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280-300 LAKEMBA STREET AND 64-70 KING GEORGES ROAD, WILEY PARK

Acoustic Assessment for Development Application

28 May 2021

Lakemba Developments Pty Ltd

TJ700-01F02 Acoustic Report for DA (r8)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

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06.05.2020	Review new scheme & update report. Add recommendations for treatment of mechanical plant (Section 7), loading docks & driveways (Section 8)		2	TW		TW
20.05.2020	Review final drawings & update Figure 6. Issue report as final.		3	TW		TW
18.09.2020	Review new design scheme & update report		4	TW		TW
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07.05.2021	Review new drawings & update report (Table 1, Table 5, Section 5.3)		6	TW		TW
18.05.2021	Update site address, Sections 1, 2.1 and add A.1.2.		7	TW		TW
28.05.2021	Update loading dock acoustic treatment (Section 8.1) and Table 5		8	TW		TW

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

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Executive summary

Renzo Tonin & Associates were engaged to conduct an environmental noise assessment of the proposed mixed-use development at 280-300 Lakemba Street and 64-70 King Georges Road, Wiley Park to accompany an application for Development Application.

As a result of our assessment of the following potential acoustic issues were identified;

- Road traffic noise associated with King Georges Road and Lakemba Street
- Airborne rail noise associated with Bankstown rail line located in a land cutting approximately 59m southeast of site
- Operational noise emission from mechanical plant and equipment rooms associated with the commercial and residential tenancies

This report presents an assessment of the above acoustic components in terms of Council's Development Control Plan, State Environmental Planning Policy (Infrastructure), Australian Standards and NSW Environment Protection Authority Industrial Noise Policy.

External Noise Intrusion into the Development

External noise intrusions into the development have been assessed in accordance with Bankstown Council DCP 2015, Canterbury DCP 2012, Canterbury draft DCP 2021, ISEPP 2007, Australian Standard AS2107 and EPA Industrial Noise Policy. The major noise intrusion sources were identified road traffic noise.

On the basis of the external noise impacting upon the development site, appropriate design of the building envelope is required to achieve a suitable indoor amenity for occupants. Our assessment has established double glazing will be required on the worst affected external building facade.

Noise Emission Generated by the Development

Noise emission from mechanical plant such as building exhaust systems, mechanical ventilation and air-conditioning systems associated with the development has the potential to impact on nearby residential properties and is to be controlled at nearby residential properties to meet the noise criteria set out in EPA Industrial Noise Policy. As the specifications of individual mechanical plant are not available at this stage of the development, in-principle noise control advice is present in this report.

Construction Noise

The major construction activities proposed on this site are demolition and excavation works, concrete pours and general building works. Construction and building work is to be managed in accordance with the NSW Interim Construction Noise Guideline so as to minimise disruption to the local community and

the environment. As the specifications of construction equipment and operating times are not available at this stage of the project, in-principle noise and vibration measures are provided in this report.

Contents

List of tables

1 Introduction

Renzo Tonin & Associates were engaged to assess noise impacts onto and from the proposed mixed-use development at 280-300 Lakemba Street and 64-70 King Georges Road, Wiley Park.

This study examines the effects of external noise intrusion onto the proposed development from road traffic and airborne rail noise. A noise survey was carried out on site by Renzo Tonin & Associates from 02/08/2017 to 09/08/2017 to establish the existing levels of external noise affecting development. These noise levels were used to predict noise levels inside the future residential and retail spaces and then assessed against the recommended internal noise criteria for the project. RT&A have reviewed historical traffic volume data published by RMS for King Georges Road and confirm there is no significant change in traffic volume in the section of King Georges Road to our site from 2017 to 2021 with exception of 2020 due to impact of COVID-19. Therefore, the traffic noise levels measured on site in 2017 remain relevant in 2021.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

The following architectural drawings from Marchese Partners International Pty Ltd were reviewed.

Table 1: Drawings Reviewed

Drawing No.	Issue	Date	Title
DA2.01	C	12.05.2021	Plan Level B3
DA2.02	C	12.05.2021	Plan Level B2
DA2.03	C	12.05.2021	Plan Level B1
DA2.04	C	12.05.2021	Plan Level B0
DA2.05	C	12.05.2021	Plan Level 00
DA2.06	C	12.05.2021	Plan Level 01
DA2.07	C	12.05.2021	Plan Level 02
DA2.08	C	12.05.2021	Plan Level 03
DA2.09	C	12.05.2021	Plan Level 04
DA2.10	C	12.05.2021	Plan Level 05
DA2.11	C	12.05.2021	Plan Level 06
DA2.12	C	12.05.2021	Plan Level 07
DA2.14	C	12.05.2021	Plan Level Roof
DA3.01	C	12.05.2021	Section A-A
DA3.02	C	12.05.2021	Section B-B
DA3.03	C	12.05.2021	Section C-C
DA4.01	C	12.05.2021	Elevation - South West – King George Rd

Drawing No.	Issue	Date	Title
DA4.02	C	12.05.2021	Elevation - North West – Lakemba St
DA4.03	C	12.05.2021	Elevation North-East
DA4.04	C	12.05.2021	Elevation – South-East
DA8.07	C	12.05.2021	Privacy Sections

2 Internal Noise Criteria

Long-term noise surveys were conducted on site from 02/08/2017 to 09/08/2017 to determine existing levels of ambient noise surrounding the site. These levels were used to predict noise levels within the residential spaces and assessed against the internal noise criteria recommended for this development. The results of the noise survey were used to calculate noise levels within the residential and commercial spaces and assessed against the relevant internal noise and vibration criteria describe below.

2.1 Road and Rail Noise Criteria

Table 2 below presents internal noise criteria recommended for this development which was based on the following documentations;

1. Bankstown Development Control Plan 2015
2. Canterbury Development Control Plan 2012
3. Draft Canterbury Bankstown Development Control Plan 2021
4. State Environment Planning Policy (Infrastructure 2007)
5. Department of Planning publication "Development Near Rail Corridors & Busy Roads – Interim Guideline" 2008
6. NSW Environment Protection Authority Industrial Noise Policy
7. Australian Standard AS/NZS 2107:2000 "Acoustics – Recommended design sound pressure levels and reverberation times for building interior"

The Roads and Maritime Services (RMS) have identified King Georges Road as a road that requires mandatory acoustic assessment in accordance with the State Environment Planning Policy (Infrastructure) 2007, meaning that the average annual daily traffic (AADT) volume on this road is greater than 40,000 vehicles per day - refer to RMS ISEPP Map 15 attached in APPENDIX B.

The internal noise criteria for this development as per ISEPP is outlined in Table 2 below and defined in APPENDIX A of this report.

Table 2: Recommended Internal Noise Criteria for Road Traffic and Rail Noise

Occupancy	Period	Maximum Noise Level
Living areas (includes kitchen, dining and family rooms)	7am – 10pm	40 dB(A) $L_{Aeq,\ 15hr}$
Sleeping areas	10pm – 7am	35 dB(A) $L_{Aeq,\ 9hr}$
Bathrooms [1]	7am – 10pm	50 dB(A) $L_{Aeq,\ 15hr}$
Apartment common areas [1](lobbies and corridors)	7am – 10pm	50 dB(A) $L_{Aeq,\ 15hr}$
Retail tenancies [1]	7am – 10pm	50 dB(A) $L_{Aeq,\ 15hr}$
Notes: 1. Design sound pressure levels for these spaces (not coved in the ISEPP) were based on Australian Standard AS2107		

Relevant sections of the Australia Standard AS2107, Council DCPs, and Government Policies are presented in APPENDIX A of this report. Results of the background and ambient noise monitoring conducted on site are presented in APPENDIX E.

3 Site and Surrounds

The subject site is located at the corner of King Georges Road and Lakemba Street, Wiley Park with a 3-storey residential building on its north-east boundary and 2 to 4 storey residential buildings on its south-east boundary and is approximately 70m to the north of Wiley Park train station. The section of Bankstown rail corridor nearest to subject site has two operational tracks and runs perpendicular to Kings Georges Road and services commuter trains. The shortest distance the between the proposed building on site and nearest operational track is approximately 59m.

The proposed development comprises of four residential buildings, each with retail tenancies on ground floor and 7 levels of residential apartments above. Beneath the buildings are 3 levels of common basement car park with a supermarket on basement level 1.

Long-term noise monitoring has been undertaken on site as indicated in Figure 1 below to determine existing acoustic environment.

Figure 1: Site Boundary and Noise Monitoring Locations

4 Measured Noise Levels

4.1 Long-term Noise Survey

The proposed development is potentially affected by road traffic noise from King Georges Road and Lakemba Street and airborne rail noise from the Bankstown rail corridor approximately 59m south-east of the development. Two environmental noise monitors were installed on site for a background and ambient noise survey from 02/08/17 to 09/08/17.

The noise logger records noise levels on a continuous basis and stores data every fifteen minutes. The noise logger was calibrated before and after measurements and no significant deviation in calibration was noted. The noise monitoring equipment used here complies with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters" and is designated as Type 2 instruments suitable for field use.

The results of the background and ambient noise monitoring conducted on site are presented in APPENDIX E.

4.2 Measured Road Traffic Noise Level

The design road traffic noise levels are taken from the representative L_{Aeq} for the week for both the day-time (7am to 10pm) and night-time (10pm-7am) periods. The design external traffic noise levels are presented Table 3 below.

Table 3: Representative Day and Night Road Traffic Noise Levels

Monitoring Location	Survey Period	Measured Noise Level $L_{Aeq, T}$ [1,2]	Predicted Noise Level $L_{Aeq, T}$ [1,2] Worst Affected Residential Façade
1m in front of building façade on shop awning of 66 King Georges Road, Wiley Park	Day time (7am to 10pm) 02/08/17 to 09/08/17	74 dB(A)	74dB(A)
	Night time (10pm to 7am) 02/08/17 to 09/08/17	73 dB(A)	73 dB(A)

Notes:

1. Noise levels presented are façade corrected.
2. Representative road traffic noise level in measured L_{Aeq} over 15 hour and 9 hour day and night period respectively.

4.3 Existing Noise Environment at Development Site

The results of the long-term noise monitoring have been summarised in accordance with Industrial Noise Policy requirements published by NSW Environment Protection Authority (EPA) are presented in Table 4 below.

Table 4: Measured Site Background Noise Level

Noise Monitoring		Representative L_{A90} Background Noise Levels in dB(A)		
Location	**Duration**	**Day[1]**	**Evening[2]**	**Night[3]**
1m setback site north-west boundary at 282 Lakemba Street, Wiley Park	Wednesday 02/08/17 to Wednesday 09/09/17	56	54	45

Notes:

Day, Evening & Night assessment periods are defined in accordance NSW EPA's Industrial Noise Policy as follows.

1. Day is defined as 7:00am to 6:00pm, Monday to Saturday; 8:00am to 6:00pm Sundays & Public Holidays. As results were affected by construction noise weekend day and Saturday morning, Sunday results have been presented for the Day time period
2. Evening is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays
3. Night is defined as 10:00pm to 7:00am, Monday to Saturday; 10:00pm to 8:00am Sundays & Public Holidays

The representative background noise levels (L_{A90}) are used in defining external noise emission from the development such as mechanical ventilation and air-conditioning systems in accordance to Office of Environment and Heritage (formally Department of Department of Environment, Climate Change and Water).

4.4 Calculated Internal Noise Levels

Results from the noise surveys were used to calculate internal noise levels within the proposed development. Noise calculations were conducted using the OutsideIn Glazing Spreadsheet developed in this office which take into account external noise levels, facade transmission loss and room sound absorption characteristics. Noise levels were calculated for each building facade to account for any variation in the external noise levels affecting different parts of the building.

Glazing constructions required to comply with the nominated noise criteria are presented in the body of this report.

5 Recommendations

5.1 Glazing Design Requirements

Table 5 below presents recommended glazing treatment for building facades to achieve compliance with the maximum noise levels nominated in Table 2 above.

Table 5: Recommended Glazing Treatment

Level	Façade	Occupancy Type	Recommended Minimum Sound Insulation Rating of Glazing Assembly	Typical Compliance Glazing Thickness and Type	Laboratory Test Reference
Building B01-A & B01-B (Frontage to King Georges Road)					
Level 0	North-east facing Plaza	Retail	Rw 24	4mm standard float glass	ESTIMATE
	All other facades	Retail	Rw 30	10mm standard float glass Or 6.38mm laminated glass	ESTIMATE
Levels 1 to 7	South-west facing King Georges Road	Bedrooms	Rw 45	Double glazing consisting of 6mm standard float glass / 16mm air gap / 12.5mm Viridian VLam Hush laminated glass Or approved equivalent	ESTIMATE
		Open plan living/dining/kitchen	Rw 38	8.5mm Viridian VLam Hush laminated glass Or approved equivalent	ESTIMATE
		Lift lobbies	Rw 27	6mm standard float glass	ESTIMATE
	North-west and South-east	Bedrooms	Rw 40	12.5mm Viridian VLam Hush laminated glass Or approved equivalent	ESTIMATE
		Open plan living/dining/kitchen	Rw 35	10.38mm laminated glass	ESTIMATE
		Bathrooms	Rw 27	6mm standard float glass	ESTIMATE
	North-east facing Plaza	Bedrooms	Rw 32	6.38mm laminated glass	ESTIMATE
		Open plan living/dining/kitchen	Rw 27	6mm standard float glass	ESTIMATE
Building B02-A & B02-B (Rear buildings)					
Ground	All	Retail	Rw 24	4mm standard float glass	ESTIMATE
Levels 1 to 6	North-west facing Lakemba Street	Bedrooms	Rw 35	10.38mm laminated glass	ESTIMATE
		Open plan living/dining/kitchen	Rw 32	6.38mm laminated glass	ESTIMATE
	All other facades	Bedrooms	Rw 32	6.38mm laminated glass	ESTIMATE
		Open plan living/dining/kitchen	Rw 27	6mm standard float glass	ESTIMATE

Level	Façade	Occupancy Type	Recommended Minimum Sound Insulation Rating of Glazing Assembly	Typical Compliance Glazing Thickness and Type	Laboratory Test Reference
		Bathrooms	Rw 24	4mm standard float glass	ESTIMATE
		Lift lobbies	Rw 24	4mm standard float glass	ESTIMATE
		Communal rooms	Rw 24	4mm standard float glass	ESTIMATE

By way of explanation, the Sound Insulation Rating Rw is a measure of the noise reduction property of the partition, a higher rating implying a higher sound reduction performance.

Note that the Rw rating of systems measured as built on site (R'w Field Test) may be up to 5 points lower than the laboratory result.

LEGEND where no appropriate test certificate exists:

1. ESTIMATE: The client is advised not to commence detailing or otherwise commit to partition construction systems which have not been tested in an approved laboratory or for which an opinion only is available. Testing of partition construction systems is a component of the quality control of the design process and should be viewed as a priority because there is no guarantee the forecast results will be achieved thereby necessitating the use of an alternative which may affect the cost and timing of the project. No responsibility is taken for use of or reliance upon untested partition construction systems, estimates or opinions. The advice provided here is in respect of acoustics only.
2. ESTIMATE – APPROVED FOR CONSTRUCTION: Use of the form of construction is approved prior to laboratory certification. To complete the quality control of the design process and confirm the acoustical performance of the construction, we recommend testing in a laboratory to confirm the Rw rating as soon as practicable. In the case of impact rating for floor systems, no particular impact rating is guaranteed to comply with either the Building Code of Australia or Strata Scheme Management Act and hence carpet runners may still be required.
3. ESTIMATE – TEST NOT REQUIRED: Use of the form of construction is approved without laboratory certification. The STC/Rw of the form of construction exceeds the project requirements.
4. The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

NOTES FOR GLAZING CONSTRUCTIONS:

5. The information in this table is provided for the purpose of Council approvals process and cost planning and shall not be used for construction unless otherwise approved in writing by the acoustic consultant.
6. The design in this table is preliminary and a comprehensive assessment shall be conducted prior to Construction Certification.
7. Before committing to any form of construction or committing to any builder, advice should be sought from an acoustic consultant to ensure that adequate provisions are made for any variations which may occur as a result of changes to the form of construction where only an "estimate" is available for the sound insulation properties of recommended materials.
8. The glazing supplier shall ensure that installation techniques will not diminish the Rw performance of the glazing when installed on site.
9. All openable glass windows and doors shall incorporate full perimeter acoustic seals equivalent to Q-Lon, which enable the Rw rating performance of the glazing to not be reduced.
10. The above glazing thicknesses should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc.

GENERAL

11. The sealing of all gaps in partitions is critical in a sound rated construction. Use only sealer approved by the acoustic consultant.
12. Check design of all junction details with acoustic consultant prior to construction.
13. Check the necessity for HOLD POINTS with the acoustic consultant to ensure that all building details have been correctly interpreted and constructed.
14. The information provided in this table is subject to modification and review without notice.
15. The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

5.2 Facade & Roof Sound Insulation

In principle advice is provided below for the acoustic requirements of the roof and external walls for this proposed development.

5.2.1 External Walls

All external walls shall have sound isolation ratings, $R_{w,}$ of at least 15dB higher acoustic performance than that of the acoustic glazing specified in Table 5 above.

5.2.2 Roof and Ceiling

Roof/ceiling construction shall have a sound isolation rating, R_w, at least 10dB higher than that of the acoustic glazing on its facade walls.

5.2.3 Quality Assurance

The following acoustic measures should also be incorporated into the building design:

s1. All operable glass windows and doors shall incorporate full perimeter acoustic seals equivalent to Q-Lon, which enable the R_w rating performance of the glazing to not be reduced.

s2. The glazing thicknesses outlined in Table 5 should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc.

s3. The glazing supplier shall ensure that installation techniques will not diminish the R_w performance of the glazing when installed on site. Sliding door meeting stiles should form an airtight seal when closed and locked.

s4. The perimeter of all window and door frames are to be sealed airtight in the external facade using the following methods:

- For gaps less than 10mm - Fill all gaps around the window perimeter with an acoustic mastic sealer (minimum specific gravity 1.6sg) equivalent to Promat Promaseal. The depth of sealer shall be at least equal to the width of the gap.
- If the gap is greater than 10mm, fill the cavity with polyester insulation and a backing rod. Seal the gap airtight an acoustic mastic sealer (min specific gravity 1.6sg) equivalent to Promat Promaseal. The depth of sealer shall be at least equal to the width of the gap. The gaps between frames shall also be sealed using aluminium angle brackets (approximately 25 x 25 x 3mm).

5.3 Alternative Acoustic Solutions to ADG Separation between Buildings

s1. The following units: B01-A: 1.01, 1.02, 2.01, 2.02; B01-B: 1.06, 1.07,2.06, 2.07; B02-A: 1.01, 1.02, 2.01, 2.02, 3.01, 3.02, 4.01, 4.02, 5.01, 5.02, 6.01; B02-B: 1.05, 1.06, 2.05, 2.06, 3.05, 3.06, 4.05, 4.06, 5.05, 5.06, 6.04, have a proximity to each other which is 7 metres for all the levels from level 1 to level 7. Section 3F of the Apartment Design Guideline (ADG) recommends a distance between habitable rooms in opposite buildings of at least 12m up to four storeys

(including ground level). This dimension increases up to 18m from five to eight storeys. The aim of the ADG is to provide visual and acoustic privacy between living areas.

s2. The prescribed minimum distances between buildings in the ADG provides a certain level of acoustic separation between habitable rooms in opposite buildings due the loss of sound energy through the distance it travels ie. distance attenuation of sound. Our preliminary acoustic modelling has found acoustic separation equivalent to ADG can also be achieved at the proposed reduced separation distance of 7m by providing additional noise attenuation to the sound path via combined use of acoustic plenums, sound absorptive materials and altering directivity of the noise source.

s3. Figure 2 shows the recommended acoustic treatment for bedroom windows that has a proximity of 7m to achieve equivalent acoustic separation to ADG distance.

a. Orientate window opening 90 degrees to façade by creating a recess in the building as indicated in figure below

b. Line the recessed area of the façade immediately outside window with a sound absorptive material having a minimum Noise Reduction Coefficient (NRC) of 0.90 such as Pyrotek Reapor as indicated in figure below.

c. Provide a 1m solid fin (vertical height of 1.2m) protruding out of the building façade at location of window as indicated in figure below. Inner face of the fin to be lined with sound absorptive material having a minimum NRC of 0.90 such as Pyrotek Reapor.

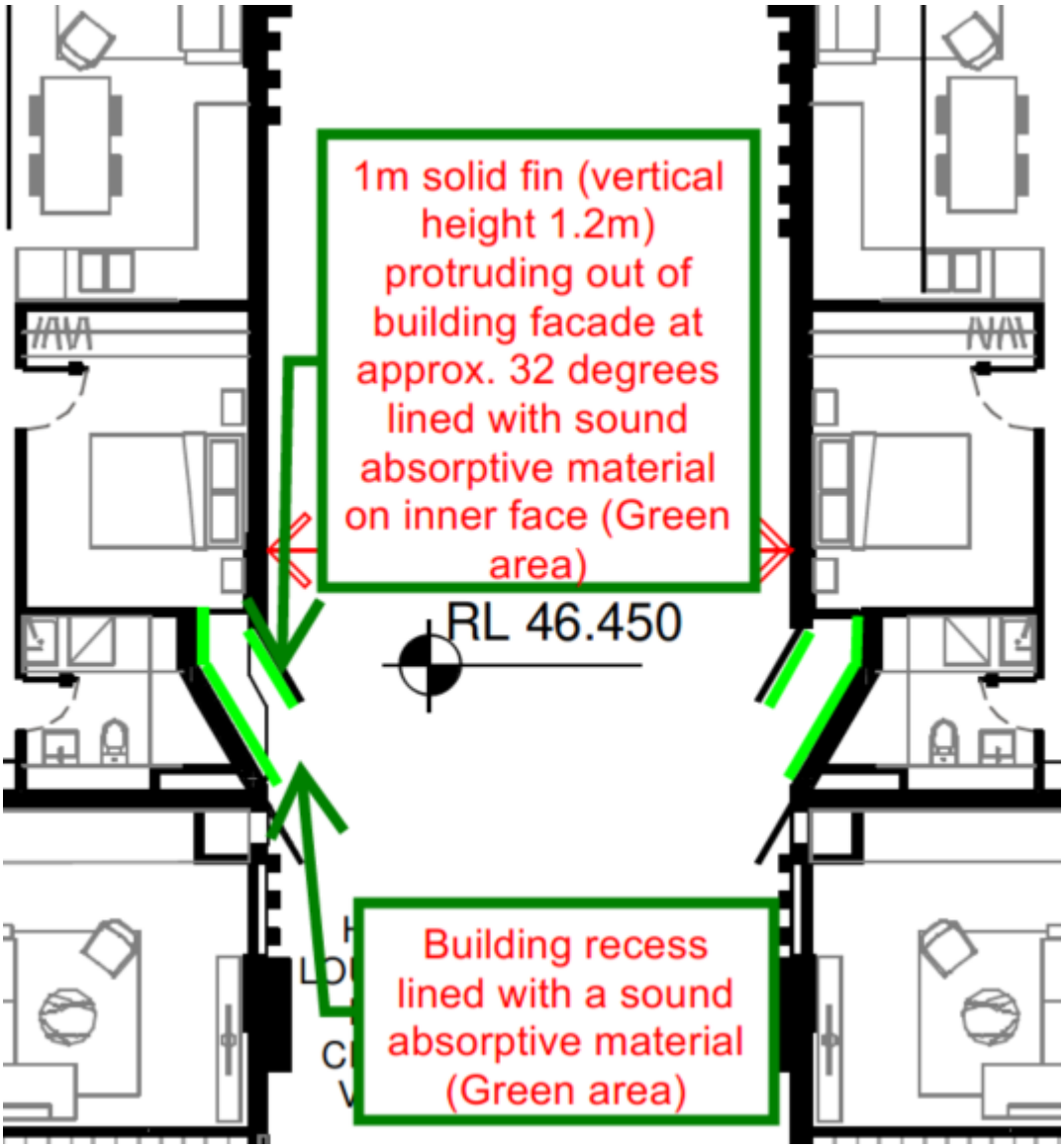


Figure 2: Acoustic Treatment to Bedroom Windows with at 7m Proximity

s4. Figure 3 shows the recommended acoustic treatment for kitchen ventilation openings that has proximity of 7m to achieve equivalent acoustic separation to ADG distance.

a. Provide an acoustic plenum box with approximate size of 600mm deep, 700mm width and 700mm height to inside of the ventilation opening as indicated in figure below. Internal surfaces of plenum to be lined with a sound absorptive material having a minimum NRC of 0.90 such as Pyrotek Reapor.

b. Provide a 1m solid fin (vertical height of 1.2m) protruding out of building façade at location of ventilation opening. Inner face of the fin to be lined with a sound absorptive material having minimum NRC of 0.90 such as Pyrotek Reapor as indicated in figure below.

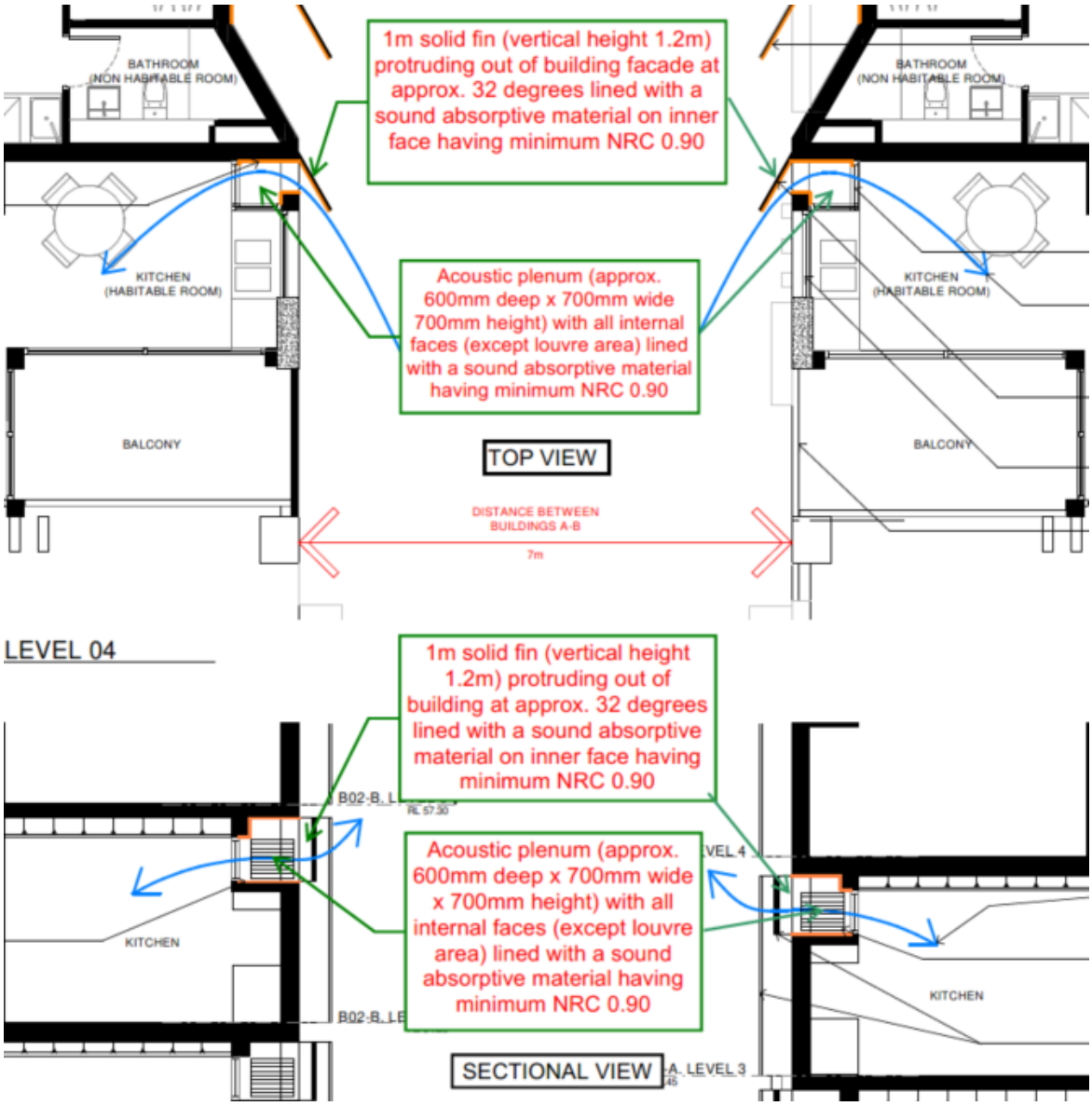


Figure 3: Acoustic Treatment to Kitchen Ventilation Openings with at 7m Proximity

s5. Figure 4 below show results of our acoustic modelling comparing break-out noise from an open bedroom window at ADG separation distance and at reduced 7m distance with acoustic treatment recommended detailed in Figure 2 above.

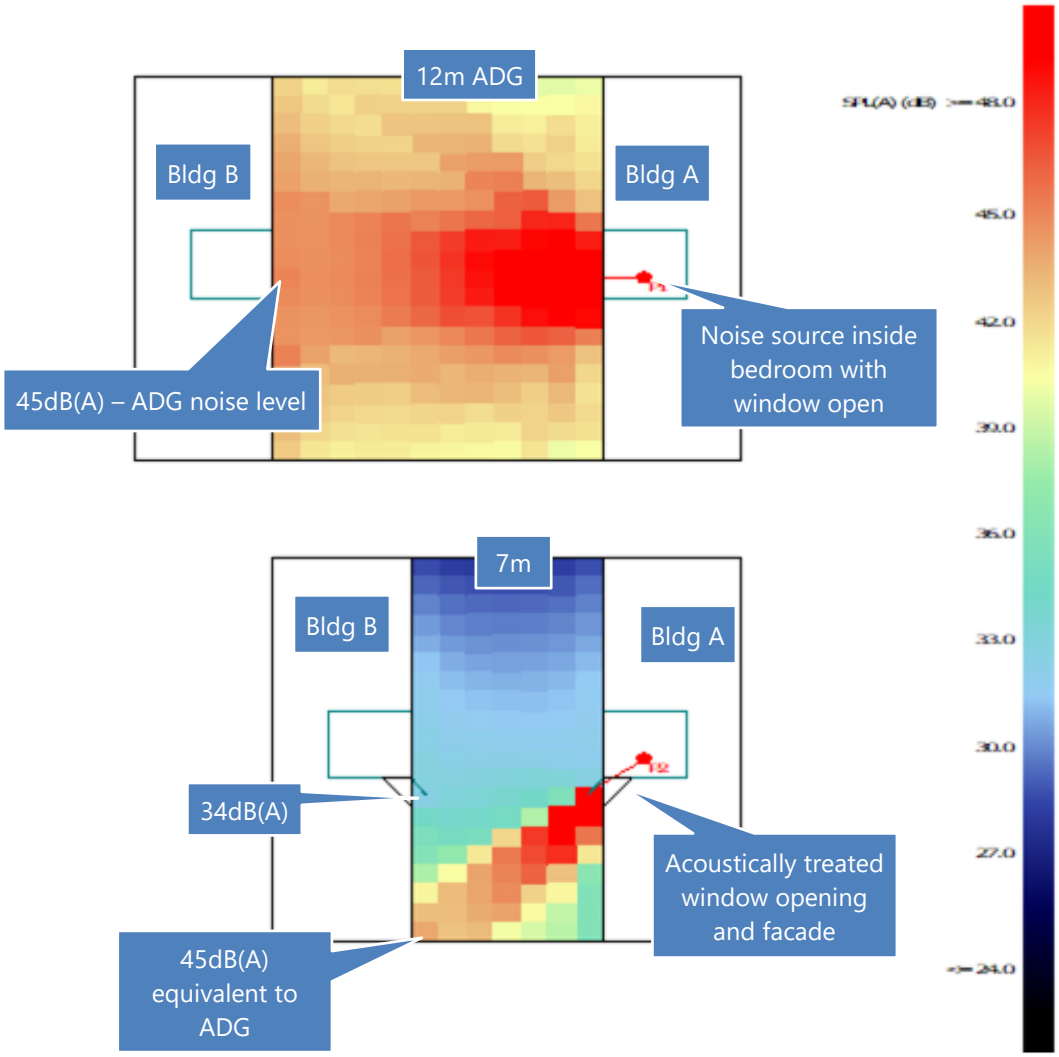


Figure 4: Comparison of sound pressure level outside bedroom windows at 7m and ADG distance

s6. Figure 5 below show results of our acoustic modelling comparing break-out noise from kitchen ventilation opening at ADG separation distance and at reduced 7m distance with acoustic treatment detailed in Figure 3.

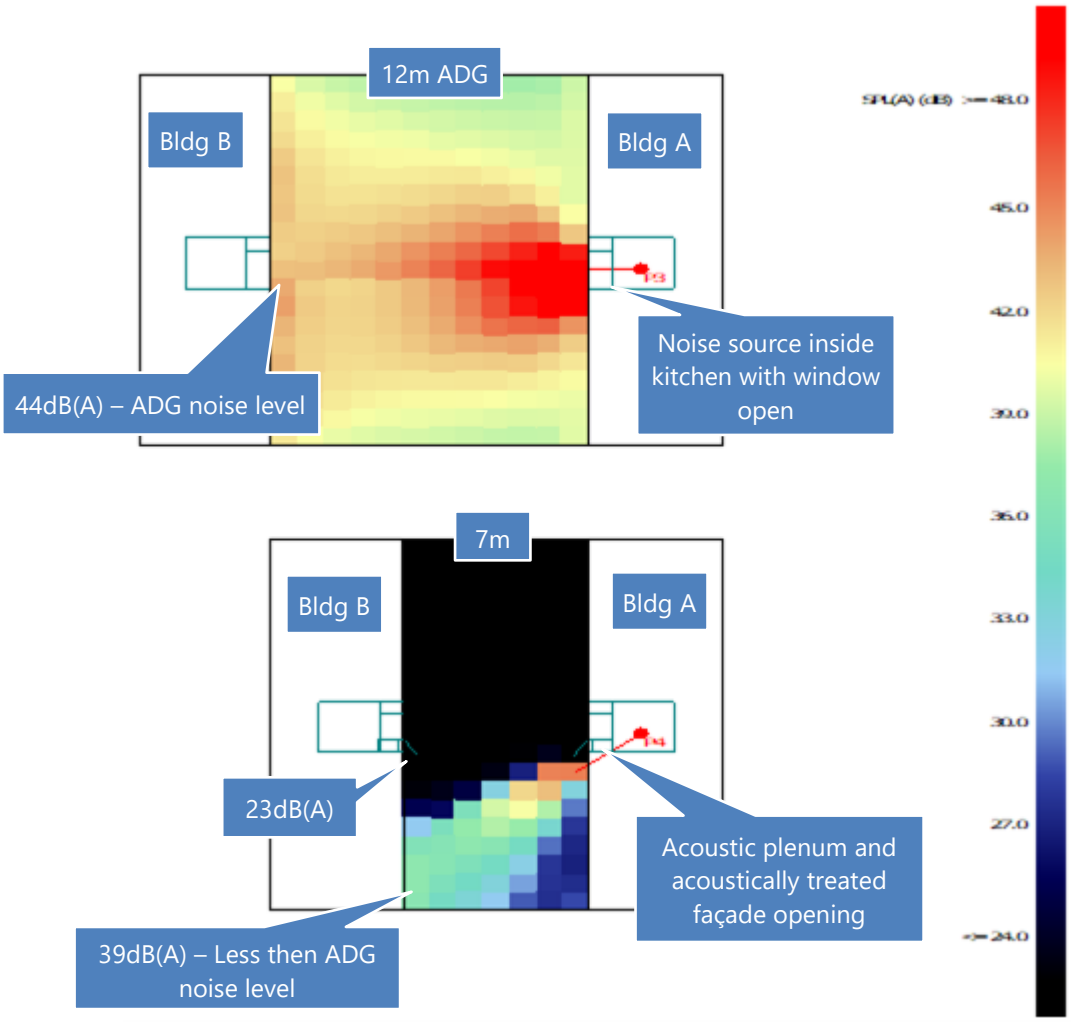


Figure 5: Comparison of sound pressure level outside kitchen ventilation opening at 7m and ADG distance

6 Internal Sound Insulation between Tenancies

Internal walls and floors shall comply with the National Construction Code of Australia 2019 (formally Building Code of Australia). All services and doors shall comply with the requirements of the NCC 2019. APPENDIX B presents a summary of acoustic provisions outlined in Part F5 of the NCC 2019.

7 External Noise Emission from Building Services

7.1 NSW Environment Protection Authority Requirements

Noise from building services will be controlled to comply with the Industrial Noise Policy (INP) outlined in NSW Environment Protection Authority (EPA). The applicable noise limits, according to the policy, are determined in the table below.

Table 6: Design Criterion for Noise Production (EPA INP)

Time of Day	Rating Background Level (RBL) L_{A90}	Intrusiveness Criterion (RBL+5)	Amenity Criterion (Acceptable)	Project Specific Design Criterion L_{Aeq}
Day (7am to 6pm)	56	61	55	55
Evening (6pm to 10pm)	54	59	45	45
Night (10pm to 7am)	45	50	40	40

Explanatory notes:

1. Recommended L_{Aeq} noise level based on 'Residence – Suburban' area in Section 2.2, Table 2.1 Amenity Criteria (Recommended L_{Aeq} noise levels from industrial noise sources) of the EPA's INP.
2. Project Specific Design Criterion based on EPA's INP and is the lower of the Intrusiveness or Amenity Criterion

Where necessary, noise amelioration treatment to mechanical plant such as carpark exhaust fans and air conditioning systems will be incorporated in the design to ensure that noise levels comply with the EPA Industrial Noise Policy.

7.2 Recommendations for Residential A/C Outdoor Units

7.2.1 Recommended Maximum Sound Power/Pressure Levels of A/C Outdoor Unit

It is our understanding that split air-conditioning has been proposed for the apartments with individual A/C condensers installed on balconies. RT&A recommends the Mechanical Consultant to select A/C condensers during the detail design stage of the development having sound pressure/power levels no greater than Daikin RXM46QVMA condensers outlined in Table 7 and Table 8 below.

Table 7: Maximum Sound Pressure Levels of Selected Residential A/C Condensers

Model	Octave Band Sound Pressure Level in dB								Sound Pressure Level @1m in dB(A)
	63	125	250	500	1k	2k	4k	8k	
Daikin RXM60QVMA outdoor unit during cooling cycle	58	58	53	47	46	39	32	25	49
Daikin RXM60QVMA outdoor unit during heating cycle	59	60	55	51	49	42	37	29	52

Notes:

1. The height, width and depth of the units is 695mm, 930mm and 350mm

The above sound pressure level from manufacturer's specification was converted in power levels in accordance to international standard ISO 3744. Sound power level of the A/C condenser show in Table 8 were used in our assessment.

Table 8: Maximum Sound Pressure Power Levels of Selected Residential A/C Condensers

Model	Octave Band Sound Power Level in dB								Sound Power Level in dB(A)
	63	125	250	500	1k	2k	4k	8k	
Daikin RXM60QVMA outdoor unit during heating cycle	72	72	67	61	60	53	46	39	63
Daikin RXM60QVMA outdoor unit during cooling cycle	73	74	69	65	63	56	51	43	66

7.2.2 Recommended Acoustic Treatment to A/C Outdoor Unit

When A/C operating during day and evening time (before 10pm), noise emission levels should be controlled to comply with NSW Industrial Noise Policy outlined in Table 6 at site boundaries. However, given that residential A/C can operate at night-time after 10pm, the more stringent criteria outlined in Table 6 applies where noise emitted from an individual A/C outdoor unit is expected not to exceed 30dB(A) outside the habitable room of any affected neighbouring residence. Compliance with nigh time criteria automatically mean compliance with the day and evening noise criteria.

The following recommendations are provided for control of noise emission from balcony A/C condenser units to comply noise levels outlined in Table 6 above.

s1. Provide a full-height balcony partition separating apartment balconies. Partition shall be of solid construction such as fibre cement sheeting, Villaboard, light-weight concrete or masonry.

s2. No gaps are permitted in balcony partitions and all service penetrations through the partition wall shall be sealed with a mastic sealant.

s3. Where possible, install condenser parallel to the balcony partition and at no greater than 300mm from the partition. In addition, the centre of condenser shall be positioned at a minimum distance of 1.5m from edge of balcony.

s4. Balcony balustrade shall be of solid construction such as glass or masonry with a minimum height of 1m. No gaps are permitted in the balustrades except for drainage holes at foot of balustrade.

s5. Condenser units shall be isolated from the balcony floor slab with minimum 10mm thick rubber pads/mounts to minimise potential structure-borne noise transfer to adjoining neighbours

s6. Acoustic treatment recommended above will require to be revised where Mechanical Contractor select A/C condensers with exceeding the recommended levels prescribed in Table 7 and Table 8

s7. Final selection of A/C condensers shall have their noise specifications and their proposed locations checked prior to their installation on site

7.3 Basement Carpark Exhaust & Supply Air Fans

Noise generated from operation of basement carpark exhaust/supply air fans has the potential impact on existing neighbours and future residences above, although at this stage of the development sound power data of the unit is not available for detailed assessment, the following in principle advice are provided to minimise potential noise and vibration impacts to future residences and nearby neighbours.

s1. Install fans in basement plant room to control fan case-radiated noise breaking into external environment via car park entry ramp or outside air louvres

s2. Carpark exhaust shall discharge vertically on roof level and positioned at least 3m away from balconies and windows of apartments below

s3. Fans shall be vibration isolated off concrete soffit by mounting the fans on isolation hangers having 25mm static deflection or equivalent Embelton Type SHS or SH to minimise potential structure-borne noise to residence above

s4. Fans shall be vibration isolated from duct work on inlet and discharge side of fan with flexible connectors

s5. Ductwork supported from the concrete soffit shall be isolated with neoprene hangers.

s6. Ductwork associated with supply and exhaust fans shall not be fixed into riser walls adjoining apartments

s7. Fan plant room walls shall be of solid construction (full-height plasterboard or masonry) with sound-rated access door.

s8. Subject to review of sound power of the selected exhaust/supply air fans the following are typical additional noise control measures incorporated into mechanical service design of basement carpark of similar size to ensure that noise levels comply with the recommended EPA noise emission criteria established in Table 6 above.

Table 9: Typical Acoustic Treatment to Basement Fans

Plant Item	Recommended Acoustic Treatment		
	Case Radiated	Intake Side	Discharge Side
Carpark Exhaust & Supply Air Fans			
Basement carpark exhaust fans	Install fan inside plantroom and provide acoustic rated access door. In addition, allow for acoustic lining of plantroom walls and/or soffit – extend of treatment to be determine upon review of selected fan with manufacturer's sound data spectrum	Allow for silencer typically 1.8m long – exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum	Allow for attenuator typically 1.8m long - exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum
Basement carpark supply air fans	Install fan inside plantroom and provide acoustic rated access door. In addition, allow for acoustic lining of plantroom walls and/or soffit – extend of treatment to be determine upon review of selected fan with manufacturer's sound data spectrum	Allow for silencer typically 1.8m long – exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum	Allow for attenuator typically 1.8m long - exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum
	Where fan is not installed in plantroom – allow for cladding or acoustic lagging of fan casing and ductwork - extend of treatment to be determine upon review of selected fan with manufacturer's sound data spectrum	Allow for silencer typically 1.8m long – exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum	Allow for attenuator typically 1.8m long - exact length and insertion loss performance to be confirmed upon review of selected fan with manufacturer's sound data spectrum

Notes

1. Acoustic treatment will require to be revised once Mechanical Contractor finalise equipment selection and associated duct work configuration

s9. Final selection of fans shall have their noise specifications and their proposed locations checked prior to their installation on site

8 Loading Dock and Driveway Ramp

8.1 Loading Dock

8.1.1 Loading Dock Noise Sources

Noise generated from the operational use of the loading dock on the ground floor has potential to impact on the acoustic amenity of existing residential neighbours on the north-east site boundary and future apartments with balconies and windows overlooking the driveway.

Typical loading dock activities commonly causing noise include;

- Movement of delivery trucks into and out of the loading dock
- Reversing alarms on trucks when backing into loading dock area
- Operation of refrigeration equipment mounted on refrigerated vehicles
- Unloading of goods off truck (tail lift lowering/rising, electric and/or manual pallet jacks driven on and off tail lift, movement of trolleys and pallets from dock area into storage etc)
- Truck engines starting and doors closing

8.1.2 Noise Criteria

In the absence of specific noise criteria stipulated by the consent authority regards to noise emitted from loading docks, reference is made to the NSW *Noise Guide for Local Government* (NGLG). According to the NGLG, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the L_{Aeq} descriptor) does not exceed the background noise level measured in the absence of the source by more than 5dB(A). The intrusiveness criterion is summarised as follows:

- $L_{Aeq,15minute} \leq$ Background noise level + 5dB(A)

The allowable $L_{Aeq\ 15minute}$ noise emission from an existing or newly introduce noise source is therefore dependant on the background noise level in the in an area without the subject noise source(s) in operation.

Therefore, based on the above intrusiveness criterion and the background noise levels presented in Table 4 the applicable noise limits at residential windows and balconies are as follows.

Table 10: Loading Dock Intrusiveness Noise Criteria

Assessment Location	Operational Noise Emission Limits for Loading Dock in LAeq, 15minutes		
	Day[1]	Evening[2]	Night[3]
Windows and Balconies of Existing and Future Residential Receivers	56 plus 5 = 61 dB(A)	54 plus 5 = 59 dB(A)	45 plus 5 = 50 dB(A)

Notes:

Day, Evening & Night assessment periods are defined in accordance NSW EPA's Industrial Noise Policy as follows.

1. Day is defined as 7:00am to 6:00pm, Monday to Saturday; 8:00am to 6:00pm Sundays & Public Holidays.
2. Evening is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays
3. Night is defined as 10:00pm to 7:00am, Monday to Saturday; 10:00pm to 8:00am Sundays & Public Holidays

8.1.3 Recommendations

The total noise generated from the usage of the loading docks will depend on the number of deliveries to the retail spaces during day, evening or night periods, the size and type of trucks. However, at this stage of development, the operating time of the retails space and delivery schedule are not available, therefore the following in-principle noise abatement measures are provided;

s1. Provide a solid fence with minimum height of 1.8m between driveway and existing residential neighbour to the north-east. Acceptable fence materials are Colorbond, fibre cement, Hebel, lapped and capped timber.

s2. Loading dock door shall be solid construction and shall be shut when trucks are operating inside the loading dock

s3. Ventilation louvres on walls of loading dock shall be acoustically rated and equivalent to Fantech SBL1

s4. Provide a minimum 300mm thick concrete slab separating the loading dock and apartments above

s5. Soffit of concrete slab separating loading dock and apartments above shall be acoustically treated with sound absorptive material such as 50mm Pyrotek Sorber Poly 2D or 50mm Reapor,

s6. Wall surfaces inside loading dock shall also be acoustically treated with sound absorptive material such as 50mm Pyrotek Sorber Poly 2D or Reapor from height of 2m extending to ceiling line.

s7. Lower section of wall surfaces inside the loading dock should be acoustically treated with minimum 20mm thick rubber/neoprene pads adhered to the perimeter walls to a height of 1.5m off the finished floor to dampen impacts onto walls and minimise transfer of structure-borne transfer.

s8. Operation of turn table shall be inaudible in any habitable space

s9. Refer to Figure 6 below for further details

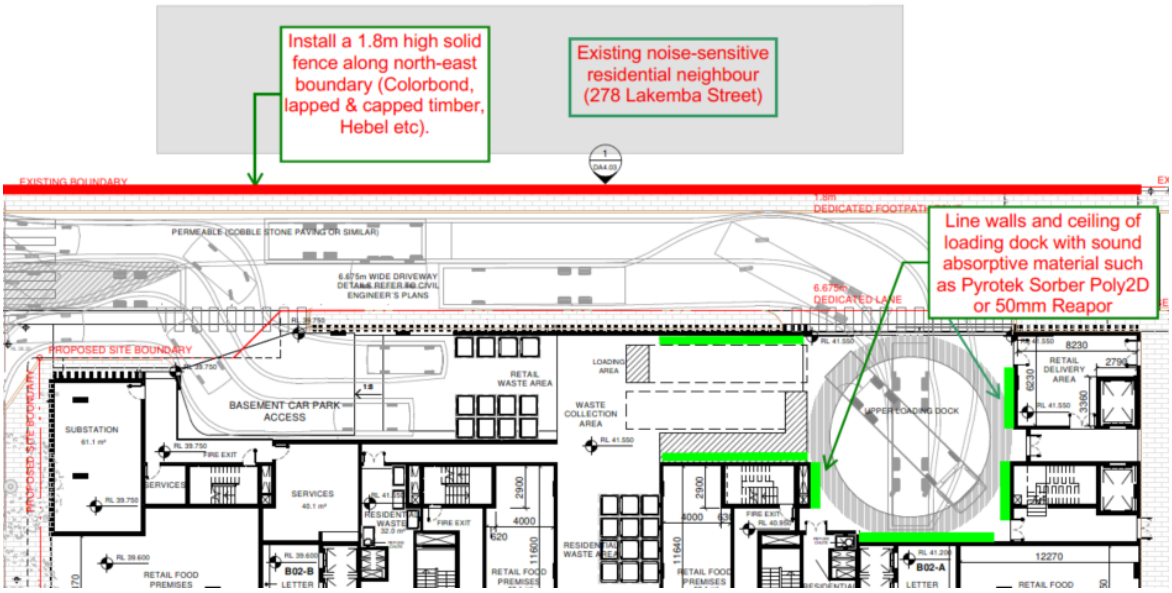


Figure 6: Acoustic Treatment to Loading Dock

8.2 Basement Driveway Ramp

The following recommendations provide in-principle vibration control measure to alleviate potential structure-borne noise impacts to internal residential spaces above basement carpark and driveway ramp.

s1. Stormwater grates located in driveways and driveway ramps shall be vibration isolated using minimum 10mm thick rubber pads.

s2. Low-profiled rubber/neoprene speed humps shall be used through-out the basement carpark including driveways with recommended maximum vehicle speed limit of 10km/hr. Speed humps shall be firmly fixed to structural floor. Concrete-formed speed humps are not recommended.

s3. Expansion joints at bottom ramp shall be fitted with a rubber-based joint cover that is flush with the surface of finished floor such as Zip Block (ZB) EPDM rubber joint covers.

For control of airborne noise generated as vehicle entry/leave the carpark which can potentially transmitted to apartments above and breaking out into the external environment the following measures are recommended;

s4. Provide a minimum 200mm thick slab separating ramp and apartment above

s5. Underside of concrete slab separating ramp and apartments above shall be acoustically treated with sound absorptive material such as Envirospray 300. Treatment shall extend at least 3m into the basement carpark at bottom of the ramp.

s6. The acoustic fence recommended in Section 8.1.3 will assist in shielding break-out noise to residential neighbours on the north-east boundary

9 Construction Noise

The nature of the construction processes proposed for the development does not present difficulties in ensuring that the associated noise limits at surrounding properties are achieved. The major construction activities proposed on this site are excavation works, concrete pours and general building works.

Construction and building work will be adequately managed so as to minimise disruption to the local community and the environment.

Noise generated by construction activities will comply with the Department of Environment Climate Change & Water's Interim Construction Noise Guide (ICNG). APPENDIX D presents a summary ICNG's standard construction times and conditions.

10 Conclusion

Renzo Tonin & Associates have completed an acoustic assessment of road traffic noise, airborne rail noise impacts onto the proposed mixed-use development on 280-300 Lakemba Street and 64-70 King Georges Road, Wiley Park.

Our assessment of airborne road and rail noise intrusion into the subject development has found that appropriate noise control measures can be incorporated into the building design such as acoustic glazing to achieve compliance with the acoustic requirements stipulated in Council DCPs, State Environment Planning Policy ISEPP 2007 and Australian Standard AS/NZS 2107.

Recommendations have been made in Section 5 of this report to comply with the nominated internal noise criteria.

In addition, preliminary operational noise assessment of proposed loading dock/driveway, carpark entry/exit ramp and residential A/C outdoor units has been undertaken. Noise and vibration mitigation measures has been provided in the Sections 7 and 8 to achieve compliance with nominated Project noise criteria.

APPENDIX A Assessment and Design Methodology

A.1 Council Development Control Plans

Canterbury-Bankstown Council (Amalgamation of Canterbury & Bankstown City Councils) is the regulatory authority for the proposed development.

A.1.1 Canterbury DCP 2012

Canterbury DCP 2012 refers to the Department of Planning publication "Development near rail corridors and busy roads – Interim Guidelines" as design guide for residential developments. Chapter C5 "Shop Top Housing", Section C5.2.4.2 of the DCP states the following;

" C5.2.4.2 Acoustic Privacy

Objectives

O1 To ensure reasonable levels of acoustic privacy are available for residents, externally and internally, during the day and at night.

O2 To minimise the effect of excessive ambient noise through siting and architectural design and detailing.

O3 To minimise the impact of rail and road noise and vibration for dwelling occupants.

O4 To protect new and existing dwellings from intrusive noise.

Controls

C1 Locate sensitive rooms, such as bedrooms, from likely sources of noise such as major roads and neighbouring' living areas.

C2 Above ground access to new dwellings must not include communal balconies that would be located immediately next to a bedroom window.

C3 Bedroom windows in new dwellings that would be located at or close to ground level are be raised above, or screened from, any shared pedestrian pathway.

C4 Screen balconies or windows in living rooms or bedrooms that would face a driveway or basement ramp.

C5 On land adjoining railway or busy roads, address all requirements in 'Development Near Rail Corridors and Busy Roads - Interim Guideline' which has been published by the NSW Department of Planning and Environment.

C5 Design the layout of lower levels facing the road or rail to:

(a) The position of windows facing the noise source and ensure that total unprotected window area is minimal so as to limit the amount of airborne noise entering the built fabric;

(b) Ensure that the detailing of the window types addressing the corridors are designed and constructed to attenuate excessive noise - (double and triple glazing and insulated to manufacturers standards); and

(c) Ensure that balcony parapet walls are constructed of solid masonry or materials of similar sound attenuating qualities.

C7 When designing the public spaces fronting busy roads and the rail corridor at ground level, consider the use of elements such as moving water and screens to achieve sound attenuation."

A.1.2 Draft Canterbury Bankstown DCP 2021

It is noted that the draft Canterbury Bankstown DCP 2021 (December 2020) does not contain any additional acoustic requirements to the DCP 2012 discussed above.

A.2 State Environmental Planning Policy (Infrastructure) 2007

The NSW State Environmental Planning Policy (Infrastructure) 2007 (known as 'ISEPP') came into force in NSW on 1 January 2008 to facilitate the effective delivery of infrastructure across the State. The aim of the policy includes identifying the environmental assessment category into which different types of infrastructure and services development fall and identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure.

Pertinent to noise assessment, the ISEPP includes the following clauses:

87 Impact of rail noise or vibration on non-rail development

1. *This clause applies to development for any of the following purposes that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to be adversely affected by rail noise or vibration:*
    a. *a building for residential use,*
    b. *a place of public worship,*
    c. *a hospital,*
    d. *an educational establishment or child care centre.*
2. *Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.*
3. *If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*

a. in any bedroom in the building - 35 dB(A) at any time between 10 pm and 7am,

b. anywhere else in the building (other than a garage, kitchen, bathroom or hallway) - 40 dB(A) at any time.

102 Impact of road noise or vibration on non-road development

1. This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

c. a building for residential use,

d. a place of public worship,

e. a hospital,

f. an educational establishment or child care centre.

2. Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.

3. If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

a. in any bedroom in the building - 35 dB(A) at any time between 10 pm and 7am,

b. anywhere else in the building (other than a garage, kitchen, bathroom or hallway) - 40 dB(A) at any time.

4. In this clause, "freeway", "tollway" and "transitway" have the same meanings as they have in the Roads Act 1993

A.2.1 Department of Planning publication 'Development near rail corridors and busy roads – Interim guideline'

To support the Infrastructure SEPP, the NSW Department of Planning released the *Development in Rail Corridors and Busy Roads – Interim Guideline* (December 2008). The Guideline assists in the planning, design and assessment of developments in, or adjacent to, major transport corridors in terms of noise, vibration and air quality. While the ISEPP applies only to roads with an AADT greater than 40,000 vehicles, the guideline is also recommended for other road traffic noise affected sites.

A.2.2 Clarification of ISEPP noise limits

The Guideline clarifies the time period of measurement and assessment. Section 3.4 '*What Noise and Vibration Concepts are Relevant*' and Table 3.1 of Section 3.6.1 confirms that noise assessment is based over the following time periods:

- Daytime 7:00am - 10:00pm $L_{Aeq(15hr)}$
- Night-time 10:00pm - 7:00am $L_{Aeq(9hr)}$

The noise criteria nominated in the ISEPP apply to internal noise levels with windows and doors closed. However as the preliminary noise assessment is based on measurements/predictions at external locations, equivalent external noise criteria has been established. The equivalent external noise criterion is used to determine which areas of the development may require acoustic treatment in order to meet the internal noise requirements of the ISEPP. The equivalent external goals have been determined on the following basis:

- The ISEPP states: "*If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia*." The internal criteria with windows open is therefore 10dB(A) above the criteria explicitly outlined in the ISEPP.
- The generally accepted noise reduction through an open window from a free-field external position is 10dB(A). Windows/doors are assumed to be open no more than 5% of room floor area, in accordance with the Building Code of Australia (BCA) ventilation requirements.

Table 11 presents the ISEPP internal noise criteria along with the equivalent external noise criteria for residential premises.

Table 11: ISEPP noise criteria for new residential development

Room	Location	$L_{Aeq, 15hr}$ Day 7am – 10pm	$L_{Aeq\ 9hr}$ Night 10pm – 7am
Living rooms*	Internal, windows closed	40	40
	Internal, windows open	50	50
	External free-field (allowing windows to remain open)^	60	60
Bedrooms*	Internal, windows closed	40	35
	Internal, windows open	50	45
	External free-field (allowing windows to remain open)^	60	55

Notes: * Requisite for 40,000AADT Roads only under ISEPP 2007.

^ ISEPP Guideline states that where internal noise criteria are exceeded by more than 10dB(A) with windows open mechanical ventilation is required. External goals have been calculated on the basis of nominal 10dB(A) reduction through an open window to a free-field position. Windows open to 5% of floor area in accordance with the BCA 2011 requirements.

A.3 Australian/New Zealand Standard AS/NZS 2107:2000

As traffic noise levels are not constant, an L_{eq} noise level descriptor is used when assessing this type of noise source. The L_{eq} is the mean energy level of the noise being measured, and has been found to accurately describe the level of annoyance caused by traffic noise.

This standard provides recommended noise levels for steady state such as noise from building services and quasi-steady state sounds, such as traffic and industrial noise. The noise levels recommended in AS/NZS 2107:2000 take into account the function of the area and apply to the sound level measured within the space unoccupied although ready for occupancy.

This standard recommends the following noise levels for residential buildings.

Table 12: Recommended design sound levels for different areas of occupancy in buildings

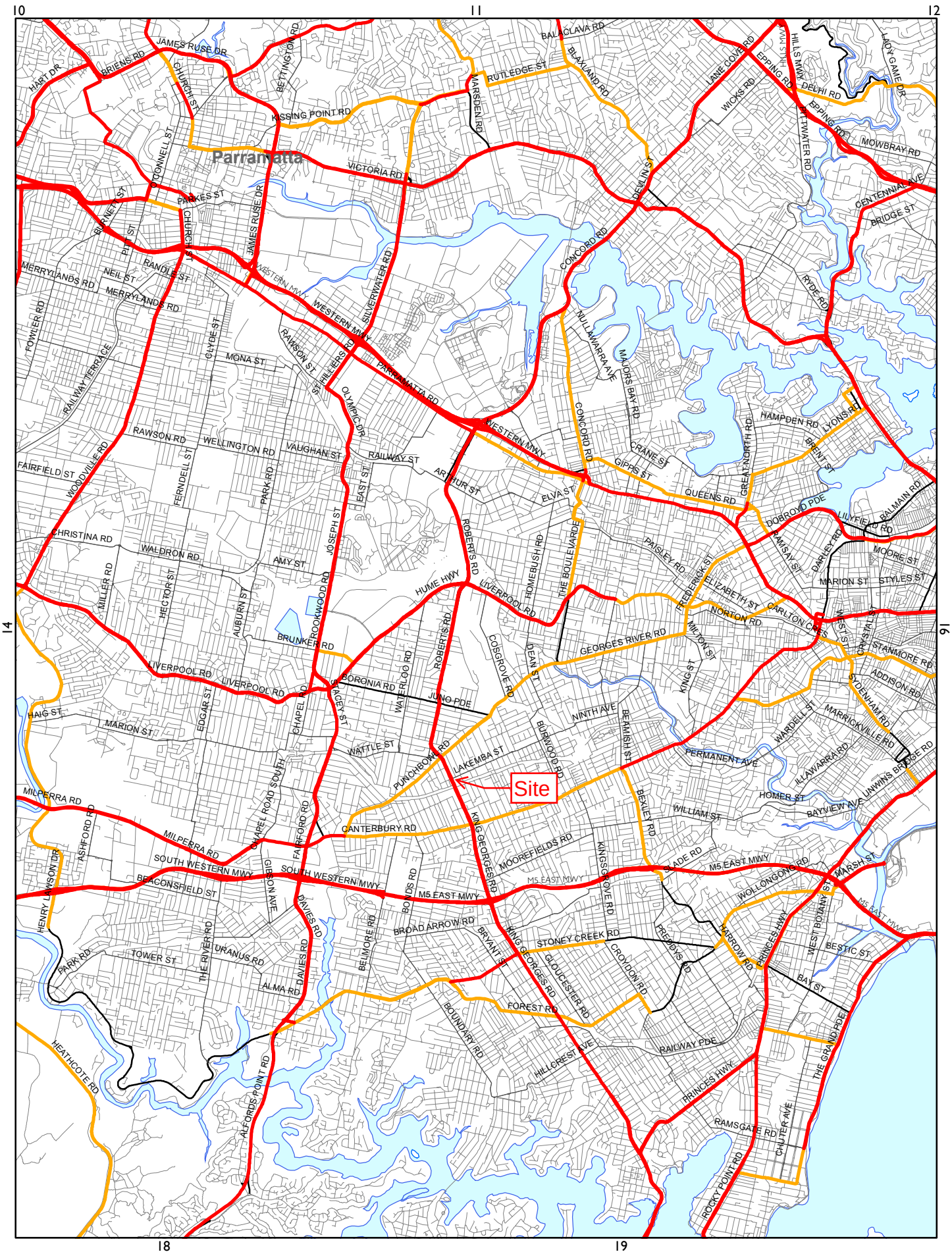
Type of occupancy/ activity	Recommended design sound level, L_{Aeq}, dB(A)		Recommended reverberation time (T),s
	Satisfactory	Maximum	
7 RESIDENTIAL BUILDINGS (see Note 7 and Clause 5.2)			
Houses in areas with negligible transportation -			
Sleeping areas	25	30	-
Houses and apartments near minor roads -			
Living areas	30	40	-
Sleeping areas	30	35	-
Work areas	35	40	-
Apartment common areas (e.g. foyer, lift lobby)	45	55	See Note 3
Houses and apartments near major roads -			
Living areas	35	45	-
Sleeping areas	30	40	-
Work areas	35	45	-
Apartment common areas (e.g. foyer, lift lobby)	45	55	See Note 3

NOTES:

Type of occupancy/ activity	Recommended design sound level, L_{Aeq}, dB(A)		Recommended reverberation time (T),s
	Satisfactory	Maximum	

1. The recommended design sound levels are for a fully fitted out and completed building. Attention is drawn to the additive noise effect of many machines within the same area and adjacent areas. Allowance for the total number and type of noise sources should therefore be made in the selection of equipment and in the design of building spaces. A building owner or developer may consider an allowance of 3-5 dB(A) to be appropriate.
2. Recommended reverberation time is 10 percent to 20 percent higher than Curve 1 of Appendix A.
3. Reverberation time should be minimized as far as practicable for noise control.
4. Certain teaching spaces, including those intended for students with learning difficulties and students with English as a second language, should have reverberation times at the lower end of the specified range.
5. Specialist advice should be sought for these spaces.
6. A very wide range of noise levels can occur in the occupied state in spaces housing manufacturing processes, and the levels are primarily subject to control as part of a noise management program (see AS/NZS 1269.2). The possibilities for segregating very noisy processes from quieter ones by partitioning vary between particular industries and plants. For reasons such as these, it is difficult to make generalized recommendations for desirable, or even maximum, design levels for the unoccupied state, but one guiding principle may still be observed - when the activity in one area of a manufacturing plant is halted, it is desirable that the local level should if possible drop to 70 dB(A) or lower to permit speech communication without undue effort.
7. In situations where traffic noise levels may vary widely over a 24-hour period, measurements to assess compliance with this Standard should be taken at the relevant time and for an appropriate measurement period according to the area of occupancy or activity in the building. Where traffic noise fluctuates rapidly with the passage of individual vehicles, the community reaction may not correlate well with the equivalent continuous noise level as measured.
8. The overall sound pressure level in dB(A) should conform to the recommended design sound level given in Table 1. In these spaces, a balanced sound pressure level across the full frequency range is essential. These spaces should therefore be evaluated in octave bands across the full frequency spectrum. The recommended maximum sound pressure levels for the individual octave bands corresponding to the overall dB(A) value are given in Appendix C.
9. In spaces in which high quality sound recordings are to be made, the levels set for low frequency octave bands should not be exceeded (see Appendix C). Subsequent replay of the recordings may cause an amplification of the ambient sound resulting in an overemphasis of its low-frequency components. Specialist advice should always be sought when these spaces are being designed. In some circumstances, for purposes of very high quality recording, lower levels than those specified in Table 1 may be required.

APPENDIX B Traffic Volume Map For Noise Assessment


10
11
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Parramatta
Site
JAMES RUSE DR
CHURCH ST
VICTORIA RD
PARKES ST
WESTERN MWY
M5 EAST MWY
SOUTH WESTERN MWY
HUME HWY
PARRAMATTA RD
CONCORD RD
GEORGES RIVER RD
KING GEORGES RD
PRINCES HWY
RAILWAY PDE
RAMSGATE RD
MILPERRA RD
CANTERBURY RD
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DELHI RD
MOWBRAY RD
CENTENNIAL AVE
BRIDGE ST
RYDE RD
HAMPDEN RD
QUEENS RD
DOBROYD PDE
MARION ST
STYLES ST
NORTON RD
ADDISON RD
MARRICKVILLE RD
ILLAWARRA RD
UNWINS BRIDGE RD
HOMER ST
BAYVIEW AVE
WILLIAM ST
MOOREFIELDS RD
WOLLONGONG RD
MARSH ST
BESTIC ST
BAY ST
THE GRAND PDE
CHUTER AVE
ROCKY POINT RD
ALFORDS POINT RD
HEATHCOTE RD
BOUNDARY RD
FOREST RD
STONEY CREEK RD
BROAD ARROW RD
BEACONSFIELD ST
MERRYLANDS RD
WESTERN MWY
RAWSON RD
WELLINGTON RD
VAUGHAN ST
RAILWAY ST
MONA ST
OLYMPIC DR
CHRISTINA RD
WALDRON RD
AMY ST
BRUNKER RD
BORONIA RD
JUNO PDE
WATTLE ST
LAKEMBA ST
PUNCHBOWL RD
NINTH AVE
PERMANENT AVE
HAIG ST
MARION ST
LIVERPOOL RD
CHAPEL ROAD SOUTH
FAIRFORD RD
KINGSGROVE RD
BEXLEY RD
BEAMISH ST
KING ST
ENMORE RD
STANMORE RD
SYDENHAM RD
WARDELL ST
PRINCES HWY
HARROW RD
FREEWAYS
CROYDON RD
GLOUCESTER RD
BRYANT RD
BOMBS RD
DAVIES RD
URANUS RD
THE RIVER RD
TOWER ST
PARK RD
ALMA RD
BELMORE RD
GIBSON AVE
ASHFORD RD
HENRY LAWSON DR
MILLER RD
HECTOR ST
AUBURN ST
ROOKWOOD RD
EDGAR ST
CHAPEL RD
WATERLOO RD
ROBERTS RD
COSGROVE RD
DEAN ST
HOMEBUSH RD
THE BOULEVARDE
PRISLEY RD
FREDERICK ST
ELIZABETH ST
CARLTON CRES
DARLEY RD
RAMSAY ST
LILYFIELD RD
BALMAIN RD
GREAT NORTH RD
LYONS RD
BRENT ST
CRANE ST
GIPPS ST
ELVA ST
ARTHUR ST
EAST ST
PARK RD
FERNDELL ST
WOODVILLE RD
FAIRFIELD ST
RAILWAY TERRACE
TOWER RD
CLYDE ST
RAWSON ST
HILLIERS RD
SILVERWATER RD
NEIL ST
RANDLE ST
PIPER ST
BURNETT ST
CONNELL ST
BETTINGTON RD
KISSING POINT RD
MARSDEN RD
RUTLEDGE ST
BALACLAVA RD
BLAXLAND RD
LANE COVE RD
WICKS RD
EPPING RD
TWIN ST
LADY GAMEIR DR
HART DR
BRIENS RD
NULLAMARRA AVE
MAJORS BAY RD
CONCORD RD
DEVLIN ST
0
1
2
4
Kilometres
Scale 1:100,000
TRAFFIC VOLUME MAPS FOR NOISE ASSESSMENT FOR BUILDING ON LAND ADJACENT TO BUSY ROADS
LEGEND
Mandatory under clause 102 of the Infrastructure SEPP (Freeways, tollways, transitways and >40,000 AADT)
Recommended (> 20,000 and < 40,000 AADT)
Roads
Local Roads
Regional Roads
State Roads
Map: 15
RTA
Map produced by RTA, RIAMT, SIS Unit.
Map data copyright (c) 2006 Roads & Traffic Authority, NSW.
Some spatial data courtesy of NSW Department of Lands.
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APPENDIX C Internal Sound Insulation

C.1 National Construction Code of Australia 2019

The National Construction Code of Australia (NCC) outlines minimum requirements for inter-tenancy (party) walls and ceiling/ floors to maintain privacy. This includes the incorporation of penetration of a service through a floor or through more than one sole-occupancy unit.

NCC nominates required Weighted Sound Reduction Indexes (R_w) and spectrum adaptation factor (C_{tr}) for partition constructions, of different space/ activity types in adjoining units. The R_w and $R_w + C_{tr}$ are single number descriptors for quantifying the attenuating performance of partitions for typical intrusive noises produced inside residences. The higher the rating, the greater the isolation provided by the partition.

Spectrum adaptation factors are commonly used to compensate for the fact that certain kinds of sounds are more readily transmitted through insulating materials than others insulate.

The adaptation factor C_{tr} has now been introduced for most building elements which require an airborne sound insulation rating. The only exception is a wall which separates a dwelling from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification. Therefore, both the C_{tr} factor and the R_w of the building element will need to be considered in most cases.

The C_{tr} factor takes into account lower frequency level sounds, and has been chosen in large part, in recognition of the problem of the high bass frequency outputs of modern home theatre systems and music reproduction equipment.

The Deemed-to-Satisfy Provisions also have impact sound insulation requirements for floors. The terms to describe the impact sound insulation of the floor is the weighted normalised impact sound pressure level ($L_{n,w}$). The lower the $L_{n,w}$ of the floor, the better the performance of the floor in terms of impact sound insulation.

The following section represents a summary of acoustic provisions outlined in the Part F5 of the NCC.

C.2 Sound Insultion Provision of NCC of Australia

The acoustic provisions for inter-tenancy walls in Class 2 & 3 buildings are outlined in the National Construction Code of Australia and the following is an extract from the NCC:

F5.2 Determination of airborne sound insulation ratings

A form of construction required to have an airborne sound insulation rating must –

c. have the required value for weighted sound reduction index (R_w) or weighted sound reduction index with spectrum adaptation term ($R_w + C_{tr}$) determined in accordance with AS/NZS 1276.1 or ISO 717.1 using results from laboratory measurements; or

d. comply with Specification F5.2.

F5.3 Determination of impact sound insulation ratings

a. A floor in a building required to have an impact sound insulation rating must –

i. have the required value for weighted normalised impact sound pressure level ($L_{n,w}$) determined in accordance with AS/ISO 717.2 using results from laboratory measurements; or

ii. comply with Specification F5.2.

b. A wall in a building required to have an impact sound insulation rating must –

i. for a Class 2 or 3 building be of discontinuous construction;

c. For the purposes of this part, discontinuous construction means a wall having a minimum 20 mm cavity between 2 separate leaves, and

i. for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and

ii. for other than masonry, there is no mechanical linkage between leaves except at the periphery.

F5.4 Sound insulation rating of floors

a. A floor in a Class 2 or 3 building must have an $R_w + C_{tr}$ (airborne) not less than 50 and an $L_{n,w}$ (impact) not more than 62 if it separates –

i. sole-occupancy units; or

ii. a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.

F5.5 Sound insulation rating of floors

a. A wall in a Class 2 or 3 building must –

i. have an $R_w + C_{tr}$ (airborne) not less than 50, if it separates sole-occupancy units; and

ii. have an R_w (airborne) not less than 50, if it separates a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification; and

iii. comply with F5.3(b) if it separates:

A. a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit; or

B. a sole-occupancy unit from a plant room or lift shaft.

b. A door may be incorporated in a wall in a Class 2 or 3 building that separates a sole-occupancy unit from a stairway, public corridor, public lobby or the like, provided the door assembly has an R_w not less than 30.

c. Where a wall required to have sound insulation has a floor above, the wall must continue to –

i. the underside of the floor above; or

ii. a ceiling that provides the sound insulation required for the wall.

F5.6 Sound insulation rating of services

a. If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than –

i. 40 if the adjacent room is a habitable room (other than a kitchen); or

ii. 25 if the adjacent room is a kitchen or non-habitable room.

b. If a storm water pipe passes through a sole-occupancy unit it must be separated in accordance with (a).

F5.7 Sound isolation of pumps

A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.

APPENDIX D Construction Noise

The NSW *Interim Construction Noise Guideline* (ICNG, 2009) provides guidelines for assessing noise generated during the construction phase of developments.

The key components of the guideline that are incorporated into this assessment include:

- Use of L_{Aeq} as the descriptor for measuring and assessing construction noise.

  NSW noise policies, including the INP, RNP and RING have moved to the primary use of L_{Aeq} over any other descriptor. As an energy average, L_{Aeq} provides ease of use when measuring or calculating noise levels since a full statistical analysis is not required as when using, for example, the L_{A10} descriptor.

- Application of reasonable and feasible noise mitigation measures

- As stated in the ICNG, a noise mitigation measure is feasible if it is capable of being put into practice, and is practical to build given the project constraints.

- Selecting reasonable mitigation measures from those that are feasible involves making a judgement to determine whether the overall noise benefit outweighs the overall social, economic and environmental effects.

The ICNG provides two methods for assessment of construction noise, being either a quantitative or a qualitative assessment. A quantitative assessment is recommended for major construction projects of significant duration, and involves the measurement and prediction of noise levels, and assessment against set criteria. A qualitative assessment is recommended for small projects with a duration of less than three weeks and focuses on minimising noise disturbance through the implementation of reasonable and feasible work practices, and community notification.

Table 13 below (reproduced from Table 2 of the ICNG) sets out the noise management levels and how they are to be applied for residential receivers. The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 13: Noise management levels at residential receivers

Time of day	Management level $L_{Aeq\ (15\ min)}$	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (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 75dB(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, 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(A)	A strong justification would typically be required for works outside the recommended standard hours. 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 5dB(A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2 of the ICNG.

Sensitive Land Use

Table 14 below (reproduced from Table 3 of the ICNG) sets out the noise management levels for various sensitive land use developments.

Table 14: Noise management levels at other noise sensitive land uses

Land use	Where objective applies	Management level $L_{Aeq\ (15\ min)}$
Classrooms at schools and other educational institutions	Internal noise level	45 dB(A)
Hospital wards and operating theatres	Internal noise level	45 dB(A)
Places of worship	Internal noise level	45 dB(A)
Active recreation areas	External noise level	65 dB(A)
Passive recreation areas	External noise level	60 dB(A)
Community centres	Depends on the intended use of the centre.	Refer to the 'maximum' internal levels in AS2107 for specific uses.
Commercial premises	External noise level	70 dB(A)
Industrial premises	External noise level	75 dB(A)

Notes: Noise management levels apply when receiver areas are in use only.

APPENDIX E Monitoring Location & Results of Noise Survey

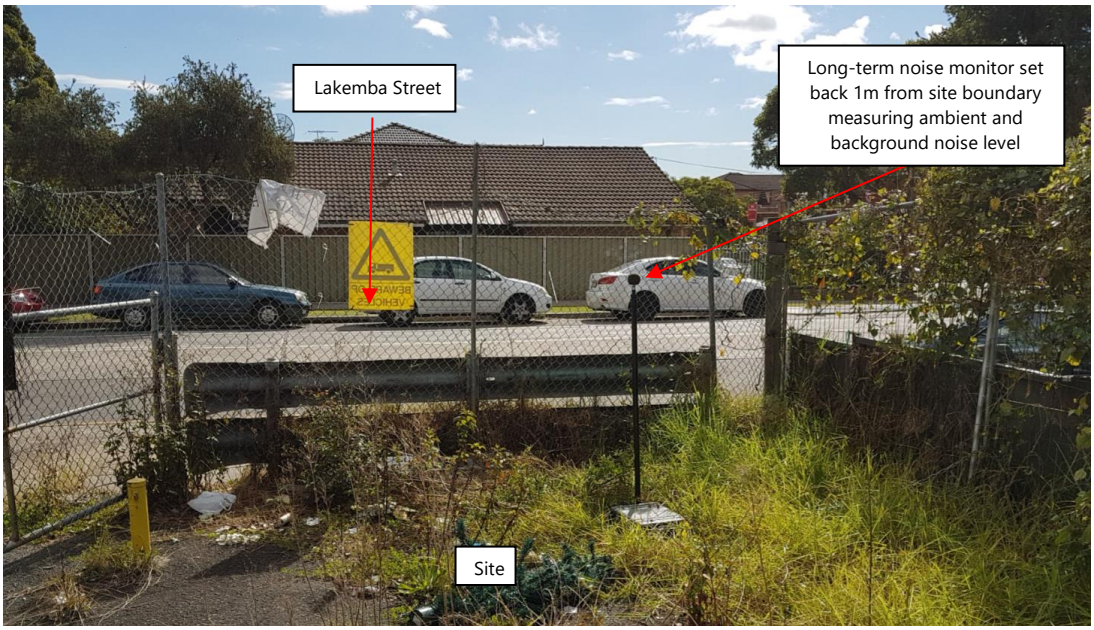
E.1.1 Site Background and Ambient Noise Survey

Location 1: 1m in front of building façade on shop awning of 66 King Georges Road, Wiley Park

Survey Period: Wednesday 02/08/2017 to Wednesday 02/08/2017

Location 2: 1m from site north-east boundary at 282 Lakemba Street, Wiley Park.

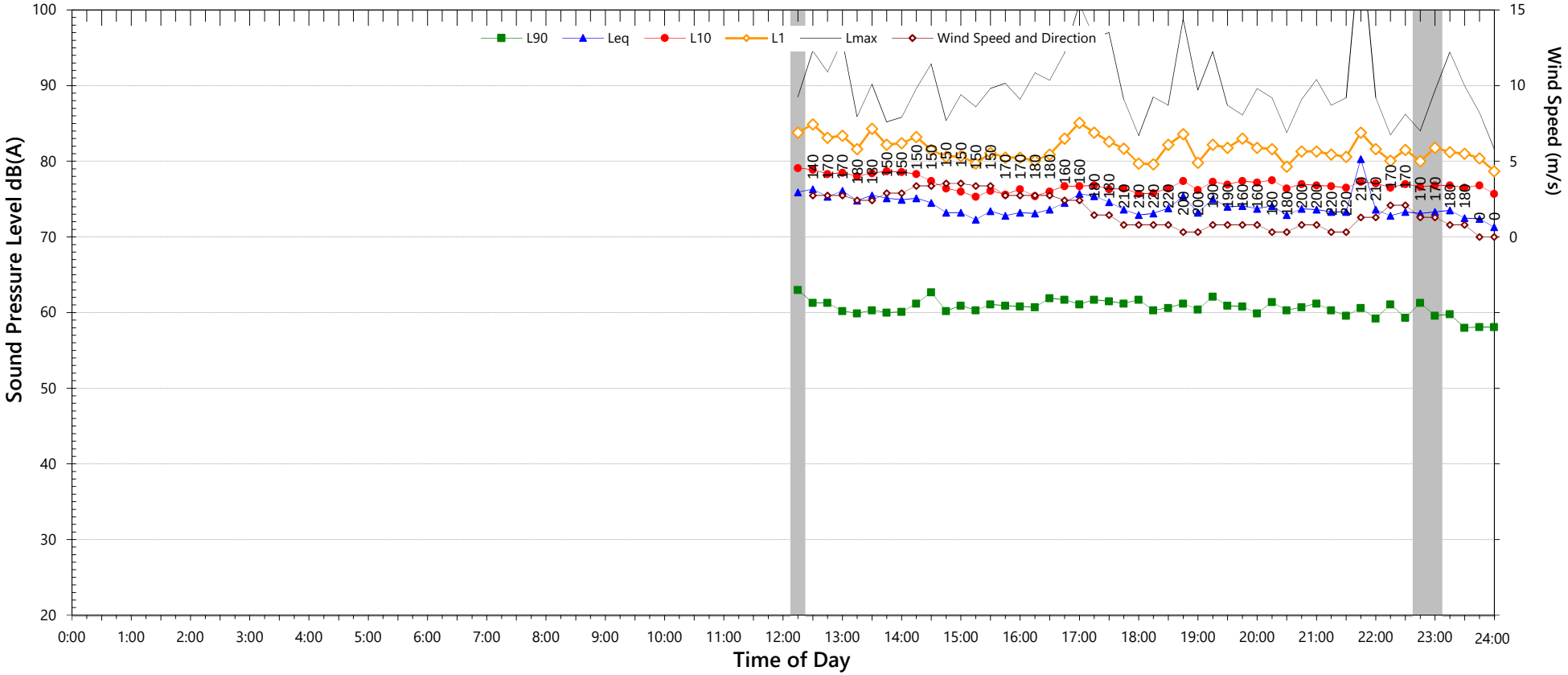
Survey Period: Wednesday 02/08/2017 to Wednesday 02/08/2017



Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Wednesday, 2 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	-	59.6	-
LAeq (see note 6)	-	72.2	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	89.4	to	99.1
L_{Max} - L_{eq} (Range)	17.2	to	27.8

NSW Road Noise Policy (1m from facade)		
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74.6	73.9
$L_{eq\ 1hr}$ upper 10 percentile	76.4	77.2
$L_{eq\ 1hr}$ lower 10 percentile	72.9	70.2

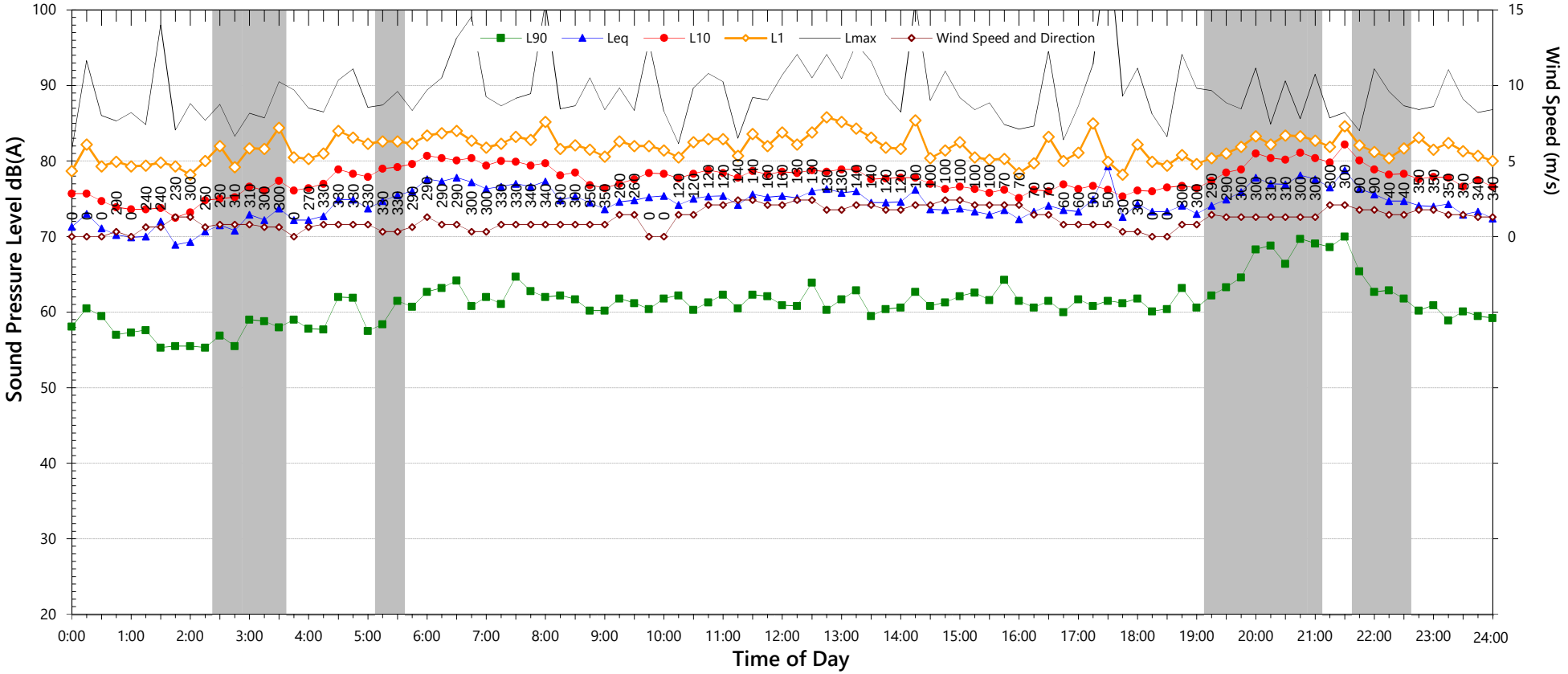
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Thursday, 3 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	60.3	-	56.8
LAeq (see note 6)	72.6	-	71.1

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	90.1	to	97.2
L_{Max} - L_{eq} (Range)	18.8	to	26.2

NSW Road Noise Policy (1m from facade)		
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75.1	73.6
$L_{eq\ 1hr}$ upper 10 percentile	77.5	76.6
$L_{eq\ 1hr}$ lower 10 percentile	73.2	70.9

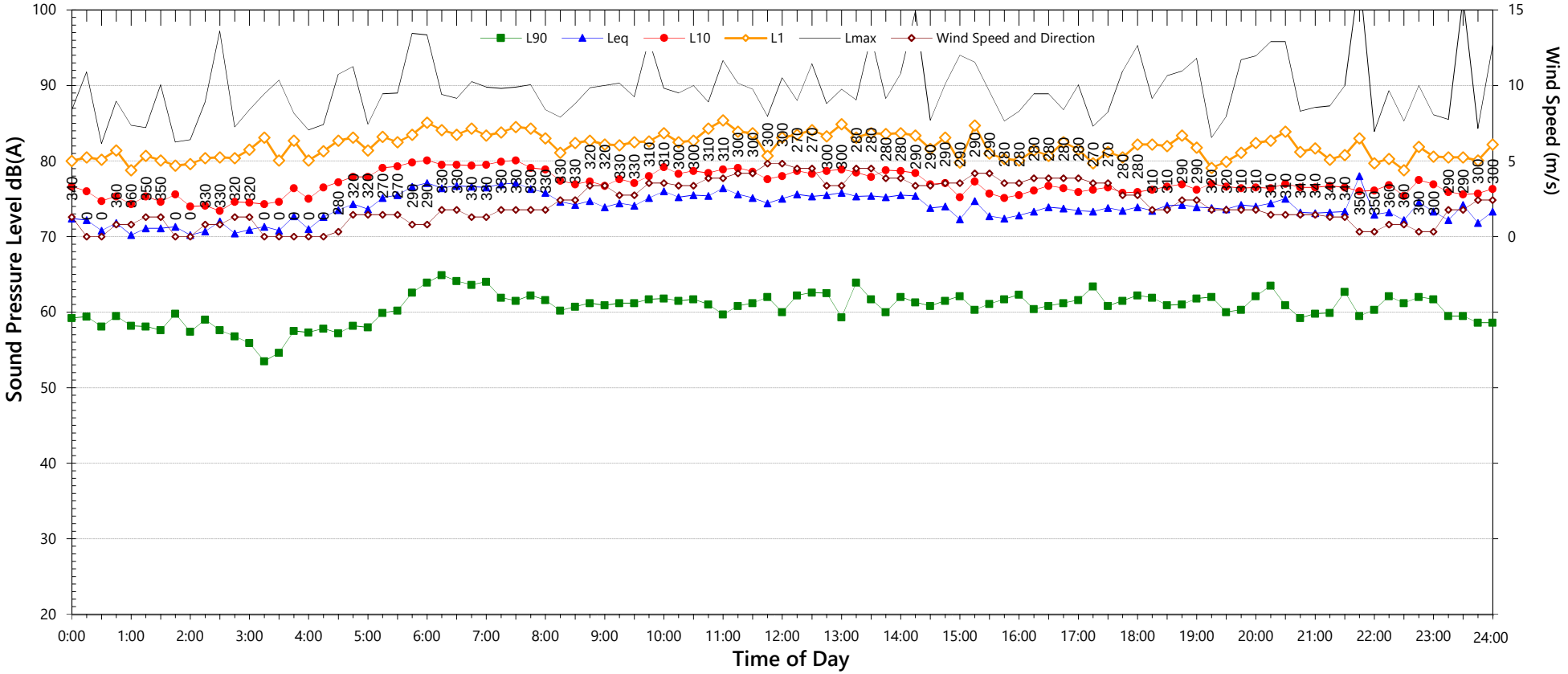
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Friday, 4 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	60.2	59.5	55.8
LAeq (see note 6)	72.3	71.7	69.7

Night Time Maximum Noise Levels			**(see note 7)**
L_{Max} (Range)	86.8	to	101.6
L_{Max} - L_{eq} (Range)	15.8	to	29.8

NSW Road Noise Policy (1m from facade)		
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74.7	72.2
$L_{eq\ 1hr}$ upper 10 percentile	76.1	74.9
$L_{eq\ 1hr}$ lower 10 percentile	73.4	69.5

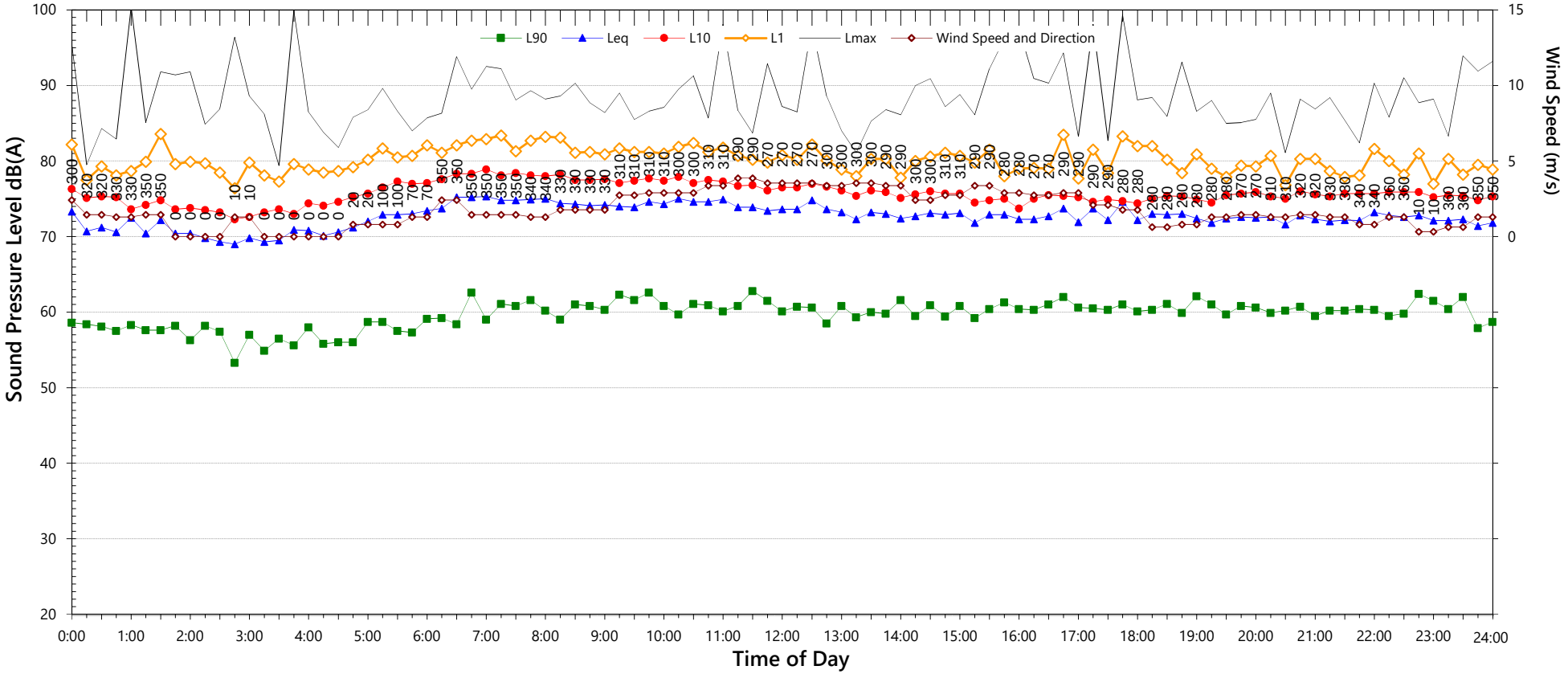
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Saturday, 5 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	59.4	59.7	53.9
LAeq (see note 6)	71.2	70.0	68.3

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	84.3	to	97.3
L_{Max} - L_{eq} (Range)	15.8	to	25.7

NSW Road Noise Policy (1m from facade)		
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73.4	70.6
$L_{eq\ 1hr}$ upper 10 percentile	74.8	72.6
$L_{eq\ 1hr}$ lower 10 percentile	72.3	67.8

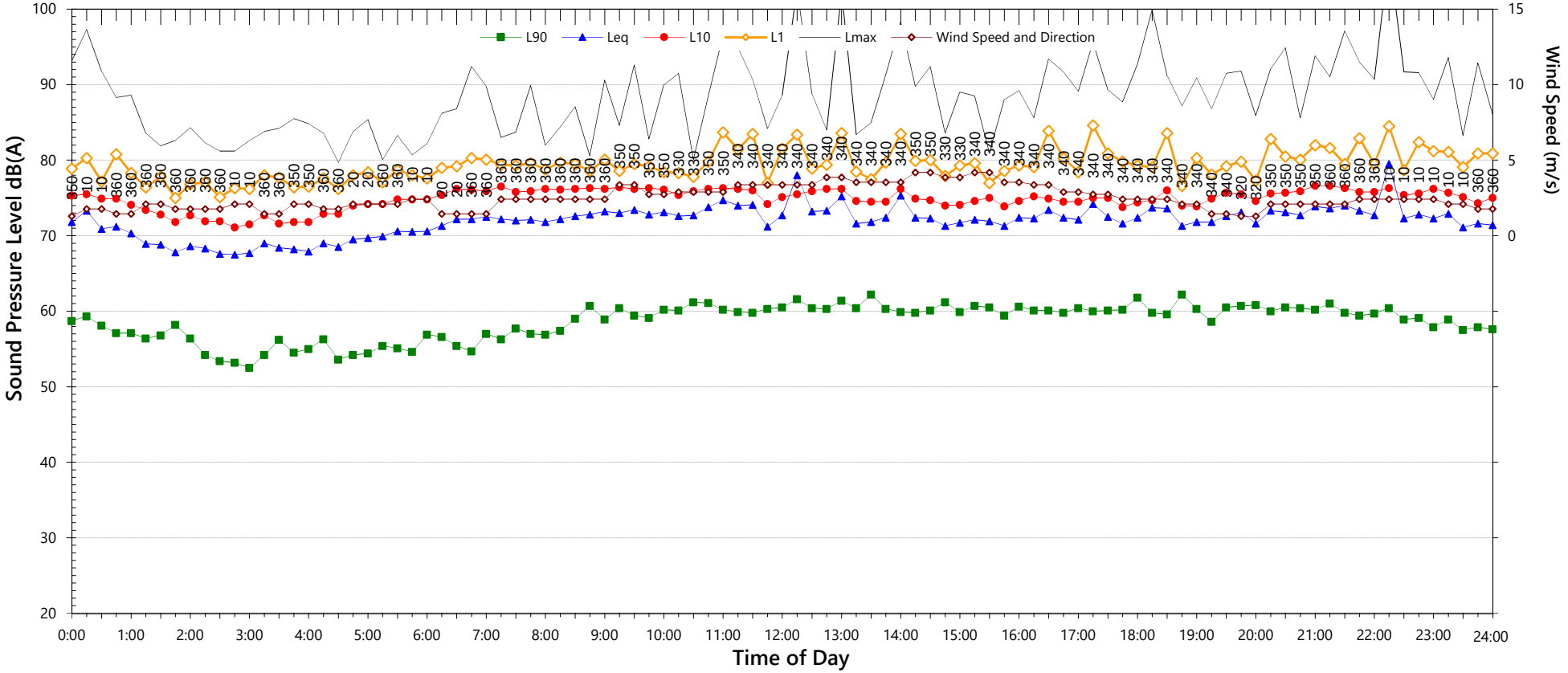
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Sunday, 6 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	59.3	59.4	52.7
LAeq (see note 6)	70.6	70.5	70.6

Night Time Maximum Noise Levels			**(see note 7)**
L_{Max} (Range)	91.5	to	107.2
L_{Max} - L_{eq} (Range)	18.9	to	31.7

NSW Road Noise Policy (1m from facade)		
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73.0	73.1
$L_{eq\ 1hr}$ upper 10 percentile	74.6	75.9
$L_{eq\ 1hr}$ lower 10 percentile	71.9	69.0

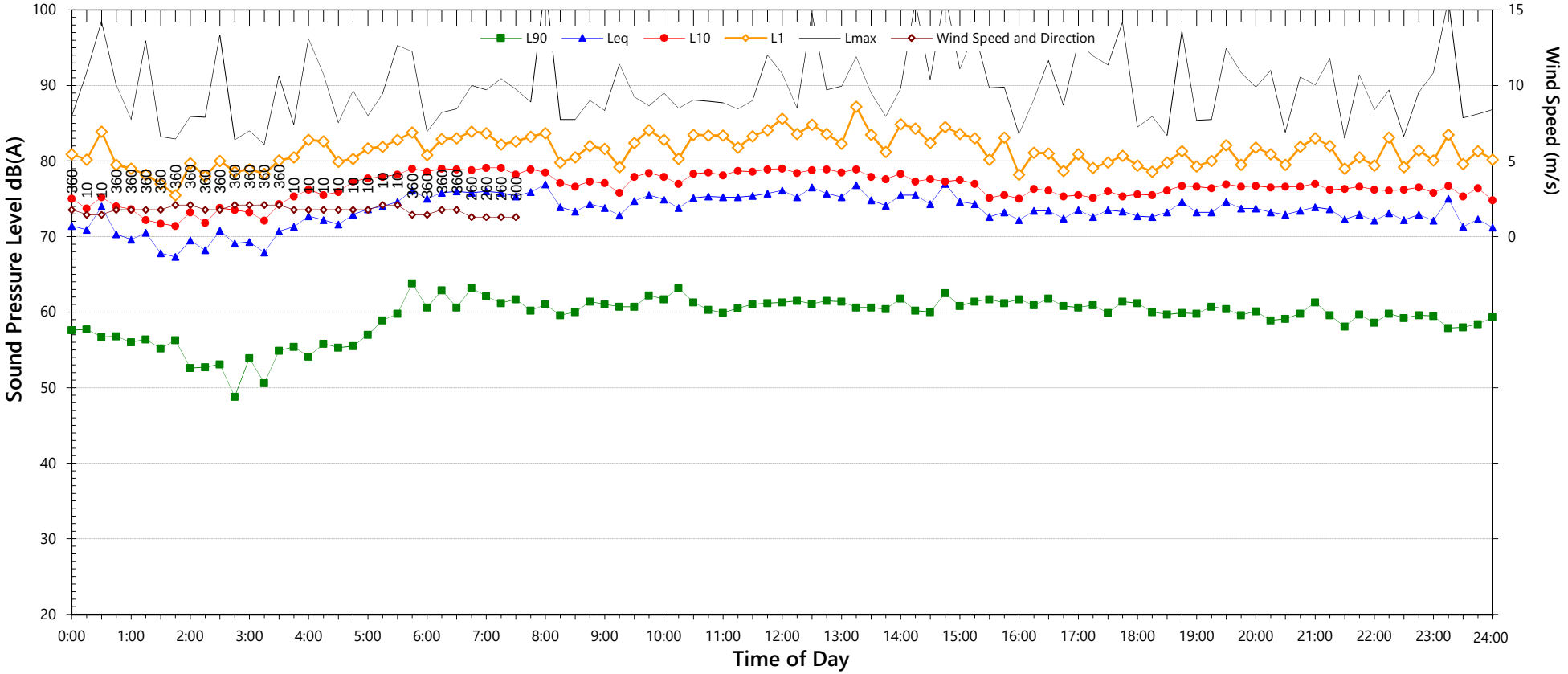
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Monday, 7 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	60.0	58.6	54.8
LAeq (see note 6)	72.3	70.9	70.7

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	88.0	to	101.3
L_{Max} - L_{eq} (Range)	16.3	to	28.6

NSW Road Noise Policy (1m from facade)		
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74.4	73.2
$L_{eq\ 1hr}$ upper 10 percentile	75.9	76.3
$L_{eq\ 1hr}$ lower 10 percentile	72.9	69.8

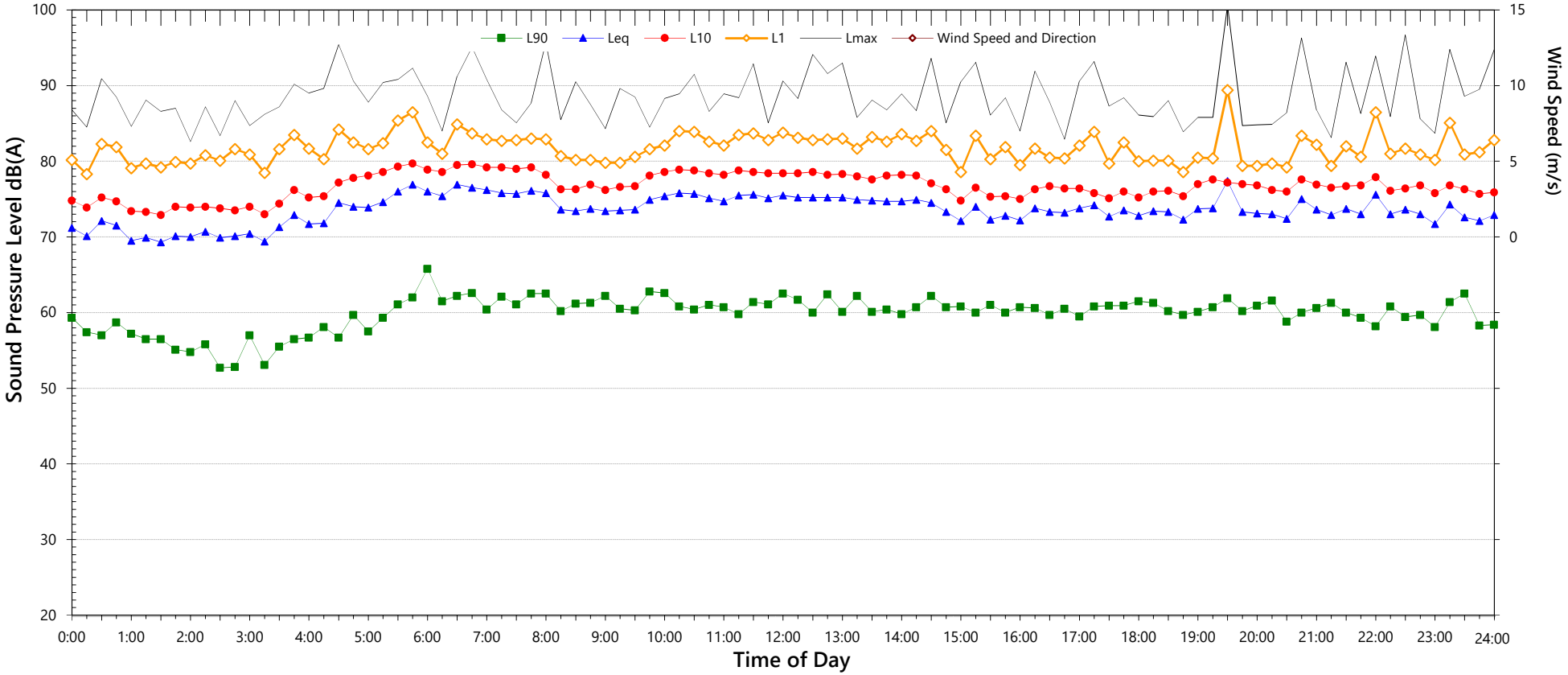
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Tuesday, 8 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	60.0	58.8	55.8
LAeq (see note 6)	72.0	71.4	70.7

Night Time Maximum Noise Levels			**(see note 7)**
L_{Max} (Range)	88.4	to	96.7
L_{Max} - L_{eq} (Range)	15.1	to	23.8

NSW Road Noise Policy (1m from facade)		
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74.3	73.2
$L_{eq\ 1hr}$ upper 10 percentile	75.6	76.0
$L_{eq\ 1hr}$ lower 10 percentile	73.0	70.2

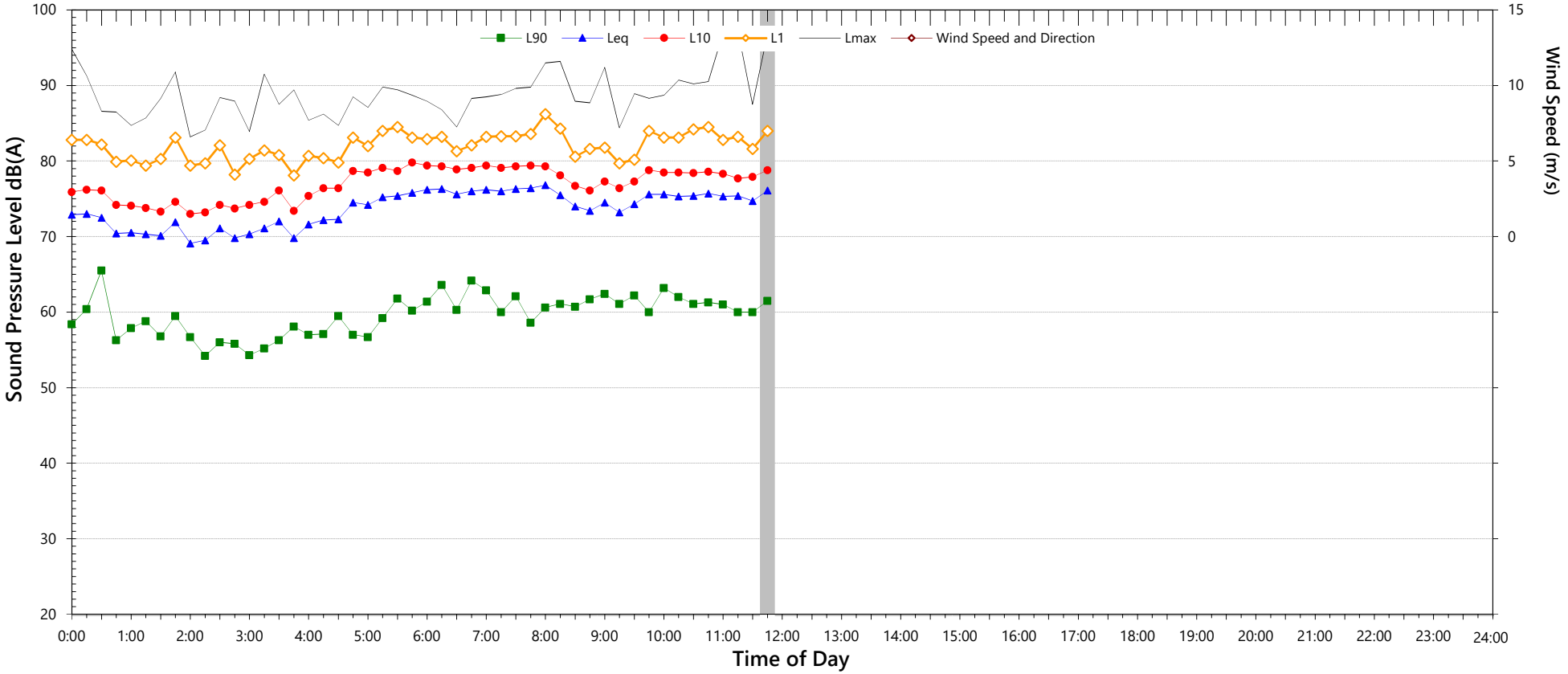
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

Shop awning at 66 King Georges Road, Wiley Park

Wednesday, 9 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{90}	-	-	-
LAeq (see note 6)	-	-	-

Night Time Maximum Noise Levels			**(see note 7)**
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	75.3	-
$L_{eq\ 1hr}$ upper 10 percentile	76.4	-
$L_{eq\ 1hr}$ lower 10 percentile	74.4	-

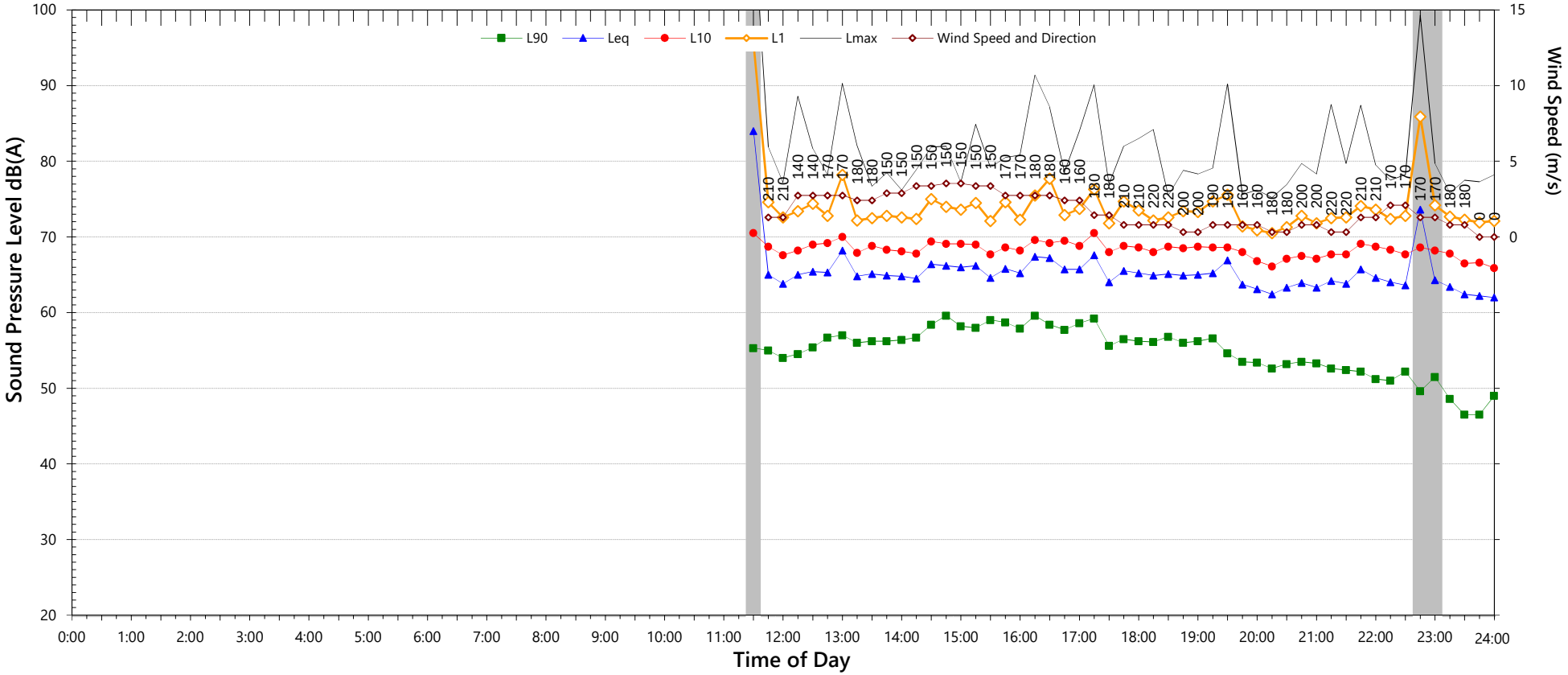
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured 1m from facade; tabulated results free-field corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Wednesday, 2 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	52.2	-
LAeq	-	64.5	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	76.3	to	83.5
L_{Max} - L_{eq} (Range)	15.7	to	19.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.8	65.4
$L_{eq\ 1hr}$ upper 10 percentile	69.0	69.1
$L_{eq\ 1hr}$ lower 10 percentile	65.9	61.6

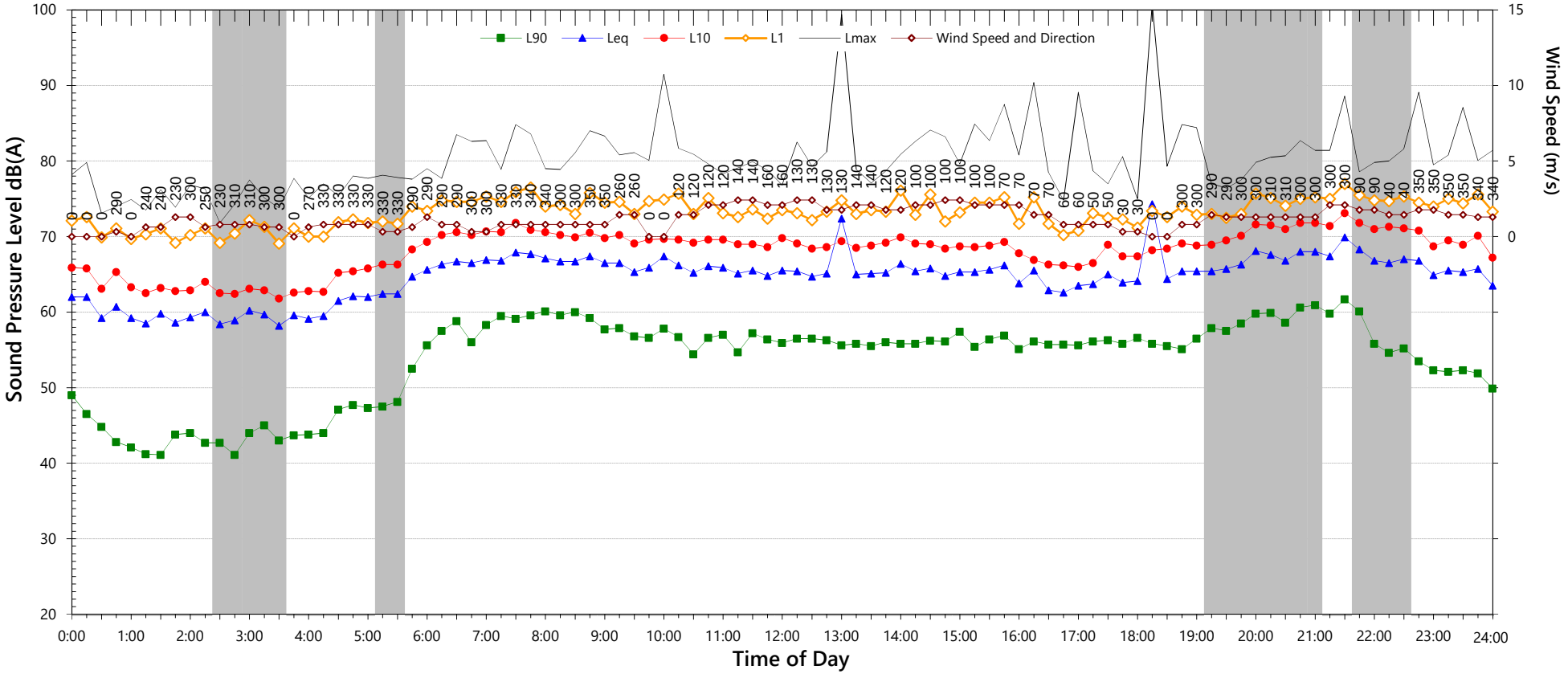
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Thursday, 3 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	55.5	-	46.8
LAeq	66.0	-	64.5

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.1	67.0
$L_{eq\ 1hr}$ upper 10 percentile	71.9	70.4
$L_{eq\ 1hr}$ lower 10 percentile	66.4	62.9

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	77.0	to	89.1
L_{Max} - L_{eq} (Range)	15.9	to	24.0

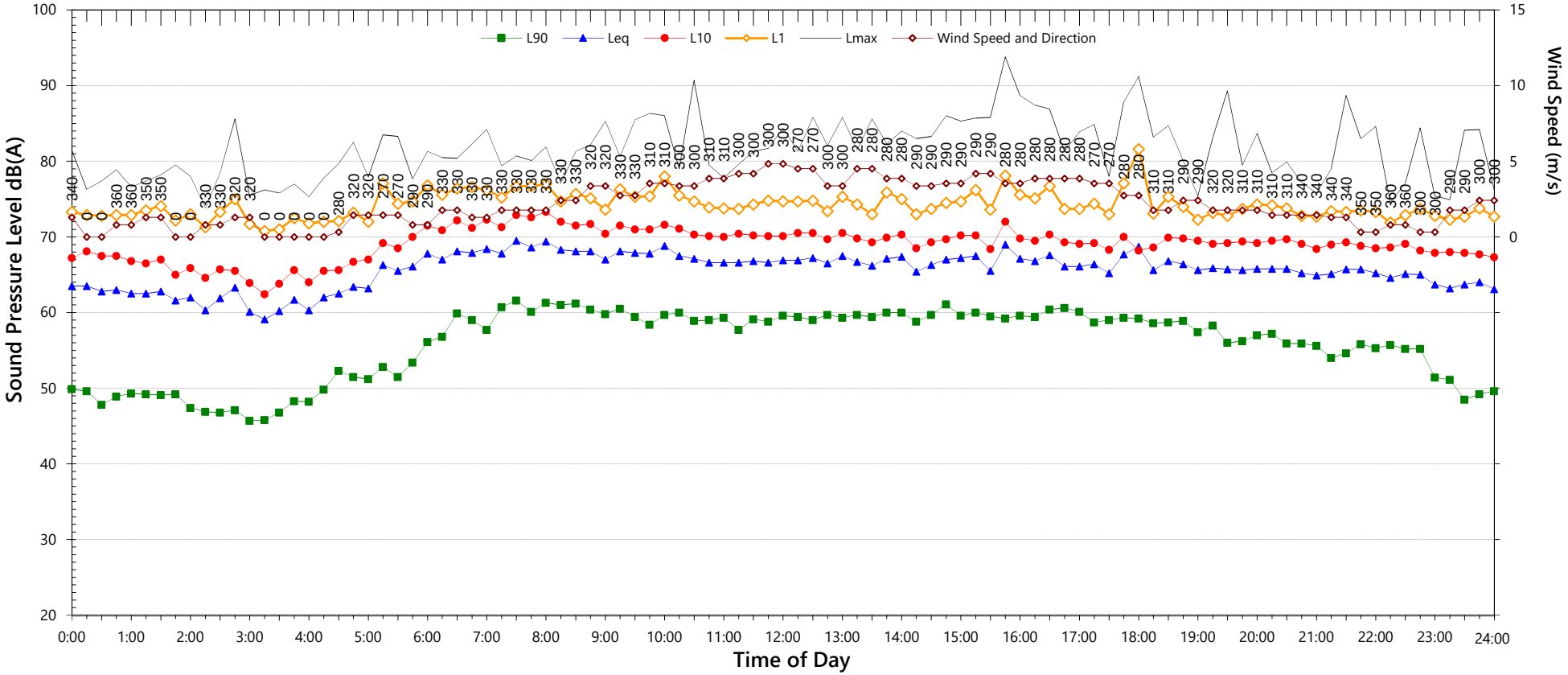
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Friday, 4 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	58.8	54.6	45.2
LAeq	67.4	65.7	62.1

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	77.8	to	84.4
L_{Max} - L_{eq} (Range)	16.1	to	20.7

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.5	64.6
$L_{eq\ 1hr}$ upper 10 percentile	71.0	67.1
$L_{eq\ 1hr}$ lower 10 percentile	67.9	61.2

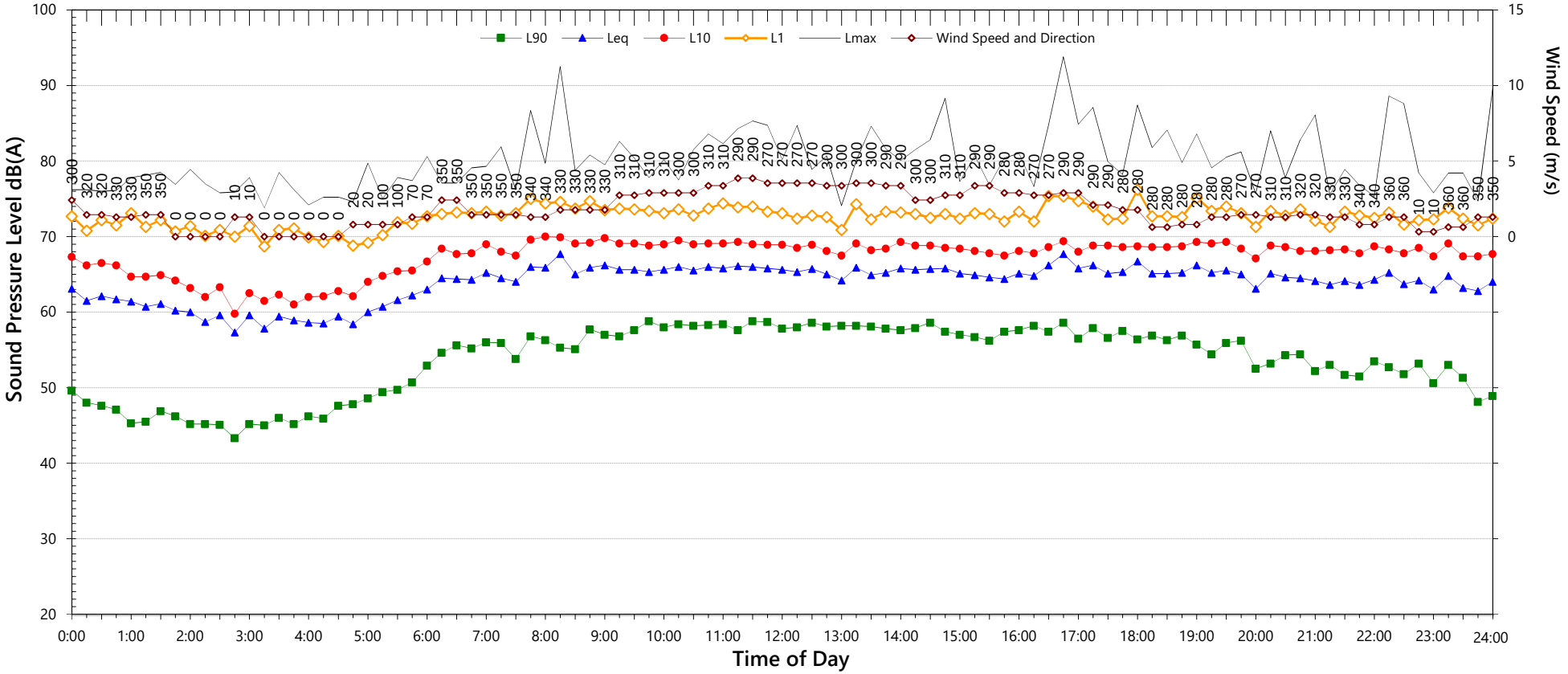
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Saturday, 5 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	56.2	51.7	42.8
LAeq	65.6	64.7	61.3

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.9	63.8
$L_{eq\ 1hr}$ upper 10 percentile	68.8	66.6
$L_{eq\ 1hr}$ lower 10 percentile	66.8	60.5

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	76.0	to	89.7
L_{Max} - L_{eq} (Range)	17.7	to	25.9

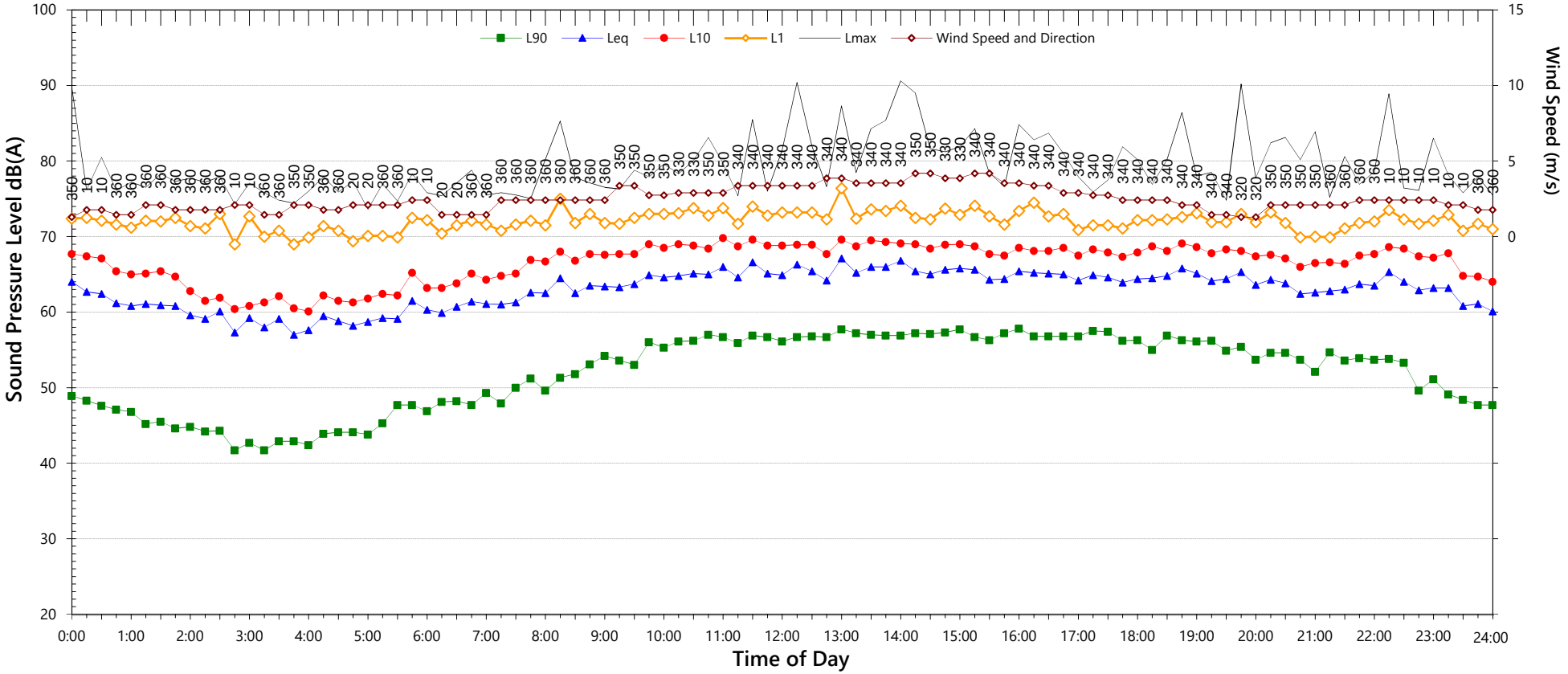
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Sunday, 6 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	53.4	53.6	45.2
LAeq	65.1	64.1	62.2

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	75.1	to	90.0
L_{Max} - L_{eq} (Range)	15.2	to	28.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.2	64.7
$L_{eq\ 1hr}$ upper 10 percentile	68.5	69.3
$L_{eq\ 1hr}$ lower 10 percentile	65.1	60.8

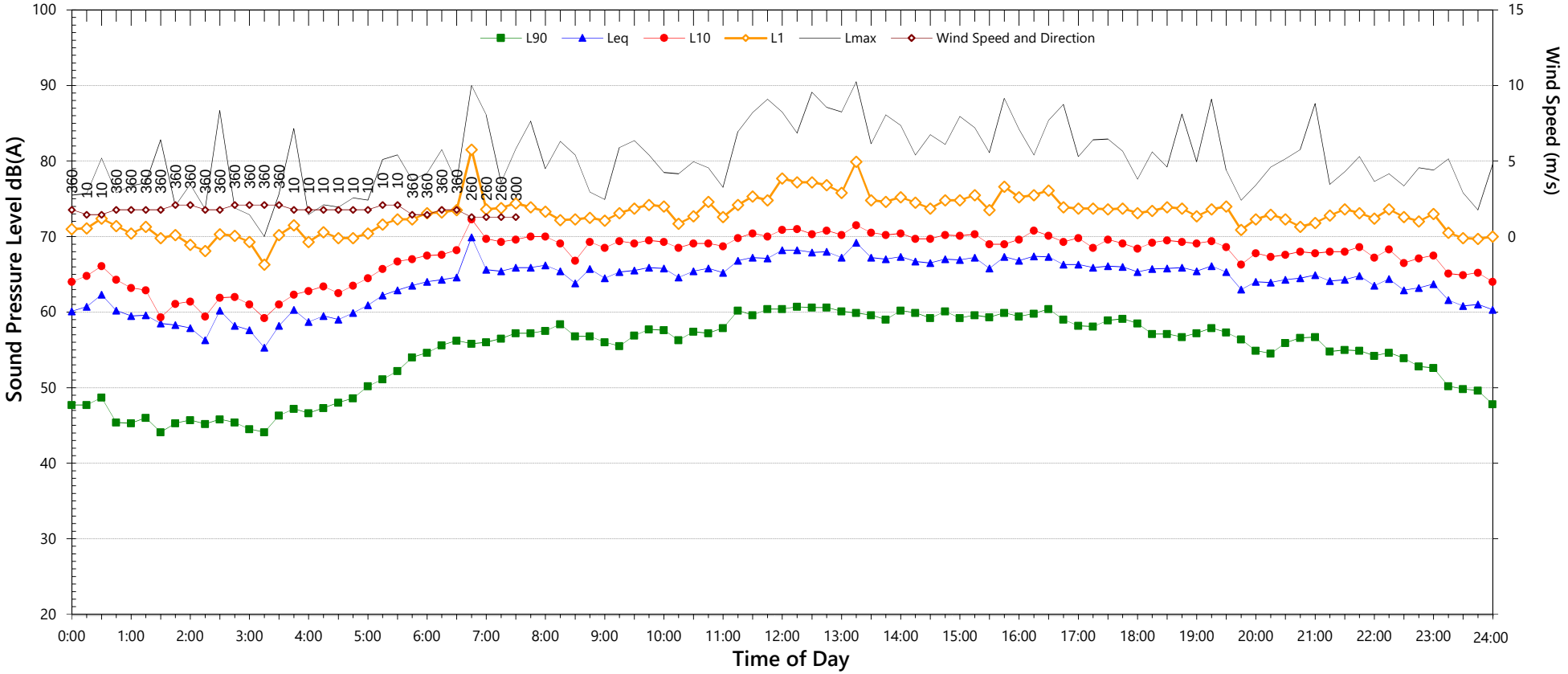
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Monday, 7 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	56.8	54.5	43.5
LAeq	66.6	64.8	62.0

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	75.1	to	92.6
L_{Max} - L_{eq} (Range)	15.5	to	26.4

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.7	64.5
$L_{eq\ 1hr}$ upper 10 percentile	70.3	68.7
$L_{eq\ 1hr}$ lower 10 percentile	66.8	59.8

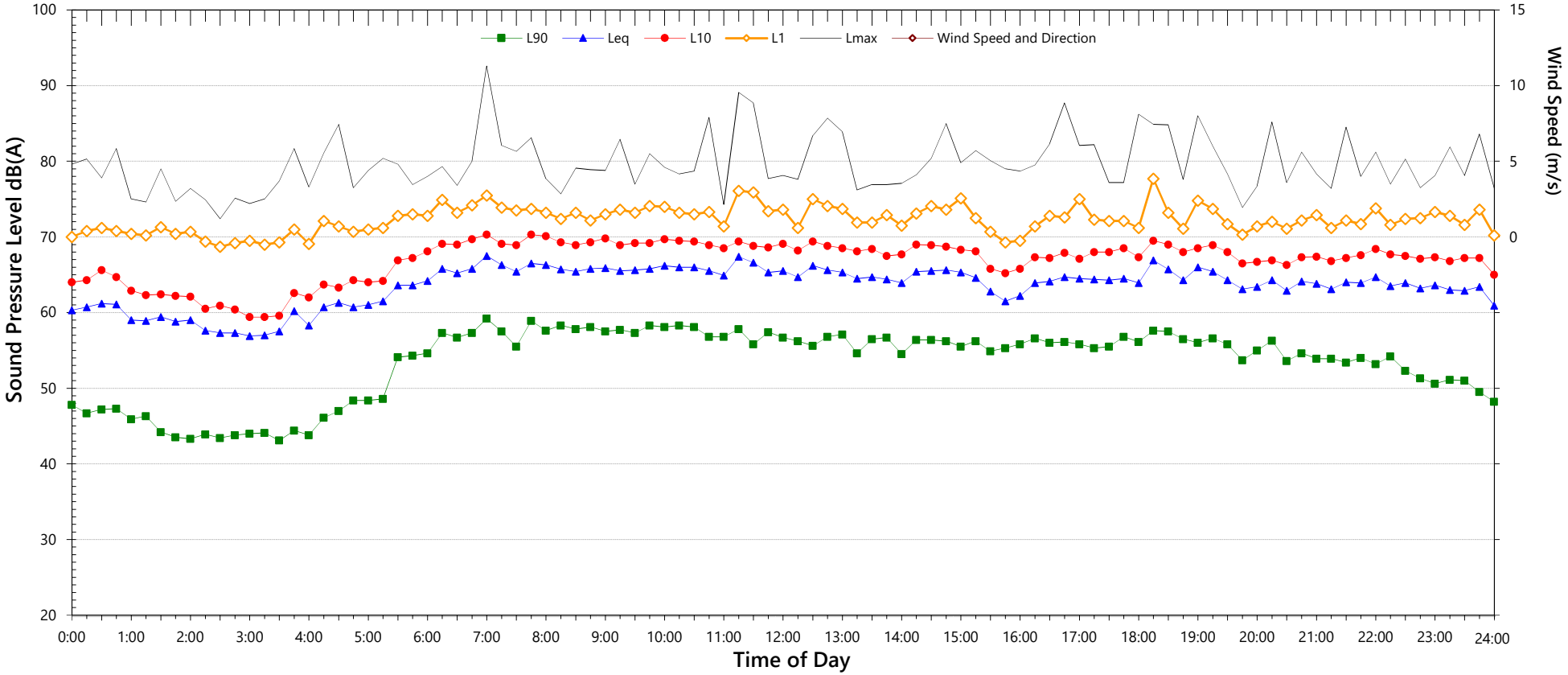
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Tuesday, 8 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	55.3	53.4	44.4
LAeq	65.2	64.5	62.4

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	74.8	to	92.6
L_{Max} - L_{eq} (Range)	15.7	to	31.6

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.5	64.9
$L_{eq\ 1hr}$ upper 10 percentile	68.7	68.0
$L_{eq\ 1hr}$ lower 10 percentile	65.9	60.5

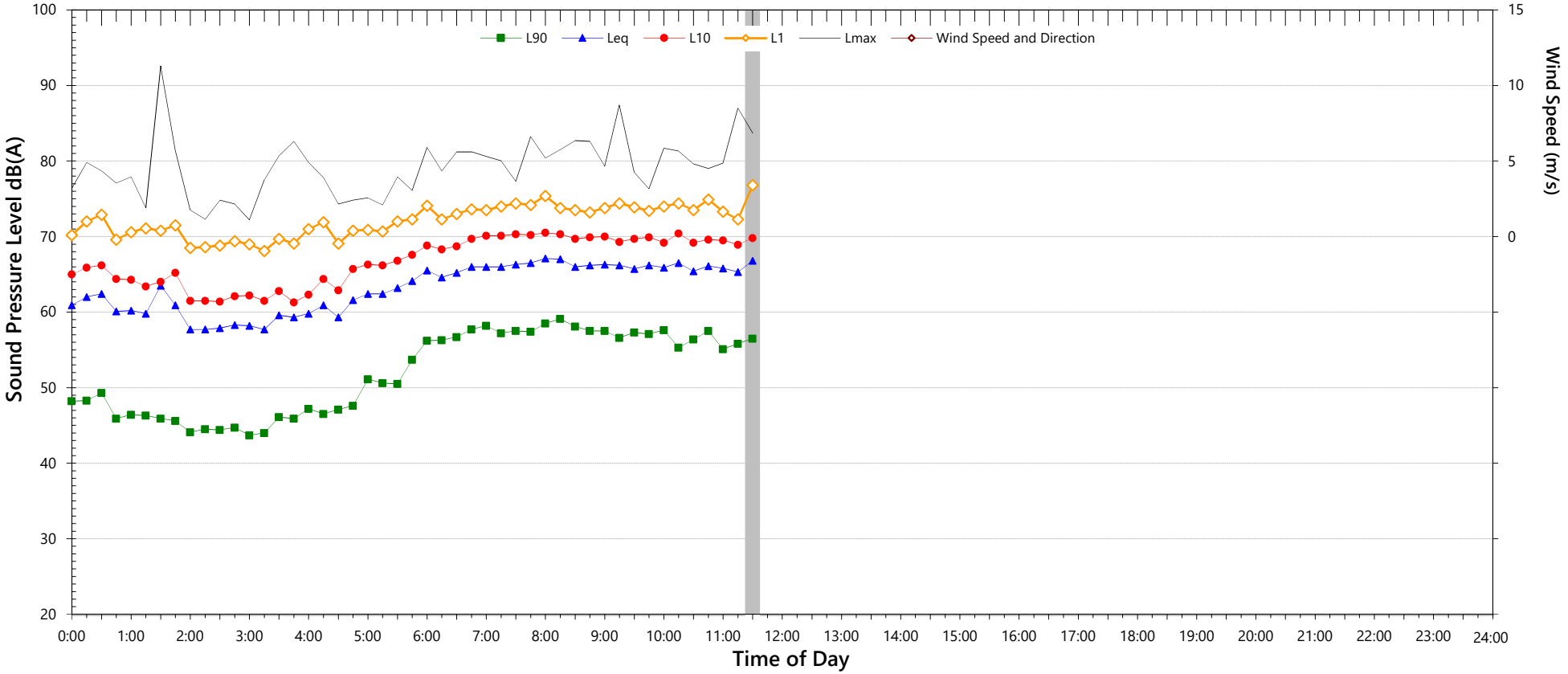
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)

Unattended Noise Monitoring Results

282 Lakemba Street, Wiley Park

Wednesday, 9 August 2017



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{90}	-	-	-
LAeq	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{Max} (Range)	-	to	-
L_{Max} - L_{eq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.7	-
$L_{eq\ 1hr}$ upper 10 percentile	69.0	-
$L_{eq\ 1hr}$ lower 10 percentile	67.8	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am til 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. Night time L_{Max} values are shown only where L_{Max} >65dB(A) and where L_{Max}- Leq ≥15dB(A)