/A
RC6 – Residential (Urban)	38	65	0	Yes
RC7 – Childcare (External active recreation spaces)	46	65	0	N/A

Table 22: Predicted noise levels – Construction

RECEIVER CATCHMENT	PREDICTED LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	COMPLIES WITH HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1 – Residential (Urban)	31	54	0	Yes
RC2 – Industrial	74	75	0	N/A
RC3 – Active Recreation	< 30	65	0	N/A
RC4 - Residential (Urban)	< 25	53	0	Yes
RC5 - Industrial	< 25	75	0	N/A
RC6 – Residential (Urban)	34	65	0	Yes
RC7 – Childcare (External active recreation spaces)	43	65	0	N/A

7.5 CONSTRUCTION VIBRATION ASSESSMENT

It is expected that majority of vibration intensive activities will only occur during the excavation phase if rock breaking and hammering were to occur. Safe working distances for vibration intensive plant for both "cosmetic" damage (in accordance with BS 7385) and human comfort (in accordance with Assessing Vibration – a technical guideline), have been provided, based on the Transport for NSW's "Construction Noise Strategy (2013)". The recommended safe working distances for vibration intensive plant listed above are provided in Table 23.

Table 23: Recommended safe working distances for vibration intensive plant

ACTIVITY / ITEM	SAFE WORKING DISTANCE (METRES)	
	COSMETIC DAMAGE (BS 7385)	HUMAN RESPONSE (OH&E VIBRATION GUIDELINE)
Small Hydraulic Hammer (5t to 12t excavator)	2m	7m
Medium Hydraulic Hammer (12t to 18t excavator)	7m	23m
Large Hydraulic Hammer (18t to 34t excavator)	22m	73m

The nearest vibration sensitive receivers are industrial use buildings situated north of the project site. As such, attended vibration monitoring shall be conducted at the commencement of vibration inducing activities (rock breaking and hammering) in order to verify the safe working distances. If the levels are compliant with the vibration limits as listed in Section 5.2 then work may proceed based on the implementation of the measures detailed in this report.

If there are exceedances, reasonable and feasible mitigation measures should be considered to lessen the impact, such as an alternative method of activity or using machinery with less capacity, and additional vibration monitoring should be conducted.

8 OPERATIONAL NOISE AND VIBRATION IMPACT ASSESSMENT

8.1 Noise-Enhancing Meteorological Conditions

Noise enhancing meteorological conditions have been conservatively adopted for all assessment periods as discussed in Fact Sheet D of the NPfI. This includes assessing against the following parameters; Pasquill-Gillford stability category F with winds up to 2 m/s at 10m.

8.2 Modelling Assumptions

3D acoustic modelling for operational noise emissions levels has been conducted using the software SoundPLAN v9.0. Operational noise emissions were predicted using the CONCAWE noise propagation algorithm which allows for the effects of meteorological conditions (as identified in Section 8.1) to be accounted for when assessing noise propagation over large distances.

The resultant operational noise contours from SoundPLAN modelling are presented in Appendix B.

8.3 Operational Noise Assessment

An assessment of noise generated by operational activities associated with the warehouse facility has been conducted to calculate the noise impacts on surrounding noise sensitive receivers. A breakdown of typical activities, equipment, and vehicle movements associated with the development is presented in sections below.

8.3.1 Mechanical Plant and Equipment Noise Impact Assessment

Major external mechanical plant and equipment servicing the proposed site are expected to be limited to roof-mounted exhaust fans and outdoor air-conditioning condensers. At this stage of the proposed development, mechanical plant and equipment selections have not been made. During the design development stage of the project, the mitigation measures outlined in Section 10.1 should be considered when preparing the mechanical services to design to ensure compliance with the external noise emissions criteria established in Section 6.2.

Notwithstanding, an assessment of noise from mechanical plant and equipment has been undertaken based on the equipment sound power levels, quantity and location are as per Table 24.

Table 24: Indicative noise levels for major external plant and equipment

EQUIPMENT TYPE	QUANTITY	LOCATION	ASSUMED SOUND POWER LEVEL $L_{Aeq,period}$ - dB(A)
Roof Mounted Exhaust Fans -	15	Evenly distributed across warehouse roof area.	80
Outdoor AC Condenser Units (VRV's)	5	Roof mounted on south-east corner	85

8.3.2 On-site Vehicle Movements

A *Transport Assessmen*t for the development has been undertaken by Ason Group, Revision 02 dated 9th April 2024. The following information has been extracted from the *Transport Assessment*:

- The heavy vehicle component of vehicular trips associated with the development will be equal to 23 percent.
- A total of 66 vehicle trips are expected to be generated by the development (i.e. 51 light vehicles, 15 heavy vehicles) in any peak hour.
- Based on the above, in any peak 15-minute period the development will conservatively generate up to 4 heavy vehicle movements and 13 light vehicle movements.

For the purpose of the NVIA, we have adopted the following acoustic assumptions in line with the Ason Group *Transport Assessment:*

- Within a peak 15-minute period (any time of the day), there will be up to 4 heavy vehicle movements (2 arriving, 2 leaving) and 13 light vehicle movements within the carpark.
- All vehicles are assumed to travel at a speed of 10km/h while on the premises.
- Trucks are assumed to idle for up to 10 minutes while in hardstand areas after entering, and prior to departing.
- Vehicle sound power levels are assumed to be equal to those provided in Table 25.

8.3.3 Internal Warehouse Operation

Based on measurements of similar warehouse and distribution facilities undertaken by this office, an internal sound pressure level of 70dB(A)$L_{eq(15min)}$ is assumed within the warehouse from activities such as pallet jacks, forklifts and powered hand tools. It is assumed that the roller shutter doors on the northern building façade are open at all times while the development is in operation.

8.3.4 External Warehouse Operation (Hardstand Areas)

The following external noise generating activities are expected to be undertaken in hardstand areas based on the proposed development use as a warehouse and distribution centre:

- Powered hand tools for vehicle repair or maintenance.
- Use of forklifts externally.

Equipment sound power levels are assumed to be equal to those provided in Table 25.

8.3.5 Outdoor Lunch Areas

Noise from the use of outdoor lunch areas on the southern edge of the warehouse offices have been assessed based on the following assumptions:

- A conservative estimate of up to 1 person per 2 square metres occupying the outdoor lunch areas at any given time. This equals to a total of 35 people across the covered outdoor area.
- One in two people in the outdoor lunch area will be speaking at any given time, with a conversational speech sound power level of 68dB(A) per person.

8.3.6 Operational Sound Power Levels

Source sound power levels used in the assessment of noise emissions from the proposed development are summarised in Table 25.

Table 25: Sound power levels of operational noise sources

OPERATIONAL NOISE SOURCE	ACTIVITY/INDIVIDUAL NOISE SOURCE	SOURCE/ACTIVITY SOUND POWER LEVEL
Truck movements on site	Trucks travelling at 10km/h	108dB(A)L_{eq}
	Truck idling	99dB(A)L_{eq}
	Truck air brake	120dB(A)L_{max}
Light vehicle movements on site	Car travelling at 10km/h	84dB(A)L_{eq}
	Car door closing	84dB(A)L_{max}
	Car engine starting	85dB(A)L_{max}
Internal Warehouse Operation	General warehouse activities (powered hand tools, forklift operation, pallet jacks, etc)	70dB(A)L_{eq}
External Warehouse Operation	Powered hand tools	102dB(A)L_{eq}
	Forklift operation	95dB(A)L_{eq}

8.3.7 Predicted Noise Levels

In consideration of the assumptions detailed above, noise emissions to surrounding noise sensitive receivers have been assessed based on a typical worst case 15-minute periods. Internal and external warehouse activities will operate as described in Section 8.3.3 and 8.3.4, and mechanical plant will be operating with noise levels as described in Section 8.3.1. Project trigger noise levels for residential receivers have been adopted for the Night period which is the most stringent. Predicted operational noise levels for the above scenarios are summarised in Table 26, and are also shown on operational noise contours in Appendix B.

Table 26: Predicted operational noise levels (L_{Aeq} noise emissions)

RECEIVER CATCHMENT	PREDICTED NOISE LEVEL, $L_{AEQ(15MIN)}$	PROJECT TRIGGER NOISE LEVEL, $L_{AEQ(15MIN)}$	COMPLIES
RC1 – Residential (Urban)	< 30	43	Yes
RC2 – Industrial	64	68	Yes
RC3 – Active Recreation	< 25	53	Yes
RC4 – Residential (Urban)	< 20	45	Yes
RC5 – Industrial	< 20	68	Yes
RC6 – Residential (Urban)	< 30	45	Yes
RC7 – Childcare (External active recreation spaces)	< 40	53	Yes

Events with the potential to cause sleep disturbances have been identified in Table 25. Predicted L_{Amax} noise levels are summarised in Table 27.

Table 27: Predicted operational noise levels (L_{Amax} noise emissions)

RECEIVER CATCHMENT	PREDICTED NOISE LEVEL, L_{AMAX}	EXTERNAL SLEEP DISTURBANCE TRIGGER LEVEL, L_{AMAX}	COMPLIES
RC1 – Residential (Urban)	43	65	Yes
RC4 - Residential (Urban)	< 30	65	Yes
RC6 – Residential (Urban)	33	65	Yes

8.4 Traffic Noise Generation

Section 5.1 of the Ason Group *Transport Assessment* provides an estimated traffic generation of the proposed development in comparison to the existing warehouse GFA on the site. The proposed development is expected to generate less than 30 additional vehicle trips in a peak hour, which is considered minor in the context of the site size, surrounding industrial precinct and existing road network.

We understand existing road networks carry traffic volumes exceeding 1000 vehicles in a peak hour. On this basis the predicted increase in traffic noise due to the development is less than 1dB(A) which is within the limits given in the Road Noise Policy criteria (as shown in Section 6.3). For this reason, we understand that the traffic generated by the proposed development will not have an adverse impact on nearby noise sensitive receivers.

9 CONSTRUCTION NOISE AND VIBRATION MITIGATION MEASURES

9.1 PROJECT SPECIFIC RECOMMENDATIONS

Project specific recommendations and required mitigation methods have been listed below. For general noise and vibration mitigation and management measures, refer to Section 9.2.

9.1.1 Noise

Noise impacts from construction activities will be greatest during demolition and civil works when heavy equipment such as excavator mounted hammering are located close to the site boundary.

A preliminary assessment of indicative works has been undertaken in Section 7. Noise modelling indicates that construction noise emissions to nearby noise sensitive receivers will not exceed the noise management levels prescribed in the NSW EPA ICNG, and will also not exceed the highly noise affected level at any residential receivers.

Notwithstanding the above, the following mitigation measures could be adopted as a best practice approach and reasonable and feasible measures to ensure noise emissions are minimised during each stage of construction:

- Where possible, stationary plant (such as concrete trucks, generators, vehicle hardstand areas) should be located centrally within the site or towards the southern edge of the project site to maximise their distance to industrial developments which share a common boundary to the north, east, and west.
- As much as possible, equipment such as trucks and concrete pumps should be switched off when not in use.

Site specific construction noise mitigation measures are expected to be finalised as part of a future Construction Noise and Vibration Management Plan once construction methodologies and staging are determined where reasonable and feasible.

9.1.2 Vibration

Residential receivers identified in Figure 1 will not be affected by construction vibrations impacts associated with the development.

The nearest potentially affected structure includes industrial use buildings to the north of the project site approximately 20m from the project boundary. Based on the indicative safe working distances listed in Table 23, the risk of cosmetic damage or adverse comment from building occupants is low. Notwithstanding, site specific safe working distances should be determined once vibration emission levels are measured on site prior to continuous operation.

9.1.3 Out of Hours Construction

Noise management levels for out of hours construction activities are summarised in Table 12 based on the ICNG recommendations detailed in Table 6.

Table 28: Project intrusiveness noise level criteria for each residential receiver

RECEIVER	TIME OF DAY	MEASURED RBL - dB(A)	OUT OF HOURS CONSTRUCTION NOISE MANAGEMENT LEVEL - $L_{Aeq,15min}$ dB(A)
RC1 – Residential (Urban)	Evening	44	49
	Night	42	47
RC4 – Residential (Urban)	Evening	43	48
	Night	40	45
RC6 – Residential (Urban)	Evening	49	54
	Night	40	45

Based on predicted noise levels from indicative works in Section 7.4, construction noise emissions at residential receivers are expected to satisfy the relevant out of hours construction noise management levels. In the event out of hours works are pursued, a detailed assessment is to be undertaken as part of a future Construction Noise and Vibration Management Plan once construction methodologies and staging are known.

9.2 GENERAL ACOUSTIC RECOMMENDATIONS FOR CONSTRUCTION

According to AS 2436 – 2010 "Guide to noise and vibration control on construction, demolition and maintenance sites" the following techniques could be applied to minimize the spread of noise and vibrations to the potential receivers.

9.2.1 Noise

If a process that generates significant noise levels cannot be avoided, the amount of noise reaching the receiver should be minimized. Two ways of achieving this are to either increase the distance between the noise source and the receiver or to introduce noise reduction measures such as screens.

Physical methods to reduce the transmission of noise between the site works and residences, or other sensitive land uses, are generally suited to works where there is longer-term exposure to the noise. Practices that will reduce noise from the site include:

- Increasing the distance between noise sources and sensitive receivers;
- Reducing the line-of-sight noise transmission to residences or other sensitive land uses using temporary barriers (stockpiles, shipping containers and demountable offices can be effective barriers); and
- Constructing barriers that are part of the project design early in the project to introduce the mitigation of site noise.

Screening

On sites where distance is limited, the screening of noise may be beneficial, and this should be taken into account when planning the method of construction.

If structures such as stores, site offices and other temporary buildings are situated between the noisiest part of the site and the nearest dwellings, some of the noise emission from the site can be reduced. If these buildings are occupied, sound insulation measures may be necessary to protect workers inside the buildings.

Storage of building materials or the placement of shipping containers between the noise source and any noise-sensitive area may also provide useful screening and the same is true of partially completed or demolished buildings. A noisy, stationary plant can be placed in a basement, the shell of which has been completed, provided reverberant noise can be controlled.

Where such noise barriers are not practical, a worthwhile reduction in noise can be obtained by siting the plant behind and as close as possible to mounds of earth, which may effectively screen any noise-sensitive areas from the plant. These can often be designed into the construction schedule or site arrangement for future landscaping.

In many cases it is not be practical to screen earthmoving operations effectively, but it may be possible to partially shield a construction plant or to build-in at the early stages protective features required to screen traffic noise. Where earth noise barriers are not practical due to lack of space, consideration should be given to the possibility of constructing temporary screens from wood or any equivalent material in surface density.

If the works are predominately within nominally closed structures, careful consideration should be given to reducing noise breakout at any openings.

Reversing and warning alarms

Community complaints often involve the intrusive noise of alarms commonly used to provide a safe system of work for vehicles operating on a site. Beeper reversing alarm noise is generally tonal and may cause annoyance at significant distances from the work site.

There are alternative warning alarms capable of providing a safe system of work that are equal to or better than the traditional 'beeper', while also reducing environmental noise impacts. The following alternatives should be considered for use on construction sites as appropriate:

- Broadband audible alarms incorporating a wide range of sound frequencies (as opposed to the tonal frequency 'beep') are less intrusive when heard in the neighbourhood;
- Variable-level alarms reduce the emitted noise levels by detecting the background noise level and adjusting the alarm level accordingly;
- Non-audible warning systems (e.g. flashing lights, reversing cameras) may also be employed, providing safety considerations, are not compromised;
- Proximity alarms that use sensors to determine the distance from objects, such as people or structures, and generate an audible alarm in cabin for the driver; and
- Spotters or observers.

The above methods should be combined, where appropriate.

9.2.2 Vibration

Vibration can be more difficult to control than noise, and there are few generalizations that can be made about its control. It should be kept in mind that vibration may cause disturbance by causing structures to vibrate and radiate noise in addition to perceptible movement.

During the demolition works and the erection of new structures, some vibrations (transmitted through the structure from the demolition sites) are not expected to be significant or noticeable.

General principles of seeking minimal vibration at receiving structures should be followed in the first instance. Predictions of vibration levels likely to occur at sensitive receivers are recommended when they are relatively close, depending on the magnitude of the source of the vibration or the distance associated. Relatively simple prediction methods are available in textbooks, codes of practice and standards, however, it is preferable to assess site transmission and propagation characteristics between source and receiver locations through measurements.

Guidance for measures available for the mitigation of vibration transmitted can be sought in more detailed standards, such as BS 5228-2 or policy documents, such as the NSW DEC *Assessing Vibration: A technical guideline*. These measures should be considered when developing a future Construction Noise and Vibration Management Plan prior to obtaining a Construction Certificate. Identifying the strategy best suited to the control of vibration follows a similar approach to that of noise: avoidance, control at the source, control along the propagation path, control at the receiver, or a combination of these. It is noted that vibration sources can include stationary plants (pumps and compressors), portable plants (jackhammers and pavement vibrators), mobile plants and pile-drivers amongst others. Unusual ground conditions, such as a high water-table, can also cause a difference to expected or predicted results, especially when considering the noise propagated from piling.

9.2.3 Community Consultation to be Undertaken

The contractor shall directly contact adjacent noise sensitive receivers and provide them with the following information:

- The contact details for a nominated representative in order to make noise / vibration complaints.
- Explain the timeframe for the construction works and the proposed activities, i.e. the proposed start / stop dates of work and a description of the noise producing equipment that will be used.
- Notify the noise sensitive receivers and Council in a timely manner should there be any need for an extension to the proposed arrangements.
- Provide them with a copy of this report as may be approved.
- Council should be notified of the nature and details of any complaints received (time, complainant etc.) and what remedial action has taken place, if any.
- Where noise is demonstrated as being compliant with criteria, this should not limit the proponent in undertaking further additional reasonable and feasible steps to reduce noise emissions.

9.2.4 Complaint Handling Procedures and Community Liaison

To assist in the management of noise and vibration complaints various procedures are to be followed. These include, but are not limited to:

- Clearly visible signage identifying any key personnel along with their contact details to be erected along the perimeter of the building site including:
  - A 24-hour contact name, phone number and email address provided for the resident to address any complaint. The signage will declare; “For any enquiry, complaint or emergency relating to this site at any time please contact…”
- The contact details for a nominated representative in order to make noise / vibration complaints.
- Explain the timeframe for the construction works and the proposed activities, i.e. the proposed start / stop dates of work and a description of the noise producing equipment that will be used.
- Notify the noise sensitive receivers and Council in a timely manner should there be any need for an extension to the proposed arrangements.
- Provide them with a copy of this report as approved by Council.
- Where noise is demonstrated as being compliant with criteria, this should not limit the proponent in undertaking further additional reasonable and feasible steps to reduce noise emissions.
- Give complaints a fair hearing.
- Have a documented complaints process, including an escalation procedure so that if a complaint is not satisfied there is a clear path to follow.
- Call back as soon as possible to keep people informed of action to be taken to address noise problems. Call back at night time only if requested by the complainant to avoid further disturbance.

- Implement all feasible and reasonable measures to address the source of the complaint.
- A register is to be kept by the contractor to keep a record of complaints and detail any information associated with them. The contents of the register will include:
  - The name and the address of the complainant
  - Time and date of the complaint
  - The nature of the complaint (Noise/Vibration)
  - Subsequent details
  - Remedial action undertaken

The contents of the register will be maintained and updated with any new complaint without delay. The complaints will be reported to both Council and the Contractor. The investigation of the complaint and any remedial actions will be performed by the builder and/or client representative.

In the event of noisy works scheduled, the builder will notify residents minimum 48 hours in advance.

9.3 NOISE & VIBRATION MONITORING STRATEGY

General Methodology

Noise and vibration levels should be monitored from time to time to ensure that noise and vibration generated as a result of construction activities is appropriate.

Monitoring may be in the form of regular checks by the builder or indirectly by an acoustic consultant engaged by the builder and in response to any noise or vibration complaints. Where noise and vibration criteria are being exceeded or in response to valid complaints, noise and / or vibration monitoring should be undertaken. This would be performed inside the premises of the affected property and on site adjacent to the affected receivers.

Monitoring is to be undertaken by an experienced noise and vibration monitoring professional or an acoustic consultant. The results of any noise or vibration monitoring are to be provided to the relevant party or person in a timely manner allowing the builder to address the issue and respond to the complaints.

Noise and vibration monitoring can take two forms:

- Short term monitoring; and
- Long-term monitoring

Short-term monitoring

Short-term monitoring consists of attended monitoring when critical stages of the construction are occurring. This normally provides real-time assistance and guidance to the subcontractor on site letting them know when the noise and vibration criteria are exceeded allowing the selection of alternative method on construction or equipment selection in order to minimise noise and vibration impacts.

Long-term monitoring

Similarly, long-term monitoring uses noise and vibration loggers providing real-time alerts to the builder / site manager when the noise and vibration criteria are exceeded.

Typically, the noise and vibration loggers stay on site for a period of several months for the critical construction stages of the project.

Both methodologies are complementary and normally used simultaneously providing a significant of amount of data via the long-term monitoring but also providing information on the sources of noise and vibration generating exceedances via the short-term or attended monitoring.

9.3.1 Noise & Vibration Monitoring Program

Noise and vibration monitoring programme shall be developed in a future Construction Noise and Vibration Management Plan as part of the submission for a Construction Certificate. This way, the noise and vibration monitoring strategy will be tailored specifically for the methods of construction used once the design has developed.

10 RECOMMENDED OPERATIONAL NOISE MITIGATION MEASURES

10.1 MECHANICAL PLANT AND EQUIPMENT NOISE IMPACT ASSESSMENT

In the absence of specific equipment selections, we have assessed mechanical plant noise emissions based on indicative and typical equipment sound power levels expected for this type of development as scheduled in Table 24. Based on the scheduled equipment sound power levels and equipment siting, noise emission requirements are achieved without any specific mitigation measures for mechanical plant and equipment.

Notwithstanding the above, we expect that a detailed review of equipment selections and siting is to be undertaken during the design development stage to ensure compliance with the outlined criteria at the nearest sensitive receiver catchments. If required, mitigation measures could include where possible and practicable, but not limited to the following:

- Positioning mechanical plant away from nearby receivers;
- Acoustic attenuators fitted to duct work
- Screening around mechanical plant
- Acoustic insulation within duct work

10.2 OPERATIONAL NOISE MITIGATION MEASURES

Operational noise emissions have been assessed in Section 8.3, with operational assumptions detailed from Section 8.3.2 to Section 8.3.6. No specific operational mitigation measures are required to achieve the project noise trigger levels summarised in Table 15.

We have provided noise contour maps in Appendix B.

11 CONCLUSION

This Noise and Vibration Impact Assessment has been prepared in support of a Development Application Development Application (DA) made to Fairfield City Council for the proposed single storey warehouse facility to be located at 88 Newton Road, Wetherill Park.

The following has been assessed as part of this noise and vibration impact assessment:

- Noise generated by vehicles movements (trucks, cars and other moving equipment) and warehouse activities from general operation of the site
- Noise impacts of additional traffic on surrounding local roads generated by the proposed development
- Noise emissions from mechanical plant associated with the development
- Noise and vibration impacts from the construction of the development

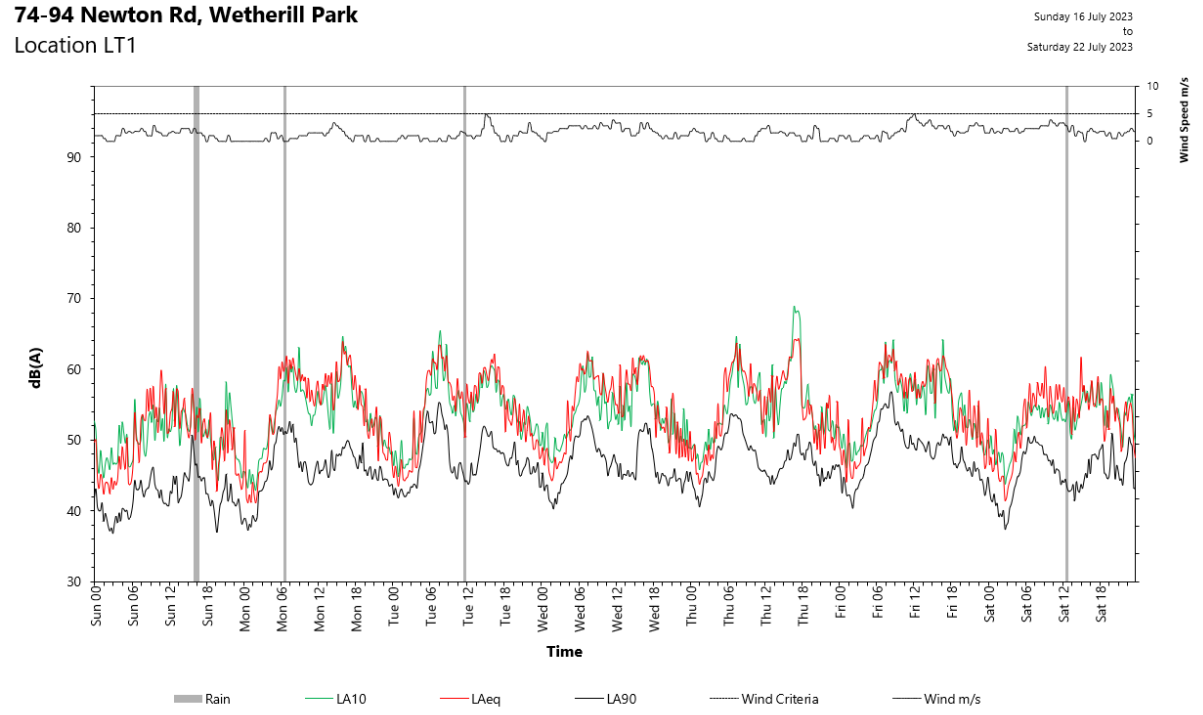
The acoustic, noise and vibration legislation, standards and guidelines applicable to the proposal include:

- Fairfield Citywide Development Control Plan 2013 Amendment 22 – Chapter 9 Industrial Development (**DCP**)
- Fairfield City Council Local Environment Plan 2013 (**LEP**)
- NSW EPA *Road Noise Policy* 2011 (**RNP**)
- NSW EPA Noise Policy for Industry 2017 (**NPfI**)
- NSW EPA Interim Construction Noise Guideline 2009 (**ICNG**)
- AS 2436:2010 (R2016) Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites (AS 2436:2010)
- BS 6472:1992 Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz) (BS 6472)
- BS 7385.2:1993 Evaluation and Measurement for Vibration in Buildings Part 2: Guide to Damage Levels from Ground-borne Vibration (BS 7385)
- DIN 4150.3:1999 Structural Vibration Part 3: Effects of Vibration on Structures (DIN 4150)

Having given regard to the analysis conducted within this report, it is the finding of this noise and vibration impact assessment that the proposal is compliant with the relevant noise and vibration criteria controls for this type of development, and it is expected to comply with the applicable regulations with regards to noise and vibration, particularly those listed above, subject to the mitigation measures outlined within Section 9 and Section 10 of this report.

Appendix A **Long-term Noise Monitoring Results**

Figure 3: Long-term noise monitoring data graph (LT1)



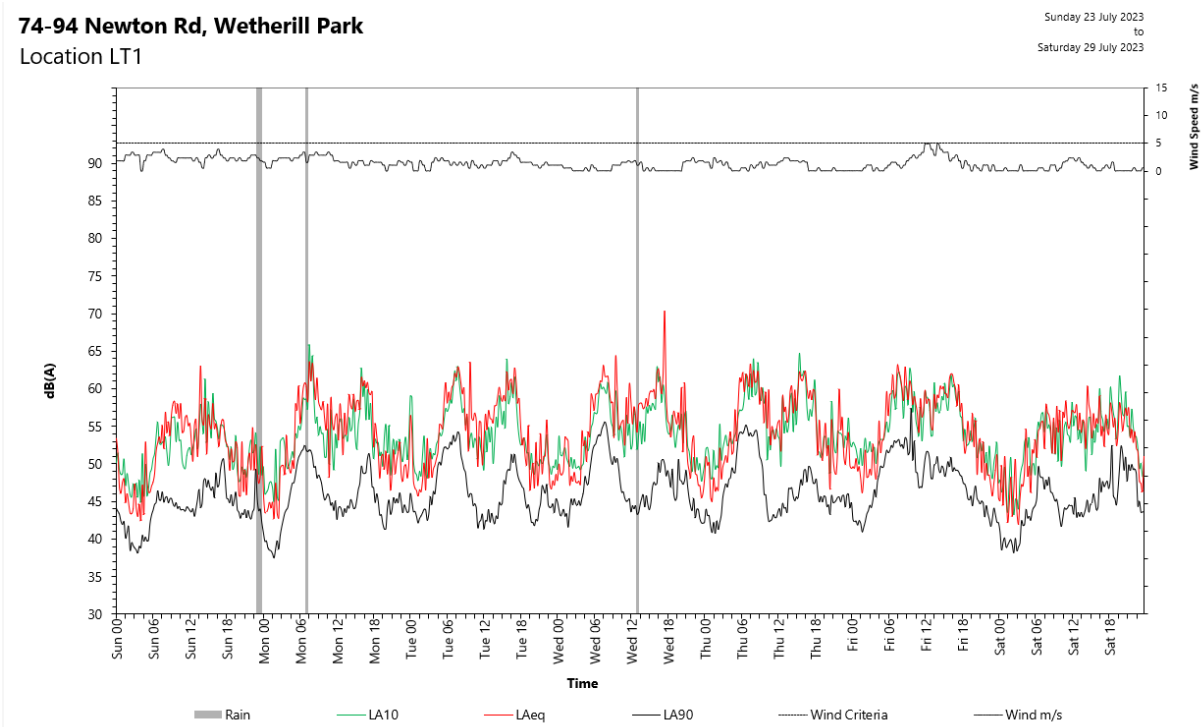
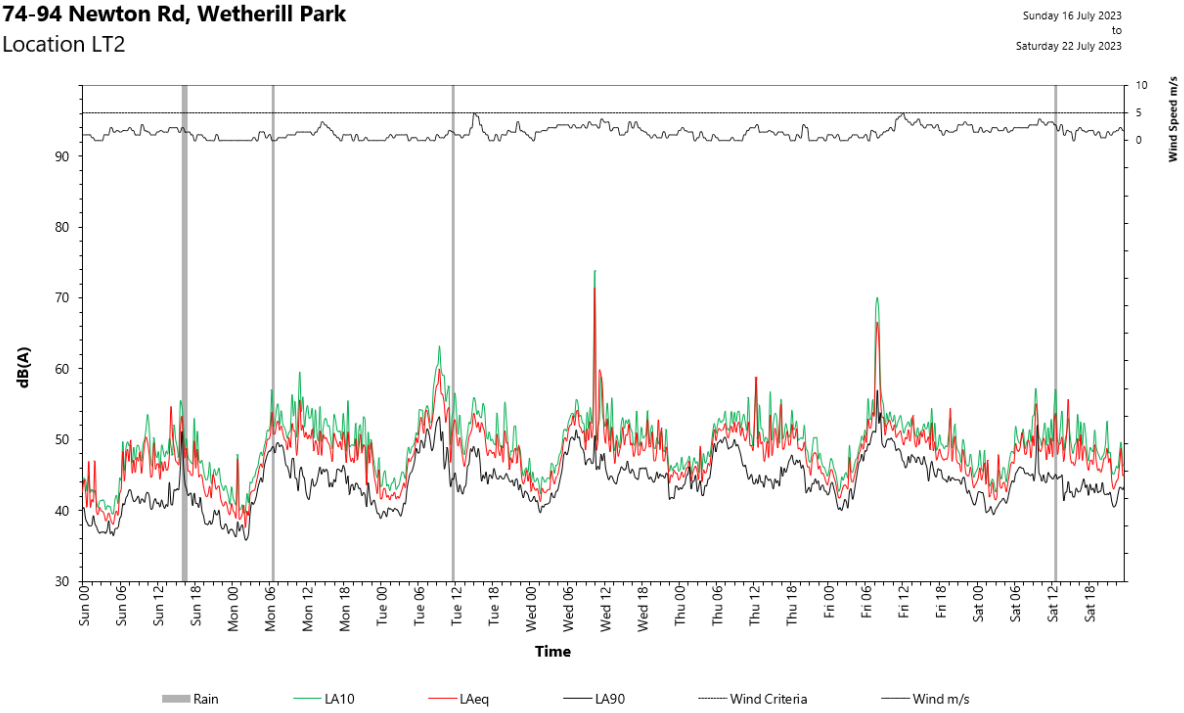


Figure 4: Long-term noise monitoring data graph (LT2)



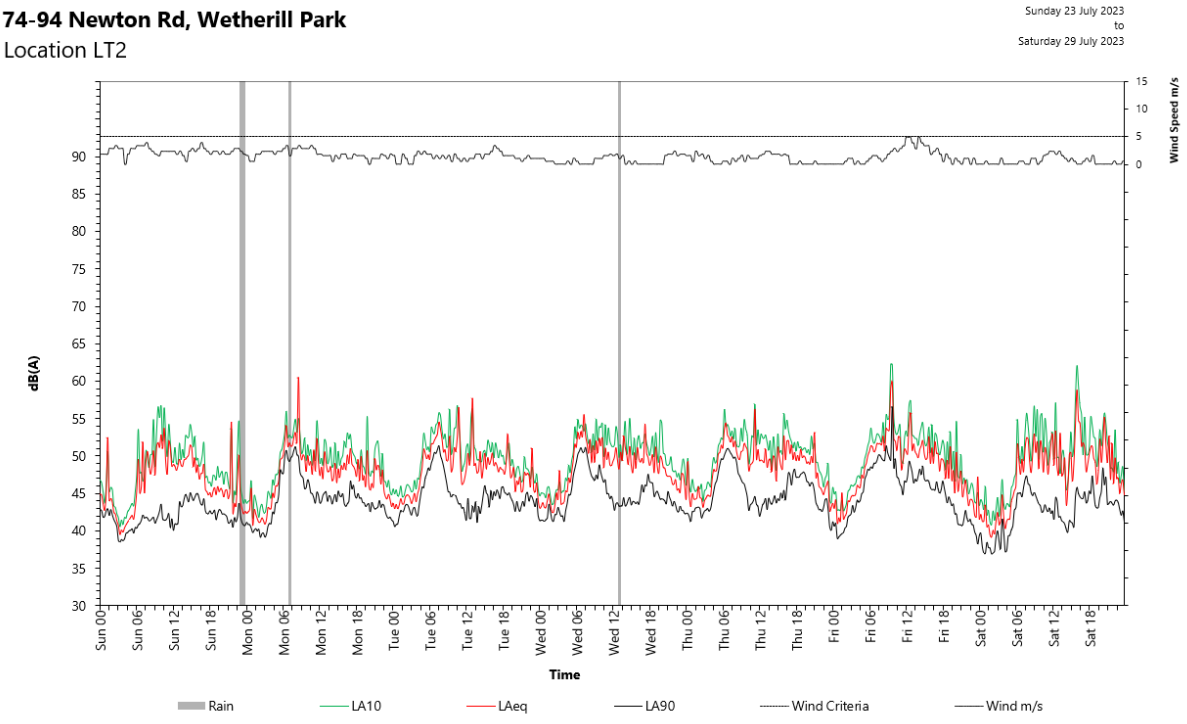
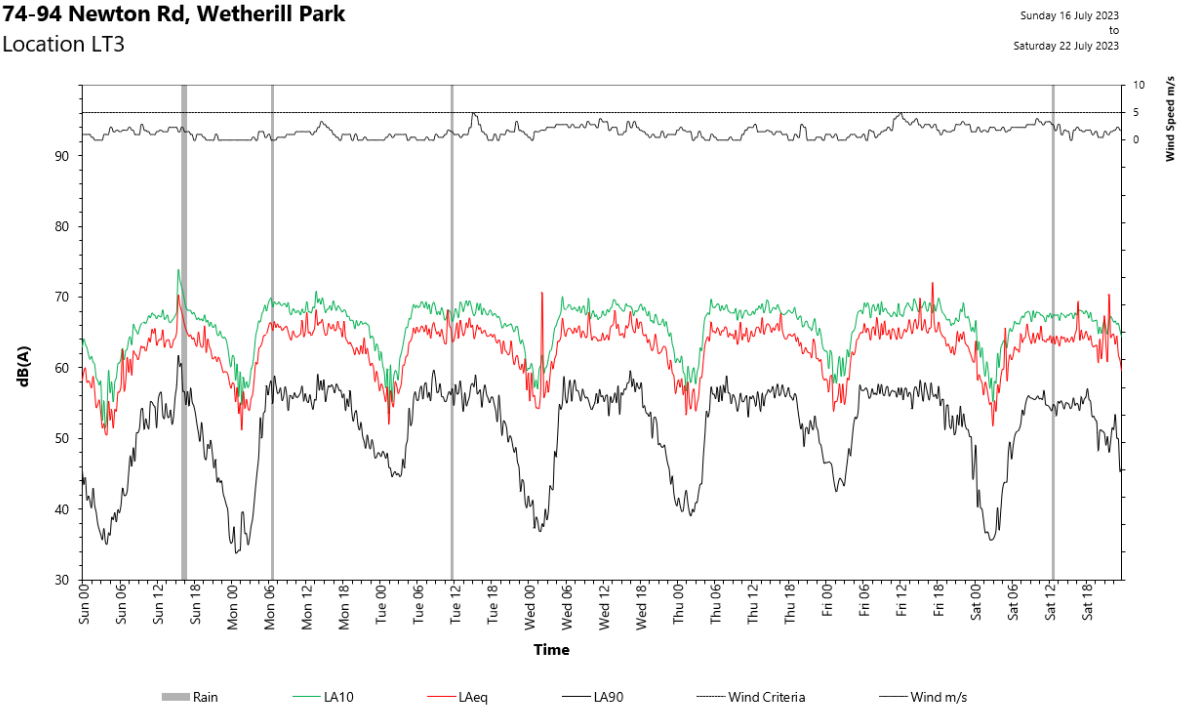
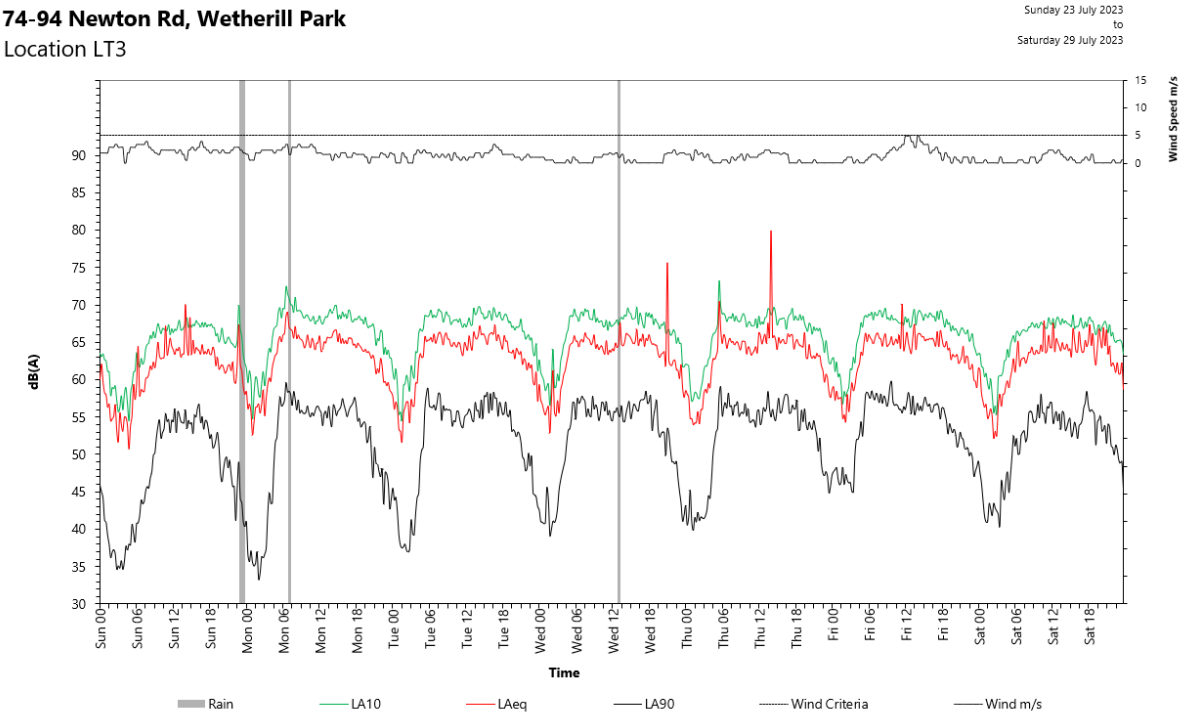
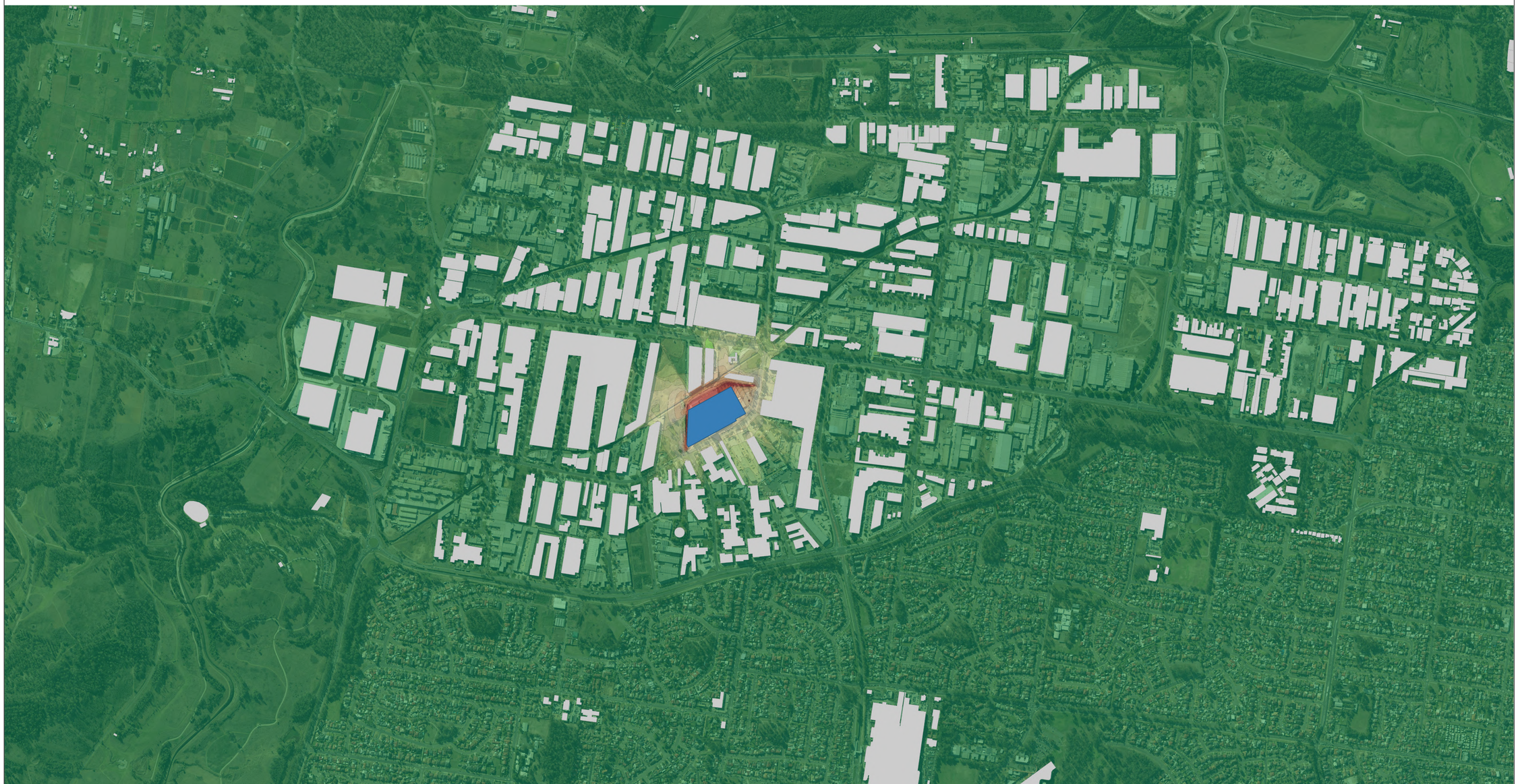


Figure 5: Long-term noise monitoring data graph (LT3)





Appendix B **Operational Noise Contours**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	24/04/2024	FOR INFORMATION

LEGEND

Predicted Noise Level - dB(A)$L_{eq(time)}$

- ≤ 43
- 43 - 45
- 45 - 47
- 47 - 49
- 49 - 51
- 51- 53
- 53 - 55
- 55 - 57
- 57- 59
- 59 - 61
- 61 - 63
- 63 - 65
- 65 - 67
- 67 - 69
- > 69

NOTES

Proposed development buildings

Nearby existing receiver buildings

PROJECT
88 NEWTON ROAD, WETHERILL PARK

PROJECT NO.
P00756

ARCHITECT
SBA ARCHITECTS

CLIENT
CENTURIA CAPITAL LIMITED

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FOR INFORMATION

DRAWING
OPERATIONAL NOISE CONTOURS

VIEW 1

DISCIPLINE
ACOUSTICS AND VIBRATION

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AC-DWG-400-01-01	001

E-LAB CONSULTING

ISSUE	DATE	STATUS
1	24/04/2024	FOR INFORMATION

LEGEND

Predicted Noise Level - dB(A)$L_{eq(time)}$

- ≤ 43
- 43 - 45
- 45 - 47
- 47 - 49
- 49 - 51
- 51- 53
- 53 - 55
- 55 - 57
- 57- 59
- 59 - 61
- 61 - 63
- 63 - 65
- 65 - 67
- 67 - 69
- > 69

NOTES

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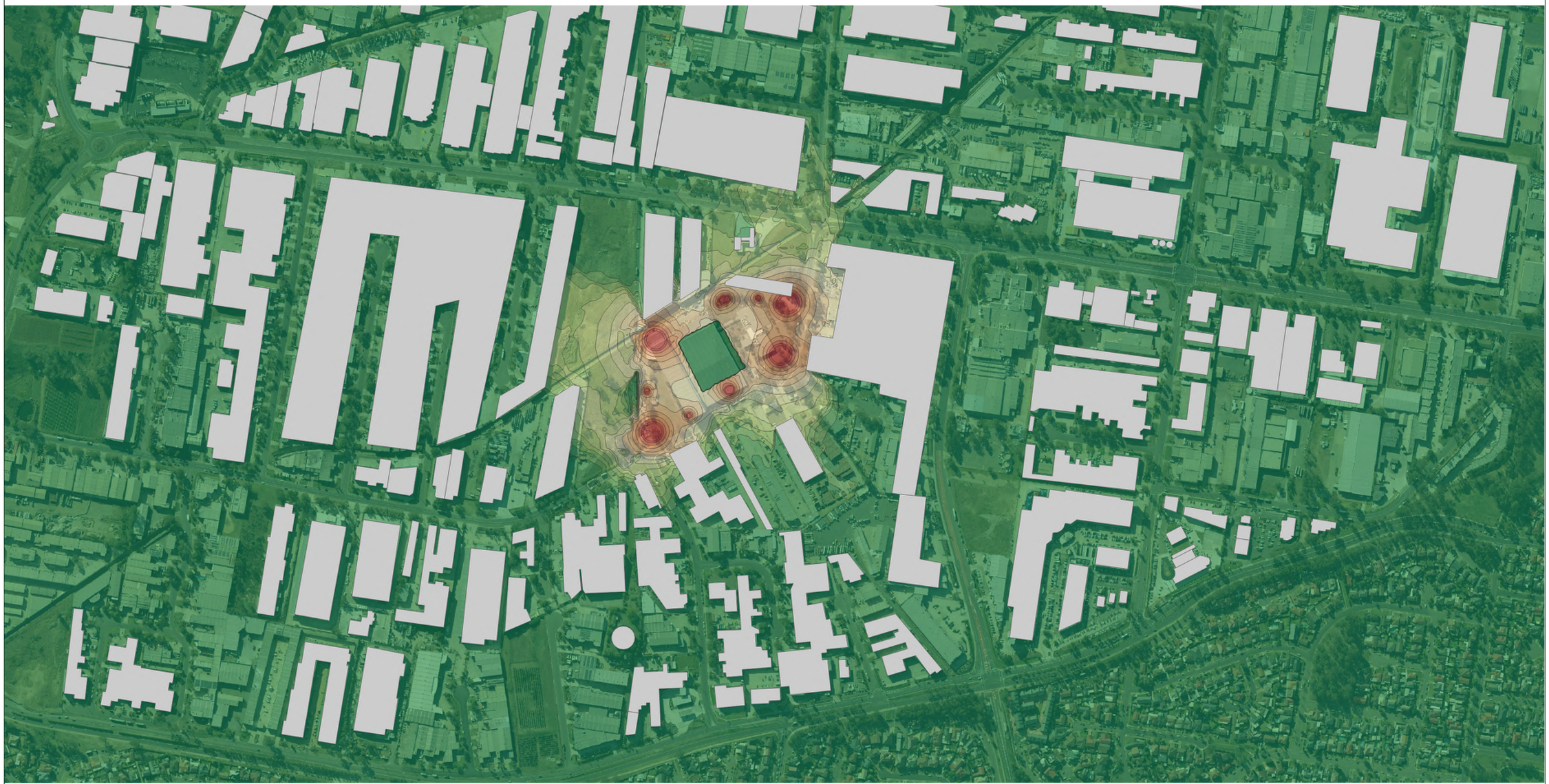
OPERATIONAL NOISE CONTOURS

VIEW 2

DISCIPLINE
ACOUSTICS AND VIBRATION

DRAWING NUMBER	REVISION
AC-DWG-400-01-02	001

Appendix C **Construction Noise Contours**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	05/12/2023	FOR INFORMATION
2	24/04/2024	FOR INFORMATION

LEGEND

Predicted Noise Level - dB(A)$L_{eq(15min)}$

- ≤ 55
- 55 - 57
- 57 - 59
- 59 - 61
- 61 - 63
- 63 - 65
- 65 - 67
- 67 - 69
- 69 - 71
- 71 - 73
- 73 - 75
- 75 - 77
- 77 - 79
- 79 - 81
- > 81

NOTES

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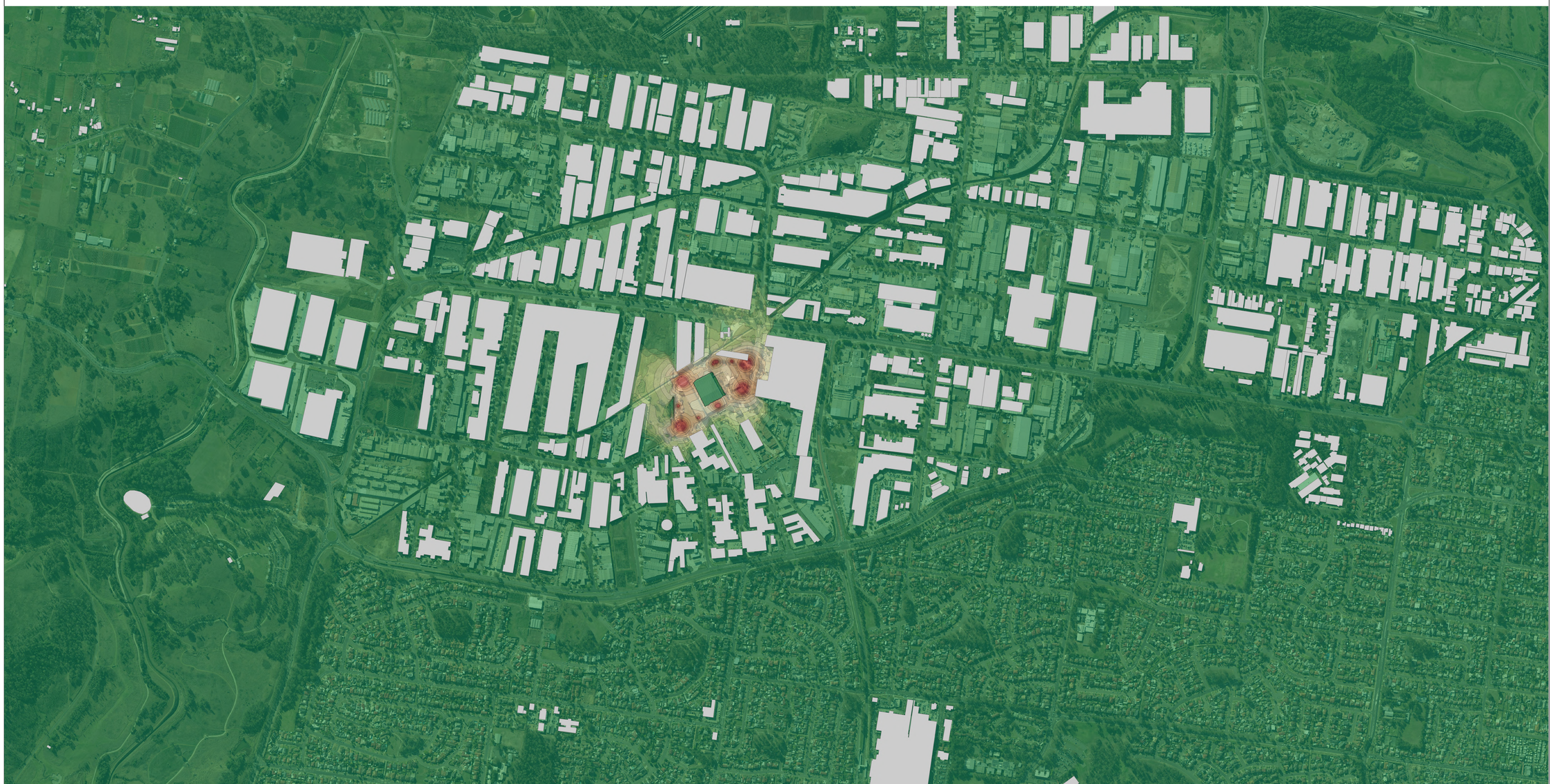
DRAWING
CONSTRUCTION NOISE CONTOURS

DEMOLITION VIEW 1

DISCIPLINE
ACOUSTICS AND VIBRATION

DRAWING NUMBER
AC-DWG-300-01-01

REVISION
002



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- 73 - 75
- 75 - 77
- 77 - 79
- 79 - 81
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DEMOLITION VIEW 2

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CIVIL WORKS VIEW 1

DISCIPLINE
ACOUSTICS AND VIBRATION

DRAWING NUMBER
AC-DWG-300-02-01

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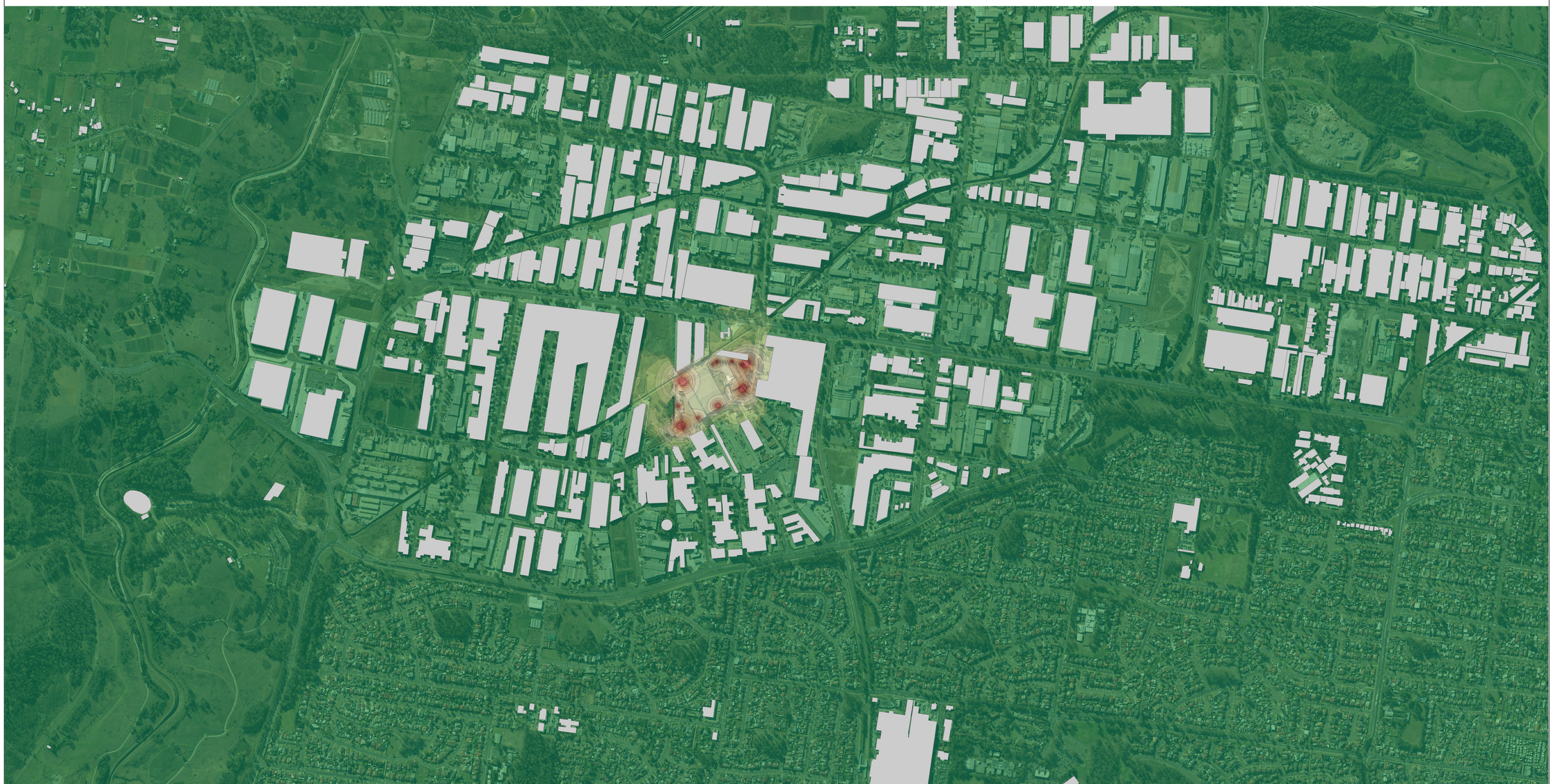
002



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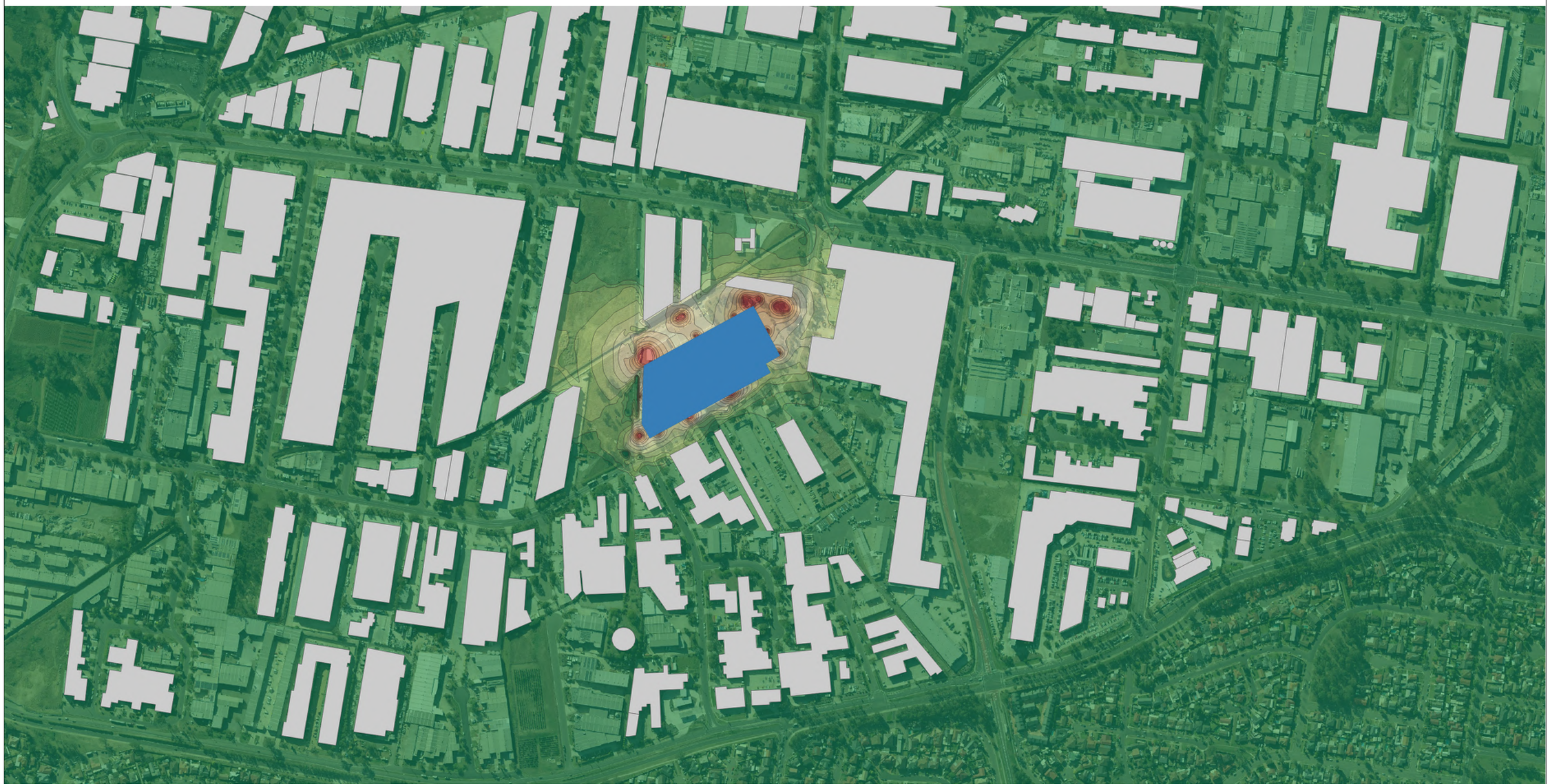

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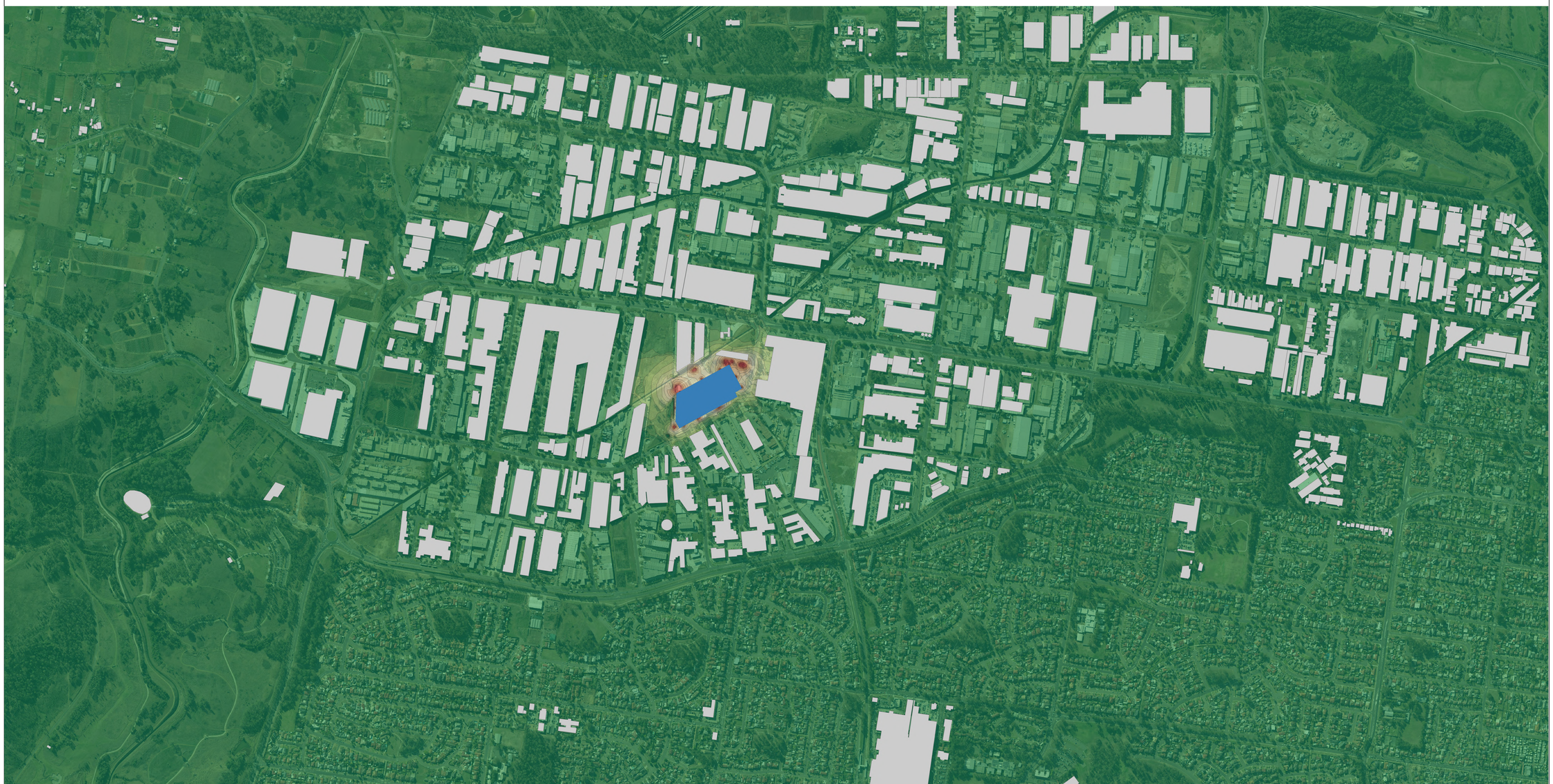
AC-DWG-300-03-01

REVISION
002



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